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The Military Balance in the Koreas and Northeast Asia

AUTHORS

Anthony H. Cordesman

with the assistance of Charles Ayers

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I. Northeast Asian Military Modernization Trends

The history of the events that have shaped the Korean balance, and the security strategies of North and South Korea, since the Korean war is complex and involves a wide range of different actors. In broad terms, however, South Korea (the Republic of Korea or ROK) has been in a largely defensive position, supported by the US. The balance and the strategies of each side have been shaped by a long series of crises that have been driven largely by North Korea (the Democratic People's Republic of Korea's or DPRK's) and by its need to use foreign threats to justify its dictatorship and militarism.

The Grim Chronology of Post Korea War Events and the DPRK's Nuclear Weapons and Missile Build Up

While there have been efforts to negotiate a peace or more stable balance of forces, and avoid the "nuclearization" of the Korean Peninsula, all have so far failed. Each of these effort has left the Koreas in a constant state of crisis, with growing military forces and the ever-present threat of war. **Figure I.1** provides a quick list of the key events shaping the balance since the Korean War. Looking at the timeline, it seems clear that the DPRK has in recent years shifted from efforts to build up its conventional weapons to an emphasis on missiles and nuclear weapons in order to asymmetrically dominate the military balance and intimidate its neighbor.

Figure I.1: Timeline of Key DPRK-ROK Events¹

- **July 27, 1953:** The Korean War ended in a truce signed by a representative of the US-backed UN forces and a representative of DPRK and allied Chinese forces. The ROK was not a signatory. There is no formal peace treaty, meaning the two countries are technically still at war. The Korean War cost 2 million lives.
- **January 1968:** North Korean commandos launched a failed assassination attempt on then-president of the ROK, Park Chung-hee.
- **August 15, 1974:** Another assassination attempted on Park Chung-hee by a DPRK agent. Park survives, but his wife is killed.
- **October 9, 1983:** DPRK agents struck at the area of a visit by South Korean president Chun Doo-hwan to Burma, killing more than 20 people, including four ROK cabinet ministers. The president escaped.
- **November 29, 1987:** DPRK blew up a South Korean civilian airliner, killing 115 people. The US decided to include the North on its list of countries that support terrorism.
- **September 17, 1991:** North and South Korea became UN members.
- **December 31, 1991:** North and South Korea announced that they have initialed an agreement banning nuclear weapons from the Korean Peninsula, but did not agree on measures to ensure compliance.
- **January 30, 1992:** After years of promises and false starts, the DPRK signed an agreement to permit inspections of its seven sites at Yongbyon, its heavily guarded nuclear complex 60 miles north of Pyongyang.
- **March 12, 1993:** In a defiant move against international pressure to inspect its suspected nuclear weapons development program, North Korea announced it was withdrawing from the Nuclear Nonproliferation Treaty, which it ratified in 1985, but then reconsidered the withdrawal. The North also began stockpiling plutonium.

- **May 29, 1993:** North Korea conducted what appeared to be the first successful test of the country's homegrown midrange missile, raising Japanese fears that missiles could reach some of Japan's most populous cities.
- **December 1993:** The Central Intelligence Agency (CIA) told President Bill Clinton that the DPRK may have one or two nuclear bombs, though the intelligence was murky. When the International Atomic Energy Agency (IAEA) analyzed samples of North Korea's plutonium in 1992, it had concluded that scientists had engaged in more extensive reprocessing had been acknowledged.
- **February 1994:** The DPRK averted a possible trade embargo by allowing one full inspection of seven atomic sites by the IAEA. But when inspectors arrived in March, the North refused to let them take radioactive samples from critical parts of its nuclear reprocessing center at Yongbyon.
- **May 1994:** IAEA inspectors returned to North Korea to finish their inspection, concluding that the country was within days of obliterating evidence of how much, if any, nuclear fuel had been diverted to its weapons program. The Pentagon said the spent fuel could provide enough material for four or five nuclear bombs.
- **May 31, 1994:** The DPRK tested a cruise missile designed to sink ships; American officials said the cruise missile was part of North Korea's broad effort to upgrade its conventional forces.
- **June 1994:** The DPRK announced its withdrawal from the IAEA and said the agency's inspectors would no longer be allowed in the country. It also threatened to turn its stockpile of nuclear fuel into bombs. The Clinton administration reinforced the American military presence in South Korea, while former President Jimmy Carter, acting on his own, traveled to the North, meeting with Kim Il-sung and striking a deal that averted confrontation.
- **July 9, 1994:** Kim Il-sung died suddenly. His son, Kim Jong-il became the DPRK's leader.
- **October 21, 1994:** Negotiations following the Carter visit resulted in a deal: the DPRK agreed to freeze and then dismantle the complex in Yongbyon and open up two secret military sites to inspection by international experts. In exchange, an international consortium would replace the North's current graphite nuclear reactors with new light-water reactors, which produce little weapons-grade plutonium. The US and its allies also agreed to provide fuel oil to the North.
- **September 1996:** A DPRK submarine landed commandos on the South Korean coast.
- **August 31, 1998:** The North fired a two-stage Taepodong-1 missile over Japan and into the Pacific Ocean. The firing suggested that North Korea had greatly increased the range of its missiles.
- **June 2000:** DPRK leader Kim Jong-il and ROK President Kim Dae-jung met in Pyongyang.
- **January 2002:** Then US President George W. Bush made his "axis of evil" speech, including North Korea and linking it to Iran and Iraq.
- **October 2002:** Confronted by Bush administration officials with evidence that it had cheated on the 1994 agreement, North Korea admitted that it has been conducting a major clandestine nuclear program using enriched uranium. It declared it had "nullified" its agreement to freeze all nuclear weapons development activity.
- **February 2003:** As the US prepared to invade Iraq, the North decided to begin harvesting plutonium from its five-megawatt reactor at the Yongbyon complex.
- **August 9 2003:** The US, China, Russia, South Korea and Japan hold the first of several rounds of Six Party Talks with the DPRK in Beijing.
- **May 11, 2005:** The DPRK said it had removed 8,000 spent fuel rods from a reactor at its main nuclear complex at Yongbyon as one of several "necessary measures" to bolster its nuclear arsenal.
- **February 2005:** The DPRK claimed to have built nuclear weapons.
- **September 19, 2005:** The DPRK agreed to end its nuclear weapons program in return for security, economic, and energy benefits.
- **July 5, 2006:** The DPRK test-fired seven medium- and long-range missiles.

- **October 8, 2006:** The DPRK said it had set off its first nuclear test, becoming the eighth country in history to proclaim that it has joined the club of nuclear weapons states. The test was something of a fizzle – a subkiloton explosion – but it was enough to win unanimous passage of a resolution that imposed new economic sanctions.
- **October 31, 2006:** The DPRK agreed to resume the Six Party nuclear disarmament talks.
- **February 13, 2007:** The US and four other nations reached a tentative agreement to provide North Korea with roughly \$400 million in fuel oil and aid in return for the DPRK's starting to disable its nuclear facilities and allowing nuclear inspectors back into the country.
- **November 2007:** The prime ministers of the two Koreas met for the first time in 15 years.
- **March–May 2008:** North Korea test-fired short-range missiles.
- **June 27, 2008:** The DPRK demolished the cooling tower at its Yongbyon nuclear reactor site.
- **July 2008:** A DPRK soldier shot and killed a South Korean tourist at the Mount Kumgang resort.
- **September 2008:** Complaining that the Bush administration had not yet fulfilled a promise to remove North Korea from a list of state sponsors of terrorism, the DPRK moved to resume plutonium reprocessing.
- **October 11, 2008:** The US removed the DPRK from its list of states sponsoring terrorism after North Korea agreed to resume disabling its nuclear plant and to allow inspectors access to its declared nuclear sites.
- **December 2008:** Six Party Talks failed to reach an agreement on inspecting the DPRK's nuclear sites. The North subsequently said there would be no more talks and vowed to increase its nuclear efforts – including uranium enrichment.
- **April 5, 2009:** The DPRK launched a long-range rocket capable of carrying a nuclear warhead. Criticism from the UN Security Council prompted Kim Jong-il to walk out of talks aimed at ending the North's nuclear program.
- **May 25, 2009:** The DPRK announced it had successfully conducted a second nuclear test, sparking an emergency UN Security Council meeting. It also withdrew from the 1953 Korean War armistice.
- **May 26, 2009:** The DPRK fired three missiles into the sea near Japan and said it “fully ready for battle” against the US.
- **June 12, 2009:** The UN Security Council voted unanimously on an enhanced package of sanctions that, among other things, called upon UN members to inspect cargo vessels and airplanes suspected of carrying military material in or out of the DPRK.
- **November 2009:** Shots were exchanged near the Yellow Sea border for the first time in seven years.
- **January 2010:** North Korea fired artillery near its disputed maritime border with the South. The ROK returned fire, but no one was injured.
- **March 27, 2010:** ROK corvette *Cheonan* sank after an unexplained explosion; 46 sailors died. A later investigation found that the boat was sunk by a torpedo launched from a North Korean submarine.
- **September 2010:** Kim Jong-un, Kim Jong-il's youngest son, gained high-powered military and political posts, resulting in increased speculation that he would be his father's successor.
- **October 2010:** North and South Korea exchanged shots across the border.
- **November 2010:** The DPRK gave a US scientist a tour of a uranium plant, creating alarm at the sophistication of its nuclear technology.
- **November 23, 2010:** The DPRK fired artillery rounds onto an inhabited South Korean border island. The ROK scrambled its fighter jets and returned fire; two ROK marines and two civilians were killed.
- **December 19, 2011:** Kim Jong-il died of a heart attack, and Kim Jong-un was declared “supreme leader” two weeks later.

- **February 29, 2012:** In the so-called Leap Day Agreement, the DPRK agreed to suspend nuclear weapons testing and uranium enrichment and to allow international inspectors to monitor and verify activities at its main reactor as part of a deal that included a US pledge to provide food aid.
- **April 12, 2012:** The DPRK launched a rocket that the US and its allies called a provocative pretext for developing an intercontinental ballistic missile that might carry a nuclear warhead in the future. The failed launch drew swift international condemnation, including the suspension of food aid by the US.
- **December 12, 2012:** North Korea successfully launched a long-range rocket into orbit.
- **January 2013:** In response to the UN Security Council's unanimous decision to tighten sanctions, the DPRK bluntly threatened the US, saying that it had no interest in talks on denuclearization and that it would forge ahead with its missile and weapons development with the goal of developing the capability to hit US territory.
- **February 12, 2013:** The DPRK confirmed that it had conducted a third nuclear test.
- **March 7, 2013:** The UN Security Council ordered new economic sanctions against the DPRK for its third nuclear test, unanimously approving a resolution that the US negotiated with China.
- **March 11, 2013:** North Korea declared that it would no longer abide by the 1953 armistice amid joint US-ROK military drills.
- **March 15, 2013:** The US said it would deploy additional ballistic-missile interceptors along the Pacific Coast by 2017. The new deployment would increase the number of ground-based interceptors to 44 from the 30 already in California and Alaska.
- **March 27, 2013:** The DPRK cut off the last remaining military hot lines with the South, accusing President Park Geun-hye of pursuing her predecessor's hardline policy.
- **March 28, 2013:** The US military carried out a rare long-range mission over the Korean Peninsula, sending two nuclear-capable B-2 stealth bombers on a practice sortie over the ROK, underscoring Washington's commitment to defend its ally amid rising tensions with the North. In response, the DPRK ordered missile units to be ready to strike the ROK and US.
- **April 2, 2013:** The DPRK threatened to restart its plutonium reactor.
- **April 3, 2013:** The United States announced that it was deploying an advanced missile defense system to Guam two years ahead of schedule, in what the Pentagon said was a "precautionary move" to protect American naval and air forces from the threat of a North Korean missile attack.
- **April 4, 2013:** The ROK's defense chief said that the DPRK had moved a missile with "considerable" range to its east coast, but that it was not capable of reaching the US, while the North's military warned that it was ready to strike US military forces with "cutting-edge smaller, lighter and diversified nuclear strike means."
- **April 5, 2013:** The DPRK's government advised Russia, Britain, and other countries to consider evacuating their embassies in Pyongyang. Analysts in Russia and the ROK suggested that the announcement was part of rhetorical escalation of threats.
- **April 8, 2013:** North Korea said it would withdraw all of its 53,000 workers and "temporarily suspend the operations" at Kaesong, an industrial park jointly run with the ROK, casting doubt on the future of the last remaining symbol of inter-Korean reconciliation.
- **April 9, 2013:** The DPRK warned foreigners that they might want to leave the ROK because the Peninsula was on the brink of a nuclear war.
- **April 11, 2013:** The Defense Intelligence Agency said with "moderate confidence" that the DPRK had learned how to make a nuclear weapon small enough to be delivered by a ballistic missile.
- **May 18-20, 2013:** North Korea launched a series of short range missiles into the Sea of Japan.
- **May 24, 2013:** China tells North Korea to return to diplomatic talks regarding its nuclear weapons.
- **August 7, 2013:** A study conducted by the Institute for Science and International Security suggested that North Korea is doubling area devoted to uranium enrichment.

- **September 16, 2013:** The Kaesong Industrial Complex was reopened after talks.
- **March 31, 2014:** A North Korean drone was found by South Korea, following an exchange of artillery fire into NLL waters.
- **October 4, 2014:** Three high-ranking North Korean officials travel to South Korea to attend the closing ceremony of the Asian Games.
- **October 7, 2014:** North and South Korean patrol boats exchange fire near the NLL.
- **October 9, 2014:** Kim Jong-Un has not been seen in public for over a month, missing some important holidays and rituals. This fuels speculation regarding Kim's grip on power, while others believe the absence is due to health reasons.²
- **October 24, 2014:** U.S. Commander [General Curtis Scaparrotti, Commander of USFK] said that he believed North Korea had most likely completed its year's long quest to shrink a nuclear weapon to a size that could fit atop a ballistic missile.
- **November 19, 2014:** The research organization, the Johns Hopkins University's U.S.-Korea Institute at SAIS, reports on its website 38 North that recent commercial satellite imagery of the Yongbyon nuclear facility showed evidence that the country might be preparing to reprocess spent nuclear fuel to extract weapons-grade plutonium.
- **November 24, 2014:** Sony Entertainment announces that it has been hacked by a group called "Guardians of Peace", now widely believed to be state sponsored actors operating in North Korea.
- **January 2, 2015:** The US expands its sanctions on various DPRK institutions and individuals.
- **February 8, 2015:** North Korea test fires five short-range ballistic missiles into the sea, over a distance of 125 miles.
- **April 7, 2015:** The commander of UN North Command, Admiral William Gortney, claims that the KN-08 (the DPRK's ICBM) is operational.
- **May-December 2015:** North Korea conducts three separate ballistic missile using submarines; only the final one is reported as a success.
- **December 8, 2015:** The Treasury and State Department collaborate in an expansion of sanction targeting specifically focused on the DPRK's Strategic Rocket Force, several banks, and three shipping companies.
- **January 6, 2016:** North Korea conducts its 4 nuclear test, and subsequently claims that it had successfully detonated a hydrogen bomb. Experts who have analyzed the seismic data have disputed this claim fairly consistently.
- **February 7, 2016:** The DPRK launches what it claims is an observational satellite on a long-range ballistic missile, with the apparent intent of boosting its missile program.
- **March 2, 2016:** The UN Security Council (UNSC) unanimously passes Resolution 2270. 2270 condemned the DPRK's nuclear and missile test, demanded that it immediately halt all activity related to its nuclear or ballistic missile test, and imposed a new set of sanctions.
- **June 1, 2016:** The US imposes unilateral financial sanctions on the DPRK over Chinese objections.
- **June 22, 2016:** After several failed attempts, North Korea appears to successfully test the Musudan rocket capable of striking US forces in Guam.
- **July 8, 2016:** The ROK and US reach an agreement to deploy the THAAD anti-missile system in South Korea over the objections of the PRC, DPRK, and Russia.

Three different DPRK leaders from the same family – Kim Il-sung, Kim Jong-il, and Kim Jong-un – have driven these events. They have used outside threats to maintain power, as well as the steady militarization of the DPRK; the DPRK's efforts to become a nuclear power; and the responses of the ROK, US, and DPRK. They have also used foreign threats as an excuse to develop one of the most repressive nations in the world, and as an excuse to use the nation's

resources to build up its military forces at the expense of the civil sector. They have maintained power for well over half a century, but at the cost of economic development and the risk of war.

At the same time, the balance in the Koreas and Northeast Asia has been driven by the strategies and force postures of the United State and China, and particularly in recent decades by the DPRK's development and deployment of nuclear weapons and long-range missiles. These efforts not only give the DPRK leverage over the ROK, they give it the ability to threaten Japan and eventually the U.S. if the DPRK ever deploy a successful ICBM.

The Impact on U.S. Strategy

Current US policy calls for a rebalancing of US strategy in Asia that has five strategic pillars: strengthening alliances, forging deeper partnerships with emerging powers, building a constructive relationship with China, strengthening regional institutions, and building an economic architecture to increase the benefits of trade and growth for countries in the Asia-Pacific region and the US – such as through the US-ROK FTA and the Trans-Pacific Partnership (TPP). Furthermore, 2011-2013 was a period of significant transition in Asia, especially in Northeast Asia – a new DPRK leader at the end of 2011, a Japanese leadership change at the end of 2012, and leadership transitions in both the ROK and China in early 2013.

The US alliances with Japan and the ROK remain the foundations of this US regional security and economic strategy. Polls in both countries show approximately 80% support for their alliances with the US. Greater trilateral cooperation is envisioned as key to maintain security. Militarily, the rebalance involves.³

... in the coming years a higher proportion of our military assets will be in the Pacific. Sixty percent of our naval fleet will be based in the Pacific by 2020. Our Air Force is also shifting its weight to the Pacific over the next five years. We are adding capacity from both the Army and the Marines. The Pentagon is working to prioritize the Pacific Command for our most modern capabilities – including submarines, Fifth-Generation fighters such as F-22s and F-35s, and reconnaissance platforms. And we are working with allies to make rapid progress in expanding radar and missile defense systems to protect against the most immediate threat facing our allies and the entire region: the dangerous, destabilizing behavior of North Korea.

At the same time, the U.S. cannot ignore the slow build-up of the DPRK nuclear threat and the expanding range of its missiles. The U.S. may publically emphasize its efforts to persuade the DPRK to give up nuclear weapons over its own extended deterrence, but the need to materially deter and counter the DPRK's nuclear forces has to be a sixth pillar of U.S. strategy. The ROK has so far not pursued its own nuclear weapons, but the U.S., the ROK, and Japan can scarcely ignore North Korea's actions and nuclear threats. Similarly, the U.S. has built up its own missile defenses to counter the DPRK's expanding missile capabilities, and work with the ROK and Japan to help develop their missile defenses.

The relationship between the US and China is another a key element in US strategy in Northeast Asia and in dealing with the Koreas. US policy calls for both cooperation and competition with China to continue, and “to improve the quality and quantity of our cooperation, promote healthy economic competition, and manage disagreements to ensure that U.S. interests are protected, and that universal rights and values are respected.... the United States welcomes the rise of a peaceful, prosperous China.” In order to achieve these goals, the US feels that communication channels must be improved and practical cooperation on important issues demonstrated.⁴

At the same time, the U.S. has sought to persuade China that it has a critical interest in limiting the growth of North Korea's nuclear and missile forces and in restraining the DPRK's provocations and threats. The U.S. recognizes China's ties to the DPRK, and China's interest in keeping the DPRK as a strategic buffer that keeps the ROK, U.S. and Japan at a distance. At the same time, it also recognizes the reality that the ROK is a far more valuable trading partner to China than the DPRK, and that China has the same basic interest as the ROK, U.S., and Japan in avoiding a major nuclear arms race in Northeast Asia, critical levels of tension, and any risk of war.

The Impact on Chinese Strategy

China, in turn, must balance its interests in regional stability against the fact that the DPRK does help counterbalance the alliance between the ROK and U.S., and the impact of the U.S. alliance with Japan. It has sought to limit the DPRK's provocations and some aspects of its nuclear and missile programs, but there are practical restrictions to China's actions. It will tolerate the DPRK's actions as long as they stay within limits, because while the DPRK needs China, China also needs the DPRK.

China is a steadily growing regional power that has improved its military capabilities for well over a decade and is increasingly projecting power throughout the East Asian region. These trends began along with China's emergence as a major economic power, and have increasingly led to tension with the US – as well as a number of China's neighbors.

China does not formally allocate military forces for the defense of the DPRK and does not forward deploy military forces in that country. It also has recently stepped up its efforts to persuade the DPRK to restrain its aggressiveness and nuclear and missiles efforts. China did, however, save the DPRK from total defeat in the Korean War, and it sees the DPRK as a critical buffer that ensures ROK and US forces remain away from its borders, as well as a counterbalance to Japan.

China and the DPRK maintain the "Sino-North Korean Mutual Aid and Cooperation Friendship Treaty" that it signed in 1961. Chinese commentators have sometimes described the two countries as "blood brothers" or "closer than lips and teeth," but the PRC-DPRK relationship has been rocky over the past 60 years, and China has sought to moderate the DPRK's behavior and move it towards economic reform based on the Chinese model.

No one can dismiss the possibility that Chinese forces might intervene if the DPRK again is threatened with defeat, or if any form of regime collapse threatened to create a US presence in the DPRK or deploy ROK forces near the Chinese border. According to the 1961 treaty, China does not have to come to North Korea's aid if it is the attacker, which China clarified.

More broadly, US and Chinese strategy regarding the Koreas cannot be separated from their broader strategic interests in Northeast Asia, in Asia as a whole and the Pacific. Whether the US chooses to formally state it or not, its "rebalancing" of its force posture and military modernization efforts in Asia is driven in large part by China's military modernization and growing power projection capabilities.

China, in turn, is doing far more than creating a "blue water" navy and modernizing key elements of its forces. Its strategy involves the creation of new joint warfare, power projection, and sea-air-missile-nuclear capabilities that affect any confrontation or conflict in the Koreas and northeast

Asia at least as much as any struggle that affects Taiwan of US base and forces deeper in the Pacific up to the “second island chain.”

The end result is that the current security situation on the Korean Peninsula is shaped by the military balance between the two Koreas, the role of US forces, and the positions of three other regional powers: China (the People’s Republic of China, or PRC), Japan, and Russia. These countries not only influence how the Koreas behave, but can also become entangled in any potential DPRK-ROK crisis or conflict.

DPRK

Unlike the other countries in this report, the DPRK does not publish an English or Korean-language defense white paper, security strategy, or any other report discussing the country’s armed forces in depth. There are, however, a number of DPRK sources that can help put its actions into context, and North Korea does issue propaganda statements that help illustrate its views.

The DPRK’s actions and history also speak for it. The Kim regime has imposed decades of military build-up, and endless propaganda campaigns about foreign threats and invasions to justify its dictatorship and devoting the bulk of its resources to military forces ever since the armistice on the Korean War on July 27, 1953. It has steadily expanded state control over every aspect of life, created what is now the most militarized state in the world, and used foreign threats to manipulate its people and justify shaping its military forces at their expense, while it has simultaneously used its military build-up and covert or limited attacks to extort foreign outside aid and enhance its status and negotiating leverage.

A Militarized and Impoverished Nation

There is broad agreement from most expert sources outside the DPRK that the country has emerged as one of the most militarized nations in the world, but that the combined burden of state control and excessive military spending has ensured that its economy has been unable to adequately support this militarization.

The DPRK has worked steadily to expand its military capacity. While it has always said that its ultimate goal is building a prosperous and strong nation, it has given priority to its military forces and to state control over every aspect of the economy. It has also pursued a wide range of military efforts in every section of its forces, ranging from its efforts to modernize its arms and pursue strategic WMD to build its own hovercraft for naval operations, improving its submarines, and developing new mines and torpedoes.

The DPRK has also continued developments in its ground and air forces.⁵

Performance-wise, various weapons found in North Korea’s ground forces, including T-62 tanks, M-1973 armored vehicles, various self-propelled guns, multiple rocket launchers, AT-3/4 anti-tank missiles and modified SCUD missiles, are modernized weaponry. North Korea is currently making concentrated efforts to modernize its military equipment by building Pokpung-ho (“Storm Tiger”) tanks, which are reproduced designs of Soviet-made T-72s, along with introducing, manufacturing and deploying 23mm antiaircraft guns.

Since 2010, the DPRK has started using a large portion of its military for economic development and public order; troops have been deployed to participate in a variety of economic construction projects such as highways and power plants, as well as to work on farming and inspections. However, the DPRK has still found it difficult to cope with the burden of further militarizing its economy. This has had several effects that have contributed to the further impoverishing the DPRK.⁶

First, the populace has had to bear more taxes to meet military expenditures. Second, increasing economic dependence on the military causes distortions in the allocation of human and material resources, in addition to cutbacks in resource supplies needed for civilian purposes. Third, a majority of finished goods and raw material have to be channeled to support non-productive military armament. Fourth, it hampers rational investment and constructions of new civilian facilities. Fifth, instilling conformity to military discipline and ethos in all aspects of the economy impedes the development of liberal and cooperative social relations and order.

DPRK Statements on Military Policy¹

The DPRK's constitution does provide some formal indications of its strategy. It states that "on the basis of politically and ideologically arming the military and populace, the state shall realize a self-defensive military force built on the following objectives: (1) a cadre-based army, (2) modernization, (3) militarization of the populace, and (4) a stronghold-based fortified nation."⁷

Figure I.2 summarizes these guidelines and the policy objectives that follow.

Senior North Korean officials do occasionally speak about military policy and strategy in broad terms and their statements have reinforced these points. At the fifth Plenum of the fourth Korean Workers' Party's Central Committee in 1962, the DPRK adopted the military concept of 'Four Military Guidelines': extensive training for all soldiers, fortifying the whole country, modernizing the armed forces, and arming the entire population.⁸ The DPRK has built its military capabilities and developed its military policy in accordance with these guidelines ever since.

North Korea promotes two main policies or ideologies in its government propaganda. The primary state ideology is *juche* ("self-reliance") – meaning that the focus of DPRK efforts is always on making North Korea a strong and independent nation that is not reliant on any other nation for anything, including security. *Juche* further promotes the idea of the collective identity as an organic whole, with the supreme leader at the top of this unified system. The DPRK leaders' personality cults reinforce popular support for the system.⁹

Secondly, the DPRK follows a *songun* policy ("military first"), presented as deriving from and reinterpreting *juche*, in order to construct a strong socialist state politically, economically, ideologically, and militarily. According to one DPRK Party newspaper, *songun* is "a unique mode of politics that dedicates maximum effort to reinforcing the KPA [Korean People's Army], in which military power becomes the basis that propels general tasks in the vanguard of the socialist revolution and construction of a socialist nation."¹⁰

After the collapse of the USSR and the loss of a significant source of patronage, the DPRK increased emphasis on the *songun* policy to overcome the crises it faced:¹¹

In 1997, even amid severe economic difficulties, North Korea reinforced maneuvers for its mechanized corps in rear areas as well as infiltration exercises for its special operation forces, while substantially stepping up joint tactical exercises between its air force and navy. It also monitored wartime readiness and

training of its troops in all areas. In March 1998, for instance, the regime publically issued a nation-wide wartime mobilization order for the purpose of an integrated exercise, involving the public, regime, and military, that was meant to rehearse a shift to a war footing. Intensive energy-saving map exercises were conducted afterwards for landing and takeoff drills for AN-2s, hydroplanes equipped with boats. In 1999, the regime deployed a large number of field guns with large caliber and multiple rocket launchers in underground facilities near the Demilitarized Zone (DMZ). The regime also created an electronic warfare unit and started to train military hackers.

Following the general officers' talks held between the two Koreas in June 2004, North Korea suspended propaganda broadcasts against South Korea along the DMZ. At the same time, however, it substantially stepped up the political and ideological education of its troops. The Korean People's Army reduced the number of large-scale military exercises, but increased drills for special operation forces and communication units, while placing unusual emphasis on the importance of exercises. Following the Iraq war, North Korea started to train a large number of military hackers in preparation for cyber war, expanded light infantry units, and reinforced capabilities for special warfare such as night fighting, mountain combat, and street battles. The North Korean forces are also known to have improved their electronic jamming skills as a means of dealing with electronic warfare as well as defense against precision guided missiles.

The South Korean government describes this this emphasis as follows: "The North continues to pursue its military-first policy and address the KPA as revolutionary armed forces. This indicates that the regime, which maintains its power base in the military, has not abandoned its desire to take over by force and unify the Korean peninsula under communism."¹²

Figure I.2: The DPRK's Four-point Military Guideline

Military Guidelines	Policy Objectives
Transformation of the entire force into a cadre army	Train all soldiers ideologically, politically, and technically, and enable them to handle upgraded tasks in case of emergency
Modernization of the entire force	Equip troops with modern arms and combat skills, help them learn modern military science and skills, and train them to handle advanced weapons competently
Armament of the entire population	Arm the entire working class, including workers and peasants, ideologically and politically along with the People's Army
Fortification of the entire country	Construct extensive defense facilities across the country to turn it into an impregnable fortress

Source: Ministry for Unification and Institute for Unification Education, *Understanding North Korea*, ROK Government, 2012, 107.

The Impact of Kim Jong-un

Changes in the DPRK's leadership since 2010 have also had an impact on the DPRK's actions and strategy. The new leader, Kim Jong-un, was elected Vice Chairman of the Central Military Commission (CMC, a powerful institution of the Korean Workers Party) in 2010. He was elected Supreme Commander of the Korean People's Army (KPA) following the death of his father, Kim Jong-il on December 17, 2011. He then became CMC Chairman and First Chairman of the National Defense Commission (NDC) in April 2012. These three steps established his control over the party, military, and state, and consolidated his authority.¹³

Kim Jong-un was the third son of Kim Jong-il, and only approximately 27 years old at the time of his succession. He had previously been relatively unknown outside of the DPRK, and the media reaction focused more on rumors than any known quantity; for example, the fact that he bore a significant resemblance Kim Il-sung led ROK media outlets to speculate for months that Kim

Jong-un had undergone plastic surgery to look more like his grandfather. One Chinese TV report cited a diplomatic source that had confirmed the plastic surgery rumors. This led to DPRK state media heatedly objecting to the “sordid hackwork of rubbish media,” while Chinese government censors ordered Chinese media to “not report, comment on, or redistribute stories about the personal lives of North Korean leaders (such as face-lifts).”¹⁴

The fact Kim Jong-un had been educated in the West for several years, led some observers to believe that he would open up the economy and begin to reintroduce Korea to the world when he first took power. However, DPRK state media repeatedly stated that there would be no change in policy between Kim Jong-un and his father; for example, shortly after Kim Jong-il’s death, the media stated that “foolish politicians around the world, including in South Korea, should not expect any changes from us.”¹⁵

As of mid-2016 – some four years after coming to power -- Kim had only instigated limited changes that often were more a matter of tactics and symbolism than substance. He did, however, sometime send signals he wanted more of an opening, paid more attention to economic development, and displayed a more populist image than his father, such as by giving speeches, going on more expeditions around the country, He also allowed Western influences such as clothing and Disney characters, was often seen in public with his wife, and acted informally in public appearances – even embracing citizens at times.¹⁶

In contrast to his father, Kim Jong-un also focused his on-the-spot guidance visits on Pyongyang. When he has left the capital, it is largely to visit military and security sites. There have also been indications that Kim has been working to consolidate his support among the urban elite – since taking power, a number of new projects aimed at this class have been undertaken, including a maternity hospital, health complex, skating rink, apartment complexes, and a fun fair.¹⁷

At the same time, the changes in the DPRK since Kim Jong-un’s rise to power should not be exaggerated and do not seem to have significantly changed the DPRK’s militarization or strategy. After his accession, the DPRK carried out two missile launches and one nuclear test as well as negotiated and then abrogated an agreement with the US. Kim has not departed from his father’s broader policies and has introduced an even stronger version of the *songun* military-first policy. He has followed the past DPRK policy in negotiations, of attempting to gain humanitarian and economic concessions from the other Six-Party dialogue participants in return for reversible and largely symbolic concessions.¹⁸

As one US analyst notes, there was an unusually high frequency and intensity of threats in the first year of Kim Jong-un’s rule, “raising questions about whether junior Kim fully understands the ritualistic rules of the inter-Korean ‘threat-down’; whether he might be more accepting of risks than his father, and whether he’s more likely to make miscalculations that could drive a hair-trigger situation over the edge.” The need to consolidate his power politically could lead Kim to “walk even closer to the edge than usual.”¹⁹

Kim Jong-un has also shown he is clearly in charge. Some analysts initially believed it was unlikely that Kim – with little background in politics or government experience – was developing and directing these moves. Kim’s aunt and uncle were often pointed out as the most likely candidates to be wielding real power in the DPRK, but the situation remains far from clear and expert opinion is highly divided.²⁰ One senior ROK policymaker commented at the time, “Who is in charge in North Korea? It’s hard to say. How strong is Kim Jong-un? We don’t know exactly.

Who is giving orders in Pyongyang? Apparently, it's Kim Jong-un, but we are not sure about the inner-circle decision-making process."²¹

Time seems to have provided an answer, although the power structure of the DPRK is so opaque that it is hard to assess just how strong Kim really is. He seems to have directed several high-level leadership changes, such as the sudden removal of Vice Marshal Ri Yong-ho – Vice Chairman of the CMC, Politburo Presidium member, general staff chief, and longtime mentor of Kim Jong-un in military affairs – along with the removal or demotion of three other high-level elder leaders who accompanied Kim Jong-il's hearse.

There have since been few indications of any party, military, or state opposition to Kim.²² One report indicated that two-thirds of the DPRK's senior generals have been demoted, replaced, pushed aside to jobs with less power, or banished, while all have been required to sign loyalty letters.²³ A January 2013 Congressional Research Service (CRS) report noted that,²⁴

When Kim first came to power, many observers predicted that he would rule with the aid of regents coming from his father's inner circle, especially Kim-Jong-il's brother-in-law Jang Songtaek. It is possible that a collective leadership makes national policy decisions while promoting Kim Jong-un as the visible figurehead of the regime. However, many analysts point to personnel decisions that seem to portray a strategy to concentrate power in Kim Jong-un's hands and sideline influential military leaders: four of the highest-ranking generals in the Korean People's Army (KPA) were stripped of their ranks. In addition to the purges, a civilian party functionary was appointed to director of the KPA's important General Political Department. South Korean media have cited sources that say Kim is elevating the internal security apparatus as well as those in charge of propaganda.

The appointments of Kim Jong-un and others to high-level party positions have led some analysts to posit that the KWP may be gaining in stature over the military establishment. The emphasis on the Central Military Commission, the tool through which the Party controls the military, may indicate that the regime is moving away from the concentrated power in the National Defense Commission established by Kim Jong-il and instead returning to a Party-centric order, as was the case under Kim Il-sung. The Songun, or "Military First," policy appears to have remained in place, but Kim Jong-un appears to have focused on rebuilding many party institutions to establish an alternative power center.

The December 2013 arrest and execution of Kim Jong-il's uncle -- Jang Song Thaek -- provides another indication of Kim's power. Jang Song Thaek was once considered the "Control Tower" who was making high-level decisions when Kim Jong-il was in failing health, was the biggest change in the government. Many theories and much speculation have been put forward to try to explain why Jang was executed, even though he was a very powerful member of the regime.

In addition, Un has actively worked to reform the composition of North Korea's political elite. He has attempted to limit the power of the armed forces by purging and firing senior military commanders who held important decision-making positions in his father's day. He has in turn elevated the prominence of DPRK Worker's Party, as evidenced by changing political theater, his public focus (including state visits to economic sites as oppose to military ones), and a shift in propaganda.²⁵

Kim Jong-un has also elevated a new state policy of Byungjin-which promotes the parallel goals of economic growth and developing an effective nuclear program. While this policy might suggest some form of economic reform, there has been little evidence of substantial changes to North Korea's economic environment and prospects. Indeed, the two goals seem to be in fundamental conflict with each other, as the continued progression of North Korea's nuclear program has resulted in the expansive sanctions imposed by the UN and US. As such, while Kim

seems to pay lip service to the concept of economic reform, his primary focus appears to be the development of a nuclear deterrent to ensure regime survival.²⁶

Still, there are some indications that the political landscape in North Korea is not stable. Experts note that Kim's two predecessors, his father and grandfather, took more than 20 years to consolidate power, even though they already had considerable political experience. In contrast, Kim Jong-un has relatively little political experience, which makes a long consolidation process a real possibility. Admiral Samuel Locklear, of United States Pacific Command, made a statement indicating that he believes Kim Jong-un is still in the process of consolidating power. Kim also ceased making public appearances during part of 2014, with little initial explanation, although this later seems to have been because he was ill.

Kim Jong-un, China, and Other States

Tactical political maneuvering aside, there have been no clear indications that Kim will take measures or shape a national strategy that could reduce regional frictions or improve the daily lives of North Korean citizens. Several factors make it likely that the DPRK's political system – a concentrated, one-man dictatorship – will continue without significant reform: “[c]hronic insecurity, a command economy, a strong tradition of democratic centralism, a complex structure of political institutions and a well-developed indigenous ideology,” all of which reinforce the concentration of power and the Kim family cult.²⁷ It also appears that several of the DPRK prison camps have grown significantly in size.²⁸

While Pyongyang has alternated between provocation and engagement in the past, others have seen these moves as a way to reduce reliance on China, as China has become increasingly annoyed with Pyongyang's behavior. Kim Jong-un's relationship with his Chinese counterparts also seems less friendly than that of Kim Jong-il. Some analysts think that the age difference between Kim Jong-un and Xi Jinping – as well as other Chinese leaders – is one of the reasons that the two are not close, and it is unknown if they have ever met.²⁹

After the DPRK's February 2013 nuclear test, China offered to send several senior officials to help the DPRK improve its relations with other states, but North Korea did not accept. In late November 2012, a Chinese Politburo member led a delegation to the DPRK with a letter from Xi Jinping telling Kim Jong-un not to launch a ballistic missile – which he proceeded to do less than two weeks later.

High-level contacts between the DPRK and China have been limited since Kim took power.³⁰ There were no major high-level meetings in 2013, and the DPRK sporadically reached out to Russia and South Korea in 2014 while doing little to strengthen relations and economic ties to China. At the same time, China's leader Xi Jinping, visited Seoul in July 2014 – marking the first time that a Chinese leader had gone to Seoul before going to Pyongyang.³¹

In the aftermath of the January 2016 nuclear test and the subsequent ballistic missile launch, China has worked with its fellows on the UNSC to impose the harshest round of sanctions ever imposed upon the DPRK. It also condemned these actions, again suggesting a cooling of relations between the two countries.³² The sanctions were qualitatively more stringent than previous ones, and required other countries to inspect all North Korean exports and imports, cease the purchase of certain North Korean rare-earth minerals and limit the purchase of the DPRK's coal and iron exports, end the export of jet fuel to the DPRK, expel certain institutions and individuals from their countries, seize and refuse port access for certain DPRK ships, and end any relationships

with DPRK banks.³³ If they had been enforced consistently, such punitive measures would have had a major impact on North Korea's fragile economy, and the fact that China helped draft them is a sign that China's patience for North Korea's aggression and nuclear ambitions was running thin. The fact remains, however, that the DPRK may need China, but China also needs the DPRK, and so far, Kim Jong-un seems to have been as good at leveraging China as China has been in leveraging Kim Jong-un.

DPRK Views of the US, Japan, and South Korea

The DPRK has sought warmer diplomatic ties with other countries to a limited degree when it seems to have felt it needed to ease tensions, or that this could encourage joint ventures or the lifting of some sanctions. However, the broader impact of such diplomatic overtures has been limited. For instance, Russian investment in the port of Rajin is relatively small, and is miniscule compared to Russian trade with South Korea. Japanese efforts to gain North Korean cooperation in dealing the DPRK's Japanese abductees has been cautious, and take careful account of North Korea's history of renegeing on agreements.

In spite of occasional efforts to ease relations, the DPRK also clearly still sees the US, ROK, and Japan as enemies. State media regularly reflect these views. Such media are a key instrument of the North Korean regime, including the *Rodong Sinmun* [*The Worker's Newspaper*], *Pyongyang Sinmun*, *Minju Choson* [*Democratic Korea*], *Pyongyang Times*, and Korean Central News Agency (KCNA) – which is the primary mouthpiece for the DPRK and one of the country's most influential news outlets. Of these, *Rodong Sinmun*, *Pyongyang Times*, and the KCNA publish English-language versions. The daily KCNA and the weekly *Pyongyang Times* are run by the state news agency, while the daily *Rodong Sinmun* is produced by the Central Committee of the Worker's Party of Korea. As these sources are entirely government-controlled, a careful reading of the articles and ideas expressed can offer some clues as to how the North Korean leadership views the strategic situation.

These media normally present a view of the US that assigns blame for virtually all of the military tensions since the Korean War. According to one recent KCNA article, the DPRK sees its denuclearization as impossible due to the US's hostile policies: the US divided Korea after the Second World War, refused to establish diplomatic relations or even call the DPRK by its official name, intentionally chose to prolong the state of armistice, and defined its ultimate goal in 1953 as preventing the spread of communism to South Korea by turning it into a military ally.³⁴

The same article states that the US deliberately ruined the Geneva conference for a peaceful solution to the Korean War in 1954, restricted trade with the DPRK and imposed a myriad of sanctions, "cooked up" UN Security Council resolutions after DPRK peaceful satellite launches, practiced live shell firing at a DPRK flag in 2012, and advocated destroying statues of Kim Il-sung.³⁵

Officially, the DPRK views its development of nuclear weapons as a means of legitimate self-defense in a region in which it is surrounded by larger countries with powerful friends, strong economies, much larger military budgets, and a history of intervention on the Korean Peninsula.³⁶ In fact, the DPRK argues that US aggression is to blame for the North's nuclear weapons program – the only reason it developed nuclear weapons was to keep the Korean Peninsula safe; a May 2013 article noted, "With the U.S. becoming ever more undisguised in its frantic attempt to ignite a nuclear war, if the DPRK did not have a powerful nuclear force, a thermonuclear war would have broken out on the Korean Peninsula."³⁷ However, that has not kept the DPRK from

threatening the US with nuclear destruction. Following a 2016 missile test, Kim Jung Un stated that his country “can tip new-type intercontinental ballistic rockets with more powerful nuclear warheads and keep any cesspool of evils in the earth, including the U.S. mainland, within our striking range.”³⁸

The DPRK’s treatment of Japan is shaped by Japan’s 1905-1945 occupation of Korea and past history of militarism. South Koreans also have a tendency to view Japan in a negative light. One DPRK state-run newspaper article noted, “The Japanese reactionaries are, however, getting evermore undisguised in their moves to seize Tok Islets [Dokdo] in a bid to stage a comeback to Korea, while distorting its past history of invasion and openly reviving militarism in all fabrics of society.... Their ulterior design is to establish a triangular military alliance with the U.S. and the South Korean puppet forces, take an active part in their war of aggression against the DPRK, and thus regain Japan’s erstwhile status as a colonial ruler.”³⁹ In 2015, North Korea changed its time zone to 30 minutes before that of Japan, because “the wicked Japanese imperialists committed such unpardonable crimes as depriving Korea of even its standard time.”⁴⁰

The DPRK’s rhetoric has frequently been reported by outside media as more threatening than either the DPRK’s actions or its exact words really imply. It is often reported that the DPRK has directly threatened to attack the US, ROK, or Japan, but these quotations and references usually do not include the full sentence or paragraph from which the threat came. While the DPRK does make such threats, it is generally in the context of an “if” clause – as in, the DPRK will fight *if* the US/ROK initiate.

For example, one DPRK state-run newspaper remarked on March 8, 2013, “The revolutionary armed forces of the DPRK, already put on a high alert, are waiting for an order for great advance for national reunification, determined to blast the strongholds of aggression with prompt and fatal retaliation, should the provocateurs [i.e., US and ROK] make even the slightest move.”⁴¹ At the same time, it is entirely uncertain what actions would count as “provocations,” one of many factors making an assessment of the unpredictable DPRK exceedingly difficult.

The DPRK frequently escalates its rhetoric in response to annual ROK-US military exercises. During the 2016 exercises, the NDC released a statement claiming that, “The army and people of the DPRK will launch an all-out offensive to decisively counter the U.S. and its followers’ hysterical nuclear war moves.” These regular threats and diatribes may give the DPRK some diplomatic leverage, but they also make it difficult to determine how serious North Korean threats really are.⁴²

US Official Assessments

As might be expected, the U.S. has a very different official view of developments in the DPRK. Senior US officials have summarized the US view of DPRK strategy as follows. In his February 2012 Senate testimony, Defense Intelligence Agency (DIA) Director Ronald L. Burgess Jr. stated,⁴³

...[T]he primary goals of the Democratic People’s Republic of Korea (DPRK) are preserving its current system of government, improving its poor economy, and building national confidence and support for Kim Jong Un – youngest son of the late Kim Jong Il and North Korea’s new “Great Leader.” North Korea’s leadership is emphasizing policy continuity under Kim Jong Un which DIA anticipates will include continued pursuit of nuclear and missile capabilities for strategic deterrence and international prestige, as well as to gain economic and political concessions.

In 2013, Director of National Intelligence (DNI) James R. Clapper reported to the Senate,⁴⁴

Kim Jong Un has quickly consolidated power since taking over as leader of North Korea when his father, Kim Jong Il, died in December 2011. Kim has publicly focused on improving the country's troubled economy and the livelihood of the North Korean people, but we have yet to see any signs of serious economic reform.

North Korea maintains a large, conventional military force held in check by the more powerful South Korean-US military alliance. Nevertheless, the North Korean military is well postured to conduct limited attacks with little or no warning, such as the 2010 sinking of a South Korean warship and the artillery 23 bombardment of a South Korean island along the Northern Limit Line.

In May 2013, the Department of Defense (DOD) issued its first unclassified report on the military forces of the DPRK, providing a more detailed picture of US views.⁴⁵

Regime survival in a zero-sum competition for legitimacy on the Peninsula with the South has been the consistent, overarching strategic objective of the Kim regime since 1945, but North Korean goals and supporting strategy have evolved significantly over the years. Throughout the 1960s and 1970s, North Korea boasted a viable economy and military and international relationships that either matched or outclassed those of the ROK. During this period, North Korea had reason to believe its goal of reunification on its terms was a possibility. Since the loss of the Soviet Union as a principal benefactor, devastating famine of the 1990s, and the economic rise and political maturation of the ROK, North Korea has largely abandoned unilaterally enforced reunification as a practical goal.

North Korean goals and strategies reflect the reality of political isolation, significant economic deprivation, a deteriorating conventional military, and the increasing political and military power of nearby states. Nevertheless, the North has pursued a military posture that allows it to influence coercively South Korea through provocation and intimidation, and to attempt to have as equal a voice as possible in the future of the Peninsula.

North Korea's pursuit of a "military first policy" demonstrates its view that ultimately the national security of North Korea is disproportionately dependent on military might in the absence of any other notable elements of national power. The DPRK seeks recognition as an equal and legitimate international player and as a recognized nuclear power that is eventually able to normalize its diplomatic relations with the Western world and pursue economic recovery and prosperity. The DPRK's rhetoric suggests the regime at this time is unlikely to pursue this second goal, at the expense of the primary goal of pursuing its nuclear and missile capabilities.

NATIONAL STRATEGY

Beyond its fundamental role as a guarantor of national and regime security, the North Korean military supports the Kim regime's use of coercive diplomacy as part of its larger diplomatic strategy. Through the use of limited provocations – even those that are kinetic and lethal in nature – North Korea uses small-scale attacks to gain psychological advantage in diplomacy and win limited political and economic concessions, all while likely believing it can control escalation.

Closely tied to this strategy of political coercion are North Korea's nuclear and ballistic missile programs which – absent normalized relations with the international community – it sees as essential to its goals of survival, sovereignty, and relevance.

REGIONAL OBJECTIVES AND REGIONAL BEHAVIOR

North Korea is dependent on China as a key benefactor, both in terms of diplomatic and economic support. North Korea also maintains friendly relations with Russia, although the relationship is not as robust as North Korea's relations with China. In its pursuit of nuclear and missile capabilities, and in its use of limited provocations for diplomatic objectives, North Korea is always conscious of how China and Russia will respond, and likely calculates both are more concerned about limiting U.S. responses than trying to control or dictate North Korea's behavior.

In its approach to the ROK, North Korea seeks to extract aid and investment from the ROK using a combination of diplomacy and coercion while minimizing any influence or leverage the ROK might try to wield in return. North Korea adopted a largely adversarial posture toward former ROK President Lee Myung Bak and his administration given his insistence on reciprocity and linking of aid to progress in

denuclearization, leading to the failure of the North's traditional approach to exact concessions from the ROK and drive a wedge in the U.S.-ROK relationship. North Korea's objectives in delinking inter-Korean relations from denuclearization and minimizing political concessions it makes in response to ROK economic and development assistance are likely to be unchanged in its approach to the new Park Geun-hye administration.

North Korea has a contentious relationship with the Japanese Government. Absent a breakthrough on the issue of North Korean abductions of Japanese citizens, there is little prospect for improvement in relations or for a lifting of Japanese economic sanctions against North Korea.

The 2015 DOD report drew similar conclusions to those in the 2013 report and also noted that:

North Korea's goals and strategies stem from the regime's political isolation, economic deprivation, and deteriorating conventional military, as well as the increasing political, economic, and military power of nearby states. The strategic goal of the regime is to ensure Kim family rule in perpetuity.

The overarching national security objectives to achieve this goal under Kim Jong Un have remained largely consistent over the last two years: international recognition as a nuclear-armed state; maintenance of a viable deterrent capability; the simultaneous development of its economy and nuclear weapons program (i.e., the "byungjin" line); reinforcement of its military-first approach to domestic and foreign affairs ("songun"); tight control over communications, borders, movement, and trade; and reunification of Korea under North Korea's control.

North Korea uses reunification with South Korea as a key component of its national identity narrative to validate its strategy and policies, and to justify sacrifices demanded of the populace. However, North Korea's leaders almost certainly recognize that achieving reunification under North Korean control is, for the foreseeable future, unattainable.

National Strategy

Beyond its fundamental role as a guarantor of national and regime security, the North Korean military supports the Kim regime's use of coercive diplomacy as part of its larger foreign policy strategy. North Korea uses limited provocations — even those that are kinetic and lethal in nature, such as military actions and small-scale attacks — to gain psychological advantage in diplomacy and win limited political and economic concessions.

Closely tied to its coercive diplomatic strategy are North Korea's nuclear and ballistic missile programs. DPRK leaders see these programs as necessary for a credible deterrent capability essential to its survival, sovereignty, and relevance, and supportive of its coercive military threats and actions.

Regional Objectives and Behavior

North Korea remains focused on extracting economic aid and diplomatic concessions from the international community while defending against perceived threats to its sovereignty. Since 2013, North Korea has increased diplomatic overtures to other countries in an attempt to secure foreign investment and improve its economy, but such outreach has failed to produce meaningful gains due to international sanctions and stigmatization related to concerns about its nuclear weapons program and human rights record. North Korea likely believes periodic "charm offensives" will eventually lead to improvements in regional relationships and gradual advancement of its strategic objectives.

In 2015, Kim Jong Un declined invitations to travel abroad to Moscow and Beijing for celebrations marking the 70th anniversary of the end of World War II, instead sending senior government officials. These important events could have afforded North Korea the opportunity to improve relations with its powerful neighbors, though during these visits Kim would have risked criticism of his nuclear program and unflattering comparisons to other world leaders in attendance.

Relations between North and South Korea remained stalled this year until the two sides met in August to resolve the confrontation resulting from the landmine attack. The ROK's responses may have surprised Kim Jong Un and led to the decision to deescalate the situation, but it is unclear whether continued talks will lead to a significant improvement in relations with Seoul.

North Korea remains dependent on China as its key economic benefactor, and North Korea's leaders are conscious that efforts to advance its nuclear and missile capabilities angers China. Nevertheless, the regime likely thinks China prioritizes the preservation of regional stability and will refrain from punishing North Korea too severely or entirely cutting off diplomatic or economic ties.

North Korea also maintains friendly relations with Russia, though the relationship is less robust than North Korea's relationship with China. Long-stalled plans for the creation of a natural gas pipeline from Russia to South Korea through North Korea — a project that could earn North Korea millions of dollars annually in transit fees — have made little concrete progress in recent years.

North Korean relations with Japan thawed somewhat in 2013 when North Korea accepted a visit by a Japanese delegation and indicated it might be willing to discuss the longstanding issue of Japanese citizens abducted by North Korea in the 1970s and 1980s. In May 2014, the Japanese and North Koreans held official talks in Stockholm, Sweden, which resulted in North Korea agreeing to re-open its investigation into the fate of the Japanese abductees and provide Japan with a report, in exchange for Japan easing some of its unilateral sanctions against North Korea. To date, however, North Korea has not provided Japan with any new substantive information. In August 2015, North Korea claimed to have a report but that the Japanese refused to receive it, a claim Japan denies. Regardless, Japan continues to seek resolution with North Korea on the abductee issue.

North Korea remains willing to disrupt temporarily relations with regional neighbors, including Russia and China, and absorb the associated cost when it believes coercive actions toward South Korea or the United States will advance its strategic objectives.

In 2014, DNI Clapper add an emphasis on the DPRK's nuclear tests and emphasis on cyber as asymmetric warfare, as well as on Kim Jong Un's ongoing efforts to consolidate his control and power:⁴⁶

Iran and North Korea are unpredictable actors in the international arena. Their development of cyber espionage or attack capabilities might be used in an attempt to either provoke or destabilize the United States or its partners...North Korea's nuclear weapons and missile programs pose a serious threat to the United States and to the security environment in East Asia, a region with some of the world's largest populations, militaries, and economies. North Korea's export of ballistic missiles and associated materials to several countries, including Iran and Syria, and its assistance to Syria's construction of a nuclear reactor, destroyed in 2007, illustrate the reach of its proliferation activities. Despite the reaffirmation of its commitment in the Second- Phase Actions for the Implementation of the September 2005 Joint Statement not to transfer nuclear materials, technology, or know-how, North Korea might again export nuclear technology.

In addition to conducting its third nuclear test on 12 February 2013, North Korea announced its intention to "adjust and alter" the uses of existing nuclear facilities, to include the uranium enrichment facility at Yongbyon, and restart its graphite moderated reactor that was shut down in 2007. We assess that North Korea has followed through on its announcement by expanding the size of its Yongbyon enrichment facility and restarting the reactor that was previously used for plutonium production. North Korea has publicly displayed its KN08 road-mobile ICBM twice. We assess that North Korea has already taken initial steps towards fielding this system, although it remains untested. North Korea is committed to developing long-range missile technology that is capable of posing a direct threat to the United States. Its efforts to produce and market ballistic missiles raise broader regional and global security concerns.

Because of deficiencies in their conventional military forces, North Korean leaders are focused on deterrence and defense. We have long assessed that, in Pyongyang's view, its nuclear capabilities are intended for deterrence, international prestige, and coercive diplomacy. We do not know Pyongyang's nuclear doctrine or employment concepts.

Two years after taking the helm of North Korea, Kim Jong Un has further solidified his position as unitary leader and final decision authority. He has solidified his control and enforced loyalty through personnel changes and purges. The most prominent was the ouster and execution of his uncle, Jang Song Thaek in December 2013. Kim has elevated the profile of the Workers' Party of Korea (WPK) through appointments of party operatives to key leadership positions and the convening of party conferences and plenums. Kim and the regime have publicly emphasized his focus on improving the country's troubled economy and the

livelihood of the North Korean people while maintaining the tenets of a command economy. He has codified this approach via his dual-track policy of economic development and advancement of nuclear weapons. (Information on North Korea's nuclear weapons program and intentions can be found above in the section on WMD and Proliferation.)

...Many instances of major cyber-attacks manifested themselves at home and abroad in 2013 as illustrated by the following examples....In March 2013, South Korea suffered a sizeable cyber-attack against its commercial and media networks, damaging tens of thousands of computer workstations. The attack also disrupted online banking and automated teller machine services. Although likely unrelated to the 2012 network attack against Saudi Aramco, these attacks illustrate an alarming trend in mass data-deletion and system damaging attacks.

In February 2015, DNI Clapper again emphasize the role of nuclear weapons and cyber warfare in North Korea's strategy, but noted that Kim Jong Un had put more emphasis on economic development,⁴⁷

A growing number of computer forensic studies by industry experts strongly suggest that several nations—including Iran and North Korea—have undertaken offensive cyber operations against private sector targets to support their economic and foreign policy objectives, at times concurrent with political crises.

North Korea is another state actor that uses its cyber capabilities for political objectives. The North Korean Government was responsible for the November 2014 cyber-attack on Sony Pictures Entertainment (SPE), which stole corporate information and introduced hard drive erasing malware into the company's network infrastructure, according to the FBI. The attack coincided with the planned release of a SPE feature film satire that depicted the planned assassination of the North Korean president.

North Korea's nuclear weapons and missile programs pose a serious threat to the United States and to the security environment in East Asia. North Korea's export of ballistic missiles and associated materials to several countries, including Iran and Syria, and its assistance to Syria's construction of a nuclear reactor, destroyed in 2007, illustrate its willingness to proliferate dangerous technologies.

In 2013, following North Korea's third nuclear test, Pyongyang announced its intention to "refurbish and restart" its nuclear facilities, to include the uranium enrichment facility at Yongbyon, and to restart its graphite-moderated plutonium production reactor that was shut down in 2007. We assess that North Korea has followed through on its announcement by expanding its Yongbyon enrichment facility and restarting the reactor.

North Korea has also expanded the size and sophistication of its ballistic missile forces, ranging from close-range ballistic missiles to ICBMs, while continuing to conduct test launches. In 2014, North Korea launched an unprecedented number of ballistic missiles.

Pyongyang is committed to developing a long-range, nuclear-armed missile that is capable of posing a direct threat to the United States and has publicly displayed its KN08 road-mobile ICBM twice. We assess that North Korea has already taken initial steps toward fielding this system, although the system has not been flight-tested.

Because of deficiencies in their conventional military forces, North Korean leaders are focused on developing missile and WMD capabilities, particularly building nuclear weapons. Although North Korean state media regularly carries official statements on North Korea's justification for building nuclear weapons and threatening to use them as a defensive or retaliatory measure, we do not know the details of Pyongyang's nuclear doctrine or employment concepts. We have long assessed that, in Pyongyang's view, its nuclear capabilities are intended for deterrence, international prestige, and coercive diplomacy.

Three years after taking the helm of North Korea, Kim Jong Un has further solidified his position as unitary leader and final decision authority through purges, executions, and leadership shuffles. Kim was absent from public view for 40 days in late 2014, leading to widespread foreign media speculation about his health and the regime's stability. The focus on Kim's health is a reminder that the regime's stability might hinge on Kim's personal status.

Kim has no clearly identified successor and is inclined to prevent the emergence of a clear “number two” who could consolidate power in his absence. Kim and the regime have publicly emphasized his focus on improving the country’s troubled economy and the livelihood of the North Korean people while maintaining the tenets of a command economy.

He has codified this approach via his dual-track policy of economic development and advancement of nuclear weapons. (Information on North Korea’s nuclear weapons program and intentions can be found above in the section on WMD and Proliferation.) Despite renewed efforts at diplomatic outreach, Kim continues to challenge the international community with provocative and threatening behavior in pursuit of his goals, as prominently demonstrated in the November 2014 cyber-attack on Sony.

Lt. General Vincent R. Stewart, the Director of the Defense Intelligence Agency, gave a similar description of North Korea at the same hearing.⁴⁸

The **Democratic People’s Republic of Korea’s (DPRK)** primary goals are preserving the control of the Kim family regime, improving its poor economy, and deterring attack by improving its strategic and conventional military capabilities. Pyongyang maintains that nuclear and ballistic missile capabilities are essential to ensure its sovereignty.

The DPRK continues to prioritize maintaining the readiness of its large, forward deployed forces. While Pyongyang is stressing increased realism in military training, exercises still appear to do little more than maintain basic competencies. Because of its conventional military deficiencies, the DPRK is also concentrating on improving its deterrence capabilities, especially its nuclear technology and ballistic missile forces.

We believe the DPRK continues to develop its nuclear weapons and missile programs which pose a serious threat to the U.S. and regional allies. We remain concerned that the DPRK will conduct a nuclear test in the future. Following the United Nations’ (U.N.) condemnation of its human rights record in November 2014, Pyongyang indicated it would “not refrain any further from conducting a nuclear test.” This followed a statement in March 2014 wherein North Korea’s Foreign Ministry warned it “would not rule out a new form of nuclear test.”

Pyongyang is also making efforts to expand and modernize its deployed close-, short-, medium-, and intermediate-range systems. It seeks to develop longer-range ballistic missiles capable of delivering nuclear weapons to the U.S., and continues efforts to bring its KN08 road-mobile ICBM to operational capacity. In 2015, North Korea will continue improving the combat proficiency of its deployed ballistic missile force, and will work to improve missile designs to boost overall capability. Pyongyang likely will launch additional ballistic missiles as part of its training and research and development process. We remain concerned by North Korea’s illicit proliferation activities and attempts to evade U.N. sanctions.

In his 2016 testimony, Clapper acknowledged the DPRK’s further progress on its nuclear and ballistic missile program, noting that:

North Korea’s nuclear weapons and missile programs will continue to pose a serious threat to US interests and to the security environment in East Asia in 2016. North Korea’s export of ballistic missiles and associated materials to several countries, including Iran and Syria, and its assistance to Syria’s 7 construction of a nuclear reactor, destroyed in 2007, illustrate its willingness to proliferate dangerous technologies.

We judge that North Korea conducted a nuclear test on 6 January 2016 that it claimed was a successful test of a “hydrogen bomb.” Although we are continuing to evaluate this event, the low yield of the test is not consistent with a successful test of a thermonuclear device. In 2013, following North Korea’s third nuclear test, Pyongyang announced its intention to “refurbish and restart” its nuclear facilities, to include the uranium enrichment facility at Yongbyon and its graphite-moderated plutonium production reactor, which was shut down in 2007.

We assess that North Korea has followed through on its announcement by expanding its Yongbyon enrichment facility and restarting the plutonium production reactor. We further assess that North Korea has been operating the reactor long enough so that it could begin to recover plutonium from the reactor’s spent fuel within a matter of weeks to months.

North Korea has also expanded the size and sophistication of its ballistic missile forces—from close range ballistic missiles to intercontinental ballistic missiles (ICBMs)—and continues to conduct test launches. In May 2015, North Korea claimed that it successfully tested a ballistic missile from a submarine. Pyongyang is also committed to developing a long-range, nuclear-armed missile that is capable of posing a direct threat to the United States; it has publicly displayed its KN08 road-mobile ICBM on multiple occasions.

We assess that North Korea has already taken initial steps toward fielding this system, although the system has not been flight-tested. Although North Korea issues official statements that include its justification for building nuclear weapons and threats to use them as a defensive or retaliatory measure, we do not know the details of Pyongyang's nuclear doctrine or employment concepts. We have long assessed that Pyongyang's nuclear capabilities are intended for deterrence, international prestige, and coercive diplomacy.

ROK

The ROK's strategy and force posture are far more transparent than those of the DPRK. It has a public defense budget, openly debates national security issues, and issues regular defense white papers. The 2010 English-language Defense White Paper clearly declared that the DPRK and its military were enemies of the ROK as long as threats and provocations such as the *Cheonan* and Yeonpyeong Island attacks were continued. The paper also included defense structure and operational systems reform in order to increase advanced military capabilities.

Moreover, the paper showed photos and maps of Dokdo Island, supporting Seoul's claims that the territory is indisputably Korean.⁴⁹ The 2012 Defense White paper went further, describing Japan's unjust territorial claims as a barrier to improving bilateral defense cooperation.⁵⁰

The ROK, China, and Russia

South Korea is also far more flexible in dealing with other states like China, and has far more economic leverage. Sino-South Korean trade is some 40 times the volume of Chinese trade with North Korea, and is managed on market terms rather than Chinese subsidies of North Korea.⁵¹ In recent years, the ROK has been promoting military exchanges with China, such as mutual visits of aircraft and vessels. The relationship between the two countries was upgraded from a "full-scale cooperative partnership" to a "strategic cooperative partnership" in May 2008, with hotlines established between the Navies and Air Forces of the two countries that November. At the first annual ROK-PRC Defense Strategic Dialogue in July 2011, enhanced military exchanges were agreed to; a defense strategy dialogue has also been initiated.⁵²

At the 2012 ROK-PRC Strategic Dialogue, the two countries signed a Memorandum of Understanding (MOU) on national defense exchange and cooperation, in particular stipulating vice minister-level strategic dialogue, mutual visits by high-level military personnel, and director general-level defense policy working meetings on a regular basis, in addition to international peacekeeping operations, cooperation in humanitarian relief activities, and combined search and rescue operations.

The ROK and China also agreed to establish a hotline between the Defense Ministries to strengthen strategic communications; this was the third such hotline that China had established (the other two are with Russia and the US). The two countries also agreed to strengthen cooperation and exchange in military education and further expand defense exchanges.⁵³

Relations between the two countries became cooler following the muted Chinese reaction to the *Cheonan* and Yeonpyeong Island incidents. China-ROK ties have improved significantly since those two incidents, highlighted by massive bilateral trade and the Xi-Park state visits, the two countries have different strategic goals that limit the development of this political relationship.⁵⁴

The China-ROK relationship is also complicated in many areas that go well beyond DPRK-related issues.⁵⁵

Seoul's entanglements with China extend beyond the North Korean problem. China is unhappy with the current state of relations with South Korea, which it describes as "carrying 'dark currents' that can swamp the relationship at any time" and as "coming near a strategic crossroads." The two countries also face a wide range of complex bilateral issues—differing perspectives regarding history, norms, values, and the ROK-U.S. alliance, as well as growing trade dependency—none of which has an easy or straightforward solution. Mismanagement of these pending issues could cause rising ROK and Chinese expectations for their two heads of state and improved bilateral relations to backfire. Although it may help that Park [Geun-hye] is the first South Korean president to speak Chinese, what is really needed is a better contextual understanding of China.

During Park's presidency, there have been clear attempts to improve relations with the Chinese in a bid for their support on the North Korean issue. For example, she chose to attend the PRC's 70 year World War 2 Anniversary (while Kim Jung-un was noticeably absent), despite the reservations of the United States.⁵⁶ However, following the 2016 nuclear test and China's reaction to it, there appear to be limits to what these efforts could accomplish. The fact the DPRK carried out the test emphasized the fundamentally different goals the PRC and ROK had in dealing with North Korea. They also provoked several terse exchanges between policymakers in the ROK and China when it became clear that the test did not fundamentally change China's position in dealing with the DPRK. The ROK and China are also at odds over a US-ROK agreement to deploy the Terminal High Altitude Area Defense (THAAD) system in South Korea.⁵⁷

The ROK and Russia have also engaged in military exchanges, including of naval vessels and high military officials. In September 2008, the ROK-Russian bilateral relationship was upgraded to a "strategic cooperative partnership." The two countries also agreed to cooperate in the areas of defense industry, military supplies, and military technology.⁵⁸

The ROK and Japan

The 2010 ROK Defense White Paper refers indirectly to Japan as a military ally: "Solidifying security ties with major Asia-Pacific alliances, the ROK, Japan, Australia, and the United States have been trying to establish a more effective multilateral security system within the region based on alliances." There is a section in the report entitled "Exchange and Cooperation with Japan," looking at the two countries' abilities to work together to "resolve the North Korean nuclear issue and to ensure regional security and peace."

ROK-Japan-US trilateral cooperation, Korea-Japan maritime search and rescue operations, and increased military forces combined training are also mentioned. While a proposed ROK-Japan intelligence sharing agreement fell through in July 2012 – the fact a draft had been developed did demonstrate an increasingly closer and more cooperative relationship.⁵⁹ In mid-April 2013, the Japanese ambassador to Seoul said that Japan was prepared to sign the military intelligence pact with the ROK "at any time," arguing that Japan and the ROK needed to increase military partnership in the face of the DPRK's increased threats.⁶⁰

On December 29, 2014, Japan, ROK, and the US finally signed a tripartite intelligence sharing pact that designates the US as a third party to allow the ROK and Japan to share intelligence indirectly and through the US. The pact states, "when [the ROK] and [Japan] intend to share classified information with each other, each may do so under this Arrangement by providing such classified information to [the] US Department of Defense."⁶¹

The ROK remains relatively suspicious of Japan's security strategy, noting in the 2014 White Paper that, "Japan ... join(s) the race toward increasing their national interests and influence, instability and uncertainty are likely to intensify". And while the document acknowledges a strengthening bilateral bond, it made sure to remind readers that "some Japanese political leaders' regressive perception of history and unjust claim of dominion over Dokdo Island (are) obstacles to the future-oriented development of the relationship between the two countries."⁶²

The long history of tension between the two countries over Japan's past occupation of Korea, and disputes over rights in the Pacific still presents problems. The ROK's President Park Geun-hye stated in an interview in the *Washington Post* on May 8, 2013 that,⁶³

I remember eight years ago, when I had an interview with The Washington Post, that was also a time when the North Korean nuclear crisis was ongoing, and when the Japanese were also making comments about [disputed islands], thereby raising the temperature between Korea and Japan. Eight years later I'm very disappointed and frustrated to see that we haven't made any progress. Japan and [South] Korea share many things in common — our shared values of democracy, freedom and a market economy — and there is a need for us to cooperate on North Korea and on economic issues as well as security issues. But the Japanese have been opening past wounds and have been letting them fester, and this applies not only to Korea but also to other neighboring countries.... This arrests our ability to really build momentum, so I hope that Japan reflects upon itself.

The territorial disputes and historical animosity has impeded ROK-Japan security cooperation, and has even led South Koreans to perceive Japan as a threat to its security. Despite Japan's assertion that it has apologized for past war crimes in WWII, repeated South Korean calls for Japanese apologies have led to some Japanese officials to believe that no amount of apologies will satisfy South Korea.

On March 1, 2015, ROK President Park Guen-hye urged Japan, as had her predecessors, to admit to the historical offenses to Koreans. She continued, "as Germany and France overcame conflict and mutual enmity and became leaders in building a new Europe, it is time for South Korea and Japan to write a new history together."⁶⁴ However, there is little motivation to try to rectify this issue in Japan, which may be seen as capitulating to a China-leaning ROK. Suggestions have been made for the US to act as a mediator between Japan and the ROK in resolving the historical and territorial conflicts, but there seems to be no strong consensus as to whether or not the US should get involved in this conflict as a mediator.⁶⁵ In December of 2015, the two governments announced an "irreversible" settlement on the comfort women issue (referring to women forced to work in brothels by the Japanese military before and during World War II), in which Japan agreed to a 1 billion yen (\$8.3 million) contribution to a fund supporting the remaining survivors. In return, the ROK agreed to not raise the issue again in the future.⁶⁶

The US has a clear interest in maintaining good relations between its allies, and continues to play up improving ties between them. For example, at the 2016 Shangri-La Dialogue Defense Secretary Ash Carter remarked that "the U.S.-Japan-Republic of Korea trilateral partnership helps us coordinate responses to North Korean provocations. And I'm pleased to announce that the United States, Japan, and the Republic of Korea will conduct a trilateral ballistic missile warning exercise later this month."⁶⁷

The ROK and the US

The ROK and the US are allies with a close relationship and a well-institutionalized military alliance. The importance of this alliance was highlighted in the new defense guidance the US issued in early 2012. It has been consistently stressed in the strategic justification of US defense

budgets, and was given new emphasis in the US Quadrennial Defense Review conducted in 2014. Secretary of Defense Hagel stressed the importance of the alliance at its 60th anniversary celebration in a statement in Seoul on September 30, 2013, and made similar statements in a joint press conference at the Pentagon with South Korean Defense Minister Ham Min Koo on October 23, 2014.⁶⁸

It is also a relationship that keeps evolving. It was agreed to expand ROK-Japan-US security cooperation through the assistant secretary-level Defense Trilateral Talks (DTT) at a 2012 ROK-US Foreign and Defense Ministers' Meeting. The cooperation includes humanitarian assistance, maritime security, and nuclear non-proliferation.⁶⁹

At the October 2012 44th annual ROK-US Security Consultative Meeting, the two countries signed a ROK-US Counter-Provocation Plan, in which the two would establish a combined response system against DPRK provocations on the Korean peninsula. The ROK and the US also agreed to increase combined surveillance activities of the DPRK, develop enhanced deterrence strategies and response capabilities against DPRK asymmetric threats, and develop a "tailored bilateral defense strategy." Furthermore, the two countries agreed that they needed to hold the ROK-US Extended Deterrence Table Top Exercise (TTX) annually, alongside senior-level seminars, and finalized the road map for the Extended Deterrence Policy Committee (EDPC) that provides the foundations for the development of the US's extended deterrence commitment.⁷⁰

In the wake of the DPRK's third nuclear test, the US and ROK signed an updated contingency Counter-Provocation Plan in the case of small-scale DPRK attacks, such as those on Yeonpyeong in 2010. The plan gives the ROK the lead in responding to future provocations, with US support. The press statement released at the time did not provide much specific information, such as what exactly would constitute a provocation or when a provocation would turn into a war – at which point, the US Forces Korea (USFK) Commander would lead allied operations.⁷¹

The transfer of operation control (OPCON) of forces on the Korean Peninsula from the US to South Korea has been planned for several years, but has yet to take place. The previous plan called for OPCON to be transferred in 2012. The transfer was scrapped in the wake of the sinking of the *Cheonan* and the shelling of Yeonpyeong, which raised concerns that South Korea was still not ready to take over operational control.

In October 2014, South Korea and the US agreed that OPCON would only be transferred to South Korea on the basis of certain "conditions." This amounted to an indefinite postponement of the transfer, but the South Korean government was hopeful that these "conditions could be met in order to transfer OPCON in the mid-2020s. According to the 46th SCM Joint Communiqué:

The Secretary and the Minister reaffirmed the commitment of both sides to a stable OPCON transition at an appropriate date and noted that the conditions-based approach ensures that the ROK will assume wartime OPCON when critical ROK and Alliance military capabilities are secured and the security environment on the Korean Peninsula and in the region is conducive to a stable OPCON transition. Based on the SCM's recommendation, the National Authorities of the United States and the ROK will make a determination on the appropriate timing for wartime OPCON transition.

The ROK and the DPRK

The ROK has sought to establish better relations with the DPRK, with consistently uncertain results. Over the last half century, North Korea has engaged in over 2,660 military provocations against the South.⁷² This has not, however, prevented the ROK from taking repeated diplomatic and political initiatives.

Kim Dae-jung (President 1998-2002) adopted the “Sunshine Policy” in dealing with North Korea, emphasizing increased communication, assistance, and exchanges while delaying political settlement and reunification to the far future. His successor, Roh Moo-hyun (President 2003-2007) followed a similar plan, entitled the “Peace and Prosperity Policy.” These policies of rapprochement with the DPRK often required breaking – politically or rhetorically – with the US, resulting in increased anti-American sentiment and harming the US-ROK alliance.

During these two presidencies, the ROK pursued large-scale economic engagement with the DPRK for a decade, believing that it had to convince the DPRK’s leadership that the external security environment was benign. Through economic engagement, the ROK attempted to both pacify the DPRK’s belligerence and initiate slow reform in the DPRK itself. In turn, these goals would avoid any collapse of the DPRK and a so-called “hard landing” unification scenario. When Kim Jong-il responded to the ROK’s unilateral offers of assistance, these two Presidents felt validated that their policies were working successfully. However, the DPRK was in reality simply accepting the freely offered ROK assistance and propagandizing it domestically as “gifts” from the weaker ROK.⁷³

The ROK and DPRK had two summit meetings (both in the DPRK, one in 2000 and the second in 2007), which the ROK saw as evidence of transformative change in the DPRK, though it was later revealed that the ROK had paid the DPRK \$200 million to secure acceptance of the first summit. During President Kim’s first year in office, the ROK gave \$29 million in fertilizer, food, and humanitarian aid; by 2007, under President Roh, aid had reached \$635 million.⁷⁴

The two countries also agreed to two major inter-Korean economic projects: the Kaesong Industrial Complex and the Kumgang Mountain tourism project; over 1.9 million South Korean tourists visited the latter before it was shut down in 2008. North Korea accepted these projects because they provided the regime with a large amount of cash and neither project had the potential to enlighten the North Korean people or promote forces for change.⁷⁵

After the first inter-Korean summit in 2000, there was also a series of ROK-DPRK military talks,⁷⁶

...including those between the respective defense ministers and working-level contacts. In the general officers’ talks held on June 3-4, 2004, the two Koreas adopted and put into effect ‘an agreement on the prevention of accidental clashes in the West Sea, suspension of propaganda broadcasting, and removal of propaganda devices from the areas near the Military Demarcation Line (MDL).’ Accordingly, both sides restrained their naval ships from possible confrontations, prohibited any unprovoked actions against each other, ceased propaganda activities and removed all propaganda devices from the MDL line.

Later, a working group meeting of the third round of general officers’ talks was held on July 20, 2005, culminating in an agreement to establish correspondence offices to prevent accidental West Sea clashes. The construction of these offices on August 13 enabled the two Koreas to make urgent calls using radio or wireless communication. An agreement was also made to enable inter-Korean communication between North and South Korean vessels, based on communication networks shared among international merchant ships. Both sides also agreed to exchange information regarding ships engaged in illegal fishing activities.

During the third and fourth round of general officers talks held on March 2-3 and May 16-18, 2006, respectively, South Korea proposed to prevent confrontations and establish joint fishing grounds in the West Sea. These talks, however, ended without result as the North insisted on drawing a new maritime West Sea border. Later, in the seventh round of general officers’ talks held in December 2007, the two Koreas adopted an agreement to provide military guarantee for passage, communication and customs clearance. Of the military talks held since 2000, however, few have been effective in producing agreement on matters directly relevant to the building of inter-Korean trust.

However, at the same time as both political and military talks were occurring, the DPRK engaged in further military provocations:⁷⁷

Around the 2000s, while economic cooperation between the two Koreas as well as South Korea's economic assistance to the North was in progress, the North carried out a series of provocations against the South, including an infiltration of the South with its midget submarine, two nuclear tests (2006 and 2009), and three test firings of long-range missiles (1998, 2006 and 2009). Other examples include: the Second Battle of Yeonpyeong in 2002, which was sparked by North Korean vessels that had intruded the Northern Limit Line in the West Sea. At this time, the North fired at a South Korean patrol boat on the day a match between South Korea and Turkey was played during the Japan-Korea World Cup; the torpedo attack on the South Korean corvette *Cheonan* in March 2010, just after the resumption of South Korea's humanitarian assistance to the North, including rice and cement; and the artillery shelling of Yeonpyeong Island in November 2010, just before Red Cross talks between the two Koreas were scheduled to take place.

By the end of Roh Moo-hyun's tenure, the majority of ROK citizens were criticizing these engagement-oriented policies as being too naïve and resulting in a South Korea that was too vulnerable to DPRK threats and provocations. The economic assistance was also criticized as simply helping the DPRK regime, in particular the Kim family, increase its power and further build up its military, threatening ROK security.⁷⁸

Lee Myung-bak (President 2008-2012) came to office with a much more hardline policy towards North Korea, stressing a pragmatic diplomacy that would not offer concessions to the DPRK without anything in return. His "Denuclearization, Opening and 3000" initiative focused on co-existence and co-prosperity and gave top priority to resolving the nuclear issue, emphasizing the ROK's goal of the DPRK abandoning its nuclear weaponization program. The policy promised ROK assistance in achieving a \$3,000 GDP per capita in the DPRK once North Korea denuclearized and opened its economy. The North refused.⁷⁹

The ROK did, however, make clear its readiness to decisively respond to military provocations and maintain a deterrence capability. President Lee also worked to strengthen the US alliance – during his tenure, alliance cooperation reached an all-time high – as well as ties with Moscow and Beijing, while also promoting US-Japan-ROK trilateral cooperation.⁸⁰ President Lee also advocated the idea of "Global Korea," raising the ROK's international profile and the possibility of South Korea playing a larger role in international affairs.

After the *Cheonan* and Yeonpyeong Island attacks in 2010 (discussed in Chapter 4) in which the ROK military failed to respond effectively to DPRK provocations, South Korea switched to a new strategy, called "active deterrence" or "proactive deterrence." This policy emphasized enhanced offensive capabilities in order to ensure deterrence, enabling the ROK military to immediately retaliate in the event of any further DPRK provocations. The ROK Army has deployed short-range missiles and other weapons systems to border areas in order to increase rapidity of response. At the same time, this also increases the potential for miscalculation or accidental escalation – for example, under the new strategic doctrine, ROK troops accidentally shot at an Asiana civilian airliner in 2012.⁸¹

In 2010 and 2011, Kim Jong-il indicated several times that he wanted to resume Six Party Talks, but the ROK insisted that the North apologize for the Yeonpyeong shelling and include enrichment activities in the proposed discussions. However, in January 2011 the ROK dropped the requirement of an official DPRK apology for the *Cheonan* and Yeonpyeong provocations, instead seeking assurances that the North would end its provocative actions and take responsible measures for the incidents. Still, the negotiations for high-level meetings collapsed fairly quickly.⁸²

On September 3, 2012, the ROK offered to send humanitarian aid to the DPRK, which responded that it was ready to discuss the issue and asked what was being offered and how much. The ROK indicated that it could provide 10,000 tons of flour, three million packets of noodles, and medicine, and was willing to discuss further aid after the two sides met. The North rejected the offer – the DPRK rejected a similar offer in 2011 as also being too small – with the state-run news agency calling the “meager” offer “deeply insulting,” and noting that the ROK often rejected DPRK requests for grain, construction equipment, and concrete. ROK officials fear that any such aid would be used for the military. Under the Sunshine Policy, the ROK used to send up to 500,000 tons of rice and 300,000 tons of fertilizer annually.⁸³

Park Geun-hye and ROK Policy towards the DPRK

Park Geun-hye became the South Korean President on February 25, 2013. During her campaign, she asserted that she was willing to soften the ROK’s DPRK policy, desiring to steer a middle course between Lee’s hardline policy and Roh’s engagement policies – a strong defense posture promising retaliation with the possibility of dialogue and “flexible engagement.”⁸⁴

She adopted a campaign slogan of “trustpolitik,” emphasizing small steps in a process of trust- and confidence-building in inter-Korean relations and on the Peninsula. “Trustpolitik” would include a range of projects, such as cultural exchanges, increased economic cooperation, and helping the DPRK join international financial institutions.⁸⁵ Though she has said she will not give significant aid to the DPRK until it ends its nuclear program, she is willing to meet Kim Jong-un if doing so would improve bilateral ties.⁸⁶

President Park has also indicated she would continue at last some aspects of former President Lee’s “Global Korea” policy, such as the ROK’s commitment to green growth and development assistance. Park has also proposed a US-China-ROK strategic dialogue on how to deal with the North.⁸⁷ Conversely, relations with Japan may be less congenial.⁸⁸

The new South Korean administration’s Japan policy may also face difficulties, Park’s good intentions toward a “grand reconciliation” notwithstanding. It has become increasingly difficult in recent years to distinguish a “realist Japan” from a “revisionist Japan,” and there is an emerging South Korean perception that Japan’s rightist drift is not merely the mishap of isolated and select politicians but rather a consistent trend of growing significance.

The DPRK, however, has moved in a very different direction. It conducted a nuclear test in the final days of the Lee Administration, sending a message emphasizing the negative consequences of Lee’s hardline policy. At the same time, the DPRK made it more difficult for the new Park Administration to be more flexible in its policies towards North Korea.⁸⁹

Through the DPRK’s actions, President Park was forced to strongly denounce the DPRK’s third nuclear test, saying it undermined trust-building and posed a significant threat against the Korean Peninsula and international peace.⁹⁰ At the same time, Park indicated that such DPRK actions had been anticipated, and thus her approach to the DPRK would not significantly change – she would continue to try to separate humanitarian assistance from the broader political issues on the Peninsula.⁹¹

In her inauguration speech, she stated that “North Korea’s recent nuclear test is a challenge to the survival and future of the Korean people, and there should be no mistake that the biggest victim will be none other than North Korea itself.” She urged the DPRK to abandon its nuclear ambitions, “instead of wasting its resources on nuclear and missile development and continuing to turn its back to the world in self-imposed isolation.”⁹²

President Park called for both a shift in the DPRK's policies towards the ROK and increased Chinese efforts to restrain the DPRK in a May 2013 interview in the *Washington Post*.⁹³

...The reason we see the security posture in the region being strengthened is because of what North Korea has been doing, as North Korea escalates the level of threats and provocations.... The basis of peace in this area is to maintain a firm deterrence posture, especially with regard to North Korea. If North Korea were to choose to become a responsible member of the international community and desist from provocations... I'm sure we would not need to see the strengthening of military postures in the region.

I've proposed a trust-building process on the Korean Peninsula. We will never tolerate North Korea's nuclear weapons and North Korea's provocations. Its threats will not pay. At the same time, this trust-building process is about keeping open the window to dialogue with North Korea at all times. If it chooses the right path, there can also be consequences. But what use would it be at this moment? As the Korean saying goes, it takes two hands to clap.

I wasn't referring to a specific country; it's more about history. It can be said that if territory constitutes the body, history constitutes the soul. .. Even a very small fire can be greatly inflamed, so it is imperative that we have a hard-headed and correct understanding of history.

After President Xi Jinping took office in China we were able to see some changes, which President Obama also referred to as positive. I believe that China can exert more influence on [North] Korea, I think they can do more...In order for North Korea to change, and in order for the Korean Peninsula to enjoy greater peace, North Korea needs to choose the right path, and China should exert greater influence in inducing North Korea to do so.

When I meet with President Xi Jinping I look forward to engaging in very candid discussions with him on issues that encompass North Korea, its nuclear weapons, as well as peace and stability in Northeast Asia. I also hope to be able to engage in candid discussions with him about whether, if North Korea decides not to become a responsible member of the international community, and chooses not to take the right path, whether this current path that it is taking is sustainable. Is there a future there?

Of course, we can't expect China to do everything, and the Chinese also say they can't do everything. But I do believe there's room for them to undertake more with respect to some material aspects. At the same time China has been able to achieve growth and development through reform and opening, and I think this offers a very good model for [North] Korea to follow, and so they can perhaps strengthen their persuasion of Korea in this regard...North Korea is very heavily dependent on China. South Korean popular attitudes towards the DPRK shift with the level of tension. One ROK post-election poll taken prior to the DPRK's third nuclear test showed that the majority of South Koreans supported renewed dialogue with the DPRK and also favored providing humanitarian aid "[r]egardless of the situation." This was similar to South Korean attitudes following the 2006 nuclear test, after which there was little change in support for supplying humanitarian aid, and the 2009 nuclear test, after which polls showed an increase in support for additional humanitarian aid.⁹⁴ However, a poll taken after the third nuclear test showed that while only 60% of South Koreans felt threatened by the DPRK's test, 55% supported a response of sanctions, while only 37% supported dialogue.⁹⁵

While the same type of public opinion data is often not available for South Koreans' perceptions of the DPRK after missile tests, there is some data accessible for the April and December 2012 tests. After the April 2012 launch, 72% of South Koreans saw the act as a clear provocation and 56% thought it would not change DPRK-ROK relations. However, in a survey assessing the most salient issues to the ROK public, while interest in the DPRK had jumped slightly following the death of Kim Jong-il in December 2011, rising 5.3% to 12.6%, there was a much more muted reaction to the April 2012 launch: interest in DPRK-ROK relations rose only 3.6%, reaching 14.8%. Although this did put it among the top three most important issues to South Koreans, interest in ROK-DPRK did not detract from the two most important issues (job creation and wealth redistribution); instead, interest in public education declined.⁹⁶

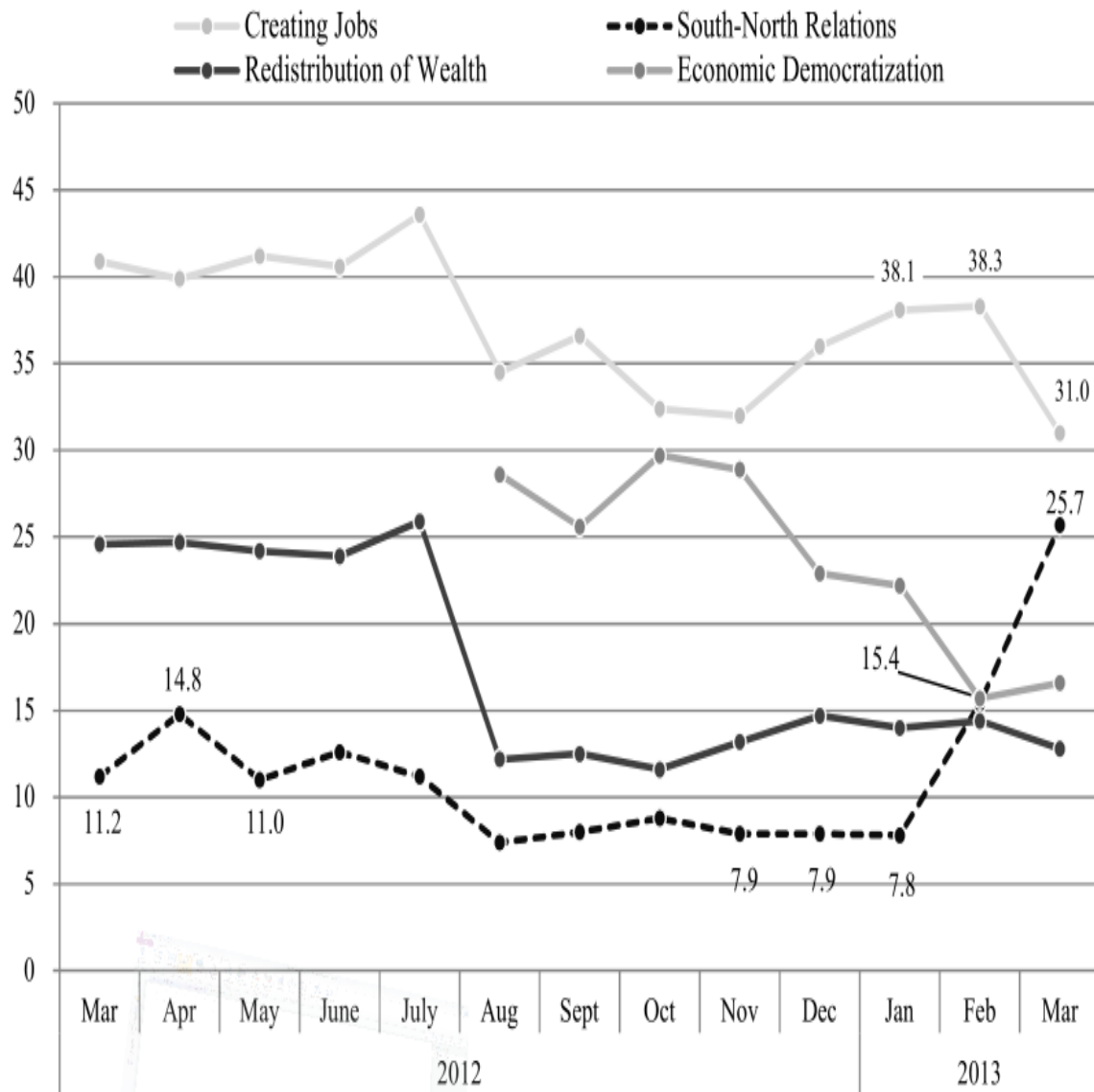
Similarly, after the DPRK's December 2012 missile test, interest in the North-South relations actually declined very slightly, from 7.9% in November 2012 to 7.8% in January 2013. Some explanatory factors include the simultaneous ROK presidential election and the lack of DPRK threats directly following the launch. However, interest in ROK-DPRK relations rose to 25.7% in March 2013 due to the DPRK's third nuclear test and increasingly bellicose rhetoric.⁹⁷ The progression of the four issues most salient to the ROK public, from March 2012 to March 2013, can be seen in **Figure I.3**.

Up until the 2016 nuclear test, Park continued to try and engage with North Korea; her government negotiated an accord with the DPRK government that allowed families to be reunited, while working to promote the Kaesong Industrial Zone. However, the subsequent nuclear and missile tests prompted Park to close Kaesong and makes any further rapprochement during her term seem unlikely.⁹⁸

Looking Toward the Future

The ROK has not yet publically stated how its force posture and strategy will change if the DPRK goes on to create much larger nuclear forces, and react to the changing balance of US and Chinese capabilities that will grow out of the US rebalancing to Asia and China's shifts in strategy and ongoing military modernization. The ROK's public strategies and defense white papers focus largely on past events and the present balance. Like Japan, however, the ROK must assess the ongoing changes in the US-Chinese balance and their level of cooperation versus competition as a key factor in its own security. For all of the reasons outlined in the following chapters, this may lead to a major expansion of ROK military efforts and possibly ROK long-range missile and nuclear programs.

Figure I.3: Most Salient Issues to the South Korean Public, March 2012 - March 2013



Source: Kim Jiyoung and Karl Friedhoff, *The Asan Public Opinion Report*, Asan Institute, March 2013.

US

The US has remained firmly committed to the security of the ROK ever since the Korean War. Thomas Donilon, National Security Adviser to President Obama, stated in March 2013 that the overarching objective of the Obama Administration's Asia policy was to "sustain a stable security environment and a regional order rooted in economic openness, peaceful resolution of disputes, and respect for universal rights of freedom." The policy was based on several key considerations:⁹⁹

This reflected a recognition of the critical role that the United States has played in Asia for decades, providing the stabilizing foundation for the region's unprecedented social and economic development. Beyond this, our guiding insight was that Asia's future and the future of the United States are deeply and increasingly linked. Economically, Asia already accounts for more than one-quarter of global GDP. Over the next five years, nearly half of all growth outside the United States is expected to come from Asia. This growth is fueling powerful geopolitical forces that are reshaping the region: China's ascent, Japan's resilience, and the rise of a "Global Korea," an eastward-looking India and Southeast Asian nations more interconnected and prosperous than ever before.

The 2014 US Quadrennial Defense Review (QDR), which is the primary public document the US issues on national security policy, put US policy towards the ROK in the following broader context,¹⁰⁰

In striving to achieve our ...strategic objectives, the Department will also continue to rebalance and sustain our global posture. We will continue our contributions to the U.S. rebalance to the Asia-Pacific region, seeking to preserve peace and stability in a region that is increasingly central to U.S. political, economic, and security interests. Faced with North Korea's long-range missiles and WMD programs – particularly its pursuit of nuclear weapons – the United States is committed to maintaining peace and security on the Korean Peninsula. As part of our broader efforts for stability in the Asia-Pacific region, the United States will maintain a robust footprint in Northeast Asia while enhancing our presence in Oceania and Southeast Asia.

...The United States has been a Pacific power for more than a century, with deep and enduring economic and security ties to the region. Particularly in the past six decades, the United States has helped ensure peace and prosperity in the Asia-Pacific region through our commitment to free and open commerce, promotion of a just international order, and maintenance of open access to shared domains. U.S. economic, security, and people-to-people ties with the region are strong and growing.

The Asia-Pacific region is increasingly central to global commerce, politics, and security. Defense spending in this region continues to rise. As nations in the region continue to develop their military and security capabilities, there is greater risk that tensions over long-standing sovereignty disputes or claims to natural resources will spur disruptive competition or erupt into conflict, reversing the trends of rising regional peace, stability, and prosperity. In particular, the rapid pace and comprehensive scope of China's military modernization continues, combined with a relative lack of transparency and openness from China's leaders regarding both military capabilities and intentions.

A multilateral security architecture – composed of groups such as the Association of South East Asian Nations (ASEAN) and regional actors collaborating on issues ranging from humanitarian assistance to maritime security to counterterrorism – is emerging to help manage tensions and prevent conflict. Traditional anchors of regional security such as Australia, Japan, and the Republic of Korea (ROK), and growing powers such as India and Indonesia, are taking on additional leadership roles to foster increased communication and shared understanding.

As many Asia-Pacific countries seek to achieve greater prosperity, establish regional norms, and strive for a stable military balance, North Korea remains closed and authoritarian. North Korea's long-range missile and weapons of mass destruction (WMD) programs – particularly its pursuit of nuclear weapons in contravention of its international obligations – constitutes a significant threat to peace and stability on the Korean Peninsula and in Northeast Asia and is a growing, direct threat to the United States.

...Supporting the broader U.S. rebalance to the region, the United States will maintain a robust footprint in Northeast Asia while enhancing our presence in Oceania, Southeast Asia, and the Indian Ocean. By 2020, 60 percent of U.S. Navy assets will be stationed in the Pacific, including enhancements to our critical naval presence in Japan. This will include LCSs rotated through Singapore, a greater number of destroyers and amphibious ships home-ported in the Pacific, and the deployment of surface vessels such as Joint High Speed Vessels to the region. The Department is increasing the number of U.S. naval and air forces and relocating Marines to Guam as part of our distributed laydown, which will result in a force posture that is more geographically distributed, operationally resilient, and politically sustainable.

The U.S. Air Force already stations assets in the Asia-Pacific region, including tactical and long-range strike aircraft, and will move additional forces such as ISR assets to the region, operating in concert with allies and partners to improve land, air, and maritime domain awareness. The deployment of Marines to Darwin, Australia will grow with the goal of establishing a rotational presence of a 2,500 strong Marine Air Ground Task Force (MAGTF) over the coming years.

Even during the past decade while engaged in two warfights, the U.S. Army maintained a viable, substantial presence on the Korean peninsula and in Northeast Asia to deter aggression and demonstrate commitment to regional stability. The end of U.S. combat in Iraq and Afghanistan will mean that forces currently allocated to these conflicts will be available to return to their assigned home stations – many of which are in the Asia-Pacific region – to support the rebalance or for other missions. These forces will resume regular bilateral and multilateral training exercises, pursue increased training opportunities to improve capabilities and capacity of partner nations, as well as support humanitarian, disaster relief, counterterrorism, and other operations that contribute to the stability of the region.

The Department of Defense FY2015 defense budget request reinforced these policies,¹⁰¹

...the Department will...continue to rebalance and sustain our global posture. We will continue our contributions to the U.S. rebalance to the Asia-Pacific, seeking to preserve peace and stability in a region that is increasingly central to U.S. political, economic, and security interests. Faced with North Korea's pursuit of long-range missiles, and weapons of mass destruction—particularly nuclear weapons—the United States is committed to maintaining peace and security on the Korean Peninsula. As part of our broader efforts for stability in the Asia-Pacific, the United States will maintain a robust footprint in Northeast Asia while enhancing our presence in Oceania and Southeast Asia.

The US has also continued to work with South Korea in areas like reshaping their joint command responsibilities in the event of war, and dealing with the emerging missile and nuclear threat from North Korea. The US, ROK, and Japan signed a trilateral information sharing arrangement concerning the nuclear and missile threats posed by North Korea on December 24, 2014 that created a framework by which the defense authorities of the United States, the Republic of Korea, and Japan may voluntarily share classified information. The Department of Defense is to serve as the hub for information shared trilaterally.¹⁰²

The Koreas and the Rebalance of US Interests in Asia

Current US policy calls for a rebalancing of US strategy in Asia composed of five strategic pillars: strengthening alliances, forging deeper partnerships with emerging powers, building a constructive relationship with China, strengthening regional institutions, and building an economic architecture to increase the benefits of trade and growth for countries in the Asia-Pacific region and the US – such as through the US-ROK FTA and the Trans-Pacific Partnership (TPP).

The US alliances with ROK and Japan do clearly remain the foundation of the US's regional security and economic policies. Moreover, polls in both the ROK and Japan show approximately 80% support for the alliances with the US. Greater trilateral cooperation is envisioned as key to

maintain security. Militarily – discussed in more detail later in this report – the rebalance involves.¹⁰³

...in the coming years a higher proportion of our military assets will be in the Pacific. Sixty percent of our naval fleet will be based in the Pacific by 2020. Our Air Force is also shifting its weight to the Pacific over the next five years. We are adding capacity from both the Army and the Marines. The Pentagon is working to prioritize the Pacific Command for our most modern capabilities – including submarines, Fifth-Generation fighters such as F-22s and F-35s, and reconnaissance platforms. And we are working with allies to make rapid progress in expanding radar and missile defense systems to protect against the most immediate threat facing our allies and the entire region: the dangerous, destabilizing behavior of North Korea.

In terms of the China-US relationship, US strategy indicates that cooperation and competition will both continue, though US policy has consistently been “to improve the quality and quantity of our cooperation, promote healthy economic competition, and manage disagreements to ensure that US interests are protected and that universal rights and values are respected.... the United States welcomes the rise of a peaceful, prosperous China.” In order to achieve these goals, communication channels must be improved and practical cooperation on important issues demonstrated.¹⁰⁴

To that end, a deeper U.S.-China military-to-military dialogue is central to addressing many of the sources of insecurity and potential competition between us. This remains a necessary component of the new model we seek, and it is a critical deficiency in our current relationship. The Chinese military is modernizing its capabilities and expanding its presence in Asia, drawing our forces into closer contact and raising the risk that an accident or miscalculation could destabilize the broader relationship. We need open and reliable channels to address perceptions and tensions about our respective activities in the short-term and about our long-term presence and posture in the Western Pacific.

It is also critical that we strengthen the underpinnings of our extensive economic relationship, which is marked by increasing interdependence. We have been clear with Beijing that as China takes a seat at a growing number of international tables, it needs to assume responsibilities commensurate with its economic clout and national capabilities. As we engage with China’s new leaders, the United States will encourage them to move forward with the reforms outlined in the country’s twelfth Five Year Plan, including efforts to shift the country away from its dependence on exports toward a more balanced and sustainable consumer-oriented growth model. The United States will urge a further opening of the Chinese market and a leveling of the playing field. And the United States will seek to work together with China to promote international financial stability through the G-20 and to address global challenges such as climate change and energy security.

Another such issue is cyber-security, which has become a growing challenge to our economic relationship as well. Economies as large as the United States and China have a tremendous shared stake in ensuring that the Internet remains open, interoperable, secure, reliable, and stable. Both countries face risks when it comes to protecting personal data and communications, financial transactions, critical infrastructure, or the intellectual property and trade secrets that are so vital to innovation and economic growth.

It is in this last category that our concerns have moved to the forefront of our agenda. I am not talking about ordinary cybercrime or hacking. And, this is not solely a national security concern or a concern of the U.S. government. Increasingly, U.S. businesses are speaking out about their serious concerns about sophisticated, targeted theft of confidential business information and proprietary technologies through cyber intrusions emanating from China on an unprecedented scale. The international community cannot afford to tolerate such activity from any country. As the President said in the State of the Union, we will take action to protect our economy against cyber-threats.

From the President on down, this has become a key point of concern and discussion with China at all levels of our governments. And it will continue to be. The United States will do all it must to protect our national networks, critical infrastructure, and our valuable public and private sector property. But, specifically with respect to the issue of cyber-enabled theft, we seek three things from the Chinese side. First, we need a

recognition of the urgency and scope of this problem and the risk it poses—to international trade, to the reputation of Chinese industry and to our overall relations. Second, Beijing should take serious steps to investigate and put a stop to these activities. Finally, we need China to engage with us in a constructive direct dialogue to establish acceptable norms of behavior in cyberspace.

The Military Aspects of US Rebalancing

These policies all, however, require resources and most US policies towards its future force deployments and modernization in Asia have not yet been publically tied to specific implementation plans. The US was still debating both the overall shape of its “rebalancing to Asia,” at the end of 2014. The US has also been making major cuts in its defense spending whose size and impact is not yet predictable, and in spite of a leveling of its baseline defense expenditures in FY2013-2015, and in projected spending for 2016-2019. Debates over civil spending, the deficit, federal debate, and Sequestration could lead to further cuts. Furthermore, the US will inevitably react to the fact Northeast Asia is continuing to go through a period of significant political transition – with a new DPRK leader at the end of 2011, a Japanese leadership change at the end of 2012, and leadership transitions in both the ROK and China in early 2013.¹⁰⁵

Given this background, it is not surprising that the US has not announced its overall plans for reshaping its forces that affect the Korean balance, Northeast Asia, and Pacific. Even if it had, it is unclear that such plans would be fully funded, or would be stable in the face of the changes taking place in DPRK nuclear capabilities and every aspect of Chinese military forces.

The US Joint Chiefs of Staff (JCS) have, however, issued a number of documents explaining the changes being made in strategy and force posture in Asia since this became part of the new defense strategy issued by the DOD in late 2011. Deputy Secretary of Defense Ashton Carter described the rebalance to Asia in detail in a speech on April 8, 2013. He discussed that the rebalance involves an investment of time, energy, and intellectual capital, in the Asia-Pacific region, across the US government, and that “we’re not only rebalancing to the Asia Pacific, but also within the Asia Pacific, in recognition of Southeast Asia and South Asia to the region as a whole.” And, while the “rebalance to Asia is mostly a political and economic concept, not a military one,” there are some significant military components.¹⁰⁶ This tracks with JCS Chairman General Martin Dempsey’s April 2013 remark that the US would now carry out an Asia-Pacific policy of “three mores:” more interest, more engagement, and more quality assets.¹⁰⁷

Militarily, the rebalance to Asia is composed of five pillars: force structure decisions, presence and posture, investments (in technology, weapons systems, and human capital), innovations in operational plans and tactics, and strengthening alliances and partnerships in the region. Particularly in terms of the first pillar, Carter noted that, as the US draws down from Afghanistan, the military will be releasing significant capabilities that will be re-deployed to the Asia-Pacific.¹⁰⁸

For the Navy, naval surface combatants and eventually carriers, as well as naval intelligence, surveillance, and reconnaissance, and processing, exploitation and dissemination capabilities, will be moved to the Asia-Pacific region. Already, EP-3 signals reconnaissance aircraft have been moved from CENTCOM to PACOM, and soon CENTCOM will be releasing Firescout UAVs and several electronic surveillance aircraft from Afghanistan. P-3s will also be returned to PACOM. In addition, the Navy is adding a fourth forward-deployed naval force SSN to Guam.¹⁰⁹

Overall, the Navy is shifting its posture to the Asia-Pacific, with up to 60% of its naval assets assigned to the region by 2020. This shift will take place in three main ways. First, the US will

move six of the 10 destroyers based in Spain for ballistic missile defense to the Asia-Pacific region, leaving four to protect the US's European allies. Secondly, destroyers and amphibious ships that have conducted security cooperation and humanitarian assistance missions in South America, Africa, and Europe, will be replaced by new joint high-speed vessels and littoral combat ships under construction. This move will free destroyers and amphibious ships to deploy to the Asia-Pacific. Thirdly, the Navy will generate more forward presence, such as the joint high-speed vessel littoral combat ships and mobile landing platforms that use rotating military or civilian crews.¹¹⁰

The Air Force will also shift capacity from Afghanistan to the Asia-Pacific, including ISR assets like the MQ-9 Reaper, U-2, and Global Hawk. The Air Force will also allocate space, cyber, tactical aircraft, and bomber forces to the region – 60% of its overseas-based processes are already stationed there, including 60% of combat F-22s. More B-1s will be available from Afghanistan, augmenting the B-52s already on continuous rotational presence in the Asia-Pacific.¹¹¹

The Army has approximately 91,000 soldiers and civilians assigned to the Asia-Pacific, including the forward presence of eight active component Brigade Combat Teams, 12 batteries of Patriots, and many theater-enabling units. After a decade of using PACOM assets in CENTCOM, PACOM will regain control of the other 60,000 soldiers assigned to the Asia-Pacific. Army units assigned to PACOM will focus on PACOM-specific mission profiles – like bilateral training exercises. The Army is preferentially protecting the readiness and modernization of soldiers in the ROK. The Marines also have roughly 18,000 forward-deployed in the region, and is increasing infantry battalions (rotational). An EA-6 Prowler squadron and more heavy lift and attack helicopters will be added to the region as well.¹¹²

Across the region, the US military will be modernizing and enhancing its forward presence, including by adding aviation capability in Japan, upgrading missile defense posture, and working to revise US-Japanese defense guidelines to meet the challenges of the 21st century. The US and Japan have achieved an important milestone in the effort to realign the Marine Corps presence in Okinawa, which helps build an operationally resilient and sustainable posture in Northeast Asia.¹¹³

Shaping an Integrated Response

In his April 2013 speech, then Deputy Secretary of Defense Carter emphasized the need to have an internationally integrated response in dealing with the DPRK. And, he stressed that the rebalance is “not aimed at anyone – no individual country or group of countries.” In closing, Carter argued that the US's rebalance to Asia was sustainable and would continue for a variety of reasons.¹¹⁴

The rebalance will continue, and in fact gain momentum for two reasons: First, U.S. interests in the region are enduring, and so also will be our political and economic presence. This presence is accompanied by values of democracy, freedom, human rights, civilian control of the military, and respect for the sovereignty of nations that America has long stood for, and that human beings welcome and I think relate to. So our interest in staying a pivotal force in the region will, we believe, be reciprocated.

Second, we have the resources to accomplish the rebalance. Some who wish to question the rebalance to the Asia-Pacific theater point to the current, seemingly endless debate in Washington about the U.S. budget, and wonder whether all this can be accomplished.

I'm interested to hear this because I'm more accustomed to listening to people question why the U.S. spends more on defense than the next 16 largest militaries in the world combined. This statistic is true and won't change much in coming years. It's also worth noting that most of the rest of the money that the world spends on defense is spent by countries that are allies and friends of the United States. These levels of defense spending are a reflection of the amount of responsibility that the U.S. and its friends and allies share for providing peace and security.

You may also be wondering whether the sequester will change these facts in a significant way. It won't, and here's why: Sequester was never intended to be implemented and is very disruptive because it gives us very little managerial flexibility in where we take budget adjustments this year. But wherever we have flexibility, we are favoring and protecting the rebalance. We continue to review and revise our plans for executing the FY13 budget in the face of sequester, increased costs of the Afghanistan campaign, and the fact that we only recently got an appropriation. Back in January I gave direction about what is exempt from or protected from sequestration, and the Services and components are applying that guidance. It explicitly directs the protection, wherever possible, of activities related to the rebalance this year.

The main point is that the arbitrary cuts that sequester imposes under the Budget Control Act are temporary, lasting through October of this year. In other words, sequester is an artificial, self-inflicted political problem, not a structural problem. Hopefully, the turmoil and gridlock will end and the U.S. can get back to normal budgeting.

When it does, Congress and the President will decide what DoD's budget will be in the years beyond fiscal year 2013. The President has been clear about holding defense spending steady in the long run or reducing it by a few percentage points, including especially by improving efficiency of defense spending. If the drastic cuts that began with sequester this year were extended for a decade, U.S. defense spending would be cut somewhere around ten percentage points. This is the range under debate today. None of these political scenarios changes the math I described earlier: the U.S. defense rebalance to the Asia-Pacific is not in jeopardy.

That said, there is obviously considerable uncertainty about where an overall budget agreement, which is needed to end the current turmoil, will lead. And what is clear to us in DoD is that we need to think and act ahead of this uncertainty, and not in reaction to it. Moreover, it's not the budget but strategic necessity that requires us to examine and reexamine our defense in a fundamental way: strategically, we are turning a corner after ten years of war, and we need to master the security challenges that will define the future. And, as you know I believe deeply, we need to improve the way we spend the taxpayer's defense dollar, always striving for what I've called Better Buying Power....

Finally, it is important to stress that the strength of our rebalance is not measured only by comparing defense budget levels. The end of the war in Iraq and the reduction in Afghanistan allow us to shift the great weight of effort from these wars to our stabilizing presence in the Asia-Pacific region. Next, this weight has accumulated over decades of U.S. defense spending, so you have to consider a nation's defense investments over time. It takes decades to build a military capability of the kind the U.S. has.

And probably most importantly, another feature of the U.S. military today is that its operational experience is unrivaled, including such attributes as the ability to work constructively with partners, fuse intelligence and operations, to operate jointly among services, and to support forces with logistics – all of these skills honed in Iraq and Afghanistan. For these reasons – enduring values and increasing military power – the United States can and will succeed in rebalancing to the Asia-Pacific in the years to come.

Focusing on the Koreans

US military strategy towards the Koreans reflects these policies, although the US has not yet defined what “rebalancing” means in any mid or long-term detail, and its strategy will have to adapt to force developments in the ROK, future USFJ resources, and DPRK and Chinese actions. In a 2010 report, US Forces Korea (USFK) remarked, “the Korean peninsula is the strategic lynchpin of Northeast Asia and is vital to America's position in the region, as well as America's security and prosperity.” The ROK-US alliance helps ensure regional stability and USFK is committed to strengthening the alliance, especially in terms of the Strategic Alliance 2015 plan.¹¹⁵

- Refining and improving our combined ROK-U.S. defense plans.
- Defining and developing new organizational structures required for the ROK to lead the war effort.
- Implementing more realistic exercises based on the North Korea of today and the future.
- Preparing for the transfer of wartime operational control to the ROK Joint Chiefs of Staff in December 2015.
- Consolidating U.S. military units within two enduring hubs as part of the Yongsan Relocation Program and Land Partnership Program.

The US national military strategy developed in 2014, described the US strategy for Korea and Northeast Asia – and for shaping the Korean military balance – as follows:¹¹⁶

A multilateral security architecture – composed of groups such as the Association of South East Asian Nations (ASEAN) and regional actors collaborating on issues ranging from humanitarian assistance to maritime security to counterterrorism – is emerging to help manage tensions and prevent conflict. Traditional anchors of regional security such as Australia, Japan, and the Republic of Korea (ROK), and growing powers such as India and Indonesia, are taking on additional leadership roles to foster increased communication and shared understanding. (p. 4)

We will continue our contributions to the U.S. rebalance to the Asia-Pacific region, seeking to preserve peace and stability in a region that is increasingly central to U.S. political, economic, and security interests. Faced with North Korea's long-range missiles and WMD programs – particularly its pursuit of nuclear weapons – the United States is committed to maintaining peace and security on the Korean Peninsula. As part of our broader efforts for stability in the Asia-Pacific region, the United States will maintain a robust footprint in Northeast Asia while enhancing our presence in Oceania and Southeast Asia. (p. viii)

As many Asia-Pacific countries seek to achieve greater prosperity, establish regional norms, and strive for a stable military balance, North Korea remains closed and authoritarian. North Korea's long-range missile and weapons of mass destruction (WMD) programs – particularly its pursuit of nuclear weapons in contravention of its international obligations – constitutes a significant threat to peace and stability on the Korean Peninsula and in Northeast Asia and is a growing, direct threat to the United States. (p. 4)

We will retain and strengthen our power projection capabilities so that we can deter conflict, and if deterrence fails, win decisively against aggressors. The North Korean regime continues to pursue interests counter to those of the United States. Faced with this threat, the United States is committed to maintaining peace and security on the Korean Peninsula and closely monitors the situation through military and diplomatic channels in coordination with the ROK, Japan, China, and Russia. The U.S. Armed Forces will continue their close collaboration with the ROK military to deter and defend against North Korean provocations. The ROK military is a highly capable, professional force that is increasing its ability to lead the defense of Korea. The United States trains regularly with members of the ROK military and participates in a variety of bilateral and multilateral exercises aimed at increasing interoperability. (p. 20)

As noted earlier, the 2014 Quadrennial Defense Review re-emphasized the US rebalancing to the Asia-Pacific first set forth in the US defense strategic planning guidance issued in early 2012. The QDR projected that by 2020, “60 percent of US Navy assets will be stationed in the Pacific.” (p. 34) In regards to North Korea, ballistic missile defense takes center stage as the US deploys a second radar in Japan that can track and provide early warning of ballistic missiles from North Korea. Although the QDR considers North Korea's ballistic missile capabilities a “limited ballistic missile threat,” (p. 13), it projects that an ICBM threat to the US homeland will exist in the 2020s (p. 32). While several countries with advanced militaries already field ballistic missiles that can reach the US, current “limited threats” that may develop into much more serious ones later appears to be of concern.

Similarly, the updated US National security Strategy issued in February 2015 reaffirmed the US commitment to South Korea in the broader context of US strategy for the Pacific region,¹¹⁷

Our commitment to the denuclearization of the Korean Peninsula is rooted in the profound risks posed by North Korean weapons development and proliferation... The United States has been and will remain a Pacific power. Over the next 5 years, nearly half of all growth outside the United States is expected to come from Asia. That said, the security dynamics of the region—including contested maritime territorial claims and a provocative North Korea—risk escalation and conflict. American leadership will remain essential to shaping the region's long-term trajectory to enhance stability and security, facilitate trade and commerce through an open and transparent system, and ensure respect for universal rights and freedoms.

To realize this vision, we are diversifying our security relationships in Asia as well as our defense posture and presence. We are modernizing our alliances with Japan, South Korea, Australia, and the Philippines and enhancing the interactions among them to ensure they are fully capable of responding to regional and global challenges. We are committed to strengthening regional institutions such as ASEAN, the East Asia Summit, and Asia-Pacific Economic Cooperation to reinforce shared rules and norms, forge collective responses to shared challenges, and help ensure peaceful resolution of disputes. We are also working with our Asian partners to promote more open and transparent economies and regional support for international economic norms that are vital to maintaining it as an engine for global economic growth. The TPP is central to this effort.

As we have done since World War II, the United States will continue to support the advance of security, development, and democracy in Asia and the Pacific. This is an important focus of the deepening partnerships we are building in Southeast Asia including with Vietnam, Indonesia, and Malaysia. We will uphold our treaty obligations to South Korea, Japan, the Philippines, and Thailand, while encouraging the latter to return quickly to democracy. We will support the people of Burma to deepen and sustain reforms, including democratic consolidation and national reconciliation.

The United States welcomes the rise of a stable, peaceful, and prosperous China. We seek to develop a constructive relationship with China that delivers benefits for our two peoples and promotes security and prosperity in Asia and around the world. We seek cooperation on shared regional and global challenges such as climate change, public health, economic growth, and the denuclearization of the Korean Peninsula. While there will be competition, we reject the inevitability of confrontation. At the same time, we will manage competition from a position of strength while insisting that China uphold international rules and norms on issues ranging from maritime security to trade and human rights. We will closely monitor China's military modernization and expanding presence in Asia, while seeking ways to reduce the risk of misunderstanding or miscalculation. On cybersecurity, we will take necessary actions to protect our businesses and defend our networks against cyber-theft of trade secrets for commercial gain whether by private actors or the Chinese government

US interests on the Korean Peninsula include denuclearization, preventing proliferation of nuclear and missile technology, the threat of DPRK nuclear weapons leading others – such as the ROK or Japan – to develop their own nuclear deterrent, deterring a DPRK attack against US allies, a reunified Korea under ROK control, and improving DPRK citizens' quality of life.¹¹⁸ For many years, the US has worked to convince the DPRK to give up its nuclear weapons and ballistic missiles, with little success. According to an analysis by David Kang and Victor Cha,¹¹⁹

Since Ronald Reagan's time in office, successive U.S. administrations have put forward the idea that if insecurity and relative deprivation drive North Korea's obsession with nuclear weapons, then surely the answer is for the United States and neighboring countries to guarantee a peaceful peninsula, and provide money, food, and political recognition to the regime. This has been the basis of the agreements reached with North Korea in 1994 under Bill Clinton and in 2005 under George W. Bush.

From 1989 to 2010, U.S. presidents, their national security advisers, and secretaries of state have given written and verbal assurances of non-hostile intent and a willingness to engage to the North over 33 times. Pyongyang acknowledged, rejected, and ignored these assurances, all the while continuing with their nuclear and weapons programs. In fact, the record of U.S. engagement is pretty impressive. In addition to massive amounts of food, energy, and other economic assistance given over a period from 1994 to 2008, two former U.S. presidents (Clinton and Carter) have visited with the North Korean leadership to express U.S. good intentions, as have (in less formal contexts) the New York Philharmonic, Google Chairman Eric Schmidt, and of course Dennis Rodman.

Presidents Clinton, Bush, and Obama have each written personal letters directly to the North Korean leader about a willingness to make a deal. And when North Koreans have visited the United States, they have been hosted by everyone from Gov. Bill Richardson to Henry Kissinger, and been given the company of luminaries such as Paul Volcker, Winston Lord, and Bob Hormats. Clearly, this charm offensive hasn't worked. Signing a peace treaty in advance of denuclearization would recognize and legitimize Pyongyang's nuclear status, leaving it little incentive to shed those weapons. North Koreans have said to me that a peace treaty is just a piece of paper; why would they give up their cherished nuclear program for that?

An Uncertain Degree of Strategic Patience

The Obama Administration has pursued a policy of “strategic patience” towards the DPRK, waiting for verifiable changes before making any large concessions. The US has repeatedly called for the DPRK to take concrete, irreversible denuclearization steps along the lines of the 2005 Six Party Talks Joint Statement, comply with international law (including UN Security Council Resolutions), stop provocative moves, and improve relations with its neighbors.¹²⁰

In particular, the US current policy towards the DPRK is based on close and expanded cooperation with the ROK and Japan, close coordination with China, a refusal to reward bad DPRK behavior such as by yielding to threats or accepting empty promises, reaffirming the US commitment to the defense of both its homeland and its allies, and encouraging the DPRK to choose a better path. If the DPRK is willing to negotiate and implement commitments in good faith, the US is willing to provide both food and economic development assistance. The Obama Administration has stated on many occasions that it will not accept the DPRK as a nuclear state or stand by while the DPRK seeks to develop nuclear-armed missiles that could threaten the US.¹²¹

While the Obama Administration has conveyed the potential for dialogue and assistance to the DPRK, overall Obama's policies have actually resembled those of the Bush Administration: “demanding irreversible denuclearization, applying financial sanctions, carrying out military exercises, and demanding a North Korean return to, and reaffirmation of, the denuclearization commitments of the Six-Party Talks” are among the primary similarities.¹²² However, the continued progression of North Korea's nuclear program has raised questions on the long-term viability of the strategic patience policy. Since Kim Jung-un's rise to power, the DPRK has not slowed its pursuit of an effective nuclear arsenal, continuing with nuclear tests and missile launches despite continued US and international pressure. In light of this seemingly unimpeded progress, some commentators have called for clear “red lines” on the DPRK nuclear program that will provoke a more aggressive US posture.¹²³

At the same time, it is important to stress that the US does operate in a more constrained budget atmosphere. These issues are discussed in more detail in Chapters II and III, and Chapter IX. There is no way to predict their full impact as of yet, but the International Institute for Strategic Studies (IISS) is scarcely the only outside voice that argues that the US “rebalance towards Asia” has not yet been followed by a clear list of actions that shift military capabilities to the Asia-Pacific theater, and that resources may drive the US force posture as much as strategy.¹²⁴

For all the talk of the military rebalancing to Asia, the steps taken towards this in the FY2013 budget, issued on 13 February 2012, were modest. Troop numbers in Europe were slated to drop by 10,000 to about 70,000, while marines were to be deployed to Australia and Littoral Combat Ships to Singapore. In the Middle East, the number of troops deployed will be significantly below their peak level, but substantial assets remain in Kuwait and other locations such as Bahrain (US Fifth Fleet and NAVCENT HQ) and Qatar (home to a Combined Air Operations Center and a USAF Central Command forward-deployed headquarters). Since its themes had been foreshadowed in previous announcements, the main interest in the budget was in the detail of the many cuts proposed for the military and its equipment programs. But the budget's publication was the beginning rather than the end of the process: it shifted battles about specific reductions beyond the Pentagon hierarchy and into the political arena.

As had been the case ever since the US first raised the issue of rebalancing its strategy to Asia, the FY2016 budget request that President Obama circulated in February 2015 did nothing to clarify the situation. It did not describe any plan, but the Department of Defense summary of the request did state that:¹²⁵

It is important to note that the FY 2016 budget request comes after several years of declining defense budgets. The post-Iraq/Afghanistan defense drawdown is the fifth major defense drawdown since the end of World War II (WWII), following those after WWII and the Korean, Vietnam, and Cold wars. This decline began with the FY 2010 budget.

With continuing fiscal and strategic uncertainty, this FY 2016 budget request reflects the Department's attempt to fashion a coherent defense program with the proper balance between capacity, capabilities, and current and future readiness. The FY 2016 funding levels will allow the military to protect and advance U.S. interests and execute the updated defense strategy - but with somewhat increased levels of risk for some missions. The Department will continue to experience gaps in training and maintenance over the near term and will have a reduced margin of error in dealing with risks of uncertainty in a dynamic and shifting security environment over the long term. As a global leader, the United States requires a robust national defense strategy to protect and advance its interests, and ensure the security of its allies and partners, with a military that can implement that strategy effectively. This can only be achieved by the package of balanced reforms and initiatives that the Department is presenting to Congress and will require Congress partnering with DoD to make politically difficult choices. Most importantly, the specter of sequestration needs to be eliminated. The QDR strategy cannot be executed at sequester-levels of funding.

If anything, the Department of Defense request seemed to back away from an emphasis on Asia and described a much vaguer and resource-driven rebalancing of the force that reflected the growing problems in Europe raised by Russian pressure on the Ukraine failed to establish any clear global priorities:¹²⁶

The Department must rebalance the Joint Force to address major changes in the security environment.

Rebalancing for a broad spectrum of conflict. Future conflicts could range from hybrid contingencies against non-state actors to high-end conflicts against states armed with weapons of mass destruction and/or advanced anti-access and area-denial capabilities. To address this diverse range of challenges, the U.S. military will broaden its capabilities to the full spectrum of possible operations. While preserving hard-won expertise in counterinsurgency and stability operations, the Joint Force must also be prepared to battle sophisticated adversaries employing advanced warfighting capabilities, to include space and cyber capabilities. The Department will sustain robust investments in science, technology, research, and development in areas most critical to meeting future challenges or where there is greatest potential for game-changing advances.

Rebalancing and sustaining presence and posture abroad to protect U.S. national security interests. In meeting its priorities, the Department will continue to rebalance and sustain its global posture. The Department will continue its contributions to the Asia-Pacific rebalance, while remaining fully committed to the security of allies and partners in the Middle East. The Department will continue to work with allies and partners in Europe to promote regional security, Euro-Atlantic integration, enhanced military capability, and enhanced interoperability. Across the globe, DoD will ensure that the Joint Force is properly manned, trained, and equipped in the event of a crisis.

Rebalancing capability, capacity, and readiness within the Joint Force. After more than 10 years of conflict and amid ongoing budget reductions, the Joint Force’s full spectrum readiness capabilities have atrophied. Taking the prudent steps outlined in the QDR will improve the Department’s ability to meet national security needs. Key force structure decisions in this QDR include:

- Sustaining a world-class Army capable of conducting the full range of operations on land including prompt and sustained land combat by maintaining a force structure that it can train, equip, and keep ready. Under the Quadrennial Defense Review (QDR), the Department will rebalance within the Army, across the Active, Guard, and Reserve components. The active component of the Army will reduce its planned post-war end strength from the 490,000 soldiers proposed in the budget for FY 2015 to 450,000 personnel by the end of FY 2018. The Army National Guard will reduce its planned force structure from 350,200 in FY 2015 to 335,000 soldiers by the end of FY 2017. If the Department returns to the funding levels in the Budget Control Act of 2011, the Army will be forced to downsize to 420,000 Active Component soldiers and 315,000 Reserve Component soldiers. These drawdowns would be detrimental to meeting the defense strategy outlined in the QDR.
- Providing stability in shipbuilding to affordably deliver warfighting requirements. The FY 2016 budget includes construction of 48 ships across the Future Years Defense Program (FYDP), including the steady production of destroyers and submarines; construction of ten ships of each type is funded through FY 2020. The Department of the Navy will build 14 Littoral Combat Ships (LCS) in the FYDP, the last 5 of which will be of the modified LCS configuration. The modified configuration program begins in FY 2019 with no gap from earlier LCS production; it provides improvements in ship lethality and survivability, delivering enhanced naval combat performance at an affordable price. The FYDP shipbuilding construction program also includes one aircraft carrier; one LHA replacement; one Landing Ship, Dock replacement (LX(R)); five T-ATF(X) fleet ocean tugs; one afloat forward staging base platform; and four T-AO(X) fleet oilers. The FY 2016 budget also funds the overhaul/life extension of the *USS GEORGE WASHINGTON* (CVN-73), its Carrier Air Wing, and associated force structure. If the Department returns to sequester-level funding, the Navy will be forced to retire this carrier and air wing, and it will be unable to procure approximately 9 ships and 35 aircraft over the FYDP. These cuts would jeopardize the Navy’s modernization and recapitalization plans, threatening both readiness and the industrial base.
- Maintaining the role of the Marine Corps as a vital crisis response force, protecting its most important modernization priorities and ensuring readiness but reducing from 184,100 end strength in FY 2015 to a planned end strength of 182,000 active Marines by the end of FY 2017. If sequester-level cuts return, the Marines would continue their drawdown to an end strength of 175,000 by 2019, which would be detrimental to meeting the defense strategy outlined in the QDR.
- Maintaining an Air Force with global power projection capabilities and modernizing next generation Air Force combat equipment — to include fighters, bombers, and munitions — particularly against increasingly sophisticated air defense systems. To make resources available for these programs and preserve investments in critical capabilities, the Air Force will reduce capacity in some single-role aviation platforms by the end of the FYDP. A return to sequester-level funding would necessitate additional force structure reductions plus cuts to flying hours and weapon sustainment that would delay readiness recovery.
- Achieving the right balance between the Active Component (AC) and the Reserve Component (RC) is critical to the Department’s overall efforts to size and shape the future joint force. The RC provides capabilities and capacity that complement those of the AC and bolster the ability of the joint force to execute the national defense strategy. As the Department reshapes the joint force, it will continue to rely on the RC to maintain those complementary capabilities and capacity.

As the joint force rebalances to remain modern, capable, and ready — while reducing end strength—the Department will take the following additional steps that are consistent with the President’s Budget submission to protect key capability areas:

- Air/Sea. The Department will increase the joint force’s ability to counter advanced anti-access and area-denial capabilities by continuing to invest in fifth-generation fighters and long-range strike aircraft, survivable persistent surveillance, resilient architectures, and undersea warfare capabilities.
- Nuclear Deterrence. The DoD will continue to invest in modernizing the triad’s essential nuclear delivery systems, command and control, and, in collaboration with the Department of Energy, nuclear weapons and

supporting infrastructure.

- Space. The DoD will move toward less complex, more affordable, more resilient systems and system architectures and pursue a multi-layered approach to deter attacks on space systems.
- Missile Defense. The DoD will make targeted investments in defensive interceptors, discrimination capabilities, and sensors.
- Cyber. The Department will continue to invest in new and expanded cyber capabilities and forces to operate and defend DoD's networks, enhance its ability to conduct cyberspace operations, support military operations worldwide; and to counter cyber-attacks against the U.S.
- Precision Strike. The DoD will procure advanced air-to-surface missiles that will allow fighters and bombers to engage a wide range of targets and a long-range anti-ship cruise missile that will improve the ability of U.S. aircraft to engage surface combatants in defended airspace.
- Intelligence, Surveillance, and Reconnaissance (ISR). The DoD will rebalance investments toward systems that are effective in highly contested environments while sustaining capabilities appropriate for more permissive environments in order to support global situational awareness, counter-terrorism, and other operations.
- Counter-Terror and Special Operations. The DoD will slightly increase Special Operations Forces growth to an end strength of 69,900 personnel, protecting DoD's ability to sustain persistent, networked, distributed operations to defeat al Qaeda and other terrorist networks, counter other emerging transnational threats, counter weapons of mass destruction, build the capacity of U.S. partners, and support conventional operations.

If the Department returns to sequester-level funding, the ability to hedge against future risk with these investments in key capability areas would be put at risk. The ability to hedge against near-term risk by bolstering readiness will also be undermined.

The FY 2017 budget request kept this general language, focusing on a range of different specific global security challenges as oppose to general regional rebalancing (though it does label North Korea and China as potential security challenges):¹²⁷

The Department must balance the Joint Force and adapt to changes in the security environment. The Secretary of Defense has directed the Department to prioritize the challenges presented by ongoing or possible future aggression from China, Russia, Iran, and North Korea, as well as maintaining the capabilities to conduct ongoing counter-terrorism operations.

These five challenges are informative to balancing the Joint Force. Balancing for broad spectrum of conflict. Future conflicts could range from hybrid contingencies against state or non-state actors to high-end conflicts against states armed with weapons of mass destruction and/or advanced anti-access and area-denial capabilities. To address this diverse range of challenges, the U.S. military will continue to invest in a broad range of capabilities to support the full spectrum of possible operations.

While preserving hard-won expertise in counterinsurgency and stability operations, the Joint Force must also be prepared to battle sophisticated adversaries employing advanced warfighting capabilities, especially space and cyber. The Department will sustain robust investments in science, technology, research, and development in areas most critical to meeting future challenges or where there is greatest potential for game-changing advances. Balancing presence and sustaining posture abroad to protect U.S. national security interests. In meeting the defense priorities of the nation, the Department will continue to ensure the right balance is achieved to sustain a global posture that deters aggression and safeguards the nation's allies. The Department will continue its contributions to the Asia-Pacific rebalance, while remaining committed to the security of allies and partners in the Middle East.

The Department will continue to work with allies and partners in Europe to promote regional security, Euro-Atlantic integration, enhanced military capability, and enhanced interoperability. Across the globe, DoD will ensure that the Joint Force is properly manned, trained, and equipped in the event of a crisis. Balancing capability, capacity, and readiness within the Joint Force. The Department greatest responsibility is to win the nation's wars. The Department will continue to invest in the most capable, ready, and efficient force that

can project power globally for full-spectrum operations against a range of threats. The FY 2017 budget request supports this aim in the following ways:

- Sustaining a world-class Army capable of conducting the full range of operations on land, including prompt and sustained land combat, by maintaining a force structure that it can train, equip, and keep ready. The Department will maintain a balance of capability, capacity, and readiness across the Army's total force, including the Active, Guard, and Reserve components.

The active component of the Army is reducing its planned post-war end strength from 490,000 to 450,000 personnel by the end of FY 2018. The Army National Guard and the Army Reserve are reducing their planned force structure to 335,000 and 195,000 soldiers, respectively, by the end of FY 2017. The Army continues to move toward stabilizing its total force at 980,000.

- Providing stability in Navy shipbuilding while buttressing aviation and weapons to address emerging challenges. The FY 2017 budget request supports the construction funding for 38 ships across the FYDP and supports steady production of destroyers and submarines; ten destroyers and nine submarines are constructed through FY 2021 to support a fleet size of 308 ships. The FYDP shipbuilding construction program includes funding for the Ohio Replacement Program Advanced Procurement beginning in FY 2017; one LHA amphibious assault ship replacement; four T-AO(X) fleet oilers, and continued funding for the refueling and overhaul of the USS GEORGE WASHINGTON (CVN 73). The FY 2017 budget request also funds two littoral combat ships (LCS) and continues to finance the detailed design and construction of the second Ford Class carrier and provides for the procurement of carrier-based aircraft to address a looming strike-fighter shortage in the 2020s, and it bolsters funding for some of the Navy's most capable weapons to provide a powerful deterrent to potential aggressors.
- Resourcing the Marine Corps to be a force-in-readiness, immediately deployable to respond to crises and support contingencies. This budget provides a Marine Corps with an 182,000 active duty end strength, and capable of expeditionary operations across all warfighting functions. The Marine Corps is actively modernizing and preparing for future challenges, as demonstrated by its Joint Strike Fighter program achieving initial operating capability this year, and is increasing this momentum with new technologies to enable its mission set.
- Maintaining an Air Force with global power projection capabilities and modernizing next generation Air Force combat equipment — to include fighters, bombers, and munitions — particularly against increasingly sophisticated air defense systems, while sustaining the health of the combat fleet. To make resources available for these programs and preserve investments in critical capabilities, the Air Force will reduce capacity in some single-role aviation platforms by the end of the FYDP.
- Achieving the right balance and integrated approach to warfighting readiness between the Active Component (AC) and the Reserve Component (RC), which is critical to the Department's overall efforts to size and shape the future Joint Force.

As the Joint Force maintains this critical balance to remain modern, capable, and ready — while reducing end strength — the Department is taking the following steps in the President's Budget submission to develop and protect key capability areas, including:

- Air/Sea: increasing the Joint Force's ability to counter advanced anti-access and area-denial capabilities by continuing to invest in fifth-generation fighters and long-range strike aircraft and munitions, survivable persistent surveillance, resilient architectures, and undersea warfare capabilities;
- Nuclear Deterrence: continuing to invest in modernizing the triad's essential nuclear delivery systems, to include the Ohio Class Submarine, command and control, and, in collaboration with the Department of Energy, nuclear weapons and supporting infrastructure;
- Space: moving toward more resilient systems and system architectures, and pursuing a multi-layered approach to deter attacks on space systems;
- Missile Defense: making targeted investments in defensive interceptors, discrimination capabilities, and sensors;
- Cyber: continuing to invest in new and expanded cyber capabilities and forces to operate and defend

DoD's networks; enhance DoD's ability to conduct cyberspace operations; support military operations worldwide; and counter cyber-attacks against the United States;

- Precision Strike: procuring advanced air-to-surface weapons that will allow fighters and bombers to engage a wide range of targets, and a long-range anti-ship cruise missile that will improve the ability of U.S. aircraft to engage surface combatants in defended airspace;
- Intelligence, Surveillance, and Reconnaissance (ISR): continuing to invest in systems that are effective in highly contested environments, while sustaining capabilities appropriate for more permissive environments, in order to support global situational awareness, counter-terrorism operations, and other Combatant Command needs; and,
- Counter-Terror and Special Operations: improving the nation's ability to counter terrorist activity by maintaining current SOF end-strength and improving the efficacy of counter-terrorism operations. This requires the Department to budget and plan to sustain persistent, networked, distributed operations to defeat trans-regional terrorist networks, counter other emerging transnational threats, counter weapons of mass destruction, build the capacity of U.S. partners, and support conventional operations.

The Chinese View of US Strategy

Chinese views of the US approach to Asia can see the US in different – and far more extreme — terms. China does not issue official critiques of US military strategy and plans like those the US Department of Defense (DOD) issues on Chinese strategy and forces. At the same time, it does tightly control what its press is allowed to print and Chinese press reports are an important source of official Chinese opinion.

The following quotes show that Chinese strategic patience with the US has limits that are important both in considering how China may view US policy towards the Koreas and Northeast Asia, and as an introduction to the US analyses of China discussed in the following section.¹²⁸

- *Liaowang*, August 23, 2012: The strategic objective of the United States “is to ensure its leading status in the entire Asia pacific region, build a trans-Pacific order centered on the United States, and continue its Pacific dominance. And the key link in achieving this objective is to dismantle the East Asian regional corporation framework which has already taken shape....The key link here is to sow discord in the good neighborly, friendly, and cooperative relations between China and countries on its periphery.”¹²⁹
- *Renmin Ribao*, January 30, 2013: The United States “is boosting old military alliances, damaging the political foundation of East Asian peace, sharpening the territorial sovereignty contradictions between China and the countries around it, building a united front aimed at China, forcibly pushing the Trans-Pacific Strategic Economic Partnership, and disrupting the self-determined cooperation and regional integration process between the East Asian countries...in order for China to achieve strategic balance in the Asia Pacific region, it must greatly increase its military presence.... [China] should give full play to the strategic role of Russia and DPRK.”¹³⁰
- *Renmin Ribao*, February 28, 2013: “America’s overall goal is to secure the total control of the Eurasian Continent, and the purpose of clearing the perimeter is to pave the way for ultimately subduing China and Russia...this no longer is simply containment aimed at impeding expansion; rather, it is a way of choking aimed at controlling or even suffocating the other side...judging by the historical experience of the Cold War between the United States and the Soviet Union, containment will surely be accompanied by murder.”¹³¹
- *Jiefangjun Bao* (a military journal), January 22, 2013: After a long critique of the United States, the article ended as follows: “We [China] should cast away that pacifism and romanticism, which will easily evolve into capitulationism under pressure and threat. We should make full struggle preparation and war preparation. Only by doing so can China maintain a longer period of peace and development.”¹³²

It is useful to note that China's views on US contingency planning, like the Counter-Provocation Plan. Contingency planning is common and “ensures an effective Alliance response to potential

crises.” However, such planning – North Korean regime collapse scenarios, for instance - may complicate Chinese perspectives on the future stability of the Korean Peninsula. According to Korean scholars at the Korea Institute for Defense analyses, Chinese perspectives tend to view potentially any move by the US vis-a-vis North Korea, as a thinly disguised effort to contain China. This same suspicion can be applied to other US action in the region. The above quotes from Chinese sources reflect certain voices that are concerned that US intentions in the region are fundamentally detrimental to China.

These concerns are clearly expressed in the 2015 Chinese defense white paper, which stated that “the US carries on its “rebalancing” strategy and enhances its military presence and its military alliances in this region” and that “such development has caused grave concerns among other countries in the region”.¹³³

China

China does not issue any documents or official, open-source studies that formally allocate military forces for the defense of the DPRK and does not forward-deploy military forces in that country. It did, however, save the DPRK from total defeat in the Korean War, and it still sees the DPRK as a critical buffer ensuring that ROK and US forces remain away from its borders, as well as a counterbalance to Japan. Furthermore, no one can dismiss the possibility that Chinese forces might intervene if the DPRK was again threatened with defeat or any form of regime collapse that threatened to result in a US presence in the DPRK or deployment of ROK forces near the Chinese border.

China believes that maintaining the status quo on the Korean peninsula is beneficial to its national security and economic development. It has sought to moderate the DPRK’s behavior and move it towards economic reform based on the Chinese model. It also stepped up its efforts to persuade the DPRK to restrain its aggressiveness and nuclear and missiles efforts. While China has voiced regret and condemnation over the DPRK’s nuclear tests and missile launches, it resists any UN Security Council resolutions that might destabilize the DPRK politically. China also sees an improvement in DPRK-ROK relations as the first step towards resolving issues on the Korean peninsula and believes that the DPRK and the US should follow the Leap Day Agreement – discussed later in this report – resolving their disputes through compromise and dialogue.¹³⁴

At the same time, the balance in the Koreas and Northeast Asia is driven by the broader changes taking place in the strategies and force postures of the United States and China. China has steadily improved its military capabilities for well over a decade and is increasingly projecting power throughout the East Asian region. These trends began as China emerged as a major economic power, and have increasingly led to tension with the US, as well as a number of China’s neighbors.

China still maintains the “Sino-North Korean Mutual Aid and Cooperation Friendship Treaty” that it signed in 1961. However, past descriptions of the two countries as “blood brothers” and “closer than lips and teeth” bear little resemblance to the current strategic realities. The PRC-DPRK relationship has often been rocky over the past 60 years, and while China still sees the DPRK as an important strategic buffer between it and the US presence in the ROK, it has shown progressively less tolerance for the DPRK’s erratic leadership, has made growing overtures to an ROK that is now a far more important and profitable economic partner, has sought to end the DPRK’s nuclear weapons efforts, and has strong incentives to avoid any form of combat or crisis on the Korean peninsula.

More broadly, Chinese strategy regarding the Koreas cannot be separated from its broader strategic interests in Northeast Asia, in Asia as a whole, and the Pacific. Whether the US chooses to formally state it or not, its “rebalancing” of its force posture and military modernization efforts in Asia is driven in large part by China’s military modernization and growing power projection capabilities. China in turn is doing far more than creating a “blue water” navy and modernizing key elements of its forces. Its strategy involves the creation of new joint warfare, power projection, and sea-air-missile-nuclear capabilities that affect any confrontation or conflict in the Koreas and northeast Asia at least as much as any struggle that affects Taiwan or US base and forces deeper in the Pacific up to the “second island chain.”

Chinese Policies and White Papers

The broader context for China’s treatment of the Koreas is set by its overall strategic priorities. Many of these were formalized in 2004, and a DOD analysis describes Chinese thinking at the time as follows:¹³⁵

In 2004, former President Hu Jintao articulated a mission statement for the armed forces titled, the “Historic Missions of the Armed Forces in the New Period of the New Century.” These “new historic missions” focus primarily on adjustments in the leadership’s assessment of the international security environment and the expanding definition of national security. These missions were further codified in a 2007 amendment to the CCP Constitution. The missions, as currently defined, include:

- Provide an important guarantee of strength for the party to consolidate its ruling position.
- Provide a strong security guarantee for safeguarding the period of strategic opportunity for national development.
- Provide a powerful strategic support for safeguarding national interests.
- Play an important role in safeguarding world peace and promoting common development.

According to official writings, the driving factors behind the articulation of these missions were: changes in China’s security situation, challenges and priorities regarding China’s national development, and a desire to realign the tasks of the PLA with the CCP’s objectives. Politburo member and CMC Vice Chairman Xu Caihou in 2005 asserted “the historic missions embody the new requirements imposed on the military by the Party’s historic tasks, accommodate new changes in our national development strategy, and conform to the new trends in global military development.” While these missions are not expected to replace the defense of China’s sovereignty in importance, implications for PLA modernization may be increased preparation for and participation in international peacekeeping and disaster relief operations, interaction with the international community that allows the PLA more opportunities to learn from other militaries, and greater efforts to improve PLA logistics and transport capabilities.

The Department of Defense’s 2014 report on Chinese military power noted these four points and added that:¹³⁶

The PLA has adopted these imperatives and put them into practice over the past decade, particularly its role as guarantor of the CCP’s ruling position. This has been critical to maintaining stability during China’s leadership transition, important CCP meetings, and various corruption scandals among senior officials in 2013. The PLA has implemented the other missions through continued modernization and professionalization focused on protecting China’s national interests and sovereignty claims. It has also taken on a larger role in military diplomacy, peacekeeping, and humanitarian aid/disaster relief operations. President Xi’s instructions to the PLA to resolutely obey the CCP while preparing to “fight and win battles” were clearly broadcast throughout the force in 2013.

China’s Defense White Papers have increased in transparency over the past 10 years, describing the larger Chinese national security goals and strategy in more detail, while also looking at force structure and missions. One CRS report summarized, “The overall purpose of the Defense White

Paper seems to be to counter what Beijing calls the ‘China Threat Theory’ and to affirm that the PRC remains a peaceful power pursuing ‘Peaceful Development’ with a military that is ‘defensive in nature.’¹³⁷

The 2010 White Paper: Strategy and Conventional Forces

The 2010 China Defense White Paper emphasized China’s peaceful intentions, but did not include many specific details about military capabilities, especially the PLA’s future force and how it would be used to advance or defend China’s national interests.¹³⁸

China has now stood at a new historical point, and its future and destiny has never been more closely connected with those of the international community. In the face of shared opportunities and common challenges, China maintains its commitment to the new security concepts of mutual trust, mutual benefit, equality and coordination. By connecting the fundamental interests of the Chinese people with the common interests of other peoples around the globe, connecting China’s development with that of the world, and connecting China’s security with world peace, China strives to build, through its peaceful development, a harmonious world of lasting peace and common prosperity.

Looking into the second decade of the 21st century, China will continue to take advantage of this important period of strategic opportunities for national development, apply the Scientific Outlook on Development in depth, persevere on the path of peaceful development, pursue an independent foreign policy of peace and a national defense policy that is defensive in nature, map out both economic development and national defense in a unified manner and, in the process of building a society that is moderately affluent on a general basis, realize the unified goal of building a prosperous country and a strong military.

The 2010 White Paper also differed from its predecessors in that it expressed confidence that China’s position relative to other world powers had significantly improved, highlighted the PLA’s growing focus on military operations other than war, and gave only incremental new information regarding the PLA’s doctrine, capabilities, and structure.¹³⁹ As described in the paper, China saw the international security environment as increasingly complicated:¹⁴⁰

China is meanwhile confronted by more diverse and complex security challenges. China has vast territories and territorial seas. It is in a critical phase of the building of a moderately prosperous society in an all-round way. Therefore, it faces heavy demands in safeguarding national security.... Pressure builds up in preserving China’s territorial integrity and maritime rights and interests. Non-traditional security concerns, such as existing terrorism threats, energy, resources, finance, information and natural disasters, are on the rise. Suspicion about China, interference and countering moves against China from the outside are on the increase.

...In the face of the complex security environment, China will hold high the banner of peace, development and cooperation, adhere to the concepts of overall security, cooperative security and common security, advocate its new security concept based on mutual trust, mutual benefit, equality and cooperation, safeguard political, economic, military, social and information security in an all-round way, and endeavor to foster, together with other countries, an international security environment of peace, stability, equality, mutual trust, cooperation and win-win.

At the same time, the White Paper remarked that, “the international balance of power is changing... Prospects for world multi-polarization are becoming clearer. The prevailing trend is towards reform in international systems.... Profound realignments have taken place in international relations.”¹⁴¹

China’s defense goals and interests were stated as “safeguarding sovereignty, security, and interests of national development,” “maintaining social stability,” “accelerating military modernization,” and “maintaining world peace and stability.” In addition, the paper appeared to legitimize greater power projection both at home and abroad. The seven tasks under the “Deployment of the Armed Forces” section are:¹⁴²

- (1) Safeguard the borders, coastal and territorial air security
- (2) Maintain social stability
- (3) Participate in National Construction, Emergency Rescue, and Disaster Relief
- (4) Participate in UN Peacekeeping Operations
- (5) Conduct Escort operations in the Gulf of Aden and Waters off Somalia
- (6) Hold Military Exercises and Training with Other Countries
- (7) Participate in International Disaster Relief Operations

Emphasis was on increased levels of joint operations, which would allow greater effectiveness in the use of missiles, counter-space capabilities, and naval, air, and amphibious-airborne strikes. Joint operations in these areas would be necessary for any anti-access/anti-denial capacity under development.

The document also emphasized the importance of informationization to the Chinese military.¹⁴³

In line with its strategic objective of building informationized armed forces and winning informationized wars, and with overall planning and phased implementation, the PLA is trying to break through major bottlenecks which hinder the building and improvement of combat effectiveness of systems. The fighting capabilities of the armed forces in conditions of informationization have been significantly raised.

A step-change development has been achieved in information infrastructure. The total length of the national defense optical fiber communication network has increased by a large margin, forming a new generation information transmission network with optical fiber communication as the mainstay and satellite and short-wave communications as assistance.

Significant progress has been made in building information systems for reconnaissance and intelligence, command and control, and battlefield environment awareness. Information systems have been widely applied in logistics and equipment support. A preliminary level has been achieved in interoperability among command and control systems, combat forces, and support systems, making order transmission, intelligence distribution, command and guidance more efficient and rapid.

Strategic planning, leadership and management of informationization have been strengthened, and relevant laws, regulations, standards, policies and systems further improved. A range of measures, such as assembly training and long-distance education, have been taken to disseminate knowledge on information and skills in applying it. Notable achievements have been made in the training of commanding officers for joint operations, management personnel for informationization, personnel specialized in information technology, and personnel for the operation and maintenance of new equipment. The complement of new-mode and high-caliber military personnel who can meet the needs of informationization has been steadily enlarged.

The 2010 White Paper: Nuclear Forces and the DPRK Nuclear Program

The 2010 China Defense White Paper reiterated the standard Chinese non-first use policy and efforts for non-proliferation, supporting “complete prohibition and thorough destruction of nuclear weapons.” The document argued that,¹⁴⁴

...[C]ountries possessing the largest nuclear arsenals bear special and primary responsibility for nuclear disarmament. They should further drastically reduce their nuclear arsenals in a verifiable, irreversible and legally binding manner, so as to create the necessary conditions for the complete elimination of nuclear weapons. When conditions are appropriate, other nuclear-weapon states should also join in multilateral negotiations on nuclear disarmament. To attain the ultimate goal of complete and thorough nuclear disarmament, the international community should develop, at an appropriate time, a viable, long-term plan with different phases, including the conclusion of a convention on the complete prohibition of nuclear weapons.

China holds that, before the complete prohibition and thorough destruction of nuclear weapons, all nuclear-weapon states should abandon any nuclear deterrence policy based on first use of nuclear weapons, make an

unequivocal commitment that under no circumstances will they use or threaten to use nuclear weapons against non-nuclear-weapon states or nuclear-weapon-free zones, and negotiate an international legal instrument in this regard. In the meantime, nuclear-weapon states should negotiate and conclude a treaty on no-first-use of nuclear weapons against each other.

...China has never evaded its obligations in nuclear disarmament and pursues an open, transparent and responsible nuclear policy. It has adhered to the policy of no-first-use of nuclear weapons at any time and in any circumstances, and made the unequivocal commitment that under no circumstances will it use or threaten to use nuclear weapons against non-nuclear-weapon states or nuclear-weapon-free zones. China has never deployed nuclear weapons in foreign territory and has always exercised the utmost restraint in the development of nuclear weapons, and has never participated in any form of nuclear arms race, nor will it ever do so. It will limit its nuclear capabilities to the minimum level required for national security.

...China maintains that the global missile defense program will be detrimental to international strategic balance and stability, will undermine international and regional security, and will have a negative impact on the process of nuclear disarmament. China holds that no state should deploy overseas missile defense systems that have strategic missile defense capabilities or potential, or engage in any such international collaboration.

...China firmly opposes the proliferation of weapons of mass destruction (WMD) and their means of delivery, and consistently deals with non-proliferation issues in a highly responsible manner. China maintains that, in order to prevent proliferation at source, efforts should be made to foster a global and regional security environment featuring mutual trust and cooperation, and the root causes of WMD proliferation should be eliminated. It holds that non-proliferation issues should be resolved through political and diplomatic means. It holds that the authority, effectiveness and universality of the international non-proliferation regime should be upheld and enhanced. The international community should ensure fairness and prevent discrimination in international non-proliferation efforts, strike a balance between non-proliferation and the peaceful use of science and technology, and abandon double standards. China has joined all international treaties and international organizations in the field of non-proliferation, and supports the role played by the United Nations in this regard, and has conscientiously implemented any relevant resolutions of the UN Security Council.

At the same time, the 2010 White Paper mentioned North Korea and denuclearization several times, though without any direct pressure on North Korea regarding its uranium enrichment program, missile and nuclear tests, or 2010 attacks on South Korea. The 2006 White Paper did mention the DPRK's nuclear and missile tests. The 2010 White paper referenced strengthened military relations and friendly exchanges with both the DPRK and ROK militaries.¹⁴⁵

China advocates resolving the nuclear issue in the Korean Peninsula peacefully through dialogues and consultations, endeavoring to balance common concerns through holding six-party talks in order to realize the denuclearization on the Korean Peninsula and maintain peace and stability of the Korean Peninsula and the Northeast Asia. China, always considering the whole situation in the long run, painstakingly urges related countries to have more contacts and dialogues in order to create conditions for resuming six-party talks as early as possible.

The 2013 White Paper

China's leaders stated that the country was undergoing a period of strategic opportunity through 2020 at the 18th National Congress of the Communist Party of China in November 2012, and they publically focused on domestic development in the context of a relatively peaceful international order. In general, it seemed as if Xi Jinping was concentrating more on great power diplomacy than his predecessor, Hu Jintao.¹⁴⁶ In practice, however, China was concentrating on both civil and military development.

China's new leader, Xi Jinping, quickly began establishing himself as a strong military leader, going on high-profile visits to Navy, Air Force, Army, and Missile Command facilities during his first 100 days in office. He has also launched a campaign to enhance the armed forces' ability to

“fight and win wars,” while taking direct control of an interagency body that has overseen the escalation over islands claimed by both Japan and China.¹⁴⁷

China released a new 2013 Defense White Paper – *The Diversified Employment of China’s Armed Forces* – on April 16, 2013. This white paper is different from its predecessors in several key ways. One is that the White Paper revealed the structure of each military branch in terms of numbers of troops and officers as well as the organization of each branch, all of which will be discussed further in Chapter 4. Moreover, the Air Force, Navy, and domestic R&D investment are all emphasized in terms of capabilities and operational reach expansions.

The 2013 White Paper started by discussing China’s view of itself in the international arena and China’s place in it, emphasizing again the PRC’s commitment to peaceful development.¹⁴⁸

In today’s world, peace and development are facing new opportunities and challenges. It is a historic mission entrusted by the era to people of all nations to firmly grasp the opportunities, jointly meet the challenges, cooperatively maintain security and collectively achieve development.

It is China’s unshakable national commitment and strategic choice to take the road of peaceful development. China unswervingly pursues an independent foreign policy of peace and a national defense policy that is defensive in nature. China opposes any form of hegemonism or power politics, and does not interfere in the internal affairs of other countries. China will never seek hegemony or behave in a hegemonic manner, nor will it engage in military expansion. China advocates a new security concept featuring mutual trust, mutual benefit, equality and coordination, and pursues comprehensive security, common security and cooperative security.

It is a strategic task of China’s modernization drive as well as a strong guarantee for China’s peaceful development to build a strong national defense and powerful armed forces which are commensurate with China’s international standing and meet the needs of its security and development interests. China’s armed forces act to meet the new requirements of China’s national development and security strategies, follow the theoretical guidance of the Scientific Outlook on Development, speed up the transformation of the generating mode of combat effectiveness, build a system of modern military forces with Chinese characteristics, enhance military strategic guidance and diversify the ways of employing armed forces as the times require. China’s armed forces provide a security guarantee and strategic support for national development, and make due contributions to the maintenance of world peace and regional stability.

The Paper also implicitly criticized the US’s increased presence in the Asia-Pacific as well as highlighting the increasing complication of international relations:¹⁴⁹

There are signs of increasing hegemonism, power politics and neo-interventionism. Local turmoils occur frequently. Hot-spot issues keep cropping up. Traditional and non-traditional security challenges interweave and interact. Competition is intensifying in the international military field. International security issues are growing noticeably more abrupt, interrelated and comprehensive. The Asia-Pacific region has become an increasingly significant stage for world economic development and strategic interaction between major powers. The US is adjusting its Asia-Pacific security strategy, and the regional landscape is undergoing profound changes.

...China still faces multiple and complicated security threats and challenges. The issues of subsistence and development security and the traditional and non-traditional threats to security are interwoven. Therefore, China has an arduous task to safeguard its national unification, territorial integrity and development interests. Some country has strengthened its Asia-Pacific military alliances, expanded its military presence in the region, and frequently makes the situation there tenser. On the issues concerning China’s territorial sovereignty and maritime rights and interests, some neighboring countries are taking actions that complicate or exacerbate the situation.... Major powers are vigorously developing new and more sophisticated military technologies so as to ensure that they can maintain strategic superiorities in international competition in such areas as outer space and cyber space.

In such a situation, the PLA plans to “broaden their visions of national security strategy and military strategy, aim at winning local wars under the conditions of informationization, make active planning for the use of armed forces in peacetime, deal effectively with various security threats and accomplish diversified military tasks.”¹⁵⁰ In particular, the PLA will adhere to the following fundamental principles and policies:¹⁵¹

- Safeguarding national sovereignty, security and territorial integrity, and supporting the country’s peaceful development.
- Aiming to win local wars under the conditions of informationization and expanding and intensifying military preparedness.
- Formulating the concept of comprehensive security and effectively conducting military operations other than war (MOOTW).
- Deepening security cooperation and fulfilling international obligations.
- Acting in accordance with laws, policies and disciplines.

The document also discussed the work of the PLA in supporting national economic and social development – such as building highways, railways, airports, water conservancy facilities, hydroelectric units, viaduct bridges – as well as work to preserve the environment, like controlling desertification, preserving wetlands, and afforesting barren hills. In these missions, the PLA and People’s Armed Police Force (PAPF) have, since 2011, contributed more than 15 million work days, been involved in more than 350 province-level construction projects, and planted more than 14 million trees.

The PLA and PAPF have also set up centers and undertaken projects to reduce poverty, solve domestic water and irrigation problems, and support cultural, educational, technological, scientific, and health undertakings. The two services have in addition undertaken disaster relief and emergency rescue operations – since 2011, the PLA and PAPF have rescued or evacuated over 2.45 million people, transported 160,000 tons of goods to disaster areas, and participated in operations due to floods, earthquakes, fires, typhoons, and droughts. Over 370,000 servicepersons and 870,000 militiamen and reservists have been involved in this work.¹⁵²

The paper also stressed the PLA’s increasing ability to safeguard maritime rights and interests and protect overseas interests, which¹⁵³

...have become an integral component of China’s national interests. Security issues are increasingly prominent, involving overseas energy and resources, strategic sea lines of communication (SLOCs), and Chinese nationals and legal persons overseas. Vessel protection at sea, evacuation of Chinese nationals overseas, and emergency rescue have become important ways and means for the PLA to safeguard national interests and fulfill China’s international obligations.

In a final key departure from previous papers, this White Paper contained no statement about “no-first use” of nuclear weapons for the first time since China developed nuclear weapons 50 years ago.¹⁵⁴ The document acknowledged that China would use nuclear weapons in an attack, but did not rule out their use in other circumstances as well.¹⁵⁵

The PLASAF [PLA Second Artillery Force] keeps an appropriate level of readiness in peacetime. It pursues the principles of combining peacetime needs with wartime needs, maintaining vigilance all the time and being ready to fight. It has formed a complete system for combat readiness and set up an integrated, functional, agile and efficient operational duty system to ensure rapid and effective responses to war threats and emergencies. If China comes under a nuclear threat, the nuclear missile force will act upon the orders of the CMC, go into a higher level of readiness, and get ready for a nuclear counterattack to deter the enemy from using nuclear weapons against China. If China comes under a nuclear attack, the nuclear missile force

of the PLASAF will use nuclear missiles to launch a resolute counterattack either independently or together with the nuclear forces of other services. The conventional missile force is able to shift instantly from peacetime to wartime readiness, and conduct conventional medium- and long-range precision strikes.

The 2015 White Paper

In 2015, China released a new defense white paper. It reflected changing Chinese perspectives on its role in the region with an increased focus on naval forces and power projection. An analysis of the white paper by the U.S.-China Economic and Security Review Commission notes that:¹⁵⁶

The DWP (defense white paper) decisively elevates the maritime domain in China's strategic thinking, asserting that "the traditional mentality that land outweighs sea must be abandoned." In articulating "enhance[d] military strategic guidance" for its long-held concept of "active defense," the DWP emphasizes "highlighting maritime military struggle," signaling that China recognizes its most urgent threats emanate from offshore and anticipates its most likely conflict scenarios will take place at sea.

The DWP notes the need for the People's Liberation Army (PLA) Navy to transition from a primarily coastal force to a force that is capable of playing a global role. In an evolution from past DWPs, which have emphasized offshore defense as the primary focus of the PLA Navy, the new DWP notes that "the PLA Navy will gradually shift its focus from 'offshore waters defense' to the combination of 'offshore waters defense' with 'open seas protection.'"

The white paper also touched on the China's multiple maritime territory disputes, stating:

On the issues concerning China's territorial sovereignty and maritime rights and interests, some of its offshore neighbors take provocative actions and reinforce their military presence on China's reefs and islands that they have illegally occupied. Some external countries are also busy meddling in South China Sea affairs; a tiny few maintain constant close-in air and sea surveillance and reconnaissance against China. It is thus a long-standing task for China to safeguard its maritime rights and interests.

The Korean Peninsula was also cited as a source of "instability and uncertainty" in the region with "a negative impact on the security and stability along China's periphery" that could potentially demand the attention of PRC military forces.¹⁵⁷

Emerging Priorities in Chinese Strategy

The US Department of Defense issued an updated version of its own white paper on Chinese strategy and military developments called the *Annual Report to Congress: Military and Security Developments Involving the People's Republic of China 2016* in April 2016. The Department of Defense views Chinese strategy as becoming more competitive and as involving related shifts in its military capabilities that could make China far more of a peer competitor to the US, and steadily alter the balance in Northeast Asia and in the Koreas unless the US is successful both in rebalancing its forces in Asia and in creating more effective partnerships with the ROK and Japan.

The US report described China's changing strategy and related shifts in its force posture as follows:¹⁵⁸

The long-term, comprehensive modernization of the armed forces of the People's Republic of China (PRC) entered a new phase in 2015 as China unveiled sweeping organizational reforms to overhaul the entire military structure. These reforms aim to strengthen the Chinese Communist Party's (CCP) control over the military, enhance the PLA's ability to conduct joint operations, and improve its ability to fight short-duration, high-intensity regional conflicts at greater distances from the Chinese mainland.

China's leaders seek ways to leverage China's growing military, diplomatic, and economic clout to advance its ambitions to establish regional preeminence and expand its international influence. Chinese leaders have characterized modernization of the People's Liberation Army (PLA) as essential to achieving great power status and what Chinese President Xi Jinping calls the "China Dream" of national rejuvenation.

They portray a strong military as critical to advancing Chinese interests, preventing other countries from taking steps that would damage those interests, and ensuring that China can defend itself and its sovereignty claims.... In the long term, Chinese leaders are focused on developing the capabilities they deem necessary to deter or defeat adversary power projection and counter third-party—including U.S.—intervention during a crisis or conflict. China's military modernization is producing capabilities that have the potential to reduce core U.S. military technological advantages (1)

The PRC continues to focus on preparing for potential conflict in the Taiwan Strait, but additional missions, such as contingencies in the East and South China Seas and on the Korean peninsula, are increasingly important to the PLA. Moreover, as China's global footprint and international interests grow, its military modernization program has become more focused on investments and infrastructure to support a range of missions beyond China's periphery, including power projection, sea lane security, counterpiracy, peacekeeping, and humanitarian assistance/disaster relief (HA/DR).

PLA global operations in 2015 included counterpiracy patrols, humanitarian assistance and disaster relief, exercises, and sea lane security operations. China's November 2015 public confirmation of its intention to build its first overseas military support facility in Djibouti likely reflects this more global outlook, as it will be utilized to sustain the PLA Navy's operations at greater distances from China.(II)

Since 2002, China's leaders—including President Xi Jinping—have characterized the initial two decades of the 21st century as a “period of strategic opportunity.” They assess that during this time international conditions will facilitate domestic development and the expansion of China's “comprehensive national power,” which outside observers believe will serve what they assess to be the Chinese Communist Party's (CCP) overriding strategic objectives:

- > perpetuate CCP rule;
- > maintain domestic stability;
- > sustain economic growth and development;
- > defend national sovereignty and territorial integrity;
- > secure China's status as a great power and, ultimately, reacquiring regional preeminence;
- > and safeguard China's interests abroad.

The CCP has distilled these objectives into President Xi's “China Dream” of national rejuvenation. The concept, first articulated by Xi shortly after the 2012 leadership transition, encapsulates a long-standing national aspiration of establishing a powerful and prosperous China. President Xi and other leaders also link the China Dream to two high-profile centenary goals: achieving a “moderately prosperous society” by the 100th anniversary of the CCP in 2012, and building a “modern socialist country that is prosperous, strong, democratic, culturally advanced and harmonious” by the 100th anniversary of the establishment of the PRC in 2049.

The China Dream also includes a commitment to developing military power commensurate with China's resurgent status as a great power. China's leaders are increasingly seeking ways to leverage its growing military, diplomatic, and economic clout to establish regional preeminence and expand its international influence. China's strategy is to secure these objectives without jeopardizing the regional peace that has been conducive to its military modernization and the economic development that has helped the CCP maintain its monopoly on power (41).

As China's foreign interests increase and its power have grown, former paramount leader Deng Xiaoping's oft-repeated policy dictum that China should “hide capabilities and bide time” has come under strain as some members of China's elite question its continued relevance. China is seeking progressively higher-profile leadership roles in existing regional and global institution while seizing the initiative to establish multilateral mechanisms such as the proposed “New Asian Security Concept,” an all-inclusive security framework that promotes Asian solutions to Asian problems and provides an alternative to U.S. alliances in Asia.

In late November 2014, President Xi at a rare CCP Central Foreign Affairs Work Conference—only the fourth since the establishment of the PRC—called on Beijing to take on regional and global leadership and

officially endorsed the main thrust of China's foreign policy. Xi remarked on the "protracted nature of the struggle over the international order" and highlighted China's intention to play a larger role. He stressed that China would be firm in defending its interests, especially its territorial sovereignty and maritime rights.

China's increasingly assertive efforts to advance its national sovereignty and territorial claims, its forceful rhetoric, and lack of transparency about its growing military capabilities and strategic decision-making continue to raise tensions and have caused countries in the region to enhance their ties to the United States. These concerns are likely to intensify as the PLA continues to modernize, especially in the absence of greater transparency. (45)

The DOD went on to cite several specific shifts in Chinese strategy that were having major impacts on US power projection capabilities as well as on ROK and Japanese deterrent and defense capabilities.¹⁵⁹

Anti-Access/Area Denial. As China modernizes the PLA and prepares for various contingencies, it continues to develop capabilities that serve to dissuade, deter, or if ordered, defeat possible third-party intervention during a large-scale, theater campaign such as a Taiwan contingency. U.S. defense planners often refer to these collective PLA capabilities as A2/AD, though China does not use this term. China's military modernization plan includes the development of capabilities to attack, at long ranges, adversary forces that might deploy or operate within the Western Pacific Ocean in the air, maritime, space, electromagnetic, and information domains.

As the PLA Academy of Military Science 2013 Science of Strategy states, "we cannot count on luck and must keep a foothold at the foundation of having ample war preparations and powerful military capabilities of our own, rather than hold the assessment that the enemy will not come, intervene, or strike."

Information Operations. An essential element, if not a fundamental prerequisite, of China's ability to counter third-party intervention is the requirement to control the information spectrum in all dimensions of the modern battlespace. PLA authors often cite the need in modern warfare to control information—sometimes termed "information blockade" or "information dominance"—and to seize the initiative early in a campaign so as to set the conditions needed to achieve air and sea superiority.

China is improving information and operational security to protect its own information structures, and is also developing EW and other information warfare capabilities, including denial and deception. China's "information blockade" likely envisions the employment of military and non-military instruments of state power across the battlespace, including in cyberspace and space.

China's investments in advanced EW systems, counterspace weapons, and cyberspace operations—combined with more traditional forms of control such as propaganda and denial through opacity—reflect the emphasis and priority China's leaders place on building capability for information advantage.

Cyber Operations. China believes its cyberspace capabilities and personnel lag behind the rest of the world. To deal with these perceived deficiencies, China is improving training and energy intercept at exo-atmospheric altitudes (greater than 80 km), as well as intercepts of ballistic missiles and other aerospace vehicles within the upper atmosphere. In January 2010, and again in January 2013, China successfully intercepted a ballistic missile at mid-course, using a ground-based missile. The announced acquisition by China of the S-400 SAM system from Russia could provide China with a counter-MRBM capability depending on which interceptor variants are delivered to China.

Surface and Undersea Operations. China continues to build a variety of offensive and defensive capabilities that could permit the PLA to achieve sea control within what the PLAN calls the "near seas," as well as to project limited combat power into the "far seas." Of these, China's coastal defense cruise missiles (CDCM), air- / surface- / sub-surface-launched anti-ship cruise missiles (ASCMs), submarine-launched torpedoes, and naval mines provide the PLAN with an ability to counter an adversary fleet's intervention with multi-axis, high-intensity attacks that increase in lethality as adversary naval combatants approach China's coast.

Additionally, China has fielded CSS-5 anti-ship ballistic missiles (ASBMs) specifically designed to hold adversary aircraft carriers at risk 1,500 km off China's coast. China is making gradual progress in the undersea domain as well, but continues to lack either a robust coastal or deep-water anti-submarine warfare capability. It is also unclear whether China has the capability to collect accurate targeting information and to

pass it to launch platforms in time for successful strikes in sea areas beyond the first island chain.

Space and Counterspace. The PLA continues to strengthen its military space capabilities, which include advancements with the Beidou navigation satellite system, and its space surveillance capabilities that can monitor objects across the globe and in space. China is seeking to utilize space systems to establish a real-time and accurate surveillance, reconnaissance and warning system, and to enhance C2 in joint operations. Publicly, however, China stands against the militarization of space. In 2009, the then-commander of the PLAAF Xu Qiliang retracted his earlier assertion that the militarization of space was a “historic inevitability” after former President Hu Jintao swiftly contradicted him.

PLA strategists regard the ability to use space-based systems—and to deny them to adversaries—as central to enabling modern informationized warfare. Although PLA doctrine does not appear to address space operations as a unique operational “campaign,” space operations will probably form an integral component of other PLA campaigns and would serve a key role in enabling actions that counter third-party intervention.

Integrated Air Defense System (IADS). Within 300 nm (556 km) of its coast, China has a credible IADS that relies on robust early warning, fighter aircraft, and a variety of SAM systems as well as point defense primarily designed to counter adversary long-range airborne strike platforms. China continues to develop and to market a wide array of IADSs designed to counter U.S. technology, tailoring the threats to attempts to deny “high-tech” operations across a wide range of capabilities.

In addition to improving China’s ability to counter traditional IADS targets such as fixed-wing aircraft, UAVs, helicopters, and cruise missiles, China’s airshow displays claim that new Chinese radar developments can detect stealth aircraft. China’s trade materials also emphasize the systems’ ability to counter long-range targets, such as long-range airborne strike and combat support aircraft. Long-range air surveillance radars and airborne early-warning aircraft, such as China’s indigenous KJ-2000 and KJ-500, are said to extend China’s detection range well beyond its borders.

China has increasing numbers of advanced long-range SAMs, including its indigenous CSA-9 (HQ-9), Russian SA-10 (S-300PMU), and SA-20 (S-300PMU1/PMU2), all of which have the advertised capability to protect against both aircraft and low-flying cruise missiles. In fall 2014, China signed a contract for delivery of Russia’s extremely long-range SA-X-21b (S-400) SAM system (400 km), and is also expected to continue research and development to extend the range of the domestic CSA-9 SAM to beyond 200 km.

Air Operations. The planned development of China’s fifth-generation fighter force will bolster China’s air-to-air capability. These fighters feature high maneuverability, low observability, and an internal weapons bay, based on the J-20 or FC-31/J-31 prototypes. Other key features of these aircraft are modern avionics and sensors that offer more timely situational awareness for operations in network-centric combat environments, radars with advanced tracking and targeting capabilities, protection against enemy electronic countermeasures, and integrated EW systems.

These fifth-generation aircraft, which could enter service as early as 2018, will significantly improve China’s existing fleet of fourth-generation aircraft (Russian-built Su-27/Su-30 and J-11A, and indigenous J-10 and J-11B fighters) to support regional air superiority and strike operations. China’s continuing upgrades to its bomber fleet will give them the capability to carry new, longer-range cruise missiles. In conjunction with procuring more capable military equipment, China is increasing the complexity and realism of air and air-defense training.

Similarly, the acquisition and development of longer-range UAVs will increase China’s ability to conduct long-range ISR and strike operations. China is advancing its development and employment of UAVs. In 2015, Chinese media reported the development of the Shendiao (Sacred Eagle or Divine Eagle) as the PLA’s newest high-altitude, long-endurance UAV for a variety of missions such as early warning, targeting, EW, and satellite communications. Last year, the PLAAF also reported on its use of a UAV to assist in HA/DR in the aftermath of an earthquake in China’s west—the first public acknowledgment of PLAAF UAV operations. Photos of the UAV showed it was the Yilong (also known as the Wing Loong or Pterodactyl).

As the following chapters of this report make clear, these developments are reshaping the structure and character of virtually every aspect of Chinese forces, make it a far more effective

military power in terms of both conventional and asymmetric warfare capabilities, and altering the balance of nuclear deterrence affecting the Koreas and the rest of the Pacific region.

China and the Koreas

China's strategy toward the Koreas is increasingly driven by its broader rivalry with the US over power and influence in Asia and the Pacific as well as by China's concern that the US is rebalancing its posture in the Pacific to compete with Chinese military forces. China sometimes does not name the US, but its 2013 Defense White Paper stated,¹⁶⁰

Some country has strengthened its Asia-Pacific military alliances, expanded its military presence in the region, and frequently makes the situation tenser... [China] has an arduous task to safeguard its national unification, territorial integrity and development interests.

The People's Liberation Army (PLA) Daily issued a more blunt commentary that same day – echoing an earlier speech in March 2013 by China's President Xi Jinping: “Currently, the world situation is undergoing its most profound and complex changes since the end of the cold war...Hostile Western forces have stepped up their strategy of imposing Westernization on our country and splitting it up, and they are doing their utmost to fence in and contain our country's development.”¹⁶¹

US Director of National Intelligence (DNI) James R. Clapper discussed such Chinese actions as follows in his testimony to the US Senate Select Committee on Intelligence early 2013,¹⁶²

During 2012, Beijing adopted strong, uncompromising positions in maritime territorial disputes with several of its neighbors. In each case, China sought to expand its control over the relevant territories and obstructed regional efforts to manage the disputes. Beijing's regional activities appear to be, in part, a response to the US strategic rebalance toward Asia-Pacific, which Chinese leaders believe is aimed at undermining China's position in the region. Globally, Beijing has both assisted and hindered US policy objectives on such issues as Iran, Syria, Afghanistan, and North Korea, and it continues to expand its economic influence and to try to parlay it into greater political influence.

The leadership transition in Beijing continues to unfold as Chinese leaders grapple with a confluence of domestic problems—including lagging economic indicators, corruption, and pressure for political reform—that are fueling leadership fears about the potential for serious domestic unrest.

The leadership team that is confronting these internal challenges is also likely to maintain uncompromising positions on foreign policy issues, especially those involving maritime and territorial disputes in the South and East China Seas.

DNI Clapper described China as follows in his 2014 testimony,¹⁶³

Chinese leaders will try to focus primarily on domestic priorities during 2014 while leveraging China's growing influence in the region. A new generation led by Xi Jinping is in place and its ambitious policy agenda is coming into focus: accelerate economic reforms, make governance more efficient and accountable, and tighten Communist Party discipline.

China will probably continue its increasingly proactive approach to maritime disputes, including a hardline stance toward Japan over the Senkaku Islands. More broadly, China's growing confidence, new capabilities, and other perceived challenges to China's interests or security will drive Beijing to pursue a more active foreign policy.

Growing regional competition in territorial disputes and competing nationalist fervor increase the risk of escalation and constrain regional cooperation. Sovereignty concerns and resurgent historical resentments will generate friction and occasional incidents between claimants in the East and South China Seas and slow or stall bilateral or multilateral efforts to resolve the disputes.

Beijing has highlighted its pursuit of a “new type of major power relations” with Washington, but China is simultaneously working at least indirectly to counterbalance US influence. Within East Asia, Beijing seeks to fuel doubts about the sustainability of the US “rebalance” and Washington’s willingness to support its allies and partners in the region.

China is pursuing a long-term comprehensive military modernization designed to enable its armed forces to achieve success on a 21st century battlefield. China’s military investments favor capabilities designed to strengthen its nuclear deterrent and strategic strike options, counter foreign military intervention in a regional crisis, and provide limited, albeit growing, capability for power projection. During 2013, the People’s Liberation Army (PLA) introduced advanced weapons into its inventory and reached milestones in the development of key systems. China’s first domestically developed heavy transport plane, the Y-20, successfully conducted its initial test flight. Additionally, China has continued to develop multiple advanced ballistic and cruise missiles.

Developments in PLA capabilities support an expansion of operations to secure Chinese interests beyond territorial issues. For example, China is pursuing more effective logistical support arrangements with countries in the Indian Ocean region.

Elements from China’s army, navy, air force, and strategic missile forces from multiple military regions participated in Mission Action 2013 in September and October 2013. The exercise included two large-scale amphibious landings and coordinated long-range air force and naval air operations in a maritime environment.

His 2015 testimony was very similar,¹⁶⁴

China will continue to pursue an active foreign policy—especially within the Asia Pacific—bolstered by increasing capabilities and its firm stance on East and South China Sea territorial disputes with rival claimants. The chances for sustained tensions will persist because competing claimants will probably pursue actions—including energy exploration—that others perceive as infringing on their sovereignty. China will probably seek to expand its economic role and outreach in the region, pursuing broader acceptance of its economic initiatives, including the Asia Infrastructure Investment Bank. Although China remains focused on regional issues, it will seek a greater voice on major international issues and in making new international rules.

Notwithstanding this external agenda, Chinese leaders will focus primarily on addressing domestic concerns. The Chinese Communist Party leadership under President Xi Jinping announced an ambitious agenda of legal reforms in late 2014 that built on its previous agenda of ambitious economic reforms—all aimed at improving government efficiency and accountability and strengthening the control of the Communist Party. The difficulty of implementing these reforms and bureaucratic resistance to them create the possibility of rising internal frictions as the agenda moves forward. Beijing will also remain concerned about the potential for domestic unrest or terrorist acts in Xinjiang and Tibet, which might lead to renewed human rights abuses. Following months of pro-democracy protests in late 2014, Chinese leaders will monitor closely political developments in Hong Kong for signs of instability.

His counterpart in the Department of Defense, Lt. General Vincent R. Stewart, the Director of the Defense Intelligence Agency, described China in more military terms,¹⁶⁵

China’s People’s Liberation Army (PLA) is building a modern military capable of defending China’s “core interests” of preserving its political system, protecting territorial integrity and sovereignty (China views these to include Taiwan and other contested claims to land and water), and ensuring sustainable economic and social development.

The PLA remains focused on transforming the army into a fully mechanized force. The PLA is converting its divisions into brigades to increase lethality and improve combat capabilities. China’s national-level training focus has been on brigade-level exercises that stress unit combat mission capabilities under realistic conditions, long distance mobility, and command and control. We expect these trends to continue.

The PLA Navy continues to expand its operational and deployment areas. China’s first aircraft carrier, commissioned in late 2012, will not reach its full potential until it acquires a fully operational fixed-wing air regiment, but we expect the navy will make progress toward its goal this year.

The South China Sea (SCS) remains a potential flashpoint. Overlapping claims among China, Vietnam, the Philippines, Malaysia, Taiwan, and Brunei—exacerbated by large-scale construction or major steps to militarize or expand law enforcement—has increased tensions among claimants. This has prompted an increase in defense acquisition, to include submarine capabilities, in some of these countries.

In 2014, China twice deployed submarines to the Indian Ocean. The submarines probably conducted area familiarization to form a baseline for increasing China's power projection. China continues production of JIN-class nuclear-powered ballistic missile submarines and submarine-launched ballistic missiles. We expect China to conduct its first nuclear deterrence patrols this year.

The PLA Air Force (PLAAF) is approaching modernization on a scale unprecedented in its history. China now has two stealth fighter programs - the third and fourth J-20 prototypes, which conducted their first flights in March and July 2014. Further PLAAF developments are anticipated.

China's nuclear arsenal currently consists of 50-60 ICBMs. China is adding more survivable road-mobile systems, enhancing its silo-based systems, and developing a sea-based nuclear deterrent. They are also augmenting more than 1,200 conventional short-range ballistic missiles deployed opposite Taiwan with a limited but growing number of conventionally armed, medium-range ballistic missiles, including the DF-16, which will improve China's ability to strike regional targets. China continues to deploy growing numbers of the DF-21D anti-ship ballistic missile and is developing a tiered ballistic missile defense system, having successfully tested the upper-tier capability on two occasions.

China does not usually stress the fact it still adheres to the 1961 "Sino-North Korean Mutual Aid and Cooperation Friendship Treaty."¹⁶⁶ The 1961 treaty is renewed automatically every 20 years and is only subject to change if both parties agree. It states that "the two parties undertake to adopt all measures to prevent aggression against either party by any state," and that "in the event of one of the parties being subjected to armed attack by any state or several states together and thus being involved in a state of war, the other party shall immediately render military and other assistance by all means at its disposal." The treaty does not apply in the case of a DPRK attack on the ROK – only if the DPRK is attacked.¹⁶⁷

The ramifications of Korean re-unification vis-a-vis the US bring Chinese geostrategic concerns into focus. In particular, China is concerned with US support for a South Korean led reunification of the Peninsula. Beijing has to date rejected any joint contingency planning with the US regarding North Korea. According to Yun Sun, from the East Asia Program at the Stimson Center,

A careful examination of China's strategic concerns reveal that Beijing's rejection is fundamentally determined by one factor: the endgame in North Korea...In the case of North Korea, although China does share the US-ROK goal of denuclearization, it understands very well that denuclearization is not the endgame in the mind of either Washington or Seoul. In the event of a North Korea contingency, the US and ROK would likely pursue not just a policy of denuclearization but also one of stabilization leading to a South Korean-led reunification. Successful implementation of this policy would inevitably alter the power equilibrium on the Korean peninsula.

In Beijing's view, a Korea unified under current circumstances would most likely be pro-US given the history and reality of the US-ROK alliance. US influence and alliance would prevail on the whole peninsula regardless of whether or not American troops were deployed to the north of the 38th parallel. This change would have a critical negative impact on China's security environment. Whether such a unified Korea would try to remain neutral is relevant but not a game-changer. China fundamentally sees South Korea as incapable or unwilling to challenge the US and their military alliance. Furthermore, even if such a unified Korea indeed becomes neutral, it would still tremendously damage Chinese influence on the peninsula. It is believed that South Korea, upon reunification will be more assertive and ready to challenge China on bilateral and regional issues, with or without the alliance with the US. Therefore, many in China see that it has no reason to abandon its strategic leverage on North Korea, not only vis-à-vis the US, but also vis-à-vis South Korea.

Unless Beijing determines the endgame in the event of North Korea contingencies is beneficial to China's strategic interests, it will not engage in such discussions or support any planning that Washington and Seoul pursue. Given this reality, any viable discussion about North Korea contingencies must begin with a genuine, credible and realistic conversation about the agendas of the three sides so as to address their shared and conflicting interests.

Economic Ties with the Korean Peninsula

China is a major trading partner of the DPRK, but it is not clear how much the Chinese economy really benefits from such trade. Unlike Chinese trade with ROK, which is conducted in market terms, Chinese trade with the DPRK often seems to be heavily subsidized and a de facto form of aid.

Estimates differ as to the trade volumes involved. According to one estimate, China accounted for 70%, or \$5.6 billion, of the DPRK's trade volume (a total of \$8 billion) in 2011. This was an increase of 62% over 2010. In late 2012, the PRC reportedly agreed to investments in cross-border infrastructure and trade with the DPRK worth almost \$1.3 billion – though there were reports that many Chinese businessmen are becoming disillusioned by the tough deals imposed by the DPRK, such as the demand that Chinese businesses in the North build their own roads and supply their own electricity.¹⁶⁸

The CIA has a different estimate of total trade volumes. It estimates that total North Korean exports were \$4 billion in 2013 and \$4.4 billion in 2014, with some 75.7% going to China. It estimates that total North Korean imports were \$4.8 billion in 2013 and \$5.2 billion in 2014, with some 76.4% coming from China.¹⁶⁹

This makes a striking contrast to the ROK's trade data. The CIA estimates that total South Korean exports were \$621.3 billion in 2014 and \$535.5 billion in 2015, with some 26% going to China in 2015. It estimates that total South Korean imports were \$528.6 billion in 2014 and \$430.8 billion in 2015, with some 20.7% coming from China.¹⁷⁰

In short, the ROK was the fourth largest recipient of Chinese exports (4.5%) and the first largest source of Chinese imports (10.9%). Given that the DPRK does not even break into the list of top PRC trade partners, it would appear that the official trade ties between these two traditional allies pale in comparison to the economic importance of ROK-PRC exchanges.¹⁷¹

According to other estimates, the combined legal and illegal trade between the DPRK and PRC has been approximately \$10 billion annually. Furthermore, China has provided food and fuel aid to the DPRK for many years, fearing that the DPRK would collapse without this assistance. However, since normalization in 1992, Chinese trade with the ROK has increased exponentially: bilateral trade was \$245 billion in 2012, 38 times higher than 20 years previously.¹⁷²

China has also allowed North Korean workers to work in China. In June 2012, 20,000 visas were issued to North Koreans to work in Jilin Province (North Koreans laborers also reportedly work in Russia and the Middle East¹⁷³), with the majority of their wages to be garnered by the DPRK government. Chinese companies have been investing in natural resource extraction in the DPRK, such as mining coal and rare earths – there is an estimated \$6 trillion worth of DPRK mineral reserves. A recent \$10 billion infrastructure project on the DPRK-Chinese border would improve Chinese access to the country for mining purposes, and China was alleged to have expanded investment in border areas in August 2012.¹⁷⁴ As a January 2013 CRS report notes,¹⁷⁵

China and North Korea continue to develop their highly complementary trade and investment ties, though several contradictions hamper deeper engagement. North Korea needs foreign capital to improve its

infrastructure, exploit natural resources, and create productive exporters, but the multitude of corrupt and self-serving actors within the North Korean system has led to poor results for Chinese investors. China is by far North Korea's largest trading partner (57% of all trade in 2011), but North Korea fears dependence on China and exposure to subversive information from China's relatively open society. Despite the obstacles, the two countries announced their intention to create or revamp several Special Economic Zones in northern North Korea to facilitate deeper economic linkages.

Tensions with the DPRK

China finds some of North Korea's actions and extreme rhetoric to be a liability, but also feels that challenges from the US, Japan, and other Pacific powers necessitate keeping it as a buffer. The end result is a set of mixed policies and reactions.

As early as 1997, some Chinese government officials discussed the DPRK-China treaty's military assistance clause as "a remnant of Cold War era thinking and no longer relevant to the current situation." It was reported that the PRC proposed that the language be changed in 2002, but the DPRK refused. Other Chinese experts opposed emendation, arguing that the clause was a deterrent to DPRK nuclearization and US preemptive attack, as well as a guarantor of PRC leverage over the DPRK.¹⁷⁶

Since 2010, an increasing number of Chinese academics have been calling for China to reappraise its ties with the DPRK, especially because of the reputational and material costs to China.¹⁷⁷ In the wake of the DPRK's third nuclear test, one academic remarked, "The public does not want China to be the only friend of the North Korean government, and we're not even recognized by North Korea as a friend... For the first time the Chinese government has felt the pressure of public opinion not to be too friendly with North Korea." Another prominent political scientist wrote on the *Foreign Policy* website that it was time for China "to cut its losses and cut North Korea loose."¹⁷⁸

In an early 2013 interview, former ROK President Lee Myung-bak said that the Chinese perception of the DPRK was changing, adding, "Since the middle of (former Chinese) President Hu Jintao's term, Beijing has sent us the message that we shouldn't consider China 'too much on the North's side.' The leaders of South Korea and China have discussed that the Seoul-Washington alliance helps Seoul's relationship with Beijing, rather than affect it." These comments suggest that there have been or could be ROK-China and ROK-US talks regarding how to cope with an emergency situation in the DPRK.¹⁷⁹

In March 2013, a government advisory group called the Chinese People's Political Consultative Conference debated whether to "keep or dump" and "fight or talk" with the DPRK.¹⁸⁰ China has had other reasons to question the cost of China's ties to the DPRK. Incidents like the May 8, 2012 13-day DPRK detention of 28 Chinese fishermen and their three boats are a case in point. The Chinese fishermen were taken captive three nautical miles inside Chinese waters and towed to the DPRK with a ransom demand of approximately \$190,000.¹⁸¹ Inflamed "Netizens" in China's blogosphere called on the government to cancel DPRK aid, renewing public debate in China over the nature of the DPRK-PRC relationship.¹⁸²

China seems to have been further irritated by the DPRK's third nuclear test, which the DPRK carried out on an important Chinese holiday. While the state media has not called Kim Jong-un unflattering names, editorials and commentators have reacted negatively; one editorial proclaimed, "When Pyongyang's acts seriously violate China's interests, we will by no means indulge it," while another paper criticized the DPRK for violating UN resolutions against missile

launches and nuclear testing. Chinese social media sites have seen a multitude of jokes, images, and derogatory names aimed at Kim Jong-un – such as “The Kid” and “Fatty, the Third.” While the Chinese government usually censors Internet comments that are too critical of or against PRC foreign and domestic policy, the insults to Kim Jong-un have not been erased.¹⁸³

There has been other evidence of a growing Chinese frustration with the DPRK leadership in the aftermath of the 2016 test. An editorial in the *Global Times*, known for its strong nationalistic leanings, criticized the DPRK’s nuclear and missile testing as “reckless risk taking” and warned that China’s international influence might not be enough to protect it if such provocations continued. In another article, the *Global Times* declared that the new UNSC resolution displayed the unity of the great powers and demonstrated that “there is no future for North Korea’s possession of nuclear weapons”¹⁸⁴.

Jonathan Pollack made the following comments on the role of North Korean unpredictability in China’s behavior towards the North:¹⁸⁵

So what goes essentially unmentioned, I think, in most renderings of explaining Chinese behaviors, is a deeper fear, a deeper fear of the unpredictability, of the North, of its adversarial nationalism, that it is not accountable to China, and that the steps that China has sought to take, both under Hu Jintao and now under Xi Jinping, to gain a measure of predictability in North Korean behavior, assurance that it will not take steps that might undermine the security of China. These kinds of assurances have gone nowhere. It is the power of the weak, over the power of the strong. Look at, both historically and at present, North Korea, rather than being some form of strategic asset for China, is very very much a strategic liability, and more than this, China often talks about, its concerns about the lack of strategic trust, between the United States and China. There is most assuredly, a total lack of strategic trust, between the leaders here in Beijing, and the leaders in Pyongyang.

Despite this lack of trust between Beijing and Pyongyang, the reality is that China maintains stability as its top priority for the Korean Peninsula. As of 2014, debates over whether China should reconsider its relations with North Korea have largely stayed in the academic and public spheres. Official government policies have remained steady and do not yet show signs of a large shift in the near-term.¹⁸⁶ In fact, China may have to tread very carefully in its policies toward the Peninsula.¹⁸⁷

Some argue that the legacy of the Korean War weighs heavily on the minds of more traditional constituencies within the Chinese Communist Party and army. But deeper, current anxieties also inhibit Beijing. China fears that extreme actions by an unpredictable, heavily armed neighbor with a xenophobic leadership could trigger a larger crisis on the peninsula that would quickly involve China. Lacking realistic options to control North Korean behavior, China prefers instead to avoid doing anything that might alienate Pyongyang.

Daniel Snider of the Asia-Pacific Research Center describes China’s constrained North Korea policy by saying, “It’s clear that the Chinese have enormous leverage over North Korea in many respects. But can China actually try to exercise that influence without destabilizing the regime? Probably not.”¹⁸⁸ Different perceptions between China, North Korea, the US, and US allies, regarding exactly what constitutes destabilization may feed perception gaps between these actors.

While the lack of official Chinese commentary makes it difficult to determine Chinese leverage, China appears to have increasing difficulty in influencing North Korea’s actions and policies. The execution of Jang Song Thaek, who was considered to be one of Beijing’s major channels of communication with the North, highlights the diminishing influence of North Korean advocates of closer cooperation with China. This is due in part to the deteriorating military-to-military relationship between the two countries:¹⁸⁹

The ties between the two armed forces were fairly active for many years, but ‘almost all of those people on both sides have died off or are retired...The current leaderships in the KPA and PLA have no set of shared camaraderie on the battlefield to bring them into contact with one another. Also, by and large the senior officers in the two forces do not trust each other.’

The increased distance between Beijing and Pyongyang has also been partly the result of Chinese efforts to dissociate itself from the North Korean regime, such as backing economic sanctions on North Korea. However, China still continues its efforts to develop special economic development zones along the China-North Korea border. This mix of cooperation and frustration with North Korea demonstrates that China’s general policy and economic support towards North Korea may continue even if China increasingly sees North Korea as more of a liability.¹⁹⁰

In testimony before the US-China Economic and Security Review Commission, representatives from the US Institute of Peace state that “larger geopolitical calculations – in which the US is central – dictate that China’s interest in maintaining the North Korean regime and a divided peninsula is not contingent on good relations with Pyongyang.”¹⁹¹ The potential consequences of destabilization or regime collapse are too severe for China to put significant portions of North Korean aid and political support under risk of termination.

Such a Chinese perspective is something that Pyongyang can use to its advantage. Although China does not like the idea of a nuclear armed North Korea, it values North Korean stability more. Knowing this, Pyongyang can reasonably continue its nuclear development while continuing to receive economic support from China. However, this strategy would depend on assuming that China is willing to tolerate a nuclear North Korea to a certain extent. Pyongyang would have to play a sort of brinksmanship with China, continuing its nuclear development but not to the point where China would be willing to cut off economic aid.

Chinese Efforts at “Denuclearization”

These problems and risks may lead China to do more in the future to try to influence the DPRK to decrease provocations and give up nuclear development, but this is far from clear. China provides the bulk of food, fuel, and development aid to the DPRK. Since 2008, China has been the only regular source of assistance, providing an estimated 100,000 tons of food, 500,000 tons of oil (70% of the DPRK’s fuel), and \$20 million worth of goods annually. The PRC also often sends free aid shipments, though the contents and scale are not usually made public. One example was a December 2011 delivery of 500,000 tons of food and 250,000 tons of oil to assist in stabilizing the new DPRK regime.¹⁹² Without China’s assistance, the North Korean regime would be unlikely to last long.

Furthermore, a June 2012 UN report looking into the past several years of DPRK sanctions enforcement listed Chinese involvement in 21 of the 38 suspected breaches of sanctions addressing luxury items and weapons. In two of those instances, China was involved in the DPRK’s ballistic missile component and other unconventional weapons materials purchases or sales.¹⁹³

China has long taken a “no war, no instability, no nukes” (不战、不乱、无核) position regarding the Koreas as well as desired to maintain the useful purpose the DPRK serves as a buffer state against the ROK. Also, in the event of a regime collapse or other large-scale unrest, China worries about a mass influx of refugees pouring into its northeastern provinces. In the context of the US’s rebalance towards Asia, the buffer provided by the DPRK could be increasingly important in Chinese strategic calculation.¹⁹⁴

China has, however, consistently prioritized peace and stability over denuclearization and control of the DPRK, and is unwilling to put substantial pressure on the DPRK for fear of decreasing the stability of the current regime – despite China’s clear preference for a nuclear-free Korean Peninsula. CSIS’s Victor Cha calls this a “mutual hostage” relationship.¹⁹⁵

One ROK scholar at Seoul National University has argued that there are three structural and perceptual obstacles that make any change in China’s DPRK policy unlikely or even impossible.¹⁹⁶

First, Beijing predicts a difficult future for Sino-U.S. relations. Second, Beijing views U.S. alliances with South Korea and Japan as part of a U.S. strategy to contain China’s rise. Third, the Korean peninsula lacks a stable mechanism for peace. Since none of these obstacles is likely to be addressed in the near term, China’s modus operandi regarding North Korea is likely to remain unchanged, rendering the regional situation similar to that of the past.

At the same time, some in China worry that the ROK, Japan, or even Taiwan could develop nuclear weapons due to the growing DPRK threat. The increase in nuclear weapons states not sanctioned by the Nuclear Nonproliferation Treaty (NPT) could cause the NPT to collapse, creating more uncertainty in international security.¹⁹⁷

Also, the DPRK could transfer nuclear materials, knowledge, or technology to another country or non-state actor, potentially to the detriment of Chinese security.¹⁹⁸ Other Asia-Pacific countries could also be pushed towards the US, which would be contrary to Chinese regional interest and attempts to increase its soft power appeal.¹⁹⁹ Internationally, China loses face and reputation by its support of the DPRK.

China must also consider the risk that the DPRK might go too far and trigger a US strike against the DPRK. If such a strike left the present DPRK regime in place, this would not harm Chinese security interests and would embarrass China if it did react. If the regime did fall as a result, or if the ROK and US intervened in response to DPRK instability, the result might be a reunified peninsula under ROK control – giving South Korea control of the North’s weapons, and putting US soldiers at the Chinese border.²⁰⁰ To mitigate this Chinese fear, at least, former ROK President Lee Myung-bak has argued that the ROK should signal China through an NGO that, in the case of reunification due to a contingency in the DPRK, the US military would stay south of the DMZ.²⁰¹

China does, however, need to consider how much a DPRK strategic buffer is worth, and whether it could find a way to put a more moderate and stable regime in place. The issue is not simply a matter of military risk. China’s continued support of the DPRK has led to strained relations with the US, ROK, and Japan as a result of the increase in DPRK provocations over the course of the past decade, in particular nuclear and missile tests and the *Cheonan* and Yeonpyeong incidents.

As a result, the ROK and Japan have strengthened their alliances with the US and increased bilateral coordination with each other, as well as considered expansion of their own missile forces and missile defense, and increased other aspects of the regional arms race. China’s diplomatic shielding of the DPRK has also weakened its claim to be an honest broker in the Six Party Talks and tarnished its international image, especially at the UN, while perhaps encouraging risky DPRK moves due to lack of Chinese punishment.²⁰²

China seems to have realized that more pressure on the DPRK is necessary to make progress towards denuclearization in the wake of the DPRK nuclear test. The PRC has put some open pressure on the DPRK to assuage US demands that it use its leverage to greater effect. In early

May 2013, China's chief nuclear envoy told ROK diplomats that China will not accept the DPRK as a "nuclear-armed state," and a consensus on this issue between the ROK, US, and China appears to have been reached.²⁰³

Chinese efforts taken to pressure the DPRK include:²⁰⁴

- Delaying aid shipments
- Raising the nuclear issue in many official exchanges, regardless of the primary issue at hand
- Special envoys with letters or messages to heed PRC warnings, at critical times
- Chinese leaders using more forceful language with DPRK leaders
- Chinese officials occasionally publically stating their frustrations with the DPRK
- Increasing news references to the differences between the two countries and Chinese actions in response to the DPRK's destabilizing acts
- Discussion of the DPRK in multilateral settings, including those with the ROK and Japan, and voicing of opposition to DPRK provocations and nuclear ambitions
- Denials of DPRK requests for military aid
- Tightening of export control policies to restrict the sale of dual-use items to the DPRK.

Starting in 2003, China used incentives and rewards to gain DPRK participation in the Six Party Talks, while from 2006-2009, China switched to increased use of coercive measures to influence the DPRK. Since 2009, China has instead followed comprehensive engagement in an attempt to increase influence over the DPRK, enhancing high-level ties in a variety of areas and sectors. This has led to an increase in the economic instruments being used to influence DPRK behavior, with the primary goals of the DPRK engaging in policies that paralleled Chinese interests and curbing costly DPRK provocations.²⁰⁵

North Korea was discussed at length during the early June 2003 summit between Presidents Obama and Xi. It also reported that Chinese officials discussed using their economic and energy provision to the DPRK as leverage in DPRK provocations. American officials reported that the Chinese apparently agreed with the US that if the DPRK continues to develop nuclear weapons, the US will further increase its military presence in the Asia-Pacific region, while the ROK and Japan will be much more likely to develop their own weapons in advance – potentially further destabilizing the region.²⁰⁶

According to US National Security Advisor Tom Donilon, China and the US agreed that dealing with the DPRK's nuclear arsenal was a promising issue for "enhanced cooperation." The two agreed that they should work together to achieve denuclearization of the DPRK and "that North Korea has to denuclearize, that neither country will accept North Korea as a nuclear-armed state."²⁰⁷

These trends have continued through the 2016 nuclear test. China condemned North Korea's actions and actively participated in drafting and passing the toughest UN sanctions ever imposed on the DPRK. If its key provisions, especially the inspection of all cross border trade with North Korea, are fully enforced by China, the impact on North Korea could be substantial. However, given China's past aversion to actions that could seriously undermine the DPRK's stability, it remains to be seen whether this hard line will actually be enacted.²⁰⁸

Much will depend on the broader interactions between the US and Chinese military strategies and force development plans that affect their overall security policies in Northeast Asia, the rest of Asia, and the Pacific. According to the Department of Defense report for 2013, China sees stable relations with its neighbors and the US as essential to stability and necessary for maximizing its current window of opportunity to expand and develop as a great power. At the same time, “China’s growing economic and military confidence and capabilities occasionally manifest in more assertive rhetoric and behavior when Beijing perceives threats to its national interests or feels compelled to respond to public expectations.”²⁰⁹

China, in turn, sees the US as an increasing risk. Whatever it may think of the DPRK, it may see the US rebalance to Asia as potentially as threatening as the US see the modernization of Chinese forces and the steady expansion of Chinese power projection and anti-access area denial (A2/AD) capabilities. Once again, the choice each power makes between cooperation and competition is likely to be a key factor in shaping not only their capabilities in the Koreas and Northeast Asia, but the reactions and strategies of the ROK and Japan.

Japan

Japan sees the DPRK’s military build-up, political hostility, and North Korea’s nuclear programs as a direct threat to Japanese national security. The government takes the position that one key way to counteract this threat is through close cooperation with the ROK and the US, allowing for the strict implementation of bilateral and UN Security Council sanctions. At the same time, the Japanese government holds that the Six Party Talks should be continued in order to move forward with denuclearization of the DPRK.²¹⁰

Japanese relations with the ROK are based on common strategic interests, but there are also serious tensions. An analysis by the US CRS summarizes Japan’s policies towards the Koreas as follows:²¹¹

After a period of relatively warm ties and the promise of more effective security cooperation, Tokyo-Seoul ties appear to have cooled anew. Under the DPJ governments and the Lee Myungbak administration in Seoul, South Korea and Japan managed historical issues, cooperated in responding to North Korean provocations, and exchanged observers at military exercises. The two countries were on the verge of concluding two modest but significant bilateral security agreements on information sharing and military acquisitions until an anti-Japanese outcry in South Korea scuttled the signing. The new governments in both capitals appear less likely to reach out to each other, dimming U.S. hopes for more sustained trilateral cooperation among the three democracies. Policy toward North Korea has been the one issue where regular trilateral consultation persists, and the February 2013 nuclear test by North Korea will provide an opportunity for the three capitals to coordinate their response.

...In addition to the comfort women issue discussed above, the perennial issues of a territorial dispute between Japan and South Korea and Japanese history textbooks continue to periodically ruffle relations. A group of small islands in the Sea of Japan known as Dokdo in Korean and Takeshima in Japanese (referred to as the Liancourt Rocks by the United States) are administered by South Korea but claimed by Japan. Mentions of the claims in Japanese defense documents or by local prefectures routinely spark official criticism and public outcry in South Korea. Similarly, Seoul expresses disapproval of some of the history textbooks approved by Japan’s Ministry of Education that South Koreans claim diminish or whitewash Japan’s colonial-era atrocities.

Some of Abe’s cabinet appointments have raised concern among South Koreans. Minister of Education Hakubun Shimomura has criticized history textbook companies for being insufficiently patriotic by, among other items, giving undue deference to the concerns of China and South Korea in their presentation of Japan’s colonial past. Abe’s appointment of Shimomura appears to signal his intent to follow through on the LDP’s pre-election advocacy of reducing “self-torturing views of history” in education and of giving the

central government greater authority over the content of history textbooks. Abe's Cabinet also includes Internal Affairs Minister Yoshitaka Shindo and Minister for Administrative Reform Tomomi Inada, who have aggressively asserted Japanese territorial claims, including a well-publicized attempt to visit South Korea in 2011 to advocate for Japanese sovereignty over the Dokdo/Takeshima islets.

...Since 2009, Washington and Tokyo have been strongly united in their approach to North Korea. Although the U.S. and Japanese positions diverged in the later years of the Bush Administration, Pyongyang's string of provocations in 2009-2010 forged a new consensus among Japan, South Korea, and the United States. North Korea's provocations have helped to drive enhanced trilateral security cooperation between Washington, Tokyo, and Seoul. Japan also appeared to be at least somewhat in synch with the United States in late 2011 and early 2012 when the Obama Administration—with the blessing of the South Korean government—was negotiating agreements with North Korea over its nuclear and missile programs and food aid. North Korea's 2012 missile launches and the February 2013 nuclear test are likely to drive closer cooperation among the three governments.

Tokyo has adopted a relatively hardline policy against North Korea and plays a leadership role at the United Nations in pushing for stronger punishment for the Pyongyang regime for its military provocations and human rights abuses. Japan has imposed a virtual embargo on all trade with North Korea. North Korea's missile tests have demonstrated that a strike on Japan is well within range, spurring Japan to move forward on missile defense cooperation with the United States. In addition to Japan's concern about Pyongyang's weapons and delivery systems, the issue of several Japanese citizens abducted by North Korean agents in the 1970s and 1980s remains a top priority for Tokyo. Japan has pledged that it will not provide economic aid to North Korea without resolution of the abductee issue. The abductee issue remains an emotional topic in Japan.

In 2008, the Bush Administration's decision to remove North Korea from the list of state sponsors of terrorism in exchange for North Korean concessions on its nuclear program dismayed Japanese officials, who had maintained that North Korea's status on the list should be linked to the abduction issue. Although the abductions issue has lost potency in recent years, Abe came onto the political scene in the early 2000s as a fierce advocate for the abductees and their families and could dedicate attention to the issue.

In late 2013 and 2014, relations between Japan and South Korea showed no signs of significant improvement.²¹²

Japan's relations with South Korea continued to worsen in late 2013 and early 2014, a development that drew considerable attention from U.S. policymakers and Members of Congress who met with officials from each country. A poor relationship between Seoul and Tokyo jeopardizes U.S. interests by complicating trilateral cooperation on North Korea policy and other regional challenges.

...Tense relations also complicate Japan's desire to expand its military and diplomatic influence, goals the Obama Administration generally supports, as well as the creation of an integrated U.S.-Japan-South Korea ballistic missile defense system. Furthermore, South Korea-Japan frictions could damage U.S. relations with South Korea or Japan if and when either country feels the United States is taking the other country's side in the ongoing bilateral disputes.

As of February 2014, Abe and his South Korean counterpart President Park Geun-hye had yet to hold a summit, and the high-level interaction that has occurred between the two governments frequently has been contentious. South Korean leaders have objected to a series of statements and actions by Abe and his Cabinet officials that many have interpreted as denying or even glorifying Imperial Japan's aggression in the early 20th Century. For much of 2013, South Korean leaders stated that they would have difficulty holding a summit, or improving relations, unless Japan adopts a "correct understanding" of history. Many Japanese argue that for years South Korean leaders have not recognized and in some cases rejected the efforts Japan has made to acknowledge and apologize for Imperial Japan's actions. As a result, South Korea has arguably helped to undermine those Japanese who have made such overtures, including a proposal that the previous Japanese government floated in 2012 to provide a new apology and humanitarian payments to the surviving "comfort women." During the fall of 2013, many U.S. policymakers and Asia watchers grew concerned that the Park government, by appearing to allow history issues to affect most aspects of Seoul-Tokyo relations, was being overly narrow and was damaging U.S. interests in Asia. Abe's visit to Yasukuni in December 2013, however, shifted the focus back to Japan.

Korea and Japanese Defense Policy

Japan released new National Defense Program Guidelines in 2010 that were intended to guide Japan's defense policy for the next 10 years. The report was the first major update since 2004, and listed the following seven aspects of Japan's changing security environment.²¹³

1. Number of so-called "gray zone" disputes (confrontations over territory, sovereignty and economic interests that are not to escalate into wars) is on the increase.
2. A global shift in the balance of power has been brought about by the rise of emerging powers and the relative change of the U.S. influence.
3. Issues such as sustained access to cyberspace, in addition to international terrorism and piracy, have become global security challenges.
4. North Korea's nuclear and missile issues are immediate and grave destabilizing factors to regional security.
5. Military modernization by China and its insufficient transparency are of concern for the regional and global community.
6. Russia's military activities are increasingly robust.
7. A full-scale invasion against Japan is unlikely to occur today, but the security challenges and destabilizing factors Japan faces are diverse, complex and intertwined.

The document also established Japan's three security objectives: "(1) to prevent and eliminate external threat[s] from reaching Japan; (2) to prevent threats from emerging by improving international security environment; and (3) to create global peace and stability and to secure human security," to be established by internal capacity building, cooperation with allies, and "multilayered" international security cooperation.²¹⁴ As described by the NTI,²¹⁵

The [2010] NDPG introduced a major shift in post-World War II Japanese strategic thinking, replacing the "basic defense force concept" with a "dynamic defense force concept" that will embrace proactive and assertive rather than passive and reactive defense policies... In line with this approach, the new NDPG stipulated that Japan will continue to improve and develop missile defense capabilities in cooperation with the United States. Of significant note is the ongoing debate over whether, in conjunction with the further improvement of the missile defense system, Japan's decades-old self-imposed arms export ban should be eased.

The new NDPG were also undertaken in an international security environment with growing momentum—at least among some states—toward a world free of nuclear weapons. While the document's "dynamic defense force concept" and further emphasis on U.S.-Japan missile defense cooperation are proactive responses to intensifying regional security threats, the guidelines did not clearly reflect international efforts to reduce the role of nuclear weapons. Instead, the NDPG adopted the same line on extended nuclear deterrence as all past versions had, stating that, "As long as nuclear weapons exist, the extended deterrence provided by the United States with nuclear deterrent as a vital element, will be indispensable..." Issues surrounding Japan's position on nuclear disarmament and nonproliferation are left unresolved, reinforcing the continued tension between Japan's global pro-disarmament stance and its reliance on U.S. extended nuclear deterrence.

The 2010 Japanese Defense White Paper introduced the concept of a "Dynamic Defense Force" for the first time, a concept which involves the effective and flexible use of Japan's Self-Defense Forces (SDF) against unspecific contingencies – apparently understood to be North Korea and China.²¹⁶ In keeping with this shift, the White Paper called for a review of SDF deployment and looked to strengthen the US-Japan alliance. The 2012 Defense White Paper continued these plans, further promoting the Dynamic Defense Force concept.

Japan's 2012 White Paper provided additional updates and discussed the concept of a Dynamic Defense Force in more detail:²¹⁷

In order to react to the changing security environment, a major characteristic of the 2010 NDPG is the principle of developing a “Dynamic Defense Force.”

In the regions surrounding Japan, there still exist large-scale military forces including nuclear forces, and many nations are modernizing their military forces and increasing their military activities. Under these conditions, not only deterrence through the existence of the defense force per se, but also “dynamic deterrence”, which focuses on operational use of the defense force such as demonstrating the nation's will and its strong defense capabilities through timely and tailored military operations under normal conditions, is important. Additionally, warning times of contingencies is shortening due to exponential advances in military technology. Thus, in order to respond speedily and seamlessly to a contingency, comprehensive operational performance such as readiness is increasingly important.

Since many of security issues currently exist around the world may spread across national boundaries, international coordination and cooperation are becoming important. Under such circumstances, roles of military forces are tending to be increasingly diversified and becoming more involved in various everyday operations such as humanitarian aids and disaster relief, peace keeping, and providing countermeasures against piracy. The SDF has contributed to many international peace cooperation activities, and their activities abroad have been becoming routine. It is important for the SDF to be capable of continuing and supporting such activities.

Given these conditions, it is necessary that Japan's future defense force acquire dynamism to proactively perform various types of operations in order to effectively fulfill the given roles of the defense force without basing on the “Basic Defense Force Concept” that place priority on “the existence of the defense force.” To this end, the 2010 NDPG calls for the development of “Dynamic Defense Force” that has readiness, mobility, flexibility, sustainability, and versatility, and is reinforced by advanced technology based on the latest trends in the levels of military technology and intelligence capabilities. The concept of this “Dynamic Defense Force” focuses on fulfilling the roles of the defense force through SDF operations.

In order to handle an increasingly challenging security environment, Japan needs to steadily build an appropriate-size defense force. In doing so, and in light of the difficult financial circumstances, the 2010 NDPG state that Japan will carry out “selection and concentration” to selectively concentrate resources on truly necessary functions and bring about structural reform to the defense force to produce increased outcome with limited resources after carrying out drastic optimization and streamlining the SDF overall through fundamental review of the equipment, personnel, organization, and force disposition. Through a fundamental review of personnel management system, it is also stated that Japan will curve personnel costs and improve its efficiency and increasing the SDF strength by lowering its average age, in order to improve the structure of the defense budget, which has a high promotion of personnel cost that currently suppresses the expenditure of SDF activities. One of the characteristics of the 2010 NDPG is that it touches upon structural reform to the defense force and personnel structure reforms as above.

A 2012 Japanese defense White Paper described Japan's security environment as “becoming increasingly harsh” despite deepening cultural and economic ties with regional neighbors. In the Forward, the Defense Minister wrote that,²¹⁸

In North Korea, a new regime centered on Kim Jong-un was put in place in a short period of time, and the country pressed ahead with the launch of a missile, which it calls “Satellite”, in April this year. As well as continuing to boost its defense expenditure and broadly and rapidly modernizing its military forces, China is expanding and intensifying its activities in waters near Japan. Russia is stepping up the activities of its naval vessels and aircraft in its Far Eastern region.

Taking a broad overview of the international community as a whole, frequent regional conflicts and terrorism, as well as other asymmetric threats, inspire a great deal of fear among the public. Furthermore, the transfer and proliferation of weapons of mass destruction, such as nuclear, biological and chemical weapons, and the ballistic missiles that are their means of delivery, is becoming a major problem.

The 2012 White Paper discussed Japan's strategy of increasing defense capabilities, strengthening the US-Japan alliance, "encouraging bilateral defense cooperation and exchange, starting with Australia and South Korea, which are our key partners in the Asia-Pacific region, [and] striv[ing] to promote relationships of mutual understanding and trust with China and Russia, which are our neighbors....," increasing international peacekeeping activities, and developing a crisis management system "that facilitates a swift, accurate response, as well as strengthening intelligence functions, in order to ensure the safety of the country and the reassurance of the nation in regard to various internal and external risks, such as major earthquakes and missile launches by North Korea."²¹⁹

The same paper warned that, "Maintaining peace and stability on the Korean Peninsula is vital for the peace and stability of the entire East Asian region, to say nothing of Japan." The document also comments,²²⁰

North Korea's nuclear issue has serious influence on Japan's national security and it is also a critical problem for the entire international community in terms of non-proliferation of WMD. In particular, nuclear tests by North Korea, when considered in conjunction with North Korea's reinforcement of its ballistic missile capability that could serve as the means of delivery of WMD, simply cannot be tolerated as they constitute a serious threat to the security of Japan and do considerable harm to the peace and stability of Northeast Asia and the international community.

As for ballistic missiles, North Korea seems to be conducting R&D for deploying existing ballistic missiles, extending the range and converting into solid fuel propulsion.... North Korea's missile issue is, coupled with its nuclear issue, destabilizing factors for the entire international community and the Asia-Pacific region, and such developments are of great concern.

In terms of strategies to resolve the situation on the Korean peninsula, the White Paper notes,²²¹

While it is important for Japan, the United States, and the ROK to maintain close cooperation to resolve the North Korean nuclear problem, roles played by other countries like China and Russia (the other participants in the Six-Party Talks), as well as such international institutions as the United Nations and the International Atomic Energy Agency (IAEA) are also important.

In December 2013, Japan approved a new set of National Defense Program Guidelines (NDPG). It pointed out what Japan saw as a new security environment that required a new response:²²²

As interdependence among countries expands and deepens, there is a growing risk that unrest in the global security environment or a security problem in a single country or region could immediately develop into a security challenge or destabilizing factor for the entire international community. The multi-polarization of the world continues as a result of shifts in the balance of power due to the further development of countries such as China and India and the relative change of influence of the United States (U.S.). At the same time, the U.S. is expected to continue to play the role in maintaining world peace and stability.

There is an increase in the number of so-called "gray-zone" situations, that is, neither pure peacetime nor contingencies over territory, sovereignty and maritime economic interests.

In the maritime domain, there have been cases of undue infringement upon freedom of the high seas due to piracy acts as well as coastal states unilaterally asserting their rights and taking actions. In addition, securing the stable use of outer space and cyberspace is becoming a significant security challenge for the international community against the backdrop of rapid technology innovation.

...In light of the above, while the probability of a large-scale military conflict between major countries, which was a concern during the Cold War era, presumably remains low, various security challenges and destabilizing factors are emerging and becoming more tangible and acute. As a result, the security environment surrounding Japan has become increasingly severe since the formulation of 2010 NDPG. As the security challenges and destabilizing factors are diverse and wide-ranging, it is difficult for a single country to deal with them on its own. Therefore, it is increasingly necessary that countries which share

interests in responding to shared security challenges, among others, cooperate and actively respond to maintain regional and global stability.

The basic policies underlying the new NDPG shifted slightly in next year's defense white paper, *The Defense of Japan 2014*.²²³

The new NDPG clearly states Japan's basic policy on defense from the standpoint of highlighting the most fundamental matters essential to the Japan's defense, as explained below.

First, in light of the National Security Strategy, Japan will strengthen its diplomatic and defense capabilities along the policy of "Proactive Contribution to Peace" based on the principle of international cooperation, thereby expanding the role it can play. At the same time, Japan will contribute even more proactively in securing peace, stability, and prosperity of the international community while achieving its own security as well as peace and stability in the Asia-Pacific region by expanding and deepening cooperative relationships with other countries, with the Japan-U.S. Alliance as its cornerstone.

Under this basic principle, Japan will build a comprehensive defense architecture and strengthen its posture for preventing and responding to various situations. In addition, Japan will strengthen the Japan-U.S. Alliance and actively promote bilateral and multilateral security cooperation with other countries, while closely coordinating defense and diplomatic policies. Japan will also seek to establish an infrastructure necessary for its defense capabilities to fully exercise their capabilities.

Under the Constitution, Japan will efficiently build a highly effective and joint defense force in line with the basic principles of maintaining an exclusively defense-oriented policy, not becoming a military power that poses a threat to other countries, while adhering to the principle of civilian control of the military and observing the Three Non-Nuclear Principles.

Additionally, with regard to the threat of nuclear weapons, the extended deterrence provided by the U.S. is indispensable. In order to maintain and enhance the credibility of the extended deterrence, Japan will closely cooperate with the U.S. In addition, Japan will take appropriate responses through its own efforts, including ballistic missile defense (BMD) and protection of the people. At the same time, Japan will play a constructive and active role in international nuclear disarmament and non-proliferation efforts.

Based on this, the new NDPG defines the following three approaches as key pillars for Japan's defense within today's increasingly severe security environment.

- (1) Japan's own efforts;
- (2) Strengthening of the Japan-U.S. Alliance; and
- (3) Active promotion of security cooperation

The *Defense of Japan 2014* explained the differences between the 2010 NDPG and the new NDPG as follows.²²⁴

...the new NDPG carry with it great significance because it identifies functions and capabilities of particular emphasis from a comprehensive viewpoint based on capability assessments focused on the functions and capacities of the entire SDF, strictly focusing on the basic approach of responding to various situations by joint operations. By advancing defense capability buildup based on the results of these capability assessments, it has become possible to realize a more prioritized and efficient defense capability buildup, overcoming the boundaries of the Ground, Maritime and Air Self-Defense Forces more easily than ever.

Compared to the 2010 NDPG, the new NDPG calls for the establishment of a wider-ranging logistical support foundation. For example, SDF camps and bases will become important deployment staging grounds for the dispatch for disaster relief, and to minimize damages to these camps and bases, it is essential to improve survivability including recovery capabilities. Additionally, failure to provide adequate accommodations for personnel or family support measures will make it impossible to respond immediately during a situation and fully ensure readiness. In addition, taking into consideration a variety of elements, including "skills," "experience," "physical strength," and "morale," it is necessary to ensure the edge of SDF troops.

As such, it is important to carry out rigorous training and exercises in peacetime as well as comprehensively carry out personnel education measures, such as recruitment and support for re-employment, including the further utilization of female SDF personnel and reserve personnel. Furthermore, the collaboration and cooperation with local governments and relevant organizations as well as understanding and cooperation of the general public is indispensable to enabling the SDF to respond appropriately to various situations. As a result, it is extremely critical to actively strengthen collaboration with local communities and boost communication capabilities.

Given the vital importance of fundamentally enhancing the wide-ranging logistical support foundation compared to the 2010 NDPG to effectively carry out various activities, as explained above, the new NDPG calls for the strengthening of infrastructure for enabling a broad range of defense capabilities to be exhibited, such as training, exercise and operational infrastructure, personnel and education, defense production and technological bases, efficient acquisition of equipment, research and development, collaboration with local communities, boosting of communication capabilities, enhancing of intellectual base, and promotion of reform of the Ministry of Defense.

The 2010 NDPG described the development of a “Dynamic Defense Force that demonstrates readiness, mobility, flexibility, sustainability, and versatility, underpinned by advanced technical capabilities and intelligence skills, in light of trends in the level of military technology.” The Defense of Japan 2014 summarized the characteristics of the Dynamic Joint Defense Force under the new NDPG:

The defense force also must be an effective one which enables conducting a diverse range of activities to be seamless as well as dynamic and adapting to situations as they demand. To that end, the new NDPG states Japan will build a Dynamic Joint Defense Force, which emphasizes both soft and hard aspects of readiness, sustainability, resiliency and connectivity, reinforced by advanced technology and capability for C3I, with a consideration to establish a wide range of infrastructure to support the SDF’s operation.

In this regard, characteristics prioritized by the Dynamic Joint Defense Force, “resiliency” and “connectivity” which had not been expressed in the previous NDPG, are newly pointed out. This is based on the result of reviewing functions and capability to be especially prioritized from a comprehensive perspective after implementing capability assessments based on joint operations. Specifically, “resiliency” refers to necessary and sufficient securing of “quality” and “quantity” of defense capabilities that underpin various activities, and further strengthen the basic foundation for SDF. “Connectivity” refers to the strengthening of posture to collaborate with relevant ministries and offices, local governments, private sector, and to cooperate with the U.S., to seamlessly respond to various situations, from peacetime to contingencies.

A new Japanese Medium Term Defense Program (FY2014-FY2018) (new MTDP) was laid out in December 2013 to systematically transition towards the realization of the Dynamic Joint Defense Force that “follows the philosophy laid out in the new NDPG:”

To seamlessly and dynamically fulfill the responsibilities outlined in the new NDPG, with a focus on enhancement of joint operability, emphasis will be placed on the following functions and capabilities in particular: (1) ISR capabilities; (2) intelligence capabilities; (3) transport capabilities; (4) C3I capabilities (5) response to an attack on remote islands; (6) response to ballistic missile attacks; (7) response to outer space and cyber space threats; (8) large-scale disasters; and (9) international peace cooperation efforts.

In addition to enhancing the above capabilities, SDF units would be reorganized, with more units being deployed towards southwest Japan. The new MTDP addresses the North Korean threat primarily through BMD and enhanced ISR:

Given North Korea’s improved ballistic missile capabilities, the SDF will pursue the comprehensive improvement of its response capabilities against the threat of ballistic missiles.

The MOD will conduct studies on the best mix of the overall posture of its future BMD system, including the new BMD equipment.

In preparations for an attack by guerrilla or special operations forces concurrent with a ballistic missile attack, the SDF will continue to procure necessary equipment, etc., in order to improve its ISR posture, ability to protect key facilities such as nuclear power plants as well as search and destroy infiltrating units.

Japan and the DPRK

For the DPRK, historical grievances and propaganda – including Japan's status as a former colonizer, an ally of the US, and a supporter of the ROK's economic development – have resulted in extremely negative attitudes towards Japan. For Japan, the DPRK was low in the list of international priorities prior to 1998. This changed, however, when DPRK carried out long-range ballistic missile tests that overflowed Japan – resulting in both the Japanese government and the general public realizing the seriousness of the threat.²²⁵

While relations with the DPRK warmed somewhat in the early 2000s, the revelation in 2002 that the DPRK had kidnapped more than a dozen Japanese citizens during 1977-83 led to Japanese government and public outrage. While some of the abductees were allowed to return to Japan for a visit, the DPRK held their families hostage, (though the Japanese government declined to force them to return to the DPRK). Many Japanese are not convinced by the DPRK's claims that most of the abductees are dead. In fact, when the remains of one abductee were returned to Japan, tests showed that the remains were not those of the abductee that the DPRK had claimed.²²⁶

The lack of further DPRK concessions on this issue has resulted in a hardening of Japanese public opinion towards the DPRK, with the government cutting almost all trade and ties, dropping food aid, and pressing the US to do likewise. The DPRK, in return, has increased demands for Japanese colonial occupation reparations and removal of sanctions.

Normalization of relations between the two countries was a part of the 2005 Six Party Joint Statement, but both implementation of the agreement and the talks themselves have stalled and warmer relations have not been realized. In addition, Japan has reduced support for the Six Party Talks process overall, as it has failed to denuclearize the DPRK and also does not address the DPRK's ballistic missiles, which Japan sees as directly threatening its national security.²²⁷

In January 2013, Prime Minister Shinzo Abe's party declared that Japan would increase military spending for the first time in 11 years, starting in April 2013. While this is in part due to the escalated confrontation with China over disputed islands, it is also in response to the DPRK's December 2012 rocket launch over Japan's southern islands.²²⁸

In the 2015 defense white paper, Japan again reaffirms its realistic assessment of the DPRK's conventional and nuclear threat to regional stability:²²⁹

Although North Korea has been facing serious economic difficulties and has depended on the international community for food and other resources, it seems to be maintaining and enhancing its military capabilities and combat readiness by preferentially allocating resources to its military forces. North Korea deploys most of its military forces along the DMZ.

According to the official announcement at the Supreme People's Assembly in April 2015, the proportion of the defense budget in the FY2015 national budget was 15.9%. However, it is believed that this represents only a fraction of the real defense expenditures. Furthermore, North Korea seems to maintain and reinforce its so-called asymmetric military capabilities by continuing to develop weapons of mass destruction (WMD) and ballistic missiles and by maintaining large-scale special operations forces. In addition, North Korea repeatedly uses provocative words and actions against relevant countries, including Japan. In particular, from March to April 2013, North Korea underscored that it would exercise its right to preemptive nuclear attack against the United States and other countries, and that the strike zone of its ballistic missiles included Japan, naming specific cities.

In November 2014, the North Korean National Defense Commission released a statement protesting the Third Committee of the U.N. General Assembly's adoption of a resolution on North Korea's human rights situation. The statement noted that like the United States and the ROK, Japan will have to be hit hard and sent to the bottom of the sea. Such military trend in North Korea constitutes a serious destabilizing factor to the security not only of Japan but also of the entire region and the international community. Needless to say, North Korea's possession of nuclear weapons cannot be tolerated. Sufficient attention needs to be paid to the development and deployment of ballistic missiles, the military confrontation on the Korean Peninsula, and the proliferation of WMDs and ballistic missiles by North Korea.

Despite Abe's efforts to increase Japanese involvement in regional security, his administration has also made diplomatic progress with North Korea, which was highlighted by North Korea's agreement to reopen investigations into Japanese abductees. In return, Japan lifted some of the economic sanctions it has placed on North Korea. North Korea's efforts may be part of a push to "diversify its diplomatic focus away from China," as relations with China have soured after North Korea's third nuclear test in 2013.²³⁰

Such a conclusion appears to be complemented by Hwang Pyong So's visit to Seoul, and the release of an American prisoner in October 2014. While it is impossible to determine what will come of the recent Japan-North Korea engagement, some experts believe that North Korea's decision to engage with Japan is only a tactical move aimed towards the more strategic goal of improving relations with the US.²³¹ And Japanese policymakers and the public remained deeply concerned by the increasing capabilities of the DPRK missile program. A North Korean Rodong missile that was launched on August 3, 2016 came as close to Japan as any missile launched since 1998, and was launched just after the North's successful testing of the potent Musudan missile. Abe called this test a "serious threat", demonstrating the concern Japanese leaders have for this aspect the DPRK's military buildup.²³²

Japan, China, and the ROK

Japan, China, and the ROK have increased their formal cooperation in foreign policy, economy, trade, science, technology, and culture over the past ten years. They institutionalized cooperation mechanism involving a Trilateral Summit Meeting, Secretariat, 18 ministerial meetings, and over 50 working-level mechanisms.²³³ However, Japanese relations with China and the ROK have had their own tensions. As the International Crisis Group has reported,²³⁴

Japan and South Korea have recognized the need to increase military cooperation against the North Korean threat. After the attack on Yŏnp'yŏng Island, defence ministers discussed two proposals. The General Security of Military Information Agreement would allow sharing of information on issues such as the North's nuclear and missile programs. The Acquisition and Cross-Servicing Agreement (ACSA) would allow exchanges of logistical supplies and support. South Korean Defence Minister Kim Kwan-jin was to sign the agreements in Tokyo in May 2012, but the signing has been delayed due to a domestic backlash over military cooperation with Japan.

Tensions between Japan and China have increased steadily as a result of debates over maritime rights and sovereignty over islands in the northeast Pacific, but both sides have been careful to try to limit the level of confrontation. Despite the fact that Japan and China have been engaging in disputes over islands claimed by both states, Japan's Prime Minister Shinzo Abe remarked in 2003 that, "I have absolutely no intention to climb up the escalation ladder... For me, Japan's relations with China stand out, as among the most important. I have never ceased to pursue what I called [a] 'Mutually Beneficial Relationship Based on Common Strategic Interests' with China. The doors are always open on my side for the Chinese leaders."²³⁵

At the same time, due to Japan's US alliance-first strategy, it is difficult for China to have a dialogue with Japan regarding the islands.²³⁶ The most the leaders of the two powers – Abe and Xi – could manage during their first meeting since each took power was a handshake at a meeting in November 2014 that was perceived throughout the world as “frosty” at best.²³⁷

Disputes in the Sea of Japan, or East Sea, also affect Japan and the ROK. They involve a small set of islands known as the Liancourt Rocks (or, Takeshima by the Japanese and Dokdo by the Koreans), which are claimed by both countries, but is administered by the ROK. In the summer of 2012, tensions between Japan and the ROK rose significantly after the ROK President, at the time Lee Myung-bak, visited the islands, prompting Japan to increase its territorial claims assertions and attempts to take the issue to the International Court of Justice, all of which the ROK rejected.²³⁸

Several bilateral meetings were also cancelled, and the atmosphere of tension had remained. Although the two countries continue to cooperate, especially with the US and especially regarding the DPRK, these islands and other issues have reduced the prospects for increasing trilateral US-ROK-Japan relations.

As is the case with the ROK, this raises the broader issue that at least the public aspects of Japan's strategy and force posture have not yet addressed how Japan will react if the DPRK goes on to create much larger nuclear forces, and to the changing balance of US and Chinese capabilities that will grow out of the US rebalancing to Asia and China's shifts in strategy and ongoing military modernization.

Like the ROK, Japan's public strategies and defense white papers focus largely on past events and the present balance. Like Japan, however, the ROK must assess the ongoing changes US-Chinese balance and their level of cooperation versus competition as key factor in its own security. For all of the reasons outlined in the following chapters, this may lead to a major expansion of ROK military efforts and possibly ROK long-range missile and nuclear programs.

Russia

Russian policy towards North and South Korea had been shaped largely by its broader relations with China, the US, and Japan, and has been affected by the growing tension between Russia and the West over Russia's invasion of Ukraine. DNI James R. Clapper reported to the Senate in March 2013 that Russian domestic political developments and foreign policy were shaped by the following major considerations.²³⁹

During the next year, Russia's political system of managed democracy will come under greater strain as the Kremlin grapples with growing social discontent and a society that is increasingly in flux. Important sectors of the Russian public are frustrated with the country's sluggish economy and are no longer content with a political system that lacks any real pluralism and suffers from poor and arbitrary governance and endemic corruption. All of these factors present Russian President Vladimir Putin with far greater challenges than any he faced during his two previous terms in office.

Putin's return to the presidency in 2012 was intended to restore strength and vigor to a system that he believed had weakened under President Dmitriy Medvedev. Instead, antipathy over the Putin-Medvedev job swap touched off some of the largest political protests Russia has seen since the breakup of the Soviet Union. Despite these unprecedented protests, the Russian leadership has demonstrated firm resolve to preserve the system, while a disparate opposition movement struggles to become more cohesive, broaden its base, and build momentum.

After initially tolerating demonstrations and offering a few political reforms in the hope of dividing the opposition, the Kremlin took a more aggressive approach, adopting measures to restrict opposition activities,

such as targeting opposition figures for harassment and using legislative and judicial means to confront, intimidate, and arrest opponents. These actions have helped to thwart the opposition's ability to build momentum and preserve the Kremlin's control of the political system, but they have not addressed the sources of bitterness and dissatisfaction.

Russian foreign policy is unlikely to deviate significantly from its current course in the next year, but domestic political factors almost certainly will exert greater influence on foreign policy. Putin is sensitive to any US criticisms of Russian domestic political practices, which he perceives as meddling in Russia's internal affairs. Nevertheless, he sees benefits in cooperating with the United States on certain issues.

Missile defense will remain a sensitive issue for Russia. Russian leaders are wary that in the long run US pursuit of a "missile shield" will result in systems that enable the United States to undercut Russia's nuclear deterrent and retaliatory capabilities. Russian leaders also see aspects of US plans for missile defense in Europe as serious threats to their core national security interests. The Kremlin will continue to look to the United States and our NATO partners for guarantees that any system will not be directed at Russia.

Clapper's 2014 statement came before Russia had seized Crimea and provided military support to the rebels in eastern Ukraine, and most US and other NATO statements in 2014 focused on the security of Russia. Russia, however, has accused the US and Europe of trying to use states like Ukraine to encircle it, reached out to China, and accused the US of trying to destabilize Asian and other developing states to serve US interests through covert policies that Russia calls "Color Revolutions." It may well see the DPRK as a pawn to play in this game.

Russia and the Korean Military Balance

Russia has long maintained relatively close cooperation with the DPRK, holding summit meetings, releasing joint statements, and signing several agreements over the past decade. Although Russia did join the UN Security Council's condemnation after the DPRK's second nuclear test in 2009, Kim Jong-il visited Russia in August 2011, and the two countries agreed to a variety of construction projects and other cooperation. In general, Russia wishes to enhance its position as a mediator and increase its economic presence in the region.²⁴⁰

Russia published a new Military Doctrine in February 5, 2010. The document did not discuss the Koreas per se, but it reflected a perceived reduction in military and political threats while also referencing the use of military force in solving conflicts and an increase in military dangers in certain areas. Russia's stated national interests are to develop partnerships with other states based on common interests, protect Russian interests, and promote the use of special armed forces formations to assist Russia's economy.

The threats Russia included in the 2010 Military Doctrine are a general deterioration in the international military-political system, the use of military force in states near Russia, other countries' increased mobilizations, and the impeding of state and military command and control. Dangers listed mostly applied to the West, especially NATO, and again the expansion of foreign militaries located on or near Russia. Also discussed were missile defense systems and territorial claims.²⁴¹

World development at the present stage is characterized by a weakening of ideological confrontation, a lowering of the level of economic, political, and military influence of certain states (groups of states) and alliances and an increase in the influence of other states with ambitions for all-embracing domination, multipolarity, and the globalization of diverse processes.

Many regional conflicts remain unresolved. There is a continuing tendency towards a strong-arm resolution of these conflicts, including in regions bordering on the Russian Federation. The existing international security architecture (system), including its international-legal mechanisms, does not ensure equal security for all states.

That said, despite the decline in the likelihood of a large-scale war involving the use of conventional means of attack and nuclear weapons being unleashed against the Russian Federation, in a number of areas military dangers to the Russian Federation are intensifying.

In contrast to the previous (2000) Military Doctrine, the 2010 version did not specifically refer to Russia as a democracy or remark upon the defensive character of its doctrine. Before it was released there were many reports that the document would discuss Russia's possible preemptive use of nuclear weapons;²⁴² however, the final version had almost exactly the same language as the 2000 document, reaffirming the right to use nuclear weapons in response to a WMD or conventional weapons attack that threatens the existence of the state.²⁴³

Nuclear weapons will remain an important factor for preventing the outbreak of nuclear military conflicts and military conflicts involving the use of conventional means of attack (a large-scale war or regional war).

In the event of the outbreak of a military conflict involving the utilization of conventional means of attack (a large-scale war or regional war) and imperiling the very existence of the state, the possession of nuclear weapons may lead to such a military conflict developing into a nuclear military conflict.

...In the context of the implementation by the Russia Federation of strategic deterrence measures of a forceful nature, provision is made for the utilization of precision weapons.

The Russian Federation reserves the right to utilize nuclear weapons in response to the utilization of nuclear and other types of weapons of mass destruction against it and (or) its allies, and also in the event of aggression against the Russian Federation involving the use of conventional weapons when the very existence of the state is under threat.

The Korean peninsula was not mentioned in Russia's 2010 Military Doctrine, but the 2014 Japanese Defense White Paper commented as follows on Russian and DPRK relations:²⁴⁴

While North Korea and Russia became estranged with the end of the Cold War, they signed the Russia-North Korea Treaty on Neighborly Friendship and Cooperation in 2000. In August 2011, Kim Jong-il, then Chairman of the National Defense Commission, visited Russia. A Russia-North Korea summit was held for the first time in nine years, and the two sides agreed to cooperate on a gas-pipeline project, among other matters.

In September 2012, after the transition to the Kim Jong-un regime, the two countries signed an agreement that writes off 90% of the debt owed to Russia by North Korea, and in such ways, friendly relations have been maintained between the two countries. Furthermore, in September 2013, a railway opened for service connecting Khasan, a coastal area in the Russian Far East, and Rajin Port in northeastern North Korea.

Concerning North Korea's nuclear issue, Russia, along with China, has expressed support for the denuclearization of the Korean Peninsula and early resumption of the Six-Party Talks. After the nuclear test conducted by North Korea in February 2013, Russia issued a statement that condemned the test but expressed that it was against sanctions that could influence normal trade and economic relations with North Korea.

While it still uncertain how much the Ukraine crisis will change Russian relations with the DPRK, Russia has sharply reduced its nuclear cooperation with the US, and threatened to limit further arms control talks. It reached out to the DPRK in 2014 by offering new economic projects, and more political exchanges. It held a vote in the Duma that forgave some \$10 billion in debt incurred during the Soviet era, and allow the DPRK to pay off \$1.09 billion more over a 20 year period in equal installments every six months – a period that mean most of the payments in the outyears would be offset by inflation. Russia also promised to reinvest \$1 billion more that Pyongyang still owed into a trans-Siberian railway through North Korea to South Korea. It also discussed a pipeline that could allow Russia to export gas and electricity to South Korea.²⁴⁵ Outside observers noted an increase in DPRK-Russian diplomatic and military exchanges in 2014-2015. One report stated:²⁴⁶

There has been a flurry of high-level exchanges, with Russia becoming the country most frequently visited by North Korean senior officials. Since February 2014, the DPRK Supreme People's Assembly Presidium Chairman Kim Yong-nam, Minister of Foreign Trade Lee Ren-Nam, Foreign Minister Lee Soo-Young, Kim Jong-un's special envoy Choe Ryong Hae, Supreme People's Assembly Chairman Choi Thae Baek and other senior leaders traveled Russia. Russia reciprocated by sending to Pyongyang multiple delegations. Although the expected visit of the DPRK's supreme leader Kim Jong-un to Moscow for the celebrations of the 70th anniversary of victory over Nazi Germany did not materialize (Pyongyang was instead represented by Kim Yong-nam, the number two in the DPRK state hierarchy), this did not slow the momentum of Russia-North Korea ties, with 2015 designated as the Year of Friendship of Russia and the DPRK. In November 2015, Moscow and Pyongyang signed an agreement on "preventing dangerous military activity." The agreement, concluded at the level of the two countries' general staffs, was an indication of increased military contacts between Russia and the DPRK. In February 2016, Moscow and Pyongyang concluded an agreement on the transfer of illegal migrants, which will facilitate the deportation of North Korean defectors back to the DPRK. This sensitive document was signed just a few weeks after the North's nuclear test and a few days before the planned long-range missile launch, suggesting that, even under such inauspicious circumstances, Russia was keen to pursue political cooperation with the North Korean regime.

Like its fellow Security Council members, however, Russia condemned the 2016 tests and voted for the imposition of harder sanctions on the DPRK, suggesting that its leaders are at least somewhat serious in their opposition to a nuclear North Korea.²⁴⁷

Mixed Security Policies

Like China, Russia has opposed the DPRK's nuclear weapons development in the past because this could cause the ROK, Japan, and other countries to develop their own nuclear capabilities and/or increase development of their missile defenses – both of which could be used against Russia. Russia has also been interested in economic development of Northeast Asia, and in using the DPRK as a transit country for export, rail, and energy links to the ROK.²⁴⁸

At the same time, Russia strengthened its relationship with the DPRK long before the crisis over the Ukraine. For example, Russia signed a military technology cooperation agreement with North Korea in 2001,²⁴⁹ and then-President Medvedev met in August 2011 with Kim Jong Il, who was visiting Russia for the first time in nine years. At the same time, Russia generally supports the UN Security Council resolutions regarding DPRK nuclear and missile tests.²⁵⁰

Russia has also been increasing its presence in the Asia-Pacific region and has joined a variety of regional frameworks. It has been a big supporter for the Six Party Talks, as the country otherwise has the weakest political, economic, and cultural links, among the six participants, to the Korean peninsula and East Asia. Russia's leverage over the DPRK is much smaller than China's, resulting in significant limitations of its plans for the region. Furthermore, Russia has realized that as long as the DPRK is pursuing nuclear weapons, its ambitious economic projects will remain unrealized.²⁵¹ The invitation of Kim Jong-un to Moscow for the May 9, 2015 celebration – marking the 70th anniversary of the former Soviet Union's victory over Nazi Germany – has been seen a sign of thawing relations, most likely to increase economic interest in the Korean peninsula.²⁵²

There still, however, are leaders and think tanks in Russia that view the DPRK negatively. For example, one prominent Russian think tank released a report analyzing DPRK's collapse as a certainty and concluding that ROK-led Korean reunification would coincide with Russia's national interest. This is in opposition to Russia's official policy of equidistance between the two Koreas.

II. The Conventional Military Balance in the Koreas and Northeast Asia

The military balance has long been a key factor shaping the stability of the Koreas and Northeast Asia. For decades, the DPRK has shaped the military balance in the Koreas through periods of deliberate confrontation and military threats, threatening military movements and exercises, a steady military build-up, and sporadic acts of low-level violence ranging from assassination to artillery attacks and ship sinkings. It has focused on ROK targets, but has also consistently threatened the US.

There is no one view of the military balance that is likely to shape any conflict between the Koreas. The Democratic People's Republic of Korea (DPRK or North Korea) does not publish meaningful public assessments of the balance. As **Figures II.1 and II.2** show, outside sources can make radically different counts of the conventional balance – depending on the analyst's perspective. The Republic of Korea (ROK or South Korea) count in **Figure II.1** is far more favorable to the DPRK than the Japanese count in **Figure II.2**.

Much depends on the scenario used in making the count. The ROK count is a total force inventory. The Japanese count focuses on the modern conventional forces likely to dominate a major conventional conflict. Both methods have value, but both can tell only part of the story – even for conventional forces – and tacitly assume very different levels of each side's forces that would be committed to a conflict.

Moreover, the term “conventional” does not apply to the forces each nation would have in many credible scenarios. Asymmetric and nuclear forces are likely to play a major role in the way any conflict develops, even if this only means deterring given military options or altering the political perceptions on each side of how to shape the fighting.

Asymmetric warfare can be used at any level of conflict, and much of the DPRK's past behavior has used low-level asymmetric warfare to threaten the ROK at levels that have drawn a military response. The DPRK can also use its limited nuclear capabilities, and missile threats to try to deter ROK or US conventional attacks on the DPRK, even if it has no intention of actually using nuclear weapons.

Deterrence, Restraint, and Levels of Conflict

Warfighting is also only one aspect in assessing the military balance. The forces on each side are designed as much to deter the other and gain strategic and political influence as to actually fight. There are also powerful political and economic deterrents to a major conflict for all of the reasons outlined in Chapter II.

The ROK has emerged as a major economic power, and one that is important to the economies of the US, Japan, Russia and China (People's Republic of China or PRC) – as well as to the world. The DPRK is one of the world's most heavily militarized states, but is still a relatively small military power by US and Chinese standards. It remains vulnerable to US aid, missile power, and precision strike capability, and runs a serious risk of being isolated if it provokes or escalates a conflict without Chinese support.

Much depends on China's position and the extent to which it seeks to prevent, contain, and de-escalate any conflict on the Korean Peninsula, and particularly on its efforts to influence the

DPRK. The same is true of US and ROK efforts to avoid any repetition of the mistakes made during the Korean War – military efforts that could place US forces near the border of China – or confront China with the loss of the DPRK as a buffer state in ways China felt would become a threat.

As the analysis of Chinese conventional and nuclear missile forces in Chapter IX makes clear, China already can bring important anti-access/area denial (A2AD) assets to bear in a “worst case” conflict in the Koreas. While the Chinese modernization efforts described in Chapter VII may today be focused on Taiwan and the Pacific, they directly affect its future capabilities to intervene in the Koreas and Northeast Asia as well as increasingly challenge US power projection.

Every aspect of the broader balance of US and Chinese military capabilities and modernization efforts in Asia and the Pacific – and the extent to which they cooperate or confront each other in any present or future Korean crisis or conflict – affects the more narrow balance of forces now in the Koreas and Northeast Asia.

A Clash or Conflict between the DPRK and ROK

The fact remains, however, that a high level of mutual deterrence never means that any one side can dismiss the risk of a serious clash or war. This is particularly true if one considers the number of times that war has been the result of unpredictable incidents and patterns of escalation. The historical reality is that the likelihood of less-probable forms of war actually occurring has been consistently higher than what seemed to be the most probable contingencies in peacetime. Far too often, the real world patterns of escalation also differ sharply from those that seem most likely from the viewpoint of a “rational bargainer.”

Both sides also approach the risk of war from a different perspective. The DPRK has long emphasized irregular warfare, low-level attacks, covert operations, and large Special Forces. Its forces are ground and missile “heavy” compared to those of the ROK. The DPRK puts far more emphasis on force quantity or mass, while the ROK has emphasized land and air technology and force quality.

The DPRK has long built up large stocks of chemical weapons, may have biological weapons, and is an emerging nuclear power that may add nuclear warheads to a large force of long-range missiles. The ROK is just beginning to develop longer-range missile forces and has not seriously pursued nuclear weapons. It is, however, acquiring missile defenses.

If a major clash or conflict does occur, much will depend on the conditions and levels of preparation and warning that led to a confrontation or actual fighting. Total forces and orders of battle may or may not be relevant measures in a given crisis or conflict. Pyongyang might conduct a major conventional buildup to pressure the ROK, Japan, and/or the US. It might do so to deal with internal unrest, trying to focus the nation on a foreign enemy. It might launch a limited war for the same reasons, or engage in limited provocations – like those in 2010 – to which it expects to receive a limited ROK response and little punishment or censure from the international community.

It is doubtful that the ROK would initiate such a conflict. South Korea cannot be sure what level of escalation would follow any response to a limited incident or DPRK action of the kind Pyongyang initiated by sinking the ROK ship *Cheonan* and firing on Yeonpyeong. The ROK

might also be confronted with a DPRK succession crisis or massive suppression of the population – creating a strong incentive for some form of decisive ROK military action.

If the DPRK and ROK do go to war with “conventional” forces, the resulting level of restraint and escalation ladder would be far from clear. The perceptions of risk and capability could be so different on each side – and involve such different mixes of the use and threatened use of asymmetric, conventional, nuclear, and long-range missile forces – that each side might make a major miscalculation, and a conflict might escalate in unpredictable ways that neither side could control.

There also are major uncertainties to the outcome of any such conflict. A battle near the DMZ, directed at a target like Seoul, could rapidly escalate to the point at which it threatened the ROK’s entire economy, even if no major invasion took place. DPRK missile, rocket, and artillery fire would be met in kind, as well as by precision air strikes, though the ability of such strikes to suppress DPRK forces is uncertain, as are the potential losses to the ROK air forces. The ROK might well respond with strikes deep into the DPRK, attacking counter value targets like key economic and infrastructure facilities, but again, the exchange rates in terms of casualties and tactical outcomes would not be predictable before such a war occurred.

Similar problems drive any assessment of the outcome of a major DPRK invasion of the ROK, even if one only focuses on DPRK-ROK forces. The DPRK has far larger ground forces, but the outcome of what would today be an air-land battle driven heavily by the overall mobility of DPRK land forces and their ability to concentrate along given lines of advance relative to the attrition technically superior ROK land and air forces could inflict is impossible to calculate with any confidence, as is the actual mix of forces both sides could deploy in a given area and scenario. It may be possible to simulate with advanced war gaming models and classified data, but it is unclear what level of confidence would result.

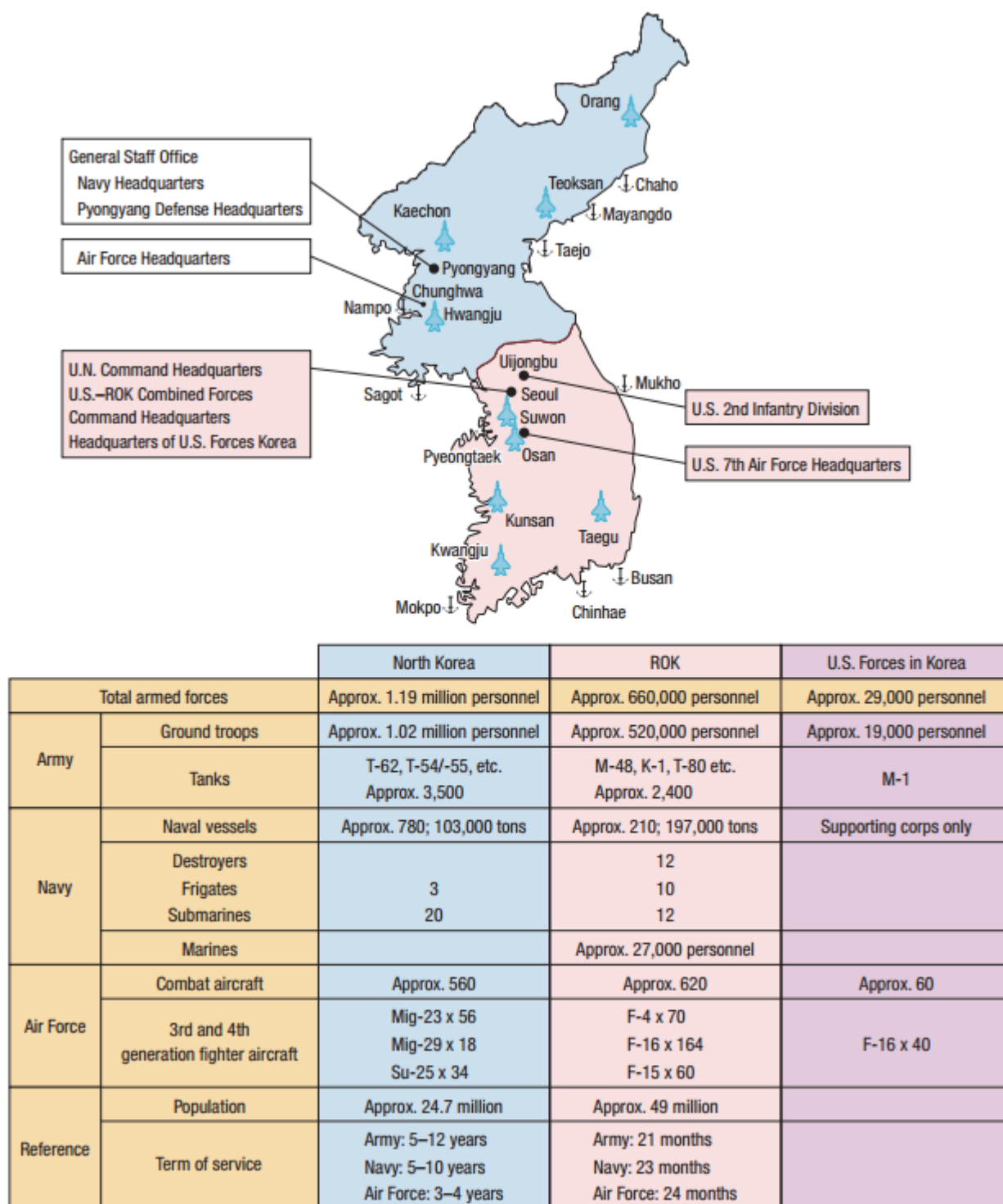
The “third party” factor is equally important. Much depends on the role of China and the U.S., as well as Japanese support for U.S. military intervention. A crisis in the Koreas may or may not come with significant strategic warning that would allow China and the U.S. to prepare for such intervention and/or begin deploying forces. It may or may not be tied to other crises in Northeast Asia or the rest of the world. Russia and other Asian states can bring great influence to bear or become involved. Once again, history is a grim warning that “probability” is very different from successful “prophecy.”

Figure II.1: ROK Summary of the DPRK-ROK Conventional Military Balance in 2012

Category				South Korea	North Korea		
Troops (in peacetime)	Army			495,000	1,020,000		
	Navy			70,000 (including 29,000 Marine Corps troops)	60,000		
	Air Force			65,000	120,000		
	Total			630,000	1,200,000		
Major Forces	Army	Units	Corps (level)	12 (including Special Warfare Command)	15		
			Divisions	44 (including Marine Corps)	81		
			Maneuver brigades	14 (including Marine Corps)	74 (Reserve Military Training Brigade not included)		
		Equipment	Tanks	2,400 (including Marine Corps)	4,300		
			Armored vehicles	2,700 (including Marine Corps)	2,500		
			Cannons	5,600 (including Marine Corps)	8,600		
			MLRS/MRLs	200	5,500		
			Ground-to-ground missiles	60 (launchers)	100 (launchers)		
			Navy	Surface vessels	Combatants	110	430
					Amphibious ships	10	260
	Mine warfare vessels	10			20		
	Support and auxiliary vessels	20			40		
	Submarines		10	70			
	Air Force	Combat aircraft		400	820		
		Surveillance & Control aircraft		60 (including those belonging to the Navy)	30		
		Transport aircraft		50	330		
		Trainers		160	170		
	Helicopters (Army/Navy/Air Force)			690	300		
Reserve Troops			3,100,000 (including officer candidates, wartime labor call, and switchover and alternative service personnel)	7,700,000 (including Reserve Military Training Unit, Worker-Peasant Red Guards, and Red Youth Guard)			

Sources: Republic of Korea, Ministry of Defense, 2014 *Defense White Paper*.

Figure II.2: Japanese Summary of the DPRK-ROK Conventional Military Balance in 2012



Source: The Military Balance 2015, etc.

Source: Japanese Ministry of Defense, Defense of Japan 2015, 14

Levels of “Conventional” Conflict

As Sun Tzu pointed out centuries ago, wars do not have to involve conflict if military force can be used politically in the equivalent of “wars of intimidation.” The DPRK has found that one way to both mobilize support for the regime and put pressure on its neighbors and the US is to utilize military pressure in the context of some self-generated crisis. It has learned that one rational way for a power with limited resources but large military forces to survive is to appear “irrational” and then compromise. Within limits, it has been able to count on the ROK and US showing restraint, China being forced to largely stand aside or support its “buffer” state, Japan and other Asian states pressing for some form of compromise that the DPRK can exploit, and Russia largely standing aside.

No one, however, can be certain that the DPRK will not escalate its future threats and actions in ways that lead to serious conventional conflicts. The DPRK can threaten the ROK’s capital, raid across the DMZ, provoke large-scale maritime clashes, provoke a major artillery strike, or raise the political ante with a new set of attacks on the ROK’s leaders. This can lead to escalation at a level neither side wants and serious miscalculations that increase the level of conflict. It can provoke a cycle of challenge and response neither side can easily end. The DPRK’s manipulation of a large artificial threat of ROK and US invasion can be manipulated to win popular support and some experts fear that any internal power struggle in the DPRK might result in its leadership provoking a war to retain power.

The DPRK’s unique ideological extremism and reliance on the cult of the leader may also interact with the fact it has not had any serious military experience since the 1953 cease-fire in the Korean War. Its complex mix of regular and internal security forces and massive bureaucracy may interact with ideology and reliance on the leader in ways that make its military operations both inefficient and unpredictable and lead to unexpected levels of escalation or tactical and strategic behavior.

Furthermore, the DPRK’s economic weaknesses may impose problems in terms of readiness and sustainability that may lead to military actions that are more desperate, or at least different, from what might be expected based on the size of its order of battle and the deployment of its forces. This further highlights the risk of relying on “rational bargainer” behavior and scenarios in a conventional – or any other form of – conflict.

Open-Ended Scenarios and Escalation Ladders

The Demilitarized Zone (DMZ) presents special problems for the ROK. It is four kilometers long and about 250 kilometers wide, and allows North Korean forces to deploy much closer to the capital of South Korea than ROK forces can deploy near the capital of North Korea - Pyongyang, the capital of the DPRK, is approximately 125 kilometers north, while the ROK’s capital, Seoul, is about 40 kilometers south. There are some 20,000 artillery pieces and armored vehicles, as well as over one million troops, in the surrounding areas.

The DPRK has deployed many of its forces near the DMZ and has massive Special and naval forces designed to support raids and use smaller systems like mine layers and submersibles. It emphasizes artillery, rocket, and missile forces. The ROK emphasizes defense, conventional military forces, air power, and air and missile defenses. It can count on limited support from US ground forces and a far larger US presence in terms of air precision strike, stealth, cruise missile, and naval forces.

The threat of a large land war for control of the entire peninsula cannot be dismissed, but a repetition of a Korean War-type conflict seems increasingly unlikely. The Korean Peninsula is 250 kilometers wide at the narrowest point and approximately 1,000 kilometers long. Most of the Peninsula is mountainous, so heavily armored forces are generally either forced to use predictable routes or are unable to move quickly. According to the International Institute of Strategic Studies (IISS), there are three main avenues of approach for a land offensive that are shaped by Korea's topography; these are also shown in **Figure II.3**.²⁵³

Two are in the relatively flat western part of the Peninsula, known as the Chorwon and Kaesong Munsan corridors, and provide the most direct approaches to Seoul and Pyongyang, although much of the flat terrain is marsh land and rice fields. The third route runs along the east coast through the Taedong Mountains and is the most amenable to vehicle passage. In some places, these corridors are about 15km wide and interconnected with other possible routes, which would utilize existing road networks and suitable terrain in the central and eastern parts of the Peninsula.

It is important to note, however, that such terrain considerations affect the use of modern intelligence, surveillance, and reconnaissance (ISR) assets and precision air power. Joint warfare today can count on 24-hour surveillance and targeting of land movements almost regardless of weather. As the wars against Iraq in 1991 and 2003 demonstrated, smart submunitions and stand-off precision strike weapons vastly increase the lethality of the modern strike aircraft and bombers in US and ROK forces. Stealth adds another dimension, as does the ability to use cruise missiles, deep strikes, and weapons like earth penetrators to attack DPRK command, control, computer and battle management (C4I/BM) assets and critical infrastructure.

The end result can be an air-land battle rather than a battle dominated by land forces. In fact, stealth, precision-guided air-to-surface weapons, and cruise missiles are becoming the equivalent of "weapons of mass effectiveness," and if the ROK must fear massive artillery and rocket strikes on a key target like Seoul, the DPRK must increasingly fear an ROK-US response that can strike deep into the DPRK. This changes the definition of "conventional" in terms of war fighting effects, but the DPRK can respond with its own rockets, missiles, and weapons of mass effectiveness.

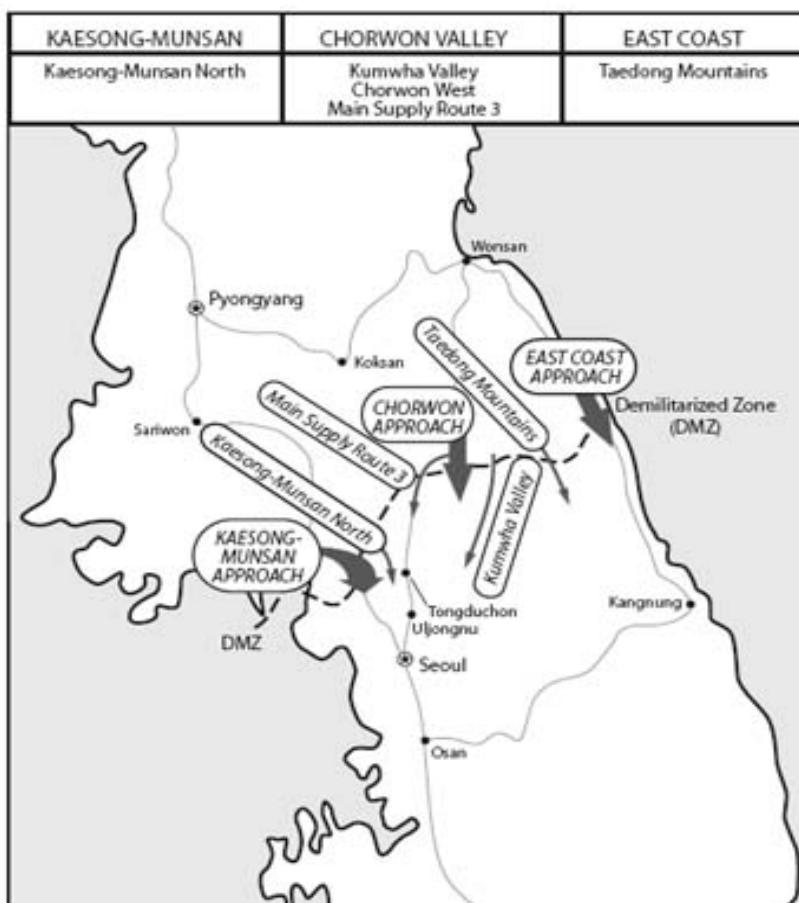
As is described in detail in a later chapter, the DPRK has large stocks of chemical weapons, a small nuclear arsenal, and possible possession of biological weapons, all of which add another wild card to the problem of assessing the balance. The DPRK could escalate to the use of such weapons to try to deter counteroffensives and hold any gains, limit ROK and US air and missile strikes, limit other forms of ROK and US escalation, try to force a favorable settlement, or to ensure regime survival if the DPRK's other forces faced a major defeat and ROK attacks across the DMZ.

The risk of some type of DPRK use of CBRN weapons – if only in terms of threat and intimidation – will grow if the DPRK can develop a serious stockpile of nuclear weapons and arm longer-range ballistic missiles. The DPRK's nuclear efforts are also creating a growing risk that China and the US will compete to provide some form of extended deterrence for each side with their own missile forces, that the ROK will go nuclear, and that Japan will develop its own counterstrike capabilities against the DPRK.

There is also a slowly increasing risk that a conflict will escalate beyond the Korean Peninsula – a threat compounded by the many tensions between Asian states over the emergence of China as a power capable of regional power projection and a major nuclear and missile power in its own

right, and by the many tensions over control of islands and offshore waters in Northeast Asia and the rest of the Pacific.

Figure II.3: Avenues of Approach from the DPRK to the ROK



Source: ROK Ministry of National Defense, 2001; cited in Bruce E. Bechtol Jr., "The Future of US Airpower on the Korean Peninsula," *Air & Space Power Journal*, 2005. <http://www.airpower.maxwell.af.mil/airchronicles/apj/apj05/fal05/bechtol.html>.

Comparing Total "Conventional" Orders of Battle with Possible Combat Scenarios

The force counts that follow provide more detailed estimates of the conventional forces on each side and offer a break out of equipment types that gives some indication of force quality.

In broad terms, the ROK has the advantage in "conventional force" quality, while the DPRK has the advantage in force quantity. James R. Clapper, the US Director of National Intelligence (DNI), summarized the Korean conventional balance as follows on February 10, 2011.²⁵⁴

North Korea's conventional military capabilities have eroded significantly over the past 10-15 years due to persistent food shortages, poor economic conditions, inability to replace aging weapons inventories, reduced training, and increased diversion of the military to infrastructure support. Therefore, Pyongyang increasingly relies on its nuclear program to deter external attacks on the state and to its regime. Although there are other reasons for the North to pursue its nuclear program, redressing conventional weaknesses is a major factor and one that Kim and his likely successors will not easily dismiss.

Nevertheless, the [Korean People's Army ("KPA")] remains a large and formidable force capable of defending the North. Also, as demonstrated by DPRK attacks on the South Korean ship Cheonan in March 2010 and Yeongpyong Island in November, North Korea is capable of conducting military operations that could potentially threaten regional stability. These operations provide Pyongyang with what the regime may see as a means to attain political goals through coercion.

U.S. intelligence assessments have not changed since that time, except to note that North Korea's leadership has not become less provocative, and the DPRK has continued every aspect of its military buildup. The DNI's threat assessment for Congress in 2016 stated that,²⁵⁵

Since taking the helm of North Korea in December 2011, Kim Jong Un has further solidified his position as the unitary leader and final decision authority through purges, executions, and leadership shuffles. Kim and the regime have publicly emphasized—and codified—North Korea's focus on advancing its nuclear weapons program, developing the country's troubled economy, and improving the livelihood of the North Korean people, while maintaining the tenets of a command economy. Despite efforts at diplomatic outreach, Kim continues to challenge the international community with provocative and threatening behavior in pursuit of his goals, as prominently demonstrated in the November 2014 cyberattack on Sony, the August 2015 inter-Korean confrontation spurred by the North's placement of landmines that injured two South Korean soldiers, and the fourth nuclear test in January 2016.

Similarly, Lieutenant General Vincent R. Stewart, the Director of the U.S. Defense Intelligence agency (DIA) stated in 2016 that,²⁵⁶

The Democratic People's Republic of Korea's (DPRK) primary goals are preserving the control of the Kim family regime, improving its poor economy, and deterring attack by improving its strategic and conventional military capabilities. Pyongyang maintains that nuclear and ballistic missile capabilities are essential to ensure its sovereignty.

The DPRK continues to prioritize maintaining the readiness of its large, forward-deployed forces. While Pyongyang is stressing increased realism in military training, exercises still appear to do little more than maintain basic competencies. Because of its conventional military deficiencies, the DPRK is also concentrating on improving its deterrence capabilities, especially its nuclear technology and ballistic missile forces.

We believe the DPRK continues to develop its nuclear weapons and missile programs which pose a serious threat to the U.S. and regional allies. We remain concerned that the DPRK will conduct a nuclear test in the future. Following United Nations (U.N.) condemnation of its human rights record in November 2014, Pyongyang indicated it would "not refrain any further from conducting a nuclear test." This followed a statement in March 2014 wherein North Korea's Foreign Ministry warned it "would not rule out a new form of nuclear test".

Pyongyang is also making efforts to expand and modernize its deployed missile forces consisting of close-, short-, medium-, and intermediate-range systems. It seeks to develop longer-range ballistic missiles capable of delivering nuclear weapons to the U.S., and continues efforts to bring its KN08 road-mobile ICBM to operational capacity. In 2015, North Korea will continue improving the combat proficiency of its deployed ballistic missile force, and will work to improve missile designs to boost overall capability. Pyongyang likely will launch additional ballistic missiles as part of its training and research and development process. We remain concerned by North Korea's illicit proliferation activities and attempts to evade U.N. sanctions.

The Limits to Conventional Force Comparisons

The DPRK does face serious limits to its conventional capabilities that could seriously affect its ability to exploit its apparent conventional strength. Some experts feel that the DPRK's recurrent economic crises have severely affected its ability to upgrade major weapons, modernize combat and service support forces, and logistic stocks and capabilities. This may affect the quality and quantity of basic military stocks like artillery ammunition, and there are reports that the DPRK lacks the national fuel stocks to even carry out a major conventional offensive.

Other reports question the DPRK's realism in training as well as its levels of readiness and the size of its capability to sustain offensive operations. These reports cannot be confirmed at the unclassified level, but they also cannot be ignored. They present further reasons why the DPRK might choose scenarios or attack models that do not seem predictable. Such limits could encourage it to rely on asymmetric or nuclear options, depending on the scenario and cause of any fighting. They might also force it to seek a sudden, surprise conventional victory in any all-out conventional attack.

It is also unlikely that either the DPRK or ROK will ever go to war with their entire orders of battle, and – in any case – the term “conventional” does not fit a DPRK force structure that includes so many Special Forces, covert elements, and unconventional capabilities, with so much experience in political warfare, and that are so different in deployment, terrain, and vulnerability.

Nevertheless, comparisons of total forces have broad value in measuring the contingency capabilities of a given side, even if they are not direct measures of the forces that would be involved in any given case of actual warfare. They also help illustrate the different ways forces can be counted and the range of differences that exist in the data provided by given sources.

The official sources quoted in this analysis provide only limited summary data on the balance of forces now in Korea, and only the ROK provides summary breakouts of the data on key aspects of the DPRK-ROK balance. As for other sources, comparisons based on the unclassified data issued by the IISS seem to provide the most reliable non-governmental source of data on the forces of each country, although an examination of other NGO and commercial data from sources such as *Jane's* reveals significant differences.

What to Count

All of these comparisons are affected by the fact it is difficult to determine what number of US and Chinese forces could or should be counted, so most of the following comparisons count something approaching the total US and Chinese forces that could be deployed over time.

China could deploy many of its forces into the Korean theater relatively quickly. The US can project air and sea power relatively quickly but has a lesser forward-deployed capability base and support available for such forces, and faces more serious problems in land force power projection. As a result, much might depend on the US forces now in Korea.

The size and nature of US forces that are in the ROK or might deploy in wartime is discussed in more detail in Chapter VIII. Key US official sources like the US Pacific Command (PACOM) do not provide a detailed unclassified breakout of the US forces in the ROK or of those forces could be deployed in a given contingency. The IISS does, however, provide an estimate of US forces in South Korea and Asia and these data are discussed in more depth in the section on US forces.

To summarize, the IISS reports that the US now permanently deploys some 28,500 troops in the ROK. This includes some 19,200 US Army forces including the 8th Army headquarters, the US 2nd Infantry division at Tongduchon, as well as one artillery, one combat aviation, and one air defense brigade. These are equipped with modern tanks, AFVs, artillery, Patriot surface-to-air missiles, and AH-64 attack helicopters.²⁵⁷

There are also 8,800 USAF personnel, the 7th Air Force Headquarters, three fighter squadrons with 20 F-16C/Ds, a squadron with 24 A-10C-IIs, and an ISR squadron with U-2s. There are also roughly 250 US Navy and 250 US Marine Corps personnel stationed in the ROK.²⁵⁸

These numbers are limited, but scarcely define the US presence that could affect any serious conflict. US naval and air forces would surge into the Korean theater from outside the area in any conflict or crisis, and the current total of US forces in Japan and the ROK is only a symbol of such a potential surge. US land forces would be slower to surge, but would also build-up from outside Japan and the ROK. Much would also depend on Japan's willingness to serve as a staging point and how much pressure China did or did not put on other areas of the Pacific, such as the Taiwan Straits.

Total Manpower

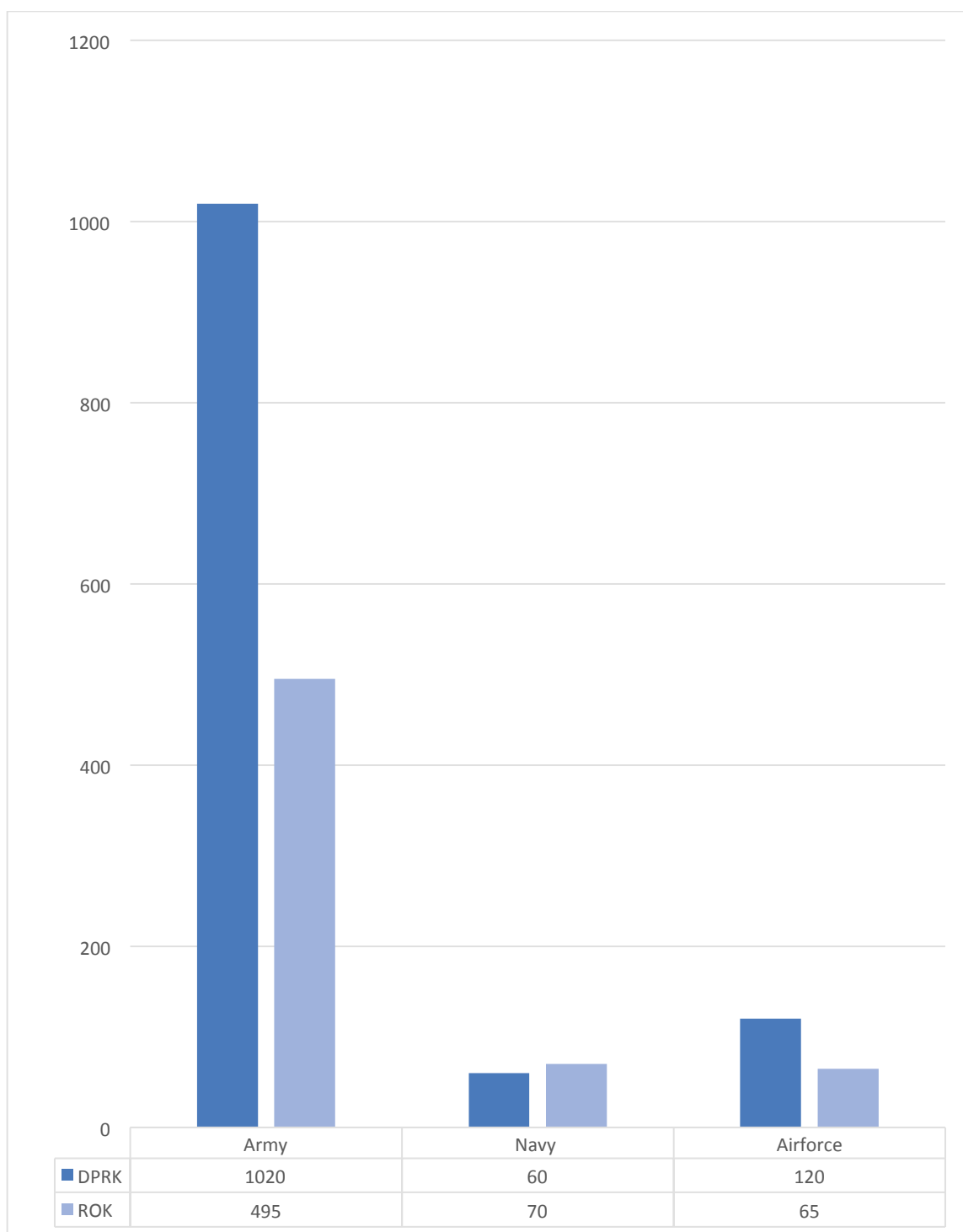
Total manpower numbers provide a rough picture of force size. They do not, however, say anything about force quality, and almost always represent estimates of authorized rather than actual strength. They must always be tied to how a given force is organized, equipped, and trained, and to the quality of its probable strategy, war planning, and battle management. While they are often used as the sole metric in media comparisons, history warns that few aspects of military strength do less to predict the outcome of combat than such totals when they are taken out of their full context. Far too often, the superior manpower numbers have been on the side of the loser.

The ROK provides DPRK and ROK manpower comparisons and total Northeast Asian manpower comparisons for 2014, shown in **Figures II.4 and II.5**. Unlike the ROK's equipment counts, these manpower counts are almost identical to the IISS breakouts of manpower data for active and reserve forces and for regular and paramilitary forces for 2013 – if one allows for the passage of time.

- **Figure II.6** shows the IISS estimate of total manpower on each side, along with US force estimates taken from general PACOM numbers. (Since more detailed deployment and equipment information is not available subsequent US estimates are be drawn from the IISS figures showing total global US force – with many elements that might not be deployed in a Korean conflict).
- **Figure II.7** shows the number of reserves available for each country. It is clear that the DPRK and China have much larger manpower totals than the ROK and US. The DPRK also has roughly twice the active military manpower of the ROK.

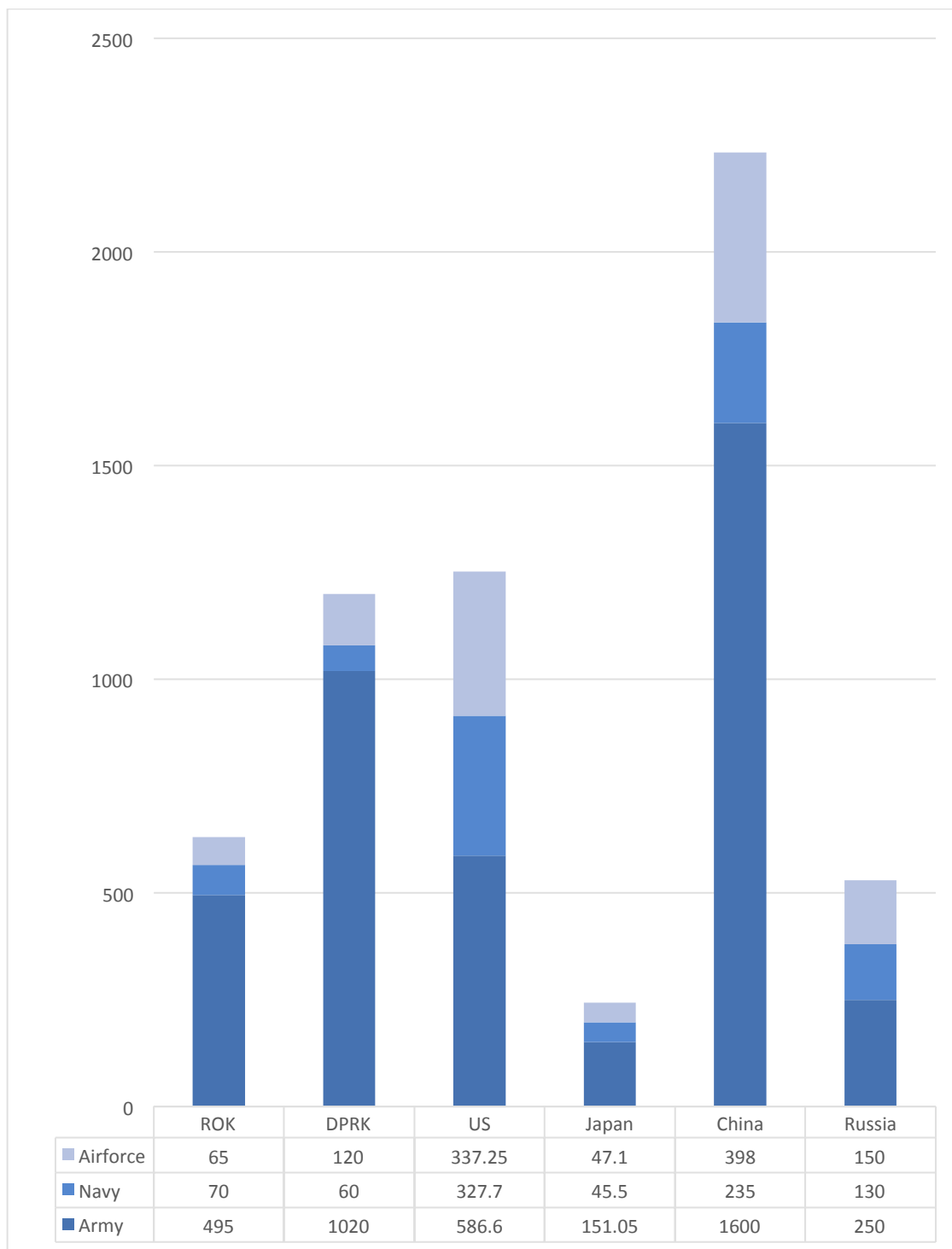
Once again, factors like manpower quality and training – and associated weapons, sustainability, battle management, ISR, and C⁴ capabilities – are likely to be more important than total active and reserve manpower. Sheer numbers – or “mass” -- are still important, but total manpower is not a key measure of force strength. Accordingly, the qualitative aspects of the manpower totals in **Figures II.4 and II.5** are discussed in more detail in the country sections that follow.

**Figure II.4: ROK Estimate of Korean Manpower Balance in 2014
(in Thousands)**



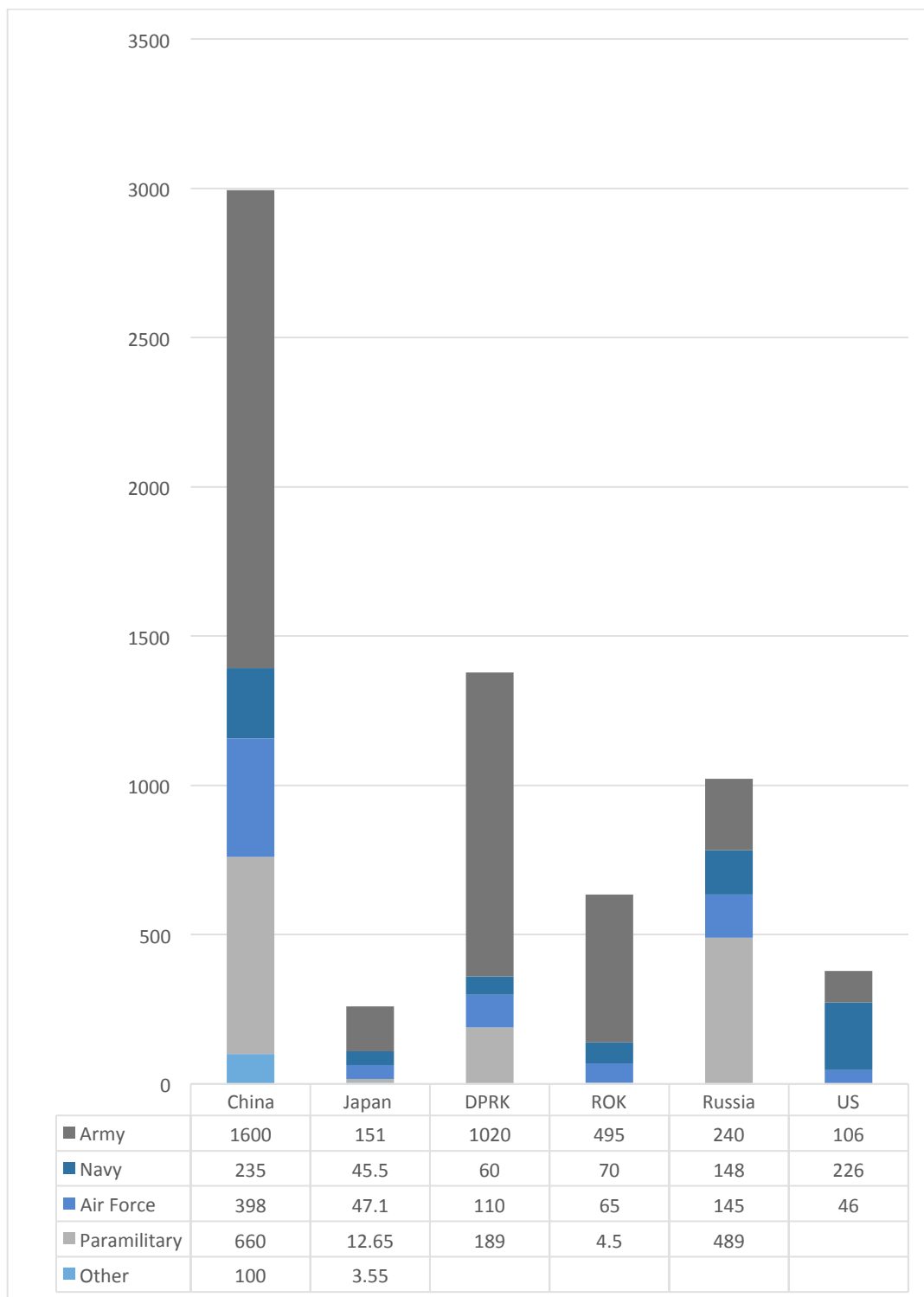
Source: Based primarily on material provided from Republic of Korea, Ministry of Defense, *2014 Defense White Paper*. Some equipment figures are estimates. All equipment figures represent equipment in active service.

Figure II.5: ROK Estimate of Northeast Asian Force Manpower Balance in 2014



Source: Based primarily on material provided from Republic of Korea, Ministry of Defense, *2014 Defense White Paper*. Some equipment figures are estimates. All equipment figures represent equipment in active service.

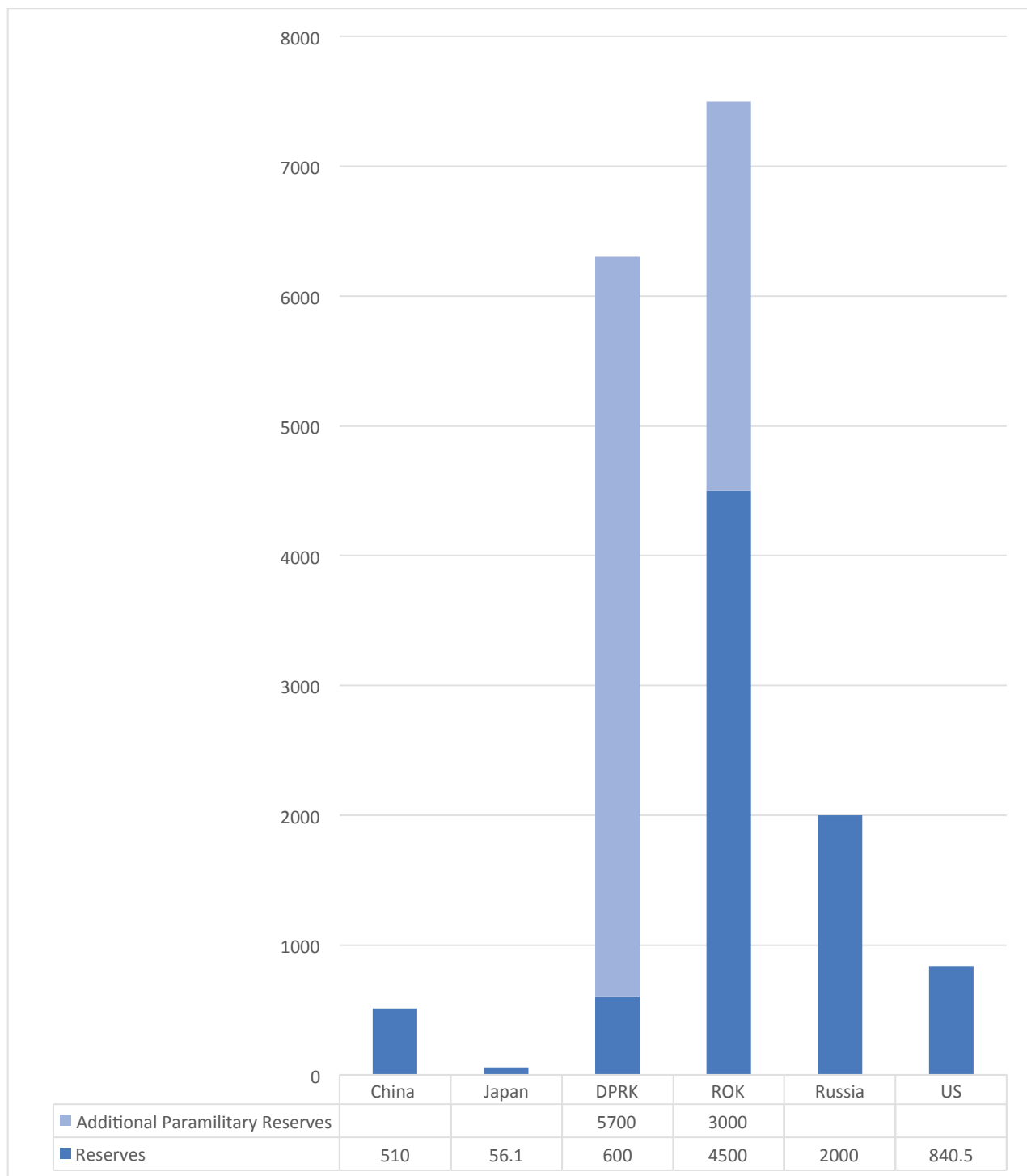
Figure II.6: IISS Estimate of Total Active Military Manpower Affecting the Northeast Asian Balance in 2016 (in thousands)



Source: International Institute for Strategic Studies, *The Military Balance 2016* (London: Routledge, 2015).

Note: US force numbers reflect USPACOM deployment in Northeast Asia, <http://www.pacom.mil/About-USPACOM/>

Figure II.7: IISS Estimate of Total Military Reserve Manpower, Affecting the Northeast Asian Balance in 2016 (in thousands)



Source: International Institute for Strategic Studies, *The Military Balance 2016*.

Army and Land Forces

The ROK white paper estimate of balance of the land forces in 2014, shown in **Figures II.8 and II.9**, reflects a much larger DPRK superiority in tanks and other armored vehicles than the IISS shows for 2016, and the ROK uses a different – but undefined – way of counting artillery. The ROK also presents a different count of helicopters. Other differences occur when the comparison is expanded to cover China and Japan and are further complicated by the fact that the ROK changes definitions from one type of comparison of the same forces to another.

There are no consistent patterns in the differences in the estimates for China and Japan, but it should be noted that official US estimates often count the same forces very differently in given commands, services, and branches of the US intelligence community. Much depends on the reason a given comparison is developed and the definitions used – definitions that often are not explicitly explained in a given source.

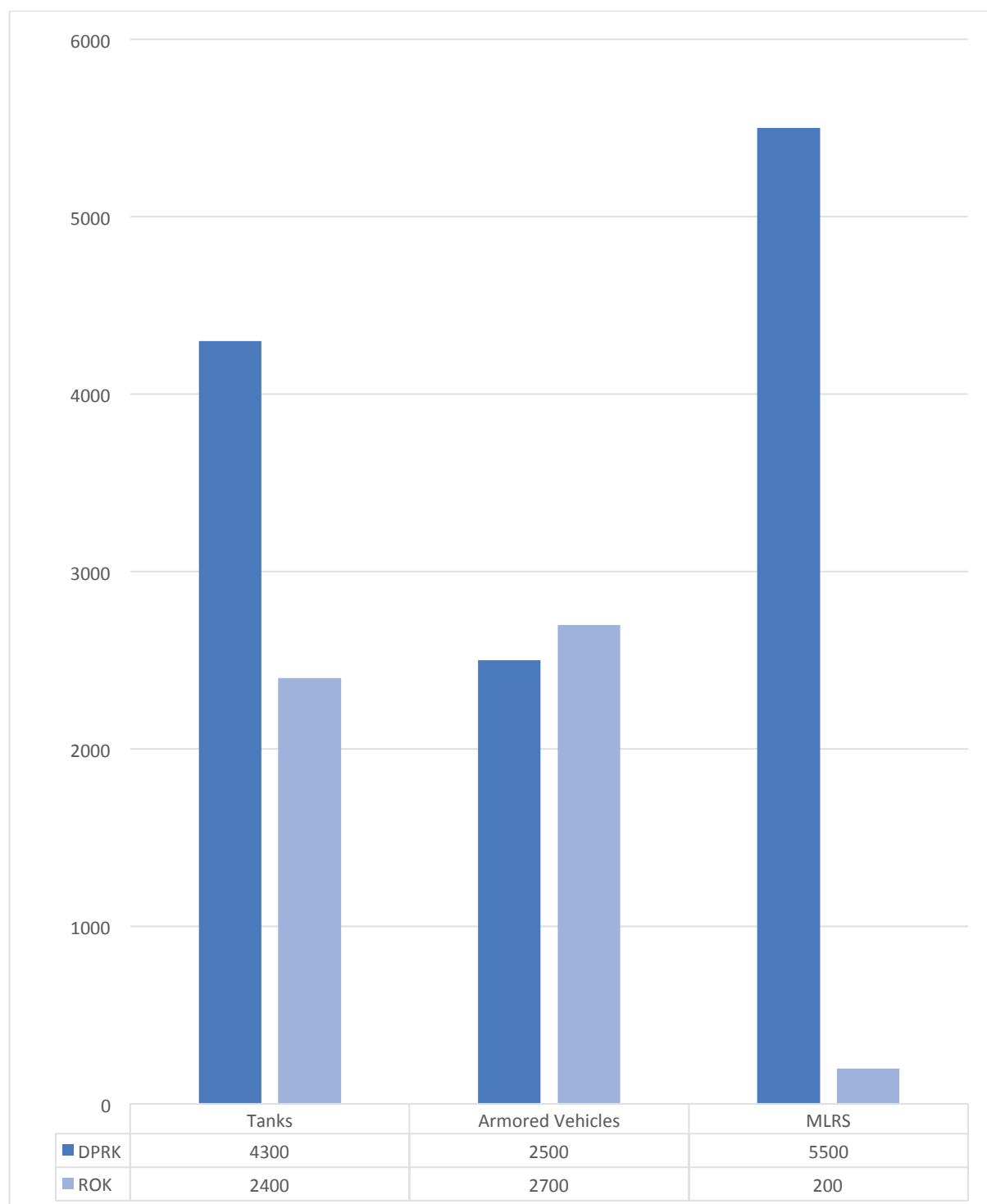
From 2000 to the present, the DPRK army made significant organizational changes that have resulted in greater numbers of light infantry units. IHS Jane's reported in 2014 that the DPRK army undertook the "expansion of existing division-level light infantry battalions within the DMZ corps to regiments and the reorganization of seven infantry or mechanized infantry divisions into light infantry divisions." Such changes came about after army studied recent wars such as those in the Balkans, Iraq, and Afghanistan, which convinced the DPRK army of the need to increase the number of light infantry troops.²⁵⁹

The 2016 IHS Jane's estimates that the ROK has eight corps with a total of four armored brigades, five mechanized infantry divisions, 16 infantry divisions and five infantry brigades, an air assault brigade, and three counter-infiltration brigades. It has a much smaller Special Forces command with seven brigades. Both countries have large numbers of combat and service support units as well as independent artillery and air defense elements.²⁶⁰

The IISS estimates for 2016 are different. The IISS *Military Balance* reports that the DPRK Army is a 12 corps force with two mechanized corps nine infantry corps, and a "Capital Defense" corp. Its armored forces include one armored division, 15 armored brigades, and four mechanized divisions. The bulk of its forces are still infantry – 27 divisions and 14 brigades – with much more limited speed of maneuver and combined armored warfare capability.²⁶¹ There are another 40 reserve infantry divisions and 18 reserve infantry brigades. The DPRK does, however, have a large Special Forces Command with some 88,000 men; a mix of land, sea, and air units that include nine light infantry bridges; ten sniper brigades; and three airborne brigades.

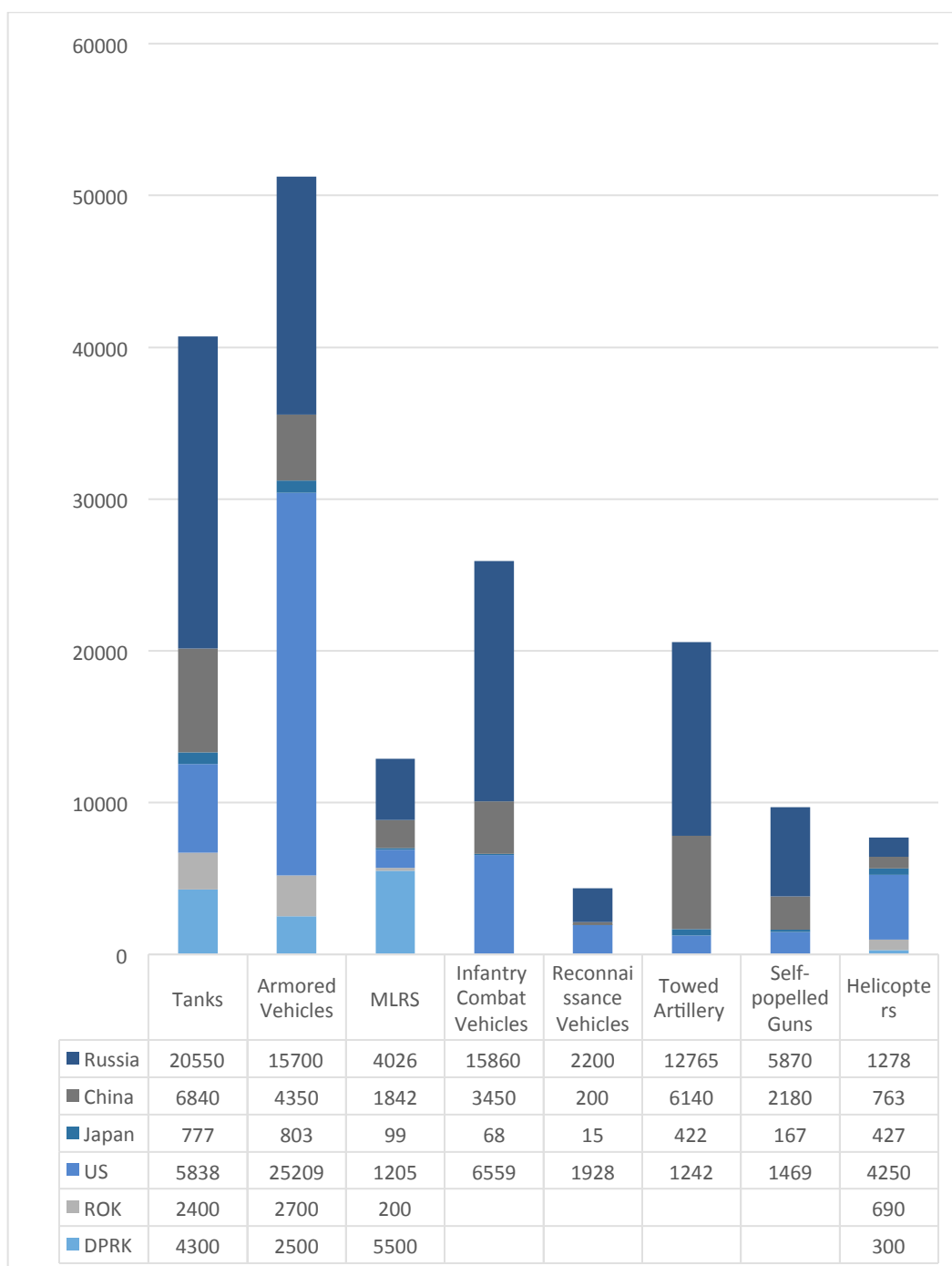
Comparisons of numbers of combat units provide a useful picture of force structure and the size of key combat elements, but can sometimes have limited operational meaning since units with the same title can differ so much in actual strength between and within given countries. Nevertheless, it is clear from their different force structures, however, that the DPRK has designed its land forces to engage in combined conventional and asymmetric warfare, including a major ability to infiltrate the ROK and deploy Special Forces – and that the ROK has tailored its forces to respond. What is not clear is the readiness, training, and real-world effectiveness of each force structure and the degree to which the DPRK can actually use much of its active and reserve infantry effectively in any kind of modern offensive warfare.

**Figure II.8: ROK Estimate of Korean Force Balance in 2014
(Army)**



Source: Based primarily on material provided from Republic of Korea, Ministry of Defense, *2014 Defense White Paper*. Some equipment figures are estimates. All equipment figures represent equipment in active service.

Figure II.9: ROK Estimate of Northeast Asian Force Land Balance in 2014



Source: Based primarily on material provided from Republic of Korea, Ministry of Defense, *2014 Defense White Paper*. Some equipment figures are estimates. All equipment figures represent equipment in active service.

Figures for ROK and DPRK Artillery, excluding MLRS, are combined under “field artillery.” The ROK possesses 5300 and the DPRK possesses 8600. Another category of system is “armed vehicles,” but it is not clear exactly what is included in this category. The ROK possesses 2700 and the DPRK possesses 2200.

Figure II.10 shows the IISS estimate of relative balance of army manpower and land force equipment strength. Here, too, the DPRK and China have a major lead in force strength. Given the economic disparity between the Koreas, this figure demonstrates that the DPRK is one of the most militarized countries in the world.

The detailed equipment breakouts in **Figure II.10** show that the DPRK has roughly 1.5 times the main battle tanks (MBTs) of the ROK – though the ROK has superior overall armored mobility and armored engineering capability. The DPRK also has nearly twice the artillery strength of the ROK as well as a massive lead in multiple rocket launchers (MRLs). The ROK has a lead in self-propelled artillery and combined arms mobility and maneuver capability.

The counts of anti-tank weapons are not detailed enough to assess with any accuracy, but other data indicates that the ROK has a qualitative advantage in anti-tank guided weapons types. There are also problems in counting each nation's air defense weapons, but the DPRK seems to have extraordinarily large holdings of unguided anti-aircraft guns while the ROK has a limited lead in man-portable air defense systems (MANPADS).

The ROK has a lead in Army helicopters and in attack and multirole helicopters, but such counts are misleading as the DPRK places its helicopter forces in its Air Force. The force includes at least one regiment of M-24 Hind attack helicopters and significant numbers of transport and multirole helicopters, but no detailed current count is provided.

As noted earlier, there is no way to determine the land forces the US and China could (or would) deploy to the DPRK or ROK in a sustained crisis or major war. China would, however, have a major advantage in moving its forces, and the US would find it difficult to rapidly reinforce by more than one additional division.

Figure II.11 to Figure II.13 summarize Northeast Asian armored fighting vehicles (the number of number of MBTs, AIFVs, AAVs, APCs, RECCE in active service).

- Figure II.11 helps show that the DPRK has a lead in MBTs, but most are older Russian and Chinese models which predate the T-72s that were unable to compete effectively against the US M-1A1s during the first Gulf War. The DPRK's numerical advantage is partially offset by the major ROK lead in tank quality provided by its K1 and K1A1 tanks.
- Figures II.12 and II.13 show that the DPRK is less mechanized than the ROK and more limited in total armored maneuver strength, and that the ROK Army at least has parity in rotary wing attack and transport capability because of superior aircraft capability. The ROK Army has rough parity in the number of other armored fighting vehicles (OAFVs) and superior overall quality. The ROK also has a larger inventory of OAFVs if the holdings of other forces are included.

In these comparisons, the distinction of “modern” vs “not modern” is made on a case -by -case basis taking into account issues like year of production and service history.

It should be noted that the actual operations of the land forces on each side would be sharply affected by the air-land and surface-to-surface missile battles – areas where the quality of ISR capability and smart air munitions would have a major impact on the balance.

Figure II.14 looks at Northeast Asian artillery strength. Both countries have massive numbers of artillery weapons. The ROK has an advantage in self-propelled artillery mobility and quality, but the DPRK has a major advantage in numbers and in the ability to deploy area fire from weapons like multiple rocket launchers. It also has numerous sheltered and buried artillery units deployed near the DMZ and ROK border. This allows the DPRK to immediately threaten the ROK's capital and to carry out harassing fire as a means of intimidating the population and disrupting the ROK economy.

What is not clear is the extent to which the ROK has an advantage in targeting fire management and being able to sustain force during movement. It seems to have an advantage over most DPRK units, which rely heavily on massed fire because of a lack of advanced targeting, fire management, or artillery radar systems, but the scale of that advantage is unclear.

**Figure II.10: IISS Estimate of Army Manpower and Equipment
in Northeast Asia in 2016**

Army and Army Reserve Manpower (in thousands, including conscripts)

	China	Japan	DPRK	ROK	Russia	US
Active	1600	151	1020	495	240	409.45
Reserve	portion of 510	56.1	600	portion of 4500	portion of 2000	840.5

Army Equipment (not including reserves)

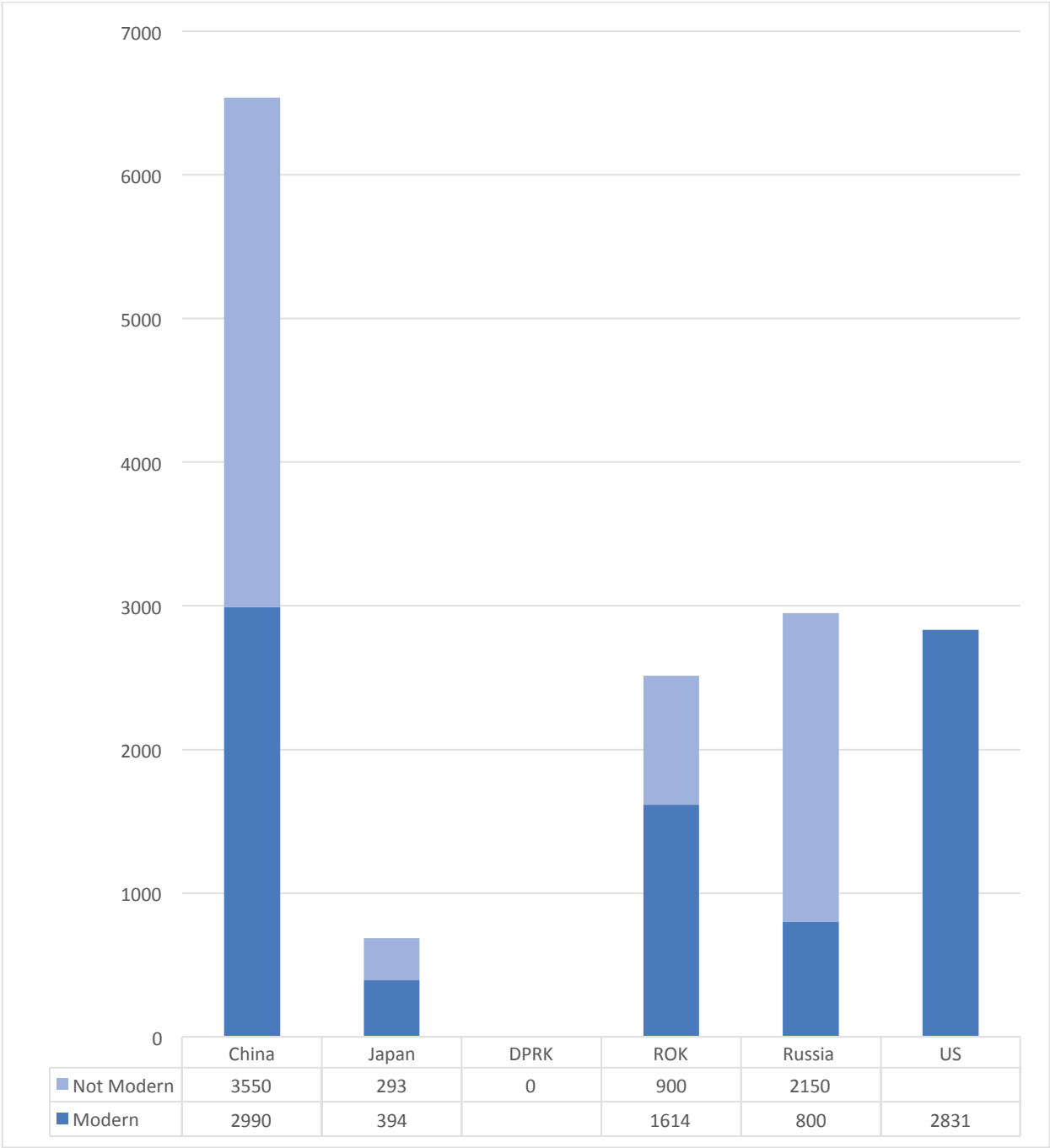
Platforms	China	Japan	DPRK	ROK	Russia	US
Tank	7,190	688	4,060+	2,418+	2,700	2,384
Tank, light	650		560+			
Tank, main battle	6,540	688	3,500+	2,418+	2,700	2,384
Personnel Carrier	9,220	1,087	2,500+	3,605	12,600+	24,374
Armored infantry fighting vehicle	3,950	68		370	5,400	4,559
Armored personnel carrier (tracked)	4,150	226	some	2,560	3,500+	5,000
Armored personnel carrier (wheeled)	870	562	2,500	220	2,500	2,972
Armored personnel carrier (protected patrol vehicle)				10		8585
Armored recovery vehicle	some	69		238	some	1,108+
Armored engineer vehicle				207	some	250
Reconnaissance	250	162			1,200+	1,900
Artillery	13,178+	1,790	21,100+	11,038+	4180+	5,923
Multiple rocket launcher	1872+	99	5,100	185+	850+	1,205
Self-propelled	2,280	166		1353+	1,500	969
Towed	6,140	422		3,500+	150	1,242
(self-propelled/towed)			8,500			
Gun/mortar	300		some		180+ (80+ Self-P., 100 Towed)	
Mortar (self-propelled)		24				
Mortar (towed)	2,586	1,079			1,500	
Mortar (not classified)			7,500	6,000		2,507
Anti-Tank	6,694+	37+	1,700+	58+	526+	1,512+

Missile (self-propelled)	924	37	some		some	1,512
Missile (manpats)	some	some	some	some	some	Some
Recoilless Launcher	3,966	some	1,700	some	some	
Guns (self-propelled)	480			50		
Guns (towed)	1,308			8	526	
Rocket Launcher		some			some	
Air Defense	7,672+	381+	11,000+	330+	1,570+	1,207+
Guns (self-propelled)	376	52	some	170	some	
Guns (towed)	7,000+		11,000	160	some	
Surface-to-air missile (self-propelled)	312	204	some	some	1570+	727
Surface-to-air missile (towed)		126				480
Surface-to-Air Missile (MANPAD)	some	some	some	some	some	some
Aircraft	8	9			some	218
Transport	8	9				157
ISR						52
ELINT						9
UAV	some				some	346
Landing Craft						81
Landing Craft Utility						45
Helicopter	913	412		511+		4,200
Attack	200	108		60		730
Multirole	351			175		200
ISR		48				44
Transport	362	256		276+		2,899
Search and rescue						173
Training						154
Missile	some	some	64+	some	120	
Bridge Systems	some	22		some	some	60
Mine-Clearing Vehicles	some				some	some
Radar, Land-based	some			some		251

Source: IISS, *The Military Balance 2016*.

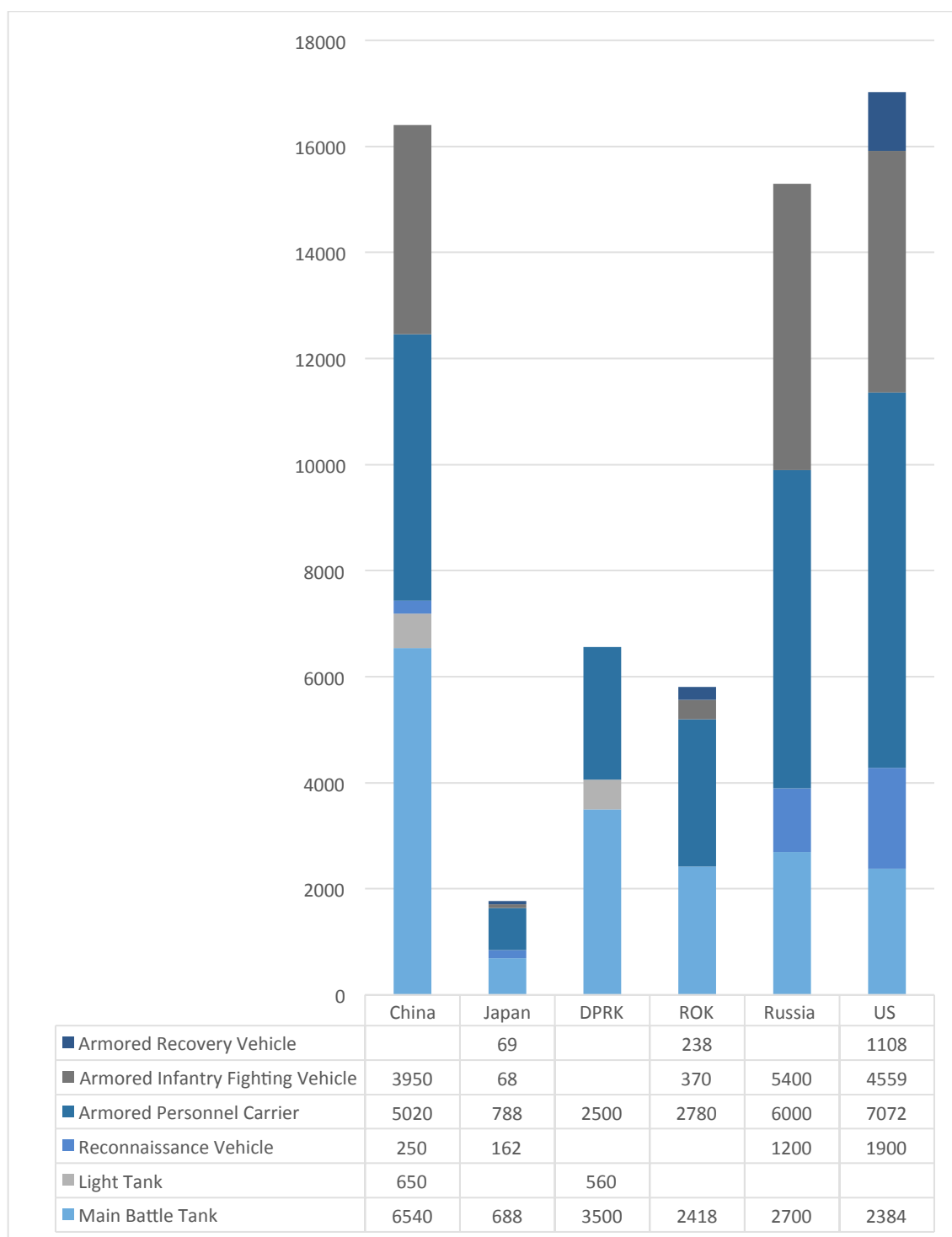
Figure II.11: IISS Estimate of Northeast Asian Modern Main Battle Tanks versus Total Holdings in 2016

Total Holdings of Main Battle Tanks



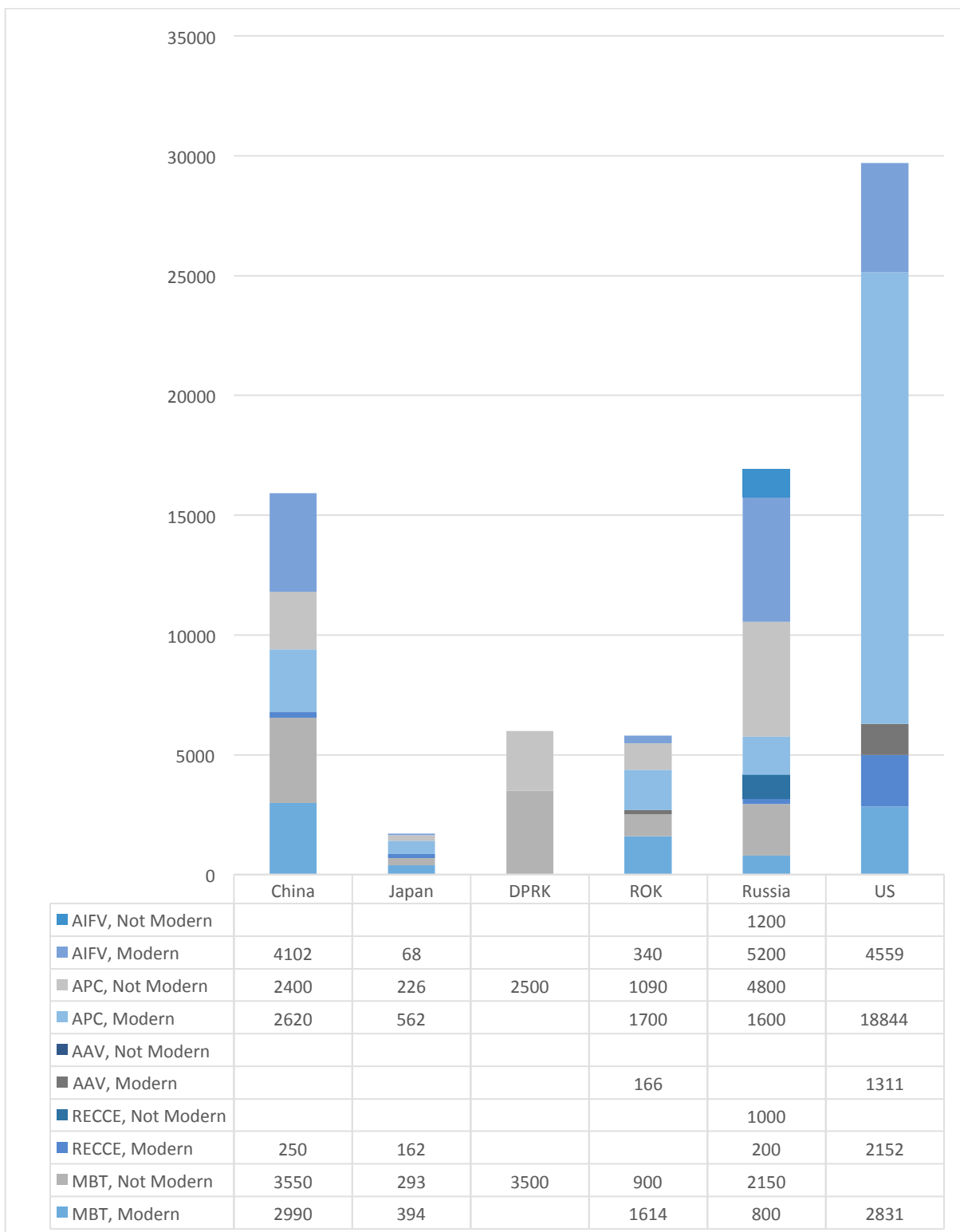
Source: IISS, *The Military Balance 2016*5. Data include both Army and Marine inventories. Figures do not include equipment used for training purposes. Some equipment figures are estimates. All equipment figures represent equipment in active service.

Figure II.12: IISS Estimate of Total Northeast Asian Armored Fighting Vehicles (Army) in 2016



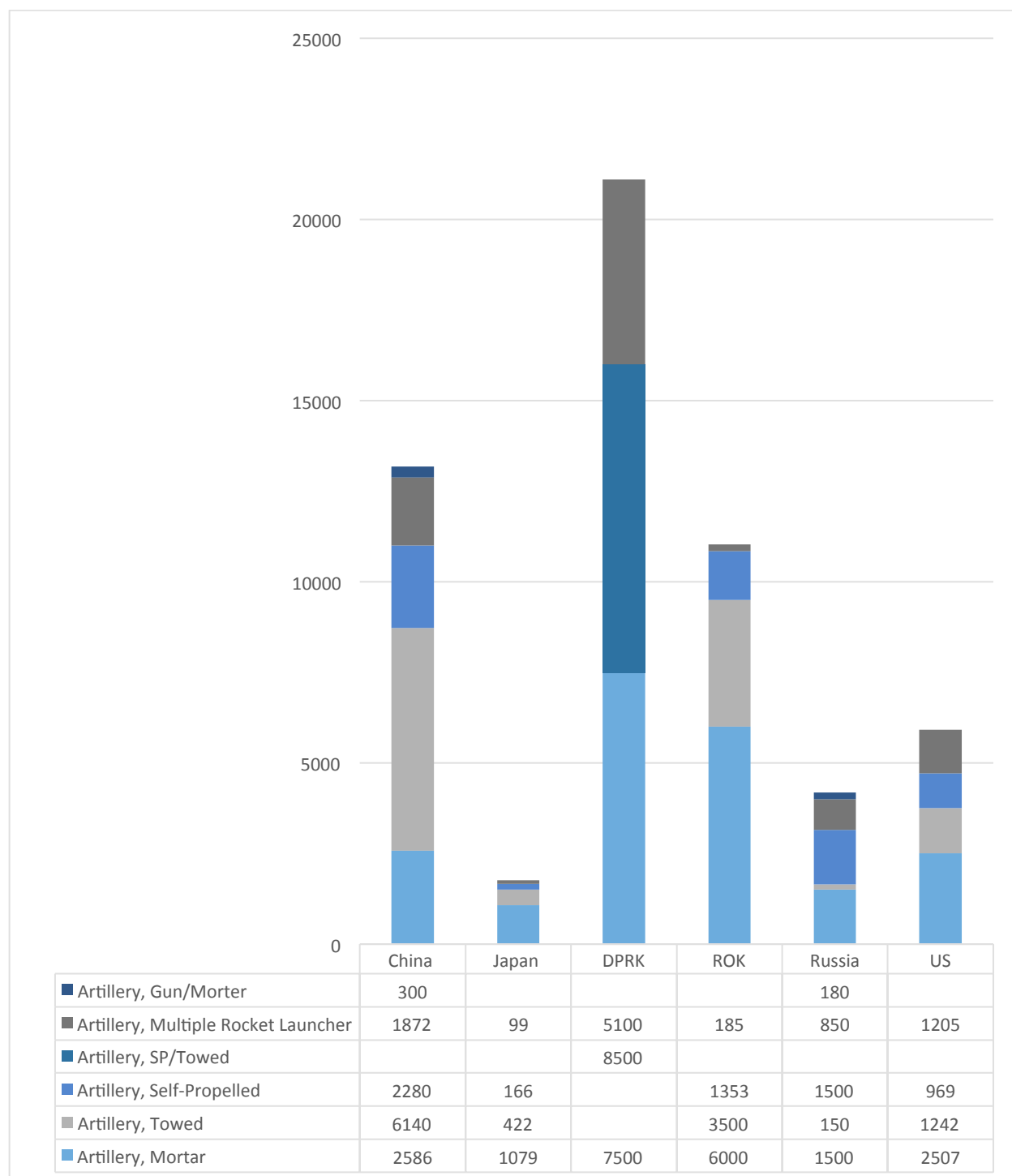
Source: IISS, *The Military Balance 2016*. Figures do not include equipment used for training purposes. Some equipment figures are estimates. All equipment figures represent equipment in active service.

Figure II.13: IISS Estimate of Total Northeast Asian Modern versus Not Modern Armored Vehicles in 2016



Source: IISS, *The Military Balance 2016*. Data include both Army and Marine inventories. Figures do not include equipment used for training purposes. Some equipment figures are estimates. All equipment figures represent equipment in active service.

Figure II.14: IISS Estimate of Total Northeast Asian Artillery Strength in 2016



Source: IISS, *The Military Balance 2016*. Figures do not include equipment used for training purposes. Some equipment figures are estimates. All equipment figures represent equipment in active service.

Naval and Marine Forces

In the past two decades, there have been significant changes in the naval military equipment and weaponry of Northeast Asian states, including Russia. In particular, there has been a trend towards more technologically advanced guided missiles and submarine-launched torpedoes. At the same time, the US has sharply improved its naval aircraft and their avionics and weaponry, cruise missile capabilities, and missile defense – including new theater missile defense capabilities. It has also steadily improved its submarine warfare capabilities. Its weaknesses lie in areas like mine warfare, and the ability to deal with “swarms” or “clusters” of smaller missile-armed ships.

Once again, there are major differences and limits in the data. The ROK data on the naval balance in 2014 in **Figure II.15** make no distinction between the size and capability of naval surface vessels – a count that sharply understates the quality of the ROK fleet. The IISS has very different estimates for 2016. **Figure II.16** shows relative balance of naval manpower and equipment strength; included are naval aviation figures that will also be included in the later air force section. **Figure II.17** provides a comparison of Northeast Asian naval combat ships, **Figure II.18** looks at combat ships by category, and **Figure II.19** gives a comparison of regional submarines by capability.

Some trends in this aspect of the balance are clear. The DPRK has a lead over the ROK in manning, but the DPRK is inferior in major naval surface vessel fleet strength and capability. The DPRK also has a major lead in patrol boats and coastal combatants, amphibious vessels, potential mine layers, and smaller surface vessels of the kind that can be used in asymmetric warfare, allowing it to operate close to shore and outside the normal operating area of major US naval surface vessels. Only 16 of the DPRK’s 383 patrol boats and coastal combatants, however, are reported to be armed with anti-ship missiles, and the ROK does have a relatively large naval coastguard, with 114 small patrol and coastal combatants.

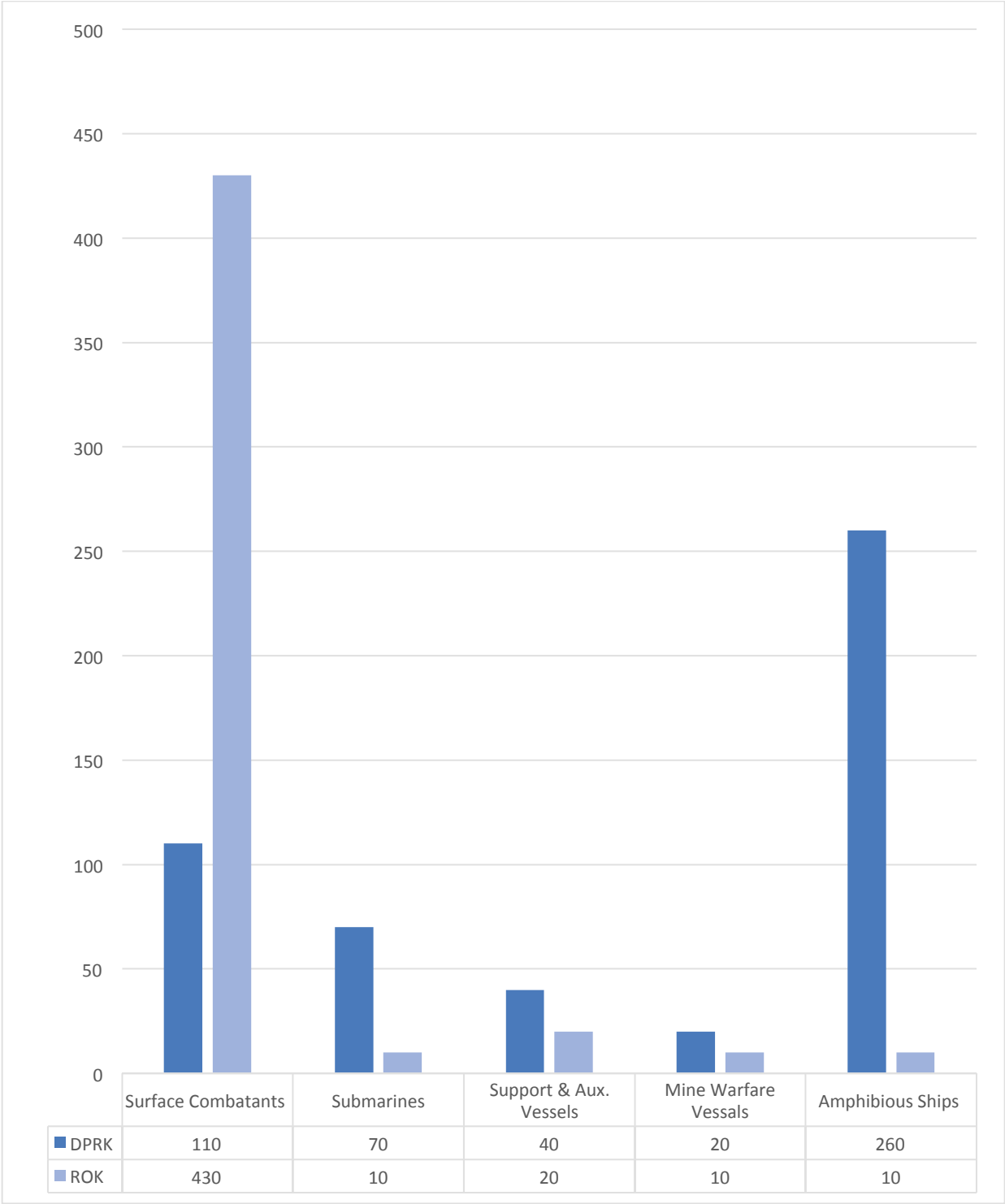
The DPRK has a lead in conventional submarines and small submersibles (72:12), as does China over Japan. The DPRK uses small submarines to infiltrate its Special Forces. Many of the submarines, however, are aging, and ROK and US forces have a qualitative advantage in the air and sea aspects of anti-submarine warfare.

Such quantitative comparisons again have their limits. Operations by the naval forces on each side would be sharply affected by the air-sea, smart mine, and anti-ship missile battles – areas where the quality of ships and aircraft, their weaponry, air/missile defenses, ISR capability, and smart munitions would again have a major impact.

The “balance” would also be determined by joint operations, rather than sea power alone. A combination of ROK and US naval and air forces would probably have a decisive advantage over the DPRK. At the same time, Chinese air intervention could affect the balance and China is gradually developing a far more effective Navy; the ROK and US would also need time to defeat a deployed DPRK submarine force and would likely face problems in dealing with mines and coastal anti-ship missiles.

Further, naval forces are only part of overall interactions involved in the air-sea and air-land battle(s). The interaction will be scenario-specific, shaped by new and unpredictable mixes of forces and tactics, the impact of intangibles like training and readiness, the role of relative ISR capabilities, and a host of other factors.

Figure II.15: ROK Estimate of Korean Naval Balance in 2014



Source: Based on material provided from the Republic of Korea, Ministry of Defense, *2014 Defense White Paper*. Some equipment figures are estimates. All equipment figures represent equipment in active service.

Figure II.16. IISS Estimate of Total Navy Manpower and Equipment in Northeast Asia in 2016

Navy and Navy Reserve Manpower (in thousands, including conscripts; figures include Naval Aviation and Marines)

	China	Japan	DPRK	ROK	Russia	US
Active	235	45.5	60	70	148	511.85
Reserve	portion of 510	1.1	portion of 600	portion of 4500	portion of 2000	135.1

Naval Equipment (not including reserves)

Platforms	China	Japan	DPRK	ROK	Russia	US
Aircraft Carriers	1	2			1	10
Cruiser	0	2	0	3	6	22
With guided missile		2		3	4	22
Heavy nuclear-powered with guided missile					2	
Destroyers	19	33	0	6	18	62
With guided missile	2	6			1	28
With guided missile and helicopter platform	17	26		6	17	34
With hanger and SAM		1				
Frigates	54	9	3	14	10	4
With guided missile	21	6	3	8	4	
With guided missile and helicopter platform	33	3		6	6	4
Aviation Frigate						
Submarines, Strategic	4				13	14
Ballistic missile, nuclear-fueled	4				13	14
Submarines, Tactical	57	18	73	23	49	57
Nuclear-powered, attack, with cruise missile					9	45
Diesel, coastal			32+	11		
Nuclear-powered, attack	5				18	12
Diesel, patrol, ASW capability	51	18	20	12	22	
Diesel, with ballistic missile	1		1			
Midget			20			
Patrol and Coastal	199+	6	383+	116	89	57

Combatants						
Corvette (anti-ship missile & SAM)	22			36	17	
Corvette, missile					29	
Hydrofoil boat, with missile					3	
Hydrofoil boat, with torpedo					1	
Patrol boat, fast, with missile		6	17+			
Patrol craft, offshore			5			
Patrol craft, coastal	50		18			
Patrol boat, with missile					10	
Patrol Craft, with missile	28		18		21	
Patrol boat, river/roadstead						42
Patrol craft, fast	65+				8	13
Patrol boat, fast	34+		229	80		2
Mine Warfare, Counter	49	27	24	9	45	11
Mine countermeasures, support		4				
Mine countermeasures, ship			24			
Mine countermeasures, ocean	12					
Mine hunter, inshore					9	
Mine hunter, ocean				6	2	
Mine sweeper, coastal	16				23	
Mine sweeper, drone	6					
Mine sweeper, ocean	16	23		3	11	11
Mine Warfare, Layer	1			1		
Missile	some		some	some	some	some
Bombs	some					some
Logistics and Support	171	28	23	24	625	71
Drydock Ship (AFDL)						1
Experimental Auxiliary Ship						4
Submersible Auxiliary Support Vessel						3
Cargo Ship	11				2	
Cargo ship, ammunition					2	
Ballistic missile transport					3	
Submarine Tender	6		8		1	
Torpedo Recovery					12	

Repair Ship					13	
Auxiliary Repair Dock (ARD)						3
Survey Ship	8	4			72	
Harbor Tug				2	60	17
Fireboat		2			42	
Barracks Ship						3
Light fleet oilers	7				13	
Oiler					1	
Submarine rescue and salvage ship	6		1		2	
Fast Combat Support Ship		5				
Range Support Tender						2
Diving Tender					91	2
Hospital ship	8				3	
Icebreaker					4	
Intelligence collection ship	5		14		15	
Cable Repair Ship		1			7	
Medium harbor tug						
Miscellaneous Auxiliary Ship	3			1	93	
Submarine Auxiliary					1	
Submarine Auxiliary (Nuclear)					7	
Unmanned Undersea Vehicle (UUV)						1
Oceanographic Research Vessel	4	2		17	6	6
Fuel replenishment					5	
light oiler ship						
Salvage and Rescue Ship	5			1	14	
Sea-going buoy tender	4				48	
Submarine rescue ship		2				
Support		5				
Oiler Transport	32			3		
Auxiliary oil replenishment ship					3	
Training Craft	3	6			12	1
Training Craft, Sail						1

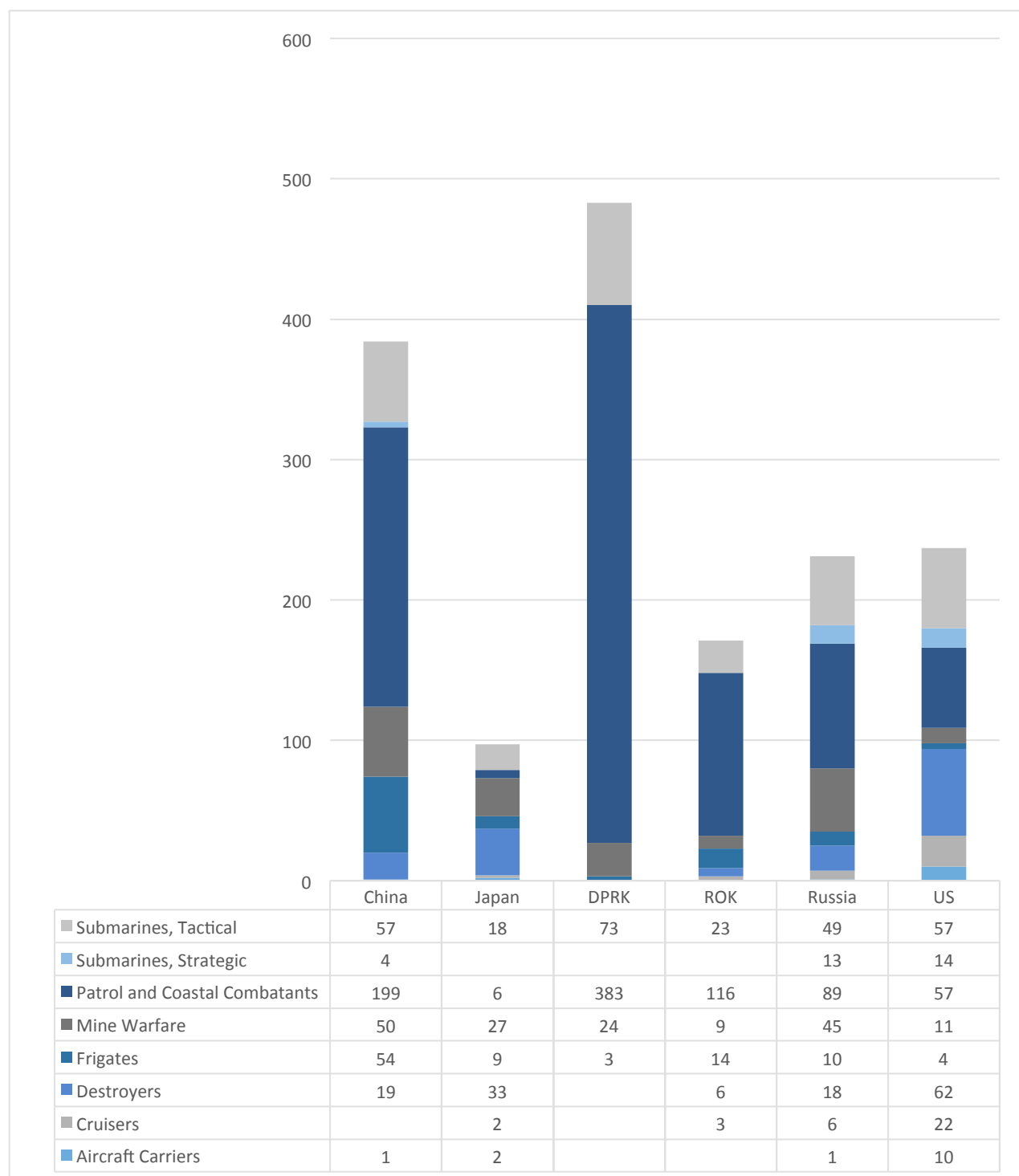
Yard Patrol (Training)						25
Tug, fleet, ocean	26				62	
Water transport	14				2	
Ocean Surveillance Ship						
Yacht		1				
Amphibious	241	11	267	212	47	1590
Amphibious Assault Ship (LHD)						8
Landing Ship Assault (LHA)						2
Amphib. Transport Dock (LPD)				2		9
Amphib. Assault Vehicle				166		1311
Amphib. Command Ship (LCC)						2
Landing Craft Air Cushion (LCAC)	5	6		5	2	80
Landing Craft Medium (LCM)			25	10	9	25
Landing craft, tank				6		
Landing Craft Utility (LCU)	56	2			17	32
Landing craft, vehicles and personnel (LCVP)			136	20		
Landing Craft Personnel (LCP)						108
Landing Craft Personnel (LCPL)			96			
Landing craft, utility air cushion vehicle	12					
Dock Landing Ship (LSD)						12
Landing ship, medium	31		10			
Landing ship, tank	16	3		4	19	
Aircraft	514+	149		21	273	2408
(combat capable)	346	80		16	186	1,541
Anti-Submarine Warfare	3	80		16	27	110
Maritime Patrol					26	
Attack					5	
Bomber	30					
Fighter	24				72	
Fighter, ground attack	254				44	1312

Search and rescue		6			3	
ISR	7				12	2
ELINT/EW	7	5			4	147
Aerial refueling tanker	3					45
Maritime Patrol					26	
Training	106+	30			4	612
Transport	66	28		5	50	88
Command & Control (C2)						16
Airborne Early Warning/Control	14					76
Tiltrotor						244
Helicopter	103+	131		42	185	1108
Anti-submarine warfare	44	85		24	83	237
Attack						156
Mine countermeasures		11				28
Combat Search and Rescue	6	18			56	15
Airborne early warning	10+				2	
Multi Mission Support						271
EW					8	
ISR		2		3		3
Training						119
Transport	43	15		15	36	279
UAV	some					93
Air Defense/Missiles	72+	0	0	0	310+	some
SAM (self-propelled)					250	some
SAM (manpad)	some				some	some
Guns (self-propelled)					60	
Coastal defense missile system	72					
Tank (Marines)	73	0	0	100	250	447
Tank, light	73					
Tank, main battle				100	250	447
Personnel Carrier (Marines)	152	0	0	0	1300	4059
Armored personnel carrier					300	4059
Armored infantry fighting vehicle	152				1000	
Reconnaissance					60	252

Artillery	40+	0	0	some	365	1506
Artillery, gun/mortar					66	
Self-Propelled	40+				263	
Towed				some		832
Multiple rocket launcher	some				36	40
Mortar	some					634
Anti-Tank	some	0	0	0	some	95+
Missile/Manpats	some			some	some	some
Self-Propelled				some	some	95
Recoilless Launcher	some					
Guns					some	
Armored Recce/Recovery Vic						185
Armored Engineer Vehicle						42
Radar, Land						23

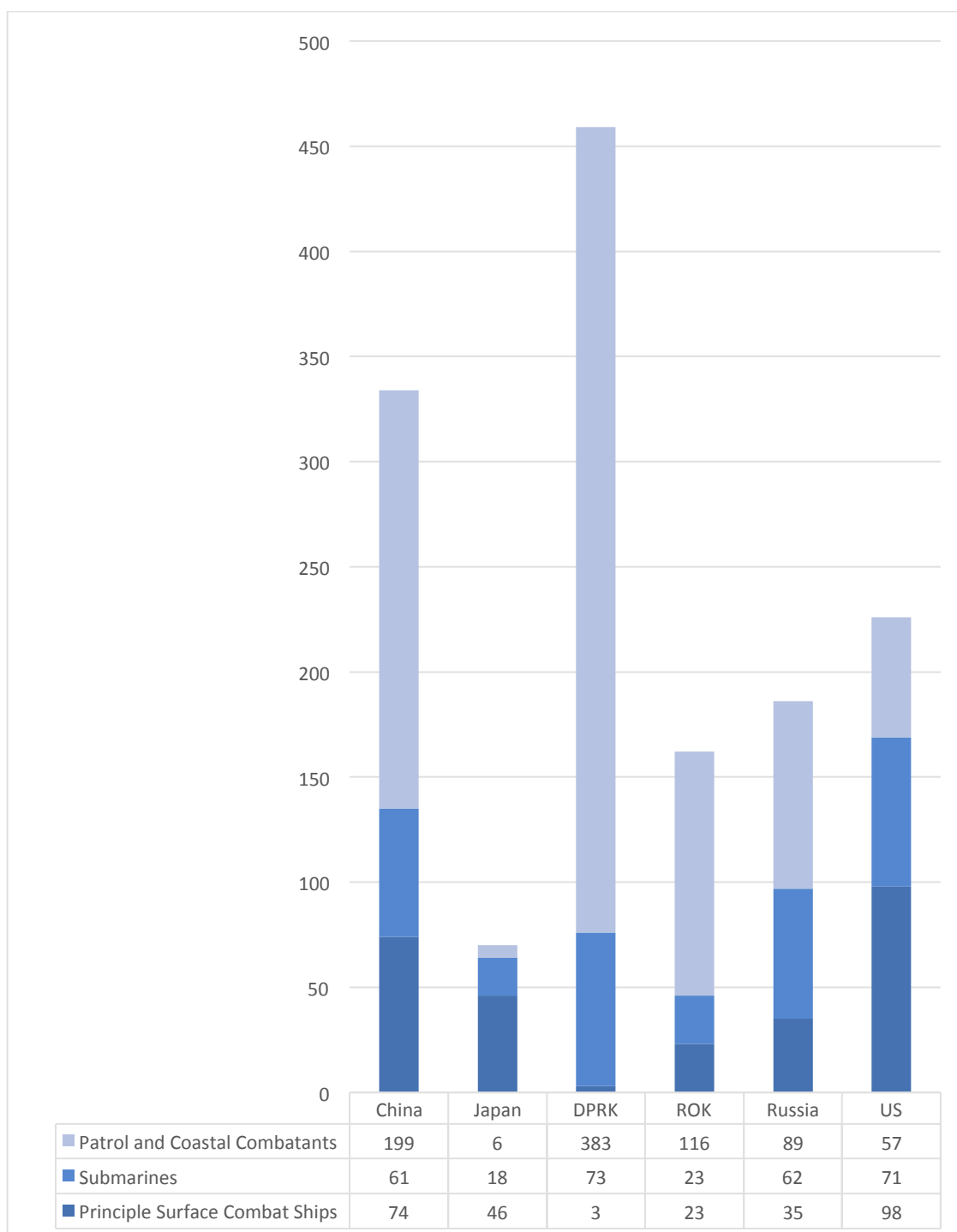
Source: IISS, *The Military Balance 2016*.

Figure II.17: IISS Estimate of Total Northeast Asian Naval Combat Ships in 2016



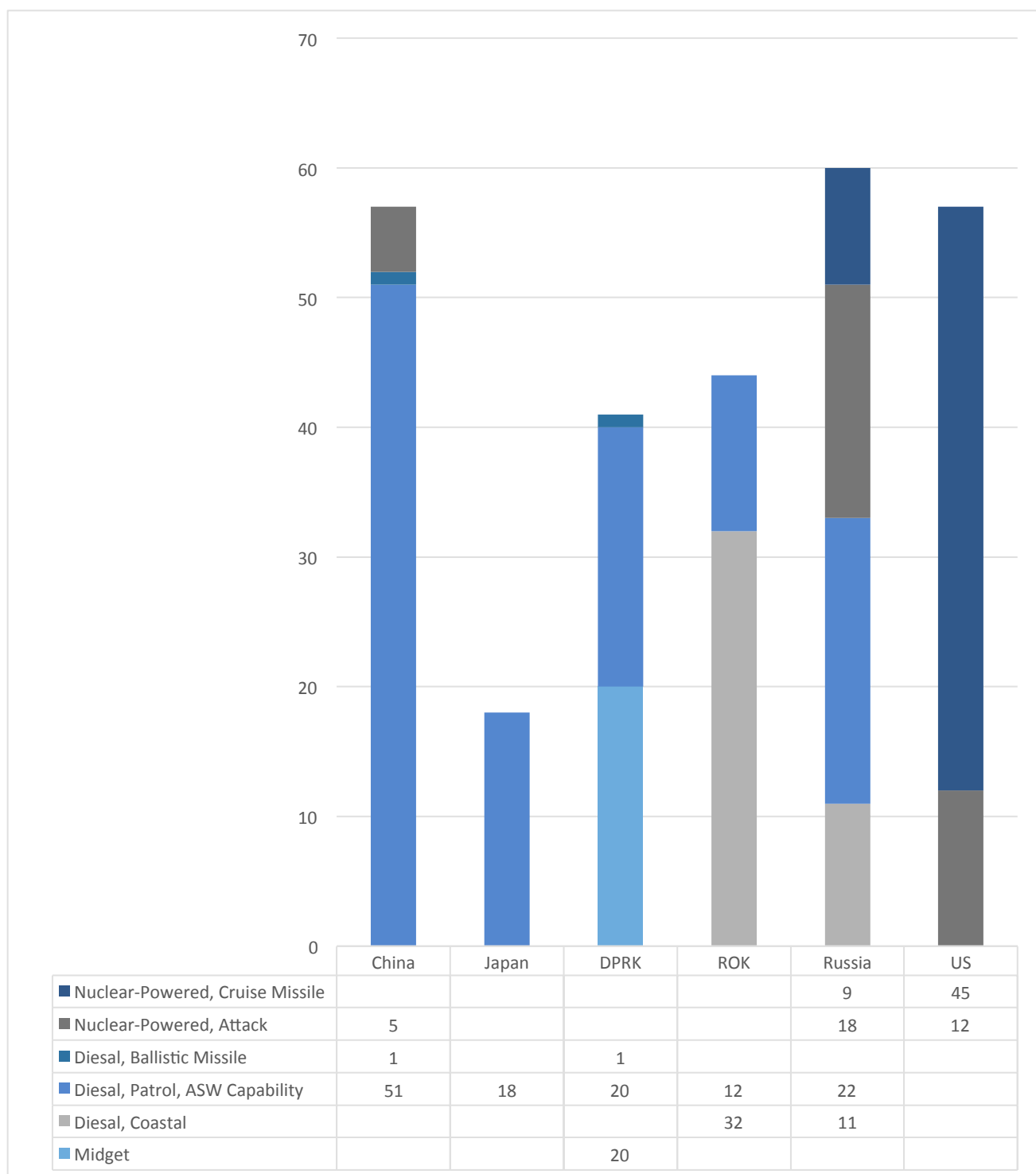
Source: IISS, *The Military Balance 2016*. Some equipment figures are estimates. All equipment figures represent equipment in active service.

Figure II.18: IISS Estimate of Total Northeast Asian Naval Combat Ships by Category in 2016



Source: IISS, *The Military Balance 2016*. Some equipment figures are estimates. All equipment figures represent equipment in active service.

Figure II.19: IISS Estimate of Total Northeast Asian Submarines by Type in 2016



Source: Based primarily on material in IISS, *The Military Balance 2016*. Figures do not include equipment used for training purposes. Some equipment figures are estimates. All equipment figures represent equipment in active service.

Air and Air Defense Forces, and DPRK Artillery, MRLs, Rockets, and Missiles

The air and conventional missile balance is the aspect of the overall balance where outside power projection forces can deploy most rapidly, and probably be most effective in limiting or shaping a conflict. US forces can surge quickly out of Japan and even from bases as far away as Guam. US air units can deploy across the Pacific in a matter of days, and the US Navy deploys significant cruise missile assets that could carry out precision strikes deep into the DPRK on short notice.

China too can now rapidly project air power, and the quality of its aircraft, their weaponry, conventional rockets and missiles, sensors, ISR, and battle management is also steadily improving. Things have changed strikingly from the ground-oriented warfare of the Korean War in the 1950s, where “dumb” bombs sharply limited the effect of air power. Deterrence and war fighting are now shaped largely by joint warfare capabilities, and air and missile power are shaped by factors like precision strike capability, stealth and enemy air defense suppression capability, and the capability to manage air-missile-land operations in joint warfare

Fixed Wing Aircraft

As before, the ROK data on the air balance in 2014 shown in **Figure II.20** are radically less favorable than the IISS data for ROK. As before, the ROK does not provide an explanation the differences.

Figure II.21 shows the IISS estimate of the balance in 2016 in terms of air manpower and equipment numbers in each country. If one looks only at the DPRK and ROK, the DPRK again has leads over the ROK in manning and in total aircraft). The DPRK, however, is far inferior in terms of aircraft quality at every level, while the ROK has a larger and more capable mix of total air, army, and naval attack and combat helicopters.

The only DPRK combat aircraft that approaches a fully modern type is a force of MiG-29A/S fighters. In contrast, the ROK is completing a buildup of fully modern F-15K advanced modern fighters and also has modern F-16C/Ds. The ROK’s AH1F/J attack helicopters are superior in individual capability to the DPRK’s 20 Mi-24s.

As of March 2014, South Korea agreed to purchase 40 F-35A stealth fighters and 4 Global Hawk reconnaissance drones, which will further enhance South Korea’s technological superiority over North Korean air forces. This purchase of stealth aircraft and high endurance drones will also impact the broader regional military balance, particularly with China, which is developing its own stealth aircraft drones.

While some of the data involved are uncertain, the ROK also seems to have a sharply superior radar and battle management and is interoperable with US AWACs and ISR systems. These are key aspects of modern air warfare, as well as the ability to manage joint warfare – including coordinating air and missile operations with land and sea operations.

As for other aspects of the balance,

Figure II.22 depicts Northeast Asian fixed wing combat aircraft by country and military force. It shows that both China and the US could radically alter the air balance in a matter of days.

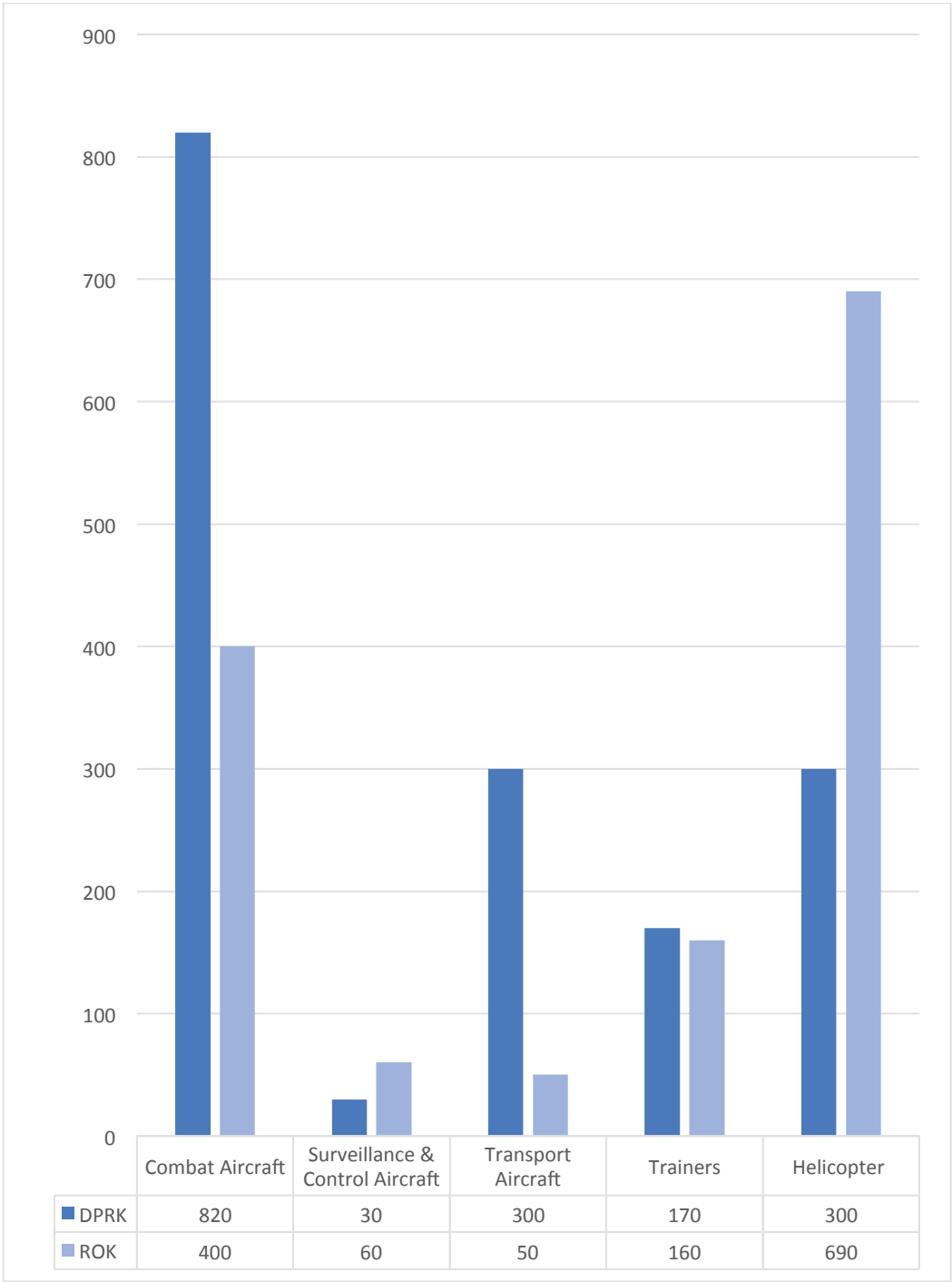
Figure II.23 shows the air balance by country and mission type. It indicates that the DPRK's Air Force does not have the support of the kind of intelligence, AWACS-type, and ISR enablers that the ROK possesses and is in many ways a "1970s" air force, compared to those of the ROK, US, China, and Russia.

Rotary Wing Aircraft

The ROK again leads in terms of modern type, diversification, and the ability to support a wider range of missions.

- **Figure II.24** shows the total rotary wing or helicopter balance by country and service. This is an area where the ROK has a major lead over the DPRK.
- **Figure II.25** looks at rotary wing aircraft by country and mission type. At the same time, this figure highlights an aspect of US capability that often tends to be overlooked. The US has a large fleet of rapidly deployable modern attack helicopters, many with advanced anti-armor weaponry. The balance of armored weapons in the Koreas could be altered significantly by the deployment of US attack helicopters.

Figure II.20: ROK Estimate of Korean Air Force Balance in 2014



Source: Based primarily on material provided from Republic of Korea, Ministry of Defense, *2014 Defense White Paper*. Some equipment figures are estimates. All equipment figures represent equipment in active service.

Figure II.21: IISS Estimate of Total Air Force Manpower and Equipment in Northeast Asia in 2016

Air Force and Air Force Reserve Manpower (in thousands, including conscripts)

	China	Japan	DPRK	ROK	Russia	US
Active	398	47.1	110	65	145	319.95
Reserve	portion of 510	0.8	portion of 600	portion of 4500	portion of 2000	165.15

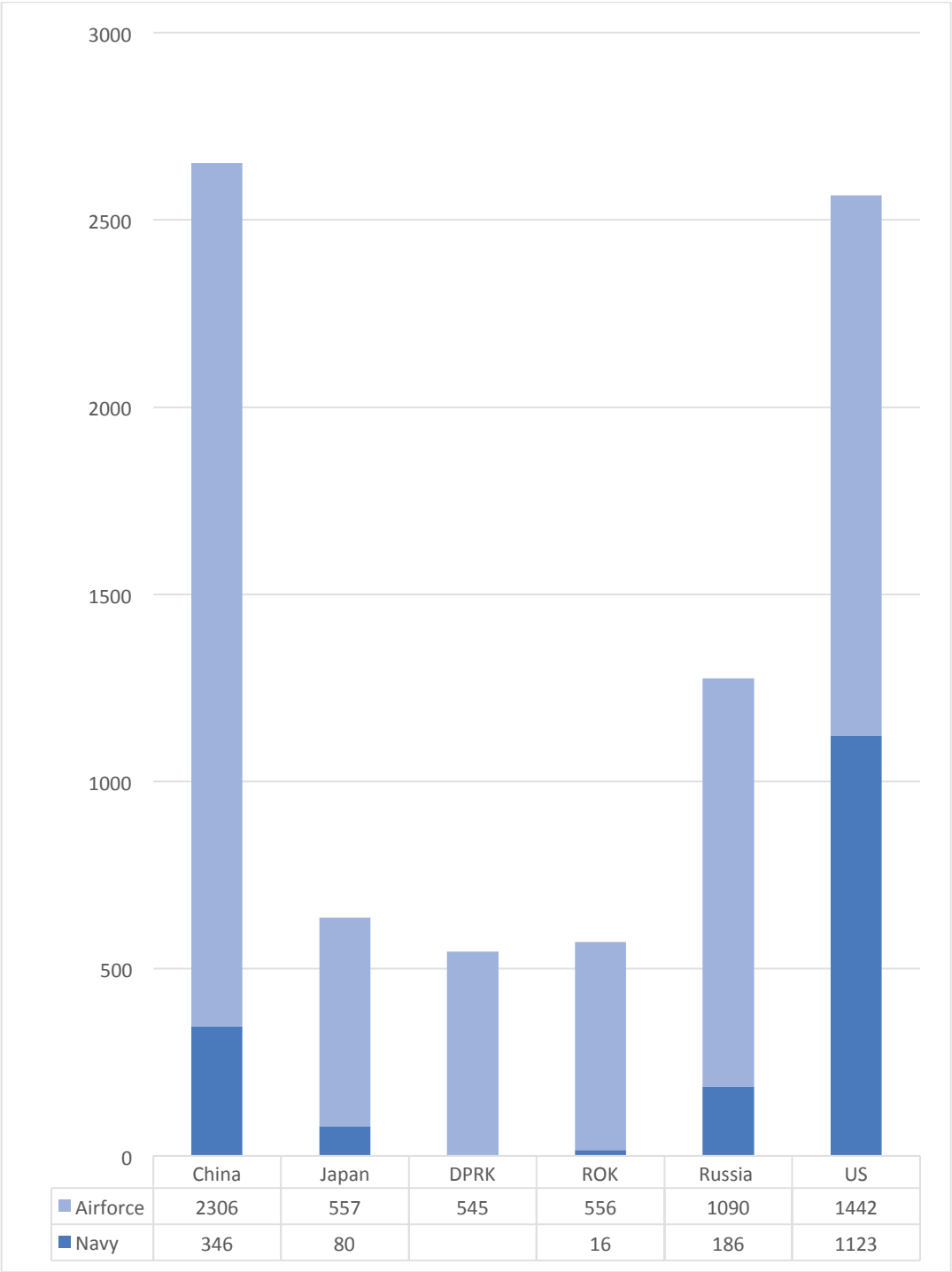
Air Force Equipment (not including reserves)

Platforms	China	Japan	DPRK	ROK	Russia	US
Aircraft	3077+	696	977+	744	1,795	3,281
(combat capable)	2,306	557	545	556	1,090	1,442
Bomber	120		80		139	139
Fighter	842	201	401+	174	320	275
Fighter, ground attack	626	147	30	314	347	868
Command & control	5				8	4
ELINT	4				32	22
Search and rescue						
ISR	51	17		24	85	41
SIGINT				4		
Airborne early warning and control	10	17		4	18	31
Electronic warfare	13	3				14
Combat Search and Rescue						22
Attack	120		34		195	160
Airborne command post						
Tanker	11	4			15	160
Tanker/transport						59
Training	950+	245	215+	186	204	1,128
Transport	325+	62	217+	38	432	358
Helicopter	53	46	286	49	669	129
Attack					271+	
Multirole/EW	22		80	3	27	
Transport	31+	15	206	30	332	62
Combat search and rescue						67

Search and rescue		31		16		
Training					39	
Tilt-rotor						35
Air Defense	16,600+	0	350+	206	560	some
Guns (towed)	16,000					
Surface-to-air missile (manpad)	some		some			some
Surface-to-air missile (static/shelter)			38			
Surface-to-air missile (self-propelled)	300+		some	48	560	
Surface-to-air missile (towed)	300+		312+	158		
Armored Infantry Fighting Vehicle	180					
Armored Personnel Carrier	4					
Artillery		0	0	0		0
Towed						
Multiple rocket launcher (towed)						
Mortar						
Radar						
Air-to-Air Missile	some	some	some	some	some	some
Bombs, laser/TV/INS/GPS-Guided	some				some	some
Missile, Tactical	some	some	some	some	some	some
Anti-tank					some	
UAV	some		some	103+	some	339+

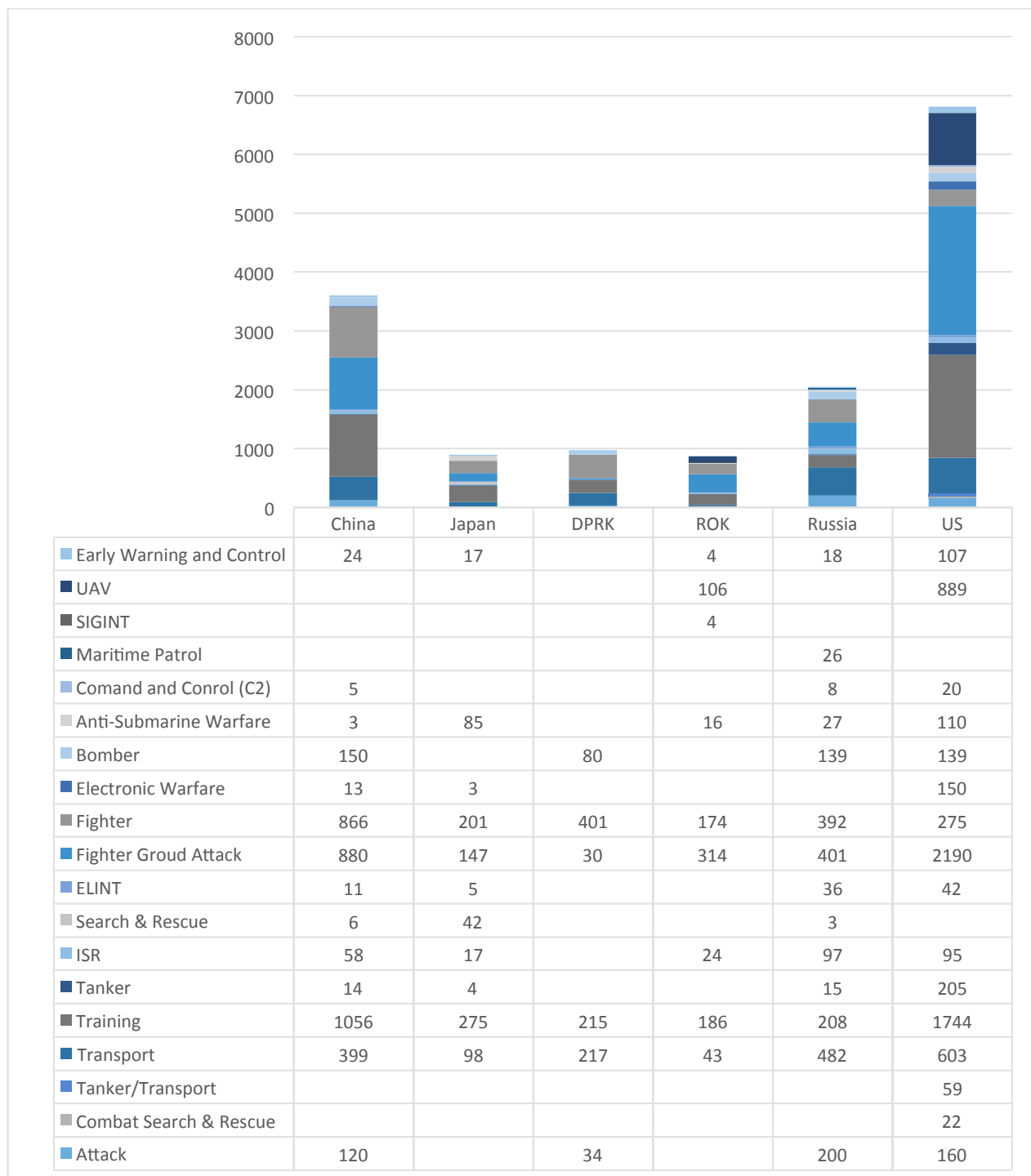
Source: IISS, *The Military Balance 2016*.

Figure II.22: IISS Estimate of Total Northeast Asian Fixed Wing Combat Aircraft by Branch in 2016



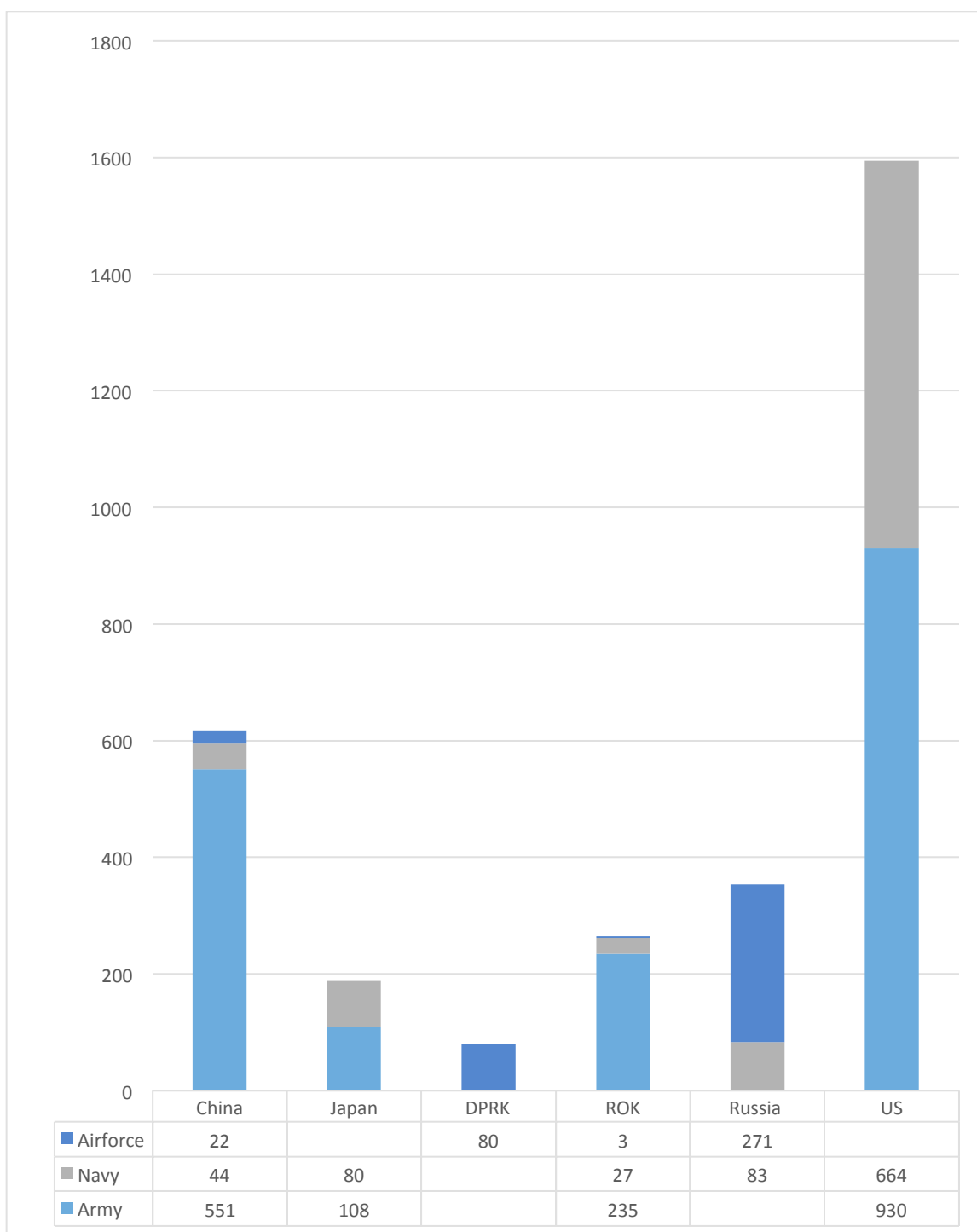
Source: IISS, *The Military Balance 2016*. Figures do not include equipment used for training purposes. Some equipment figures are estimates. All equipment figures represent equipment in active service.

Figure II.23: IISS Estimate of Total Northeast Asian Fixed Wing Aircraft by Type in 2016



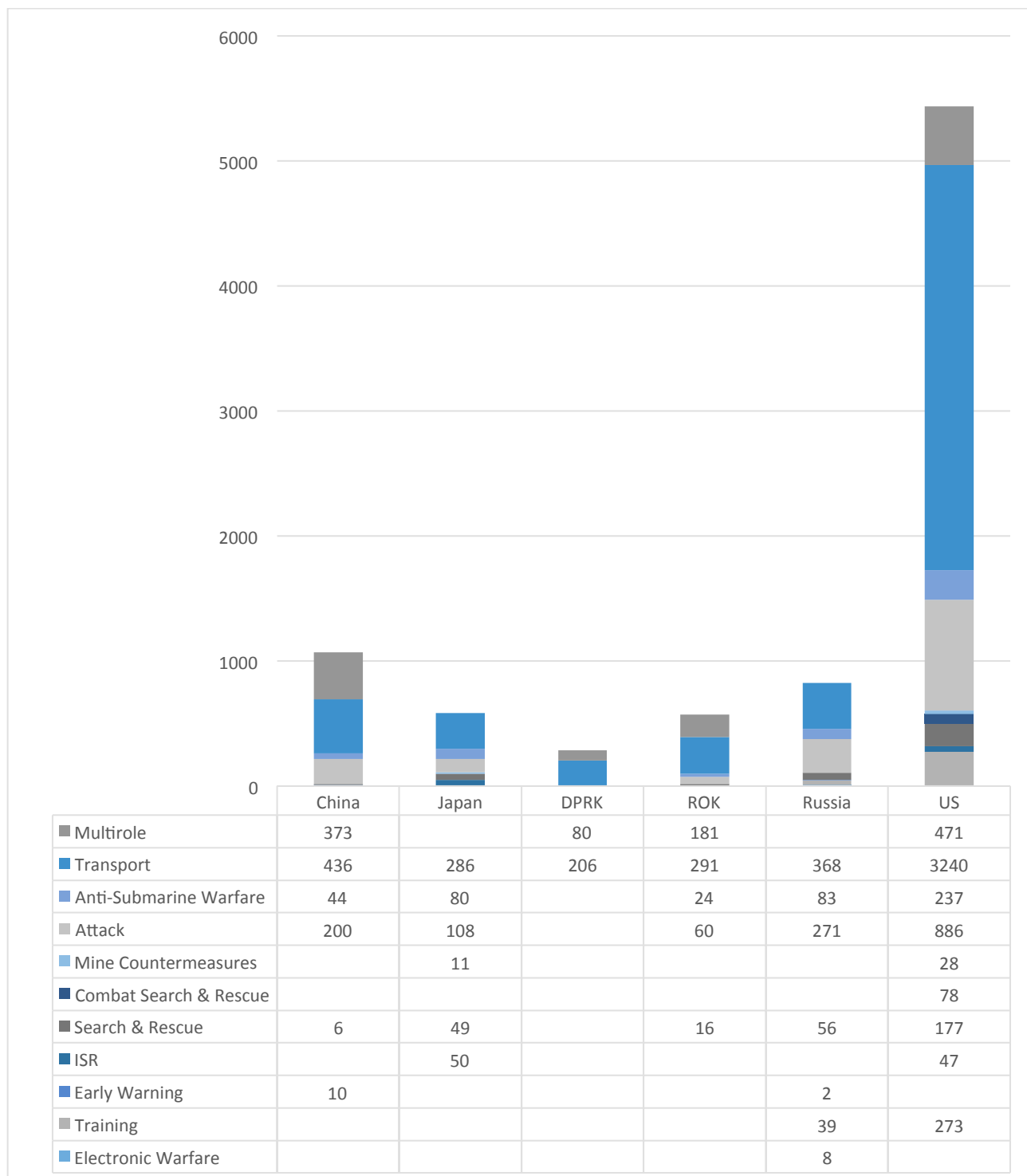
Source: IISS, *The Military Balance 2016*. Data for each fixed-wing aircraft mission represents the sum of all active service aircraft in the Army, Navy, and Air Force inventories. Figures do not include equipment used for training purposes. Some equipment figures are estimates.

Figure II.24: IISS Estimate of Total Northeast Asian Rotary Wing Combat Aircraft by Force in 2016



Source: IISS, *The Military Balance 2016*. Figures do not include equipment used for training purposes. Some equipment figures are estimates. All equipment figures represent equipment in active service. “Combat” defined as platforms designed for the purpose of offensive combat operations; included are Army (attack and multirole), Navy (anti-submarine warfare, attack, and multirole, includes Marine Aviation forces), and Air Force (multirole and attack).

Figure II.25: IISS Estimate of Total Northeast Asian Rotary Wing Aircraft by Type in 2016



Source: IISS, *The Military Balance 2016*. Data for each rotary wing aircraft mission represents the sum of all active service aircraft in Army, Navy (including Marine), and Air Force inventories. Figures do not include equipment used for training purposes. Some equipment figures are estimates.

Surface-to-Air Missiles and Anti-Aircraft Guns

Land-based air defenses, along with the growing deployment of anti-missile defenses, have become another critical aspect of modern warfare. The ROK again has an important lead over the DPRK, and one that will increase sharply if the ROK and U.S. deploy theater missile defenses like THADD.

- **Figures II.26 and II.27** add another dimension to the air balance. They show that the DPRK has large surface-to-air missiles forces, but most were first deployed in the Vietnam era or early 1970s, and have only had limited upgrades. The ROK IHAWK systems are relatively modern, and the ROK has significant numbers of Patriots, which are fully modern air defense systems with a point defense capability against missiles. The DPRK, however, has much larger short-range air defenses, although most have limited effectiveness and many are anti-aircraft unguided guns.
- **Figure II.27** shows relative balance of surface-to-air missile (SAM) and ballistic missile strength, while **Figure II.28** shows overall missile and bomb capacities – to the extent they are available in open source literature. The trends in missile defense are discussed later in Chapter 4. The DPRK has large, but mostly obsolete surface-to-air missile defenses.

North Korea does have one of the densest air defense networks in the world, but its equipment primarily consists of older or less capable Soviet-designed missiles and radars – either made in the USSR or licensed and produced in the DPRK – developed in the 1950s-1970s. The ROK has smaller holdings of SAMs, but has far more modern and more capable Hawk and Patriot systems, compared to the DPRK's aging SA-2, SA-3, and SA-5 systems.

The US has been working for decades to develop ways to defeat such weapons, using radar jamming, anti-radar missiles, and stealth technology; the B-2 and F-22 were designed specifically to evade this type of defense, and B-52s could take out the DPRK's air defense system by firing AGM-86 cruise missiles from beyond the range of DPRK defenses. The DPRK's inventory includes the SA-2 *Guideline*, SA-6 *Gainful*, SA-3 *Goa*, SA-13 *Gopher*, SA-16 *Gimlet*, SA-4 *Ganef*, SA-5 *Gammon*, and the SA-17 *Gadfly*.²⁶²

The DPRK also has massive numbers of short-range man-portable air defense systems (MANPADS) and anti-aircraft guns. The IISS estimates that the DPRK has some 3,000 MANPADS and 11,000 guns. These, however, are far less important than in the past, given stealth capabilities, and the increasingly long-range and standoff capability of precision air-launched weapons.

The ROK's qualitative advantage in SAMs would more than offset the DPRK's advantage in numbers. It is unclear how much the DPRK's advantage in anti-aircraft guns and MANPADS really matters. Most are aging and have limited range and capability. US and ROK strike aircraft have effective countermeasures against most MANPADS and can use air-to-surface missiles from standoff ranges.

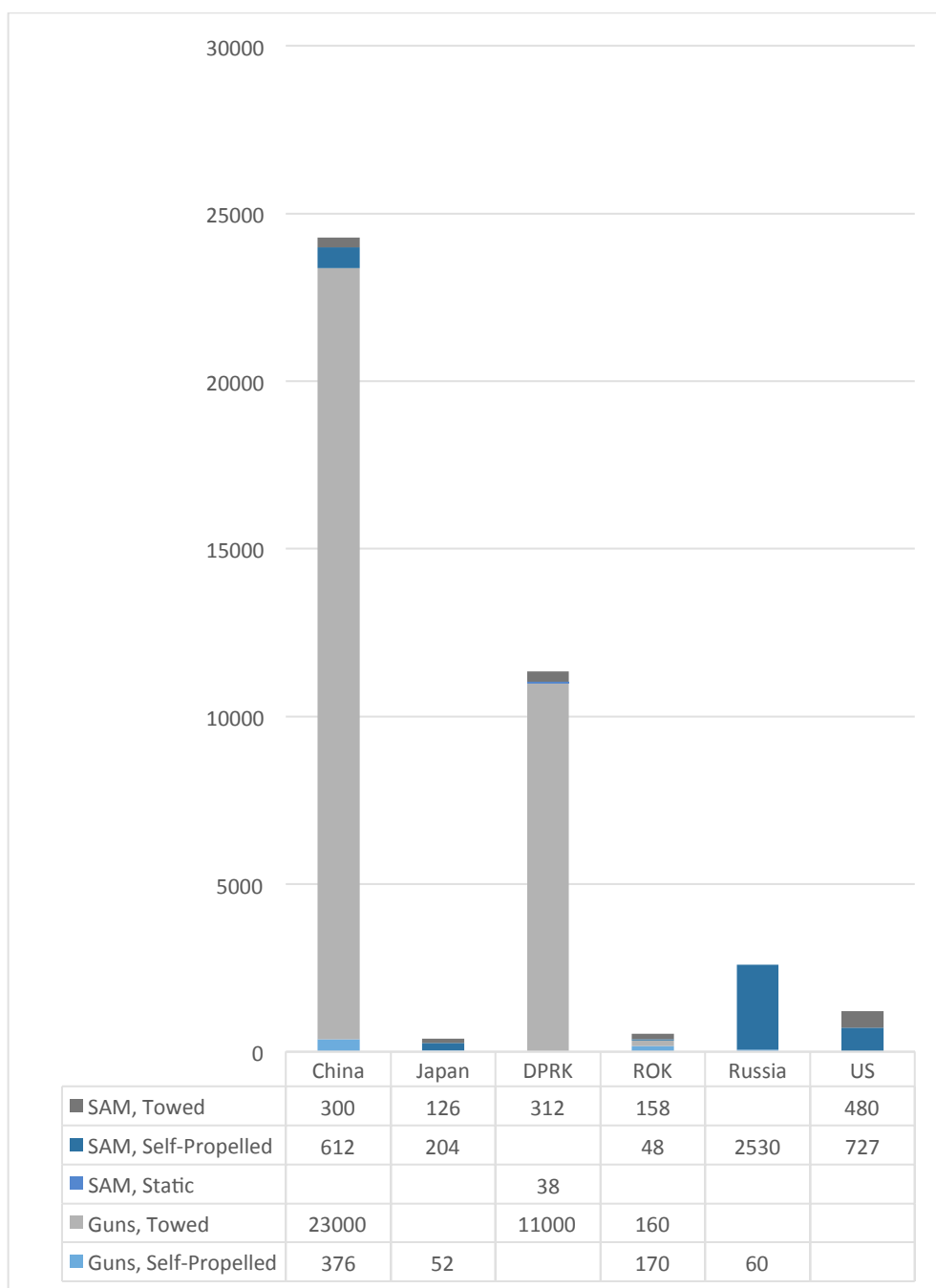
Figure II.26: IISS Estimate of Total Northeast Asian Air/Missile Defenses in 2016

Country	Major SAMs (SP/T/Static)	Light SAMs (MANPAD)
DPRK	38 S-200 (SA-5 <i>Gammon</i>) 133 S-125 <i>Pechora</i> (SA-3 <i>Goa</i>) 179+ S-75 <i>Dvina</i> (SA-2 <i>Guideline</i>) 9K35 <i>Strela-10</i> (SA-13 <i>Gopher</i>)	9K310 <i>Igla-1</i> (SA-16 <i>Gimlet</i>) 9K32 <i>Strela-2</i> (SA-7 <i>Grail</i>) 9K36 <i>Strela-3</i> (SA-14 <i>Gremlin</i>)
ROK	<i>Chun Ma</i> (<i>Pegasus</i>) 158 MIM-23B <i>I-HAWK</i> 48 <i>Patriot PAC-2</i>	FIM-43 <i>Redeye</i> FIM-92A <i>Stinger</i> <i>Javelin</i> <i>Mistral</i> 9K31 <i>Igla-1</i> (SA-16 <i>Gimlet</i>)
China	200 HQ-7A 24 SA-15 <i>Gauntlet</i> (9K331 <i>Tor M1</i>) 30 HQ-6D <i>Red Leader</i> 40 HQ-16A 18 HQ-17 24 HD-6D 60+ HQ-7 32+ HQ-9 24 HQ-12 (KS-1A) 32 S-300PMU (SA-10B <i>Grumble</i>)* 64 S-300PMU-1 (SA-20 <i>Gargoyle</i>) 64 S-300PMU-2 (SA-20 <i>Gargoyle</i>) 300+ HQ-2/HQ-2A/HQ-2B(A) (SA-2) <i>Guideline</i>	HN-5A/HN-5B <i>Hong Nu</i> FN-6/QW-1/QW-2
Japan	47 Type-81 <i>Tan-SAM</i> 126 MTM-23B <i>I-HAWK</i> 40 Type-03 <i>Chu-Sam</i> 113 Type-93 <i>Kin SAM</i> 120 MIM-104 <i>Patriot</i> 4 Type-11 <i>Tan-SAM</i>	Type-91 <i>Kin-SAM/Kei SAM</i>
Russia	350+ 9K37/9K317 <i>Buk</i> (SA-11 <i>Gadfly</i> /SA-17 <i>Grizzly</i>) 420 9K33M3 <i>Osa-AKM</i> (SA-8 <i>Gecko</i>) 450 9K35M3 <i>Strela-1/Strela-10</i> (SA-9 <i>Gaskin</i> /SA-13 <i>Gopher</i>) 120+ 9K330/9K331 <i>Tor</i> (SA-15 <i>Gauntlet</i>) 250+ 2K22 <i>Tunguska</i> (SA-19 <i>Grisson</i>) 248 S-300PS/PM (SA-10 <i>Grumble</i> /SA-20 <i>Gargoyle</i>) 72 S-400 (SA-21 <i>Growler</i>) 20 S-300V (SA-12 <i>Gladiator/Giant</i>)	9K310 <i>Igla-1</i> (SA-16 <i>Gimlet</i>) 9K38 <i>Igla</i> (SA-18 <i>Grouse</i>) 9K333 <i>Verba</i> 9K388 <i>Igla-S</i> (SA-24 <i>Grinch</i>) 9K34 <i>Strela-3</i> (SA-14 <i>Gremlin</i>) 9K32 <i>Strela-2</i> (SA-7 <i>Grail</i>)

	12 96K6 <i>Pantsir-S1</i> (SA-22 <i>Greyhound</i>) 150 BTR-ZD	
US	703 M998/M1097 <i>Avenger</i> 24 THAAD 480 MIM-104 <i>Patriot</i> /PAC-2/PAC-3	FIM-92/92A <i>Stinger</i>

Source: IISS, *The Military Balance 2016*. Figures represent equipment in use across service branches. All equipment figures represent equipment in active service.

Figure II.27: IISS Estimate of Total Korean and Northeast Asian Air/Missile Defenses in 2016



Source: IISS, *The Military Balance 2016*. Data include Army, Air Force, and Navy (and Marine) inventories. It should be noted that the exact number of these equipment types is not available for most countries; real numbers are likely much higher and broader. Additionally, data showed that each country contained man-portable surface to air missiles but no quantities were available.

Conventional Artillery and Surface-to-Surface Rockets and Missiles as a Counterbalance to Limits in Airpower

More broadly, the data on ROK and US forces shown in this section can only hint at the qualitative advantages that the ROK/US side could have when the total associated weapons, sustainability, battle management, ISR, and C4/BM capabilities of US and ROK forces are considered, and that this would be particularly true if China stood aside from the conflict. The role of external players is critical in any engagement scenario, and relative force quality could easily be far more decisive than force numbers.

As has been discussed earlier, the potential DPRK counterbalance to ROK and US advantages in airpower would be the use of longer-range artillery, rockets, and shorter-range ballistic missiles as a substitute for air power.

The DPRK's longer-range tube artillery includes 130mm M-1975/M-1981/M-1991 (27+ kilometers), 152mm M-1974/M-1977 (12.5 kilometers), 170mm M-1978/M-1989 self-propelled weapons (60 kilometers with a rocket assisted projectile), and 122mm D-30/D-74/M-1931/37 (15.4 kilometers), 130mm M-46 (27+ kilometers), and 152mm M-1937/M-1938/M-1943 towed weapons (12.5 kilometers).

The IISS also estimated that the DPRK had 5,100 107mm, 122mm and 240mm multiple rocket launchers in 2014. Its 107mm multiple rocket launchers had a maximum range of 11 kilometers, its 122mm multiple rocket launchers had a maximum range of 20 kilometers, and its 240mm multiple rocket launchers had a maximum range of 35 kilometers. In 2014, North Korea fired its new KN-09 300mm missiles in test firings. According the North Korean state media, the KN-09 could fire GLONASS guided missiles. In a June 2014 test, the missiles flew about 180-190km before landing.²⁶³

Global Security reports that,²⁶⁴

South Korean security analyst suggested that DPRK artillery pieces of calibers 170mm and 240mm “could fire 10,000 rounds per minute to Seoul and its environs...North Korea has about 5,000 long-range artillery tubes within range of Seoul, and the total rate of fire of these artillery pieces would be between 2,000 and 4,000 rounds per minute. The DPRK's two hundred 240mm MRLs fire either 12 or 22 rounds, providing a maximum single salvo of no more than 4,400 rounds... These launchers can fire a first strike of many thousands of missiles and return in a few minutes to protected caves or to alternate firing positions. The MRLs move out from underground facilities (UGFs), fire from preplanned firing positions, and return to the UGFs. Examination of the available data on the UGF sites suggests that a number of possible “exit and return” methods for the MRLs may be possible. In this case, the launchers move directly from the firing points to the UGFs. This procedure makes it difficult to target the launchers, because once they fire it only takes 75 seconds to return to their UGFs...

The IISS estimated that the DPRK had 24 fire units for longer-range rockets and missiles. These forces included units with FROG-3/FROG-5/FROG-7; 30+ *Scud-B/Scud-C* (200+ missiles), and 10 *Nodong* (90+ missiles). Some of its *Musudan* IRBMs may be nearing operational status, and it has KN-08s in development.

It is not clear that these systems have a precision strike capability, but they may well have cluster or submunition warheads as well as chemical and possibly biological warheads. Nuclear warheads are almost certainly under development. The FROG has a nominal maximum range of 70-90 kilometers with 390-500 kilogram warheads and a CEP of 500-700 meters.

The Scud B has a nominal maximum range of 270 kilometers with 985 kilogram conventional warheads and a CEP of 500-700 meters. The *Scud-C* has a nominal maximum range of 900 kilometers with 600 kilogram conventional warheads and a CEP of 500-1,100 meters. No *Scud-Ds* – which have early terminal guidance systems – were reported in the DPRK inventory.

The *Nodong* has a nominal maximum range of 900 kilometers with a nominal 1,000 kilogram conventional warhead and a CEP worse than 1,500 meters. The Musudan IRBM has a nominal maximum range of 2,500-4,000 kilometers with a 1,000-1,250 kilogram warhead and a CEP of 1,300-2,300 meters. The status of the KN-08 and Taepodong-2 ICBMs is uncertain and no clear date exists for a KN-08 operational status. The *Nodong*, *Musudan*, and KN-08 are long-range systems that are likely to be equipped solely with nuclear warheads.

It is possible that the DPRK might escalate to using chemical warheads, believing that the ROK and US response would be limited by a lack of chemical weapons and reluctance to escalate to even low-yield tactical nuclear warheads.

These missile and CBRN forces will be discussed in more detail later in this report.

Figure II.28: Northeast Asian Missile and Bomb Capabilities

Country	Missiles	Bombs
DPRK	24 FROG-3/FROG-5/FROG-7 6+ Hwasong-13 (KN-08) (reported operational) <i>Musudan</i> ~10 <i>Nodong</i> 30+ <i>Scud-B/Scud-C</i> HY-1 (CSS-N-2) KN-01 (in development) Kh-23 (AS-7 <i>Kerry</i>) Kh-25 (AS-10 <i>Karen</i>) R-3 (AA-2 <i>Atoll</i>) R-60 (AA-8 <i>Aphid</i>) R-73 (AA-11 <i>Archer</i>) PL-5 PL-7 R-23/24 (AA-7 <i>Apex</i>) R-27R/ER (AA-10 A/C <i>Alamo</i>)	
ROK	30 <i>Hyunmu I/IIA/IIIB</i> <i>Hyonmu III</i> RGM-84A <i>Harpoon</i>	

	AGM-84 <i>Harpoon</i> AGM-130 AGM-142 <i>Popeye</i> AGM-88 <i>HARM</i> AGM-65A <i>Maverick</i> AGM-84-H SLAM-ER AIM-9/9X <i>Sidewinder</i> AIM-7 <i>Sparrow</i> AIM-120B/C5 AMRAAM	
China	HY-1 (CSS-N-2) <i>Silkworm</i> HY-2 (CSS-C-3) <i>Seersucker</i> HY-4 (CSS-C-7) <i>Sadsack</i> YJ-62 AKD-8 AKD-9 AKD-10 YJ-61 YJ-8K 72 YJ-62 YJ(KD)-63 YJ-83K YJ-91 (Kh-31P variant) KD-10 KD-88 Kh-29 (AS-14 <i>Kedge</i>) Kh-31A/P (AS-17 <i>Krypton</i>) Kh-59 (AS-18 <i>Kazoo</i>) PL-2B PL-5 PL-5B/C PL-8 PL-9 PL-11 PL-12 R-27 (AA-10 <i>Alamo</i>) R-73 (AA-11 <i>Archer</i>)	Type-200-4/Type-200A LS-500J KAB-500KR KAB-1500KR

	R-77 (AA-12 <i>Adder</i>) CJ-10/CJ-20 (reported)	
Japan	86 Type-88 2 Type-12 ASM-1 (Type-80) ASM-2 (Type-93) AAM-3 (Type-90) AAM-4 (Type-99) AAM-5 (Type-04) AIM-7 <i>Sparrow</i> AIM-9 <i>Sidewinder</i>	
Russia	212 9K79 <i>Tochka</i> (SS-21 <i>Scarab</i>) 50 9K720 <i>Iskander-M</i> (SS-26 <i>Stone</i>) K-29 (AS-14 <i>Kedge</i>) K-37M (AA-X-13 <i>Axehead</i>) Kh-15P (AS-16 <i>Kickback</i>) Kh-22/32 (AS-4 <i>Kitchen</i>) Kh-25 (AS-10 <i>Karen</i>) Kh-25MP (AS-12 <i>Kegler</i>) Kh-31A/AM (AS-17B <i>Krypton</i>) Kh-31P/PM (AS-17A <i>Krypton</i>) Kh-55/55SM (AS-15A/B <i>Kent</i>) Kh-555 (AS-15C <i>Kent</i>) Kh-58 (AS-11 <i>Kilter</i>) Kh-59/Kh-59M (AS-13 <i>Kingbolt</i> /AS-18 <i>Kazoo</i>) Kh-101 Kh-102 24 3K60 <i>Bal</i> (SSC-6 <i>Sennight</i>) 12 K-300P <i>Bastion</i> (SSC-5 <i>Stooge</i>) 4K44 <i>Redut</i> (SS-C-1 <i>Sepal</i>) 4K51 <i>Rebuzh</i> (SS-C-3 <i>Styx</i>) R-27R/ER (AA-10A/C <i>Alamo</i>) R-27T/ET (AA-10B/D <i>Alamo</i>) R-27P/EP (AA-10 <i>Alamo</i> E/F) R-33/33S (AA-9 <i>Amos</i> A/B)	KAB-500 KAB-1500L KAB-500KR KAB-1500KR KAB-500OD UPAB 1500

	R-60 /R-60T (AA-8 <i>Aphid</i>) R-73 (AA-11 <i>Archer</i>) R-77/R-77-1 (A-12 <i>Adder</i>)	
US	AIM-9 <i>Sidewinder</i> AIM-9X <i>Sidewinder II</i> AIM-7 <i>Sparrow</i> AIM-120/120B/C AMRAAM AGM-65A/B/D/E/F/G <i>Maverick</i> AGM-114B/K/M <i>Hellfire</i> AGM-84E SLAM/SLAM-ER LACM AGM-154A JSOW AGM-176 <i>Griffin</i> AGM-86B/C/D LACM AG-130A AGM-158 JASSM AGM-84/84D <i>Harpoon</i> AGM-119A <i>Penguin 3</i> AGM-88/88A/B HARM MALD/MALD-J	BLU-109/Mk 84 BLU-110/Mk 83 BLU-111/Mk 82 BLU-117/Mk 84 Mk 46 Mk 50 Mk 54 CBU-59 CBU-99 <i>Paveway II</i> (GBU-10/12/16) <i>Paveway III</i> (GBU-24) JDAM (GBU-31/32/38) GBU-15 GBU-39B GBU-43B Laser JDAM (GBU-54) GBU-57A/B Enhanced <i>Paveway II</i> Enhanced <i>Paveway III</i>

Source: IISS, *The Military Balance 2016*. Figures represent equipment in use across service branches. All equipment figures represent equipment in active service.

Paramilitary Forces

The DPRK has massive paramilitary forces compared to the ROK, and **Figure II.29** portrays the balance of paramilitary strength. These forces are primarily instruments of regime control over the North's population, and this aspect of the balance is unlikely to affect any DPRK attack on the ROK.

The DPRK already has larger ground forces than it can support in any offensive. However, the situation could be different in the case of any ROK or ROK/US counteroffensive into the DPRK. Depending on the loyalty of such forces, they could put up significant local resistance both during a counteroffensive and in the rear of any ROK or ROK/US advance.

The US does not have paramilitary forces, so the US is not included. China and Russia have far larger paramilitary forces than the Koreas – unsurprising given their significantly larger demographic and geographic sizes. It is unlikely, however, that either country would use such forces in any conflict in the Koreas.

Figure II.29: IISS Estimate of Total Paramilitary Manpower and Equipment in Northeast Asia in 2016²⁶⁵

Paramilitary Manpower (in thousands, including conscripts)

China	Japan	DPRK	ROK	Russia
660+	12.65	189	4.5	489

Paramilitary Equipment

Equipment	China	Japan	DPRK	ROK	Russia
Armored infantry fighting vehicle / personnel carrier	0	0	0	0	1000
Artillery	0	0	0	0	90
Frigates					3
Patrol and Coastal Combatants	387+	395+	0	54	290
Patrol vessel, offshore	36+	28		4	4
Patrol craft, offshore	63+	28		16	18
Patrol Craft with SAM					46
Patrol Boat	246+	252+		9	45
Patrol boat (fast)		47			137
Patrol Boat, Riverine					25
Patrol craft, coastal	22+	26		24	13
Patrol vessel, offshore with hanger	20	14		1	
Patrol hydrofoil with torpedo					2
Logistics and Support	47	37	0	30+	42
Command Ship	5				
Sea-going buoy tender	16	1			
Survey ship	1	12			2
Yard Craft, Miscellaneous		5			
Aux. Vessel	5				1
Torpedo recovery vessel		3			
Fireboat		9			
Oceanographic Research Vessel	13				
Salvage and rescue ship				30+	
Icebreaker					5

Cargo ship					8
Stores Ship (Light)		7			6
Oiler					2
Tug, fleet, ocean-going	7				18
Amphibious (LC/LCAC - patrol)	7				7
Aircraft	0	25	0	6	86
ISR		2			
Maritime Patrol		2		5	
Transport		21		1	86
Helicopters	0	48	0	15	200
Multirole		7		7	
Search and Rescue		1			
Transport		40		8	

Source: IISS, *The Military Balance 2016*.

DPRK

The DPRK's constant emphasis on regime security, building up its military forces, using these forces to make military threats and carry out politically driven low level attacks, and creating growing missile and nuclear capabilities have all combined to drive the shape of Korean balance and have done so for decades. The DPRK not only is a militarized state, it has made military confrontation the primary reason for its existence.

While it is possible that the DPRK's leader could reform the state and focus on the economy and the needs of his people, he could only do so by depriving the regime of its rationale for authoritarian control and the use of so much of its economy to maintain its military forces. The DPRK would then emerge as a fifth-class economy and state little able to compete in a Northeast Asia where economic development has long been the key test of success for North Korea's neighbors – all of which have vastly outpaced the DPRK.

Leadership and Command and Control

North Korea is a hereditary and hierarchical dictatorship dominated by a supreme leader and those he personally depends upon for political power, regardless of the DPRK's formal command structure. This makes it difficult to assess the effectiveness and structure of its C4I/BM and ISR systems, but some aspects of its formal command structure are relatively clear.

South Korean analysis indicates that the primary DPRK military organs include the National Defense Commission (NDC), the Central Military Commission (CMC), the Ministry of People's Armed Forces (MPAF), the General Staff Department (GSD), and the General Political Bureau (GPB).²⁶⁶ This structure is shown in **Figure II.30**.

The following ROK commentary dates back to 2012. It provides a more in-depth description of these organizations' development and roles, but one that predates many of the steps that Kim Jong-un has taken to change the command structure since 2012 and bring it more closely under his control.²⁶⁷

Among them, the NDC was established along with the adoption of the socialist constitution in 1972. In 1992, it became the supreme guiding organ of the armed forces when the constitution was revised to build institutional support for Kim Jong-il's military control. To reinforce NDC functions, further amendments followed which authorized the management of overall national defense (1998) and promoted its status as the supreme guiding organ of national defense (2009).

The Chairman of the NDC takes command of all activities of North Korea's armed forces and national defense projects. While the GPB oversees the WPK's organization and other political and ideological projects, the GSD commands military operations, and the MPAF represents the military at home and abroad. The MPAF came into being when the regime was established in 1948 to take charge of military-related foreign affairs, industry, finance and other administrative works, but the constitutional revision in 1998 relocated the MPAF under the direct guidance and command of the NDC. At present, Kim Jong-un is known to have assumed the positions of Supreme Commander of the KPA, Chairman of the CMC, First Chairman of the NDC. This empowers the young ruler to command and oversee all military forces in North Korea, in addition to exercising administrative and power over them.

In December 1962, the 5th session of the 4th Central Committee adopted the Four-point Military Guideline proposed by Kim Il-sung. To implement the guideline, a military commission was newly established under the Central Committee, which was renamed the Central Military Commission (CMC) in November 1982. The CMC oversees the discussions and decisions of military policies and their implementation, reinforces the armed forces including the KPA, conducts the organization and supervision of projects promoting the munitions industry, and exercises military command. In the meantime, the GPB takes charge of political tasks of the WPK within the KPA with similar authority as other organs under the Central Committee, and

this in effect enables the WPK to tighten its grip over the military. Party officials are also assigned to each and every military unit, so that they may guide and direct all works of the armed forces to comply with WPK lines and policies.

As was discussed in Chapter I, Kim Jong-un is the General Secretary of the Korean Workers Party (KWP) and the CMC, First Chairman of the NDC, and Supreme Commander of the KPA. The main channel for command and control of the KPA starts at the NDC and goes to the GSD, from which command and control extend to each military branch and 25 known bureaus that have various amounts of control over the operational units. The Ministry of People's Armed Forces has the authority to administer military affairs – which includes representing the military externally and undertaking internal work like military logistics, finance, and diplomacy.²⁶⁸

There are two additional paths of command and control to make sure that the KPA remains under tight political control – one through the KWP's Central Committee (to the NDC's General Political Bureau, which supervises indoctrination programs and the Workers' Party organizations that are part of the KPA, then down through the KPA to the lower levels), and the second through the NDC (to the Ministry of State Security as well as the Security Command, which also has representatives throughout the KPA structure).²⁶⁹

The US DOD issued its first unclassified report on the DPRK's military forces in May 2013. This report too is dated relate to the decisions that Kim Jong-un has made since that time, but the report notes that,²⁷⁰

The DPRK National Defense Commission (NDC) is the symbolic nominal authority over the North's military and security services. The Ministry of Peoples Armed Forces (MPAF) is the administrative superior of the KPA, while operational command and control is exercised by its subordinate General Staff Department. The 1992 constitution shifted control from the president to the NDC and Kim Jong Il directly exercised control of the military as chairman of the NDC, and Supreme Commander of the KPA.

Kim Jong Un was made the supreme commander of the KPA shortly after his father's death and named to the newly created position of "first chairman" of the NDC in April 2012, when Kim Jong Il was made "eternal chairman" of the NDC. In the same month, Kim Jong Un was named first secretary of the Korean Worker's Party, after his father was made "eternal general secretary" of the KWP. At the same time, Kim Jong Un also became the chairman of the Central Military Commission of the KWP, having previously been one of two vice chairmen.

...North Korea's nationwide fiber optic network is available to every sector of society, and North Korea has invested in a modern nationwide cellular network. Telecommunication services and access are strictly controlled, and all networks are available for military use, if necessary.

Beginning with the elimination of his uncle Chang Song-taek in 2013, Kim Jung-un has attempted to purge certain military leaders and replace them with his own supporters. As the 2016 *Jane's* reports:

Since December of 2014 Kim Jong-un and his close aides have continued to dismiss and appoint numerous senior military commanders, including leaders of the North's naval and air forces, the head of military operations, the head of the artillery command, a commanding officer of a special operations forces unit, and all but two of the vice chiefs of the KPA General Staff. Some of the senior positions effected have been changed multiple times. The net effect is that the senior military leadership remains in flux and is significantly focused upon individual survival.

These purges have resulted in the replacement of some 80% of corps commanders.²⁷¹

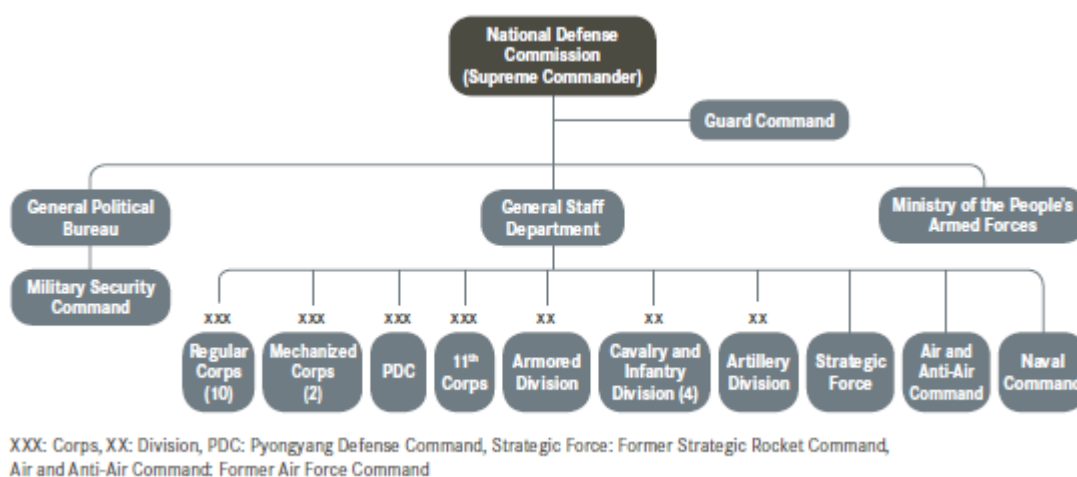
Along with these changes, Kim has sought to reform the command structure of the armed forces as well. As noted in the 2015 DOD report:²⁷²

North Korea's National Defense Commission (NDC) is the official authority over the North's military and security services. The Ministry of People's Armed Forces (MPAF) is the administrative superior of the KPA, while operational command and control is exercised by the General Staff Department. The 1992 constitution gives control of North Korea's military to the NDC, and Kim Jong Un exercises control of the military as "First Chairman" of the NDC and "Supreme Commander" of the KPA. Kim Jong Un further exercises control as "First Secretary" of the Korean Worker's Party (KWP) and "Chairman" of the KWP's Central Military Commission.

The 2016 IHS Jane's report summarizes these developments as follows:²⁷³

Kim Jong-un exercises supreme authority in North Korea as first secretary of the WPK, supreme commander of the KPA, and first chairman of the NDC. Since becoming leader of North Korea, Kim Jong-un has replaced or reassigned a large number of senior party and military officials, placing younger officials more closely associated with him in key assignments. Kim's execution of his powerful uncle Chang Song-taek in December 2013 eliminated the most influential senior party official remaining from his father's era and sent a strong message to the regime's power-holding elites that the formation of factions or potential challenges to Kim Jong-un will not be tolerated. The primary path for C2 of the KPA extends from the NDC to the General Staff Department. From here, as a unified armed force, C2 flows to the Korean People's Navy Command, Korean People's Air and Anti-Air Command, various bureaus, and operational units. The NDC is the highest guiding organ of national defence and it establishes all important national policies and oversees the defence policy. The MPAF is the agency that exercises "the authority to administer military affairs including military diplomacy, logistics and military finance, and to represent the military externally". Two secondary paths exist to ensure political control of the KPA. The first extends through the WPK Central Committee to the Central Military Commission (CMC) and onto the General Political Bureau subordinate to the NDC. The CMC "discusses and decides on measures to implement the Party's military line and policies" and "provides overall Party guidance for national defence." The General Political Bureau is responsible for Party organization and ideological education in the military. From the General Political Bureau it extends down via a separate chain of command to the lowest levels of the KPA. The second extends from the NDC to the Ministry of State Security and the Security Command that also maintains representatives to the lowest levels of the KPA.

With these and other reforms, Kim appears to have taken steps to reduce the predominance of military leaders in political decision-making. He has purged or removed senior commanders from his father's time, and has worked to elevate the importance of the Worker's Party instead, as evidenced by political theater in the form of a rare Party congress and a change in propaganda focus.²⁷⁴

Figure II.30: ROK Diagram of DPRK Force Organization

Source: Republic of Korea, Ministry of Defense, *2014 Defense White Paper*, 30.

Force Size and Structure

The report the US DOD issued on the DPRK's military forces in 2015 described the DPRK's ground forces as follows:²⁷⁵

The Korean People's Army (KPA) — a large, ground force-centric organization comprising ground, air, naval, missile, and SOF — has over one million soldiers in its ranks, making it the fourth largest military in the world. Four to five percent of North Korea's 24 million people serve on active duty, and another 25 to 30 percent are assigned to a reserve or paramilitary unit and would be subject to wartime mobilization. With approximately 70 percent of its ground forces and 50 percent of its air and naval forces deployed within 100 kilometers of the DMZ, the KPA poses a continuous threat to the ROK and U.S. forces stationed there. The general disposition of the KPA has not changed in the last two years.

The KPA primarily fields legacy equipment, either produced in or based on designs from the Soviet Union and China dating back to the 1950s, 1960s, and 1970s. Although a few weapons systems are based on modern technology, the KPA has not kept pace with regional military capability developments. The KPA has not acquired new fighter aircraft in decades, relies on older air defense systems, lacks ballistic missile defense, its Navy does not train for blue water operations, and recently unveiled artillery systems include tractor-towed rocket launchers while most other countries are improving the mobility of such systems.

Kim Jong Un seems to prioritize the development of new weapons systems, as demonstrated by his numerous appearances with military units and research and development organizations. He has personally overseen land- and sea-based ballistic missile and anti-ship cruise missile testing activity in 2014 and 2015. He has also overseen events designed to demonstrate the proficiency of his conventional military forces.

The DOD map of the deployment of DPRK ground forces is shown in **Figure II.31**. Unclassified estimates of the DPRK forces differ in detail. The DOD estimates DPRK ground forces as having a total strength of approximately 950,000 personnel, 4,200 tanks, 2,200 other armored vehicles, 8,600 artillery weapons, and 5,500 multiple rocket launchers (MRLs).²⁷⁶

The IISS *Military Balance* for 2016 estimates DPRK ground forces as having a total strength of approximately 1,190,000 personnel, 3,500 main battle tanks, 2,500 armored vehicles, 8,500+ artillery weapons, and 5,100 multiple rocket launchers (MRLs).²⁷⁷ The differences are probably

as much a matter of counting rules and real differences in underlying estimates, but illustrate the problems in making direct numerical comparisons of the balance.

The IISS estimates for 2016 report that the DPRK army is a 12-corps force with two mechanized corps, nine infantry corps, and a capital defense corps. Its armored forces include one armored division, 15 armored brigades, and four mechanized divisions. The bulk of its forces are still infantry – 27 divisions and 14 brigades.

Jane's provides a somewhat different estimate of the structure of DPRK ground forces as follows; there are more striking differences in the IISS and *Jane's* estimates of DPRK Special Forces, which are discussed in more detail in Chapter 5.²⁷⁸

16 Corps-level formations

- 10 infantry corps
- 2 mechanized corps
- 1 Pyongyang Defence Command
- Air Defence Command
- 11th Storm Corps (previously the Light Infantry Training Guidance Bureau)
- The Strategic Force
- 173 combat divisions and brigades

A number of specialized units that are under the General Staff Department bureaus, as well as special operations personnel (part of the internal security and intelligence agencies), are also part of the ground forces.²⁷⁹

Starting in 2000, the KPA has initiated many organizational changes in the ground forces to increase offensive capabilities as well as to adapt to changing economic conditions (such as the lack of fuel). Examples of these changes include reorganizing some mechanized brigades and light infantry brigades, expanding some light infantry battalions along the DMZ to regiment size, enlarging light infantry regiments to brigades, and equipping some light infantry with bicycles to increase mountain-terrain mobility.²⁸⁰

A *Jane's* 2016 analysis of these changes – which seems to differ from the limited data on unit structure provide by the IISS – indicates that,²⁸¹

Beginning in 2000, but more significantly from 2003 to the present, the KPA has undertaken a number of significant organizational changes within its ground forces units. Some of the more significant changes have included the expansion of existing division-level light infantry battalions within the DMZ corps to regiments, and the reorganization of seven infantry or mechanized infantry divisions (each division consists of approximately 7,000 troops for a total of approximately 50,000 troops) into light infantry divisions. These later organizational developments were apparently achieved by stripping these divisions of the majority of their combat and combat support units (for example, artillery, armor, air defence, and so on). Accompanying these organizational developments was the expansion of urban, night-time, and mountaineering training for all special operations units. It is believed that the KPA undertook these changes following a strategic review of a future conflict on the Korean Peninsula, combined with lessons learned from the recent conflicts in the Balkans, Iraq, and Afghanistan, which convinced the KPA of the need for a greater number of 'light' units. This is possibly one of the most interesting developments in KPA conventional forces in the past 20 years. Additionally, some light infantry battalions within divisions deployed along the DMZ were expanded to regiment size.

The DOD map of the deployment of DPRK air forces is also shown in **Figure II.32**. The DOD estimates the DPRK Air Force as having a total strength of approximately 110,000 personnel, 800+ combat aircraft, 300 helicopters, and 300+ transport aircraft.²⁸² The IISS Military Balance for 2016 estimates DPRK air forces as having a total strength of approximately 110,000 personnel, 545 combat capable aircraft, 286 helicopters, and 217 transport aircraft.²⁸³

The DOD described the DPRK's air forces as follows:²⁸⁴

The Air Force is primarily responsible for defending North Korean air space. Its other missions include special operations forces insertion, transportation and logistics support, reconnaissance, and bombing and tactical air support for KPA ground forces. However, due to the technological inferiority of most of its aircraft fleet and rigid air defense command and control structure, much of North Korea's air defense is provided by surface-to-air missiles (SAMs) and anti-aircraft artillery (AAA).

The NKAF's most capable combat aircraft are its MiG-29 and MiG-23 fighters and its SU-25 ground-attack aircraft. However, the majority of aircraft are less capable MiG-15s, -17s, -19s (F-6), and -21s. The NKAF operates a large fleet of AN-2 COLT aircraft, 1940s vintage single-engine, 10-passenger, bi-planes, which are likely tasked with inserting SOF into the ROK. The air force is rounded out with several hundred helicopters, predominantly Mi-2/HOPLITE and U.S.-made MD-500 helicopters (obtained by circumventing U.S. export controls in 1985). The rotary-wing fleet is used both for troop transport and ground attack.

North Korea possesses a dense, overlapping air defense system of SA-2/3/5 SAM sites, mobile and fixed AAA, and numerous man-portable air-defense systems (MANPADS), like the SA-7.

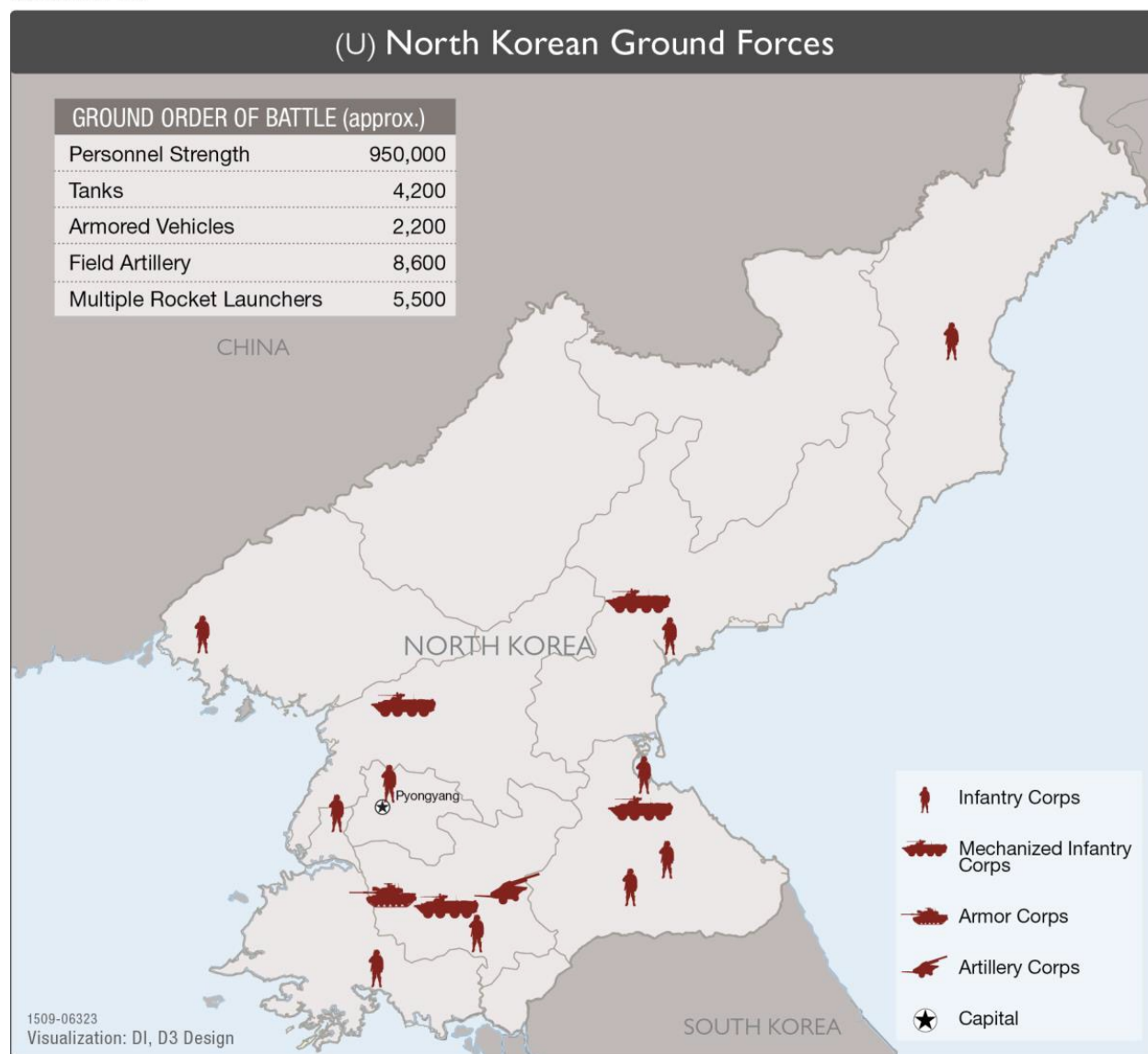
The DOD map of the deployment of DPRK naval forces is shown in **Figure II.33**. It described the DPRK's naval forces as follows:²⁸⁵

The North Korean Navy (NKN), the smallest of the KPA's three main services. This coastal force is composed primarily of aging, though numerous, small patrol craft that employ a variety of anti-ship cruise missiles, torpedoes, and guns. The NKN maintains one of the world's largest submarine forces, with around 70 attack-, coastal, and midget-type submarines. In addition, the NKN operates a large fleet of air-cushioned (hovercraft) and conventional landing craft to support amphibious operations and SOF insertion. The force is divided into East and West Coast Fleets, which each operate a range of patrol craft, guided-missile patrol boats, submarines, and landing craft.

Unclassified estimates of these DPRK forces again differ in detail. The DOD estimates the DPRK Navy as having a total strength of 60,000 personnel, 70 submarines, 430 patrol combatants, 260 amphibious ships and landing craft, 20 mine warfare vessels, and 40 support/auxiliary vessels.²⁸⁶ The IISS estimates the DPRK Navy as having a total strength of 60,000 personnel, 70 submarines, 383 patrol combatants, 267 amphibious landing craft, 24 mine warfare vessels, and 23 support/auxiliary vessels.²⁸⁷ According to IHS Jane's, compared to other naval assets in the DPRK Navy, the submarine force has a higher state of readiness.²⁸⁸

Figure II.31: Deployment of DPRK Ground Forces in 2015

UNCLASSIFIED



Source: Office of the Secretary of Defense, *Military and Security Developments Involving the Democratic People's Republic of Korea, 2015*, Department of Defense, February 2016, 16.

Figure II.32: Deployment of DPRK Air Forces in 2015

UNCLASSIFIED



Source: Office of the Secretary of Defense, *Military and Security Developments Involving the Democratic People's Republic of Korea*, 2015, 17.

Figure II.33: Deployment of DPRK Naval Forces in 2015

UNCLASSIFIED



Source: Office of the Secretary of Defense, *Military and Security Developments Involving the Democratic People's Republic of Korea*, 2015, 18.

Potential Invasion Scenarios and Capacities

There is surprisingly little data on the full scope of DPRK military exercises and plans, and particularly on how well the DPRK trains and plans to use its large Special Forces and other “asymmetric” force elements either independently or in concert with its more “conventional” armored, mechanized, and infantry forces. There is also surprisingly little unclassified transparency in the official white papers and command statements of the US, ROK or Japan on either the readiness and capability of DPRK forces in given scenarios or in net assessment terms relative to the ROK and US.

As noted earlier, both US Department of Defense and IISS analyses indicates that the actual capabilities of DPRK forces do not match its numbers.²⁸⁹ Approximately one-half of the DPRK’s major weapons were designed in the 1960s, with the other half even older. The issues of fuel, maintenance, and lack of spare parts would decrease equipment capabilities even further. Compared to Soviet-era systems (i.e., the type deployed by the DPRK), modern weapons are usually two- to four-times as effective.²⁹⁰

The DPRK still uses a Soviet-style military doctrine that discourages initiative and flexibility, focusing on high-level decision-making and scripted plans. It is therefore unlikely that mid-level officers are very capable. While the DPRK has tried to improve training in the past decade, the faltering economy and shortages have limited the actual implementation of these plans. The years of indoctrination and party control have likely resulted in highly loyal troops and officers, while the physical deprivation undergone by many in the DPRK has also likely led to the resilience and physical toughness of the military. Therefore, while it is doubtful that the DPRK military would collapse or revolt, years of maltreatment and malnutrition may have affected morale to some extent.²⁹¹

A 2013 IISS study, *The Conventional Military Balance on the Korean Peninsula*, assessed the potential DPRK threat to the ROK/USFK in an invasion scenario that illustrates many of the key issues involved. As has been raised several times earlier in the analysis, the IISS study found that the terrain of the Korean Peninsula – and the DMZ – makes any large invasion, especially of heavy armor, difficult to undertake. Manmade barriers (i.e., mines and bridge demolitions) as well as natural obstacles (i.e., marshes and rivers), when combined with air counterattacks, would be able to significantly reduce DPRK invasion force strength in a short time.²⁹²

Even if an attack occurred in winter, when the rice fields are frozen and thus can be used as roads, the IISS noted that several rivers would need to be crossed in order to reach Seoul, all in the face of US-ROK air, antitank, and artillery counterattacks.²⁹³ Anyone who has experience with Korean winters also understands how cold and challenging they can be in some areas and the problems they can present in supplying and sustaining maneuver forces.

For reasons that have been discussed earlier, the IISS study found that US and ROK tanks are better and more protected than DPRK tanks and should prevail in any altercation. They also have all-weather and day-night capabilities that provide further advantages. Ground radars and infrared detection systems, along with reconnaissance satellites and aircraft, can allow the US and ROK to detect any groupings of armored vehicles in order to counterattack more quickly and effectively.²⁹⁴

The IISS and many other analysts have also argued that any DPRK surprise attack on the ROK could succeed in capturing Seoul. In a potential conflict, the DPRK could initially heavily

bombard Seoul, using artillery in fortified positions near the DMZ. The artillery could open corridors while limiting ROK-US defensive reactions, and DPRK armored forces could push through to Seoul before any strong US-ROK counteraction could be mounted.

While the DPRK could inflict significant damage and casualties, the DPRK's capabilities would be reduced by US-ROK air strikes and counter-battery fire. Some analysts also assume the DPRK Air Force could also undertake substantial surprise attacks against civilian and military targets. If Seoul was lost, US military planners assessed that four to five carrier battle groups, 10 air force wings, and six ground combat divisions (including army and marine units) would be necessary to recapture the city.²⁹⁵

The IISS study notes that Naval and Special Forces could have an impact in a military provocation. Although the DPRK's obsolete submarines have limited capabilities, they could be effective in delivering Special Forces or mining the coast. Special Forces would have a limited ability to disrupt ROK-US defenses, though they could use chemical and biological weapons in cities and military areas to significant effect. Along with the DPRK's missile and torpedo vessels – which are also obsolete – the US and ROK would need to neutralize these assets before US ships could use ports for the delivery of reinforcements.²⁹⁶

Many US and ROK experts broadly echo the IISS's analysis of the limits to the DPRK's forces, and share its focus on the most challenging scenarios for a DPRK attack in the DMZ area and Seoul, and the risk of a deeper invasion.

The IISS analysis, does, however, present a ground-force oriented perspective. It describes real-world possibilities, but -- by focusing on ground forces --it may sharply underestimate the ROK's ability to detect and respond to any DPRK preparation for an attack to seize Seoul or invade deeply into the ROK, that modern ROK and US strike fighters might be far more effective against DPRK armor, and that the coercive power of US and ROK strikes deep into the DPRK, that attacked its already fragile critical infrastructure and economy, would equal or surpass DPRK capability to coerce the ROK.

Many current analyses conclude US-ROK air superiority would soon be established and airpower could be far more effective against armor than in the past, along with systems like the MLRS and "smart" anti-armor cluster munitions. The IISS study estimated that the US and ROK could be able to "destroy several hundred North Korean armored vehicles per day," and a fight for Seoul that involved modern precision weapons, ISR systems, and urban warfare tactics might make it hard for the DPRK to seize the city – as distinguished from making it a major battleground.²⁹⁷

A combination of US cruise missiles and stealth aircraft could also strike critical infrastructure and leadership targets deep in the DPRK. However, the DPRK's large chemical – and potentially biological – weapons stores, discussed further in Chapter 8, would be a significant threat with or without such strikes, and could be delivered through aerial bombs, short-range missiles, or artillery shells.²⁹⁸

US military plans are shifting away from a major deployment of US ground forces – both because of the limits to such a buildup in terms of time and the current size of US ground forces – towards support of the ROK with air- and sea-based strike assets. While the US could build up from one forward-deployed to two light to medium divisions relatively quickly, it can build up

sea- and land-based air and cruise missile power far more quickly, along with stealth bombers, F-22 fighters, and perhaps soon, a large inventory of F-35 stealth strike fighters.

Moreover, as the previous force structure comparisons have shown, the ROK Army is no longer dependent on US ground power. The ROK would face major problems if the DPRK achieved strategic surprise or if the ROK's leaders failed to react to the warning signals that the DPRK was actually acting upon its rhetoric by properly mobilizing and deploying ROK ground and air forces, but the ROK military today is a very different force from the largely hollow force that existed at the time of the Korean War.

Accordingly, there is a clear need for more open ROK and US official, realistic discussions of the "conventional" balance, a justification of military plans based on a net assessment of deterrent and war fighting capabilities, and a clear discussion of the changes taking place in US strategy and how they relate to ROK military plans and developments. At present, the DPRK is being treated by some based on what may be an exaggerated assessment of its capabilities and by others in terms of public silence.

Military Personnel

As has been raised at the start of this chapter, total manpower numbers have never been a key measure of military capability. Quality, equipment, leadership, C4I/BM/ISR, and sustainability have always been more critical in anything but the most static war of attrition. A heavily militarized DPRK dictatorship that does not have to pay either its people or its military forces anything like a market wage does, however, have a major advantage in terms of sheer numbers.

The IISS estimates that the DPRK is able to maintain a total active force of around 1,190,100 men, including 1,020,000 Army, 60,000 Navy, 110,000 Air Force, and some 189,000 additional paramilitary forces – plus some 600,000 reservists and a very large Special Forces command with a nominal strength of 88,000. Given the economic poverty of the country, it is unclear just how "special" many elements of such a force really are.²⁹⁹ DPRK active-service military personnel represent nearly 5% of the country's overall population, with roughly two-thirds deployed close to the DMZ.³⁰⁰ Most of the DPRK army is deployed on smaller bases throughout the DPRK, and all urban centers – including large agriculture and industrial developments – have garrisoned soldiers.³⁰¹

On paper, DPRK paramilitary and reserve forces comprise approximately 7.7 million personnel, or 30% of the 15-60 year old population. The force has been reorganized during the past 10 years and is comprised of four primary parts: the Worker-Peasant Red Guard (5.72 million people), the Red Youth Guard (0.94 million), the Reserve Military Training Unit (aka Instruction Guidance; 0.62 million), and other miscellaneous paramilitary forces like the Speed Battle Youth Shock Troops and the Guard Command (0.42 million).³⁰²

In contrast, the IISS estimates that the ROK has a total active force of around 34,500, including 495,000 Army, 70,000 Navy, 65,000 Air Force, and some 4,500 additional paramilitary forces. The ROK also has approximately 4,500,000 reserves that have a reserve training obligation of three days per year.³⁰³ The reserves are organized into the First Combat Forces (Mobilization Reserve Forces) or Regional Combat Forces (Homeland Defense Forces) and serve until age 33.³⁰⁴ Despite the prior military service of all reservists, it is unclear how many are really combat capable, though enough seem to have unit assignments to make major increases in ROK Army manning on relative short notice. The ROK also still has a nominal paramilitary force of some

3,000,000 but it is unclear whether this serves any real military purpose; the IISS indicates that it is “being reorganized.”³⁰⁵

Practically speaking, the DPRK’s active manpower base is far larger than its pool of equipment seems to justify, and much of the active force seems to be primarily an instrument of regime control over its population, rather than a competent fighting force. The cost-benefit of such large a force for so small a country, and one with some many economic problems, is questionable at best, even for a militarized state. The opportunity cost of the added manpower comes at the expense of equipment sufficiency, modernization, and overall battle readiness.

The army is reported to have placed more emphasis on regular and paramilitary reserve unit cooperation over the past five years.³⁰⁶ Once again, however, these forces seem far better suited to regime control of the population than real-world war fighting. They might add mass and popular resistance in the face of an ROK invasion – unlikely as this seems to be without the prior collapse of the DPRK regime – but the numbers are either so great as to represent a totally hollow force or one where many elements are likely to cost more in resources than its military benefits are worth.

Recruitment and Training

The DPRK conscription process begins at age 14, when young North Koreans register as enlistment candidates and have a basic physical exam, with a second physical at age 16. Draft notices are distributed through high schools, and the average conscript is a high school graduate aged 17-25. There are a variety of exemptions and disqualifications for scholastic, physical, or political reasons.³⁰⁷

Due to the slowly declining general health of the DPRK’s general population and the related decreasing physical stature and well-being of the average DPRK military recruit, the country has been forced to lower minimum entry requirements several times. Since the mid-2000s, the number of females in the KPA has also slowly increased, from an already significant percentage, indicating a shortage of able-bodied men.³⁰⁸

One ROK government report discusses the North Korean military service requirement, the longest in the world – it can last longer than 10 years for men and six years for women, during which a typical soldier sees his/her family only once or twice.³⁰⁹ Typically, Army service lasts 5-12 years, Air Force service 3-4 years, and Navy service 5-10 years. After military service, all are required to serve in the military part-time until the age of 40, after which they must serve until age 60 in the Worker/Peasant Red Guard.³¹⁰

Figure II.34 depicts the training for military officers, while **Figure II.35** shows the usual activities of the DPRK military throughout the year. An ROK governmental analysis indicates that,³¹¹

All men in North Korea are required to register for enlistment at the age of 14. Two rounds of physical examination are conducted when they reach the age of 15 during the final year of middle school, thus allowing them to join the service after graduation. The minimum requirement for check-up used to be 150cm in height and weight of 48kg, but as youths in North Korea began to grow smaller in size due to food shortages, this was adjusted to 148cm and 43kg since August 1994. Yet, even such criteria are relaxed due to the lack of eligible candidates and the decline in the proportion of female soldiers.

Excluded from military service are those who fail physical exams, who have families from the hostile class, and other delinquents who do not fit in the songbun system (families within the second parental cousin or first maternal cousin range of those who partook in anti-communist activities or defected to South Korea,

families of defectors from South Korea or political prisoners, ex-convicts, etc.). Meanwhile, exempt from military service are those who engage in particular lines of work or beneficiaries of political consideration (i.e. security officers, scientists, industrial engineers, artists, instructors, administrative officers, college students who pass military science exams, students of special or elite schools, only sons of aged parents, etc.).

North Korea presented the terms of military service in 1958 issued as Cabinet Decision No. 148 and mandated army service for three and a half years, navy service for four years. In actuality, however, this was often extended to a period of five to eight years, and in April 1993, North Korea adjusted mandatory service to ten years upon Kim Jong-il's instructions. The 6th session of the 10th Supreme People's Assembly also passed a military service law in March 2003, which specifies ten years of obligatory service for all male candidates, whereas the terms were curtailed for female volunteers to seven years. Yet, this does not include Special Forces (e.g. light infantry units, sniper units, etc.), who are required to serve for more than thirteen years, since indefinite period of service is requisite for soldiers under special instructions or with special skills.

Meanwhile, the percentage of female soldiers in units varies from ten to thirty percent. They are often assigned to transport and administration, or become medics, signalers and sentries (at bridges or tunnels). Coastal artilleries, anti-aircraft guns, and small air defense batteries are also often managed by women soldiers.

Regardless of rank, those who break military discipline face various disadvantages at the workplace after discharge. During their time in the barracks, all soldiers must follow a ten-point guideline, which Kim Jong-il himself took part and gave orders to devise.

In North Korea, the General Political Bureau promotes various competitive campaigns to enhance internal control and unity in the military. The most representative campaigns include winning the following titles: the Three Revolution Red Flag (at company level), the O Jung-hup 7th Regiment (at regiment level), and the Gold Star Elite Guard (at division and brigade level). Those who perform well are awarded WPK membership, field trips, prizes, vacations, and preferential treatment in resource supplies.

...[O]ne-third to half of military service in North Korea on average is dedicated to non-military activities such as public construction and farming.... Military authorities... have allowed a considerable number of army units to engage in foreign trade, commercial activities, labor mobilization, and various other profit-making projects. This being the case, soldiers prefer posts that enable extra income, such as border guards under the Guard Command. Shortages in supply and daily necessities within the military are generating aberrations and other offenses that damage civil-military relations.

Military ranks in North Korea are called 'military titles' and there are fifteen different levels for officers and six for those enlisted. The officers are grouped into four categories: ① marshal grade (Grand Marshal, Marshal, Vice Marshal); ② general grade (General, Colonel General, Lieutenant General, and Major General) ③ field grade (Brigadier, Colonel, Lieutenant Colonel, and Major) ④ company grade (Captain, Senior Lieutenant, Lieutenant, and Junior Lieutenant).

The enlisted ranks are categorized in two different categories: ① non-commissioned officers (Warrant Officer, Sergeant First Class, Staff Sergeant, and Sergeant) and those who choose to remain in service after their mandatory period (Sergeant First Class, Staff Sergeant, and Sergeant-in-Initial Service). ② enlisted personnel (Corporal and Private), which are divided into four sub-categories (Lane Sergeant, Corporal, Lance Corporal, and Private) in order to boost morale and enforce discipline between ranks..... At present, around 20 percent of ordinary soldiers are estimated to be WPK members, while about 40 percent in Special Forces are considered to have party status.

...North Korea's ground forces consist of fifteen army corps or equivalent units, including nine front and rear corps, two mechanized corps, the Pyongyang Defense Command, Border Guard Command, Missile Guidance Bureau, and 11th Corps (formerly known as the Light Infantry Training and Guidance Bureau).

While all recruits go through a special ideological indoctrination program, actual physical training is very limited. For example, according to the IISS, DPRK pilots average 20 hours of flying time per year, whereas US pilots receive between 189 (for fighter pilots) and 343 (for

airlift pilots). DPRK special operations troops receive more physical training than the average military recruit, with harsher discipline and more intensive political and ideological indoctrination. Despite their lack of many resources, the results of the system are³¹²

...tough, intensively trained fighters who can travel farther and faster with more equipment and less food than most of their counterparts in other armies. They are mentally and physically hardened and disciplined, ready to obey orders and to suffer privations that would cause mutinies in other armies. They are, however, woefully undertrained for a modern war based upon rapidly changing tactical and operational situations, high mobility and advanced technology.

In the early 1990s, the KPA shifted from large-scale field exercises to increased command post exercises, political training, and ideological indoctrination in an attempt to conserve resources due to a country-wide, multi-year famine. This led to a decline in combat capabilities. While in the late 1990s the army increased field exercises, again from 2000-2006, soldiers spent the majority of their time engaged in agricultural work and KPA enterprises that can earn foreign currency, instead of engaging in military training. There are often significant shortages of fuel, military supplies, warm clothes, and food for KPA troops.³¹³ Since 2006, training has increased, including large combined arms field training exercises, but this has resulted in an uneven level of operational readiness in the DPRK military. *Jane's* assesses the DPRK Army as,³¹⁴

...capable of defending the territory of the DPRK, conducting special operations against the ROK and Japan, and maintaining internal security. It currently maintains the capability to initiate an extremely destructive war of reunification against the ROK with little warning; however, it has a reduced capability to prosecute such a war for an extended period of time.

Figure II.34: DPRK Training Program for Military Officers

Rank	Training Program	Remarks
Draftees	Transferred to the military mobilization agency (first to Special Forces unit, then in the order of the Navy, Air Force, and Army)	Special Forces units and special branch of service first
Recruits	Recruit training center at each unit (3 months for general troops and 9 months for Special Forces)	Due to economic difficulties, the period of training for new recruits is curtailed
Privates	Private → Lance Corporal → Corporal → Lance Sergeant	Takes 5-7 years
Non-commissioned Officers	Non-commissioned Officers Academy (3 months) → Sergeant → Staff Sergeant → Sergeant First Class → Warrant Officer (Chief Sergeant) * After serving 3-5 years, light infantrymen and snipers can be promoted to the rank of sergeant within 5 years when recommended on their merits	In general, men are discharged from the army as Staff Sergeant after 10 years of military service
Second Lieutenants	2 years at the Military Officers Academy (Commanders Class: Top graduates in the class are commissioned as the Lieutenants) 4 years college class for Lieutenants	The ratio between political and military education in the Military Officers Academy is 5:5, while it is 3:6 in the Military College
Lieutenants	Promoted after 2-3 years	
Company Commanders	Promoted to Commander after 4-6 years	
Battalion Commanders	Graduated from Kim Il-sung National War College (3 years) after 3-7 years	
Regiment Commanders	Completed the tactics study class at Kim Il-sung National War College	Generals are promoted at the supreme leader's order

Source: Ministry for Unification and Institute for Unification Education, *Understanding North Korea*, ROK Government, 2012, 114.

Figure II.35: DPRK Military Exercises and Activities

Months	Type of Training and Activities
January-February	Preparation for field tactical training, field maneuvers exercise by each branch, engineer reconnaissance, deployment exercises
March	General shooting exercises with live ammunition at each battalion and division
May	Repairing of barracks and roads, planting seedlings in the fields for side dishes (food)
Mid-June	Summer exercise begins Collective Training: political education, lining drill, physical training Field training: by each branch, in semi-underground tunnel lodging
Mid-July	River-crossing during the rainy season, combat swimming, march, offense and defense exercise, shooting exercises with live ammunition
October	Preparation for the winter: harvest, storage of vegetables, collection of firewood, barracks repair
November	Preparation for winter exercises: checking of combat gear
December	In the morning: focused on indoor exercises including shooting practice In the afternoon: long march with full combat gear, physical training, lining drill, field shooting exercise

Source: Ministry for Unification and Institute for Unification Education, *Understanding North Korea*, ROK Government, 2012, 116.

Weapons Systems and Equipment Deficiencies and Capabilities

The most significant deficiencies in the DPRK's weapons systems and equipment are "computers, information management; electronic warfare assets; modern Command, Control, and Communications (C3), fire direction and target acquisition assets; armored fighting vehicles; anti-tank guided weapons (ATGWs); and support vehicles."³¹⁵

Conversely, the North has continued to improve its ability to stage simultaneous strikes on the ROK's front and rear flanks, initiate preemptive surprise attacks, and make swift attacks deep into the ROK. According to an ROK government analysis, the DPRK aims to build the capability to:³¹⁶

[S]tage a quick and decisive war by proceeding to create panic in enemy camps, take the initiative in the war from the start, while at the same time deploying its mechanized corps equipped with tanks, armored vehicles and self-propelled artilleries deep into South Korea's rear in order to overtake the entire peninsula before U.S. reinforcements arrive.

The North's strategy of preemptive surprise attacks based on its four-point military guideline involves a wide range of warfare, from large-scale preemptive attacks by regular armed forces to detour surprise attacks by irregular troops such as special operation forces.... At present, the North Korean military has positioned some 70 percent of its ground forces in the forward area south of the Pyongyang-Wonsan line, and the considerable number of these forces in underground tunnels poses a significant threat to South Korea.

The North has deployed and fortified a large number of long-range artilleries that could pose direct threats to South Korea's capital and other metropolitan areas near the front line; including 170mm self-propelled guns with a range of over 50km and 240mm multiple rocket launchers with a range of over 60km. It has also dispersed a few dozen air bases across the Northern part of the Korean peninsula.

...This kind of military strategy can be theoretically applied on the Korean peninsula, but in reality, there are numerous limitations. North Korea may have the military capacity to make provocations or to trigger conflicts, but attaining its ultimate objective would be a difficult task, given that North Korean forces lack

the capability to sustain warfare. Political indoctrination and topography are not the only factors that decide the outcome of war; other elements come into play, including the overall environment of battlefields, educational level of troops, quality of arms, uncertainties, unpredictable conflicts, contingencies, and so forth.

Key Assets

The DPRK is estimated to have strategic war reserves of two to three months of food, ammunition, and petroleum, oil, and lubricants; most of these supplies are stored in specially built and guarded underground facilities. Also, the DPRK maintains a munitions industry of about 300 factories, along with many civilian factories that can quickly be used as munitions factories in the event of a war. The better-prepared, elite troops of the paramilitary and reserve forces include the special operations forces, ballistic missile units, Security Command, and the Guard command.³¹⁷

Approximately 70% of active duty KPA ground forces are reported to be stationed along the DMZ, and there were reports in 2011 and 2012 that the DPRK military was reinforcing coastal defense artillery units along the Northern Limit Line (NLL). It has been estimated that if the DPRK decided to initiate hostilities, the US and ROK would have a maximum of 24-36 hours warning, or as little as 12.³¹⁸

Key DPRK military capabilities include 240mm multiple launch rockets and 170mm self-propelled guns that can target Seoul. 60 midget submarines and 130 air-cushioned landing crafts are believed to be available for infiltration or transportation of special operations forces. Among its aging fleet of combat aircraft are fourth-generation MIG-29 fighters and SU-25 attack aircraft. A large number of outdated An-2s are also believed to be used to transport SOF personnel.³¹⁹

Also, the DPRK maintains an extensive system of fortified bunkers and hardened artillery sites (HARTS), which include gun emplacements, personnel shelters, ammunition, a center for directing fire, self-defense trenches, cover locations, communication, and in the event of war, mixed minefields and protective wire. These HARTS are a very important aspect of DPRK defense; forward HART sites are located near enough to the DMZ so that 2/3 of the DPRK's artillery can reach the ROK.³²⁰

North Korea also has an integrated coastal defense system and “maintains two coastal defense missile regiments, a large number of coastal surveillance radar companies, and co-ordinates coastal defense operations with the KPA's numerous coastal defense artillery units, standard artillery units, and the Coastal Security Bureau.” There are 1,000 artillery pieces stationed on the DPRK's western coast alone. The DPRK also has an extensive system of underground facilities and tunnels, which will be discussed further in the chapter on asymmetric forces.³²¹

Quality vs. Quantity

However, the quality of the DPRK's equipment should be kept in mind. In particular, much of the DPRK's weapons are vastly inferior in technology and capabilities than the ROK's or the US's. For instance, the MiG-21 is the most common fighter jet in the DPRK; however, it was already becoming outdated in the 1960s and is no match for the F-15K's used by the ROK.³²²

Furthermore, while the DPRK has more main battle tanks, this is more than compensated for by the much more modern tanks of the US and ROK, as well as the fact that many of the DPRK's tanks would be taken out by US-ROK air power before the tanks even made it to the DMZ to engage in tank battles (similar to in Iraq).³²³ Furthermore, resources constraints can also have a

significant effect on military readiness; according to one Japanese analyst, “the North does not have the capability to wage war at the moment as they only have around 400,000 tons of oil for their military, meaning they can’t fight.”³²⁴

The DPRK’s most recent aircraft procurement was in 1999, when it bought MiGs from Kazakhstan, and it uses 1940s single engine bi-planes to transport its Special Forces. Most of the DPRK’s conventional weapons have not been upgraded or updated since the 1970s.³²⁵

ROK

One needs to be careful about “snapshots” of military capability. The ROK’s current capabilities will be sharply affected by the changes in US and Chinese forces already underway, by Japanese willingness to support the US in defending the ROK, and by whether China chooses to intervene in any conflict in the Koreas. At present, however, the combination of ROK and US capabilities both offers a strong deterrent to the DPRK and the ability to contain and defeat the North.

The command structure of each ROK service is summarized in **Figure II.36**. The Army is organized into the Army Headquarters (HQ), two Field Army HQs, one Operations Command, the Capital Defense Command, the Special Warfare Command, the Army Aviation Operations Command, the Army Missile Command, and other support units.

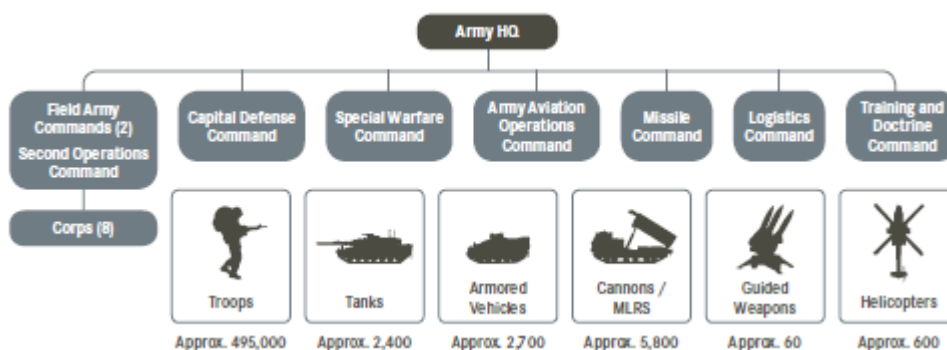
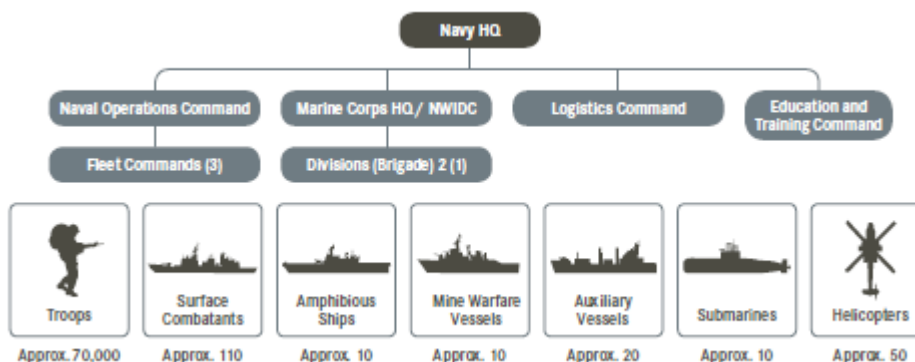
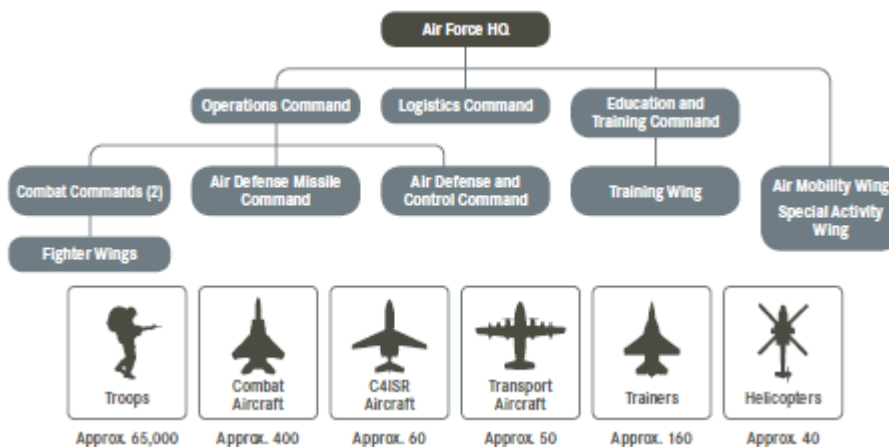
The Defense Mission of the First and Third Field Armies covers the area ranging from the Military Demarcation Line (MDL) to the frontline area of responsibility (AOR). The Second Operations Command maintains stability in the rear areas. The Capital Defense Command is responsible for protecting the capital, which includes maintaining the functions of Seoul and protecting major facilities in the area. The other units’ missions are to carry out special warfare, aviation operations, logistical support, training and education, etc.

The ROK Army will replace the First and Third Field Armies with the Ground Operations Command in 2018.³²⁶ In 2005, two out of ten corps were disbanded. Currently, there are eight corps, including seven regional corps and one mobile corps.

The Navy is organized into the Navy HQ, the Naval Operations Command, the Marine Corps HQ, and other support units. The ROK Navy will shift toward a mobile force structure by reducing the number of surface ships and dispatching its middle- and heavy-class ships to counter various threats, including the threat of the North. The capacity for submarine and air warfare will also be reinforced. The Marine Corps will be reorganized into an air-to-land mobile force structure that is applicable to a range of mission types.

A *Jane’s* study highlights the fact that these forces have several advantages over the DPRK, along with several limitations:³²⁷

... in terms of modern weapons, widespread mechanization and net-centric C3I, thereby permitting non-linear maneuver warfare as an alternative to the historical, bloody war of attrition in the mountains along the demilitarized zone (DMZ). However, modern maneuver and net-centric warfare requires highly trained, capable and motivated soldiers, which the ROKA is unlikely to adequately achieve with traditional conscription. The alternative - drastically reducing numbers of conscripts and building a leaner, more professional and more lethal ROKA would be culturally painful for the army and society at large and no decision to take that route is likely anytime soon. Meanwhile, two paramount issues loom over the immediate future of the country and the armed forces that require greater clarity - the state of the economy and the course of unfolding events in the DPRK.

Figure II.36: Command Structure of ROK Forces**ROK Army Organization****ROK Navy Organization****ROK Air Force Organization**

Source: Republic of Korea, Ministry of National Defense, *Defense White Paper 2014*, 53-55.

Responsibilities and Doctrine

The ROK Army has the primary responsibility for defending the ROK, and the deployment of the ROK armed forces is almost entirely directed to defending against a DPRK invasion. Combat readiness and capability to respond quickly in a crisis are emphasized as deterrents to both large-scale DPRK attacks and smaller-scale military incursions. If this fails, the ROK military's primary goals are to defend the Seoul metropolitan area, destroy the main forces of the DPRK, and weaken the DPRK's will to continue combat operations.³²⁸

In terms of operational art and tactical doctrines, *Jane's* observes that,³²⁹

ROKA doctrine traditionally reflects that of the US Army, though with an increasing Korean spin as military thinking adapts to new capabilities emerging from the acquisition of modern weapons, new C³I systems and greater mobility under armor. Until recently, the ROKA's concept of defeating a North Korean invasion across the DMZ had changed very little from the closing days of the Korean War in 1953 - hundreds of thousands of massed infantry on a peninsula-wide front fighting a war of attrition from prepared positions, generally occupying the tops of steep mountain chains and ridgelines, supported by lavish amounts of direct and indirect firepower, including recoilless rifles, mortars, artillery and prodigious quantities of tactical air support, much of it American.

The ROKA is now striving to develop and implement modern doctrine that will certainly reflect American developments and combat experience, such as the 2003 invasion of Iraq, incorporating mobile, net-centric, combined arms task forces and precision long range fires linked to co-operative tactical targeting. The ROKA must also be studying the post-invasion experience in Iraq, with a view to addressing the complex tasks associated with a North Korean collapse, particularly the civil-military challenges of occupation while combating a capable, well-armed insurgency.

Although the ROK Army has an active reserve force of 600,000, the ROK can control a multi-million-strong reserve force component if fully mobilized, which is the equivalent of another Army HQ and 23 infantry divisions. In 2010, the total reserve pool of the ROK military was almost seven million strong, though it is not clear in English-language sources how this is broken down into the various services. During peacetime, reserves receive yearly training; during wartime, these reserves are able to create supplementary units to reinforce existing units and serve as individual replacements for those lost in combat.³³⁰

Indigenous Equipment Development

The ROK has developed and produced many types of military equipment. In 2010, the country ranked 11th in the world in defense science technology. In 2007, the ROK finished its first domestically built Aegis-class destroyer, making it the fifth country to use an Aegis destroyer. The country also indigenously developed the T-50, an Advanced Jet Trainer, making it the 12th country in the world to build its own supersonic training aircraft.³³¹

As of 2010, the ROK also domestically developed and/or produced the Korean Military Satellite Communications System (K-MILSATCOM), The Blue Shark lightweight torpedo, K9 Thunder self-propelled howitzer, K2 Main Battle Tank, the KT-1 Basic Trainer, the Chiron man-portable SAM, the K21 infantry fighting armed vehicle/tank, the HaeSeong anti-ship missile, the K11 dual-barrel air-burst weapon, and the Red Shark anti-submarine missile. A stealth fighter plane, the KF-X, is also under development. The ROK also exports many of these systems abroad.³³²

Uncertain Patterns of Conflict and Escalation

As **Figure II.37** has shown, relations between the two Koreas have not grown more stable over time. Recent developments have not made improvements. The DPRK engaged in two major

military provocations in 2010 – the sinking of the ROK *Cheonan* and the shelling of a South Korean island that is located near the Northern Limit Line (NLL). A quick overview of the two events is given in **Figure II.37**.

Cheonan

On March 26, 2010, an ROK Navy corvette named the *Cheonan* sank after being torn in half by an underwater explosion. Of the 104 sailors on board, 46 were killed in the attack. Some analysts believe the attack was an effort to bolster Kim Jong-il's leadership strength in confronting the South, as well as his authority to select Kim Jong-un as his successor.³³³ An independent assessment was performed by an international team of experts³³⁴ that examined the pieces of the ship's hull and the weapon brought back from the wreckage site. Taking into account the physical evidence, personnel statements, medical examinations of the deceased sailors, analysis of seismic and infrasound waves, simulations of underwater explosions, and ocean current analysis, the report concluded,³³⁵

Based on all such relevant facts and classified analysis, we have reached the clear conclusion that ROKS "Cheonan" was sunk as the result of an external underwater explosion caused by a torpedo made in North Korea. The evidence points overwhelmingly to the conclusion that the torpedo was fired by a North Korean submarine. There is no other plausible explanation.

China and the DPRK continue to deny DPRK involvement. One reason given by China is that they were not invited to participate in the expert assessment, though the ROK argued that this was due to the sensitivity of the military system pieces under examination. China referred rhetorically to the incident as a "tragedy" – not an attack – and waited five weeks to give official condolences. Kim Jong-il was also welcomed to China with pomp and circumstance in May 2010, just days after ROK President Lee Myung-bak had been in China lobbying Hu Jintao to take a stronger stance towards the DPRK. These Chinese actions and reactions deeply offended the South Korean public.

After the sinking of the *Cheonan*, the US increased unilateral economic pressure on the DPRK. Individuals and entities linked to DPRK illicit activities and proliferation were added to the US government's black list, and Japan further restricted the remittances allowed to the DPRK. The ROK cut off almost all bilateral assistance and trade, while also closing sea lanes to DPRK ships.

³³⁶

Yeonpyeong

On November 23, 2010, a DPRK artillery battalion attacked a small ROK island located near the NLL shown in **Figure II.38**. According to *Jane's*, an unprovoked surprise "time-on-target" artillery attack on Yeonpyeong began at 14:34, coming from the DPRK peninsula of Kangnyong, where a KPA 122 mm MRL battalion is located. The barrage lasted for 12 minutes, consisting of approximately 150 rounds. Of these, approximately 90 fell into the water around the ROK island, while about 60 landed on ROK marine positions – including three helipads – and two small villages on the island.

At 14:47 the ROK Marines' 155 mm K-9 battery initiated counter-battery fire, continuing for approximately 8 minutes. However, of the six K-9s, only four were combat ready, while the AN/TPQ-37 Fire Finder counter-battery radar experienced operational issues – meaning that the remaining K-9s had to fire based on a pre-planned design that called for counter-battery fire against barracks and command posts on the DPRK island of Mu. The AN/TP1-37 radar was

repaired after about 50 rounds had been fired, and it identified the 122 mm MRL battery south of Kuan-gol as being responsible for the initial volleys. About 30 rounds were then directed against this position. After a 15-minute pause, a second DPRK barrage started, lasting from approximately 15:10-15:41, and consisting of approximately 20 additional rounds.³³⁷

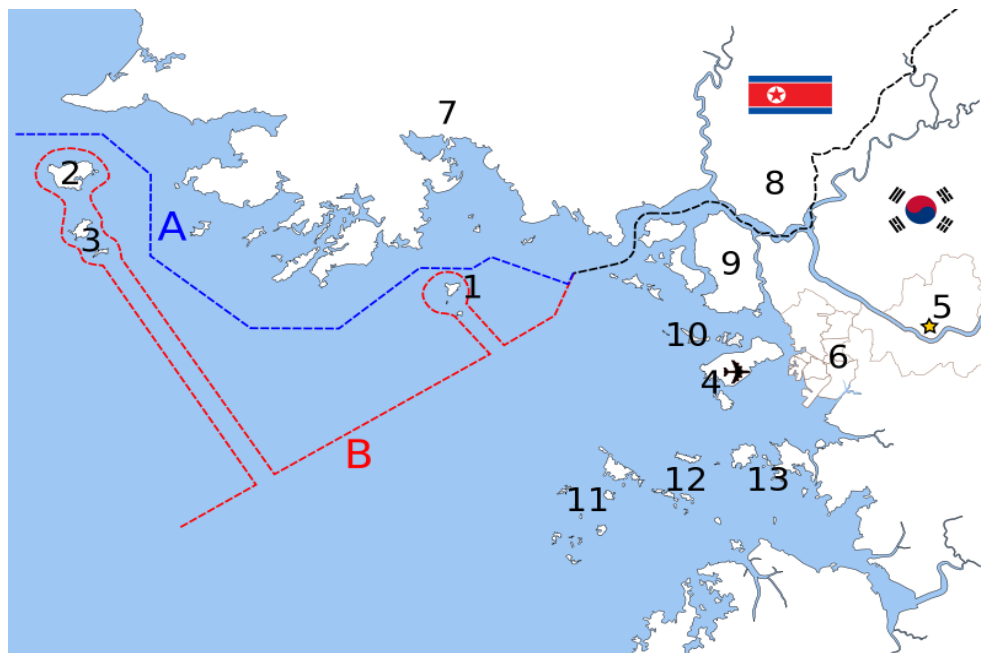
Overall, two Marines and two civilians were killed in the attack, with 15 Marines and three civilians wounded. Damage to the DPRK remains unknown, but a spokesman for the ROK Joint Chiefs of Staff reported that satellite images “show our shells landed on a cluster of barracks in North Korea, so we presume there have been many casualties and considerable property damage.”³³⁸

Figure II.37: The Cheonan Sinking and Shelling of Yeonpyeong Island (2010)

	Sinking of the <i>Cheonan</i>	Shelling of Yeonpyeong Island
Type of Attack	Torpedo attack from a mini submarine	170 shots by multiple rocket launchers and coastal artillery guys
Development of Situation	<p>March 31, 2010 – A civilian-military Joint Investigation Group (JIG) was established with 59 active service members, 17 government officials, and 6 civilians</p> <p>April 12 – The JIG was reorganized to include 49 Korean and 24 foreign experts</p> <p>May 20 – The JIG made an official announcement that the <i>Cheonan</i> had been sunk by a DPRK torpedo attack, which generated a shockwave and bubble effect that split and sunk the <i>Cheonan</i></p>	<p>14:47-15:15 – ROK Marine Yeonpyeong unit responded to the attack by firing 50 rounds of K-9 self-propelled artillery</p> <p>15:12-15:29 – The DPRK launched the second attack with 20 rounds of MRLs and coastal artillery</p> <p>15:25-15:41 – The ROK Marine unit responded to the second attack with 30 rounds of K-9 artillery</p>
Damages Caused	48 of 104 crew members killed	<p>2 ROK Marines were killed and 18 were wounded</p> <p>2 ROK civilians were killed and many were wounded</p> <p>A total of 133 buildings and power communications were damaged (33 completely destroyed, 9 half-destroyed, 91 partially destroyed); wildfires broke out at 10 different sites</p>
DPRK's Position	The DPRK denied its involvement and insisted the whole incident had been fabricated by the ROK	The DPRK insisted that it was acting in legitimate self-defense against an ROK provocation
Measures Taken Against the DPRK	<p>The ROK government announced the May 24 measures, which completely suspended trade and exchange between the two Koreas, and prohibited navigation of DPRK vessels in ROK waters</p> <p>On June 17, 2010, the European Parliament adopted a resolution condemning the DPRK</p> <p>The G8 Summit Meeting also adopted a joint statement condemning the DPRK</p> <p>On July 9, the UN Security Council condemned the sinking of the <i>Cheonan</i> in a presidential statement</p>	<p>The ROK government strongly demanded that the DPRK take responsible measures. The ROK National Assembly defined it as an act of armed provocation and strongly condemned it</p> <p>The US, UK, Japan, German, and other countries around the world were outraged by the DPRK's provocation and condemned it</p>

Source: Ministry for Unification and Institute for Unification Education, *Understanding North Korea*, ROK Government, 2012, 159.

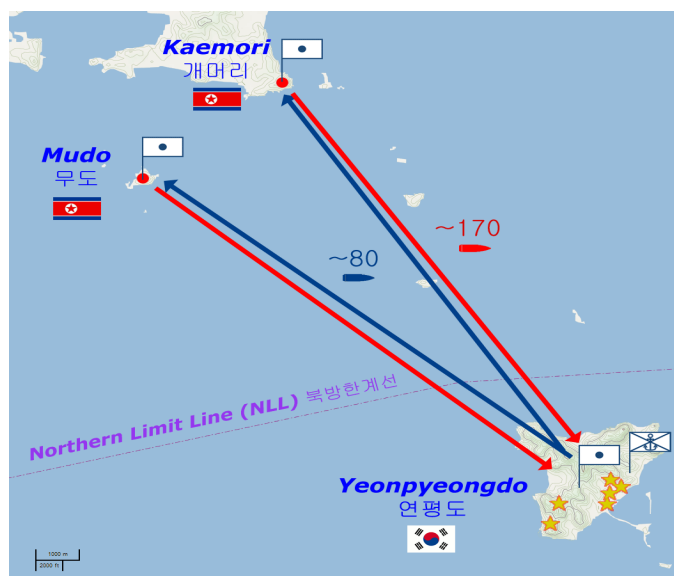
Figure II.38: The Northern Limit Line and Yeonpyeong Island
The Disputed Maritime Border between the ROK and DPRK in the West Sea



Note: The blue “A” line is the UN-created Northern Limit Line (1953); the red “B” line is the DPRK-declared “Inter-Korean MDL” (1999). Island “1” is Yeonpyeong.

Source: Wikipedia, “Map of Korean maritime border,” creative commons file, attributed to Amble, 玖巧仔 and Tomchen1989, November 25, 2010. http://en.wikipedia.org/wiki/File:Map_of_Korean_maritime_border.svg.

Map and Graphic Representation of the Bombardment of Yeonpyeong Island



Source: Wikipedia, “Yeonpyeong shelling,” creative commons file, November 24, 2010. http://en.wikipedia.org/wiki/File:Yeonpyeong_shelling.png.

Conventional Provocations: 2010-2016

The North Korean leadership has carried out other escalatory actions since 2010 in addition to the developments in its missile and nuclear programs (discussed in-depth in later chapters). There were several destabilizing developments in early 2013, when the DPRK announced that the 1953 Korean War armistice was null and void, that it would remove the DPRK-USFK hotline, and that a “second Korean War is unavoidable.”³³⁹ On April 8, North Korea withdrew workers from the joint Kaesong Industrial Complex.³⁴⁰ In October 2014, the two sides exchanged when a contingent of DPRK soldiers approached the border despite the warnings of South Korean guards; there were no reported casualties.³⁴¹

These types of low-level escalations continued into 2015. In August, two ROK soldiers were injured in the DMZ by mines. The South Korean government responded by resuming its loudspeaker broadcasts at the border and placing its forces on heightened alert; the North started broadcasting its own propaganda. On the 20th, the DPRK shelled the other side of the DMZ, which in turn provoked a response from ROK artillery. North Korean leaders released an ultimatum insisting that the South cease its loudspeaker broadcasts; following a two day conference, the two sides reached an agreement in which the DPRK expressed regret for the earlier landmine incident and the ROK halted its broadcasts.³⁴² In August, DPRK forces fired a shell into the South Korean city of Yeoncheon. While no one was injured, South Korean artillery returned fire and the exchange prompted local evacuations of ROK civilians.³⁴³

Political Fallout

These low-level DPRK attacks followed an all too familiar pattern of DPRK behavior, but did not intimidate the people of South Korea, or gain the support of China and Russia. In the weeks following the Yeonpyeong attack, which came just eight months after the *Cheonan* attack, there were civil defense drills throughout Seoul. Public outcry over the lackluster and uncoordinated South Korean response led to the ROK military’s new strategy of (pro)active deterrence, which has been discussed previously in this report.

A public opinion survey conducted on November 27, 2010 – directly after the Yeonpyeong artillery attack – assessed the ROK public’s feelings about the attack, their government, the DPRK, and China:³⁴⁴

- 66% were dissatisfied with the government’s response
- 80% thought that there should have been a stronger military response
- 41%, in the case of further DPRK provocations, favored a military response while avoiding escalation to war
- 65% said that there should be no escalation to war under any circumstances, while 33% said they were willing to risk a war in order to deliver a strong military response
- 58% thought that that aid to the DPRK and cooperation-promoting projects should be suspended until the DPRK apologized and provided compensation
- 43% thought that the Kim Dae-jung and Roh Moo-hyun Administrations were responsible for the DPRK’S nuclear weapons development; 35% said that the Lee Administration’s hard line policy was responsible for the DPRK’s nuclear development.
- 76% thought that the November 2010 ROK-US joint naval exercise should take place

- 92% were dissatisfied with the Chinese Response to the DPRK's attack; 58% thought it was necessary to send a strong protest message to China, even if it jeopardized damaging ROK-Chinese economic ties

The ROK Defense Minister quit two days after the incident in the face of widespread public criticism of the way he handled the attack.³⁴⁵ Furthermore, the ROK's countermeasures included "an increase in military expenditure and deployments, exercises and surveillance; the creation of a new command to defend the ROK's north-western islands; and the expansion of military cooperation with the US. Seoul also explored ways to cooperate militarily with Japan."³⁴⁶

As for the US, it provided the ROK with immediate support after the sinking of the *Cheonan*, and did the same after Yeonpyeong. The US also held joint exercises with the ROK in May, July, and late November 2010 to show its support for the ROK in spite of pressure from China.

Chinese and Russian reactions were mixed. Initial Chinese news reports did not place blame, featuring DPRK claims that the ROK had fired first or that ROK exercises had provoked the DPRK – and thus, the ROK was to blame for the incident. Overall, China refused to censure the DPRK for either the *Cheonan* or Yeonpyeong provocations, instead calling for restraint and a return to the Six Party process while watering down the UN Security Council statement in the wake of the *Cheonan* sinking and blocking Security Council action after the Yeonpyeong Island attack.³⁴⁷

Despite this lack of public criticism, the two visits of DPRK leader Kim Jong-il to China in 2010 were strained due to the DPRK's lack of economic reform and nuclear development. The Chinese leadership and press did not use the customary terms of friendship, instead using terminology that suggested a decrease in alliance ties and dissatisfaction.³⁴⁸

Furthermore, while initially criticizing US military deployment and exercises in the region, the increase in inter-Korean tensions after the shelling altered Chinese official opinion and led to a reduction in Chinese criticism of the US. During President Hu Jintao's January 2011 visit to the US, the two countries agreed to a joint statement emphasizing concern regarding the DPRK's uranium enrichment program and the importance of DPRK-ROK dialogue.³⁴⁹

Although Russia was initially slow to respond publically, it ultimately censured the DPRK for the shelling and ongoing nuclear development. Russia also called for an emergency UN Security Council meeting in December 2010, and was not unopposed to a statement condemning the DPRK (though Chinese opposition resulted in a shelving of the statement). Russia also noted "deep concern" after news of the DPRK's uranium enrichment capacity was released.³⁵⁰

Additional Issues and Scenarios

North Korea has apparently developed a more hawkish stance with regards to the South in other areas. According to the ROK 2010 Defense White Paper,³⁵¹

Since early 2008, North Korea has taken extreme measures: the North unilaterally deported the South Koreans in charge of the Office of Inter-Korean Economic Cooperation in the Kaesong Industrial Complex (March 27, 2008), cut off the Panmunjom hot line (November 12, 2008), and blocked crossing of the Military Demarcation Line (MDL) (December 1, 2008). . . . It made various threats and declared a posture of all-out confrontation (January 17, 2009). It also announced the cancellation of the military and political agreements (January 30, 2009) while stating that it would 'turn Seoul into a sea of fire' (June 12, 2010). . . . North Korea has taken provocative actions and hardline measures, including a navy clash near Daechong Island, the so-called Daechong Naval Campaign (November

10, 2009), establishing a 'no-sail zone' in the NLL in the west Sea and firing at coastal (January 2010), and freezing South Korean assets in Mt. Kumgang (April 2010).

While none of these events led to any meaningful form of conflict, they did raise tensions and illustrate the continuing risk that a provocation could suddenly escalate. The fact both the DPRK and ROK are always on an ear wartime footing is also a warning that any major incident could escalate into a struggle for control of the Korean Peninsula, but it is far from clear that this would be the case.

Pyongyang might conduct a major conventional build-up to pressure the ROK, Japan, and/or the US. It might do so to deal with internal unrest by trying to focus the nation on a foreign enemy. It might launch a limited war for the same reasons. Both the DPRK and the ROK, however, would be under at least initial pressure to keep any conflict limited, find ways to end it, and return to the status before the conflict began.

It is also possible that Pyongyang might risk an all-out attack, and some experts have postulated that it might do so if the regime either came under severe internal threat in an effort to unify the DPRK's citizens around a foreign threat or if Pyongyang felt it was isolated politically – and that the US and/or ROK might attack.

It seems more likely, however, that if the DPRK does launch some form of attack, it would use conventional forces to conduct a limited war for limited objectives. It might try to seize islands or part of the DMZ, or to demonstrate its capability to threaten and intimidate the ROK through a limited attack or by launching a major artillery attack across the border on Seoul or another critical ROK strategic objective. The DPRK might increase the readiness of its conventional forces and/or deploy more conventional forces forward in a battle of intimidation and not escalate beyond a minor border incident, raid, or use of asymmetric forces in a limited attack somewhere in the ROK or local waters.

It is doubtful that the ROK would initiate a new Korean conventional conflict, but Seoul cannot be sure what level of escalation would follow any response to a limited incident or attacks of the kind the DPRK made on the *Cheonan* and on Yeonpyeong. The ROK might also be confronted with a DPRK succession crisis or massive suppression of the population of the DPRK, creating a strong incentive for some form of decisive ROK military action.

Outside powers would initially play a major role in deterring both sides from an escalation of conventional conflict. The DPRK would have to consider the risk of dragging the US and Japan into a conventional conflict, and how uncertain the Chinese reaction would be to any clear act of DPRK aggression. At the same time, the DPRK's ideological hostility to the ROK and the US could lead Pyongyang to escalate in ways that are unpredictable and make a "rational bargainer" approach to scenario planning and predicting escalation highly uncertain.

Both the DPRK and ROK must consider the risks inherent in dragging an outside power into a conflict. Any major DPRK success on the ground or escalation of a war would almost certainly lead the US to escalate its forces and to expand its range of targets in the DPRK. It is possible that Pyongyang might ignore this risk or miscalculate, but that seems unlikely. Similarly, any ROK success that threatened the existence of the DPRK would confront China with the risk of losing a key buffer state.

China might or might not choose to intervene at any stage in such a conflict – either to limit or deter any action against the DPRK or to ensure that ROK and US forces did not "occupy" part of

the DPRK. It is at least possible that this escalation could extend to conventional fighting affecting Chinese bases as well as US bases and carrier task forces, including those as far away as Guam and the “outer island chain” that the US might use to base long-range bombers and stealth aircraft. Moreover, China might put pressure on Taiwan as a means of indirectly pressuring the US.

Either side might use strategic air and missile power as well as attacks on population centers and critical infrastructure to support tactical operations. In fact, it seems likely that such escalation would occur the moment either side perceived it was threatened with major losses or some form of defeat. The US demonstrated during the first and second Gulf Wars (1991 and 2003), as well as in its operations in the Republic of Serbia, that strategic air and missile power can play a critical role in limiting an opponent’s tactical capability, temporarily crippling critical infrastructure targets in ways that produce little collateral damage and allow the civil economy to continue functioning. Air-land and air-sea operations are now becoming far more complex than in the past, and the dividing lines between tactical attacks and interdiction, and tactical and strategic operations are much less distinct or easy to predict.

The naval dimension of a new Korean War is equally unpredictable. The DPRK could use its submarines, smart mines, and longer-range anti-ship missiles in a wide variety of ways, including covert or asymmetric attacks on shipping, and outside Korean waters. It might perceive a naval war, including some kind of attack or seizure of a US ship (like the USS *Pueblo* in 1968) as a safer way of exerting pressure. China might or might not become involved. Japan would have to decide on its naval posture.

Seen from this perspective, the most important measures in terms of stability may not be arms reductions or controls on modernization and force change *per se*, but finding ways to limit the risks of confrontation and escalation. Confidence-building measures and transparency might do more to limit risk – measures such as expanding limits on deployment in the border area, decreasing risk to critical population centers, allowing neutral or mixed observers at exercises, real time transparency on force movements, and mediation of border, air, coastal, and sea control disputes.

III. Korean Special, Asymmetric, and Paramilitary Forces

The DPRK and ROK have long competed in creating effective special and paramilitary forces. Pyongyang has also developed major capabilities for unconventional warfare in the border/DMZ area to attack deep into the ROK. The DPRK has mixed attacks by covert and Special Forces with limited naval and artillery strikes, while using missile and nuclear tests to obtain asymmetric leverage.

According to the South Korean Ministry of National Defense:³⁵²

The North has been strengthening its special warfare capabilities by deploying light infantry divisions to the frontline corps and adding an infantry regiment to the frontline. The number of special force troops is estimated to reach approximately 200,000. It is assumed that these troops have been trained to conduct composite operations, such as major target strikes, assassination of important figures, and disruption of rear areas, after infiltrating the rear areas of the South through either underground tunnels or AN-2 planes.

The DPRK was increasingly belligerent throughout 2012 and early 2013, significantly escalating tensions on the Peninsula. In 2012, in addition to two missile tests, the DPRK also jammed aircraft and naval GPS functionality using 50-100km range Soviet vehicle-mounted radar systems. The DPRK continued denial of service cyber-attacks on ROK institutions, including government agencies and the military.

The DPRK also has the world's third-largest chemical weapons arsenal, the world's largest Special Forces, a fleet of mini-submarines, and a significant artillery capability arrayed against Seoul and other key ROK locations.³⁵³

The sheer variety of each side's capabilities to conduct irregular or asymmetric warfare, and the DPRK's aggressiveness in threats and limited attacks, can be destabilizing and lead to miscalculation and escalation. Such forces also present a problem for any potential arms control agreement, since they give the DPRK a potential advantage in threatening and attacking the ROK that would be enhanced by any general reductions in conventional forces.

Paramilitary, Police, Internal Security, and Special Forces³⁵⁴

While Paramilitary, police, and internal security forces play an important role in the Korean balance, making accurate counts of these forces is even more difficult than estimating the size of more "conventional" forces. It is even harder to estimate the size and role of internal security forces, although these can play a major part in securing rear areas and forcing soldiers to fight.

The assessments that follow again reflect ROK and Western sources and viewpoints. It was not possible to find comparable assessments that reflect a DPRK view. Once again, it is important to note that the DPRK may see its choices as forced upon it by outside threats and pressures. At the same time, these differences between the DPRK and the ROK act as a warning that the internal security structures of each state show differences that reflect their ability and willingness to use force and to escalate.

DPRK

The DPRK has a wide range of forces and activities that support asymmetric warfare as well as covert operations in peacetime.

Special Forces

The DPRK's Special Forces are the most important fighting element of its irregular and asymmetric forces. The North Korean military is proud of these forces and often refers to them as “human torpedoes” (Navy), the “invincibles” (Air Force), and “human bombs protecting the center of the revolution” (Army).³⁵⁵

The 2014 ROK Defense White Paper estimates the DPRK Special Forces to be some 200,000 strong.³⁵⁶ The US DOD report on DPRK forces issued in May 2013 notes that,³⁵⁷

North Korean SOF are among the most highly trained, well-equipped, best-fed, and highly motivated forces in the KPA. As North Korea's conventional capabilities decline relative to the ROK and United States, North Korea appears to increasingly regard SOF capabilities as vital for asymmetric coercion.

Strategic SOF units dispersed across North Korea appear designed for rapid offensive operations, internal defense against foreign attacks, or limited attacks against vulnerable targets in the ROK as part of a coercive diplomacy effort. They operate in specialized units, including reconnaissance, airborne and seaborne insertion, commandos, and other specialties. All emphasize speed of movement and surprise attack to accomplish their missions. SOF may be airlifted by An-2 COLT or helicopters (and possibly Civil Air Administration transports), moved by maritime insertion platforms, or travel on foot over land or via suspected underground, cross-DMZ tunnels to attack high-value targets like command and control nodes or air bases in the ROK.

An ROK estimate of the size of DPRK Special Forces is shown in **Figure III.1**. The IISS estimated that the DPRK's Special Purpose Forces Command had a total of 88,000 personnel in 2016. The land component reportedly comprised eight (Reconnaissance General Bureau) Special Forces battalions, 17 reconnaissance battalions, nine light infantry brigades, and six sniper brigades. The air component had three airborne brigades, one airborne battalion, and two sniper brigades. The naval component had two amphibious sniper brigades.³⁵⁸

Jane's discusses the DPRK Special Forces in more detail; the different types of Special Forces and their respective missions and roles are depicted in **Figure III.2**. Most sources – including ROK and US intelligence and military sources – believe that the DPRK Special Forces number approximately 200,000 personnel and are divided into two categories: light infantry units (140,000 troops) and the 11th Storm Corps (60,000 troops).

According to *Jane's*, the primary missions of these Special Forces units are: “reconnaissance, establishing a ‘second front’ within the ROK strategic rear, destruction and disruption of the ROK/US C4ISR structure, neutralization of ROK and US air bases, and neutralization of ROK and US missiles and weapons of mass destruction (WMD). These missions include operations against US bases in Japan. Navy sniper brigades have the added mission of capturing the ROK islands along the Northern Limit Line (NLL) in the West Sea.”³⁵⁹

DPRK Special Forces are divided into seven divisions (with an organic light infantry battalion or regiment), five to seven reconnaissance battalions, and 25 Special Forces brigades, with the latter composed as follows:³⁶⁰

- 12 Light infantry/mechanized light infantry
- 3 Reconnaissance brigades

- 3 Airborne brigades
- 3 General sniper brigades
- 2 Navy sniper brigades
- 2 Air Force sniper brigades

The 11th Storm Corps is the main DPRK military organization that trains and undertakes special and unconventional warfare. In peace, the 11th Storm Corps likely has administrative control over all special operations units, while during war it is the primary headquarters for coordination. USFK Commander General Walter Sharp described the 11th Storm Corps in February 2011 as “elite special operations units capable of carrying out highly complicated missions,” and ROK sources believe that Lieutenant General Kim Yong-bok is the commander. It has been reported that the cover designation of the 11th Storm Corps is the 630th Large Combined Unit.³⁶¹

While the majority of the planes that comprise the Air Force are older models, the DPRK can deploy Special Force operatives effectively behind ROK front lines in an attack. There are more than 20 air operation and reserve bases run by the DPRK Air Force, some of which have underground runways.³⁶²

The 11th Storm Corps Bureau, as well as the Reconnaissance General Bureau, has access to “specialized high-speed semi-submersible infiltration landing craft (SILC), Yugo, and Yono-class SSM and Sang-O and K-300 (an improved Sang-O) class SSC.”³⁶³ While technically the DPRK military can transport approximately 4,000 troops by air and 15,000 troops by sea at one time, due to the economic difficulties of the past 30 years and the correlated reduction in operational readiness, it is likely that this capacity has dropped by 20-40%.³⁶⁴

North Korean special operations units have been expanding urban, night-time, and mountaineering training from 2003 to the present. These shifts in training have been accompanied by a reorganization of the ground forces that expanded light infantry forces and converted seven mechanized infantry divisions into light infantry divisions.³⁶⁵

Additional Paramilitary and Reserve Forces

The DPRK has an expansive system of additional paramilitary and reserve forces, which are also summarized in **Figure III.3**. A ROK Ministry of Unification report notes,³⁶⁶

According to one of North Korea’s four military guidelines, “to arm the entire population,” the regime has mobilized around 30 percent of the population between the ages of 14 to 60 to acquire over 7.7 million reserve forces. Every member of the reserve forces is given various combat gears, including personal arms, equipment, and crew-served weapons. These forces respond to emergency calls and enter boot camps to receive 15 to 30 days of military training at least once a year.

Upon the departure of the Chinese army in 1958, North Korea organized its reserve forces and civil defense corps called the Worker-Peasant Red Guards (WPRG) in January 1959, in addition to reorganizing discharged soldiers among the WPRG members into the Reserve Military Training Unit (RMTU) in 1963.

The Red Youth Guards (RYG), a military organization for senior middle school students, was created in September 1970. The RMTU, the core of North Korea’s reserved forces, consists of men between the ages of 17 and 50, as well as unmarried women volunteers between ages of 17 and 30. Its local units are organized into either divisions or brigades depending on the size of the administrative unit or workplace.... The RMTU members are given 100 percent of personal arms and equipment as well as 70 to 80 percent of crew-served weapons, and are required to complete as much as 500 hours of training each year.

The intensity of their training is equivalent to those taken by active-duty soldiers. As the RMTU is organized, equipped with firearms and undergo intensity of training similar to those of soldiers on active

duty, they can be immediately mobilized to defend rear areas or called up as reserve forces in case war breaks out. At present the RMTU accounts for over 600,000 troops.

Meanwhile, the WPRG was renamed as the Worker-Peasant Red Army (WPRA) at the Party Conference that convened on September 28, 2010, and is expected to play a role similar to that of the regular army. The WPRA currently consists of those men not belonging to the RMTU who can be mobilized between ages of 17 and 60, as well as of women who are organized at each administrative unit and workplace between ages of 17 and 30.

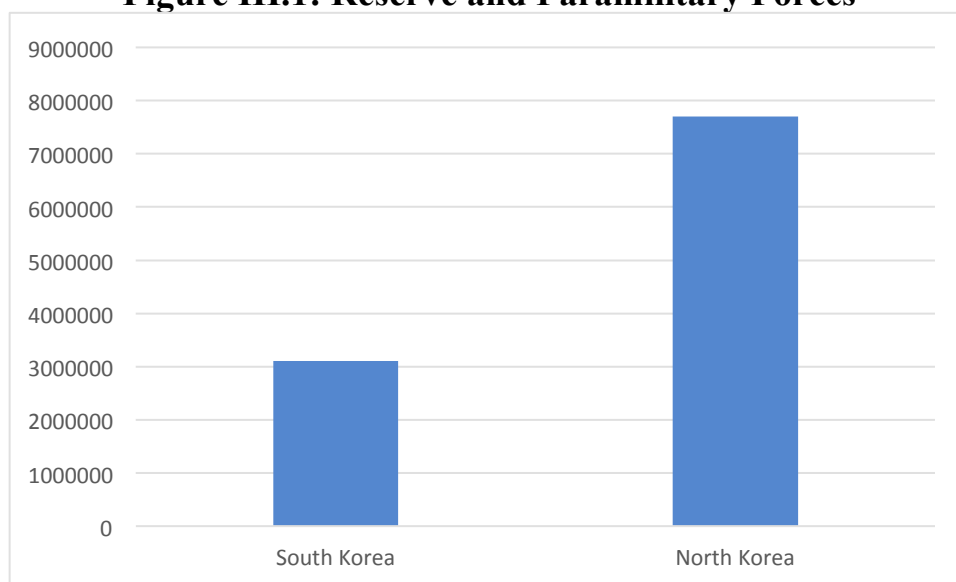
Along with the civil defense corps, the WPRA's basic responsibilities include guarding the workplace and other important facilities, as well as regional and antiaircraft defense. They are supplied with all personal arms and equipment and some crew-served weapons. A total of 160 hours of training is required. Their current numbers stand at 5.7 million.

In addition, the Red Youth Guards (RYG) consists of male and female senior middle school students aged between 14 and 16. Organized into companies and battalions at each school, RYG members are subject to a total of 160 hours of on-campus drills every Saturday and seven days of training during vacations, including a shooting exercise using live rounds at the RGY drill camp. As the royal guards of the regime, the RYG are mainly responsible for removing anti-revolutionary elements and playing a leading role in improving North Korea's combat capability.

In an emergency, they would perform the duties of rear guards or suicide squads to supplement those of junior army officers. They are supplied with all personal arms and equipment and some crew-served weapons. They undergo a total of 450 hours of training (substantially increased from 270 hours in the past) a year. Their current number stands at one million.

North Korea also has about 400,000 reserve troops affiliated with other paramilitary forces, including the Ministry of People's Security, the Logistics Mobilization Guidance Bureau, an agency responsible for providing and managing war supplies, and the Speed Battle Youth Storm Trooper Squad, a team that is often brought into public work projects. They are on a constant alert for immediate mobilization.

Figure III.1: Reserve and Paramilitary Forces



Source: Republic of Korea, Ministry of National Defense, *Defense White Paper 2014*

Figure III.2: DPRK Special Operation Forces, Missions and Roles

Type of Special Forces	Missions and Roles
Objectives	Attack and destroy targets, disturb the enemy's rear area, launch terrorist attacks, neutralize major strategic and tactical facilities (communication stations, missile bases, airfields, etc.)
Sniper Brigades	Breach the enemy's major defense lines, disguise as ROK troops and infiltrate, strike strategic targets with 82-mm mortars and multiple rocket launchers, organize pro-DPRK sympathizers
Seaborne Sniper Brigades	Start a guerilla war using hi-speed boats and LCACs, launch a surprise attack on naval vessels, radar bases, and supply bases
Air Force Sniper Brigades	Strike equipment and facilities in air bases
Airborne Infantry Brigades	Destroy logistics bases, secure strategic strongholds, block reinforcement
Army Corps Reconnaissance Battalions	Open secret passages, reconnoiter, kidnap key figures, destroy enemy facilities
Light Infantry Brigades	Secure key launts, support main units, launch attacks on enemy command posts (comprised of a total of 6 battalions, each with 6 companies; each company consists of 120 troops and equipped with 60-mm mortars and portable missile launchers)

Source: Ministry for Unification and Institute for Unification Education, *Understanding North Korea*, ROK Government, 2012, 122.

Figure III.3: The DPRK's Reserve and Paramilitary Forces

Type	Strength	Notes
Reserve Military Training Unit	60,000	Subject to combat mobilization; men (ages 17-50) and women (ages 17-30)
Worker and Peasant Red Guard	5.7 million	Similar to the ROK's Homeland Reserve Forces
Red Youth Guard	1 million	Military organization of middle school students
Paramilitary units	400,000	Secret Service Command, Speed War Youth Shock Troops, Ministry of People's Security Logistics Mobilization Guidance Bureau
Total	7.7 million	

Source: Ministry for Unification and Institute for Unification Education, *Understanding North Korea*, ROK Government, 2012, 131.

Infiltration Routes

There are a number of different estimates of the efforts the DPRK has made to create tunnels under the DMZ. Work by *Jane's* and GlobalSecurity.org note that the DPRK has created a series of infiltration tunnels since the 1970s, four of which have been discovered by US and ROK forces (see **Figure III.4** below). Each uncovered shaft was large enough to permit the passage of an entire infantry division in one hour, though the tunnels were not wide enough for tanks or vehicles. All the tunnels ran in a north-south direction and did not have branches, and, with each discovery, engineering within the tunnels has become progressively more advanced.³⁶⁷

According to North Korean defectors, Kim Il-sung issued a sweeping order in the early 1970s that required every Korean People's Army (KPA) division along the DMZ to dig and maintain at least two tunnels into South Korea.³⁶⁸ The existence of such tunnels was reported by *Jane's* using information from a KPA engineer who had defected in 1974.³⁶⁹

These reports were further confirmed in late November 1974 when an ROK Army patrol stumbled upon a DPRK tunnel, complete with reinforced concrete slabs, electric power and lighting, weapons storage, sleeping areas, and a narrow-gauge railway with carts.³⁷⁰ The tunnel's size was about three feet by four feet and, though of unknown length, it was estimated to be large enough to hide an entire infantry regiment – or to funnel thousands of soldiers into the South in short order.³⁷¹

Another tunnel was discovered in March 1975. It measured 3,300 meters long, and, as *Jane's* reports, 1,100 meters of this length extended into ROK territory. It was dug at a depth of between 50 and 150 meters and measured 2m tall by 2m wide. As many as 8,000 troops may have been able to move through it in an hour.³⁷²

US and ROK forces uncovered two more tunnels in 1978 and 1990, the latter of which was 145 meters deep and large enough for three armed soldiers to run through side-by-side. The US and ROK have since made constant efforts to detect any such tunnels and tunneling efforts, but it is not possible to be certain how many exist, their location, or their capacity. *Jane's* reports that there are an estimated 20-25 such tunnels.³⁷³

Other sources agree with *Jane's*, placing estimates at around twenty.³⁷⁴ ROK and US abilities to detect such tunnels through advanced technology like ground sensing radars, seismic monitors, and other devices – as well as classic measures like counter-tunneling – is unknown. The threat posed by any remaining tunnels and their potential to insert combat forces behind ROK-US forward defenses is substantial. If North Korea does attempt a military attack upon the South, it could be that the tunnels of the Korean DMZ will play a role in that conflict.

As of 2012, some estimates indicated there were more than 8,200 underground facilities across the DPRK, including tunnels, underground shelters, and mines. *Jane's* reports an “extensive nationwide system in excess of 11,000 fortified underground facilities.”³⁷⁵

In addition, the DPRK military has disguised and camouflaged camps and facilities several times greater in scale than the camps that are not extensively camouflaged.³⁷⁶ The KPA conducts camouflage, concealment, and deception (CCD) operations at all levels; in fact, 2004 was the “Year of Camouflage” for the KPA.³⁷⁷

A KPA manual smuggled out of the DPRK in 2010 has instructions concerning camouflage, concealment and deception of the complete range of military equipment and facilities including “command posts, foxholes, runways, fighter jet and naval bases, and cave strongholds.” The same manual stated that “Yugoslavian forces in an exposed camp deployed fake anti-aircraft guns, ground-to-air missiles, aircraft and tanks made of logs, plywood and cloth, and hid their actual weapons. As a result, NATO forces in fact destroyed only 13 of the 300 tanks though it claimed to have destroyed 40 per cent of the armored targets.” Lessons learned such as those have strongly influenced KPA CCD operations.

The influence of these lessons can be seen in the DPRK's 2010 provocations. Directly before the November 2010 attack on Yeonpyeong Island (discussed in Chapter 4), the DPRK's military³⁷⁸

...reportedly deployed decoy inflatable or painted plywood 122 mm and 240 mm rocket launchers among the real launchers to increase the difficulty of counter-battery artillery attacks and retaliation air strikes. ROK officials have stated that the KPA “is developing sophisticated camouflage and deceptions to avoid

surveillance and precision bombing by state-of-the-art South Korean and US reconnaissance equipment and weapons systems... It seems they've got all sorts of decoy equipment and facilities, from fake cave positions of long-range guns and fake naval ships to fake aircraft, fake runways and bogus guns.”

After the attack, the KPA appears to have tried to deceive ROK and US intelligence by continuously deploying SAM units and then removing them. Furthermore, reportedly the DPRK military was putting new and improved armored vehicle and fighter plane decoys in the DMZ corps.³⁷⁹

Figure III.4: DPRK Infiltration Tunnels Discovered by the ROK, to Date

	Tunnel No 1	Tunnel No 2	Tunnel No 3	Tunnel No 4
Location	8 km northeast of Korangpo	13 km north of Chorwan	4 km south of Panmunjon	26 kilometers northeast of Yanggu
Invasion route	Korangpo-Uijongbu-Seoul	Chorwan-Pochon-Seoul	Munsan-Seoul	Sohwa-Wontong-Seoul
Troop capacity	4,000/h*	8,000/h	8,000/h	8,000/h
Total length	3.5 km	3.5 km	1.64 km	2.05 km
Length south of Military Demarcation Line	1,000 m	1,100 m	435 m	1,030
Depth below surface	45 m	50-160 m	73 m	145 m
Discovery date	November 1974	March 1975	October 1978	March 1990

* This tunnel has concrete lining.

Source: IHS Jane's: Defence & Security Intelligence Analysis, "Jane's World Armies: North Korea," October 18, 2012, <http://www.janes.com>.

Artillery Near the DMZ

The vast majority of North Korea's military equipment is outdated in comparison with that used by South Korean and US forces, but the KPA often substitutes numbers and "mass" for modernization and quality. There are reports that the KPA has created thousands of artillery emplacements near the DMZ that are capable of inflicting significant damage and civilian casualties on Seoul.

US General Walter Sharp, a former commander of US troops in South Korea, has said the North has "an old but very large military that is positioned in a very dangerous place, very close" to South Korea.³⁸⁰ In addition to its ballistic missiles, reports indicate that the KPA has approximately 8,600 artillery pieces (and 5,500 MRLs), the majority of which are located along the DMZ in natural caves, man-made tunnels, and bunkers (known as Hardened Artillery Sites, or HARTS). The 2014 ROK white paper notes that the DPRK's "170 mm self-propelled guns and 240 mm MRLs in forward positions are capable of surprise, massive concentrated fire on the Greater Seoul Metropolitan Area (GSMA)." ³⁸¹

The quality of DPRK artillery forces and their military competence is somewhat questionable. Despite North Korea's use of radar in its November 2010 artillery bombardment of Yeonpyeong, the accuracy of the attack was poor. South Korean Ministry of National Defense (MND) sources state that the KPA fired approximately 170 rounds; of these, 90 (53%) impacted the waters surrounding the island, while 80 (47%) impacted on the island.³⁸²

Although inconclusive, this poor accuracy suggests that KPA artillery troops – at least those in the IV Corps – are in need of greater training despite DPRK pre-attack planning and exercises. Additionally, ROK MND sources claim that approximately 25% of the 80 rounds that impacted the island were duds and failed to detonate on impact (12% if the total of 170 is taken into consideration).³⁸³ This high failure rate suggests that some DPRK-manufactured artillery munitions, especially MRL rounds, suffer from either poor quality control during manufacture or that storage conditions and standards are poor.

Despite the limits to the quality of DPRK artillery, a DPRK artillery attack on the ROK could still be devastating, especially in the environs surrounding Seoul. Lee Yang Ho, ROK Defense Minister during the 1994 nuclear crisis, said one computer simulation conducted during his term projected 1 million dead: “all industry would be destroyed, gas stations, power plants. This is such a densely populated area that even if North Korean artillery were not very accurate, any place you would hit there would be huge numbers of casualties.”³⁸⁴

ROK

The IISS only provides limited data on the ROK's Special Forces. Its 2016 *Military Balance* estimates one (Special Warfare) command with seven Special Forces brigades. The IISS includes the ROK's 4,500 man Coast Guard in its count of active paramilitary forces. The ROK Coast Guard has some 54 Patrol and Coastal Combatants, roughly 30 logistics and support craft, 5 smaller maritime patrol aircraft, 7 multirole helicopters, and 8 transport helicopters.³⁸⁵

The ROK Special Forces are well-trained, modeled on US Special Forces and using US equipment. Each military branch (Army, Navy, Air Force, Marine Corps) has its own special operations units, though the largest is the Army Special Warfare Command (SWC) with 10,000 troops that “are tasked with infiltrating deep behind enemy lines for reconnaissance and surveillance, destruction of key military facilities, sabotage, and kidnapping enemy VIPs. Additionally, they combat terrorism, protect VIPs, and carry out top-secret operations. Furthermore, the SWC also has brigades whose specific duty is to engage and eliminate the DPRK's light infantry troops if they infiltrate the ROK.”³⁸⁶

The SWC also prepares for a wide array of potential scenarios, such as DPRK use of WMD, missiles, terrorist actions, or other provocations to gain concessions. In the case of an internal DPRK crisis, the SWC also must be ready to handle crises such as an outbreak of civil war, manmade or natural disasters, large-scale refugee flow, loss of control or transfer of WMD, and the DPRK's collapse. In the case of military action on the Peninsula, the SWC would combine with US Special Operations Korea, currently based in Yongsan, to jointly make the Combined Unconventional Warfare Task Force. This combined force would then plan and conduct special operations on the Peninsula.³⁸⁷

The ROK Navy's Special Forces unit is modeled on the US's Underwater Demolition Team unit, and is similarly intensively trained, competent, and able to undertake operations flawlessly – such as its rescue of the *Samho Jewelry*'s 21 crewmembers after the ship was hijacked by Somali

pirates in early 2010. The Air Force also maintains an elite Special Forces group, able to infiltrate behind enemy lines in advance of airlift operations or airborne troops, in order to accurately guide planes in their troop and equipment drops.³⁸⁸

Counterterrorism, Terrorism, and Low-Level Asymmetric Warfare

There is no clear dividing line between terrorism and asymmetric warfare. It is also a historical fact that the side with the stronger regular military forces is either less likely to use such tactics than the weaker side, or to conceal them in the form of state-sponsored terrorism.

DPRK

The US and ROK feel that the historical record shows that there was nothing new about the DPRK's use of limited or asymmetric attacks – some of which the US and ROK have labeled as terrorism – in 2010. The DPRK has repeatedly challenged the ROK using low-level covert operations and asymmetric attacks, using these incidents to put pressure on both the ROK and the US. The DPRK has also deployed large amounts of its force structure for the same purpose, keeping the ROK under constant pressure. It has created a special balance in the border area by creating tunnel systems and deploying large amounts of artillery in caves and sheltered positions within range of Seoul, as discussed above.

The DPRK's willingness – and inventiveness – in using the threat and reality of such attacks was so consistent between 1950 and 2007 that it led the Congressional Research Service to prepare a 36-page chronology which covered 164 examples of armed invasion; border violations; infiltration of armed saboteurs and spies; hijacking; kidnapping; terrorism (including assassination and bombing); threats/intimidation against political leaders, media personnel, and institutions; incitement aimed at the overthrow of the ROK government; actions undertaken to impede progress in major negotiations; and tests of ballistic missiles and nuclear weapons.³⁸⁹

The CRS report summarizes these trends as follows:

The most intense phase of the provocations was in the latter half of the 1960s, when North Korea (Democratic People's Republic of Korea, or DPRK) staged a series of limited armed actions against South Korean and US security interests. Infiltration of armed agents into South Korea was the most frequently mentioned type of provocation, followed by kidnapping and terrorism (actual and threatened). From 1954 to 1992, North Korea is reported to have infiltrated a total of 3,693 armed agents into South Korea, with 1967 and 1968 accounting for 20% of the total. Instances of terrorism were far fewer in number, but they seemed to have had a continuing negative impact on relations between the two Koreas. Not counting the DPRK's invasion of South Korea that triggered the Korean War (1950-1953), the DPRK's major terrorist involvement includes attempted assassinations of President Park Chung Hee in 1968 and 1974; a 1983 attempt on President Chun Doo Hwan's life in a bombing incident in Rangoon, Burma (Myanmar); and a mid-air sabotage bombing of a South Korean Boeing 707 passenger plane in 1987. Reported provocations have continued intermittently in recent years, in the form of armed incursions, kidnappings, and occasional threats to turn the South Korean capital of Seoul into "a sea of fire" and to silence or tame South Korean critics of North Korea. Then, in July 2006, North Korea launched seven missiles into the Sea of Japan, and in October 2006, it tested a nuclear bomb.

While it was not possible to find comparable assessments from a DPRK viewpoint, it is important to note that Pyongyang may see the use of unconventional or asymmetric warfare as the only way it can safely – and effectively – exert military pressure on the ROK and the US and force the pace of negotiation. In realpolitik, the difference between terrorism and asymmetric warfare is often a matter of perspective and semantics.

Ties to Outside Actors

The DPRK has also provided financial support and training to Palestinian and Iranian militant groups in the past. It has directly initiated terrorist attacks, such as the 1987 bombing of a Korean Air flight. Despite issuing a joint statement with the US in 2000 renouncing terrorism, the country has continued to collaborate with former terrorist groups in its illegal activities – which will be discussed further in the next section. The US State Department reported in a 2011 assessment of counterterrorism and terrorism in the DPRK that,³⁹⁰

Overview: The Democratic People’s Republic of Korea (DPRK) is not known to have sponsored any terrorist acts since the bombing of a Korean Airlines flight in 1987. On October 11, 2008, the United States rescinded the designation of the DPRK as a state sponsor of terrorism in accordance with criteria set forth in U.S. law, including a certification that the government of the DPRK had not provided any support for international terrorism during the preceding six-month period and the provision by the DPRK of assurances that it will not support acts of international terrorism in the future.

Four Japanese Red Army members who participated in a jet hijacking in 1970 continued to live in the DPRK. The Japanese government continued to seek a full accounting of the fate of 12 Japanese nationals believed to have been abducted by DPRK state entities in the 1970s and 1980s. The DPRK has not yet fulfilled its commitment to reopen its investigation into the abductions.

Legislation and Law Enforcement: The United States re-certified North Korea as “not cooperating fully” with U.S. counterterrorism efforts under Section 40A of the Arms Export and Control Act, as amended. In making the annual determination designating the DPRK as “not cooperating fully,” the Department of State reviewed the country’s overall level of cooperation in our efforts to fight terrorism, taking into account U.S. counterterrorism objectives with the DPRK and a realistic assessment of its capabilities.

Countering Terrorist Finance: The Financial Action Task Force (FATF) remained concerned about the DPRK’s failure to address the significant deficiencies in its regulatory regimes. In January, the DPRK engaged the FATF to discuss its anti-money laundering and counterterrorist financing regulatory regimes. While the FATF welcomed this initial engagement and said it remained open to further engagement, there were no further contacts. In its public statement in February, the FATF publicly urged the DPRK to immediately and meaningfully address these deficiencies.

The DPRK’s financial system was opaque and compliance with international standards was difficult to gauge....

Regional and International Cooperation: In June, the UN Counter-Terrorism Committee Executive Directorate (CTED) held consultations with the DPRK on strengthening its implementation of United Nations Security Council Resolutions 1267/1989, 1988, and 1373. CTED plans to continue to engage the DPRK to assist in its implementation of those resolutions.

Little changed in the country report the State Department issued in 2015,³⁹¹

Overview: The Democratic People’s Republic of Korea (DPRK) is not known to have sponsored any terrorist acts since the bombing of a Korean Airlines flight in 1987. In October 2008, the United States rescinded the designation of the DPRK as a state sponsor of terrorism in accordance with criteria set forth in U.S. law, including a certification that the DPRK had not provided any support for international terrorism during the preceding six-month period and the provision by the DPRK of assurances that it would not support acts of international terrorism in the future.

Four Japanese Red Army members who participated in a 1970 jet hijacking continued to live in the DPRK. The Japanese government continued to seek a full accounting of the fate of 12 Japanese nationals believed to have been abducted by DPRK state entities in the 1970s and 1980s. In May 2014, the DPRK agreed to re-open its investigation into the abductions, but as of the end of 2015 had not yet provided the results of this investigation to Japan.

Legislation, Law Enforcement, and Border Security: In May, the United States re-certified North Korea as a country “not cooperating fully” with U.S. counterterrorism efforts pursuant to Section 40A of the Arms Export and Control Act, as amended. In making this annual determination, the Department of State

reviewed the DPRK's overall level of cooperation with U.S. efforts to counter terrorism, taking into account U.S. counterterrorism objectives with the DPRK and a realistic assessment of DPRK capabilities.

Countering the Financing of Terrorism: The DPRK is not a member of any FATF-style regional body. In July 2014, it was admitted as an observer, but not a full member, of the Asia-Pacific Group (APG) on Money Laundering, a FATF-style regional body. Nevertheless, the DPRK failed to demonstrate meaningful progress in strengthening its anti-money laundering/ combating the financing of terrorism (AML/CFT) infrastructure. While encouraging the DPRK's continued engagement with FATF and APG, the FATF highlighted continuing concerns about North Korea's "failure to address the significant deficiencies in its [AML/CFT] regime and the serious threat this poses to the integrity of the international financial system."

It was reported in April 2013 that the DPRK and Iran agreed on a deal to exchange DPRK mineral resources for Iranian crude oil, a further increase in economic ties between the two countries.³⁹²

WMD and Missile Exports

The DPRK has also exported missile technology and may develop the potential for exporting nuclear materials or weapons to other countries or non-state actors – including terrorist organizations. Reporting by the US Department of Defense cites two possible cases of exporting missile and WMD-related technology and equipment:³⁹³

- In addition to Iran and Syria, past clients for North Korea's ballistic missiles and associated technology have included Egypt, Iraq, Libya, Pakistan, and Yemen. Burma has begun distancing itself from North Korea but remains a conventional weapons customer.
- In October 2009, the ROK seized North Korean-origin chemical warfare protective suits destined for Syria.

A US expert reports that,³⁹⁴

In April 2004 President of the Supreme People's Assembly Presidium Kim Yong-nam told visiting journalist Selig Harrison, "We make a clear distinction between missiles and nuclear material. We're entitled to sell missiles to earn foreign exchange. But in regard to nuclear materials, our policy past, present, and future is that we would never allow such transfers to al-Qaeda or anyone else." Foreign Minister Paik Nam-soon added, "We denounce al-Qaeda, we oppose all forms of terrorism, and we will never transfer our nuclear material to others." As the nuclear stalemate continued, however, the DPRK shifted. In 2005 Harrison reported that Vice Foreign Minister Kim Gye-gwan had warned, "[The United States] should consider the danger that we could transfer nuclear weapons to terrorists, that we have the ability to do so." Kim said the regime had no plans to transfer but would not rule it out "if the United States drives [us] into a corner." James Kelly, the U.S. State Department's assistant secretary for East Asian and Pacific Affairs, testified in July 2004 that a similar threat had been made during trilateral talks in April 2003.

The possibility of nuclear material exports should not be exaggerated. Moreover, DPRK-produced plutonium would not be ideal for terrorist groups lacking in high levels of nuclear weapons sophistication, as the type of bomb design that can utilize plutonium is difficult to build, compared to a uranium-based weapon. On the other hand, an operational highly enriched uranium program could increase proliferation risk. While a uranium bomb would require twice as much fuel, it is easier to weaponize and thus more attractive to non-state actors or states generally lacking in nuclear sophistication.³⁹⁵

ROK

For the ROK, the State Department reports in 2011 that,³⁹⁶

Overview: The Republic of Korea strengthened its counterterrorism efforts in 2011. The Republic of Korea's National Intelligence Service (NIS), the Korean National Police Agency (KNP), and various intelligence entities worked in close coordination with U.S. and international counterparts to access and contribute to multiple counterterrorism databases. The Government of the Republic of Korea reviewed and strengthened its emergency response plan.

In September 2011, the FBI Legal Attaché Office in Seoul worked jointly with the NIS and KNP to investigate an international terrorism subject who had relocated to the Republic of Korea. Subsequently, NIS and KNP provided information and monitored the subject until he departed the country.

Legislation and Law Enforcement: In September 2005, the Republic of Korea signed the International Convention for the Suppression of Acts of Nuclear Terrorism (ICSANT) and the National Assembly ratified it in December 2011.

Countering Terrorist Finance: The Republic of Korea is a member of the Financial Action Task Force (FATF) and the Asia/Pacific Group on Money Laundering (APG), a FATF-style regional body. The National Assembly passed the "Prohibition of Financing for Offenses of Public Intimidation Act" in September, which the Financial Intelligence Unit (FIU) had submitted in October 2010. Prior to passing the Act, the National Assembly made important changes to the law. In addition to criminalizing the provision, collection, and delivering of funds and assets to terrorists and terrorist organizations, the revised act established a freezing regime that controls the disposition and transfer of movable and immovable assets, bonds, and other property or property rights.

In December 2010, the FIU submitted a separate bill amending the Financial Transaction Reports Act to impose stricter penalties on financial institutions that violate reporting requirements. The bill was pending in the National Assembly at year's end....

Regional and International Cooperation: South Korea is a member of the United Nations, Asia-Pacific Economic Cooperation (APEC), the Association of Southeast Asian Nations' (ASEAN) Regional Forum, ASEAN+3, East Asia Summit, the Asia-Europe Meeting (an interregional forum consisting of the EC, 27 EU members and 13 members of the ASEAN Plus), Asia Cooperation Dialogue, Forum for East Asia-Latin America Cooperation, the Organization for Economic Cooperation and Development, the G20, and the Conference on Interaction and Confidence-Building Measures in Asia. It is also a partner country of the Organization for Security and Cooperation in Europe and the North Atlantic Treaty Organization.

In 2011, the South Korean government organized numerous international conferences to share information and best practices. It hosted the Seventh Plenary Meeting of the Global Initiative to Combat Nuclear Terrorism in June, and the Third APEC Seminar on the Protection of Cyberspace in September. South Korea also hosted the FATF/APG workshop on Money Laundering Typologies in December.

The South Korean government held bilateral consultations on counterterrorism with the United Kingdom, Japan, China, Russia, Algeria, Uzbekistan, and Israel.

The State Department report issued in April 2014 had few substantive changes,³⁹⁷

Overview: The Republic of Korea remains committed to its counterterrorism programs and has maintained strong cooperation with the United States and the international community. The Republic of Korea has not faced any major domestic terrorist threats, and the various agencies with counterterrorist responsibilities have remained vigilant in countering what they perceive as emerging threats, such as potential home-grown terrorism through internet recruitment.

The Republic of Korea is becoming more involved in bilateral and international counterterrorism efforts in response to the growing exposure of its citizens living and traveling abroad. South Korean and U.S. law enforcement agencies worked closely on sharing information on known or suspected terrorists, implementing an agreement passed in 2008 on Preventing and Combating Serious Crime (PCSC), and holding joint investigations on known and suspected terrorist encounters that occurred in the Republic of Korea.

In November, the Republic of Korea and the United States held the Fourth Bilateral Consultation on Counterterrorism, where the two countries shared information on ways to enhance bilateral cooperation and expand South Korea's multilateral engagement.

Legislation, Law Enforcement, and Border Security: The National Assembly failed to pass a comprehensive counterterrorism law, first proposed in 2001, that would have significantly improved the Republic of Korea's ability to conduct counterterrorist activities. The Republic of Korea derives its authority to perform counterterrorist activities from Presidential Directive 47, which was last revised on May 21, 2013. The revision was mostly administrative and did not add any new authorities.

Countering the Financing of Terrorism: The Republic of Korea is a member of the Financial Action Task Force (FATF) and the Asia Pacific Group on Money Laundering, a FATF-style regional body. In accordance with UNSCRs 1267 (1999) and 1373 (2001), the Republic of Korea is tightening its existing domestic legislative framework and administrative procedures to combat terrorist financing. For further information on money laundering and financial crimes, see the 2014 International Narcotics Control Strategy Report (INCSR), Volume 2, Money Laundering and Financial Crimes: <http://www.state.gov/j/inl/rls/nrcrpt/index.htm>.

Regional and International Cooperation: The Republic of Korea is a member of the UN, APEC, ASEAN+3, East Asia Summit, Asia-Europe Meeting, Asia Cooperation Dialogue, Forum for East Asia-Latin America Cooperation, OECD, the G-20, and the Conference on Interaction and Confidence-Building Measures in Asia. South Korea is also a partner country of the OSCE and NATO. In October 2013, the Republic of Korea hosted the Conference on Cyberspace 2013, where representatives from 87 countries and 18 international organizations discussed how to combat cyber-attacks and the use of cyberspace for terrorist activities.

To promote capacity building abroad, the South Korean government has launched development assistance initiatives in Afghanistan, Iraq, and the West Bank and Gaza, which include contributions to counterterrorism and stabilization programs. Also, various South Korean ministries provide information and communication technology advancement assistance to developing countries that includes programs to counter cyber-terrorism and to build a secure information technology infrastructure.

DPRK Drug and Weapons Sales and Other Illegal Activities

The DPRK engages in a variety of illegal and questionable activities in order to raise money for the continued existence of the regime. After defaulting on its international debts in 1975, the regime ordered its embassies to finance their own operations. Since this time – starting in 1976 – the DPRK has become extensively involved in transnational criminal smuggling, including drugs, counterfeit US currency, endangered species products, counterfeit pharmaceuticals, counterfeit cigarettes, and has even opened an international chain of restaurants. It has also been reported that the DPRK is engaged in insurance fraud and human trafficking. In recent years, North Korea's illicit activities seem to have been partly criminalized and dispersed, with operations and profits being associated with certain key powerbrokers as oppose to the state itself.³⁹⁸

Although it would appear to be secondary to financial incentives, the DPRK does claim ideological justifications for these criminal acts – explaining them as tools of guerilla warfare undermining the enemy and as a justified action under the previously explained idea of *juche* (self-reliance).³⁹⁹

Drugs

After the DPRK lost the much support of its Cold War patrons, it significantly increased its involvement in drug trade and trafficking in the mid-1990s, roughly concurrent with Kim Jong-Il's accession to leadership. Drugs, counterfeit currency, and other illegal items were produced in the country and then transferred to criminal organizations – such as the Official Irish Republican

Army, Japanese Red Army, Russian Mafia, Chinese Triads, Taiwanese organized crime syndicates, and the Japanese Yakuza – for transport and distribution. Criminal groups also started to smuggle counterfeit currency and drugs on ships in mismarked or disguised containers, hiding money in jars of honey, inside the linings of boxes, and inside cigarettes. Customs officials have discovered these containers in the US, Taiwan, and Japan.⁴⁰⁰

DPRK diplomats relied on their diplomatic immunity and used diplomatic pouches to purchase drugs – mainly opiates – for resale in foreign countries. Diplomats have also been caught smuggling other objects, such as pharmaceuticals, products made from endangered species, and gems. Scandinavia ejected most of the DPRK diplomatic corps from the country after a series of drug seizures linked to DPRK embassies worldwide.⁴⁰¹

After three years of diplomatic relations, Venezuela expelled all DPRK diplomats in 1977 for trafficking drugs. Russia arrested a DPRK envoy in 1996 with 50 pounds of heroin. Two years later, Russia arrested another two diplomats with 35 kilograms of cocaine, while Egypt arrested a diplomat trying to smuggle 500,000 tablets of rohypnol into the country. That same year, Germany arrested a deputy ambassador in the possession of heroin, and China arrested a consulate employee with 9 kilograms of opium.⁴⁰²

Overall, there were at least 50 cases in 20 countries linking the DPRK to drug trafficking, most of which involve the detention and/or arrest of DPRK diplomats.⁴⁰³ In the wake of these arrests, the DPRK has increasingly turned to distribution networks run by organized crime gangs.⁴⁰⁴

Bureau 39, one of the Korean Workers' Party Central Committee's offices that obtains luxury items for DPRK elites, also procures components and technology for weapons programs and sets up illegal activities to fund its operations. The office, which is entirely outside the jurisdiction of the DPRK's cabinet and separate from its national economic planning process, was reportedly established in 1974 and put the currency it generated into a slush fund of about \$5 billion that was exclusively under the control of Kim Jong-il.⁴⁰⁵ It was reported in April 2013 that Kim Jong-un is believed to have more than \$1 billion held in secret bank accounts in Austria, Switzerland, and Luxembourg.⁴⁰⁶

Bureau 39 operates through Korea Workers' Party-run and government-established front companies, such as Zokwang Trading Company (Macao) and Daesung Congguk (Austria). According to defectors, the DPRK regime cannot last without the income generated through Bureau 39's illegal activities.⁴⁰⁷ **Figure III.5** shows a 2010 representation of DPRK government offices, with Bureau 39 at the top.

The DPRK has also indirectly promoted social stability in other countries through its links to non-state actors and criminal gangs. For example, the DPRK has assisted guerillas in Myanmar by acting as a middleman, providing weapons in exchange for drugs. This has resulted in perpetuation of the insurgency, with the rebels having an increased weapons capacity as well as money to buy more arms, hold large areas of territory, and continue violence and human rights abuses, such as the forced recruitment of child soldiers.⁴⁰⁸

Defectors have testified that drug production began in the late 1970s, followed later by the establishment of an experimental farm in 1988-9 in Hamkyung province (where pharmaceutical plants process it into heroin, as well). There was also a countrywide public order to produce opium for export in the early 1990s – at which point the police ordered farms to switch from

grain production to growing poppies. Of course, this undermines subsistence agriculture and contributes to the North's famines.⁴⁰⁹

The major narcotics produced are heroin and methamphetamines. One refugee described the DPRK as a "narco-state in which all aspects of the drugs operation – from school children toiling in poppy fields to government-owned processing plants to state-owned cargo ships and trading companies – are controlled by Kim [Jong-Il]." State farms and villages have production targets. Bureau 39 oversees the international distribution of drugs with the help of the military, using commercial and military vessels, diplomatic personnel, and state-owned businesses to launder the profits.⁴¹⁰

One CRS report describes the reported drug manufacturing activities of the DPRK as follows:⁴¹¹

Opiates. According to press reports and North Korean defectors, farmers in certain areas have been ordered to grow opium poppies in the past. In 2006 congressional testimony, a representative of the State Department reported that North Korea cultivates 4,000 to 7,000 hectares of opium poppy, producing approximately 30 to 44 metric tons of opium gum annually. Though such estimates appear reasonable, they are nevertheless based on indirect and fragmented information. With the caveat that conclusive "hard" data is lacking, U.S. government investigative agency sources estimate North Korean raw opium production capacity at 50 tons annually. North Korean government chemical labs reportedly have the capacity to process 100 tons of raw opium poppy into opium and heroin per year.

Methamphetamine. North Korea's maximum methamphetamine production capacity is estimated to be 10 to 15 metric tons of the highest quality product for export. This coincides with a time when markets for methamphetamine are dramatically expanding in Asia, especially in Thailand, Japan, the Philippines, and more recently in Cambodia and China.

There have been several instances in which drugs linked to the DPRK have been caught enroute.⁴¹²

In 2001, the Japanese Coast Guard and a North Korean ship exchanged fire, resulting in the sinking of the North Korean naval vessel that was operated by North Korean special forces. Japanese authorities subsequently determined that the North Korean ship entered Japanese waters to deliver methamphetamines to Japanese Yakuza members. In the following year, Taiwanese authorities stopped and searched a Taiwanese fishing trawler which contained 174 pounds of heroin that it had received from a North Korean gunboat. In 2003, Australian police arrested three men in a coastal village west of Melbourne who had received \$50 million worth of street-ready heroin from a dinghy launched by the state owned North Korean ship, *Pong Su*, which lay just off shore. North Korea has used its merchant fleet to act as a middleman for other groups involved in drug trafficking by bartering other goods, such as weapons, in exchange for drugs. A North Korean vessel laden with small arms was detained by authorities in Myanmar who believed that local insurgent groups were intent on trading heroin for the arms.

Since the mid-2000s, there has been a decrease in large-scale drug seizures directly tied to North Korea, a trend that has led some experts to conclude that there has been a **decline** in state-sponsored drug activities. Instead, there has been a trend "away from an industry marked by regime sponsorship to one primarily characterized by quasi-private production and crony capitalism" aimed at local production and consumption. Different individuals and state agencies seem to be using the drug trade for personal revenue, then turning over a portion of their proceeds to the central government or Kim family. These operations may also have increased the sophistication of their smuggling techniques, making international detection more difficult.

Another explanation for the declining international drug presence is increasing demand with the DPRK itself; according to several studies and defector accounts, consumption of illicit drugs (particularly methamphetamine) has increased throughout North Korea over the past decade.⁴¹³

Pharmaceuticals and Cigarettes

There are reports that the DPRK makes fake Viagra and Cialis in factories in Chongjin and also produces counterfeit cigarettes. By 2005, the DPRK had become one of the primary sources of internationally branded cigarettes, producing several brands in approximately 12 factories owned by both DPRK entities and by Taiwanese- or Chinese-operated companies.⁴¹⁴ From 2002-2005, DPRK-sourced Marlboros were recovered across the US in over 1,300 incidents.⁴¹⁵

According to a former State Department official, a standard 40-foot container of counterfeit cigarettes can cost as little as \$70,000 to produce but can have a street value of \$3-4 million. Federal charges filed in 2006 document that over a period of several years, criminal gangs brought one 40-foot container into the US per month; the cigarettes are also sold in other Asian countries such as Singapore, Taiwan, the Philippines, Belize, Vietnam, and Japan. As early as 1995, Taiwan seized 20 containers of counterfeit cigarette wrappers on a ship going to the DPRK that could have been used to produce up to \$1 billion (street value) in counterfeit cigarettes. Defectors have reported factories in several areas in the DPRK, with workers belonging to a special work force team that receives extract rations.⁴¹⁶

Most of the DPRK-owned enterprises producing cigarettes illegally are located near Pyongyang. Rajin, a free trade zone port city on the east coast of the DPRK seems to be another main hub of counterfeit cigarette activity – where many of the factories are reportedly financed and owned by Chinese criminal organizations. One report indicated that the North Korean regime gives permission for port usage to certain deep-sea smuggling vessels and also offers a secure delivery channel for the gangs. According to the CRS,⁴¹⁷

A 2006 article on North Korean cigarette production found that DPRK cigarette manufacturers have been turning more toward producing domestic low-priced brand cigarettes instead of counterfeit products. The article states that relative to the price of rice, the price of a package of cigarettes has been falling and their quality has been rising. In 2007, the DPRK imported \$12.95 million (\$14.1 million in 2006 and \$13.5 million in 2005) in tobacco products from China. Domestic brands now are taking market share from imports, and North Korean cigarette producers — even the factories operated by the No. 39 Department of the Workers' Party, which accumulates and manages Kim Jong-il's slush funds — reportedly have been producing more for the domestic market than counterfeits of brands such as Mild Seven, Crown (both Japanese brands), and Dunhill.

Media reports indicate that Greek authorities seized some four million cartons of contraband cigarettes through the fall of 2006, of which three million were aboard North Korean vessels. For example, on September 25, 2006, Greek officials detained a North Korean freighter that was carrying 1.5 million cartons of contraband cigarettes and arrested the seven seamen on board. According to information from Greek customs authorities, the ship's load of counterfeit, duty-unpaid cigarettes would have brought 3.5 million euros in taxes.

Furthermore, state-run factories manufactured pharmaceuticals and processed and packaged opiates and methamphetamines. DPRK drugs, counterfeit currency, cigarettes, and pharmaceuticals can be forensically identified as coming from the DPRK and are actually very high-quality products in both packaging and manufacturing/chemical purity. However, reports indicate that the DPRK's criminal network partners now operate their own production and distribution networks within and outside of the DPRK, for example producing lower-quality counterfeit currency.⁴¹⁸ It appears that North Korea has continued these counterfeiting operations, and may have expanded them to other consumer goods. For example, in 2012 “Japanese shoe manufacturer ASICS complained that North Korea had imported and created

knockoff versions of its shoes, and tourists in summer 2012 observed display cases selling Marlboro cigarettes with the brand name misspelled.”⁴¹⁹

Supernotes, Insurance, and Trafficking

DPRK state-run factories also print counterfeit US \$100 bills (the “Supernote”). Part of the US-led 2005 Banco Delta Asia freeze of DPRK funds (discussed later in this report) was to stop Bureau 39 from laundering Supernotes – which have been described by the US secret Service as the most sophisticated counterfeits in the world.

These bills, allegedly manufactured in the city of Pyeongseong, use high-tech Japanese equipment, paper from Hong Kong, and French ink. The Supernote has been found in Las Vegas, first in 2005 and again in 2007, when a Chinese businessman was arrested laundering the bills in casinos. One Supernote distribution ring involved the Official Irish Republican Army distributing the notes to Ireland, Great Britain, Poland, Denmark, the Czech Republic, Belarus, and Russia, making an estimated \$28 million; the bills have also reportedly been linked with DPRK WMD proliferation.⁴²⁰

The CRS notes,⁴²¹

Media reports indicate that counterfeit \$100 bills are used in North Korean markets as currency and are valued at about the equivalent of \$70. It is not clear, however, whether the counterfeit bills circulating are from existing stocks or are currently being produced. The anti-counterfeiting security features incorporated into new U.S. bills make counterfeiting much more difficult.

While there were several Supernote discoveries through 2009, many believed that these notes were produced earlier and that North Korea had largely abandoned its counterfeiting in the face of US security measures.⁴²² However, in June 2016, a North Korean agent was arrested in China with counterfeit \$100 bills, with the apparent intent of purchasing household appliances and electronics. This apparent return of counterfeiting operations, and the relatively low quality of the forgeries, might suggest that the DPRK’s finances are strained following the implementation of the 2016 sanctions, and its leaders are looking for alternative funding sources.⁴²³

In late 2006, media reports surfaced that the DPRK could be involved in insurance fraud at a state level. Some experts believe that property damage claims are significantly overstated, claims are made for deaths that are not due to an accident, and accident circumstances are being changed. DPRK state-initiated insurance fraud has not been conclusively confirmed, though this type of activity would fit the DPRK’s criminal patterns. One source estimated that the DPRK’s 2006 fraudulent claims could have been more than \$150 million. On the reported insurance fraud and endangered species trafficking, the CRS reports,⁴²⁴

A recent example cited in media reports of possible DPRK state involvement in insurance fraud involves a ferry accident that reportedly occurred in April 2006 near the coastal city of Wonsan. After the accident, North Korea declared that 129 people had died, all of whom were provided life insurance coverage when they bought a ticket. It was claimed that most of the victims had died of hypothermia, although weather data apparently indicated that temperatures were warmer than reported by Pyongyang’s Korea National Insurance Corporation. In another case, in July 2005, a medical rescue helicopter apparently crashed into a government owned disaster supply warehouse, setting it on fire. It reportedly took the DPRK authorities only 10 days to file a claim that included a detailed inventory of hundreds of thousands of items — a task which insurance industry officials say normally takes most governments many months....

Several reports link North Korean officials with trafficking in endangered species, which is in contravention to the U.N. Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES).⁵⁵ The DPRK is not a member of CITES; however, DPRK diplomats allegedly have been

caught trafficking in CITES-protected species between treaty member states, including France, Russia, and Kenya. According to the State Department, known DPRK violations of CITES began in the 1980s and have mainly involved trafficking in elephant ivory and rhino horn. Although some may argue that cases of endangered species smuggling by DPRK diplomats may have been for personal use, the sheer size of confiscated shipments — as much as several hundred kilograms each — suggests that endangered species trafficking could have been planned by a North Korean government entity.

The CRS also discusses the DPRK's potential human trafficking activities:⁴²⁵

According to the State Department, North Korea is a source country for men, women, and children trafficked for forced labor and commercial sexual exploitation and has been listed by the U.S. government as a "Tier 3" country for as long as it has been included in the State Department's Trafficking in Persons annual reports. As a Tier 3 country, North Korea reportedly does not comply with minimum standards for eliminating trafficking and is not making significant efforts to do so.

It remains unclear to what extent DPRK profits from human trafficking activities as a source of revenue. However, the State Department indicates that North Korea directly contributes to labor trafficking by maintaining a system of forced labor prison camps inside the country, where an estimated 150,000 to 200,000 prisoners are forced to log, mine, and tend crops. According to Mark Lagon, Director of the U.S. Office to Monitor and Combat Trafficking in Persons, the most common form of DPRK trafficking are North Korean women and children who voluntarily cross the border into China and are picked up by trafficking rings and sold as brides in China and elsewhere, including Russia and Mongolia. The 2007 Trafficking in Persons report further states that North Korean women and girls may also be lured out of DPRK with promises of food, jobs, and freedom, only to be forced into prostitution, marriage, or exploitative labor arrangements in China.

Illicit Revenue and the DPRK's Official Stance

The DPRK receives an estimated annual income of \$15 million to \$100 million from counterfeiting, \$80-160 million from cigarette counterfeiting, and a total annual criminal activities income of \$500 million⁴²⁶ to \$1 billion.⁴²⁷

In the past several years, there have been few drug trafficking incidents directly linked to the DPRK government, leading the State Department to report in 2008 that DPRK drug trafficking "appears to be down sharply and there have been no instances of drug trafficking suggestive of state-directed trafficking for five years."⁴²⁸ This could be due to increased international attention to the DPRK's activities, or because the DPRK has increased its use of criminal gangs instead of being directly involved in the distribution of its illegal products. In addition, the regime has sharpened its overtly anti-drug rhetoric and has increased arrests for distribution; however, most perpetrators appear to have simply paid out bribes as oppose to facing any form of severe punishment.⁴²⁹

It must be noted that the DPRK denies all such allegations of any state-sponsored criminal acts and has accused the US of counterfeiting its own currency in an attempt to frame the DPRK. International and regional powers have either declined to comment on the issue or expressed skepticism as to the DPRK's involvement in these types of activities, though recently it would appear that there has been a subtle shift towards supporting the US's allegations.⁴³⁰

Meanwhile, US officials have grown more certain in their conclusions; one State Department official testified to the Senate in 2006 that, "There's no doubt that the government of the [DPRK], the Korean Workers' Party, and the Korean People's Army are all involved in criminal activities."⁴³¹ In addition, there seem to have been recent attempts by the DPRK to control and cut back on drug trafficking, especially outside of the state's authority; reports also indicate increasing drug addiction inside the country.⁴³²

An emerging genre of reports, yet to be substantiated, suggests that as state control of drugs in the DPRK becomes looser, a growing amount of stimulants for domestic sale and consumption are being produced privately by scientists in the DPRK and funded by private investors. Some reports suggest drug abuse is becoming widespread among senior military officials and also among the poor as a means to dull hunger. Others suggest that drug addiction is spreading among cadres such as the officer corps of the People's Army Security Department and high-ranking party officials. A scenario is being presented of drugs sold openly at farmers markets, at times being used instead of currency in transactions.

Weapons Sales

While the DPRK does import weapons components – such as a jet mill used for missile fuel in 1994 and a blocked shipment of power-control devices that could be used in uranium centrifuges or missile launches – the country also sells its ballistic missiles and related technologies to other countries. With the funds it receives from these weapons sales, the DPRK can further develop missiles.⁴³³ There have also been reports of chemical and biological weapons assistance to Syria and Iran, though this is far from being conclusively substantiated.⁴³⁴

The US Department of Defense reports that,⁴³⁵

North Korea uses a world-wide network to facilitate arms sales activities and maintains a core group of recipient countries including Iran, Syria, and Burma. North Korea has exported conventional and ballistic missile-related equipment, components, materials, and technical assistance to countries in Africa, Asia, and the Middle East. Conventional weapons sales have included ammunition, small arms, artillery, armored vehicles, and surface-to-air missiles.

North Korea uses various methods to circumvent UNSCRs, including falsifying end-user certificates, mislabeling crates, sending cargo through multiple front companies and intermediaries, and using air cargo for deliveries of high-value and sensitive arms exports.

1. In early July 2013, Panamanian authorities stopped and inspected the North Korean flagged vessel Chong Chon Gang, finding hidden cargo including two MiG-21 fighter aircraft and associated engines, SA-2 and SA-3 SAM-related equipment, and unspecified missiles. Cuba issued a statement acknowledging ownership of the military equipment and claiming it was being sent to North Korea for overhaul.
2. In June 2011, the M/V Light, a vessel bound for Burma suspected of carrying military-related cargo, returned to North Korea after refusing a U.S. Navy inspection request.
3. In February 2010, South Africa seized North Korean-origin spare tank parts destined for the Republic of Congo.
4. In December 2009, Thai authorities impounded the cargo of a chartered cargo plane containing about 35 metric tons of North Korean weapons, including artillery rockets, rocket-propelled grenades, and SAMs.

The DPRK has exported approximately 500 ballistic missiles over the past 20 years, with over 80% of these exports taking place between 1987 and 1993. The country transferred 100-400 *Scud-B* missiles to Iran in 1987-1988, along with 25-40 to the UAE in 1989. Technical assistance in the production of *Scuds* was given to Iran and Libya; the latter also received an unknown number of *Scud-Bs*, which were further exported to Ethiopia, Burma, Congo, and Vietnam. Libya and Egypt both received technical help for *Scud-C* production, while the DPRK exported *Scud-Cs* to Iran, Yemen, Syria, and Libya.

It is likely that the DPRK also provided technical assistance to Iran for *Nodong* production and exported *Nodongs* to Pakistan, Libya, Syria, Iran, Iraq, and Egypt. Missile components and related items were found on a DPRK freighter headed to Libya in 1999, while another DPRK

freighter transported *Scud* missiles to Yemen in 2002. Furthermore, 18 *Musudan* missiles were transferred to Iran in 2005.⁴³⁶ Burma (Myanmar) has also reportedly received DPRK missile assistance and conventional missile exports, in contravention of UN sanctions on the DPRK.⁴³⁷

By 1993, the DPRK reportedly had contracts with Libya, Iran, and possibly Syria and Pakistan to sell the *Nodong* missile. In 2002, US and Spain intercepted a DPRK ship headed to Yemen with a cargo of 15 *Scud* missiles, conventional warheads, and 85 drums of inhibited red fuming nitric acid, used in *Scud* missiles.⁴³⁸ However, DNI Dennis Blair testified to Congress in 2009 that,⁴³⁹

Pyongyang is less likely to risk selling nuclear weapons or weapons-quantities of fissile material than nuclear technology or less sensitive equipment to other countries or non-state actors, in part because it needs its limited fissile material for its own deterrent. Pyongyang probably also perceives that it would risk a regime-ending military confrontation with the United States if the nuclear material was used by another country or group in a nuclear strike or terrorist attacks and the United States could trace the material back to North Korea. It is possible, however, that the North might find a nuclear weapons or fissile material transfer more appealing if its own stockpile grows larger and/or it faces an extreme economic crisis where the potentially huge revenue from such a sale could help the country survive.

The economic desperation of the regime, especially in an atmosphere of increasing international sanctions, could increase the country's level of acceptable risk – perhaps resulting in nuclear smuggling, as previously discussed.

If the DPRK does decide to engage in such activities, it would have the channels and capacity to do so. Experts state that the North has the capability to make either “plutonium metal or plutonium oxide powder, the two most likely forms for transport;” it would then be possible to shield six palm-sized pucks of plutonium from sensors. And while the US and its partners have increased the pressure on the DPRK's Navy through Proliferation Security Initiative (PSI) interdictions, overland and air smuggling routes have also been developed that can be used for proliferation purposes. Furthermore, while there were 11 PSI interdictions in 2004, there are an estimated 65 nuclear smuggling events annually – if the North wanted to proliferate nuclear materials, it would likely be successful in at least some of its attempts.⁴⁴⁰

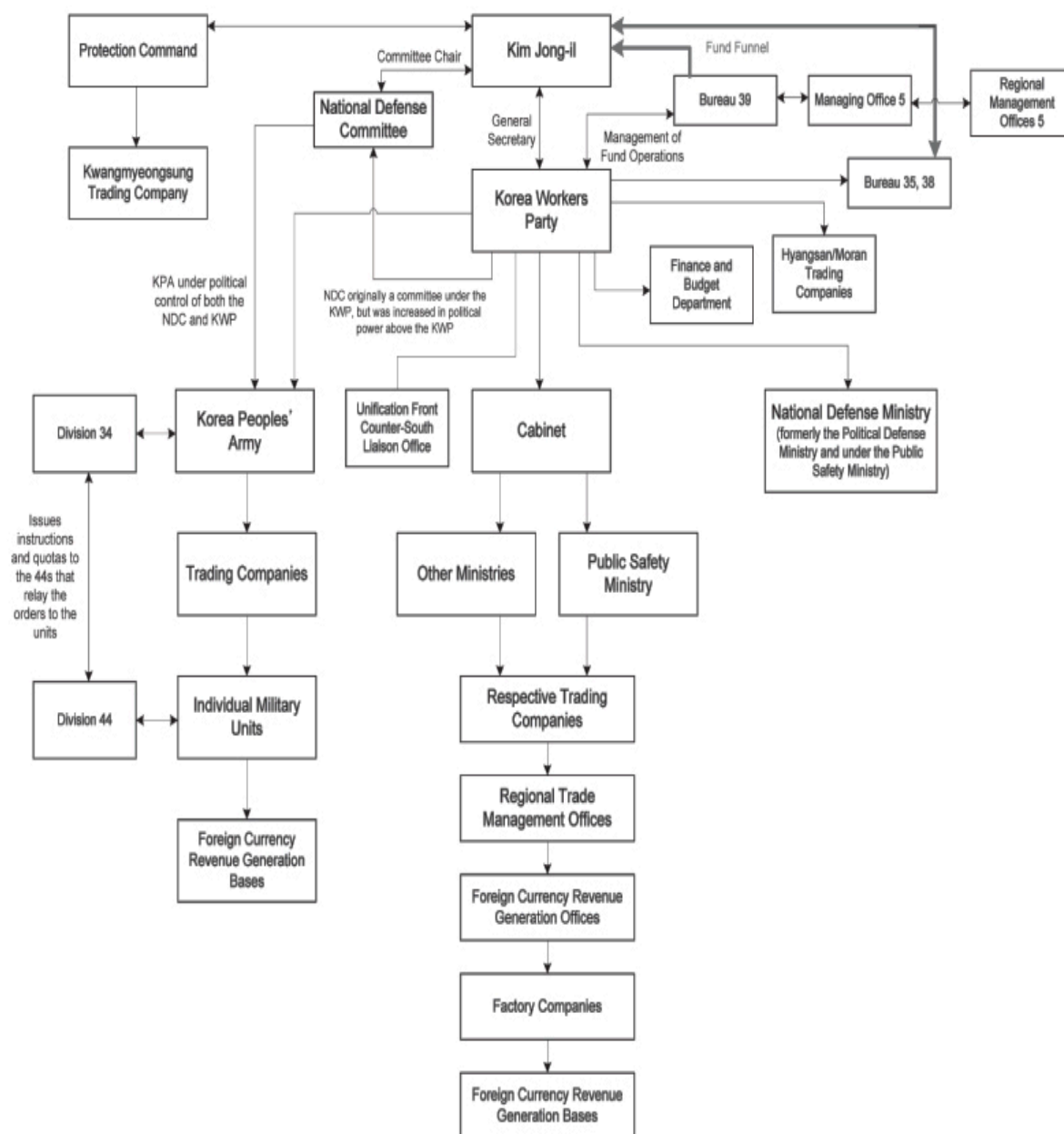
North Korea has continued its export of conventional arms, such as MANPADs, artillery rockets, and RPGs, to non-state actors. Footage from Syrian rebels appears to show rebels firing the Bulsae-2, a North Korean version of the Russian 9K111 Fagot anti-tank guided missile.⁴⁴¹ The Syrian regime was also apparently still receiving missile components and technology from North Korea as recently as 2013.⁴⁴²

UN sanctions have made it increasingly difficult for the DPRK regime to rely on arms sales as a steady source of income. Following the 2006 nuclear test, the UNSC imposed an arms embargo on North Korea that covered all major conventional weapons and ballistic missiles. After the 2009 test, this was expanded to all weapons except small arms, which were subsequently banned after the 2016 nuclear test.⁴⁴³

Despite these restrictions, the DPRK has tried to continue arms shipments through increasingly sophisticated sanction work arounds, such as “document falsification, cargo concealment, strategic attempts to take advantage of lax regulations on transshipment and business ownership structure, employment of foreign-based individuals to assist with financial transactions, and the use of front and shell companies”. These methods have allowed North Korea to continue its export of “tanks, air-defense systems, artillery systems, and rocket-propelled grenades (RPGs), as well as shells and ammunition”, in addition to running a weapons refurbishing business

focused on old Soviet equipment.⁴⁴⁴ However, it is unclear how expansive or profitable this arms trading is for the regime, especially given the recent tightening of sanctions.

Figure III.5: The DPRK's Legal, illegal, and Illicit Activities Network (2010)



Source: John Park, "North Korea, Inc.: Gaining Insights into Regime Stability in North Korea from Recent Commercial Activities," in Paul Rexton Kan, Bruce E. Bechtol Jr, Romert M. Collins, *Criminal Sovereignty: Understanding North Korea's Illicit International Activities*, Strategic Studies Institute, March 2010, 2.

ROK Weapons Sales

Because of force structure reductions and the corresponding likely lack of increase in domestic procurement demand, the ROK is promoting export of military equipment. Sales abroad reached \$2.4 billion in 2011⁴⁴⁵ – higher than the goal of \$1.6 billion thanks to the success of the T-50 Golden Eagle aircraft – while domestic sales were \$7 billion.⁴⁴⁶

The ROK aims to be among the world's top 8 exporters by 2015⁴⁴⁷ and by 2017 total ROK defense exports are forecast to be \$10 billion.⁴⁴⁸ Items exported include aircraft engine and wing assemblies, small-caliber munitions, tank production technology, submarine combat systems, and wheeled armored vehicles.⁴⁴⁹

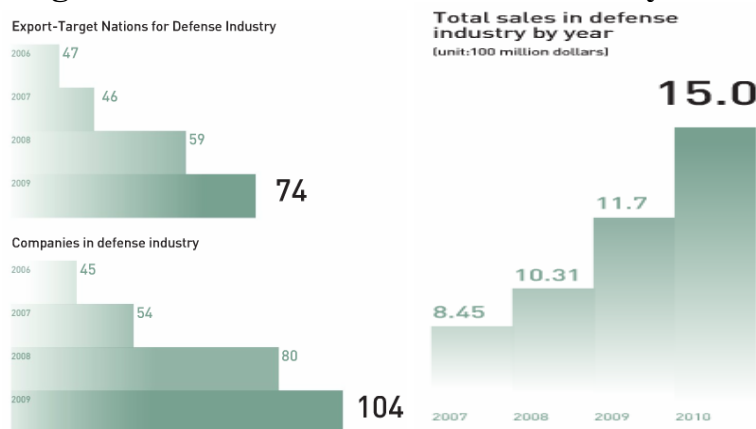
Figure III.6 shows the increase in numbers of ROK weapons sales and defense companies over the past several years, along with total defense industry sales. The ROK is hoping to link defense exports with civilian industries like shipbuilding, exploiting existing export strengths. Regarding ROK military exports, the IISS reported,⁴⁵⁰

South Korea's aerospace industry is the least developed sector, although the co-development of the T-50 trainer and the FA-50 light fighter variants show longer-term potential. Indonesia signed a contract in May 2011 for 16 T-50s, and the Philippines selected it in August 2012. The largest potential market is in the US, where the air force's T-X trainer competition (for up to 350 aircraft) could provide a major boost to the T-50.

In naval systems, South Korea already produces Aegis destroyers and its own LHDs. In February 2012, Daewoo Shipbuilding won a contract to build four military oilers for the UK Royal Navy and also won a US\$1.1bn contract to build four submarines for Indonesia. South Korea has established capacity in manufacturing armored vehicles, such as the XK-2 tank and K9/10 self-propelled howitzers, which Seoul hopes to export. Lower labor costs, precision engineering, and South Korea's military experience have boosted defence-industrial prospects.

By 2014, South Korean defense exports had reached \$3.6 billion, with an average yearly growth rate of 31 percent for the previous five years. This made the ROK the 13th largest exporter of major arms in 2014.⁴⁵¹ Export numbers slid slightly to \$3.49 billion in 2015, but still showed a marked improvement from the historic profile of South Korea's more domestically focused defense industry.⁴⁵²

Figure III.6: The ROK Defense Industry in 2010



Source: Republic of Korea Armed Forces, "Innovation Makes Us Powerful," ROK Ministry of National Defense, 2010, 34-5.

DPRK: Cyber, Electronic Warfare, and SIGINT Capabilities

There are a variety of other North Korean paramilitary and covert activities that also deserve mention. The DPRK has a significant intelligence program directed towards the ROK.⁴⁵³

North Korea's intelligence resources are focused primarily on South Korea and are dedicated to influencing public opinion, collecting sensitive information on U.S. and Republic of Korea government and military targets, and in some cases assassinating high-profile defectors and outspoken critics of the North Korean regime. North Korean intelligence officers and agents for years have infiltrated South Korea by posing as defectors. Firsthand accounts of confessed North Korean agents describe long-term strategies that can involve many years of living in South Korea as sleeper agents before being tasked with a mission. North Korean intelligence activity is likely greatest in East Asia; however, the full extent of activity outside the Korean peninsula is unknown.

Cyber

As note earlier, DPRK cyber warfare capabilities are a growing problem – and one demonstrated by its attacks on Sony in December 2014. Former US Forces Korea Commander James Thurman testified in front of the House Armed Services Committee in March 2012 that “North Korea employs sophisticated computer hackers trained to launch cyber infiltration and cyber-attacks against Korea and the United States,” showing that the DPRK has stepped up its efforts to enhance its cyber-attack capacity in recent years.

The IISS summarizes the DPRK's cyber capabilities and history as follows:⁴⁵⁴

Since the 1970s, the North Korean military (the Korean People's Army – KPA) has maintained a modest electronic warfare (EW) capability. As a result of strategic reviews following Operation Desert Storm, the KPA established an information warfare (IW) capability under the concept of ‘electronic intelligence warfare’ (EIW). Complementing these EIW developments, the KPA is believed to have expanded its EW capabilities with the introduction of more modern ELINT equipment, jammers and radars. In 1998, Unit 121 was reportedly established within the Reconnaissance Bureau of the General Staff Department to undertake offensive cyber operations. Staff are trained in North Korea but some also receive training in Russia and China. In early 2012, activity attributed to Pyongyang included jamming the global positioning systems of aircraft using Seoul's main international airports, as well as those of vessels in nearby waters for two weeks. North Korea also continued to launch distributed denial of service attacks on South Korean institutions and pursue cyber infiltration against military and other government agencies.

The DOD reported in May 2013 that,⁴⁵⁵

North Korea probably has a military computer network operations (CNO) capability. Implicated in several cyber-attacks ranging from computer network exploitation (CNE) to distributed denial of service (DDoS) attacks since 2009, the North Korean regime may view CNO as an appealing platform from which to collect intelligence.

- North Korea was allegedly behind two separate cyberattacks in 2013, which targeted South Korean banking, media, and governmental networks, resulting in the erasure of critical data.
- According to a ROK newspaper, Seoul's Central Prosecutor's office attributed to North Korea a CNO activity on the ROK's National Agricultural Cooperative Federation (Nonghyup Bank) servers in April 2011. Through remote execution, actors rendered the bank's online services inaccessible and deleted numerous files concerning customer bank accounts while removing all evidence of CNO activity in the bank's servers.
- In the years spanning 2009-2011, North Korea was allegedly responsible for conducting a series of distributed denial of service (DDoS) attacks against ROK commercial, government and military websites, rendering them inaccessible.

Technical attribution of cyberspace operations remains challenging due to the internet's decentralized architecture and inherent anonymity. Given North Korea's bleak economic outlook, CNO may be seen as a

cost-effective way to modernize some North Korean military capabilities. As a result of North Korea's historical isolation from outside communications and influence, it is likely to employ Internet infrastructure from third-party nations.

The DPRK is believed to have a cyber warfare unit called "Number 121," composed of 3,000 elite hackers who break into networks for information and spread viruses – similar to espionage and vandalism, not warfare. The DPRK is also believed to train these experts as part of its computer warfare strategies at the electronic warfare department of a military technician training center.⁴⁵⁶

Two DPRK defectors who claimed to have been part of the cyber warfare department reported in 2011 that the department was vast, highly professional, and recruited hackers straight out of primary school. They are sent to Russia or China for training and receive special treatment by the DPRK – like housing or other privileges for their families and themselves. This is in part to reduce the temptation to defect, as they have access to the internet – unlike most other DPRK citizens – and thus know of the relative prosperity enjoyed by most other countries.⁴⁵⁷

One defector provided five reasons why the DPRK had decided to focus energy and resources into developing a cyber warfare program: cyber military strength is cost effective, provides higher utility than other forces, the DPRK is confident of its software development capabilities, it sees the internet as inherently weak and thus an easy target, and cyber warfare is asymmetrically advantageous for the DPRK. As the country is almost entirely not connected to the internet, it is much less exposed to such attacks – as opposed to the ROK, which is one of the most connected societies in the world.⁴⁵⁸

The DPRK is suspected of having been behind major cyber-attacks on the ROK in 2008, when the DPRK shut down approximately 400 computers at Lee Myung-bak's presidential transition office, and in 2009, when the websites of governmental institutions such as the National Assembly and the Presidential Office were paralyzed in a distributed denial-of-service (DDoS) attack.⁴⁵⁹

The 2009 attack involved 435 different servers in 61 countries.⁴⁶⁰ The ROK's Seoul Central District Public Prosecutors' Office announced in May 2011 that its investigation into a network failure of Nonghyup bank in March 2011 showed the issue was caused by a cyber-attack in which North Korea was involved.⁴⁶¹ Another early 2011 attack paralyzed the websites of 40 public and financial institutions, including the presidential office. In 2012, a major South Korean newspaper, JoongAng Ilbo, was also attacked.⁴⁶²

The DPRK is also suspected to be behind another attack on March 20, 2013 when a hacking attack originating from a Chinese IP address paralyzed approximately 32,000 computers at the ROK's two largest public broadcasters, a news cable channel, and three large banks.⁴⁶³ The broadcasters attacked were on a list of ROK media firms denounced by the DPRK in 2012 for the right-wing manipulation of ROK public opinion.⁴⁶⁴

The ROK traced the IP address of the hacker to a registration in Ryugyong-dong in Pyongyang (the capital of North Korea), and the hacker first accessed the ROK websites weeks before the March 2013 attack. The methods used in the attack were similar to those used by the DPRK's Reconnaissance General Bureau, which has in the past led hacking attempts against the ROK.

To undertake the attack, 76 pieces of malicious code were used; 18 bits of code have been identified as exclusively used by DPRK hackers in previous attempts. The attack also involved

routing through the US, ROK, and eight other countries in an apparent attempt to disguise its identity; 49 infiltration routes were used (25 local; 24 foreign), of which 22 were IP addresses the DPRK has used before in attacks.⁴⁶⁵

From 2008-2012, ROK public institution websites have received 73,030 hacking attempts – though the vast majority have not been conclusively tied to DPRK. ROK officials also say that DPRK computers were used to distribute malicious software by accessing ROK financial firms’ networks 1,590 times between June 2012 and April 2013.⁴⁶⁶

In April 2013, the ‘hactivist’ group Anonymous claimed to have initiated “Operation Free Korea,” a series of cyber-attacks on the DPRK. The group first hacked the DPRK’s China-based website Uriminzokkiri.com, took control of the related Flickr and Twitter accounts, and posted a warning, a manifesto, a series of demands, and a wanted poster of Kim Jong-un with a pig snout and Mickey Mouse on his chest.⁴⁶⁷

The group claimed to have stolen 15,000 membership passwords to the Uriminzokkiri website, releasing personal details of these accounts. Other, smaller pro-DPRK sites were also hacked, with personal details of members released. Any ROK citizens whose information is found on these membership lists could face criminal prosecution.⁴⁶⁸

Anonymous also initiated a DDoS attack of DPRK-related websites like Uriminzokkiri.com and Air Koryo on Kim Il-sung’s birthday in early April 2013. One hacker belonging to the group was interviewed by an ROK news agency, saying, “Anonymous members not only want to attack the government’s homepage, but will try to steal personnel data of North Korean leaders, and even hack into the North’s nuclear facilities.” Although there is no evidence the group has gotten into DPRK servers or intranet, they claim to have plans to do so.⁴⁶⁹

A 2014 report by Hewlett-Packard on North Korea cyber-capabilities highlights the difficulties that arise from the nature of the internet in North Korea.⁴⁷⁰

North Korea’s Internet infrastructure and the regime’s strict control over its use ensures that there are no rogue actors and that all officially sanctioned actors exercise careful OPSEC and PERSEC practices in order to prevent inadvertent information leaks. In other words, there was no significant identifying information in the form of an OSINT trail left behind by the actors. This hinders collection of original, actionable threat intelligence and individual actor attribution.

Today North Korea’s air-gapped networks and prioritization of resources for military use provide both a secure and structured base of operations for cyber operations and a secure means of communications. North Korea’s hermit infrastructure creates a cyber-terrain that deters reconnaissance. Because North Korea has few Internet connections to the outside world, anyone seeking intelligence on North Korea’s networks has to expend more resources for cyber reconnaissance.

The report drew from several government, media, and scholarly sources in order to draw a picture of the groups and institutions within North Korea that execute and support its cyber-warfare capabilities.

- Unit 35 – “The Central Party Committee oversees the Central Party Investigative Group, also known as Unit 35. Unit 35 is reportedly responsible for technical education and training of cyber warriors. The Unification Bureau’s 132 Operations Department is responsible for cyber-psychological warfare, organizational espionage, and oversight of Unit 204.”
- Unit 204 – “Unit 204’s responsibilities include planning and execution of cyber-psychological warfare operations and technological research.”
- Psychological Operations Department of the North Korea Defense Commissions – This institution also engages in cyber-psychological warfare.

- Unit 121 - Unit 121, North Korea's premier hacking unit, was estimated to consist of 3000 personnel in 2012. South Korea's Yonhap News Agency increased that number to 5900 in July 2014. Of these 5900 personnel, about 1200 of them are professional hackers. Yonhap stated that 100 cyber warriors per year were trained at North Korea's Mirim University, though the source for this information could not be corroborated.⁴⁷¹ While the quality of this training cannot be precisely verified, it is known that the North Korean school system places heavy emphasis on mathematics, which has led North Korea to feel confident of its abilities to nurture capable programmers, cryptographers, and security researchers. "Unit 121 comprises both an intelligence component and an attack component. Unit 121's headquarters is in the Moonshin-dong area of Pyongyang, near the Taedong Rivber. It also has components that conduct operations from within China. One of Unit 121's command posts is Chilbosan Hotel in Shenyang, the capital of Liaoning Province, which borders North Korea."⁴⁷²
- Lab 110 – "Both Unit 121 and an entity known as Lab 110 are reported to maintain technical reconnaissance teams responsible for infiltrating computer networks, hacking to obtain intelligence, and planting viruses on enemy networks."⁴⁷³
- Office 225 / The 225th Bureau – This institution is "responsible for training agents, infiltration operations in South Korea, and creation of underground political parties in order to incite disorder and revolution."⁴⁷⁴ It plays a more traditional intelligence and psychological operations role, rather than focusing on cyber operations."
- No. 91 Office – "The No. 91 Office, an office responsible for hacking operates out of the Mangkyingdae-district of Pyongyang."
- Korea Computer Center (KCC) - KCC is "North Korea's leading government research venter for information technology. KCC has eleven regional information centers and eight development and production centers. Other countries with KCC branch offices include China, Syria, Germany, and United Arab Emirates. KCC has a vested interest in Linuz research and is responsible for the development of North Korea's national operating system, Red Star OS."⁴⁷⁵ "In 2011, South Korean police arrested five individuals, including one Chinese national, for allegedly collaborating with North Korean hackers affiliated with the Korea Computer Center to steal money via online games. According to South Korean reports, the culprits used an auto-player to quickly progress in the massively multiplayer online role-playing game (MMORPG) "Lineage" and were able to use the game's market to obtain real currency. In 2013, South Korean officials released information stating they had found evidence that North Korea was using games as a medium for infecting machines and launching cyber-attacks. North Korea had used game downloads to infect 100,000 South Korean machines for a botnet used to launch a distributed denial of service (DDoS) attack against Incheon Airport. This clever tactic sought to leverage a seemingly innocent game as a force multiplier in order to amplify the effects of a DDoS attack on a critical infrastructure target. However, in this case, there was little impact on the target."
- Ministry of State Security - "The Ministry of State Security (MSS), also known as the State Security Department, is North Korea's primary counterintelligence service. It is considered an autonomous agent of the regime and reports directly to leader Kim Jong Un....the MSS also reportedly has a communications monitoring and computer hacking group."⁴⁷⁶
- Reconnaissance General Bureau (RGB) – "The RGB has a role in both traditional and cyber operations. In the past, the RGB has sent agents on overseas military assistance missions to train insurgent groups. The RGB reportedly has a special operations forces (SOF) element118 and oversees six bureaus that specialize in operations, reconnaissance, technology and cyber matters, overseas intelligence collection, inter-Korean talks, and service support. Two of these bureaus have been identified as the No. 91 Office and Unit 121."
- Chongryon and the Liaison Department of the Worker's Party- This department "oversees a faction of ethnic North Koreans residing in Japan who are critical to North Korea's cyber and intelligence programs. This group, which was established in 1955, is referred to by various names including the Chosen Soren, Chongryon, and the General Association of Korean Residents in Japan... The Chongryon's underground group known as the Gakushu-gumi, or "the study group", gathers intelligence for North Korea and helps the regime procure advanced technologies."⁴⁷⁷

In December 2014, Sony suffered a cyber-attack that broke into Sony's computer network and revealed internal emails and information. The attack was attributed to North Korean retaliation for a comedy film that Sony produced about American journalists being tasked by the CIA to kill Kim Jong-un. North Korea denied any involvement, but praised it. Experts believe the hackers may have been inside Sony's network for months. Hackers threatened violence at any theaters that showed the movie, which eventually led Sony to cancel showing the film.⁴⁷⁸

As a result of many recent cyber-attacks, the Sony incident became the catalyst for the Obama administration to establish a new agency under the Director of National Intelligence.⁴⁷⁹ The Cyber Threat Intelligence Integration Center, as articulated in a Presidential Memorandum released on February 25, 2015, will "provide integrated all-source analysis of intelligence related to foreign cyber threats or related to cyber incidents affecting US national interests".⁴⁸⁰

In 2015, the hacking group previously implicated in the Sony breach launched a series of attacks against several Asian banks, stealing billions of dollars. If instigated by the DPRK government, the attacks would constitute the first occurrences of a nation-state engaging in cyber-attacks for financial gain.⁴⁸¹ The next year, North Korea was implicated in stealing the personal consumer data of South Korean citizens, as part of their pursuit of foreign currency. This matched a longstanding pattern of DPRK cyber-attacks on South Korean government, banking and media systems.⁴⁸²

Electronic Warfare and SIGINT

Jane's notes that since the mid-1990s, the DPRK has increased its electronic warfare (EW) efforts as one of the primary components of an asymmetric warfare strategy against the US and the ROK. The administration and training of all EW and signals intelligence (SIGINT) assets in the Army is overseen by the Electronic Warfare Bureau (EWB). The DPRK keeps a police battalion at the DMZ, composed of eight to 12 police companies, that is in charge of a variety of ground-surveillance equipment – such as thermal and infrared imaging devices, acoustic and seismic sensors, and radar. The police force also has a basic SIGINT collection ability, especially at the Joint Security Area at Panmunjom.⁴⁸³

Deployed near the DMZ, division-level SIGINT/EW units have responsibility for operations, spanning from their forward line to 15-30 km behind the US/ROK force deployment. At the corps level, SIGINT/EW battalions have responsibility for up to a 75-150 km depth. In addition, EWB independent units also likely support corps and division efforts.⁴⁸⁴

In August 2010, users of Global Positioning System (GPS) in the northwest section of the ROK, including sections of the West Sea, experienced an unexpected degradation or loss of signal. Subsequent investigation revealed that the cause for this was jamming - presumably by the KPA - from an emitter located in the area around Kaesong.

While the DPRK has intermittently conducted jamming operations against ROK/US military and commercial broadcasts over the years this was the first major incident of GPS jamming. The KPA reportedly acquired GPS jamming equipment from Russia during the 1990s or early 2000s and subsequently modified it and began manufacturing two different systems. Subsequent reports indicated that the KPA's GPS jammers were mobile units mounted on "electronic warfare vehicles."

Following the November 2010 attack upon the island of Yonp'yong-do the ROK Army deployed UAVs to monitor KPA activities. The KPA, however, reportedly jammed the UAV's navigation system, rendering them ineffective. More jamming occurred in March 2011 during the joint ROK-US 'Ulchi Freedom Guardian' exercises, when the KPA engaged in random GPS jamming harassment by sporadically jamming at five to 10 minutes intervals.

The jamming originated from the area of Haeju, Kaesong and Kumgang-san and had a range of approximately 100 km. During March 2011 and the again for 16 days in May 2012 the KPA conducted GPS jamming operations along the west coast, north of Seoul. The May incident effected the operations of 670 commercial airliners and 110 vessels in the Yellow Sea. These operations are believed to have conducted by elements of the Reconnaissance General Bureau.

ROK Cyber Defense

As has been touched upon earlier, South Korea has been increasing its asymmetric capabilities in order to better defend against new forms of DPRK attacks. In terms of cyber capabilities, the IISS report stated,⁴⁸⁵

South Korea established a Cyber Warfare Command Centre in early 2010, with over 200 personnel, in the wake of a substantial distributed denial of service attack in 2009. The new center responds to the attention given to cyber and information security by the National Intelligence Service and the Defense Security Command. South Korea published an ‘Internet White Paper’ in 2009.

Other sources indicate the ROK plans to add 1,000 personnel to its Cyber Warfare Command Center over the 2013-2017 period. Increasing personnel and attention to this area is part of a much broader cyberwarfare effort by the ROK’s National Intelligence Service and the Defense Security Command.⁴⁸⁶

The DPRK has accused South Korea and the US of carrying out cyber-attacks on DPRK websites;⁴⁸⁷ one DPRK state-run paper stated in March 2013, “It is nobody’s secret that the U.S. and south Korean puppet regime are massively bolstering up cyber forces in a bid to intensify the subversive activities and sabotages against the DPRK...They are seriously mistaken if they think they can quell the DPRK’s voices of justice through such base acts.”⁴⁸⁸

In response to DPRK cyber-attacks, the US and South Korea held the first Korea-US National Defense Cyber Cooperation Working Group (CCWG) in February 2014. This group provided an “opportunity for the two countries to share information about cyber threats and enhance the all-around cooperation of cyber policy, strategy, doctrine, personnel and training,” according to the South Korean Defense Ministry.⁴⁸⁹ This will likely be an early step in South Korea’s efforts to consolidate its cyber strategy. The Korea Institute for Defense Analysis noted that:⁴⁹⁰

...because the South Korean cyber security system is decentralized, each department establishes its own organization and strategies. The differences among the departments in terms of approaching cyber security makes it impossible to streamline policy in an efficient manner. Additionally, because of this decentralized structure, post-incident management for recurrence prevention is difficult to accomplish, which thereby renders inefficient any comprehensive, preventative policymaking.

The two Koreas have made very different political and military decisions in creating their missile forces. The DPRK has placed far more emphasis on missile forces, although recent developments in the ROK indicate that this may be changing. Long-range artillery, rockets, and missiles help North Korea (Democratic People's Republic of Korea or DPRK) threaten and deter South Korea (Republic of Korea or ROK) and the US, and compensate for the weaknesses in DPRK airpower. They also provide a potential means to deliver the DPRK's nuclear weapons and other weapons of mass destruction.

IV. Korean Missile Forces

The two Koreas have made very different political and military decisions in creating their missile forces. The DPRK has placed far more emphasis on missile forces, although recent developments in the ROK indicate that this may be changing. Long-range artillery, rockets, and missiles help North Korea (Democratic People's Republic of Korea or DPRK) threaten and deter South Korea (Republic of Korea or ROK) and the US, and compensate for the weaknesses in DPRK airpower. They also provide a potential means to deliver the DPRK's nuclear weapons and other weapons of mass destruction.

Overview of DPRK Missile Developments

The DPRK has given high priority to the development of ballistic missiles for a wide range of reasons. They include political and diplomatic considerations, earning foreign currency, and enhancing DPRK military capabilities on both a regional basis and in an effort to shape the Korean military balance in its favor.

According to a US Forces Korea (USFK) report in 2010,⁴⁹¹

[T]he North Korean regime continues its efforts to develop nuclear weapons and ballistic missile programs both as a means to ensure the regime's survival and to manipulate the international community. The regime's potential export of weapons of mass destruction material and technology poses a regional and global threat...North Korea views its ballistic missile programs as a source of prestige, a strategic deterrent, a means of exerting regional influence, and a source of hard currency. North Korea continues to build and test missiles of increasing range, lethality and accuracy, thereby bolstering its inventory of missiles available for internal use or external sale. With as many as 800 missiles in its active inventory, it seems as though North Korea intends to increase its offensive capabilities. Missile sales further constitute a vital source of hard currency for the North Korean regime facilitating its continued irresponsible behavior and repression of its own people.

At the same time, missile tests and deployments are an expensive effort for the DPRK due to its limited technology and economic base. For example, the ROK Ministry of Unification estimated that the DPRK's two missile launches in 2012 cost it a total of \$1.3 billion – with the rockets themselves costing \$600 million, launch site development costing \$400 million, and other related facilities costing \$300 million.⁴⁹² These funds could have bought 4.6 million tons of corn, enough to feed the DPRK for four or five years.⁴⁹³ These costs can only have increased with the corresponding rise in advanced missile tests under Kim Jung Un.

Arsenal and Capabilities

Even so, the DPRK now has hundreds of ballistic missiles, along with a significant infrastructure and institutional arrangement to sustain its missile development program. As of May 2012, the DPRK had at least nine different types of guided ballistic missiles available or in development, with some offered for export to other countries, and some open source material reports that the DPRK has operationally deployed 800-1000 missiles.⁴⁹⁴ The specifics of each missile will be discussed later in this chapter, but DPRK's capabilities may be summarized as follows.

DPRK missile development accelerated at a remarkable pace after the short-range *Hwasong-5* (a DPRK version of the Soviet *Scud-B*) was put into serial production in 1987. During a five-year period (1987–1992), the country began developing the *Hwasong-6* (a DPRK version of the Soviet *Scud-C*), the medium-range *Nodong*, the long-range *Taepodong-1* and *Taepodong-2*, and

the *Musudan* (a road-mobile version of the Soviet R-27/SS-N-6 *Serb* submarine-launched ballistic missile).⁴⁹⁵

North Korea has successfully flight tested the *Hwasong-5/6* and the *Nodong*; however, the *Taepodong-1* was only partially successful in a 1998 test and a variant of the *Taepodong-2* was tested successfully in December 2012 and February 2016 as a space launch vehicle (*Unha-3*).⁴⁹⁶

Figure IV.1 provides a chart assessing the key characteristics of the DPRK's various missiles.

Sources vary, but estimates by the NTI indicate that the DPRK possesses around 600 scud variants *Hwasong-5/6s* (*Scud-B*, *-C*, and *-D*) that can strike the ROK – though according to one 2006 source, only 100-150 of these were deployed and the rest were exported – and 200 *Nodong* missiles (with up to 50 corresponding TELs) that can strike as far as Japan. Long-range missiles, like the *Taepodong-1/2*, with the potential to hit the continental US and other international targets, are still under development.⁴⁹⁷

It is possible that the DPRK possesses 20-30 *Taepodong-I* missiles and perhaps 5 *Taepodong-IIs*. All of these missiles, except the *Scuds*, could potentially be equipped with nuclear or chemical capabilities, though sources are far from agreement on this issue.⁴⁹⁸ One often-cited source also reports that up to 50 *Musudan* missiles are deployed (with 50 TELs), and that the KN-02 is already in use.⁴⁹⁹ The NTI notes that, in total, the DPRK has less than 50 *Taepodong* and *Musudan*.⁵⁰⁰

How Capable Are the DPRK's Missiles?

Markus Schiller conducted an extensive 2009 study of DPRK missile developments and estimated that the DPRK holds fewer missiles, and with lower capacities, than is usually assumed. While the DPRK has space launch vehicles and boosters that might launch a small warhead as far as the US, he concludes that an actual ICBM with re-entry capability is unlikely, as is the actual full development and deployment of the KN-08.⁵⁰¹

1. The Scud B is probably available in large numbers (perhaps hundreds), since the R-17 had a very high production rate and was produced for three decades, if not longer, and many decommissioned or mothballed R-17s existed in post-Soviet Russia. The system is combat proven. Its nominal range is 300 km with a 1-ton warhead. Its real accuracy is probably around 1 km (CEP). Launch procedures are complex, and only few well-trained crews are expected.
2. The Scud C is probably available in smaller numbers (perhaps 100). The system is likely combat proven. Its range is about 500 km with a 0.7-ton warhead. Its accuracy is worse than that of the Scud B. Launch procedures are analogous to those for the Scud B, and only few well-trained crews are expected.
3. The Scud D is probably available in small numbers (perhaps a few dozen). Its range is about 700 km with a 0.5-ton warhead. Its accuracy is worse than that of Scud C. Launch procedures are analogous to those for the Scud B, and only few well-trained crews are expected.
4. The Nodong is limited to a small number of a few dozen at best. Its range is about 900 km with a one-ton warhead. Its accuracy is worse than that of the Scud B. Launch procedures are comparable with those for the Scud B, with additional time-consuming fueling procedures once the missile is in vertical position.
5. Other Taepodong I prototypes are unlikely to exist.
6. One or two more Taepodong II/Unha-2/-3 might exist. Launch procedures are lengthy and easily visible.
7. If available at all, the Musudan is only available in small numbers.
8. The situation of the KN-02 is hard to judge. It might be available in sufficient numbers. Its accuracy might be high. Its range with a 0.5-ton warhead is most likely limited to 70 km, but might reach 120 km, if the newer version of SS-21 found its way to North Korea.

The DPRK would face several important capacity constraints even if it had an operational deployment of 800-1000 missiles.⁵⁰²

1. Only a small number of launch crews can be well trained. Even assuming that the production quality of North Korean-produced missiles is high, or that North Korea's missiles are all of Soviet design and production, the lack of crew training will result in moderate results at best, with handling failures and low accuracy.
2. If missiles are produced in North Korea, they are not of excellent reliability and accuracy because of the lack of firing table creation and lot acceptance tests.
3. The number of imported and well-tested Soviet missiles is limited and might be only a fraction of the total missile force.

It is clear from many sources, however, that the DPRK's missile forces do continue to improve. The former commander of USFK, Burwell B. Bell testified before the House Armed Services Committee in March 2007 that "North Korea is developing a new solid-propellant short-range ballistic missile... [I]n March 2006, North Korea successfully test-fired the missile. Once operational, the missile can be deployed more flexibly and rapidly than the existing system and North Korea will be able to launch the missile in a much shorter preparation period."⁵⁰³ The short-range missile referred to appears to be the *Toksa*.

The DPRK is also making efforts to improve existing ballistic missiles such as the *Hwasong* and *Nodong*, including an attempt to extend their ranges.⁵⁰⁴ See **Figures IV.1 to IV.3** for more detailed comparisons of the missiles, their capabilities, and their likely ranges.

Most analysts believe that the DPRK is now nearly self-sufficient in ballistic missile production but still relies upon some advanced foreign technologies and components, particularly for guidance systems. The country has an extensive machine tool sector; thus, the DPRK is probably self-sufficient in the fabrication of airframes, tanks, tubing, and other basic components.⁵⁰⁵ However, the DPRK's rapid strides in the development of its ballistic missiles with only a limited number of test launches could mean that the country imported various materials and technologies from outside.⁵⁰⁶

There has been a much more focused DPRK effort to develop and test ballistic missile system (including ICBMs) since the ascension of Kim Jung-Un. The 2015 DoD report on North Korea notes that:⁵⁰⁷

North Korea has an ambitious ballistic missile development program in addition to its deployed mobile theater ballistic missiles. Since early 2012, North Korea has made efforts to raise the public profile of its ballistic missile command, now called the Strategic Rocket Forces. In 2014, Kim Jong Un personally oversaw several ballistic missile launch exercises, and North Korea launched an unprecedented number of ballistic missiles. The State media covered the usually secretive events, including reporting on two launch cycles in the same week. Kim's public emphasis of the missile force continued into 2015, when he appeared at what North Korea portrayed as the test launch of a submarine-launched ballistic missile (SLBM). In late November 2015, the ROK's Yonhap news agency reported that North Korea appeared to conduct an SLBM test but it ended in failure with no indication that the missile successfully ejected from the vessel.

North Korea is committed to developing a long-range, nuclear-armed missile that is capable of posing a direct threat to the United States. Pyongyang displayed the KN08 ICBM, which it refers to as Hwasong-13, on six road-mobile transporter-erector-launchers (TEL) during military parades in 2012 and 2013. If successfully designed and developed, the KN08 likely would be capable of reaching much of the continental United States, assuming the missiles displayed are generally representative of missiles that will be fielded. However, ICBMs are extremely complex systems that require multiple flight tests to identify and correct design or manufacturing defects. Without flight tests, the KN08's current reliability as a

weapon system would be low. In October 2015, North Korea paraded four missiles on KN08 TELs. These missiles are noticeably different from those previously displayed on these TELs.

Officials in the Russian government have admitted that Russian missile experts and nuclear scientists were in North Korea in the 1990s providing support, but the officials claimed that these scientists and experts returned to Russia by 1998. During this time period, DPRK missile experts were also in Iran, where they reportedly showed skills and knowledge that some sources report were “very unimpressive.”⁵⁰⁸

Uncertainties

There are as many uncertainties in predicting the future nature of the DPRK’s missile programs as there are in making predictions about its nuclear program. The DPRK’s ambitious missile programs are still largely in development, and their capabilities are impossible to predict because there have not been enough tests of the DPRK’s longer-range missiles to provide a clear picture of their performance.

These uncertainties, along with the fact that the DPRK’s missile testing involves firing the missiles over the ocean – as opposed to firing them towards an independently verifiable target – make it impossible to estimate the reliability and operational accuracy of its missiles, or whether the DPRK has anything approaching some form of terminal guidance technology.⁵⁰⁹

Nevertheless, DPRK advancements in missile technology coupled with its nuclear ambitions have caused considerable concern among ROK and Western sources. Former US Secretary of Defense Robert M. Gates warned in January 2010:⁵¹⁰

With the DPRK’s continuing development of nuclear weapons and their development of intercontinental ballistic missiles, North Korea is becoming a direct threat to the United States, and we have to take that into account...I think that North Korea will have developed an intercontinental ballistic missile (within five years)... Not that they will have huge numbers or anything like that, but they will have—I believe they will have a very limited capability.

It is unclear whether the DPRK could make such a large ballistic missile program effective with so few test launches. This has led some experts to believe that the DPRK imported materials, technologies, and designs. While most analysts concur that the DPRK has reverse-engineered Soviet ballistic missiles, Markus Schiller of RAND argues that the DPRK’s ballistic missile program is too sophisticated and has been tested too few times – with too low of a failure rate for so few tests – to be indigenous. He believes that instead, North Korea either received missiles directly from the USSR/Russia or had an arrangement for licensed production. Schiller proposes that the DPRK has been conducting missile tests with Soviet/Russian missiles to appear highly capable, but has probably not tested indigenously produced or designed missiles.⁵¹¹

After several years of more advanced DPRK missile testing and development, researchers still have to speculate about the long-term viability of the DPRK missile program. One 2015 report offers three potential scenarios for North Korean capabilities in 2020:⁵¹²

- *Minimal Modernization*: North Korea’s development of new delivery systems slows, resulting in a force that remains essentially the same as it is today. Nevertheless, Pyongyang may be able to make some improvements. First, it could deploy short-range, sea-launched cruise and ballistic missiles on surface ships or cruise missiles on submarines based on existing weapons, possibly the KN-01 naval cruise missile or the KN-02 SRBM. Second, Pyongyang could deploy the Musudan IRBM in an emergency operational capability. While the missile has not yet been flight tested, the North has already conducted extensive development activities. Indeed, the Musudan may already have been deployed in an emergency operational status during the 2013 crisis on the Korean peninsula if media reports are accurate.

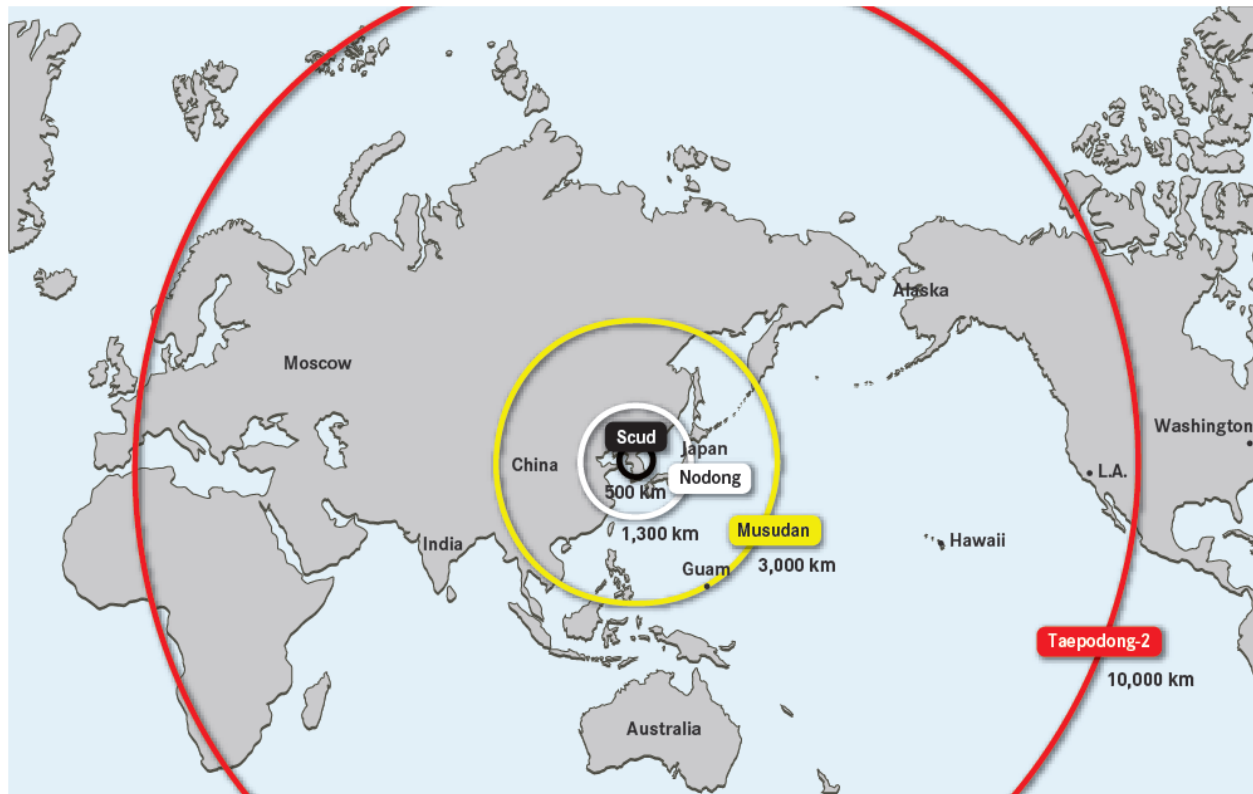
- *Steady Modernization*: North Korea continues its current development and deployment path, resulting in a greater regional threat than in the first scenario and the emergence of a more credible intercontinental threat. In the theater, greater numbers of sea-based systems would be deployed. Pyongyang may also develop an emergency operational capability to field a ballistic missile submarine. On land, the Musudan IRBM becomes an operational system after a limited number of flight tests and an enhanced range KN-02 SRBM is deployed to supplement existing Scud missiles. In addition, Pyongyang may decide to deploy countermeasures to cope with evolving theater missile defenses deployed by the United States, South Korea and Japan, most of which focus on intercepting missiles inside the atmosphere. This will require emplacing rocket-powered darts as decoys on missiles—such as the Nodong—and flight testing to ensure the system works. A more credible intercontinental threat would consist of the KN-08 ICBM, now available on an emergency basis as it moves towards becoming an operational weapon and possibly Taepodong ICBMs deployed in more survivable hardened missile silos.

- *Maximum Modernization*: North Korea accelerates the development and deployment of new systems, resulting in a more rapidly emerging regional and intercontinental threat. In the theater, the Musudan IRBM would achieve an earlier initial operating capability and deployments of missiles would increase. A solid-fuel missile with a range of 300 kilometers intended to replace the Scud becomes operational. Pyongyang might also deploy its first operational sea-launched ballistic missile submarine armed with weapons based on the Nodong MRBM or Musudan IRBM. On the intercontinental level, the KN-08 ICBM would reach an initial operational capability with growing numbers deployed by 2020, though numbers would still probably be limited by the availability of critical components, particularly engines. Finally, since the program would achieve considerable momentum beyond 2020, further developments, previously over the time horizon, might include a longer-range ICBM utilizing new high-energy engines that could reach targets anywhere in the United States, more sophisticated guidance systems that would substantially increase accuracy and a solid-propellant replacement for the Nodong MRBM.

North Korea also appears to be gradually developing the capability to launch ballistic missiles from a submarine. North Korea does have an old Cold War era Golf-II class Soviet ballistic missile submarine. 38 North analyzed imagery of a new submarine that appeared at the Sinpo naval yard, which some speculated to be a Golf class submarine. 38 North believes that this is not a Golf class, noting that it was too small to be a Golf class.⁵¹³

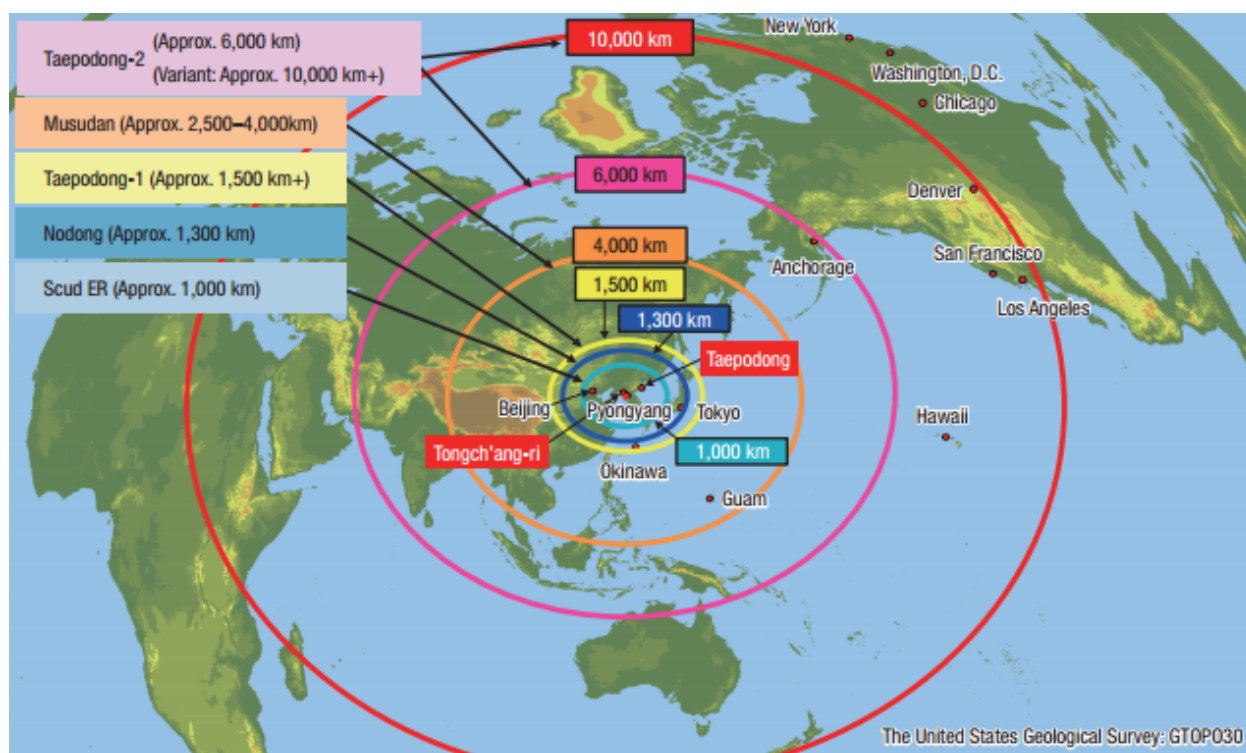
Yonhap cited sources within the ROK Ministry of Defense that said North Korea could complete tests in one to two years.⁵¹⁴ This tracks with imagery that shows a test stand that appears to be designed to test a vertical launch tube system for submarines and surface combatants. However, this information says little about North Korean efforts to develop a sea/submarine launched ballistic missile. No tests of a missile that could be fired from a naval platform have taken place.

Figure IV.2: ROK Ministry of National Defense Estimates of DPRK Missile Range



Source: Republic of Korea, Ministry of Defense, *White Paper* 2014, 33.

Figure IV.3: Japanese Ministry of Defense Estimates of DPRK Missile Range



Source: Japan Ministry of Defense, *Defense of Japan 2015*, 23.

DPRK Missile Programs

There are extensive reports available on some DPRK missiles, but much less is known about others – in particular, the DPRK's potential ICBMs.

The Hwasong and Toksa Programs

The DPRK possesses a large SRBM stockpile primarily based on different versions of the Russian Scud missile that can easily reach targets within the ROK. They are domestically produced, have a maximum range of approximately 300-500 km, and can carry a 1-ton warhead.⁵¹⁵ **Figures IV.2, IV.3, IV.5, and IV.6** show the capabilities of these missiles.

The DPRK seems to have indigenously reverse-engineered and improved the Soviet *Scud-B*, perhaps receiving the missile as early as 1972, produced the DPRK-version with USSR assistance or even under license in DPRK factories, or acquired different missile production technologies from several different foreign sources, incorporating them into its indigenous missile program. The DPRK's version is reported to have a slightly improved range and a slightly increased diameter, as well as use a different rocket fuel. At the very least, it appears that the DPRK had significant help from several foreign sources, including Egypt, China (People's Republic of China or PRC), Russia, and Iran.⁵¹⁶

The first North Korean “indigenously modified *Scud*” was reportedly first tested in April 1982. The first confirmed flight tests of *Scud*-B (Soviet R-17) versions were in April and September 1984. Successful flight tests of the *Scud*-B (*Hwasong*-5) and *Scud*-C (*Hwasong*-6) – with a smaller payload (approximately 700 kg) and a longer range (500 km) – were conducted in May 1986 and July 1986 respectively, though it would appear that the first credible report of a successful *Hwasong*-6 flight test was in June 1990.⁵¹⁷ Both were subsequently deployed by 1988.

The DPRK made its first sale to Iran of the *Hwasong*-5 during this same period. They signed a \$500 million agreement in 1987 that reportedly included 90-100 *Hwasong* missiles and other military hardware exports to Iran (were the missiles were subsequently renamed *Shehab*-1). Furthermore, a 1985 agreement between the two countries led to DPRK assistance with the construction of a *Hwasong*-5 production plant in Iran that reportedly became operational in 1988. The DPRK is also reported to have provided assistance to Egypt that led to the establishment of a *Scud*-B production plant in 1987 and a *Scud*-C plant in 1990.⁵¹⁸

A drawing found on a North Korean freighter in 1999 depicts an enlarged *Scud*, similar to a *Scud*-D, and also known as the *Scud*-ER and *Hwasong*-7. This missile has a range of approximately 700 km with what appears to be the same engine as the *Scud*-B and -C. Similar to the *Nodong*, the warhead is separable. The missile is reported to have been available in the DPRK since 2000.⁵¹⁹

Some estimates indicate that the DPRK’s SRBMs include some 600–800 regular and extended-range *Scud* missiles. According to additional estimates, Pyongyang may deploy these missiles in two belts, with 22–28 bases in the forward area and 12–15 in the rear area. The first is 50–90 km north of the DMZ, and the second 90–120 km north. A third belt may exist more than 175 km from the border.⁵²⁰

Their warheads are probably equipped with high-explosive munitions, though it is also possible they have been fitted with chemical and biological weapons – though most likely not nuclear, as the relative crudeness of the *Scud* design makes it unlikely that the DPRK would equip it with a nuclear warhead.⁵²¹

The DPRK has recently been seeking ways to improve its *Scud* arsenal and has worked on developing new short-range missile platforms. A May 2009 CRS report stated that in 2006 the DPRK tested newer versions of “solid-fuel Scuds, which can be fired quickly, in contrast to liquid-fuel missiles.”⁵²² Based on interviews with ROK officials, the International Crisis Group reported that in 2008:

North Korea also unveiled a new solid-fueled short-range tactical missile, the “*Toksa*” (Viper) or KN-02, but it is unclear whether it has been deployed. It is a North Korean version of the Soviet/Russian *Tochka* (SS-21 Scarab) but has a range of only about 120km. However, it is much more accurate than the North’s other missiles and could strike the Seoul-Incheon metropolitan area and possibly US military bases in P’yongt’aek, south of Seoul.⁵²³

Initial production of the *Toksa*/KN-02, which employs technology very different from that of the *Scud*, likely began in 2006. They were displayed during a military parade in April 2007 and probably entered service in 2008.⁵²⁴ An ROK military source reported that “A North Korean military unit on drill test-fired two shots of short-range missiles, presumed to be KN-02 missiles, into the East Sea” in mid-March, 2013.⁵²⁵

The Nodong

The DPRK is thought to have started development of a single-stage medium-range missile derived from the Soviet *Scud*, called the *Nodong* (also known as the *Rodong*, *Scud-D*, *Scud Mod-D*, *Nodong-A*, and *Nodong-1*), in the 1990s. It appears the *Nodong* was first developed and successfully flight tested in 1993 with an initial production of 18 missiles; the flight tests reportedly included Iranian and Pakistani observers.⁵²⁶

Pakistani officials also viewed the *Nodong* in 1992, while Iranian officials were also present at the 1998 *Taepodong-1* test.⁵²⁷ Much of the information about the missile stems from a comparison with the *Ghauri-II/Hatf-V* missile of Pakistan and the *Shahab-3* of Iran, which all seem to be related missile programs⁵²⁸ – and results from tests of these missiles appear to have been shared with the DPRK.

The *Nodongs* shown at an October 2010 parade in Pyongyang appeared to be slightly different than the Pakistani *Ghauri* and Iranian *Shahab-3*, looking more like the Iranian *Ghadr-1*. However, the *Nodongs* in the 2010 parade were clearly mock-ups, not real. The actual *Nodong* missile configuration is unknown, at least in open source material, and as such there are no available reliable technical statements beyond those analyzing the Pakistani and Iranian versions of the missile.⁵²⁹

It is reported that Soviet/Russian engineers assisted in development of the missile and that Iran pledged \$500 million to jointly develop missile capabilities. There are reports that Iran received 15-20 *Nodongs*, though both the DPRK and Iran deny this. It also seems that Iraq made a \$10 million down payment on *Nodong* missiles in 2003 (before the US invasion), though the missiles were never delivered and the DPRK refused to provide a refund.⁵³⁰

There also is some evidence that 12-25 *Nodong* missiles were sold to Pakistan in the late 1990s in return for uranium enrichment technology/materials, though Pakistan claims to have developed the *Ghauri* missile indigenously and denies it imported any *Nodongs*.⁵³¹

The *Nodong* is a liquid-fuel propellant single-stage ballistic missile, assessed to have a range of about 1,300-1,600 km with a 1,000 kg payload⁵³² – within reach of almost all of Japan (see **Figures IV.2, IV.3, IV.5, and IV.6**).⁵³³ *Nodong* missiles are road-mobile (able to be fired from a Transporter Erector Launcher, or TEL)⁵³⁴ and liquid-fueled, and are generally stored underground and transported to sites that are little more than concrete slabs for launch. This makes it difficult to detect signs of preparation for a launch.⁵³⁵

The *Nodong's* accuracy is low for a modern missile. It cannot be used to attack point targets with conventional warheads and would only be effective against large, soft targets like cities, airports, or harbors. It is uncertain what its single-round reliability is, and this would present problems in arming it with a nuclear warhead.⁵³⁶

Some experts feel that DPRK nuclear weapons would likely be launched from the *Nodong* missile division headquarters in Yongnim-up, Yongnim-kun, Chagang Province. Some reports indicate there are three *Nodong* missile regiments in the division: The first is headquartered in Sino-ri, Unjon-kun, North Pyongan Province (near the west coast, about 100 km from the Chinese border); the second is headquartered in Yongjo-ri, Kimhyongjik-kun, Yanggang Province (in the center of the country, about 20 km from the Chinese border); the third is located along with the *Nodong* missile division in Yongnim-up (in the center of the country about 45–50 km from Kanggye City, and about 50–60 km from Huichon City).⁵³⁷

Approximately 175-200 *Nodong* missiles are said to be deployed, but the program is still developmental and requires large numbers of additional, full-range tests to become a mature program. The Japanese Defense White Paper believes tests are limited to a possible launch into the Japan Sea in late May 1993, a mix of *Scud* and *Nodong* launches on July 5, 2006, and a mix of launches that might have involved some *Nodongs* from the Kittareryong district of the DPRK on July 4, 2009.⁵³⁸

A *Nodong* was successfully used in the failed *Taepodong-1* 1998 test.⁵³⁹ No unclassified source, however, provides a clear picture of exactly what happened during these tests or how far the DPRK has progressed in bringing the system to the final development stage.

In March 2014, the DPRK launched two *Nodong* into the Sea of Japan, in the first mid-range North Korean missile test in five years.⁵⁴⁰ This was during a period from February 21 and March 16 when the DPRK “conducted its largest, most diverse, and prolonged missile firing exercises” involving other short-range missile systems.⁵⁴¹

The Taepodong Program

The DPRK initiated the development of two ballistic missiles known to the West as *Taepodong-1* (also known as the *Scud* Mod-E, *Scud-X*, *Moksong-1*, *Paektusan-1*, and *Pekdosan-1*) and *Taepodong-2* (also called the *Moksong-2* and *Paektusan-2*) in the late 1980s and early 1990s, respectively. The *Taepodongs* are not production missiles and have never been successfully tested as a weapons platform – both have only been tested as space launchers, not as ballistic missiles.⁵⁴²

Taepodong-1

The *Taepodong-1* was the DPRK’s first multi-stage missile, proving that the DPRK had key ICBM development and deployment technologies. The missile has an estimated range of approximately 1,800-2,000 km, and is assumed to be a two- or three- stage, liquid fuel propellant ballistic missile with a *Nodong* used as its first stage and a *Scud* (*Hwasong-5* or -6) as its second stage. The space launch vehicle (SLV) adds a solid third stage instead of a re-entry vehicle. The *Taepodong-1* has been launched only as an SLV once in August 1998, but it was unsuccessful in delivering a satellite into orbit as a result of failure in its third stage (see **Figure IV.7**).⁵⁴³

Following the test, the *Taepodong-1* program was apparently ended, indicating it may have been a transitory program for the development of the longer-range *Taepodong-2*.⁵⁴⁴ The *Taepodong-2*, was developed between 1987 and 1992, and is a two-⁵⁴⁵ or three-stage (the SLV version, the *Unha*)⁵⁴⁶ missile with a new booster resembling the Chinese CSS-2 and CSS-3 first stage and a *Nodong* as its second stage.⁵⁴⁷

The missile has more advanced technology and has a much greater range than previous DPRK missiles. It is currently North Korea’s only system capable of being a true ICBM. Range and payload estimates vary, and while most estimates indicate that the missile has limited accuracy, it is thought to be targeted at major US population centers in both Alaska and Hawaii – perhaps even as far as California.⁵⁴⁸

A 2009 CRS report stated, “The two-stage variant is assessed by some to have a range potential of as much as 3,750 km with a 700 to 1,000 kg payload and, if a third stage were added, some believe that range could be extended to 4,000 to 4,300 km. Some analysts further believe that the *Taepodong-2* could deliver a 700 to 1000 kg payload as far as 6700 km.”⁵⁴⁹

Taepodong-2

David Wright of the Union of Concerned Scientists has calculated that the *Taepodong-2* ballistic missile could deliver a 500 kg payload as far as 9,000 km. This would put San Francisco and all US cities along the Pacific coast to the north within range.⁵⁵⁰ While this would be a significant increase in range over the DPRK's current missiles, it does not represent, as Wright states, "a true intercontinental nuclear delivery capability since developing a first generation warhead and heat shield with a mass of 500 kg or less is likely to be a significant challenge for North Korea."⁵⁵¹

The NTI reports that estimates of range are generally from 6,000-15,000 km, with a two-stage version capable of 7,000-7,500 km and a three-stage variant capable of 10,000-10,500 km.⁵⁵² The abilities of the *Taepodong-1* and *Taepodong-2* can be seen in **Figures IV.2, IV.3 and IV.5**.

Like the *Taepodong-1*, the *Taepodong-2* has never been launched with an active warhead, and it is not clear whether its missile engines have been used as an SLV. The Japanese Defense White Paper of 2010 reported that one failed launch occurred in July 2006 (crashing after forty seconds of flight).

Victor Cha of CSIS notes that this missile was one of seven missiles fired at the time, headed on an eastward trajectory – and some of the missile parts landed only 250 km (155 miles) from Vladivostok. Three of the other six missiles also landed in Russian waters, close to Nakhodka. After the launch, the head of Russia's Strategic Rocket forces criticized the DPRK for testing missiles that did not have any mechanisms for automatic self-destruction in case they travelled off-course. Russia, though only 150 km (90 miles) from the test site, received little advance notice of the testing from the DPRK.⁵⁵³

The DPRK undertook a second launch in April 2009 that most likely involved a variant of the *Taepodong-2*, the *Unha-2* SLV, at a range over 3,000 km (see **Figure IV.7**).⁵⁵⁴ Prior to the launch, the DPRK announced the test in advance, even informing the International Civil Aviation and International Maritime Organizations of its intentions, providing coordinates of expected stage falling areas.⁵⁵⁵

The DPRK hailed the 2009 test as a major success – even bragging that the supposed satellite payload was now broadcasting patriotic music from space – but military and private experts said that the launch had failed due to either an unsuccessful separation of the second and third stages or because the third stage did not fire successfully, citing detailed tracking data that showed the missile and payload had fallen into the sea.⁵⁵⁶

Recent Taepodong launches

The DPRK announced on March 16, 2012 that it planned to undertake an "earth observation satellite" launch in April; within hours, China's vice foreign minister "summoned" the DPRK's Chinese ambassador to express Chinese "concerns and worries." Other Chinese attempts to dissuade the DPRK from undertaking a space launch failed,⁵⁵⁷ and on April 13, 2012, coinciding with huge celebrations of the 100th anniversary of Kim Il-sung, the DPRK conducted a satellite launch of the *Gwangmyongsong-3* using a variant of the *Taepodong-2*, the *Unha-3* SLV. It appeared to have a slightly different third stage than the 2009 launch. The missile flew for over a minute before breaking into several pieces, with the first stage falling into the sea 102.5 miles west of Seoul and the remaining two stages failing.⁵⁵⁸

Several days after the launch, China supported a UN Security Council presidential statement condemning the launch as a violation of previous Security Council resolutions and supporting further Security Council measures in the case of any further DPRK provocations. This is in contrast to China's reaction to the 2009 SLV launch, when it emphasized the distinctions between a missile and a satellite and insisted that the DPRK had a right to the peaceful use of outer space.

Chinese leaders were in particular angry that the DPRK gave months of advance warning regarding the launch to the US, but had neglected to inform China. The PRC further supported the Security Council's moves to freeze the assets of several DPRK firms involved in financing nuclear and missile programs, while also initiating preemptive measures to warn the DPRK not to try another missile test.⁵⁵⁹

A further test was successfully undertaken on December 12, 2012, delivering the *Gwangmyongsong-3* satellite into orbit. Preparations were visible in late November, and in early December the DPRK announced that it would launch a satellite mid-month, later announcing this would occur between December 10 and December 22.

While previous launch preparations had taken about eight weeks, the December 2012 launch took approximately 40 days to prepare. The rocket had three load-bearing stages, and wreckage from the first stage was recovered by the ROK Navy – including parts of the power plant, a propellant tank, and a second, smaller, and badly damaged propellant tank.⁵⁶⁰ Although the DPRK claims otherwise, it also appears that the satellite is “tumbling in orbit” and thus is most likely dead.⁵⁶¹

Some ROK officials believe that for this launch, the DPRK may have used foreign scientists to assist in fixing some of the problems experienced in previous long-range missile tests, such as weak engine thrust. The DPRK may have used smuggled technology and/or rogue scientists from former Soviet republics like Ukraine. Iranian observers were invited to the launch.⁵⁶²

On February 7, 2016, a month after its fourth nuclear test, the DPRK conducted another long range ballistic missile test with the *Unha-3* (the satellite launch version of the *Taepodong-2*) under the auspices of launching a satellite. The launch successfully placed an “earth observation satellite” into orbit, and marked an important progression in the DPRK's efforts to develop a functional ICBM.⁵⁶³

The Taepodong's Potential Re-Entry Capabilities

Some experts assess that the *Taepodong* missile could be used to deliver WMDs with only minor modifications to withstand the heat of re-entry.⁵⁶⁴ In support of this claim, there is a long-standing US National Intelligence Estimate that the DPRK could successfully test an ICBM by 2015.⁵⁶⁵ It should also be remembered that the DPRK has had re-entry technology for its other ballistic missiles for over 30 years.⁵⁶⁶ Of course, how accurate such a missile would be is an entirely different matter.

Jane's Intelligence Review estimates that the *Taepodong-2/Unha-3* would not be well suited to weapons conversion, and more development would be necessary before the *Unha* SLV could be turned into a viable weapon system.⁵⁶⁷ The IISS also reported in 2011 that the DPRK would have to undertake “an extensive flight-test program that includes at least a dozen, if not two dozen, launches and extends over three to five years” – and such testing would be observable.⁵⁶⁸ Similarly, a RAND report in 2012 asserted that the *Unha-3/Taepodong-2* would be incapable of

carrying a nuclear warhead at an intercontinental range; if the DPRK wants an ICBM, “they have to develop a new rocket, using different technology. This would take a long time, require extensive work, and cost a lot of money.”⁵⁶⁹

The long preparation time necessary prior to a launch – at least several days – would provide significant advance warning, and the DPRK likely does not have the capability to use underground silos, which would then be vulnerable to surveillance and attack. In addition, a launched SLV would only be able to carry one re-entry vehicle, and the required long burn time and the delayed deployment of potential countermeasures would allow the US or another country under attack to target and engage missile defense systems in order to shoot down the missile.⁵⁷⁰

Michael Ellerman, a senior fellow at the IISS, noted that given the trajectory of ballistic missile development in other countries, space launches do not and cannot play a decisive role in the development of long-range missiles. Furthermore, it is plausible that the DPRK’s missile launches actually were legitimately satellite launches, as claimed by the DPRK.

The trajectory of the rocket and actual placement of the satellite in orbit, along with the prelaunch notification to international safety organizations, points to the DPRK actually attempting to conduct satellite launches. The 1998 *Taepodong-1*’s trajectory was also consistent with this conclusion, as were those of the 2009 *Unha-2* and April 2012 *Unha-3* launches.⁵⁷¹

Ellerman acknowledged that satellite launches and ICBMs are similar in many regards – powerful rocket engines, payload separation mechanisms, inertial navigation and guidance units, and lightweight and strong airframes. However, there are also important differences between the two systems. First, a ballistic missile needs to have re-entry capabilities that protect the payload from heat and structural stress, which require special materials to be used in the missile – and which need to be tested and validated under realistic conditions.⁵⁷²

Secondly, operationally, space launches are prepared over a period of days or weeks, waiting for ideal weather and checking and verifying subsystems and components. The process can be delayed and restarted. However, ballistic missiles must be able to reliably be used in a variety of less-than-ideal circumstances, with very little warning or preparation. This requires a much more rigorous validation scheme and extensive testing than has taken place during DPRK SLV launches.⁵⁷³

While testing SLVs does assist in developing experience and data that could help in ICBM development, Ellerman believes that this information is of only limited use. Many of the key requirements of a ballistic missile cannot be tested during satellite launches, and many tests would have to be undertaken before a missile could be confidently given combat-ready status. Often, in fact, ballistic missiles have been converted into SLVs (by the USSR, China, and the US), not the other way around.⁵⁷⁴

At the same time, the DPRK could in theory use the *Unha-3* as the basis for a missile, though an ICBM based on the *Unha-3* would weigh over 90 tons, thus too large and unwieldy to be deployed on a mobile launch platform. The DPRK would have difficulties concealing a silo launch site, and due to the DPRK’s geography, any silo would be close enough to the coastline that advanced military powers – like the US – could destroy them preemptively. Therefore, according to Ellerman, it is more likely that the DPRK would design a new missile entirely – such as the mock-ups of the KN-08 displayed during a military parade in April 2012 – than use an SLV as

an ICBM. If the KN-08 used more energetic propellants, it could have an intercontinental range; but, without testing, it is unknown if that is even a possibility.⁵⁷⁵

US, ROK, Japanese, and UN Responses to DPRK Launches

The DPRK's missile programs have led to an almost inevitable military reaction: A mix of missile defense and ROK offensive missile programs. In December 2012, Japan, the US, and South Korea all mobilized ballistic missile defense (BMD) capabilities to both guard against the potential DPRK threat and display a show of force prior to the DPRK's launch of a space vehicle. Jane's Intelligence Review reported that,⁵⁷⁶

Japan has both land- and sea-based defences and is continuing to develop its BMD capabilities. The Japan Maritime Self Defense Force has four Kongo-class destroyers, each equipped with the Aegis Ballistic Missile Defence System. The US-developed system includes the SPY-1 search radar with an estimated range of 1,000 km, and the SM-3 Block 1A mid-course interceptor. This provides upper tier BMD coverage for the whole of Japan, designed to intercept a ballistic missile after the boost phase and before re-entry. Three Kongo-class destroyers – the Kongo, Myoko, and Chokai – were deployed in the East China Sea around Okinawa and the Sea of Japan ahead of December's launch. Providing lower tier, point defence are 16 Patriot batteries, which are equipped with PAC-3 interceptors with a range of 15 km that are capable of engaging short- and medium-range missiles. Detection capability is provided by four new J/FPS-5 Early Warning 3D AESA Radars, as well as seven older FPS-3 sites that have been upgraded for the BMD role.

The ROK has less of a BMD capacity than Japan. While South Korea does have three KDX-III destroyers with the *Aegis* System, and that are able to detect and track missiles, the ships only have SM-2 anti-missile missiles, and can only intercept low-altitude threats. The ROK also has 48 land-based *Patriot* systems with PAC-2 missiles on land, but an October 2012 ROK study found that the missile has an interception rate of less than 40% against short- and medium-range ballistic missiles (PAC-3s have a 92% success rate). The ROK's strongest missile defense assets are two Israeli-supplied Green Pine radars, allowing the ROK to detect and track incoming missiles. These will likely be an important part of any future ROK missile defense network.⁵⁷⁷

The ROK reportedly deployed two of its KDX-III *Aegis* destroyers to track the December 2012 launch, but it remains dependent on the US for more effective missile defense abilities. The US deployed a Ticonderoga-class cruiser (the USS Shiloh) and three Burke-class destroyers (the USS Fitzgerald, McCain, and Benfold) off the Korean Peninsula in response to the DPRK's launch plans. All of these US ships have the *Aegis* Combat System and SM-2 and/or SM-3 interceptor missiles. Overall, the US has a TPY-2 radar deployed in northern Japan, the Army's Air Defense Artillery regiments have four PAC-3 batteries in the ROK and 12 in Japan, and the 7th Fleet has nine *Aegis*-equipped vessels based near Japan.⁵⁷⁸

The UN also reacted at the diplomatic level. In response to the December 2012 test, UN Security Council Resolution 2087 was passed on January 22, 2013, adding six North Korean entities to the sanctions list – and further upsetting the DPRK, leading to further regional tensions.

It is probable that the DPRK tested critical technologies during the recent launches, such as increasing the size of propulsion, separation of the multi-staged propulsion devices, and altitude control.⁵⁷⁹ The improvements made to the *Taepodong-2* apparent in the 2009 and 2012 tests show that the DPRK likely has the ability to improve upon current programs as well as build a new generation of ballistic missiles capable of reaching targets in the continental US.

A 2016 launch provoked an equally pointed reaction, with multiple countries releasing condemnations for the provocative test. The ROK and United States also moved closer towards the deployment of the THAAD anti-missile system in the ROK, with South Korea agreeing to

the move by July.⁵⁸⁰ Moreover, the launch, and the nuclear test that proceeded it, led to the drafting and passage of UN Security Council Resolution 2270, which subjected North Korea to the most punitive economic sanctions ever placed upon it.⁵⁸¹

The Musudan

There are reports that the DPRK has developed a more accurate, longer-range intermediate ballistic missile called the *Musudan* (also known as the *Nodong-B*, BM-25, *Taepodong-X*, and *Mirim*). The single-stage *Musudan* appears to be based on the design of the Soviet R-27/SS-N-6 missile, an intermediate-range, liquid propellant, submarine-launched ballistic missile deployed by Russia in the 1960s.⁵⁸²

It appears that development began in the early 1990s. According to the NTI,⁵⁸³

In 1992, a large contract between Korea Yon'gwang Trading Company and V.P. Makeyev Engineering Design Office of Miass, Russia was signed. The agreement stated that Russian engineers would go to the DPRK and assist in the development of the Zyb Space Launch Vehicle (SLV). Zyb is a term used by V.P. Makeyev for the R-027/SS-N-6. Later that year a number of Russian scientists and missile specialists were arrested while attempting to travel to Pyongyang. There are reports that many scientists and missile engineers were already working in the DPRK.

Reportedly, prototypes were developed in 2000 and it was first deployed as early as 2003 – though the ROK lists the *Musudan* as being deployed in 2007, when it was first displayed during a military parade. However, the October 2010 parade was the first time the missile was shown to Western audiences.⁵⁸⁴

The range of the missile is disputed – Israeli sources identified North Korean SS-N-6-based missiles in Iran with a range of 2500 km, and American sources have reported a range of 3200 km with a payload of 500 kg.⁵⁸⁵ Other sources claim a maximum range of 4000 km.⁵⁸⁶ Assuming a range of 3200 km, the *Musudan* could hit any target in East Asia (including US bases in Guam and Okinawa) and Hawaii.⁵⁸⁷

Some sources claim that Iran conducted surrogate flight tests of the *Musudan* in 2006 and 2007. It was reported in 2005 that the DPRK had sold 18 *Musudan* assembly kits to Iran. There is also limited evidence suggesting that North Korea tested the *Musudan* as part of its July 2006 missile tests. Furthermore, the *Musudan* was reportedly used as the *Unha-2* SLV's second stage, or could be used in future *Taepodong-2* or *-3* versions. While the *Unha-2* failed in April 2009, the failure occurred after the effective firing of the second stage, indicating that the stage that potentially contained the *Musudan* was successful.⁵⁸⁸

Although reports indicate that the design of such a missile would be borrowed from a Russian submarine-launched missile, North Korea probably intends to transport and fire the missile using wheeled transport erector launchers (TEL) units or surface ship-based launchers.⁵⁸⁹ While it is uncertain whether it is operational, ROK intelligence sources believe the *Musudan* missile division has three regiments and is headquartered in Yangdok-kun, South Pyongan Province, about 80 km east of Pyongyang.⁵⁹⁰

The DPRK has made its own claims. On June 22, 2016, after five failed launches over the past two months, the DPRK declared that it had successfully tested the *Musudan*. The missile was launched from Wonsan, and after reaching an altitude of 878 miles, landed in the ocean some 250 miles away. While this was far less than the system's estimated range, North Korean sources

claimed that the missile had been launched at a sharp angle to confirm that it could reach some 2000 miles without actually traveling that length.

Unlike with the DPRK's previous attempts, US and ROK authorities did not label the test a failure, and experts noted that the launch carried all the hallmarks of a success. The test elicited condemnation from Japanese, South Korean and US officials, who labeled it a violation of UN resolutions and a threat to regional stability. With the *Musudan* successfully tested, the DPRK can directly threaten US forces in Guam, assumed to be a key staging point for US forces responding to conflict on the Korean Peninsula.⁵⁹¹

The KN-08/Hwaseong-13

Mock-ups of the KN-08, also known as the DPRK's road-mobile ICBM, were presented in April 2012 at a parade honoring Kim Il-sung's 100th birthday. As only mock-ups have been seen, there are no photos of the real missile or any clear evidence that one even exists – at least not in open source material. The missile was displayed on Chinese TELs that were too large for the KN-08 missile. If the missile was actually developed and produced, it would offer the DPRK a longer range than that of the *Nodong* (maximum 5,000 km), giving it a truly intercontinental reach.⁵⁹²

There were reports that the DPRK tested an engine for the long-range KN-08 on February 11, 2013, one day before its third nuclear test. One ROK government source stated, "It appears that North Korea conducted the engine test aimed at extending the range of the KN-08 missile to over 5,000 kilometers." If the North judged the test successful, it could start operationally deploying the rockets.⁵⁹³

In 2012, Markus Schiller and Robert H. Schmucker issued a detailed analysis that concluded that KN-08 mock-ups,⁵⁹⁴

...were intended to create the impression of an ICBM that is based on SS-N-6 technology, even though the designs looks more like a high-end solid-fueled ICBM...A KN-08 design based on Nodong technology has limited range and performance. A KN-08 design based on SS-N-6 technology offers impressive range and performance but creates massive operation problems, and production is extremely challenging. Considering the presented KN-08 design, none of the two options makes much sense from a missile engineer's perspective.

Although many analysts have dismissed the KN-08 mock-ups as simple mock-ups, Jeffrey Lewis and John Schilling offered an alternative analysis in 2013. They asserted that such mock-ups are important parts of missile development programs, as demonstrated by mock-ups of previous ballistic programs like the MX program that led to the Peacekeeper missile. To further support their claim, they pointed out that small design differences in initial KN-08 mock-ups, key indicators that had led to the conclusion that the KN-08 would not go beyond the mock-up stage, eventually disappeared and the design improved. The KN-08 weld and rivet arrangements also matched those found in North Korea's successful Unha-3 launch. Lewis and Schilling directly respond to Schiller and Schmucker's assessment.⁵⁹⁵

We believe the missile mockups that North Korea displayed in 2012 and 2013 are consistent with an ongoing development program for a missile with limited intercontinental capability using only existing North Korean technology. There are a number of plausible configurations of missile engines that North Korea might use to cobble together a missile that would look like the KN-08.

One of us—John Schilling—has written a lengthy technical analysis in *Science and Global Security* that considered six different ways that North Korea could assemble components and technologies it possesses into a missile that matches the appearance of the parade mock-ups. Not all of these solutions are elegant.

For all we know, Werner von Braun is rolling in his grave. But elegant or not, these options are good enough to produce missiles with theoretical ranges from 5,500 kilometers to over 11,000 kilometers...North Korea is parading mockups through the streets of Pyongyang because, like every other country, it built mockups first.

Satellite imagery from 2014 shows what appears to be continued test of the first stage of the KN-08.⁵⁹⁶ Moreover, North Korea displayed a newly modified KN-08 model in a 2015 military parade. Reports indicated that, “the missile (had) been shortened and simplified, with two stages instead of three and a blunt warhead replacing the narrow triconic design”, indicating that the “structural design had been substantially improved”. While these changes could produce a more reliable model, they may also delay the KN-08’s transition from development to entry into active service.⁵⁹⁷ At the same time, some observers believe that the “smaller and blunter warhead shape” might lend legitimacy to the DPRK’s claims that they have successfully miniaturized their nuclear warheads.⁵⁹⁸

Figure IV.4: KN-08 ICBM Related Testing

Imagery Date	Activity	Test Probability
1/26/14	None	
3/6/14	None	
3/22/14	5 vehicles on engine test stand and probable KN-08 first and second stages seen at Assembly Building	Readying for coming test
4/3/14	7 vehicles and probable KN-08 first stage seen on engine test stand	Test in progress
5/10/14	2 vehicle and probable first stage on engine test stand	Probable test concluded
5/21/14	2 vehicles, probable KN-08 first stage and prime mover at Assembly Building	Probable test concluded
5/28/14	None	
6/10/14	5 vehicles on engine test stand, probable KN-08 first stage in front of stand	Test in progress
7/4/14	1 vehicle on engine test stand	
7/6/14	Probable KN-08 first stage parked in front of the engine test stand entrance	Preparing a new test

Submarine Launched Ballistic Missile (SLBM) Program

North Korea appears to be in the early stages of developing a submarine launched ballistic missile. A series of events have made this development a point of concern, though little is known about the program. North Korea is clearly still several years away from obtaining any sort of SLBM capability. Developing this SLBM capability into a “second-strike capability,” which is possible with an SLBM, will also require North Korea to expand and develop effective SSBNs and conduct extensive sea trials.

If the DPRK does obtain an SSBN capability at some point in the future, however, it would allow North Korea to better protect its missile arsenal, and presumably its nuclear arsenal as well. It would also make a surprise launch much easier and give the DPRK a potential second-strike capability as well as complicate missile defense.

There are some indicators of a DPRK SSBN program. In July 2014, satellite imagery reveals a new North Korean submarine at the Sinpo South Shipyard. A South Korean government source reported to Yonhap that the new submarine was based off of reverse engineered Soviet-era Golf-class ballistic missile submarines.

North Korea obtained a number of decommissioned Golf class submarines from Russia, ostensibly to be reduced to scrap metal. It is likely that these submarines were thoroughly studied before they were scrapped. 38 North challenged the conclusion that the new sub was a Golf class derivative, arguing that the submarine was “significantly smaller and bear a close resemblance to the former Yugoslav Sava and Heroj class patrol submarines, neither of which carried ballistic submarines.”⁵⁹⁹

A test stand was also constructed at the same shipyard that appeared to be “the right size and design to be used for the research, development, and testing of the process of ejecting a missile out of a launch tube as well as evaluating its compatibility with submarines and surface combatants as well as the missiles themselves.” It is not yet known what type of missile would be used if North Korea successfully developed the capability to launch a missile in this fashion. The stand is about 12 meters high.⁶⁰⁰

In August 2014, a missile launch tube was reportedly spotted on a North Korean submarine. The missile tube “may be for a missile large enough to carry a nuclear warhead.” This raises the issue of what missile launch technology the DPRK would use. SLBMs are typically launched using a “cold-launch” system, in which the missile is first ejected out of a submarine and above the surface of the water using high-pressure gas. The missile’s rocket engines are ignited once the missile has breached the water’s surface. In order to develop a “cold-launch” system,

A Jane’s analysis points to other developments that could help North Korea to develop this technology.⁶⁰¹

1. Golf class ballistic missile submarine: The missile launch tubes of these old Soviet submarines would be of particular interest, which used a cold-launch system. One of the submarines also contained an R-27 SLBM, which aided the development of the BM25 Musudan land-mobile ballistic missile. It is not known whether the BM25 will eventually be used as an SLBM, as the BM25 has not yet been test fired. This raises serious questions about the reliability of the missile.
2. Pon’gae 5/KN-06: This North Korean developed surface-to-air (SAM) system that may use a cold launch tube similar in size to the tubes used by the Chinese HQ-16A SAM. The HQ-16A is a medium range SAM.
3. Pon-gae 6: This North Korean developed SAM system is larger than the Pon-gae 5 and is similar to the larger Chinese HQ-9 or Russian S-300 SAM systems. The HQ-9 is based off the S-300, both of which are long range SAMs that utilize cold-launch systems to launch their missiles

Of the above foreign systems mentioned, only the Golf class is known to have been sold to North Korea. The S-300, HQ-9, and HQ-16A are not known to have been sold to North Korea.

The DPRK has made some public reports that such a program is underway. In November 2014, North Korea reported it tested an ejection launcher for an SLBM at the shipyard.⁶⁰²

Carried out onboard a land-based vertical launch tube, the latest tests suggested the initial stage of firing a missile out of a submarine launch tube and signified the shift towards underwater missile strike potential for a future nuclear-tipped missile.

Earlier, the US intelligence agencies reportedly observed ‘two or three’ such trials last month at a facility claimed to be a major development center for the North Korea’s SLBM programme, in line with South Korea’s intelligence over the North’s missile development, Yonhap reported.

The new missile is believed to be either a new anti-ship cruise missile boasting a range of 130km or a new short-range ballistic missile with 240km range.

The DPRK later released photographs showing what was claimed to be a SLBM launch from a submarine on May 10, 2015. However, experts eventually determined that the pictures had been falsified, with the missile actually being launched from a submerged barge.

North Korean efforts to produce a solid fueled missile (easier to store and ideal for use on submarines) did, however, lead to the test of a solid-fueled rocket motor in March 2016, and on April 23, 2016 the DPRK launched a solid-fueled missile. While the April launch badly undershot its intended range, experts still considered it a significant progression in the DPRK’s SLBM efforts.⁶⁰³

Figure IV.5: US Estimates of Primary North Korean Missiles

North Korean Ballistic Missile Forces		
System	# of Launchers	Estimated Range
Toksa	Fewer than 100	75 miles
SCUD-B		185 miles
SCUD-C		310 miles
SCUD-ER		435-625 miles
No Dong	Fewer than 50	800 miles
IRBM	Fewer than 50	2,000+ miles
TD-2	Unknown*	3,400+ miles**
SLBM	At least 1	Unknown
KN08	At least 6	3,400+ miles**

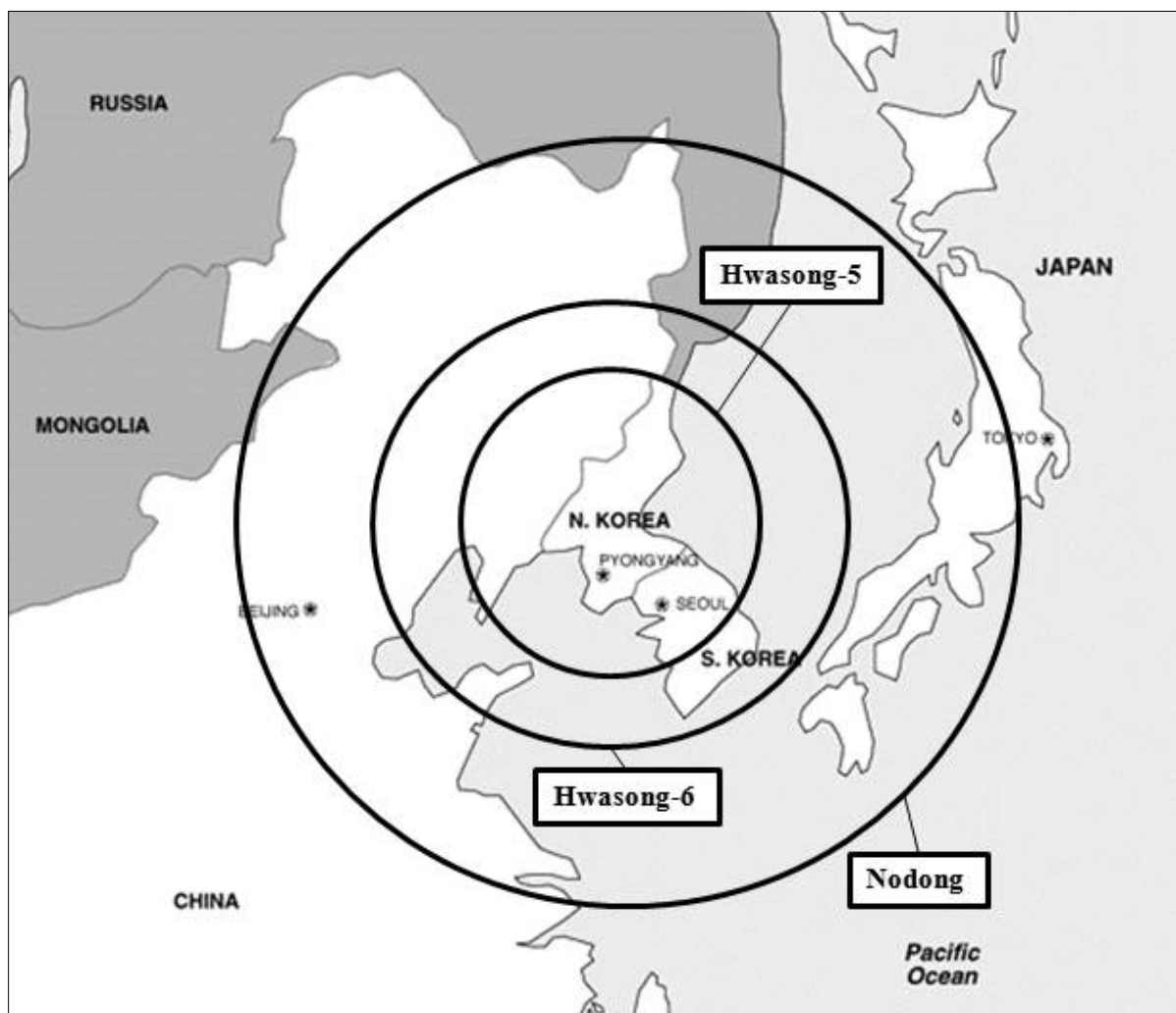
Note: North Korea has produced its own version of the SCUD B, and the SCUD C, an extended-range version of the SCUD B. North Korea will continue using and improving the TD-2, which has only been used in a space-launch role, but could reach the United States with a nuclear payload if developed as an ICBM. North Korea is also developing the KN08 road-mobile ICBM and has paraded six launchers for the system. The KN08, an IRBM, and an SLBM have not been flight-tested and their current reliability as weapon systems would be low.

* Launches of the TD-2 have been observed from both east and west coast launch facilities.

** ICBM is defined as a ballistic missile (land-based) capable of a range in excess of 5,500 kilometers (or 3,418 miles).

Source: Office of the Secretary of Defense, Military and Security Developments Involving the Democratic People's Republic of Korea, 2015, 19.

Figure IV.6: Estimates of DPRK Hwasong and Nodong Missile Range – Northeast Asia



Note: Distances are approximate.

Source: International Crisis Group, *North Korea's Nuclear and Missile Programs*, Asia Report No. 168, June 18, 2009, 28, http://www.crisisgroup.org/~media/Files/asia/north-east-asia/north-korea/168_north_koreas_nuclear_and_missile_programs.ashx.

DPRK Missile Facilities

Only limited data is available on DPRK missile production and launch facilities, but some key information is available. It is believed that the DPRK produces and/or stores chemicals, chemical precursors, and chemical agents in 12 factories and six major storage depots.⁶⁰⁴ The No. 125 Factory, the so-called Pyongyang Pig Factory in northwestern Pyongyang, reportedly produces *Hwasong*, *Nodong*, and surface-to-ship cruise missiles. Officials from Middle Eastern countries have reportedly visited the factory, but the extent of their tours is unknown.⁶⁰⁵ Additionally, Mangyongdae Electric Machinery Factory is another reported missile production facility located in the same general area of Pyongyang as the No. 125 Factory.⁶⁰⁶

The No. 7 Factory, located about five miles from the Electric Machinery Factory, is responsible for the production and testing of missile prototypes prior to the initiation of production at other plants.⁶⁰⁷ This facility is probably the same facility known as the “San’um-dong Factory” or “San’um-dong Missile Research Center.”⁶⁰⁸ The facility is under the Second Natural Science Academy, the research organization in charge of all weapons development in North Korea, working on missile design and development as well as the production of prototypes.

The Academy probably draws upon human resources from other scientific institutions under the Academy of Sciences, but the extent of any such collaboration is unknown. The DPRK is also reported to have integrated their educational institutions into their missile programs.⁶⁰⁹

According to DPRK defectors, the Korea National Defense College in Kanggye, Chagang Province, has a “Rocket Engine Department,” and the college provides instruction on the “production, operation procedures, and launching of missiles.”⁶¹⁰ North Korea’s top universities such as Kim Il Sung University, the Pyongsong College of Science, and Kim Chaek University of Technology also have programs in engineering and science that could be applied to rocket and missile development.⁶¹¹

The DPRK possesses a number of missile bases and launch facilities (see **Figure IV.8**). The Missile Division under the Ministry of the People’s Armed Forces commands at least 18 ballistic missile bases in the country, such as the Chiha-ri Missile Base in Kangwon Province and the Mayang Island Missile Base. Many of these bases likely have several alternative launch pads near the missile storage site, which in effect increases the number of locations from which they can launch missiles using mobile TELs.⁶¹²

The DPRK had previously used a small, old launch facility in the northeastern part of the country near Musudan-ri for its launches, called the Tonghae Satellite Launching Ground. However, the DPRK began construction on a new facility close – Sohae, in Tongchang-ri – to the Chinese border in the Northwest in 2001, which was completed by January 2011.⁶¹³

In contrast to the older Tonghae facility which has limited capabilities, the new installation in Sohae includes a movable launch pad with gantry, a missile assembly building, oxidizer and fuel storage, and a 10-story tall tower capable of supporting the DPRK’s largest ballistic missiles and SLVs. The height of the launch tower is unnecessary for any of the DPRK’s *Unha*/*Taepodong* missiles or SLVs, which could indicate that the DPRK is looking to develop larger and more modern launch vehicles.

The facility incorporates R&D and support facilities, while Saneum-dong Weapons Research Lab and Yongbyon Nuclear Complex are both less than 50 miles away. Furthermore, the Sohae site can launch toward the South, reducing missile flight time to the ROK and Japan. The site is

also obscured from direct sea or air observation. It was first used in April 2012 to launch the *Unha-3* rocket; the December 2012 *Unha-3* launch was also successfully conducted at this facility.⁶¹⁴

The Sohae site has seen significant construction activity in 2014 including new road access, rail access, unidentified domed structures, and the heightening of the rocket gantry.⁶¹⁵ The heightened gantry, which would be required for launches of larger rockets, also came with a new roof and new swing arms that were attached to the gantry tower. Fuel tanks near the launch pad were also moved. By the end of September 2014, the temporary shelters that were used to support the construction unit had been removed, suggesting that the construction project and upgrades at the Sohae site had been completed.⁶¹⁶

A new Musudan-ri facility is also being developed, bigger than the Sohae facility, which should be operational by 2016-17.⁶¹⁷

A test stand near the Sinpo South Shipyard appears to be appropriate for testing missile ejection systems for SLBMs.⁶¹⁸ Reports indicate that North Korea has tested such an ejection system, though it is unclear whether a missile was actually launched.

DPRK Air Defense and Counter-Space Capabilities

The DPRK's satellite program has been discussed previously in this chapter. As for air defense, North Korea is said to have one of the densest air defense networks in the world, but its equipment is primarily Soviet-designed missiles and radars – either made in the USSR or licensed and produced in the DPRK – developed in the 1950s-1970s.

The US has been working for decades to develop ways to defeat such weapons, using radar jamming, anti-radar missiles, and stealth technology; the B-2 and F-22 were designed specifically to evade this type of defense, and B-52s could take out the DPRK's air defense system by firing AGM-86 cruise missiles from beyond the range of DPRK defenses. The DPRK's inventory includes the SA-2 *Guideline*, SA-6 *Gainful*, SA-3 *Goa*, SA-13 *Gopher*, SA-16 *Gimlet*, SA-4 *Ganef*, SA-5 *Gammon*, and the SA-17 *Gadfly*.⁶¹⁹

DIA Director Ronald L. Burgess, Jr. provided the following overview of DPRK counter-space preparations in testimony before the Senate:⁶²⁰

North Korea has mounted Soviet-made jamming devices on vehicles near the North-South demarcation line that can disturb Global Positioning System (GPS) signals within a 50-100 kilometer (km) radius and is reported to be developing an indigenous GPS jammer with an extended range of more than 100 km.

ROK Missile Development

For the last thirty years, the United States has discouraged South Korea from developing long-range ballistic and cruise missiles. In a 1979 memorandum of understanding with the United States, reiterated in 1990, South Korea voluntarily pledged not to develop ballistic missiles with ranges exceeding 180 kilometers in return for technical assistance from the US. However, Seoul has sought to raise that limit since late 1995, resulting in several revisions of the ROK-US agreement.⁶²¹

Recently, however, the ROK has deployed a series of cruise missiles, the maximum range of which is 1,500 km – capable of reaching as far as Beijing and Tokyo. In addition to this cruise missile program, the ROK has successfully launched a series of communication satellites in the last decade. While it does not possess a known ballistic missile program, it clearly possesses the know-how to produce a ballistic missile.

The Early Program – The NHK Program

South Korea has made some attempts to develop and expand its offensive ballistic missile capabilities since the 1970s in spite of US pressure. In December 1971, ROK President Park Chung Hee issued a directive to develop a short-range ballistic missile aimed at countering the ballistic missile threat from North Korea. In 1975 the ROK successfully reverse-engineered the US *Nike Hercules* surface-to-air missile (SAM) system, which could also be used in a surface-to-surface capacity.⁶²²

This system was named the NHK-1 (also known as the *Paekkom-1*, *Baekgom-1* and *Hyunmu-1*), and had a range of only 150 km (93 miles).⁶²³ Development of the NHK-1 continued into the late 1970s with a successful test in September 1978.⁶²⁴ The US, however, feared that the ROK's actions could trigger a missile arms race on the Korean Peninsula and in greater East Asia, and became increasingly cautious about the impact of the ROK missile program.⁶²⁵

As a resulting of pressure from the US, the ROK agreed in 1979 to restrict the range of its missiles to 180 kilometers, and their payload to a maximum of 500 kg, in return for US technical support for ROK missile systems.⁶²⁶ In 1983, the ROK developed the NHK-2, incorporating improved technology and a range of 180 km (112 miles), which could be easily extended to 250 km (155 miles) – but at the cost of breaking the 1979 agreement.⁶²⁷

In 2006 it was reported that the ROK would keep the NHK-2 missile in service until 2010. It is not clear whether the missile has actually been decommissioned.⁶²⁸

The 2001 MTCR and the Hyunmu-3 Cruise Missile

The DPRK's growing missile capabilities led the ROK to change its policies as well as seek improve missile defenses. In 1995, Seoul responded to the advances in DPRK missile capabilities by notifying Washington in 1995 that it wished to adjust the restrictions agreed to in 1979. After five years of consultations, the US backed the ROK's joining of the Missile Technology Control Regime (MTCR) in March 2001, a regime that superseded the 1979 US agreement.⁶²⁹

the MTCR seeks to limit the risks of proliferation of weapons of mass destruction by controlling exports of goods and technologies that could make a contribution to delivery systems for such weapons (other than manned aircraft).⁶³⁰ In this context, the regime limits the range of rockets and UAVs with a payload over 500 kg to 300 km.⁶³¹ The MTCR does not, however, restrict the development of missiles as long as the warhead does not weigh more than 500 kg.⁶³²

As a result, the ROK began focusing on the development of cruise missiles such as the *Hyunmu-3* series, capable of delivering payloads below 500 kg to targets deep within the DPRK and beyond. Developed indigenously in the ROK, the *Hyunmu-3* system is reportedly similar to the US *Tomahawk* in structure and guidance technology but with a shorter range. It uses an inertial navigation system and technology that matches map images in its computer memory to the features on the ground below it, giving the missile the ability to hit within three meters of its target.⁶³³

The *Hyunmu-3A* deployed in 2006 with a range of 500 km and is capable of striking Pyongyang – but not the DPRK's long-range missile sites, including the Musudan-ri site in North Hamgyeong Province, which were located more than 300 km from Seoul.⁶³⁴ In early 2009, however, the ROK deployed the *Hyunmu-3B*, an improvement of the 3A model, which has a range of 1,000 km, capable of reaching as far as Beijing and Tokyo as well as hitting key targets throughout the DPRK.⁶³⁵

The most advanced missile in the ROK arsenal in 2016 was the *Hyunmu-3C*, which has supposedly entered into the production phase in 2010. In July 2010, it was reported that the ROK had begun manufacturing the *Hyunmu-3C* with a range of up to 1,500 km (937 miles), capable of reaching parts of China, Japan, and Russia.⁶³⁶ If these reports are true, the successful indigenous development of a long-range cruise missile would put the ROK in the company of only the US, Russia, and Israel as countries that have developed cruise missiles with ranges of more than 1,500 km.⁶³⁷

Shin In-kyun, a military expert who headed the Korea Defense Network, told *The Korea Herald* that the missile with a 450 kg warhead “measures 6 meters in length and 53–60 centimeters in diameter and weighs 1.5 tons. It can hit targets in all nuclear facilities and major missile bases in the DPRK with high precision (a margin of error of less than 2 meters).”⁶³⁸

The development of the long range, highly accurate *Hyunmu-3* is likely to have a mixed impact on the force balance on the Peninsula. According to Oliver Bloom of CSIS.⁶³⁹

The South Korean cruise missile development certainly won't fundamentally alter the military balance on the Korean Peninsula, nor will it give the South Koreans an incentive to launch a preventive strike (especially given the number of North Korean missiles and chemical weapons aimed at Seoul), but the new missile certainly may give South Korea another tool in its box in handling North Korean contingencies. If the situation on the peninsula deteriorated to open conflict, South Korea would have an independent means of accurately striking distant North Korean targets without risking aircraft. What's more, the accurate cruise missiles would give South Korea a means to preempt an imminent North Korean attack, were such a thing to develop.

The ROK has also made advanced in artillery rockets. From 2002-2004, the ROK purchased 110 US Army Tactical Missile Systems (ATACMS).⁶⁴⁰ In 2002, the ROK Army purchased 111 ATACMS Block I and 110 ATACMS Block IA missiles, which were deployed in 2004. The Block I unguided missile contains 950 M74 anti-personnel/anti-materiel (APAM) submunitions with a range of 128 kilometers (80 mi). The Block IA missile uses GPS/INS guidance, carries 275 M74 submunitions and has a 165 kilometers (103 mi) range. An affiliated company of the Hanwha Group of Korea produces munitions for the missile systems under license from Lockheed Martin.⁶⁴¹

According to an article in Wikipedia,⁶⁴²

The U.S. has ended the ATACMS program and In 2007, the Army terminated the ATACMS program due to cost, ending the ability to replenish stocks. To sustain the remaining inventory, the ATACMS Service Life Extension Program (SLEP) was launched, which refurbishes or replaces propulsion and navigation systems, replaces cluster munition warheads with the unitary blast fragmentation warhead, and adds a proximity fuse option to obtain area effects; deliveries are projected to start in 2018. The ATACMS SLEP is a bridging initiative to provide time to complete analysis and development of a successor capability to the aging ATACMS stockpile, which could be ready around 2022.[12]

In March 2016, Lockheed Martin, Boeing, and Raytheon announced they would offer a missile to meet the U.S. Army's Long-Range Precision Fires (LRPF) requirement to replace the ATACMS. The missile will use advanced propulsion to fly faster and further, out to 500 kilometers (310 mi)(Limited by the Intermediate-Range Nuclear Forces Treaty),[13] while also being thinner and sleeker, increasing loadout to two per pod, doubling the number able to be carried by M270 MLRS and M142 HIMARS launchers. One contractor is to be down-selected in 2018-19 to begin production in 2021-22.[14][15]

It is unclear how the ROK has modified and upgraded its systems. Global Security, however, reports that,⁶⁴³

In June 2003, Hanwha obtained the license to locally produce the 227mm MLRS as part of the second stage MLRS procurement program. Hanwha produced and delivered MLRS rockets worth KRW600 billion each year to the ROK Army. Over 4,000 missiles had been ordered for the year 2005. The launchers were ready for the new 300 km-range ATACMS missile directly purchased from the US. The new extended-range MLRS systems have taken over the roles of USFK MLRS currently assigned for counter-battery missions.

South Korea deployed its first missiles with a maximum range of 300 km, which the Army will bought for 400 billion won (about \$307 million) from a U.S. defense firm, in 2004. The two governments signed a contract in 2002 under which the Korean Army purchased the Army Tactical Missile System (ATACMS) Block IA. Lockheed Martin supplied the systems. The contract included 29 multiple launch rocket systems and 111 surface-to-surface missiles, each with a warhead fitted with 300 anti-personnel and anti-material bomblets. South Korea was the first foreign buyer of the latest Lockheed missile systems. With a maximum range of 300 km, the missile is capable of hitting most positions in North Korea. The missiles are capable of engaging targets at ranges well beyond the capability of existing land-launched canons and rockets in South Korea. The missile is so powerful that each unit can destroy everything in an area as wide as three to

four soccer stadiums at once. A Korean company affiliated with the Hanwha Group produces munitions for the missile systems under a license from Lockheed.

Further Revisions to the ROK's Missile Limitation Agreement

The US and the ROK agreed on an increase to the range limits on ROK ballistic missiles in October 2012, due to the increased provocations of the DPRK and the deteriorating security situation on the peninsula. The negotiations were initiated in September 2010, in the wake of the *Cheonan* and Yeonpyeong Island incidents, to allow the ROK enhanced deterrence capabilities against the DPRK.⁶⁴⁴

According to the new agreement, the ROK can deploy ballistic missiles with a payload of up to 500 kg and range of up to 800 km (500 miles), which is enough to reach any target in the DPRK from the ROK's central region, is out of firing distance of the DPRK's long-range artilleries and KN-02 ballistic missile, while simultaneously does not overly threaten China or Japan. However, some areas of China and Japan will be in reach of the ROK's new extended missile range.⁶⁴⁵

At shorter ranges, the ROK can also put up to two ton warheads on ballistic missiles. Previously, the ROK was unable to deploy ballistic missiles with a payload of 500 kg beyond a range of 300 km, a flight ceiling of 48 kilometers or 160,000 feet.⁶⁴⁶

The new agreement also gives the ROK the option to use drones that can carry up to 2.5 tons of weapons and other equipment; prior to the revised agreement, the ROK could not deploy drones carrying more than half a ton of equipment and weapons. The ROK began using low-flying reconnaissance drones in 2002.⁶⁴⁷

There were no changes to the maximum load weight restrictions for cruise missiles and drones flying less than 300km, or those that carry less than 500kg. Also, there remain no restrictions on research and development of missiles and UAVs that go beyond the scope of the current missile guidelines.⁶⁴⁸

Two days after the ROK announced the new missile deal, the DPRK said it had missiles that could hit US bases in "Japan, Guam and the US mainland."⁶⁴⁹

The ROK demonstrated its readiness to increase its missile capabilities with a test launch of a new ballistic missile on April 4, 2014. A defense ministry reported that the new design had a range of 310 miles, and that the ROK would try to expand this effective range to the 500 mile limit set by its agreement with the US.⁶⁵⁰

ROK Missile Defense and Space

South Korea has steadily increased its missile defenses and space systems to better defend against potential DPRK attacks.

Missile Defense - The Korean Air and Missile Defense (KAMD) System

In 2011, it was reported that ROK was reacting to the DPRK's missile tests and programs by rushing to improve its ballistic missile defenses (BMDs) and create a new force to detect and intercept DPRK ballistic missiles, focusing on a low-tier system. According to *Defense News*, this capability was planned to cost a total of 300 billion won (\$214 million).⁶⁵¹

Seoul plans to buy new radars which can detect objects up to 1,000 kilometers (600 miles) away for the new system, which will put the North's missiles under close watch around the clock, they said...North

Korea has short-range Scuds and Rodongs with a range of 1,300 kilometers, while actively developing longer-range Taepodong missiles that could reach the United States.

...South Korea in 2007 launched its first Aegis destroyer, which was finally deployed for operational use in December 2008... The King Sejong, the \$1 billion, 7,600-ton KDX-III destroyer, adopts the US-built Aegis system that allows a ship to combat multiple surface, underwater and aerial threats... South Korea plans to deploy a second Aegis destroyer and a third for operational use in 2010 and 2012, according to its navy.

After the December 2012 DPRK missile test and the February 2013 nuclear test -- and after the October 2012 revision of the missile guidelines discussed previously -- the ROK further accelerated its BMD efforts. It then decided not to join the US multi-layered antimissile program, but rather to build a Korean Air and Missile Defense (KAMD) as a low-layer defense system more appropriate for the situation on the Korean peninsula. This system was designed to destroy attacking missiles either using *Aegis* systems on destroyers or *Patriot* systems on land.⁶⁵²

The ROK spent \$909 million buying 48 *Patriot* Advanced Capability 2 (PAC-2) systems from Germany in 2008, but the interception success rate of this system is below 40%. To achieve an interception rate of above 70%, the ROK is quickly moving to acquire PAC-3 systems.⁶⁵³ An ROK analysis of the KAMD by Park Chang-kwoun of the Korea Institute for Defense Analyses stated,⁶⁵⁴

During their Foreign and Defense Ministers' Meeting held on June 14th [2012] in Washington, D.C., the ROK and the U.S. agreed to explore ways to strengthen "comprehensive and combined missile defenses" in response to North Korea's growing missile capabilities. The two nations aim to strengthen their combined response capabilities against the North Korean missile threat through effective interworking system between the Korean Air and Missile Defense (KAMD) and the missile defense system of the United States Forces Korea (USFK). Establishing the ROK-U.S. combined missile defense system against the North Korean missile threat is an imperative measure to guarantee the security and reinforce the deterrence capability of the ROK.

...KAMD is designed to be a Korea-specific missile defense system that only intends to intercept incoming hostile missiles at the low-altitude (10-30km) for the purpose of local defense.

The U.S., on the other hand, is developing a comprehensive missile defense system that includes high-altitude missile defense in an integrated manner with its European allies and Japan. As an ally of the U.S., South Korea also seeks to join and cooperate with the U.S.-led regional missile defense system.

...The development of the KAMD would be achieved in a gradual manner, considering the limited defense budget and technological capabilities of South Korea. The U.S. is committing an astronomical amount of budget to the tune of 1.5 trillion dollars into building its missile defense system for the next decade--yet, there have been reports that there still remain a number of technical challenges. In fact, South Korea has only limited defense budget that can be devoted to the establishment of the missile defense system.

...South Korea is planning to launch its Air and Missile Defense cell (AMD-cell), a missile defense command-and-control center, by the end of this year and to deploy its own missile defense system based on surveillance platforms such as Green Pine Radars and SPY-1D in Aegis Combat System and interception platforms such as PAC-2 Gem and SM-2 Block III. The Green Pine Radars, ballistic missile early warning radars, will be acquired from Israel by the end of this year. In addition, South Korea's indigenous antiaircraft missile, the Cheolmae-II will be added to the ballistic missile interception system.

If defense budget permits in the future, South Korea would be able to further strengthen interception capabilities of the KAMD by acquiring the PAC-3 and the SM-6, which is currently under development. Moreover, the ROK will begin a task of improving the Cheolmae-II. Since key components of the current KAMD interception system-- the PAC-2, the SM-2, and the Cheolmae-II-- were not originally developed as ballistic missile interception systems and have fragmentation warheads, the KAMD has a certain limitation in performing ballistic missile interception. Consequently, acquisition of new interception systems

including the PAC-3 and the SM-6 is expected to bolster South Korea's ballistic missile interception capabilities.

Meanwhile, the USFK operates a Theater Missile Operations cell (TMO-cell) and has ballistic missile interception systems including the PAC-2 and the PAC-3 deployed in its major military bases. These systems allow the USFK to be able to respond to North Korean ballistic missile threats from the early stages backed by various satellite systems of the U.S. forces. Currently, the missile defense system of the USFK is designed for effective defense of the U.S. military installations. In case of contingency, however, the missile defense capabilities of the U.S. forces would be further improved if U.S. Aegis destroyers are deployed to South Korea's coastal areas and complement the current missile defense system.

The ROK has, however, had to steadily broaden and adapt its planning to take account of increases in the DPRK threat. For example, it has been reported that the ROK has looked into buying Israel's Iron Dome to protect the approximately 11 million people who live in Seoul, only 35 miles from the DMZ. According to such reports, South Korea first offered to buy Iron Dome in January 2012 if Israel bought South Korean fighter jets in return – but Israel instead decided to buy from Italy. In November 2012, the ROK offered South Korean ships, potentially to hold Israel's advanced missile systems, but no deal was announced.⁶⁵⁵

Iron Dome may not be ideal for the ROK. The DPRK has such an extensive artillery and short-range rocket arsenal – the DPRK could fire 500,000 artillery rounds on Seoul in the first hour of a conflict⁶⁵⁶ – in addition to longer-range missiles, that it would take far too many Iron Dome batteries to protect Seoul sufficiently, unless the system was focused on just a few high-value targets. Each Iron Dome battery built to shoot down missiles costs approximately \$50 million, and the interceptor rockets cost \$50,000-\$80,000 each.⁶⁵⁷

Missile Defense - THAAD

The most important development in ROK planning has been adding the Terminal High Altitude Area Defense (THAAD) to its missile defense program. THAAD potentially offers a critical improvement to the ROK's missile defenses by adding a wide area capability to endo-atmospheric intercepts covering the gaps between the narrow area coverage of the PAK and the exoatmospheric capability of AEGIS-Standard as well as advanced radar and battle management capabilities.

In 2014, USFK commander General Curtis Scaparrotti suggested that the ROK deploy a THAAD battery in country as a counter to North Korean missiles. The THAAD system, developed by the United States, “is a transportable system to intercept ballistic missiles inside or outside the atmosphere during their final, or terminal, phase of flight”. It is “able to intercept incoming missiles both inside and just outside of the Earth's atmosphere at a range of 200 kilometers.”

THAAD's “ability to intercept both inside and outside the atmosphere makes (it) an important part of layered missile defense concepts, falling in between the exclusively exo-atmospheric Aegis interceptors and the exclusively endo-atmospheric Patriot interceptors.”⁶⁵⁸ This helps explain why the U.S. and ROK increasingly examined the deployment of THAAD, particularly after the DPRK's 2016 nuclear and missile tests.

On July 8 2016, negotiators from both countries agreed to placing the system in South Korea, drawing pointed criticism from the DPRK, China and Russia. China and Russia are worried that the system's powerful radar will be used to detect missile launches and tests far within their own borders.⁶⁵⁹ It was announced that THAAD's deployment site would be Seongju, a county located

in the southwest, with activation scheduled for 2017. While the location was identified as being relatively remote and capable of covering some 2/3 of the country, the decision to place THAAD in Seongju provoked protests by many of the nearby residents.⁶⁶⁰ In addition, there remains some concern as to the effectiveness of the THAAD system as a deterrent to North Korean missiles. One potential problem is the system's cost: "a single THAAD unit of six mobile launchers, 49 interceptors, fire control and communications, and the AN/TPY-2 radar runs \$1.6 billion".⁶⁶¹ Other concerns have been raised about the system's functionality, complexity, and relative newness.⁶⁶²

Space

The ROK has improved potential ballistic missile capabilities through its successful and expanding space program. Seoul began development of its own space program in the 1990s, including the development of a space-launch vehicle (SLV). After numerous delays, the ROK launched the two-stage Korea Space Launch Vehicle-1 (KSLV-1) rocket on August 25, 2009. The launch was intended to place an earth and atmospheric monitoring satellite – the *Science and Technology Satellite 2* (STSTAT-2) – into orbit, but after a successful launch, the satellite failed to successfully re-enter the atmosphere.⁶⁶³

The partial success of this launch raised concerns that South Korea had sufficient technology for a long-range ballistic missile system that could deliver WMD payloads, especially given that the US and ROK were discussing changing the missile limitation guidelines that would allow missiles with a range of no more than 800 km, as previously discussed.⁶⁶⁴

Following the December 2012 successful DPRK satellite launch, the ROK successfully launched a KSLV-1 rocket and put a satellite into space on January 30, 2013. The launch took place from Naro Space Center, and the rocket had been designed in partnership with the Khrunichev State Space Science and Production Center of Russia. The ROK has already begun work on an entirely domestically developed system with a projected 75-ton rocket engine, to be produced by 2021.⁶⁶⁵

The implications of this launch are varied. While it proves that the ROK could successfully deploy ballistic missiles, perhaps acting as a deterrent to the North, the DPRK could also use the ROK's new capabilities to justify its own program. Because the two launches were so similar, the DPRK will use the ROK's launch as an excuse to ignore any UN sanctions, potentially claiming unfair treatment despite the two countries' similar stated intentions of peaceful space exploration. Given the ROK's successful January 2013 launch, it is possible that the ROK could work to couple their space program with a ballistic missile program to counter the DPRK threat apparent in its *Nodong*, *Musudan*, and *Taepodong* missile programs.⁶⁶⁶

Conclusions

It is important to stress that advanced forms of conventionally armed ballistic and cruise missiles can be used to threaten or attack targets and do so with strategic effect. It is unclear how accurate the DPRK's missiles are, and it seems doubtful that Pyongyang now has a real-world terminal guidance capability to use conventionally armed ballistic and cruise missiles effectively against critical point targets. As long as the DPRK does not have such "smart" warheads, conventionally armed missiles are largely terror weapons. Once the DPRK does have this capability, however, they potentially could have "weapons of mass effectiveness," able to destroy high-value and critical infrastructure targets with conventional warheads.

The US does have conventionally armed, precision-guided, deep-strike SRBMs, however, and both the US and the ROK have strike aircraft and precision-guided air-to-surface weapons that targeting patterns in the Balkans conflict and both Gulf Wars show can hit critical infrastructure targets with strategic effect. This could lead to new patterns of escalation where the US and ROK use precision guided air-to-surface, surface-to-surface, and cruise missiles to destroy critical DPRK targets, or threaten to use such weapons to deter Pyongyang.

The US also can deliver precision strike weapons with “stealth” strike aircraft and bombers, and Japan and the ROK are likely to acquire strike aircraft with some “stealth” capability. Alternatively, the US and ROK might threaten or initiate the use of precision-guided air-to-surface, surface-to-surface, and cruise missiles to destroy critical DPRK targets or to halt a DPRK conventional attack

Still, conventional missile programs are only part of a far wider range of important issues in assessing the overall impact of the Korean balance. They cannot be separated from all of the uncertainties surrounding the DPRK’s chemical, biological, radiological and nuclear weapons programs – the CBRN or weapons of mass destruction (WMD) threat. The interactions between the various elements of this complex mix of known and unknown programs may be summarized as follows:

1. The DPRK has implosion fission weapons. The numbers, weapons yields, and ability to create reliable bombs and missile warheads are uncertain, but it seems likely it either has warheads or is rapidly moving toward acquiring them. It almost certainly has programs to develop boosted and thermonuclear weapons, but their status is unknown.
2. The ROK had a covert nuclear weapons program that it halted after quiet negotiations with the US. This, along with its extensive civilian nuclear power industry, gives the ROK a significant nuclear breakout capability if it should reverse its decisions.
3. Japan is unlikely to have nuclear weapons programs but has all of the technology and material necessary to rapidly acquire them and develop boosted and thermonuclear weapons.
4. The US and China have nuclear-armed aircraft and ICBMs, IRBMs, MRBMs, and SRBMs with boosted and thermonuclear weapons. The DPRK may have long-range tactical and theater missiles with implosion nuclear weapons.
5. The DPRK is a major chemical weapons state, and probably has advanced chemical warheads and bombs. China may have stocks of chemical weapons. There is no way to estimate the size, type, and lethality/effectiveness of their relative stockpiles, or doctrine and plans for using them. It should be noted, however, that relatively crude mustard gas weapons played a decisive role in area denial and disruption of Iranian forces in the final phase of the Iran-Iraq War in 1988, and that stocks of persistent nerve gas and so-called 4th generation chemical weapons are possible. Although Seoul neither confirms nor denies the existence of a CW program, the ROK is suspected to have a chemical weapons program and may have covert stocks of chemical weapons.
6. The DPRK is strongly suspected to have a biological weapons program and may have stocks of such weapons. These could range from basic weapons types to genetically modified types. China’s program is not discussed in unclassified official statements. The ROK may have a program. It should be noted that China, Japan, the DPRK, the ROK, and the US all have advanced civil biological, food processing, chemical processing, and pharmaceutical facilities that can be adapted to both chemical and biological weapons development and production. All have significant capability for genetic engineering of biological weapons. All would have to develop advanced biological weapons for test purposes to conduct an effective biological defense program.
7. No public details are available on the efforts of any power to develop small or specialized chemical, biological, radiological, or nuclear weapons for covert delivery or potential transfer to non-state actors and third-party countries.

8. China and the DPRK have large numbers of conventionally armed long-range missiles capable of hitting targets in the ROK. The nature of their conventional warheads is not clear, and this is critical since unity conventional warheads have limited lethality and terminal guidance is needed to provide the accuracy necessary to strike at high-value, rather than broad-area targets. China and the DPRK may have, and are certainly developing, ballistic and cruise missiles with some form of terminal guidance.
9. The US has large numbers of precision-guided long-range cruise missiles for air and sea launch and precision-guided long-range multiple rocket launchers. The ROK is also developing an advanced cruise missile program of its own. US stealth aircraft can deliver precision-guided weapons at standoff ranges from most Chinese and DPRK surface-to-air missiles with the exception of the S300/S400 series. China is developing long-range anti-ship ballistic missiles that can strike large surface ships like US carriers at long distances. These potentially are “weapons of mass effectiveness” that can be used in devastating strikes against critical facilities and infrastructure without the use of WMD warheads.
10. The US, Japan, and the ROK have some ballistic missile defense capability and are working together to develop wide-area theater ballistic missile defense systems. China has the Russian S300/S400 series of advanced surface-to-air missile defenses and is almost certainly seeking more advanced missile defense capabilities. The DPRK lacks such capabilities but is almost certainly seeking them. The balance of air and missile defense capabilities plays a critical role in limiting the offensive capabilities of the opposite side and reducing the risk in using one’s own missiles. This makes air and missile defenses the equivalent of a major offensive weapon.
11. China, the US, the ROK, and possibly the DPRK all have advanced cyber warfare capabilities. China has some anti-satellite capability and possibly some form of EMP weapon. These, too, are potential “weapons of mass effectiveness” that can be used in devastating strikes against critical facilities and infrastructure without the use of WMD warheads.

Current assessments of the Korean balance tend to focus on the nuclear elements of the DPRK’s WMD and missile programs, but this previous list shows that such programs are only part of a far more complex and rapidly evolving mix of current and potential capabilities to deliver weapons of both “mass destruction” and “mass effectiveness.”

The threat that such weapons may be used also cannot be limited to the Korean Peninsula. It already extends to Japan and the US bases there, as well as potentially to Alaska and the Pacific coast of the US. Potential US reactions again raise the issue of what China’s response would be and whether a crisis could escalate to the point where the US-Chinese strategic and nuclear balance became relevant – a threat that could force Japan to make hard choices of its own.

The range of uncertainties affecting DPRK capabilities also raises two key issues for DPRK and Korean Peninsula arms control:

1. One is the so-called Nth weapon paradox. It may be possible to reduce a nation’s nuclear weapons, but it is probably impossible to be certain it does not retain at least a few. The problem for arms control is that the smaller the stockpile, the more it has to be used in ways that threaten absolutely critical targets like major population centers rather than a given military target. Arms reductions can easily escalate targeting.
2. The second is the “diversion effect”: the risk that nuclear controls can drive states even more toward advanced biological and chemical weapons. Advances in biotechnology have made control regimes virtually impossible, as well as vastly increased the potential lethality of biological weapons to levels beyond that of even boosted and thermonuclear weapons.

As the next chapter shows, the nuclear threat is only part of the WMD capabilities affecting the Korean balance. The DPRK has long been a chemical weapons power. It is believed to have active biological weapons programs, and it clearly has long-range missile programs that can target Japan and anywhere in the ROK. These can potentially be armed with a range of CBRN warheads, but no meaningful unclassified evidence exists of the range of such warheads or their lethality. The same is true of DPRK bombs and rocket warheads. This means that CBRN

escalation could occur at a wide range of unpredictable levels, including asymmetric, covert, and terrorist attacks. Moreover, the DPRK is already acquiring missile engines and boosters that will give it ICBM capabilities to attack targets in the US.

V. Korean WMD Forces

The two Koreas differ sharply in their political and military need for weapons of mass destruction and missiles. South Korea is now a global economic power that is fully integrated into the international system. North Korea's economy is close to that of a failed state, and it needs nuclear weapons and missiles for both political prestige and leverage in negotiating with the US and its neighbors.

The ROK has examined nuclear options. It has the capability to create nuclear weapons and possesses a sound base of nuclear technology to build upon. It also can almost certainly design and build cruise and ballistic missiles that can accurately reach any target in the DPRK, and do so in a relatively short period of time. It has all of the technology and industrial base to design and build advanced chemical and biological weapons. This gives the ROK a near breakout capability to compete with North Korea if it chooses to do so. So far, however, it has chosen to rely on the US for extended deterrence and has focused more on deploying advanced air and missile defense systems than offensive capabilities.

The DPRK, in contrast, lacks anything like the ROK's resource and technical base. Nevertheless, it is a long-standing chemical weapons power and has tested four nuclear devices – albeit with mixed success. It is actively developing long-range missiles and almost certainly has researched biological weapons and has the capacity to build them. So far, however, it has focused on offensive systems and it has not seriously modernized its air defenses or shown that it plans, or is able, to buy and deploy missile defenses.

Nuclear weapons and long-range missiles offer North Korea the ability to pressure or intimidate its neighbors. They give the DPRK added international status, they deter ROK and US counterattacks and escalation, and they provide a cheaper alternative than trying to compete with the ROK and US in modernizing conventional forces.

They also give Pyongyang a strong incentive to retain and expand its asymmetric capabilities. As the 2012 Japanese Defense White Paper notes, “North Korea seems to maintain and reinforce its so-called asymmetric military capabilities by developing weapons of mass destruction (WMD) and ballistic missiles and by maintaining large-scale special operation forces.”⁶⁶⁷

An ROK government report adds, “The development of asymmetric capabilities seems to serve three objectives: to secure military superiority over others, to have an effective bargaining chip, and to promote internal unity.”⁶⁶⁸

US Director of National Intelligence James Clapper testified to the Senate in January 2014 that.⁶⁶⁹

North Korea's nuclear weapons and missile programs pose a serious threat to the United States and to the security environment in East Asia, a region with some of the world's largest populations, militaries, and economies. North Korea's export of ballistic missiles and associated materials to several countries, including Iran and Syria, and its assistance to Syria's construction of a nuclear reactor, destroyed in 2007, illustrate the reach of its proliferation activities. Despite the reaffirmation of its commitment in the Second-

Phase Actions for the Implementation of the September 2005 Joint Statement not to transfer nuclear materials, technology, or know-how, North Korea might again export nuclear technology.

In addition to conducting its third nuclear test on 12 February 2013, North Korea announced its intention to “adjust and alter” the uses of existing nuclear facilities, to include the uranium enrichment facility at Yongbyon, and restart its graphite moderated reactor that was shut down in 2007. We assess that North Korea has followed through on its announcement by expanding the size of its Yongbyon enrichment facility and restarting the reactor that was previously used for plutonium production. North Korea has publicly displayed its KN08 road-mobile ICBM twice. We assess that North Korea has already taken initial steps towards fielding this system, although it remains untested. North Korea is committed to developing long-range missile technology that is capable of posing a direct threat to the United States. Its efforts to produce and market ballistic missiles raise broader regional and global security concerns.

Because of deficiencies in their conventional military forces, North Korean leaders are focused on deterrence and defense. We have long assessed that, in Pyongyang’s view, its nuclear capabilities are intended for deterrence, international prestige, and coercive diplomacy. We do not know Pyongyang’s nuclear doctrine or employment concepts

In his 2016 testimony, Clapper reemphasized these warnings. He noted that while the January 2016 nuclear test was unlikely to have been a hydrogen bomb, the DPRK remained a potent threat to the US, stating.⁶⁷⁰

North Korea has also expanded the size and sophistication of its ballistic missile forces—from close range ballistic missiles to intercontinental ballistic missiles (ICBMs)—and continues to conduct test launches. In May 2015, North Korea claimed that it successfully tested a ballistic missile from a submarine. Pyongyang is also committed to developing a long-range, nuclear-armed missile that is capable of posing a direct threat to the United States; it has publicly displayed its KN08 road-mobile ICBM on multiple occasions. We assess that North Korea has already taken initial steps toward fielding this system, although the system has not been flight-tested.

This mix of political and military factors has made the DPRK’s nuclear programs – and efforts to acquire nuclear weapons and long-range ballistic missiles – a source of growing concern, and has led to negotiating and arms control efforts for the better part of two decades. Despite these efforts, the DPRK became the world’s eighth atomic power when it conducted an underground nuclear weapons test in October 2006, and currently continues both its nuclear weapons and long-range missile programs.

DPRK Chemical and Biological Developments

The DPRK’s nuclear programs are only part of this aspect of the military balance. Weapons of mass destruction include chemical, biological, radiological, and nuclear (CBRN) weapons. The DPRK reportedly possesses a sizable stockpile of chemical and, possibly, biological weapons as well as the ability to mount them on conventional and unconventional delivery systems. It is also important to note that the balance also includes the CBRN weapons of outside actors like the United State and China, which may be a reason why the ROK has chosen (or been coerced) to maintain little, if any, CBRN stockpiles relative to the DPRK.

While Pyongyang openly declares itself to be a nuclear and missile power, it denies possessing chemical or biological weapons or agents. The DPRK acceded to the Convention on the Prohibition of the Development, Production and Stockpiling of Bacteriological (Biological) and Toxin Weapons and on Their Destruction (BWC) in March 1987, but not to the Convention on the Prohibition of the Development, Production, Stockpiling and Use of Chemical Weapons and on Their Destruction (CWC).⁶⁷¹

A wide range of sources raise serious doubts about such DPRK denials. A 2000 Department of Defense (DOD) report to Congress stated,⁶⁷²

We assess North Korea is self-sufficient in the production of chemical components for first generation chemical agents. They have produced munitions stockpiles...of several types of chemical agents, including nerve, choking, blister, and blood. We assess that North Korea has the capability to develop, produce, and weaponize biological warfare agents, to include bacterial spores causing anthrax and smallpox and the bacteria causing the plague and cholera.

The Nuclear Threat Initiative reports that,⁶⁷³

...the DPRK is thought to be among the world's largest possessors of chemical weapons, ranking third only after the United States and Russia, who are working to destroy their Cold War caches. In its most recent assessment (2010), the South Korean Ministry of National Defense (MND) estimated the DPRK possesses between 2,500 and 5,000 metric tons of chemical weapons, including phosgene (choking), hydrogen cyanide (blood), mustard (blister), and sarin (nerve agent).

As long as the balance of conventional forces continues to be unfavorable for the DPRK, chemical weapons are likely to remain part of DPRK military strategy, and it seems likely that it has developed at least some biological agents.

There has been considerable debate among government officials and scholars as to whether or not the DPRK has the ability to put nuclear, biological, and/or chemical weapons on their missiles, especially on any potential ICBMs. While the country almost certainly does possess all the components – all three weapons types, as well as missiles – it is uncertain that the DPRK can now equip its ballistic missiles with reliable and effective WMD warheads.⁶⁷⁴

For warheads armed with biological, chemical, and nuclear weapons, verification of their functionality is a must. During flight, warheads suffer extreme mechanical loads, vibrations, accelerations, wide temperature ranges, and pressure differences from near vacuum to extreme dynamic pressures at reentry. Chemical and biological agents are highly sensitive to temperatures, as are nuclear weapons. A nuclear weapon is a complex mechanical device, and the ejection mechanisms of biological and chemical weapons are complex, as well.

The same is true for the respective detonators and fuses. The functionalities of these devices can only be proven under real conditions, thus requiring flight tests. No test flights with nuclear, biological, or chemical warheads in North Korea are known. The functionality and reliability of these weapons is therefore unknown, even to the North Koreans. If these warheads exist, either they have been imported from Russia or China, which seems highly unlikely, or they are unlikely to perform well once launched.

It is always possible, however, that the DPRK would arm its missiles with CBRN weapons even if they had uncertain or limited effectiveness, knowing that the political, intimidation, and terror effects would be all too real even in peace time, they could have some deterrent value out of sheer uncertainty on the part of the ROK and U.S., and force major defensive preparations in the case of war. Moreover, the problems in creating effective chemical and biological weapons are much less severe with “slow fliers” like cruise missiles.

DPRK Chemical Weapons

The DPRK is one of only six countries⁶⁷⁵ that has neither signed nor acceded to the Chemical Weapons Convention and is not expected to do so in the near-term due in part to the intrusive inspection and verification requirements mandated by the agreement.⁶⁷⁶

A number of sources indicate that the DPRK produced its first experimental chemical weapons during the late 1950s and early 1960s in the wake of the Korean War.⁶⁷⁷ Since then, its chemical weapons program has increased in scale and lethality, and the DPRK now ranks among the

world's largest possessors of chemical weapons. Many of the fire support systems in the DPRK inventory could deliver chemical agents and be employed in offensive military operations.

Western Estimates of DPRK Stockpiles and Capacity

According to a 2006 unclassified CIA report, the DPRK is believed to possess a sizable stockpile of chemical weapons. Since 1989, it has had the ability to indigenously produce bulk quantities of nerve, blister, choking, and blood chemical agents as well as a variety of different filled-munitions systems.⁶⁷⁸

The Nuclear Threat Initiative (NTI) provides similar data, alleging the DPRK's chemical arsenal to include four of the five major classes of chemical warfare (CW) agents, including phosgene (choking), hydrogen cyanide (blood), mustard (blister), and sarin (nerve agent). North Korea does not appear to possess nervous system incapacitants such as BZ. Nerve agents (i.e., Sarin and VX) are believed to be the current focus of the DPRK's CW production.⁶⁷⁹ Additionally, GlobalSecurity.org estimates that the DPRK may produce tabun and adamsite.⁶⁸⁰ However, the DPRK may require imports of some specific precursors to produce nerve agents that are relatively more difficult to fabricate than the first generation blister, blood and choking agents.⁶⁸¹

The International Crisis Group (ICG) and IISS also provide estimates of possible DPRK CW agents, and other reports indicate that the DPRK appears to have increased its CW agent production capacity in the last two decades and has been able to develop and deploy a variety of delivery systems.

The country's arsenal includes thousands of artillery of various calibers and hundreds of forward-deployed *Hwasong-5/-6* missiles and *Frog-5/-7* missiles capable of being fitted with chemical warheads.⁶⁸² According to defector accounts, the DPRK's long-range missiles such as the *Nodong* and other ballistic rockets and artillery pieces with calibers larger than 80 mm are capable of delivering CW agents, and beginning in 2002 the DPRK began to substantially increase the number of long-range multiple rocket 280 mm and 320 mm launching systems near the DMZ.⁶⁸³

The possible range of DPRK chemical weapons is shown in **Figure V.1**.

Figure V.1: DPRK Possible CW Agents

AGENT	AGENT ID	MAJOR EFFECTS
Blister Agents		
Lewisite	HD	Cutaneous (skin): Pain and irritation of eyes and skin followed by blisters and lesions on the skin. Pulmonary (inhalation): runny nose, hoarseness, bloody nose, sinus pain, coughs. Intestinal: diarrhea, nausea, vomiting.
Mustard Agents	L, H	Cutaneous (skin): Pain and irritation of eyes and skin followed by blisters and lesions on the skin. Pulmonary (inhalation): runny nose, hoarseness, bloody nose, sinus pain, coughs. Intestinal: diarrhea, nausea, vomiting.
Choking Agents		

Phosgene	CG	Coughing, blurred vision, shortness of breath, nausea, pulmonary edema, heart failure, death.
Diphosgene	DP	Coughing, blurred vision, shortness of breath, nausea, pulmonary edema, heart failure, death.
Vomiting Agents		
Adamsite	DM	Coughing, severe headache, muscle spasms, chest pains, shortness of breath, nausea, vomiting.
Vomiting Agent	DA	Headache, nausea, vomiting, diarrhea, abdominal cramps.
Chloropicrin	PS	Coughing, severe skin irritation on contact, corneal edema and liquefaction of the cornea, pulmonary edema.
Tear Gas	CN	Tears, coughing, mucus, burning in the nose and throat, disorientation, dizziness restricted breathing, burning of the skin.
Tear Gas	CS	Tears, coughing, mucus, burning in the nose and throat, disorientation, dizziness, restricted breathing, burning of the skin.

Blood Agents		
Cyanide (Hydrogen Cyanide/Cyanogen Chloride)	ANCK	Rapid breathing, dizziness, weakness, headache, nausea, vomiting.
Nerve Agents		
Tabun	GA	Runny nose, watery eyes, rapid breathing, nausea, unconsciousness, paralysis, respiratory failure, death.
Sarin	GB	Runny nose, watery eyes, rapid breathing, nausea, unconsciousness, paralysis, respiratory failure, death.
Soman	GD	Runny nose, watery eyes, rapid breathing, nausea, unconsciousness, paralysis, respiratory failure, death.
VX	--	Salivation, runny nose, sweating, shortness of breath, muscle spasms, unconsciousness, death.
VE	--	Salivation, runny nose, sweating, shortness of breath, muscle spasms, unconsciousness, death.
<p>For further information see:</p> <ul style="list-style-type: none"> • Organization for the Prohibition of Chemical Weapons (OPCW): http://www.opcw.org/resp/html/cwagents.html • World Health Organization (WHO): www.who.int/csr/delibepidemics/biochem_threats.pdf • Carnegie Endowment for International Peace: www.ceip.org/files/publications/RegimeAppendix7.asp?p= • NATO Handbook on the Medical Aspects of NBC Defensive Operations AmedP-6(B): 		

<http://www.fas.org/nuke/guide/usa/doctrine/dod/fm8-9/toc.htm>

• US Government, the Chemical & Biological Warfare Threat; US Army Medical Research Institute of Chemical Defense, Chemical Casualty Care Division, <http://ccc.apgea.army.mil>.

Source: International Crisis Group, *North Korea's Chemical and Biological Weapons Programs*, Asia Report No. 167, June 18, 2009, 25, http://www.crisisgroup.org/~media/Files/asia/north-east-asia/north-korea/167_north_koreas_chemical_and_biological_weapons_programs.pdf; John Chipman, "North Korea's Chemical and Biological Weapons (CBW) Programs," *North Korea's Weapons Programs*, IISS, 2004, 55.

Korean Estimates of DPRK Stockpiles and Capacity

Official reports and testimonies from North Korean defectors are uncertain, but most agree with the ROK Ministry of National Defense (MND), which in its most recent assessment in 2010 indicated that the DPRK could possess between 2,500 and 5,000 metric tons of chemical weapons. These estimates are summarized in **Figure V.2**.⁶⁸⁴ The ROK also estimates that the DPRK is capable of producing 12,000 metric tons.⁶⁸⁵

Kwon Yang-Joo of The Korea Institute for Defense Analyses (KIDA) agreed with this analysis in an October 2010 report, stating that the DPRK was capable of producing "up to 12,000 tons of chemical weapons," which could "contaminate about 2,500 square kilometers (950 square miles), four times the area of Seoul."⁶⁸⁶

This stockpile is not believed to be increasing, however, because there is no indication of the necessary expansion of storage facilities to do so.⁶⁸⁷ Despite this, South Korea continues to be vigilant, and distributed gas masks to civilians and civil defense corps members in the month following the Yeonpyeong Island shelling.⁶⁸⁸

Guesstimates of Key Locations

The DPRK maintains a number of facilities involved in producing or storing chemical precursors, agents, and weapons that are shown in **Figures V.3 and V.4**. GlobalSecurity.org estimates that North Korea has at least eight industrial facilities that can produce chemical agents; however, the production rate and types of munitions are uncertain.⁶⁸⁹

ICG also has reported that the DPRK's Second Natural Science Academy conducts weapons-related research and development and that the main CW research facility is co-located with a production plant in Kanggye City, Chagang Province.⁶⁹⁰ In addition, a number of civilian chemical facilities have been implicated in chemical weapons production, such as the Manpo Chemical Factory and Aoji-ri Chemical Complex.⁶⁹¹

Chemicals are part of heavy industry and a key component for the DPRK's economy, especially in an atmosphere in which military preparedness is strongly emphasized. All chemical production – and other heavy industry – is militarized in North Korea, though it is unclear exactly how much of the production is geared towards chemical warfare. According to the NTI, the DPRK has:⁶⁹²

- 4 military bases equipped with chemical weapons
- 11 facilities where chemical weapons are produced and stored
- 13 locations where research and development is carried out relating to chemical weapons
- 2 facilities near the cities of Kanggye and Sakchu are reportedly equipped for CW agent final preparation and filling of artillery shells, as well as testing, possibly in large underground facilities

The DPRK's leadership has traditionally had total control over procedure and policy regarding armaments production. The National Defense Commission (NDC) is the highest military industry-related decision-making body, and the Second Economic Committee (SEC) is directly subordinate to it. Set up in the 1970s, the SEC is key for the majority of DPRK planning, development, manufacturing, and distribution of ordnance and WMD. The SEC is located in Kangdong-kun, Pyongyang, and controls eight bureaus and 190 munitions factories. The Ministry of Chemical Industry is separate from this line of command, but likely coordinates production and transfer of CW agent intermediaries with the SEC and its subordinate bureaus. The eight bureaus are:⁶⁹³

- A general affairs office
- First Machine Industry Bureau: ammunition and small arms
- Second Machine Industry Bureau: armored personnel carriers (APCs) and tanks
- Third Machine Industry Bureau: multi-stage rockets
- Fourth Machine Industry Bureau: guided missiles
- Fifth Machine Industry Bureau: chemical, biological, and nuclear weapons
- Sixth Machine Industry Bureau: submarines and battleships
- Seventh Machine Industry Bureau: production and purchase of war aircraft

While the SEC establishes requirements, the Fifth Machine Industry Bureau is the most important for chemical and biological weapons in that it carries out the production of the agents. The Nuclear and Chemical Defense Bureau (NCDB) is directly subordinate to the General Staff Department, is responsible for offensive and defensive chemical operations, and is in charge of the filling, storage, and handling of munitions. The NCDB works in the research and development of chemical weapons as well as undertakes chemical and nuclear defense measures. It is composed of seven department units and two further research institutions.⁶⁹⁴

- Operations unit
- Training unit
- Materials unit
- Technology unit
- Reconnaissance unit
- Mining/underground facility operations unit
- Section 32 unit (reportedly working in developing specialized chemical-delivery warheads for the Nodong-1 missile)
- Section 55 [research institute]: simulating nuclear and chemical contamination for decontamination operations and training (approximate research staff of 70)
- Section 398 [research institute]: decontamination operations in both nuclear and chemical environments and is reportedly developing antidotes, masks, and suits (approximately 250 researchers)

Munitions plants located at Ganggye and Sakju are nominally civilian, but are under the control of the SEC's General Machine Industry Bureau and the NCDB's Equipment Department. At these locations, chemical weapons agents from the Fifth Machine Industry Bureau are inserted into artillery shells (including mortar shells) previously received from the Third Machine

Industry Bureau. Also at these two plants, aerial munitions and chemical spray tanks are prepared and can be used in wartime when filled with chemical agents from bulk storage facilities located at various airfields. Factory 279 produces defensive equipment, such as protective suits, detection systems, and decontamination chemicals.⁶⁹⁵

After the munitions are assembled and filled, they are taken to the Maram Materials Corporation (Maram neighborhood, Yongsong district station, Pyongyang) and the Jiha-ri Chemical Corporation (in Pangyu-gun, Gangwon province) for storage. It has been reported that DPRK chemical weapons storage facilities are in underground tunnels, with the agents stored in 12-foot-high tanks along with Factory 279's defensive materials.⁶⁹⁶

According to an ROK source in 2002, the DPRK has several different chemical troops under different organizations. The NCDB has eight battalions in its department of operations – the 17th and 18th battalions are considered active, while the 13th, 14th, 15th, 16th, 27th, and 36th are reserve.

The 18th Nuclear Chemical Defense Battalion is composed of six companies; according to a DPRK defector, the 18th Battalion has a nuclear/chemical reconnaissance company (the 1st Company), while the 2nd, 3rd, 4th, and 5th companies are “decontamination” units. The 6th company is flame-throwers and likely obscurant smokes (also referred to as “Smoke Screen Company”), which had once been located in Sadong district station, Pyongyang, and had been transferred to the 18th Battalion in 1993. According to the defector, none of these companies have specific offensive duties, instead being primarily concerned with reconnaissance and decontamination.⁶⁹⁷

Defensive Preparations

In spite of the lack of any key threat in kind, the DPRK has devoted considerable resources to defensive measures aimed at protecting its civilian population and military forces from the effects of chemical weapons. Such measures include extensive training in the use of protective masks, suits, detectors, and decontamination systems.⁶⁹⁸

The DPRK has chemical defense units at all levels of its forces equipped with decontamination and detection equipment, and DPRK military units conduct regular NBC (nuclear-biological-chemical) defensive training exercises in preparation for operations in a chemical environment.⁶⁹⁹ Though these measures seem to be focused on a perceived threat from US and ROK forces, they could also support the offensive use of chemical weapons.

**Figure V.2: Defector Reports on the DPRK CW Program
(as of 2004)**

Name	Background	Defector Comment
Yi Chung Kuk	Sergeant in the 18th Nuclear and Chemical Defense Battalion in the early 1990s. Defected in March 1994.	Warned that the DPRK was capable of killing everyone in the ROK with chemical and bacterial weapons. Linked the Sunchon Vinalon Complex to the DPRK's CW program.
Choi Ju Hwal	Served in the Ministry of Defense from 1968 to 1995. (Acknowledged that he did not have direct knowledge of the CBW program, but he obtained second-hand information from other officials.)	As of 1997, the DPRK had stockpiled over 5,000 tons of toxic gases, including nerve gases (sarin, soman, tabun, and V agents), first-generation blister gases (lewisite and mustard gas), and blood agents (hydrogen cyanide and cyanogen chloride). Choi identified numerous facilities associated with CW research and production, including several civilian chemical factories involved in vinalon production.
Yi Sun Ok	Inmate at a DPRK prison. Defected in 1995.	Said that some 150 fellow inmates died due to a chemical weapons test.
Hwang Chang Yop	Secretary of the DPRK's Workers Party. Defected in August 1996.	Claimed that the DPRK had both nuclear and chemical armed missiles capable of hitting the ROK and Japan. He quoted the DPRK leadership as saying that the DPRK ranked third or fourth in the world in chemical weapons.
Yi Chun Sun	Commander of a missile station. Defected from the KPA in 1999.	Said that chemical agents are produced in Factory 102.
Yi Mi (pseudonym)	Worked at the Yongbyon nuclear complex. Defected in September 2000.	Said the 304 Lab mainly worked on nuclear weapons development but also conducted research and development in chemical weapons.
Source: Chipman, "North Korea's Chemical and Biological Weapons (CBW) Programs," <i>North Korea's Weapons Programs</i> , 54.		

Figure V.3: Map of Possible DPRK Chemical Facilities



Note: Locations are approximate.

Sources: International Crisis Group, *North Korea's Chemical and Biological Weapons Programs*, Asia Report No. 167, 23; Chipman, "North Korea's Chemical and Biological Weapons (CBW) Programs," *North Korea's Weapons Programs*, 50–52.

**Figure V.4: Major DPRK Civilian Chemical Production Facilities
(as of 2004)**

Aoji-ri (Haksong-ri) Chemical Complex	Production of methanol, ammonia, ammonium bicarbonate, coal tar derivatives, and liquid fuel products. About 3,500 employees. Processes 600,000 tons of lignite coal processing per year; produces 100,000 tons of ammonium bicarbonate and 35,000 tons of methane per year.
April 25th Vinalon Factory (Hamhung)	Produces 540,000 tons per year of fertilizer, herbicides, and pesticides. Other products include ammonia, as well as other chlorine-based pesticides – probably DDT and chlordane, among others.
February 8th Vinalon Complex (Hamhung)	One of the largest chemical facilities in the DPRK. Around 10,000 employees. Comprises about 50 large buildings. Produces 50,000 tons of vinalon and 10,000 tons of movilon per year. Also produces carbide, methanol, sodium hydroxide, livestock feed, sodium carbonate, vinyl chloride, and agricultural insecticide.
Hamhung Chemical Factory	Produces sulfuric acid, nitric acid, ammonia, and fertilizer products.
Hungnam Chemical Fertilizer Complex (Hamhung)	Produces ammonium sulphate, ammonium nitrate, phosphate, and urea. Employs more than 10,000 people. Production capacity of 1.4 million tons (unclear whether annual capacity or other time period).
Institute of Chemistry, Hamhung	R&D, education, and training in applied chemistry. Established in 1960.
Chongjin Chemical Fiber Complex	Employs around 3,000 people. Produces 300 tons of pesticides, 10,000 tons of other chemical products, and 30,000 tons of synthetic fiber per year. Also produces carbonic acid, formalin, and phenol.
Chongsu Chemical Complex	Production of large quantities of calcium carbide and smaller amounts of phosphate fertilizer and calcium cyanamide.
Hwasong Chemical Factory	Produces agricultural chemicals and 2,500 tons of phenol per year. Unknown iodine capacity.
Hyesan Chemical Factory	Produces chemicals such as benzol, phenol, and hydrochloric acid.
Manpo Chemical Factory	Produces ammonia, sodium hydroxide, and sulfuric acid.
Namhung Youth Chemical Complex	Produces ammonia, ethylene, fertilizers, fibers, and paper. Annual production capacity of approximately 500,000 tons.
Sariwon Potash Fertilizer Complex	Produces Fertilizers – planned production target of 510,000 tons per year of potash fertilizer (unclear whether annual capacity or other time period).

Shinhung Chemical Complex	Produces calcium hypochlorite, caustic soda, dyes, hydrochloric acid, paints, vinyl chloride, polyvinyl chloride, potassium carbonate, sodium carbonate, sodium bicarbonate, barium chloride, ammonium sulfate fertilizer, magnetized fertilizer, slag fertilizer, and sulfuric acid fertilizer.
Sinuiju Chemical Fiber Complex	Produces calcium cyanide, chlorine, sodium hydroxide, sulfuric acid, synthetic fiber, and paper products. Annual production capacity of 107,000 tons.
Sunchon Vinalon Complex	The DPRK's largest chemical production facility with about 50 affiliated factories. First stage of construction completed in 1989; final construction reportedly still not completed as of 2000. Estimated annual production (if completed) of 100,000 tons of vinalon, one million tons of carbide, 750,000 tons of methanol, and 900,000 tons of vinyl chloride.
Sunchon Calcium Cyanide Fertilizer Factory	One of the DPRK's four major fertilizer plants. Produces calcium cyanide and calcium carbide. Annual chemical production capacity of 100,000–150,000 tons. Probably a part of the Sunchon Vinalon Complex.
Source: Based on information from the NTI's website: http://www.nti.org/e_research/profiles/NK . This draws on information from documents such as 'DPRK Factories Suspected of Producing Chemical Agents,' FBIS: KPP2001021600106; 'Alleged Locations of DPRK Nuclear, Biological, Chemical Warfare Facilities Mapped,' 6 June 2001, FBIS: KPP20010606000075; 'North Korean Chemical Industry,' FBIS: FTS19981230001322; and 'Chemical Engineering, Experts Described,' 23 December 1999, FBIS: FTS199991223001168. Chipman, "North Korea's Chemical and Biological Weapons (CBW) Programs," <i>North Korea's Weapons Programs</i> , 50.	

DPRK Biological Weapons

Much less is known about the North Korean biological warfare program than about its chemical warfare program. The DPRK acceded to the Biological and Toxin Weapons Convention (BTWC) in March 1987, but most official estimates conclude that the DPRK possesses the scientists and facilities for producing traditional infectious biological warfare (BW) agents and weapons, and has done so since the 1960s. Several DPRK defectors have claimed that the North tested biological and/or chemical weapons on mentally or physically deficient children and concentration camp prisoners.⁷⁰⁰

Capabilities

An April 2012 ROK official report stated that the DPRK was able to equip its rocket launchers, mortars, and field artilleries with biological weapons and assessed that botulinum toxins, smallpox, and anthrax were the most likely to be weaponized.⁷⁰¹ The South Korean government further estimated that half of the DPRK's long-range missiles and 30% of its artillery were able to deliver biological or chemical weapons, though it was unknown if the North was able to equip missiles/artillery in a way that would allow the biological payloads to survive and effectively disperse.⁷⁰²

As the DPRK appears to be focusing on improving its nuclear and missile capabilities, recent assessments have tended to downgrade the threat of biological weapons, compared with past assessments.⁷⁰³ There is, however, no clear public source of evidence as to its actions and intentions.

North Korea has dual-use facilities that could be used to produce biological agents and a munitions industry that could be used to weaponize such agents – a recent Deputy DNI report, noted that “North Korea has a biotechnology infrastructure that could support the production of various BW agents.”⁷⁰⁴ However, there is not enough information to determine whether Pyongyang has progressed beyond the research and development stage and actually has stocks of biological weapons. But while the DPRK may not possess ready-to-use weapons, it certainly has the technical abilities to produce them.

According to GlobalSecurity.org, Pyongyang's resources presently include a rudimentary (by Western standards) biotechnology infrastructure that is sufficient to support the production of limited quantities of toxins as well as viral and bacterial biological warfare agents.⁷⁰⁵

BW agents are reportedly cultured in both civilian and military-related research institutes in the DPRK, and, according to NTI, pathogens that have possible utility for BW and that are allegedly being researched and developed by the DPRK include: *Bacillus anthracis* (anthrax), *Clostridium botulinum* (botulism), *Mycobacterium tuberculosis* (tuberculosis), *Rickettsia prowazekii* (typhus), *Salmonella typhi* (typhoid), *Vibrio cholerae* 01 (cholera), *Yersinia pestis* (plague), Korean hemorrhagic fever, *Variola major* (smallpox), Yellow fever virus (yellow fever), Dysentery, Brucellosis, *Staphylococcus aureus*, and Yellow Rain (T-2 Micro Toxins)

These possible agents are described in **Figure V.5**.⁷⁰⁶

Figure V.5: Possible DPRK Biological Agents

TYPE	SYMPTOMS/CHARACTERISTICS	STATUS
Bacteria		
<i>Bacillus anthracis</i> (Anthrax)	Pulmonary (inhalation): difficulty breathing, exhaustion, toxemia, terminal shock. Cutaneous (skin): itching, small lesions and possible blood poisoning. Intestinal: nausea, fever, diarrhea. Mortality (if untreated): Pulmonary 80–95%; Cutaneous 5–20%; Intestinal 25–60%. Incubation period: Symptoms usually occur with 7 days. Not contagious.	Possibly weaponized, with delivery system
<i>Vibrio cholera</i> (Cholera)	Diarrhea, vomiting, and leg cramps. Rapid loss of body fluids, dehydration and shock. Mortality (if untreated): 5–10%. Death in 1–3 hours. Not contagious.	Unknown
<i>Yersinia pestis</i> (Plague)	Fever, headache, exhaustion, swollen lymph nodes, blood infection, and pneumonia. Mortality (if untreated): 50–60%. Incubation period: 1–3 days, death in 2–6 days. Contagious.	Unknown
<i>Salmonella Typhi</i> (Typhoid Fever)	Fever, malaise, chills, stomach pains, headache, loss of appetite, and rash. Mortality (if untreated): 12–30%. Contagious.	Unknown
Typhus	Fever, headache, chills, whole body rash, and general pains. Mortality (if untreated): 30–50%. Incubation Period: 6–12 days. Not contagious.	Unknown
<i>Mycobacterium tuberculosis</i> (tuberculosis)	Coughing, chest pain, fatigue, loss of appetite, chills, fever, and coughing blood. Mortality (if untreated): 30–50%. Incubation period: 14 days–1 year. Contagious.	--
Virus		
Hemorrhagic fever (Korean Strain)	Fever, fatigue, dizziness, muscle aches, exhaustion, internal bleeding, coma, delirium, and seizures. Mortality (if untreated): 5–15%. Incubation period: 7–17 days. Contagious.	Unknown
<i>Variola</i> (smallpox)	Fever, malaise, aches, rash, and crusting scabs. Mortality (if untreated): 30–40%. Incubation: 7–17 days. Contagious.	Unknown
Yellow Fever	High fever, chills, headache, muscle aches, and vomiting; can lead to shock, kidney, and liver failure. Mortality (if untreated): 5–40%. Incubation: 3–6 days. Not contagious.	--
Toxin		
<i>Clostridium Botulinum</i> (Botulism)	Nausea, weakness, vomiting, and respiratory paralysis. Mortality (if untreated): 60–90%. Incubation: 12–36 hours after inhalation. Death in 24–72 hours. Not contagious.	Unknown
<p>Note: World Health Organization, http://www.who.int/csr/deliberedemics/en/annex3May03.pdf; NATO, <i>Handbook on the Medical Aspects of NBC Defensive Operations AmedP-6(B)</i>, http://www.fas.org/nuke/guide/usa/doctrine/dod/fm8-9/2toc.htm; and US Army Medical Research Institute of Infectious Diseases, <i>Medical Management of Biological Casualties Handbook</i>, http://www.usamriid.army.mil/education/bluebook.html; and Centers for Disease Control, http://www.cdc.gov.</p> <p>Source: Nuclear Threat Initiative, “North Korea: Biological,” http://www.nti.org/country-profiles/north-korea/biological/; Chipman, “North Korea’s Chemical and Biological Weapons (CBW) Programs,” <i>North Korea’s Weapons Programs</i>, 50.</p>		

Facilities

A number of DPRK facilities have been linked to ongoing work in biological weapons research, development, and manufacture that are shown in **Figures V.6 and V.7**. Although the indicators involved are often uncertain, the IISS provides a detailed list and map of possible facilities.

Additionally, the ROK MND estimated in 2001 that the DPRK maintains at least three possible BW production facilities and six BW or BW-related research centers, including the No. 25 Factory in Chongju, the Central Biological Weapons Research Institute in Pyongyang and a plant in the City of Munchon, Kangwon Province. One ROK newspaper reported the existence of more than 10 facilities, while NTI has also reported a number of facilities in addition to the No. 25 Factory linked to BW production. They include:⁷⁰⁷

- The Research Institute of the Armed Forces Ministry (synonymous with the Bacterium Research Institute, Second Academy of Natural Sciences), responsible for developing biological weapons.
- A Biological research facility located in Songch'on County, South P'yongan Province, adjacent to the Onjong-ni chemical weapons facility; growth media is allegedly supplied (approximately 200 tons per year) by a facility in Munchon, Kangwon Province.
- A germ-producing facility known as the 25 February Plant (also known as the 25 Plant), located in Chongju, North Pyongan Province.
- The National Defense Research Institute and Medical Academy (NDRIMA), which conducts studies on disease pathogens such as the bacteria and viruses that cause anthrax, cholera, bubonic plague, smallpox, yellow fever, and others.

In 2015, pictures depicting the Pyongyang Bio-technical Institute (which Kim Jung Un was visiting) were released by the North Korean media. Subsequent analysis determined that the site could potentially be used to produce mass quantities of anthrax.⁷⁰⁸

Few details are known about these facilities or which, if any, microorganisms have been or are being weaponized. Regardless, whatever the status of its biological weapons efforts, the DRPK possesses a number of dual-use biotechnology facilities that could be used to research biological weapons agents and produce militarily significant quantities of biological agents.⁷⁰⁹

Figure V.6: Civilian DPRK Biological Facilities

Aeguk Compound Microbe Center	R&D and production of microbial-based fertilizer supplements.
Aeguk Preventative Medicine Production Factory	Comprised ten laboratories and various workshops devoted to R&D and production of vaccines and medicines. The main product has been hepatitis B vaccine.
Branch Academy of Cell and Gene Engineering	One of nine research branches of the Academy of Sciences. Conducts research on cellular biology and genetic engineering.
National Sanitary and Anti-Epidemic Research Center	Administers quarantines and provides inoculations against various diseases.
Endocrinology Institute	Mainly diagnoses and treats diabetes.
Industrial Microbiology Institute	R&D and production of microbial cultures.
Munchon Agar Plant	Agar (growth media) production. As of 1992, the annual agar production capacity was 200 tons.
Pharmaceutical Institute of the Academy of Medical Sciences	R&D of medicaments. Reportedly located in Pyongyang.
Pyongyang Pharmaceutical Factory	As of August 2000, the factory produced seven drugs, including antibiotics and multivitamins. Has received raw materials and support from UNICEF and Diakonie Emergency Aid of Germany.
Synthetic Pharmaceutical Division, Hamhung Clinical Medicine Institute	R&D of medicaments and clinical diagnostics.
Taedonggang Reagent Company	R&D of vaccines. Previously known as the November 19 Institute.
Sources: NTI, "North Korea: Biological"; "DPRK's NAS Pursues Cultivation of Stock Bacteria for Microbial Fertilizers," <i>Chungang Ilbo</i> , January 17, 2000; "DPRK Korea Donor Update," UNICEF Emergency Programs, August 7, 2000, http://www.reliefweb.int ; Chipman, "North Korea's Chemical and Biological Weapons (CBW) Programs," <i>North Korea's Weapons Programs</i> , 50.	

Figure V.7: Map of Possible DPRK Civilian Biological Facilities



Source: Chipman, "North Korea's Chemical and Biological Weapons (CBW) Programs," *North Korea's Weapons Programs*, 57.

DPRK Nuclear Developments

US intelligence estimates of the DPRK's nuclear weapons program have long warned that the DPRK has an active program. It is clear that Pyongyang has effectively ignored or terminated its past agreements to limit the production of nuclear materials and missile tests, posing very real concerns not only in the region, but also in the International community.

According to a May 2010 UN Security Council report on the DPRK's nuclear program, "the Democratic People's Republic of Korea believes...that its nuclear programmer can provide the country a way to achieve its stated goal of becoming a 'strong and prosperous country' (*kangsongdaeguk*) by the year 2012 without succumbing to what they view as 'foreign influences.'"⁷¹⁰

Motivations for Acquisition

The broad rationales for the DPRK's efforts have already been discussed. The DPRK noted in a state-run newspaper, "The DPRK was left with no option but to choose the way of accessing nuclear deterrent in order to put an end to the U.S. ever-more intensified nuclear threat and defend the sovereignty, dignity, and vital rights of the country" – making nuclear weapons a matter of defense and dignity, not offense.⁷¹¹

In June 2010, a DPRK Foreign Ministry spokesman stated that "recent developments" have underscored the need for the DPRK "to bolster its nuclear deterrent in a newly developed way."⁷¹² Given the aggressiveness in the DPRK sinking of the ROK Corvette *Cheonan* in March 2010 and the shelling of Yeonpyeong Island in November, there may be little possibility that the DPRK will give up its nuclear weapons program any time soon.

US officials assess DPRK nuclear capabilities as "being more for deterrence, international prestige, and coercive diplomacy than for war fighting, and assess that Pyongyang most likely 'would consider using nuclear weapons only under narrow circumstances.'"⁷¹³

One former DOD official called the DPRK's nuclear weapons acquisition a "survival game" in that nuclear weapons are the only reason anyone pays attention to the DPRK, which is necessary for the regime to gain aid and assistance. As the poorest country in the region, it would receive little without calling attention to itself so forcefully.⁷¹⁴ Furthermore,⁷¹⁵

It should also be considered that even speculative sources estimate that North Korea cannot have more than a few nuclear weapons available. If they exist, these devices are very precious to the regime, and it seems unlikely that they would be mounted on inaccurate and unreliable missile systems—the risk of "loosing" a weapon is simply too high. Of course, a singular shot can never be totally ruled out, but the chances of success are very low. And even if this unlikely event was to happen, with North Korea unable to repeat this feat on short notice, this scenario should be seen more like a terrorist attack than nuclear warfare.

DNI James R. Clapper noted in 2011,⁷¹⁶

Based on the scale of the facility and the progress the DPRK has made in construction, it is likely that North Korea has been pursuing enrichment for an extended period of time. If so, there is clear prospect that DPRK has built other uranium enrichment related facilities in its territory, including likely R&D and centrifuge fabrication facilities, and other enrichment facilities. Analysts differ on the likelihood that other production-scale facilities may exist elsewhere in North Korea.

Ironically, the Arab Spring may have acted as a further incentive to the DPRK. Some experts feel that North Korea sees Muammar Qaddafi's willingness to give up Libya's nuclear programs as one reason that the UN and NATO were willing to impose a no-fly zone and make a de facto

effort to remove him from power. It also sees India, Iran, Israel, and Pakistan as examples of states whose nuclear efforts also give them political and military leverage where they may not have had it. Looking at the examples of Libya and Iraq, countries that gave up their WMD programs, the DPRK state media outlet noted on April 4, 2013 that “the nuclear weapons of Songun Korea are not something for display and the DPRK is very different from Iraq, Libya and the Balkans.”⁷¹⁷

In any case, the DPRK’s third nuclear test in February 2013 signaled that it was attempting to establish itself as a nuclear power or, at the very least, a de-facto nuclear state – like Israel, India, and Pakistan – a nation that is implicitly recognized as a nuclear state by the international community, though not formally recognized under the NPT framework. The Institute for Science and International Security (ISIS) also reported in August 2013, that satellite data indicated that the DPRK might have doubled the area used to enrich uranium at its Yongbyon reactor complex – its key source of weapons grade material – over the previous months.⁷¹⁸

It is also clear that the DPRK stepped up its nuclear research and production activity in 2014, as well as gave indications that it planned new nuclear tests in June and November.⁷¹⁹ Gen. Curtis M. Scaparrotti, the Commander of US forces in the ROK stated publically on October 24, 2014 that he believed that the DPRK had probably developed a nuclear weapon small enough to be used in a nuclear warhead on a ballistic missile.⁷²⁰

Scaparrotti’s public statement at a Pentagon press conference was particularly significant because of the uncertainty as to the DPRK’s ability to deploy nuclear missile warheads, and an intelligence incident in April 2013, when the Defense Intelligence Agency had issued a statement that it had concluded with “moderate confidence” that the DPRK now had the technology to make a nuclear weapon small enough to fit a ballistic missile warhead. A few days later, James R. Clapper Jr., the Director of National Intelligence, stated that the DIA’s one-paragraph assessment had been declassified by mistake, and was inadvertent disclosure that revealed competing views on the country within the United States’ spy agencies.⁷²¹

Assessments of Capabilities: Plutonium

It is difficult to determine just how large the DPRK’s nuclear program is and how much progress it is making. The DPRK is an extremely isolated and secretive state and provides few signals of the existence – let alone the extent – of its nuclear weapons program, which has resulted in substantial uncertainty about its size and capability. However, a general picture of the program has become relatively clear over the past two decades.

The US Intelligence Community estimates that Pyongyang see its nuclear capabilities as intended for “deterrence, international prestige, and coercive diplomacy,” and would consider using nuclear weapons only “under certain narrow circumstances.”⁷²² In addition, research centers like Institute for Science and International Security (ISIS) have indicated that the DPRK may be sharing at least some aspects of its nuclear weapons technology with Iran and the Syria.⁷²³

CSIS’s Mike Green notes “the danger of horizontal escalation by the DPRK – namely, transferring weapons to third parties in the event of tensions or conflict. The DPRK directly threatened the United States with this in March 2003.”⁷²⁴

The DPRK reported in May 2008 that it had extracted roughly 38.5 kg of weapons-grade plutonium from fuel rods.⁷²⁵

A February 2013 report by the Congressional Research Service (CRS) reported that North Korea had between 30 and 50 kilograms of separated plutonium, enough for at least half a dozen nuclear weapons.⁷²⁶ In 2011, the NTI estimated that the DPRK had 6-10 kg of weapons-grade plutonium and another 29-34 kg of plutonium in spent fuel stockpiles that could be reprocessed and weaponized.⁷²⁷

ROK MND figures are similar, estimating that the DPRK has secured about 40 kg of plutonium as a result of three reprocessing procedures (as of 2010).⁷²⁸ Additionally, the Strategic Studies Institute (SSI) believes that the DPRK has discharged anywhere from 43 to 61 kg from its 5MWe reactor since 1989. Furthermore, it has been reported that approximately 3,000 people work on the DPRKs nuclear program, including about 200 key researchers and scientists.⁷²⁹

In contrast, an assessment by David Albright of ISIS that is shown in **Figure 8**, found that the DPRK was more likely to process some 30-34 kilograms of separated plutonium for a full range of 5-18 nuclear weapons (with a more likely distribution of some 9-10 weapons) at the end of 2014. This assessment took account of various production stoppages and the material used in the three preceding nuclear test. However, Albright cautioned that this would only be the case if *all* plutonium was being converted into nuclear weapons, which seems unlikely.⁷³⁰

Some sources indicate that DPRK nuclear technologies and materials appear to be poorly guarded and could be exploited or stolen by personnel in the security services or military and transferred to criminal groups, terrorist organizations, and/or other states. After his visits to the DPRK, Dr. Siegfried Hecker stated that he had seen “little recognition of the safety hazards posed by primitive nuclear bombs,” likely meaning that security is also minimal.⁷³¹

The DPRK has sometimes halted its plutonium production from its 5MWe reactor in Yongbyon, but it can easily restart plutonium production and weaponization, and the DPRK announced in March 2013 that it was going to do so. According to a CRS report:⁷³²

In order to produce additional plutonium, the North Koreans would need to restore their 5-MWe reactor or build a new reactor. Timelines for restoring the 5-MWe reactor are uncertain, although experts estimate between six months and one year. Rebuilding the cooling tower, which was destroyed in June 2008, could take approximately six months, but other venting solutions for the reactor could be possible. Additionally, this aging reactor may be in need of additional parts or repair... After the facilities were operating, they could produce approximately 6 kg of plutonium per year.

In 2013, evidence emerged that the DPRK was restarting the Yongbyon reactor. While information on the facility’s operational capacity is hard to discern, by 2014 there was some evidence that the plant had begun producing fuel.⁷³³ Despite these signs, it is still not 100 percent certain whether the reactor has returned to an operational standing.⁷³⁴

On November 18, 2014, the U.S.-Korea Institute at SAIS at Johns Hopkins University, issued a report that recent commercial satellite imagery of the Yongbyon nuclear facility indicated the DPRK might be preparing to reprocess spent nuclear fuel to extract weapons-grade plutonium.

Assessments of Capabilities: Uranium

While North Korea’s weapons program was plutonium-based at the start, intelligence has emerged showing that it is pursuing a second route to obtaining weapons grade fissile material using highly enriched uranium (HEU). The DPRK confirmed this in June 2009 when it announced it would commence uranium enrichment, stating “enough success has been made in

developing uranium enrichment technology to provide nuclear fuel to allow the experimental procedure.”⁷³⁵

Three months later, DPRK officials announced that experimental uranium enrichment had entered into the “completion phase.”⁷³⁶ According to the US Intelligence Community, the exact intent of these announcements is unclear, and they do not speak definitively to the technical status of the uranium enrichment program.⁷³⁷

In November 2010, a visit by Dr. Hecker to Yongbyon shed additional light on the DPRK’s HEU program. On his visit he saw “a small, recently completed, industrial-scale uranium-enrichment facility” that *appeared* fully operational, though Dr. Hecker and his colleagues were unable to confirm whether it was in fact operating at full capacity.⁷³⁸

ISIS released a report in mid-2012 warning that, in the best case scenario, the DPRK would use its uranium centrifuges at Yongbyon to make enough low enriched uranium to have a maximum of 25 nuclear weapons by 2015 – an increase of two from the ISIS’s current estimate. In the worst case scenario – the absence of effective sanctions – the DPRK could build as many as 48 nuclear weapons by 2015 (an increase of 25).⁷³⁹

An additional assessment by ISIS concluded that the DPRK is now “poised for significant expansion over the next five years” and – at a worst case scenario – on track to develop up to 100 nuclear weapons by 2020.⁷⁴⁰ These reports were followed by press reports that the International Atomic Energy Agency (IAEA) suspected that the DPRK had at least one additional covert centrifuge site and might have significant additional sites.⁷⁴¹

Given the speed with which the DPRK outfitted the Yongbyon location, it seems unlikely that there wasn’t a previously built facility where the process of constructing such a centrifuge plant was perfected.⁷⁴² In July 2016, a report by ISIS indicated that such an early site might be located at the Panghyon Aircraft Plant, some 45 kilometers west of Yongbyon in an underground facility.⁷⁴³ These reports mean that the DPRK may have substantial stocks of enriched uranium as well as plutonium.

At a minimum, this means the DPRK’s future production of weapons-grade material is impossible to predict and that both targeting and arms control are far more difficult because of the inability to predict how many dispersed centrifuge facilities the DPRK may have. However, the DPRK is probably far from having a self-sufficient program. According to ISIS:⁷⁴⁴

Whatever North Korea has accomplished in building centrifuges, it faces an ongoing, fundamental problem. It is not self-sufficient in making and operating centrifuges. It acquired key equipment and materials abroad and appears to be continuing its overseas procurements. North Korea will undoubtedly need additional equipment and materials to build and operate large numbers of centrifuges successfully.

**Figure V.8: Estimates of DPRK Nuclear Fuel Production and
Weapon Equivalents
(as of 2014)**

North Korea’s Military Fissile Material Stocks and Weapon Equivalent, end of 2014			
Fuel Type	Amount	Nuclear Weapons Equivalent	Estimated Nuclear Weapons Built

Separated Plutonium	30-34 kg	-	-
Irradiated Plutonium	2-4 kg	-	-
Weapons Grade Uranium – Scenario 1 (2 Centrifuge Plants)	240 kg (median only)	22	15-16
Weapons Grade Uranium – Scenario 2 (1 Centrifuge plant)	100 kg (median only)	15	10-11
Source: David Albright, “North Korean Plutonium and Weapon-Grade Uranium Inventories”, ISIS, January 8, 2015 (Revised October 7, 2015).			

Nuclear Weapons and Warhead Developments

Despite the progress of the DPRK’s nuclear program, it is unclear whether the DPRK has mastered the ability to efficiently and reliably weaponize a nuclear device it can deploy on a missile. The detonation of a nuclear explosive device is a significant scientific achievement, but creating a device that can be included in a small bomb or a missile warhead presents a number of difficult engineering problems.⁷⁴⁵ Theoretically, the DPRK could use an aircraft, a ship, or even a vehicle to deliver a nuclear weapon, but these platforms are either vulnerable or unreliable.

ROK intelligence believes, however, DPRK engineers were able to make significant progress in warhead miniaturization between 1999 and 2001, and the national defense ministry – along with ROK experts – now believes the DPRK has warheads that can be mounted on ballistic missiles.⁷⁴⁶ Furthermore, ROK intelligence sources told the ICG in 2009 they believe the DPRK has deployed nuclear warheads for *Nodong* missiles in the northern part of the country.⁷⁴⁷ As noted earlier, US intelligence experts and senior officers also indicate in 2013 and 2014, however, that the DPRK may have reached the point where it has the technical capability to deploy a nuclear missile warhead.

It is also unclear how reliable or safe such a warhead would be, what the risks would be if it might malfunction, how well it could survive an accident, and whether the DPRK could predict its operational yield in kilotons.⁷⁴⁸

The Early Program

North Korea's strengths and weaknesses in weaponizing and deploying nuclear weapons become clearer if one examines the full history of its efforts. The origins of the DPRK nuclear program seem to stem from the gross insecurity felt by then-leader Kim-Il-sung following the near defeat of his forces in the Korean War. Although nuclear weapons were never used, US political leaders and military commanders threatened their use during the war. In February 1956, Pyongyang signed the founding charter of the Soviet Union's Joint Institute for Nuclear Research and began to send scientists and technicians to the USSR for training shortly thereafter.⁷⁴⁹

When the US deployed nuclear weapons to South Korea for the first time in 1958, the DPRK began a rudimentary nuclear program primarily focused on basic training and research, relying on assistance from the Soviet Union. The program trained North Korean scientists and engineers and helped to construct basic research facilities, including a small research reactor (the IRT-2000) in Yongbyon.⁷⁵⁰

In the late 1960s, the DPRK expanded its educational and research institutions to support a nuclear program for both civilian and military applications. By the early 1970s, DPRK engineers had begun using indigenous technology to expand the IRT-2000 reactor, and Pyongyang began acquiring plutonium reprocessing technology from the Soviet Union.⁷⁵¹ In July 1977, the DPRK signed a trilateral safeguards agreement with the IAEA and the USSR that brought the IRT-2000 research reactor and a critical assembly plant in Yongbyon under IAEA safeguards.⁷⁵²

In 1980, Pyongyang's nuclear program began a period of expansion to the point that it could produce substantial amounts of nuclear energy and weapons-grade plutonium.⁷⁵³ This expansion included uranium milling facilities, a fuel rod fabrication complex, and a 5 MW(e) nuclear reactor, as well as research and development institutions.⁷⁵⁴ By the mid-1980s, Pyongyang began construction on a 50 MW(e) nuclear power reactor in Yongbyon and expanded its uranium processing facilities.⁷⁵⁵

Pyongyang was also exploring the acquisition of light water power reactors (LWRs), and agreed to sign the Non-Proliferation Treaty (NPT) in December 1985 in exchange for Soviet assistance in the construction of four LWRs.⁷⁵⁶ However, the DPRK refused to sign a safeguards agreement with the IAEA, an obligation under the NPT.⁷⁵⁷

Denuclearization of the Korean Peninsula and the 1993–1994 Crisis

In September 1991, US President George H.W. Bush announced that the US would withdraw its nuclear weapons from the ROK, and on December 18, 1991, South Korean President Roh Tae Woo declared that South Korea was free of nuclear weapons.⁷⁵⁸ As a result, the DPRK and ROK signed the Joint Declaration on the Denuclearization of the Korean Peninsula. In the document, both sides promised to “not test, manufacture, produce, receive, possess, store, deploy or use nuclear weapons,” “use nuclear energy solely for peaceful purposes,” and to forgo the possession of “nuclear reprocessing and uranium enrichment facilities.”⁷⁵⁹

Following the signing of the Joint Declaration, the DPRK signed an IAEA safeguards agreement on January 30, 1992. Under the terms of the agreement, North Korea provided an “initial declaration” of its nuclear facilities and materials and allowed IAEA inspectors to verify the completeness and correctness of the initial declaration.⁷⁶⁰ Inspections began in May 1992 and concluded in February 1993. However, when the IAEA requested access to two suspect nuclear waste sites, North Korea declared them to be military sites and therefore off-limits.⁷⁶¹ In

response, the UN Security Council passed Resolution 825 on May 11, 1993, urging the DPRK to cooperate with the IAEA and to implement the 1991 North-South denuclearization accord.⁷⁶²

Having reached a deadlock with the IAEA and facing sanctions from the UN, North Korea announced on March 12, 1993 that it intended to withdraw from the NPT. The US responded by holding political-level talks with the DPRK in early June 1993 that led to a joint statement outlining the basic principles for continued US-DPRK dialogue and North Korea's "suspending" its withdrawal from the NPT before it became legally effective.⁷⁶³

The agreement was short-lived. Immediately following the return of IAEA inspectors to North Korea in March 1994, the DPRK refused to allow the inspection teams to inspect a plutonium reprocessing plant at Yongbyon, and in May 1993 the IAEA confirmed that North Korea had begun removing spent fuel – which can be reprocessed for use in nuclear weapons – from its 5 MW(e) nuclear research reactor even though international monitors were not present.⁷⁶⁴

Faced with renewed UN sanctions, the DPRK withdrew from the IAEA on June 13, 1994. Although still a member of the NPT, the DPRK no longer participated in IAEA functions as a member state and thus refused to allow inspectors to carry out their work under the Safeguards Agreement.⁷⁶⁵

The crisis was defused by then-former President Jimmy Carter's visit to the DPRK in June 1994. Four months of negotiations concluded in an Agreed Framework between the US and the DPRK on October 21, 1994. Under the agreement the US committed to arranging for the provision of a LWR with a generating capacity of approximately 2,000 MW(e) in exchange for a DPRK "freeze" and ultimate dismantlement of its reactors and related facilities.⁷⁶⁶ Although the accord froze North Korea's plutonium production facilities and placed them under IAEA monitoring, the US estimated that the DPRK could have recovered enough plutonium for one or two nuclear weapons before the agreement came into force.⁷⁶⁷

The Collapse of the Agreed Framework (1994–2002)

The DPRK's indigenous plutonium production facilities remained frozen following the agreement, and its known plutonium stocks were subject to IAEA monitoring. The facilities subject to the freeze were the 5 MW(e) reactor, the Radiochemical Laboratory (reprocessing), the fuel fabrication plant, and the partially built 50 and 200 MW(e) nuclear power plants.⁷⁶⁸ It was during this time that the international community discovered the extent of the DPRK's plutonium production in the late 1980s and early 1990s. According to the American Federation of Scientists:⁷⁶⁹

A close examination by the IAEA of the radioactive isotope content in the nuclear waste revealed that North Korea had extracted about 24 kilograms of Plutonium. North Korea was supposed to have produced 0.9 gram of Plutonium per megawatt every day over a 4-year period from 1987 to 1991. The 0.9 gram per day multiplied by 365 days by 4 years and by 30 megawatts equals to 39 kilograms. When the yearly operation ratio is presumed to be 60 percent, the actual amount was estimated at 60% of 39 kilograms, or some 23.4 kilograms. Since 20-kiloton standard nuclear warhead has 8 kilograms of critical mass, this amounts to mass of material of nuclear fission out of which about 3 nuclear warheads could be extracted.

Estimates vary of both the amount of plutonium in North Korea's possession and number of nuclear weapons that could be manufactured from the material. South Korean, Japanese, and Russian intelligence estimates of the amount of plutonium separated, for example, are reported to be higher—7 to 22 kilograms, 16 to 24 kilograms, and 20 kilograms, respectively—than the reported US estimate of about 12 kilograms. At least two of the estimates are said to be based on the assumption that North Korea removed fuel rods from the 5-MW(e) reactor and subsequently reprocessed the fuel during slowdowns in the reactor's

operations in 1990 and 1991. The variations in the estimates about the number of weapons that could be produced from the material depend on a variety of factors, including assumptions about North Korea's reprocessing capabilities—advanced technology yields more material—and the amount of plutonium it takes to make a nuclear weapon. Until January 1994, the Department of Energy (DOE) estimated that 8 kilograms would be needed to make a small nuclear weapon. Thus, the United States' estimate of 12 kilograms could result in one to two bombs. In January 1994, however, DOE reduced the estimate of the amount of plutonium needed to 4 kilograms—enough to make up to three bombs if the US estimate is used and up to six bombs if the other estimates are used.

Despite the freeze, neither party was completely satisfied with either the compromise reached or its implementation. The United States was dissatisfied with the postponement of safeguards inspections to verify Pyongyang's past activities, and North Korea was dissatisfied with the delayed construction of the LWRs.

Uranium Enrichment, Six Party Talks, and the Banco Delta Asia (2002-2005)

The fact the plutonium route was partly blocked by the Agreed Framework may help explain why Pyongyang seems to have instigated a secret program in the late 1990s to develop the means to produce weapons-grade enriched uranium utilizing gas centrifuge technology.⁷⁷⁰ These efforts were brought to light in October 2002 with the announcement by the US that the DPRK had acknowledged, in talks with Assistant Secretary of State for East Asian and Pacific Affairs James Kelly, a “program to enrich uranium for nuclear weapons.”⁷⁷¹

This led to the conclusion that the DPRK's program was a violation of the Agreed Framework, the NPT, the DPRK-IAEA Safeguards Agreement, and the North-South Joint Declaration on the Denuclearization of the Korean Peninsula.⁷⁷² In November 2002 the IAEA adopted a resolution calling upon North Korea to “clarify” its “reported uranium-enrichment program.”⁷⁷³ The DPRK rejected the resolution, saying the IAEA's position was biased and in favor of the United States.⁷⁷⁴

The United States responded in December 2002 by suspending heavy oil shipments, and North Korea subsequently retaliated on January 10, 2003 by lifting the freeze on its nuclear facilities, expelling IAEA inspectors, and announcing its withdrawal from the NPT.⁷⁷⁵ On December 26, 2002, an IAEA press release stated that North Korea had cut all IAEA seals, disrupted IAEA surveillance equipment on its nuclear facilities and materials, and started moving fresh fuel rods into the reactor.⁷⁷⁶

It was reported in mid-2002 that US intelligence had found evidence of HEU materials and/or technology transfers from Pakistan to the DPRK, in return for ballistic missile technology. Furthermore, it was reported in 2004 that the DPRK had been part of the AQ Kahn network, purchasing gas-centrifuge technology.⁷⁷⁷

The US government also established the Illicit Activities Initiative, an attempt to create a parallel track to diplomacy by increasing efforts to stop the DPRK's international criminal activities (i.e., illicit weapons sales, counterfeiting, drug smuggling, etc. – discussed in Chapter III). Japan cut economic ties with the DPRK, curtailed remittances to the DPRK from the pro-DPRK ethnic Korean population in Japan, and increased oversight and restrictions on DPRK ships ferrying between the DPRK and Japan. However, the ROK and China did not introduce any new sanctions, although there were reports that the PRC briefly stopped energy shipments in March 2003.⁷⁷⁸

Little progress was made in arms control following the DPRK's withdrawal from the NPT. In early 2003, US intelligence detected activities around Yongbyon, which indicated that North Korea was probably reprocessing the 8,000 spent fuel rods that had been in a temporary storage pond.⁷⁷⁹ The assessment was reaffirmed in September, when a DPRK Foreign Ministry spokesman said that reprocessing of this spent fuel had been completed, providing enough plutonium for approximately four to six nuclear devices.⁷⁸⁰ This was confirmed in January 2004 when a delegation of invited US experts, headed by Dr. Hecker, confirmed that the canisters in the temporary storage pond were empty.⁷⁸¹

In April 2003, a multilateral dialogue involving six nations – the US, ROK, DPRK, China, Russia, and Japan – began with the aim of ending the DPRK's nuclear weapons program; however, little was accomplished. Throughout the Six Party Talks, DPRK officials often expressed their preference for bilateral engagement with the US rather than the multilateral forum.

After multiple meetings spanning two years, the parties could only agree to a Statement of Principles.⁷⁸² However, due to disagreements over light water reactors and the Banco Delta Asia sanctions, progress on both the Statement and on further Six Party Talks stalled.⁷⁸³ **Figure V.9** highlights the progress made during the Talks, while **Figure V.10** summarizes the primary agreements reached.

Throughout the talks, the DPRK had continued its plutonium reprocessing, and when the Six-Party process stagnated April 2005, the North shut down its 5MW(e) reactor and removed the spent fuel.⁷⁸⁴ The reactor had been operating since February 2003, meaning that it could have produced enough plutonium for between one and three nuclear devices in its spent fuel.⁷⁸⁵

In 2005, the US government used the Patriot Act to designate Banco Delta Asia (BDA) -- a small Macanese bank holding DPRK accounts -- as an institution of money laundering concern. It did so by applying based on Section 311 of the USA PATRIOT Act, 31 U.S.C. 5318A. In the wake of this designation, the government of Macau froze the DPRK's accounts at the BDA, totaling approximately \$25 million, an action that was quickly followed by other major international financial institutions refusing to undertake transactions with the DPRK, apparently fearing that they could be cut off from the US financial system.

This was effective in reducing the DPRK's access to its international financial accounts, but at the same time became a major source of tension in the Six Party Talks – though positively, also contributing to DPRK concessions several years later. The funds were returned in February 2007.⁷⁸⁶

As for the impact of the measures, the CRS reports,⁷⁸⁷

In addition to the issue of returning the frozen funds, some analysts claim that the BDA issue brought to the surface lingering questions about the way the international banking community treats DPRK accounts. Specifically, the financial effects of the BDA action were larger than expected. It caused a run on accounts at the bank that compelled the government of Macau to take over BDA's operations and place a temporary halt on withdrawals. It also appears to have obstructed some legitimate North Korean financial interests, as the BDA action caused other banks around the region, including Chinese, Japanese, Vietnamese, Thai, and Singaporean banks, to impose voluntarily more stringent regulations against North Korean account holders. As North Korean traders and others move forward, some question whether the situation will return to "business as usual," "business with caution," or remain as "no business at all." In the case of China, a media report indicates that the country is allowing North Koreans to open bank accounts in China to settle business transactions in Chinese yuan. This enables them to conduct transactions in the Chinese currency.

The October 2006 Test and 2007 Accords and the Chinese Reaction

The situation continued to deteriorate throughout 2006, reaching a low point in October when North Korea conducted its first nuclear test. Following the underground test, the US Director of National Intelligence (DNI) issued a press release stating, “Analysis of air samples collected on October 11, 2006, detected radioactive debris which confirms that North Korea conducted an underground nuclear explosion in the vicinity of P’unggye on October 9, 2006. The explosion yield was less than a kiloton.”⁷⁸⁸ North Korea was reportedly expecting at least a 4 kiloton yield, perhaps indicating that the North Korean plutonium program still had a number of technical hurdles to overcome before it had a usable warhead.⁷⁸⁹

In response, China “used unprecedentedly harsh language to rebuke Pyongyang for ‘flagrantly’ conducting a nuclear test in disregard of the universal opposition of the international community;” until this point, China had only used the term “flagrantly” to condemn acts of its adversaries. Furthermore, China voted in favor of UN Security Council Resolution 1718, which prohibited states from transferring or providing luxury goods, heavy military equipment, or dual-use items to the DPRK.⁷⁹⁰

After intense diplomatic activity by the Chinese government and others involved in the Six-Party process, the parties met again, and in February 2007 they agreed on the “Initial Actions for the Implementation of the Joint Statement.” The DPRK agreed to abandon all its nuclear weapons and existing nuclear programs and return to the NPT and IAEA safeguards in exchange for energy assistance and a release of the DPRK’s frozen Banco Delta Asia assets.⁷⁹¹ After the February 2007 agreement, Pyongyang began shutting down and sealing its main nuclear facilities at Yongbyon under IAEA supervision.⁷⁹²

Further progress was made in the Six Party Talks when the parties adopted the second “action plan” that called on the DPRK to disable its main nuclear facilities and submit a complete and correct declaration of all its nuclear programs by December 31, 2007.⁷⁹³ While disablement activities on the three key plutonium production facilities at Yongbyon progressed as shown in **Figure V.11**, Pyongyang failed to meet the December 31 deadline to submit its declaration. Almost six months past the deadline, on June 26, 2008, North Korea submitted its declaration, which indicated that North Korea had separated a total of about 30 kilograms of plutonium and used approximately 2 kilograms for its 2006 nuclear test.⁷⁹⁴

According to NTI, various media reports claimed that the declaration failed to address the DPRK’s alleged uranium enrichment program or suspicions of its nuclear proliferation to other countries, such as Syria.⁷⁹⁵ Despite these issues, in return for North Korea’s declaration, President George W. Bush rescinded the application of the Trading with the Enemy Act toward Pyongyang and notified Congress of his intention to remove the DPRK from the list of state sponsors of terrorism after 45 days, in accordance with US law.⁷⁹⁶

Following the US government’s action, Pyongyang demolished the cooling tower at the Yongbyon reactor.⁷⁹⁷ Yet, when the 45-day period expired, the US did not carry out the de-listing. The State Department claimed that the 45-day period was a “minimum” rather than a deadline.⁷⁹⁸ In response, the KCNA released a statement by the Foreign Ministry stating that because the US had not carried out its commitment to remove the DPRK from the State Department’s terrorism list, Pyongyang would suspend the disablement of its key nuclear facilities at Yongbyon and consider taking steps to restore them “to their original state.”⁷⁹⁹

The next month, the DPRK asked the IAEA to remove seals and surveillance from the reprocessing plant in Yongbyon.⁸⁰⁰ Then in April 2009, North Korea's Foreign Ministry indicated that Pyongyang would withdrawal from the Six Party Talks and "would no longer be bound" by any of its agreements, saying instead that it would "fully reprocess" the 8,000 spent fuel rods from its Yongbyon reactor in order to extract plutonium for nuclear weapons.⁸⁰¹ Two days later, IAEA inspectors at the Yongbyon nuclear facilities removed safeguards equipment and left the country.⁸⁰² Although there were moves in mid-2011 to restart the process, the Six Party Talks have been suspended since late 2008.

While some see the Six Party Talks as useless, one ROK Deputy Foreign Minister has argued that they are still helpful in dealing with the DPRK. There are actually many bilateral relationships and working groups formed under the umbrella of the Talks that continue to this day. Through these meetings, there is still a signaling dialogue going on with the DPRK. Furthermore, should North Korea decide to return to the negotiating table, the Deputy Foreign Minister believes that the Six Party Talks have a lot of merit – the intransigence of the DPRK has been the problem, not the format of the forum. Every major regional player is involved in the discussions, so any decision reached would have a lot of weight. Furthermore, if the Talks are able to resolve the DPRK nuclear issue, the forum could continue as an inter-governmental or multilevel forum for a Northeast Asian security dialogue, a framework that is currently lacking in the region.⁸⁰³

Figure V.9: Uncertain Progress in the Six Party Talks

Round		Date	Major Progress
First		August 27-29, 2003	Formation of a consensus on denuclearization of the Korean Peninsula and the principle of peaceful resolution through dialogue
Second		February 25-28, 2004	Reaffirmation of a consensus on Korean Peninsula denuclearization and the principle of peaceful resolution
Third		June 23-26, 2005	Formation of a consensus on the need for initial actions for denuclearization of the Korean Peninsula and phased process based on the principle of “commitment for commitment, action for action”
Fourth	Session 1	July 26 – August 7, 2005	Adoption of the September 19 Joint Statement
	Session 2	September 13-19, 2005	
Fifth	Session 1	November 9-11, 2005	Affirmation of willingness to fully implement the September 19 Joint Statement
	Session 2	December 18-22, 2006	Reaffirmation of willingness to fully implement the September 19 Joint Statement and agreement on taking coordinated steps in implementation
	Session 3	February 8-13, 2007	Agreement on first-phase actions for the implementation of the September 19 Joint Statement (the February 13 Agreement)
Sixth	Session 1	March 19-22, 2007	Agreement on the second-phase actions for the implementation of the September 19 Joint Statement (the October 3 Agreement)
	Session 2	September 27-30, 2007	

Source: Ministry for Unification and Institute for Unification Education, *Understanding North Korea*, ROK Government, 2012, 86.

Figure V.10: Key Agreements in the Six Party Talks

Agreement Name	Key Points
Joint Statement (September 19, 2005)	<ul style="list-style-type: none"> • Dismantlement of North Korea’s Nuclear Programs and Removal of North Korea’s Security Concerns <ul style="list-style-type: none"> ○ North Korea committed to abandoning all nuclear weapons and existing nuclear programs. ○ The United States affirmed that it has no nuclear weapons on the Korean peninsula and has no intention to attack or invade North Korea. ○ North Korea stated that it has the right to peaceful uses of nuclear energy. The other parties expressed their respect and agreed to discuss, at an appropriate time, the subject

	<p>of the provision of light water reactor to North Korea.</p> <ul style="list-style-type: none"> • Normalization of Relations <ul style="list-style-type: none"> ○ North Korea and the United States undertook to respect each other's sovereignty, exist peacefully together, and take steps to normalize their relations. ○ North Korea and Japan undertook to take steps to normalize their relations. • International Assistance to North Korea <ul style="list-style-type: none"> ○ The six parties undertook to promote economic cooperation in the fields of energy, trade and investment. ○ China, Japan, ROK, Russia and the US stated their willingness to provide energy assistance to North Korea. ○ The ROK reaffirmed its proposal of July 12, 2005 concerning the provision of 2 million kilowatts of electric power to North Korea. • Vision for Peace and Stability on the Korean Peninsula and Northeast Asia <ul style="list-style-type: none"> ○ The directly related parties will negotiate a permanent peace regime on the Korean peninsula at an appropriate separate forum. ○ The six parties agreed to explore ways and means for promoting security cooperation in Northeast Asia. • Principles for Implementation <ul style="list-style-type: none"> ○ The six parties agreed to take coordinated steps to implement the aforementioned consensus in a phased manner in line with the principle of "commitment for commitment, action for action."
<p>Agreement on February 13, 2007</p>	<ul style="list-style-type: none"> • Action Plans for Initial Phase: Within first 60 days <ul style="list-style-type: none"> ○ North Korea will shut down and seal existing nuclear facilities, including the reprocessing facility, and invite back IAEA inspectors. ○ North Korea will discuss with other parties a list of all its nuclear programs. ○ North Korea and the US will start bilateral talks aimed at moving toward full diplomatic relations. The US will begin the process of removing the designation of North Korea as a state-sponsor of terrorism and terminating the application of the Trading with the Enemy Act with respect to North Korea. ○ North Korea and Japan will start bilateral talks aimed at taking steps to normalize their relations. ○ The parties agreed to the provision of emergency energy assistance equivalent to 50,000 tons of heavy fuel oil to North Korea. • Establishment of Five Working Groups: First WG meetings within next 30 days <ul style="list-style-type: none"> ○ Denuclearization of the Korean Peninsula, Normalization of North Korea-US Relations, Normalization of North Korea-Japan Relations, Economy and Energy Cooperation, Northeast Asia Peace and Security Mechanism. • Action Plans for Next Phase: After the completion of the initial phase <ul style="list-style-type: none"> ○ North Korea would make a complete declaration of all nuclear programs and disable all existing nuclear facilities. ○ The other parties would provide economic, energy, and humanitarian assistance equivalent of 950,000 tons of heavy fuel oil to North Korea. • Ministerial Meeting: After the completion of the initial phase • Peace Regime on the Korean Peninsula: The directly related parties will negotiate a permanent peace regime on the Korean peninsula at an appropriate separate forum.

Agreement on October 3, 2007	<ul style="list-style-type: none"> • North Korea agreed to disable all existing nuclear facilities by the end of year. • North Korea agreed to declare all its nuclear programs by the end of year. • North Korea reaffirmed its commitment not to transfer nuclear materials, technology, or know-how. • The United States would begin the process of removing the designation of North Korea as a state sponsor of terrorism. • The United States would advance the process of terminating the application of the Trading with the Enemy Act with respect to North Korea. • The United States and Japan would make sincere efforts to normalize their relations with North Korea. • The five parties would provide economic, energy and humanitarian assistance equivalent of one million tons of heavy fuel oil.
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Source: Ministry for Unification and Institute for Unification Education, *Understanding North Korea*, ROK Government, 2012, 82.

**Figure V.11: Known Disablement Steps at Yongbyon
(as of January 2013)**

Step	Facility	Status
Discharge of 8000 spent fuel rods to the spent fuel pool	5-megawatt reactor	6400 completed as of April 2009
Removal of control rod drive mechanisms	5-megawatt reactor	To be done after spent fuel removal completed
Removal of reactor cooling loop and wooden cooling tower interior structure	5-megawatt reactor	Tower demolished June 26, 2008
Disablement of fresh fuel rods	Fuel fabrication facility	Not agreed to by DPRK; consultations held Jan. 2009 with ROK on possibility of purchase
Removal and storage of 3 uranium ore concentrate dissolver tanks	Fuel fabrication facility	Completed
Removal and storage of 7 uranium conversion furnaces, including storage of refractory bricks and mortar sand	Fuel fabrication facility	Completed
Removal and storage of both metal casting furnaces and vacuum system, and removal and storage of 8 machining lathes	Fuel fabrication facility	Completed
Cut cable and remove drive mechanism associated with the receiving hot cell door	Reprocessing facility	Completed
Cut two of four steam lines into reprocessing facility	Reprocessing facility	Completed
Removal of the drive mechanisms for the fuel cladding shearing and slitting machines	Reprocessing facility	Completed
Removal of crane and door actuators that permit spent fuel rods to enter the reprocessing facility	Reprocessing facility	Completed
<p>Source: Mary Beth Nikitin, <i>North Korea's Nuclear Weapons: Technical Issues</i>, Congressional Research Service, February 12, 2013, 18-19.</p> <p>Note: As of now, it appears that DPRK has halted its demolition of the Yongbyon facility and intends to use it once again for nuclear fuel production</p>		

The May 2009 Test

On May 25, 2009, the DPRK issued the following statement: “The Democratic People’s Republic of Korea successfully conducted one more underground nuclear test on May 25 as part of the measures to bolster up its nuclear deterrent for self-defense in every way as requested by its scientists and technicians.”⁸⁰⁴ The DPRK also expelled nuclear inspectors and declared it would “never” return to the Six Party Talks.⁸⁰⁵ The US Intelligence Community assessed that the DPRK probably conducted an underground nuclear explosion in the vicinity of Punggye with an explosion yield of approximately a few kilotons.⁸⁰⁶

Most yield estimates were in range of 4 to 5 kilotons, but an initial Russian statement gave a much higher estimate of 20 kilotons.⁸⁰⁷ The test produced seismic signals characteristic of an explosion, indicating that they were generated by human activity, but no radioactive materials were reportedly detected, in contrast to the first test.⁸⁰⁸

Verification experts such as Professor Paul Richards considered the scenario of a bluff – the creation of a nuclear explosion-like seismic signal using conventional explosives – but while technically possible, he stated that it was highly implausible, seeing as “several thousand tons of conventional explosives to be fired instantaneously would have been virtually impossible under the prevailing circumstances and would not have escaped detection.”⁸⁰⁹ It is generally agreed that the test suggested the DPRK had the capability to produce nuclear weapons with a yield of roughly a couple kilotons TNT equivalent.⁸¹⁰

In response, China condemned the test using critical language, while a spokesperson for the Foreign Ministry described DPRK-Chinese relations as “normal state-to-state relations” that were similar “with any country around the world” – in contrast to its past official references to the DPRK as a traditional ally and friend. Also, China voted in favor of UN Security Council Resolution 1874, which tightened financial sanctions and trade restrictions on the DPRK while also calling on all countries to inspect vessels believed to be carrying prohibited cargo, in ports and on the high seas, and to seize and dispose of such cargo if it was identified.⁸¹¹

Furthermore, in March 2010, the DPRK announced plans to construct a 25-30 MW(e) light-water reactor, which US nuclear expert Siegfried Hecker confirmed during his November visit. The reactor could be operational by 2014. Hecker also reported DPRK construction of a uranium enrichment facility at Yongbyon with 2,000 P-2 centrifuges in six cascades, claimed by the DPRK to be used for producing low-enriched uranium to fuel the light water reactor under construction. This enrichment facility would be able to make up to 40 kg – enough for one or two nuclear warheads – of HEU each year.⁸¹²

The Leap Day Agreement

After a series of bilateral meetings with the US beginning in the summer of 2011, the US and the DPRK prepared for resumption of the Six Party Talks by announcing a Leap Day Agreement on February 29, 2012. The DPRK promised to halt uranium enrichment and missile testing as well as resume international monitoring of its nuclear sites, while the US committed to 240,000 tons of food aid, at an estimated cost of \$200-250 million. The two countries released separate statements regarding the agreement:⁸¹³

The United States announced that the two countries would hold further talks to finalize details on a “targeted U.S. program consisting of an initial 240,000 metric tons of nutritional assistance with the prospect of additional assistance based on continued need.” The U.S. statement also emphasized several

wider security issues, such as its continued commitment to the 1953 armistice agreement and desire to increase people-to-people contacts with the DPRK.

The DPRK statement included a reference to a “discussion of issues concerning the lifting of sanctions on the DPRK and provision of light water reactors” as priorities once the Six-Party Talks have resumed. The United States did not include those issues in its statement, and they are likely areas of continued disagreement between the parties. In the past, U.S. officials have not supported the lifting of sanctions until after full denuclearization and a determination by the U.N. Security Council, and have supported only “discussion” of light-water reactors in the 2005 Six Party statement.

During the meetings, “U.S. negotiators verbally warned their North Korean counterparts that any missile testing, including under the guise of a peaceful satellite launch, would violate the terms of the agreement, but this message was not received or was ignored by Pyongyang.”⁸¹⁴

Two and a half weeks later, on March 16, the DPRK announced it would be conducting another satellite launch, undertaking the test the following April, while also proclaiming itself a “nuclear armed state” and revised its constitution accordingly. The US suspended the promised food aid and cancelled another outreach program that had planned to resume US-DPRK missions to search for missing US soldiers’ remains from the Korean War,⁸¹⁵ and the UN Security Council passed Resolution 2087 condemning the rocket launch. A further satellite test launch was conducted in December 2012, which has been discussed previously in this report.

The February 2013 Test and Reactions

After widespread speculation, the DPRK followed its December launch with a third nuclear test on February 12, 2013. Since mid-2012, activity at the Punggye nuclear test site had given analysts advance indication that the DPRK was likely planning another nuclear test. After the test, the DPRK official news organ announced a “successful” underground detonation, while seismic monitoring equipment in the vicinity registered a 5.1 magnitude earthquake with waves similar to the nuclear tests in 2006 and 2009.

According to the CRS,⁸¹⁶

The South Korean Ministry of Defense estimated that the test yield was between 6 and 7 kilotons. North Korea claimed that the February 12, 2013, nuclear test was to develop a “smaller and light” warhead. At a minimum, the test would likely contribute to North Korea’s ability to develop a warhead that could be mounted on a long-range missile. It is unclear what impact a third nuclear test would have on future negotiations, but it would make their success far less likely, and the UN Security Council was discussing additional sanctions measures.

Observers are also waiting for evidence from test emissions that might show whether the North Koreans tested a uranium or plutonium device. This information could help determine the type and sophistication of the North Korean nuclear warhead design about which little is known. Two U.S. experts, Hecker and Pabian, have assessed that North Korea used plutonium in both the 2006 and 2009 tests, and that without at least one additional successful plutonium test, the North would not have confidence in its miniaturized plutonium design. Other experts believe North Korea may choose to test highly enriched uranium-based devices. Testing of a uranium device might indicate a clandestine supply of highly enriched uranium, potentially from an enrichment facility in North Korea. If venting of the nuclear test site has occurred, air samples could indicate what kind of material was used.

The earthquake magnitude of the 2006 test was 3.9, the 2009 test was 4.4, and the February 2013 test was 5.0-5.1, according to the US Geological Survey.⁸¹⁷ At a yield of approximately 6 kilotons, the test was larger than the first test (less than a kiloton of power) and the second test (approximately two kilotons). However, this is small compared to other countries – for example, China’s first three nuclear tests were measured at 22 kilotons, 35 kilotons, and 250 kilotons.⁸¹⁸

One Western diplomat said that Iranian scientists may have witnessed the nuclear test – indeed, Iran may have paid the DPRK tens of millions of dollars (in Chinese currency) to gain access to the test.⁸¹⁹

Following the 2013 test, all UN Security Council members approved a press statement condemning the test and pledging further action – setting the stage for negotiations over a fourth round of sanctions. While Russia announced it was ready to support additional sanctions on the DPRK’s nuclear program, the Russian Deputy Foreign Minister said it would “oppose any sanctions damaging normal trade and economic relations with North Korea.”⁸²⁰

Furthermore, in a 15-0 vote on March 7, the UN Security Council passed sanctions that further constrained DPRK trade, travel, and banking, while imploring countries to search any suspect DPRK cargo. The vote came just hours after the DPRK, angry with the proposed resolution and annual US-ROK joint military exercises, threatened for the first time to carry out “a pre-emptive nuclear strike” on the ROK and the US.⁸²¹

According to UN Security Council diplomats, the latest resolution is intended to make the DPRK sanctions regime similar to the tough sanctions against Iran’s nuclear program – which they argue have been more effective than previous DPRK sanctions – using the Iranian sanctions used as a model.⁸²² However, similar US sanctions on Iran have been judged to be ineffective, at least in stopping Iran from nuclear development, according to US Central Command head General James Mattis.⁸²³

One of the most important aspects of the sanctions, however, is that China participated in the three-week drafting process – suggesting that China was losing patience with its ally. China’s Foreign Ministry has repeatedly condemned the DPRK’s recent actions.⁸²⁴

Beijing’s reaction was strong and swift. Immediately after the test, Chinese Foreign Minister Yang Jiechi summoned the North Korean Ambassador and ‘lodged a solemn representation’ over the test. He said that China ‘was strongly dissatisfied with and firmly opposed to’ the test. Chinese media carried editorials and essays expressing frustration and opposition to the North Korean action — even the *Global Times*, known for its critical stance against the west, issued an editorial arguing that China should reduce aid to North Korea and that if Pyongyang is not happy, so be it. Pyongyang’s ill-conceived criticism of China’s agreement to a UN resolution condemning the test further fueled Chinese frustration with Pyongyang. It is against this background that the debate in China has changed from one about whether China should work with other countries to impose sanctions against North Korea to one about the kind of sanctions China should endorse.

Conversely, Russian officials and the general public did not react sharply to the DPRK’s third nuclear test. The US, ROK, and Japan all believed that Russia should be more proactive regarding the DPRK nuclear issue, but Russia did not agree for several possible reasons:

- One was that Russian policy-makers did not actually think that the DPRK would ever attack Russia or use nuclear arms against it. Russia maintained a stable relationship with the DPRK and has never called for regime change.
- Second, although missile and nuclear tests are carried out near the DPRK-Russian border, Russia does not see these as dangerous. Radiation has stayed at normal levels, and while a missile could theoretically crash into Russia in a failed launch, the low population density in Eastern Russia means that not much damage would be done.⁸²⁵
- Third, the US would not likely reduce its missile defense buildup even if the DPRK did give up its nuclear weapons and missiles, and Russia was more worried about European-area US missile defense. Also, Russia has not accused the DPRK of missile and nuclear trafficking, unlike other Western countries.

- Finally, Russia perceived a rising “geopolitical pressure on Russia on behalf of the United States and its allies,” according to Russian Federal Security Service chief Alexander Bortnikov, meaning that it was more concerned about a potential confrontation with the US.⁸²⁶

In March 2013, the US Treasury imposed its own financial sanctions on the Foreign Trade Bank of North Korea, the DPRK’s primary foreign exchange institution. The Treasury Undersecretary also visited the ROK, Japan, and China to persuade the countries to adopt similar measures, in an attempt to apply further pressure on the DPRK to disrupt their nuclear development.⁸²⁷

In addition, the US Army Pacific (USARPAC) elevated the USARPAC Commander position from a three-star to a four-star general, because the DOD saw a war on the Korean Peninsula as increasingly likely – in which case a four-star general would be better-equipped to lead USARPAC forces.⁸²⁸

Two weeks after the DPRK’s third nuclear test, one Chinese academic, Deng Yuwen, the deputy editor of a respected journal published by a Party school, published an article in a British newspaper entitled, “China should abandon North Korea.” Several other leading Chinese academics have made similar calls. Deng wrote that the DPRK’s third nuclear test was a good time for the PRC to re-evaluate the DPRK-PRC alliance, and there were several good reasons for China to withdraw its support of North Korea and instead support reunification of the Peninsula.⁸²⁹

- Basing a state-to-state relationship on ideology is dangerous.
- The DPRK no longer holds much value as a geopolitical ally – especially if the US launched a preemptive strike, with the Chinese then being obligated to respond and in turn engage the US military.
- The DPRK will not and likely cannot reform and it cannot continue indefinitely in its current state, so why should China keep a relationship with a country and leadership that will ultimately fail?
- The DPRK is repudiating its relationship with China. During the Korean War, hundreds of thousands of Chinese soldiers were killed while supporting the DPRK, so China views the bilateral relationship as cemented by this shared sacrifice. However, starting in the 1960s, the DPRK rewrote the history of the war – and left the Chinese out. Kim Il-sung took all the credit, and many cemeteries with Chinese soldiers’ remains were leveled.
- The DPRK could use its nuclear weapons as a means of blackmail against China. According to one Chinese scholar, during President Clinton’s 2009 visit to the DPRK, the North Koreans blamed China’s “selfish” strategy and American sanctions for their economic poverty. During the same visit, Kim Jong-il also hinted that the DPRK had withdrawn from the Six Party talks in order to gain more independence from China, and that if the US agreed to help the DPRK, North Korea could become a strong fortress against China.

Overall, Deng concluded that the PRC should think about abandoning the DPRK, or at least trying to force the country to start acting more accommodating to the PRC and/or give up nuclear weapons:⁸³⁰

North Korea’s development of nuclear weapons is, in part, based on the illusion that it can achieve an equal negotiating position with the US, and thereby force Washington to compromise. But it is entirely possible that a nuclear-armed North Korea could try to twist China’s arm if Beijing were to fail to meet its demands or if the US were to signal goodwill towards it.

Considering these arguments, China should consider abandoning North Korea. The best way of giving up on Pyongyang is to take the initiative to facilitate North Korea’s unification with South Korea. Bringing about the peninsula’s unification would help undermine the strategic alliance between Washington, Tokyo

and Seoul; ease the geopolitical pressure on China from northeast Asia; and be helpful to the resolution of the Taiwan question.

The next best thing would be to use China's influence to cultivate a pro-Beijing government in North Korea, to give it security assurances, push it to give up nuclear weapons and start moving towards the development path of a normal country.

In response, Deng was given a month-long suspension from his job. Other Chinese commentators, especially those linked to the security and military establishment, argue that China should strengthen relations with the DPRK – and Russia – to counterbalance the US pivot to Asia. One recent commentary in the main military newspaper, the People's Liberation Army Daily, argued: "The main reason why North Korea is bent on developing nuclear weapons is basically the threat that the U.S. poses to its security."⁸³¹

At the same time, China announced that it would not abandon the DPRK and that support of tougher sanctions should not be interpreted to mean that China's basic attitude was changing or that it did not still believe that dialogue was the best way to persuade the DPRK to abandon its nuclear weapons program.⁸³² In late March 2013, one state-run Chinese newspaper ran an editorial supporting the DPRK and blaming the US for the nuclear situation on the Korean Peninsula.⁸³³

It is time for both sides to take a step back and let cooler minds prevail to avoid any escalation of the situation. The US has long adopted a punishment heavy approach in dealing with ties to the DPRK. It has imposed rounds after rounds of severe sanctions against Pyongyang... the approach has only heightened Pyongyang's seeds of insecurity and forced it to resort to more extreme actions to defend itself... Both the DPRK and the US should tone down their rhetoric and work with Beijing for an early return to the long stalled six-party talks.

There are indications that China was increasing DPRK-bound cargo inspections in the wake of the March 2013 UN sanctions while it was setting up back-channel negotiations with the DPRK.⁸³⁴ Other reports note that prices of rice and other produce rose sharply as Chinese customs and border control impose more stringent inspections on exports to the DPRK. A Japanese newspaper reported that the price of rice had increased 50%, from 6,000 to 9,000 won per kilogram.⁸³⁵ It also appears that Chinese exports of rice to the DPRK dropped to zero in January, then rebounded in February, while exports of crude oil also dropped to zero in February. It is not clear if these are cyclical declines or signs of a changing policy in China.⁸³⁶

Traders in Jilin Province, a northeastern Chinese province next to the DPRK, reported there was no noticeable slowdown of goods passing across the border, and no crackdown on smugglers.⁸³⁷ It does appear, however, that increased border controls by both the DPRK and China have resulted in a significantly decreased number of DPRK defectors to China – compared with the first several months of 2012, there have been approximately 57% fewer in 2013.⁸³⁸ It was also reported in early May 2013 that the state-controlled Bank of China had ended all dealings with a key DPRK bank. Experts evaluated this move as the strongest public PRC response to the DPRK's continued development of its nuclear and missile programs to date.⁸³⁹

Though China and Russia both supported the March 2013 UN Security Council sanctions, Russia had very little trade with or control over the DPRK, meaning it has little influence. China has voted for sanctions against the DPRK in the past, followed them for several months, and then quietly returned to assisting the regime.⁸⁴⁰ Indeed, according to the Korea Trade-Investment Promotion Agency (KOTRA) overall bilateral trade between the PRC and DPRK actually

increased by 8.9 percent in 2013, despite a first quarter drop in Chinese exports and a hold on oil shipments in February.⁸⁴¹

Further Escalation in 2013

In late January 2013, the DPRK proclaimed the 1992 Joint Declaration on Denuclearization of the Korean Peninsula to be null and invalid.⁸⁴² In late February, the chief delegate of the DPRK military mission to the DMZ (Panmunjom mission), Pak Rim-su, in a rare direct message to USFK Commander General James Thurman, warned that, “If your side ignites a war of aggression by staging the reckless joint military exercises... at this dangerous time, from that moment your fate will be hung by a thread with every hour” and that US forces would “meet a miserable destruction.”⁸⁴³

In early March 2013, the DPRK said the 1953 Korean War armistice was null and void and that it would also cut off the DPRK-USFK hotline, with the DPRK Foreign Ministry announcing that a “second Korean War is unavoidable.”⁸⁴⁴ The two sides normally speak twice a day during the week on the hotline, which was established in 1971.⁸⁴⁵ The DPRK has also shut down the Red Cross hot lines with the ROK, and it decided in late March to further cut off military hot lines with the ROK – although it was reported that one dialogue channel, a hotline between civil aviation authorities, still remained.⁸⁴⁶

Citizens in the DPRK were seen covering up buses and trains with camouflage in an attempt to be ready for war, while some citizens were evacuated into tunnels with emergency provisions.⁸⁴⁷ Kim Jong-un continued his visits to DPRK military installations and commented, “Once an order is issued, you should break the waists of the crazy enemies, totally cut their windpipes and thus clearly show them what a real war is like.”⁸⁴⁸ On March 30, the DPRK proclaimed it had entered “a state of war” with the ROK.⁸⁴⁹

At the same time, the DPRK announced that it would “exercise the right to a preemptive attack” if US-ROK military exercises went ahead.⁸⁵⁰ The three-star general and Vice Defense Minister of the DPRK, Kang Pyo-yong, also claimed, “With their targets set, our intercontinental ballistic missiles and other missiles are on a standby, loaded with lighter, smaller, and diversified nuclear warheads... If we push the button, they will blast off and their barrage will turn Washington, the stronghold of American imperialists and the nest of evil, and its followers, into a sea of fire.”⁸⁵¹ The DPRK also declared a no-fly, no-sail zone off of its coasts – suggesting possible short-range rocket testing⁸⁵² – and the DPRK army “ratified” a potential “diversified nuclear strike” against the US.⁸⁵³

The DPRK argued that the armistice was a military document, not a peace treaty. DPRK state media further argued that the country had made repeated demands for peace talks since the 1970s, only to be rebuffed by the US – further justifying a unilateral nullification of the armistice. However, the armistice states that any change must be agreed to by all signers, and that unilateral declarations are unacceptable.⁸⁵⁴

This was the seventh time the DPRK had said it would nullify the armistice.⁸⁵⁵ The DPRK has also cut off, and later restored, the military hotline at least six times in the past when it wanted to raise tensions. The DPRK last cut off all military hotlines during US-ROK military drills in 2009.⁸⁵⁶ In fact, the ROK and DPRK have together formally accused each other of more than 1.2 million armistice violations.⁸⁵⁷

Since the end of the war, South Korea has accused North Korea repeatedly of violating the armistice by sending armed spies across the border, infiltrating submarines in South Korean waters, kidnapping hundreds of South Korean fishermen and still holding them there and launching an artillery attack on a South Korea island in 2010 that killed four people. Thousands of men from both sides, including many American soldiers, are believed to have died or remain missing,

As of the mid-1990s, North Korea had violated the truce 420,000 times, according to American and South Korean military data. North Korea alleged more violations by its enemies; until recently it has routinely accused them of sending spy planes into its airspace and bringing heavier weapons into the Demilitarized Zone along the border than allowed.

At the same time, the DPRK announced, “If they think we have acquired our nuclear weapons to trade them for some economic benefits, it will be nothing but an utterly absurd miscalculation... as long as the United States does not abandon its hostile policy, we have no intention of talking with it, and we will stick fast to our course under ‘songun.’” This is in contrast to its until-recently stated ultimate goal of ridding the Korean Peninsula of all nuclear weapons.⁸⁵⁸ In response, the US has announced on multiple occasions that the US would not accept the DPRK as a nuclear state.⁸⁵⁹

While initial reports did not indicate any sign of imminent DPRK military action accompanying the February 2013 nuclear test, extra troop and vehicle movements at the DPRK’s mid- and long-range missile sites were reported in the South Korean news by March 29. The timing is ambiguous.

On March 28, the US had flown two radar-evading B-2 spirit bombers over South Korea, flying from the US and back, dropping inert munitions as a practice run in the South for the first time. The following day, the DPRK put its missile units on standby to attack US military bases, with Kim Jong-un reportedly signing a plan to technically prepare the country’s strategic rockets to be on standby. In previous periods of US-ROK joint military exercises, the DPRK has similarly put its military on highest readiness to fight, and Kim Jong-un has also previously given “final orders” for the DPRK military to wage revolutionary war with the ROK.⁸⁶⁰

At the end of March, the DPRK also announced a “new strategic line” to build both its nuclear arsenal and its economy simultaneously – because a growing nuclear deterrent would allow the DPRK to reduce military spending and invest more resources into light industries and the agricultural sector. In order to promote the new guidelines, the Central Committee of the ruling Workers’ Party met for the first time since 1993, with Kim Jong-un presiding; the next day the Supreme People’s Assembly – the DPRK’s rubber-stamp Parliament – was expected to follow up and pass the guidelines.⁸⁶¹

In early April 2013, the DPRK passed a decree at the 7th session of the 12th Supreme People’s Assembly on “further consolidation of the self-defense nuclear power status.”⁸⁶² The North also announced that, as part of a plan to put all of its nuclear facilities to use in expanding its nuclear arsenal, it would restart its plutonium reactor at Yongbyon, the cooling tower of which had been destroyed pursuant to the Six Party Talks in 2007 – and continue construction on other reactors. The DPRK also cited the need to generate more electricity as a motivation for its actions.

This was significant because, as Siegfried Hecker has noted, it would take six months to a year for the DPRK to restart the aging plutonium reactor, and another three years to reprocess and extract enough fissile material for more weapons. Hecker has also stated that the DPRK could do so without needing foreign materials or equipment, and, once operational, could produce 6 kg of plutonium per year.⁸⁶³

That same month, the US reported that an Aegis-class warship had been moved to the ROK's southwest coast, and an SBX-1 sea-based radar platform was being moved to the Western Pacific to monitor the DPRK as well.⁸⁶⁴

In addition, the DPRK moved what appeared to be two Musudan missiles (unveiled in 2010 but not yet tested) and seven mobile launchers to its east coast in early April, and a ROK military source noted on April 21, 2013 that satellite images showed that the DPRK had moved an additional two short-range Scud mobile missile launchers to South Hamgyeong Province (also on the east coast). These missiles appeared to have been removed by early May 2013.⁸⁶⁵

In response to the movement of the Musudan missiles on the east coast, Japan deployed ballistic missile interceptors near Tokyo.⁸⁶⁶ The US repositioned two Aegis missile destroyers – the John McCain and the Decatur – in waters near the Korean Peninsula, and announced it would deploy a second TPY-2 missile-defense tracking radar in Japan,⁸⁶⁷ along with the Terminal High-Altitude Area Defense (THAAD) system – a land-based missile defense system that includes a truck-mounted launcher, a component of interceptor missiles, an AN/TPY-2 tracking radar, and an integrated fire control system – to Guam within the next several weeks.⁸⁶⁸

The US deployed B-2 and B-52 planes, both with nuclear capabilities, over the ROK, and used F-22s in drills with the ROK.⁸⁶⁹ On April 10, ROK-US combined forces raised their alert level to Watchcon 2 to increase surveillance monitoring, while the ROK had raised its alert level to “vital threat,” as it appeared that at least one of the Musudan missiles was fueled and ready for launch.⁸⁷⁰

The US also announced that it would deploy additional ballistic missile interceptors in California and Alaska, increasing the number of ground-based interceptors from 30 to 44 at a cost of just under \$1 billion. While the system has only been successful in 50% of tests, the weapons send a signal of credible deterrence, showed the ROK and Japan that the US remained committed, and also warned Beijing to restrain the DPRK or face an expanding US military focus in the Asian-Pacific region; according to one senior government official, “We want to make it clear that there's a price to be paid for letting the North Koreans stay on the current path.” The missiles could also be used to deter Iran.⁸⁷¹ At the same time, in an attempt to avoid misperception by the DPRK, a long-scheduled test of Minuteman-3 ICBMs was delayed.⁸⁷²

Several foreign companies operating in the ROK announced they were considering contingency plans for their employees' safety,⁸⁷³ while the ROK stock market was negatively affected by the growing tension on the Peninsula. One expert noted that the DPRK was attempting to use extreme propaganda to damage foreign direct investments in South Korea, a type of asymmetrical psychological warfare attack on the ROK's economic strength.⁸⁷⁴ While on a visit to China, Secretary of State John Kerry attempted to garner increased Chinese support of the US position towards the DPRK – meaning, a reduction in Chinese support of the North – and reportedly offered to reduce US missile defense in the Asia-Pacific if the DPRK abandoned its nuclear program.⁸⁷⁵

In early 2015, however, the US made it increasingly clear to the ROK that it should install the THAAD system as a deterrent to the DPRK's missile threats. This issue brought increased tension between Seoul and Beijing because China worries that the THAAD system would compromise its own strategic deterrent capabilities by having US radar sensors extend deeper into Chinese territories.⁸⁷⁶

Halting Operations at the ROK-DPRK Joint Industrial Complex at Kaesong

On April 3, 2013, the DPRK shut down the ROK-DPRK joint industrial complex at Kaesong, followed shortly thereafter by a pull-out of 53,000 workers. It blocked border traffic three times before – in 2009 – the longest of which was for three days;⁸⁷⁷ the April 2013 closing has been the longest period since the facility was first installed. The factories in Kaesong produced approximately \$470 million annually in textiles and other labor-intensive products.⁸⁷⁸ A basic map of Kaesong's location can be seen in **Figure V.12**.

However, there reportedly was friction within the DPRK's ruling elite over the decision, with the military demanding an immediate shut-down of the complex and some Workers' Party officials arguing instead that a shutdown would affect 50,000 DPRK workers' livelihoods, as well as their 200,000 family members. If the complex closes permanently, the total loss to ROK business owners, the ROK government, and investors would be approximately \$5.3 billion.⁸⁷⁹ North Korea, which makes approximately \$2 billion annually in trade due to the complex (\$90 million in wages alone),⁸⁸⁰ remarked in its state-run press,⁸⁸¹

But the puppet group of south Korea, its dutiful media and hack writers are saying that "the north does not take up the issue of the zone because it is a source for its foreign currency income" and talking about "two faces of the north". They are even insulting the dignity of the supreme leadership of the DPRK.

It is an extremely unusual thing that the Kaesong Industrial Zone is still in existence under the rave situation in which the north-south relations have plunged into a deadlock and the Korean Peninsula is on the verge of a war due to the U.S. and the south Korean warmongers' vicious moves for igniting a nuclear war against the DPRK

Under the situation, the South Korean puppet forces are left with no face to make complaint even though we ban the south sides' personnel's entry into the zone and close it.

But we have exercised self-restraint, taking into consideration that the closure of the zone on which the livelihood of small and medium businesses of south Korea hinge can leave those businesses bankrupt and lots of people jobless. In fact, it is the puppet group and small and medium businesses of south Korea, not the DPRK, which benefit from the zone.

By the middle of April 2013, the 123 ROK companies that had operations at Kaesong were beginning to feel the effects. Several companies reported that their foreign business partners had cancelled contracts and asked for their investments to be returned, while others indicated they might move their factories to China.⁸⁸² On April 24, ROK President Park Geun-hye announced a financial aid package of \$8 billion in special loans and \$14.3 million in bank loans with government-assisted postponed repayments. Two weeks later, this was enlarged to a \$270 million emergency loan fund. The companies would also receive tax relief and unemployment allowances if they had to lay off workers because of the Kaesong troubles.⁸⁸³

Two days later, the ROK announced it would pull out the remaining 175 factory managers from Kaesong, hours after the DPRK rejected the ROK's proposal for talks about the future of the Kaesong Complex despite the ROK's threat of a "grave measure" if its proposal was rejected. President Park reportedly told her cabinet that she had no intention of "waiting forever" for the DPRK to change its mind about the industrial complex. One DPRK analyst stated that the DPRK was likely to confiscate the assets of the ROK companies in Kaesong – which had happened after operations at the joint tourism resort on Diamond Mountain were suspended in 2008 following the fatal shooting of a 53-year-old ROK tourist. The ROK's Unification Minister warned the

DPRK not to seize ROK assets at Kaesong, which had cost the ROK almost \$1 billion to build after an agreement was reached in 2000 to begin the project.⁸⁸⁴

The ROK's decision to evacuate Kaesong was fully supported by the US, but criticized by Chinese media. The PRC's official Xinhua News Agency ran an article asserting that a total shutdown would cost the ROK \$1 trillion annually, while the DPRK would lose \$87 million per year – and the livelihoods of the 300,000 people living there would be directly affected.⁸⁸⁵ While the DPRK attempted to tell the residents of the city that the shutdown was temporary, it was reported that workers – who had been earning \$134 monthly – and residents were increasingly discontent and voicing their complaints.⁸⁸⁶

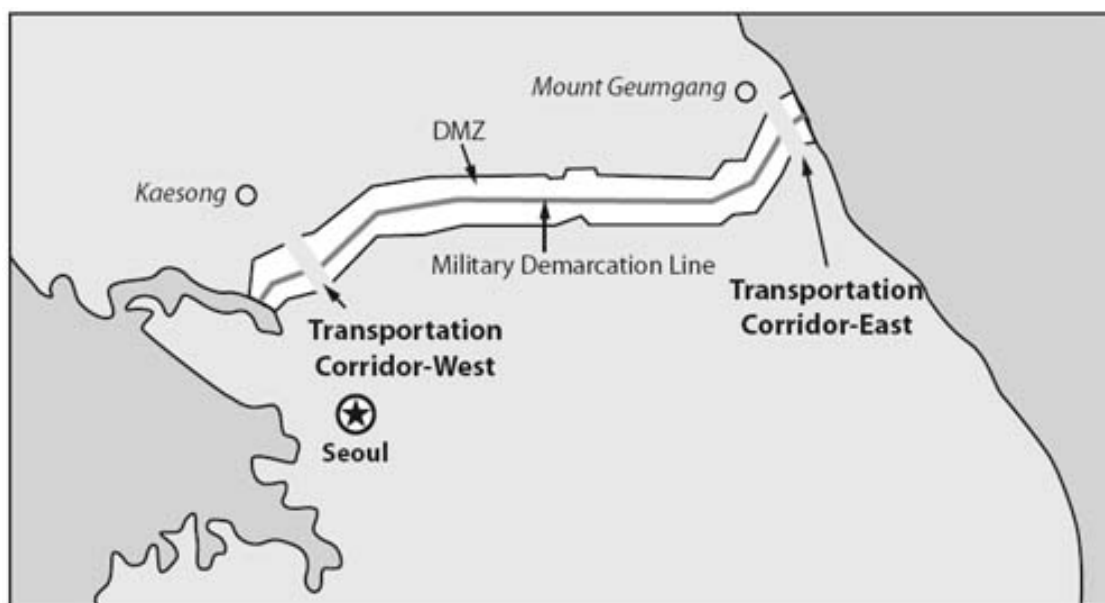
Experts in the ROK believe that the DPRK was trying to pressure the ROK over Kaesong as a way to avoid dialogue, but that the move backfired due to President Park's strong response. The DPRK was judged to be likely to “await a pretext to revive the Kaesong complex depending on the situation, such as a special envoy from China or improvement in relations with Washington,” according to one ROK-based expert.⁸⁸⁷

On April 23, several days after hundreds of leaflets supporting the DPRK and threatening ROK Defense Minister Kim Kwan-jin were distributed near the Defense Ministry, Kim received a letter containing a suspicious white powder – which was concluded to be wheat flour – and a leaflet in the mail. The leaflet threatened to “punish” Kim if he dared to challenge the DPRK's “highest dignity” and instigate war on the Korean Peninsula. The Minister is known for his tough stance on the DPRK and has often promised to respond harshly to any provocation; in turn, the DPRK's state media has called him a “war maniac,” a “traitor,” and published pictures of DPRK soldiers shooting paper targets with his likeness. Although it is unclear who sent the letter, the Defense Ministry called it “an attempted act of terrorism.”⁸⁸⁸

Kaesong was eventually reopened in September 16 2013 in an attempt to defuse tensions; the total loss for South Korean business during the shutdown was estimated at \$944 million.⁸⁸⁹

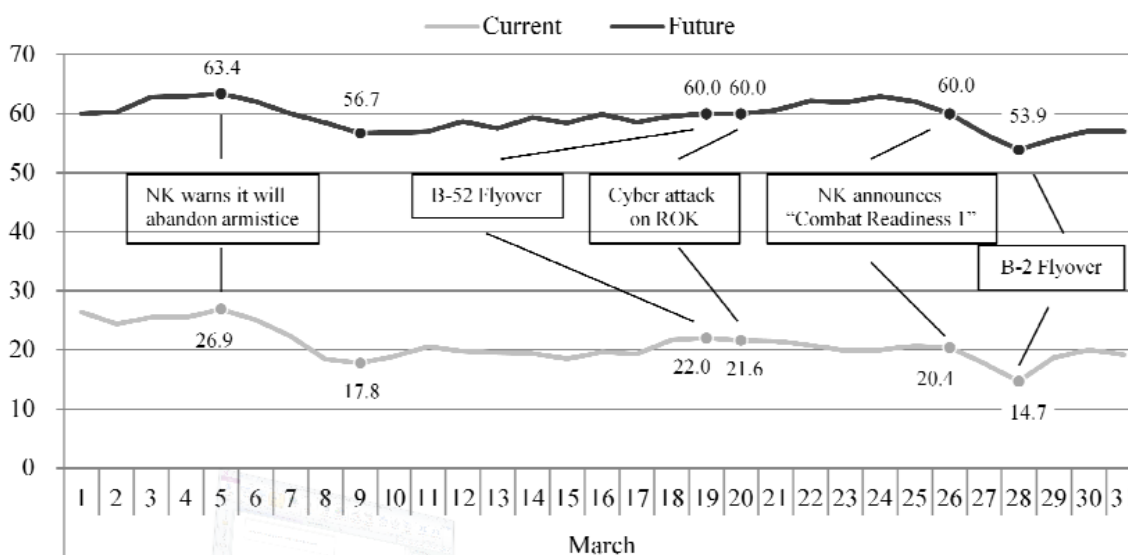
The results of the 3 DPRK provocations in early 201 on South Korean public opinion can be seen in **Figure V.13**. It is interesting to note that while most ROK citizens viewed their current security situation as not particularly positive, many had a much higher perception of future security – and thus, it appears that South Koreans do not believe that the DPRK's provocations would be particularly lasting or have a significant effect on the future.⁸⁹⁰

Figure V.12: Inter-Korean Transportation Corridors



Source: Statement of General Leon J. LaPorte, Commander United Nations Command, Commander, Republic of Korea–United States Combined Forces Command and United States Forces Korea before the 108th Congress House Armed Services Committee, March 12, 2003, 108th Congress, 1st sess., <http://armedservices.house.gov/openingstatementsandpressreleases/108thcongress/03-03-12laporte.pdf>; in Dr. Bruce E. Bechtol Jr., “The Future of US Airpower on the Korean Peninsula,” *Air & Space Power Journal*, September 2005. <http://www.airpower.maxwell.af.mil/airchronicles/apj/apj05/fal05/bechtol.html>.

Figure V.13: South Korean Positive Perceptions of National Security (Present and Future), March 2013



Source: Kim Jiyoung and Karl Friedhoff, *The Asan Public Opinion Report*, Asan Institute, March 2013.

Attempted De-escalation

The US responded by working with the ROK on a Counterprovocation plan, calling for an immediate but proportional “response in kind” to any potential DPRK attack, and as discussed earlier, delayed a planned missile defense test.⁸⁹¹

China consistently called for both sides to engage in dialogue, arguing that this was the only way to ease tensions on the Peninsula. In mid-April 2013, the ROK made a conditional offer of talks to the North, but these were rejected as a “crafty trick.” The US said it was willing to talk to the North – but only if the DPRK upholds its previous disarmament agreements, meaning providing a promise to give up nuclear weapons,⁸⁹² something at which the North scoffs.

The DPRK reacted by releasing its own conditions for negotiations through its state-run newspaper on April 18, 2013, along with its own analysis of ROK and US offers for talks:⁸⁹³

The preconditions for dialogue raised by them include a stop to “provocative” remarks which the DPRK has so far been engaged in and demonstration of its intention to realize denuclearization and suspend missile launch. These are absurd ones.... It is another provocation against the DPRK that the U.S. urged the former to show the “will for denuclearization” as a precondition for dialogue.

The U.S. and the south Korean puppet regime should make a bold decision to take the following practical measures if they want to shirk off the historical responsibility for the prevailing grave situation on the Korean Peninsula, escape sledge-hammer retaliatory blows of the army and people of the DPRK and if they truly stand for dialogue and negotiations:

First, they should immediately stop all their provocative acts against the DPRK and apologize for all of them. As the first phase, they should take the measure of retracting the UNSC’s “resolutions on sanctions” cooked up under absurd pretexts. They should bear in mind that doing so would be a token of good will towards the DPRK. The south Korean puppet forces should promptly halt all their anti-DPRK rackets, not linking their own mishaps such as Cheonan warship sinking incident and the “March 20 hacking case” to the north.

Second, they should give formal assurances before the world that they would not stage again such nuclear war drills to threaten or blackmail the DPRK. Dialogue can never go with war actions. Frequent nuclear war maneuvers will only strain the situation and totally block the way of dialogue.

Third, they should make a decision to withdraw all nuclear war means from south Korea and its vicinity and give up their attempt to reintroduce them as their immediate duty. They should bear in mind that the denuclearization of the Korean Peninsula... may lead to the global denuclearization.

The chief of Chongwadae should not forget that the prospect of south Korea may be rosy when the north’s nukes are considered as a property common to the nation but south Korea is bound to go to ruin when it remains under the U.S. nuclear umbrella.

A ROK Foreign Ministry spokesman rejected these, responding, “North Korea’s demands are totally incomprehensible. It’s absurd.”⁸⁹⁴

The North issued several threats in late April 2013, claiming that the DPRK was “one click away from pushing the launch button” (Strategic Rocket Force Commander Kim Rak-gyom) and “Stalwart pilots, once given a sortie order, will load nuclear bombs, instead of fuel for return, and storm enemy strongholds to blow them up” (Air and Anti-Air Force Commander Ri Pyong-Chol).⁸⁹⁵ Chinese Chief of the General Staff General Fang Fenghui also stated on April 22 that a fourth DPRK nuclear test was a possibility.⁸⁹⁶

As has been described earlier, no progress was made in 2014. North Korea was reported to be making preparations for a fourth test, and threatened to carry out such a test in November 2014. Time was, however, imposing other changes. In July 2014, General Jon Pyong Ho, a key figure

in North Korea's ballistic missile, nuclear weapons, and space programs, passed away. As Michael Madden notes, His death was part of a generational shift that is taking place within the community developing North Korea's nuclear capabilities. "North Korea's plans to develop new nuclear weapons designs, produce more fissile materials for a larger stockpile, and launch bigger and better rockets will depend largely on the capabilities of its next generation of WMD scientists and technicians."⁸⁹⁷ The subsequent 2016 testing demonstrated the continued willingness of the DPRK to pursue a full nuclear weapons program, and put to bed most hopes of immediate de-escalation.

The January 2016 Test and Reactions

On January 6, 2016, the DPRK conducted its fourth nuclear test, after which it announced that it had successfully developed and tested a hydrogen bomb, following a similar claim made by Kim Jong Un in December 2015. A non-earthquake seismic event was recorded by the U.S. Geological Society with a magnitude of 5.1, about the same as the 2013 test⁸⁹⁸. While the US government did admit that a nuclear test had occurred, White House spokesman Josh Earnest claimed that "The initial analysis is not consistent with the claim the regime has made of a successful hydrogen bomb test."⁸⁹⁹

In a subsequent analysis, David Albright of ISIS claimed,⁹⁰⁰

First, it is likely that this was not a test of what in the popular literature is interpreted as an H-Bomb, namely a two-stage fission-fusion weapon developed by the major nuclear-weapon states capable of obtaining explosive yields of hundreds or thousands of kilotons. First, the explosive yield of the test did not match the expected yield of the H-Bomb. If North Korea had indeed tested this type of H-bomb, the device's yield would be expected to be many tens of kilotons, at least. However, the need to contain the underground explosion and prevent radioactive releases from its test site may have led North Korea to limit the yield of this test device. Thus, if it tested an H-bomb, it is possible that it did not test the device at its full potential yield. Nonetheless, the explosive yield of a two-stage H-Bomb test would have been expected to be far higher than reported so far. Second, the development of a two-stage thermonuclear weapon is very challenging. It is assessed as beyond North Korea's capabilities at this stage.

Another possibility put forth by a variety of experts was that the DPRK had detonated a "boosted" fission bomb, which consists of a "fission device plus a small amount of hydrogen isotopes (tritium and deuterium gas) which undergo fusion"; the "resulting energy release sustains the fission reaction for longer, causing a larger blast". In addition, a boosted weapon is smaller and lighter than conventional fission bombs, and is potentially a step toward the DPRK's goal of fitting a nuclear device to one of their missile systems⁹⁰¹.

There were additional confrontational moves on the part of the DPRK, ROK and US following the 2016 test, there. As it did after the 2013 test, the US military responded by flying a B-52 over South Korea as a show of force.⁹⁰² Despite the potentially heavy losses to South Korean businesses, the ROK government shut down the complex again in 2016 in response to the DPRK's nuclear test, the first time that the South Koreans had initiated a shutdown; workers were repatriated and both water and power were shut off.⁹⁰³

In February, North Korea shot off a long-range missile under the auspices of sending a satellite into orbit. Countries condemned the launch as a further testing of long-range missile technology; the test was an extra impetus for the UNSC negotiations.⁹⁰⁴ A month later, South Korea and the United States launched one of their biggest annual joint military exercises, provoking another reaction from the DPRK. Its state run media stated that, "as the joint military exercises to be staged by the enemies are regarded as the most undisguised nuclear war drills aimed to infringe

upon the sovereignty of the Democratic People's Republic of Korea, its military counteraction will be more preemptive and offensive nuclear strike to cope with them” and responded with further short-range missile launches into the ocean.⁹⁰⁵

The 2016 test also precipitated a new round of international condemnations and sanctions. On March 2 2016, the UNSC unanimously decided to toughen its existing sanctions in reaction to the nuclear test and February missile test, following the negotiations of Chinese and American officials.⁹⁰⁶ On paper, Resolution 2270 added “numerous, qualitatively different restrictions” to the sanctions regime; it compelled countries to inspect all North Korean exports and imports, cease the purchase of certain North Korean rare-earth minerals and limit the purchase of the DPRK’s coal and iron exports, end the export of jet fuel to the DPRK, expel certain institutions and individuals from their countries, seize and refuse port access for certain DPRK ships, and end any relationships with DPRK banks.⁹⁰⁷

Where previous resolutions had been primarily aimed at restricting the DPRK nuclear project and military capabilities, the new sanctions seemed at least in part designed to actively hit the North Korean economy, as punishment for its continued defiance of UN resolutions and as a harsher incentive to bring North Korean leaders back to the negotiating table.⁹⁰⁸

China once again played a key part in drafting the new resolution, and following its passage “unequivocally pledged to uphold the letter and spirit of the council’s decision.”⁹⁰⁹ The key factor in the success of the new sanctions is still China’s willingness to fully implement them; in particular, if China were to fully enforce the inspection provision on all trade between it and North Korea, this could seriously disrupt illicit DPRK activities and slow cross-border exchanges in general.

Any serious reduction in the Chinese purchase of North Korean iron and coal would also be significant.⁹¹⁰ China’s participation in drafting the new sanctions reflected its aggravated response in the immediate aftermath of the test, which stated that the PRC was strongly opposed to the test and that pressed “North Korea to fulfill its promise of denuclearization and stop any actions that would worsen the situation.”⁹¹¹ Several Chinese leaders, such as Xi Jinping and Wang Yi, have reiterated their support for the imposing of UN sanctions and the dissolution of North Korea’s nuclear program.⁹¹²

There has been other evidence of a growing Chinese frustration with the DPRK leadership in the aftermath of the 2016 test. An editorial in the *Global Times*, known for its strong nationalistic leanings, criticized the DPRK’s nuclear and missile testing as “reckless risk taking” and warned that China’s international influence might not be enough to protect it if such provocations continued. In another article, the *Global Times* declared that the new UNSC resolution displayed the unity of the great powers and demonstrated that “there is no future for North Korea’s possession of nuclear weapons.”⁹¹³

These were accompanied by the statements of skeptical Chinese academics like Pang Zhongying, who pointed out that China was unlikely to aid the DPRK in the event of an actual war. More materially, following the adoption of Resolution 2270 there were initial reports of proactive PRC moves on the border, such as an increase in Custom cargo inspectors and the release of blacklists for DPRK individuals and vessels.⁹¹⁴

However, the extent or existence of any change in China’s DPRK policy remains to be seen. During the initially meetings between Secretary of State John Kerry and his Chinese counterpart

Foreign Minister Wang Yi over possible UN responses to the testing, there appeared to be continued Chinese adherence to longstanding positions on the Korean nuclear issue. Wang insisted that Chinese policy would “not be swayed by specific events or the temporary mood of the moment” and that the PRC valued “the commitment to uphold peace and stability (and) the commitment to resolve the issue through dialogue and consultation” as much as Korean denuclearization.⁹¹⁵

Chinese officials also watered down certain aspects of the sanctions package (such as a provision allowing the purchase of DPRK coal for “livelihood” purposes), suggesting a continued reluctance to exercise harsh economic measures that could potentially destabilize the North Korean regime. Without China’s strict enforcement of the UN resolution, the DPRK can rely on numerous work-arounds to maintain ongoing illicit trade and financial ties with the outside world.⁹¹⁶ As of now, it is unclear how stringently the PRC intends to enforce sanctions. While KOTRA findings show an increase in trade in March, observers believe the jump to be a one-off event before sanctions are fully put in place.⁹¹⁷

Russia also released a pointed statement in the aftermath of the January 6 testing, labeling it a “flagrant violation of international law”.⁹¹⁸ During a meeting with his Chinese counterpart in March, Russian Foreign Minister Sergei Lavrov insisted that North Korean’s actions were “irresponsible” and insisted that the international community was united in its condemnation and that the DPRK should not expect any forthcoming assistance.⁹¹⁹

Despite several planned economic projects between Russia and the DPRK, Russia voted for Resolution 2700 along with its Security Council fellows, directly putting those projects in jeopardy. However, Russian officials (and PRC officials as well) remain suspicious of US and ROK responses to DPRK provocation, particularly the deployment of the anti-missile THAAD system in South Korea.⁹²⁰

In addition to UN imposed sanctions, the United States has moved forward with additional unilateral restrictions on North Korean financial flows. On June 1, the Treasury department labeled North Korea a “primary money-laundering concern,” requiring further due diligence on the part of US financial institutions to prevent indirect DPRK access to the US financial system⁹²¹. In effect, this cut off third country banks with DPRK connections from US banks and business.

The move impacted primarily on regional Chinese banks doing business with North Korea. While larger national banks had largely cut off relations with the DPRK over the previous few years, local banks near the North Korean border maintained business connections with DPRK nationals and state entities. While few banks heavily depend on North Korean business, China objected to the decision, stating that instead of imposing unilateral sanctions, countries should simply fully implement and enforce Resolution 227.⁹²²

The escalating tension on the peninsula resulted in increased ROK and US interest in placing the THAAD anti-missile system in South Korea. New talks between the two countries were underway by mid-2016. Chinese leaders, including Foreign Minister Wang and Xi Jinping, reacted by expressing uneasiness about the system’s deployment in its strategic backyard, claiming that its operational coverage reached into PRC territory and constituted a security concern. Russian policymakers have made similar statements.⁹²³

In early July, the talks reached an agreement to deploy THAAD in the ROK, with the intent of having it operational by 2017.⁹²⁴ Both China and Russia registered opposition to the move, while Japan has hinted that, “it is considering another layer of ballistic missile defense, such as THAAD”.⁹²⁵

North Korea reacted to the new deployment, as well as the concurrent sanction targeting of Kim Jung Un by the US, stating that “there will be physical response measures from us as soon as the location and time that the invasionary tool for U.S. world supremacy, THAAD, will be brought into South Korea are confirmed” and “it is the unwavering will of our army to deal a ruthless retaliatory strike and turn (the South) into a sea of fire and a pile of ashes the moment we have an order to carry it out.”⁹²⁶

According to polling from South Korea, the events of 2016 saw a precipitous decline in approval for both North Korea and Kim Jun Un among ROK citizens. In addition, a majority of respondents favored the closing of the Joint Industrial Complex at Kaesong as a way to punish and bring pressure on the DPRK leadership.⁹²⁷

Key Issues and Weapons Design

Decades of talks and arms control negotiations have sometimes delayed the DPRK’s nuclear programs, but scarcely stopped them. The DPRK has unfrozen its plutonium program and instigated a highly enriched uranium program in violation of the 1991 North-South denuclearization agreement, the 1994 Agreed Framework, and the basic tenants agreed upon in the Six Party Talks. As a result, the value of further arms control negotiations is uncertain. According to Dr. Christopher Ford, “there seems to be increasing agreement across the breadth of the US policy community that there is little to be gained from further engagement.”⁹²⁸

This makes an assessment of the DPRK’s progress in weapons design even more important. As has been noted earlier, there is no way to be certain of the DPRK’s progress in weaponizing its nuclear capabilities. Moreover, experts debate the number of nuclear weapons it could now make and can acquire in the near term, and there are critical areas of uncertainty like its access to Chinese designs and the level of technology sharing with Iran and Syria.

According to an ROK government report discussing DPRK nuclear and strategic weapons,⁹²⁹

As early as in the 1960s, North Korea had sent its nuclear scientists to the largest nuclear research institute in the Soviet Union, the Joint Institute for Nuclear Research in Dubna. The number of professionals currently working in the North Korean nuclear industry is known to be about 3,000, including over 200 top-class experts. North Korea is also known to have about 4 million tons of uranium in recoverable deposits.... Over 300 scientists and engineers are known to have been stricken with atomic-related diseases during the course of their work.

It is important to note that the DPRK has so far only conducted four low-yield nuclear tests – on October 9, 2006 with a yield of less than one kiloton, one on May 25, 2009 with a yield of a few kilotons, a third on February 12, 2013 with a yield of approximately six kilotons (a 5.1 magnitude seismic shock in the area was reported by the US Geological Service), and a fourth on January 6th, 2015 with a similar yield to the 2013 test. This compares with a yield that would have been at least three to five times higher (20 kilotons) in an efficient fission weapons system.

This helps explain why US officials cannot be certain whether the DPRK can weaponize its arsenal to the point it can put low yield fission weapons on ballistic missile.⁹³⁰ It also helps explain the assumption is that Pyongyang’s current nuclear weapon designs are, or will be, based

on a first-generation implosion device, the logical choice for states in the initial stage of nuclear weapon development.⁹³¹ Data collected from the DPRK's May 2009 and February 2013 nuclear tests suggest the DPRK has the capability to produce nuclear weapons with a yield of roughly five or six kilotons TNT equivalent.⁹³²

It also indicates that it may be years before the DPRK can develop high-yield boosted weapons or the megaton and thermally dominated yields of fusion weapons. This is a major issue in assessing the DPRK program where few unclassified data are available. While low-yield fission weapon are still extremely lethal, they are very different in war-fighting lethality and deterrent impact from a high-yield weapon and presents further substantial problems if the DPRK deploys long-range missiles with operational accuracy that can be more in tens of kilometers than several hundred meters.

Miniaturization

Most experts estimate that a primary objective of the DPRK's nuclear program is to develop a nuclear warhead capable of being mounted on intermediate- and long-range missiles. This would require miniaturization – making the nuclear warhead small enough to be mounted on a missile – and would likely require further missile and nuclear tests.

Most experts believe that the DPRK has not yet achieved miniaturization of its nuclear arsenal. However, it has been reported that the DPRK received materials/assistance from the AQ Khan network, potentially providing the DPRK with a Chinese HEU-based nuclear weapon design that could help the DPRK create a reliable ballistic missile warhead – robust, small, and light.

The assessment by the US Defense Intelligence Agency in 2013, made “with moderate confidence, that the DPRK had nuclear weapons capable of delivery by ballistic missile” – was qualified by the statement that the weapon would have “low reliability.” It is important to note, however, that it later became clear that the DIA had been making somewhat similar assessments since 2005.

As noted earlier, DNI James R. Clapper issued a statement that the DIA assessment did not reflect consensus of the US intelligence community, commenting, “North Korea has not yet demonstrated the full range of capabilities necessary for a nuclear armed missile.” Secretary of State John Kerry responded similarly, and the Obama Administration downplayed the report.

Accordingly, as noted earlier, the statement by General Curtis Scaparrottii, commander of US Forces Korea, in October 2014 that North Korea “has had the right connections and technology” to develop a miniaturized nuclear weapon that could be launched by a missile is significant. The general stated:⁹³³

I think given their technological capabilities, the time that they been working on this, that they probably have the capabilities to put this together. I don't believe that they have. I don't know that they have at this point.

In 2016, there were additional reports from members of the United States and ROK intelligence community that new analysis indicated that the DPRK was capable of fitting nuclear devices on short to mid-range rockets capable of hitting much of “Japan and South Korea”. According to a New York Times report:⁹³⁴

The assessment of the North's new capabilities is not based on direct evidence from inside its nuclear program, senior officials said, but draws on intelligence gleaned from high-level defectors, analysis of propaganda images and data collected from North Korean missile and nuclear tests, which have accelerated

over the past six months. While some intelligence agencies suggested as early as 2013 that the North had learned enough about rocket engineering and the miniaturization of nuclear warheads to mount one on a shorter-range missile, there is a new consensus and greater confidence in that view in both Washington and Seoul, the officials said.

These new viewpoints were at least partially motivated by new DPRK propaganda photos released showing Kim Jung Un examining what appeared to be a miniature nuclear device. However, the opinions expressed by the quoted officials are still not the formal position of the US government; a Pentagon spokesperson noted that while it was wise to prepare for such contingencies, it "does not mean that they (DPRK) have that capability. They've not demonstrated that."⁹³⁵

These are important qualifications. Even if the DPRK has the necessary technology, the reliability and yield of a miniaturized North Korean nuclear weapon will be in question until it is actually tested.

Fuels – Plutonium and the Potential for Uranium

There has also been speculation about whether – and how soon -- the DPRK can create bombs using uranium. Scientists believe that first two nuclear tests conducted used bombs made of plutonium, although no radioactive gas signatures were able to be collected after the second test. In a CSIS assessment, Victor Cha and Ellen Kim commented,⁹³⁶

A uranium-fueled test would suggest several disturbing new problems in the effort to denuclearize North Korea. First, it would mean that the DPRK has not one, but two ways to make a bomb which doubles the problem. Second, highly enriched uranium is much easier to hide than plutonium. It can be made in [sic] from centrifuges operating in buildings the size of a warehouse unlike the big and easily identifiable footprint of a plutonium nuclear plant facility. Third, the North can potentially produce a lot more uranium than it can plutonium and proliferate horizontally to others (like Iran) who may not need to test a device and feel confident that it has acquired a working device. Moreover, if this is proven to be a test of a miniaturized device as the North claims, then they will have crossed another technological threshold in [making] a nuclear warhead with a long-range ballistic missile that could threaten U.S. security and that of its allies. Basically, none of this is good at all.

As mentioned, the DPRK displayed uranium reprocessing facilities to Dr. Hecker in 2010, claiming it had the ability to convert plutonium reactor rods into uranium. According to the CRS, the DPRK has⁹³⁷

...industrial-scale uranium mining and plants for milling, refining, and converting uranium; it also has a fuel fabrication plant, a nuclear reactor, and a reprocessing plant – in short, everything needed to produce Pu-239/ It has recently been built a uranium enrichment facility at Yongbyon that could produce HEU for weapons, or LEU reactor fuel which could be irradiated for plutonium production. In its earlier 5 MWe nuclear reactor, North Korea used magnox fuel – natural uranium (>99%U-238) metal, wrapped in magnesium-alloy cladding to produce plutonium for weapons. About 8,000 fuel rods constitute a fuel core for the reactor.

Although the DPRK has announced it had finished reprocessing these 8,000 fuel rods, it is technically possible that the third nuclear test in February 2013 was of a uranium weapon. Like the second nuclear test, sensors were unable to pick up any gas radioactive gas signatures after the test, so no open-source information is available regarding whether the third test was of a plutonium or uranium weapon.

While the UN's Comprehensive Nuclear Test Ban Treaty Organization announced on April 23, 2013 that it had detected traces of radioactive materials from the February 2013 test, giving the first conclusive evidence that the test was of a nuclear weapon – and not just a large amount of

conventional explosives – it remains unclear what type of fuel was used.⁹³⁸ One ROK analyst at a government-sponsored think tank, Korea Institute for Defense Analyses, wrote that “it is more likely that North Korea detonated HEU-based nuclear weapons in the third nuclear test.”⁹³⁹

In addition to the 8,000 claimed reprocessed fuel rods, the DPRK still has 2,400 5-MWt and 12,000 50-MWt fresh fuel rods stored at Yongbyon.⁹⁴⁰ It is also assessed that, if the February 2013 test was a plutonium weapon, the DPRK has used up a significant amount of their available plutonium, and would thus need to produce more or make sure its uranium enrichment programs were working.

Future Nuclear Capabilities

On February 26, 2015, the Institute for Science and International Security (ISIS) published a report by David Albright that analyzed estimated inventories of separated plutonium and weapons-grade uranium to forecast three possible scenarios of DPRK’s future nuclear arsenal through 2020. He drew from previous assessments of possible stockpiles and analyzed current construction of facilities and reactors, the evolution of recent nuclear weaponization efforts, and Kim Jong-un’s stance on nuclear weapons development – among other factors – to provide the following projections.⁹⁴¹

Over the next several years, North Korea could pursue quantitative and qualitative improvements in its nuclear weapons stockpile. This section lays out a set of projections through 2020 that capture the boundaries of North Korea’s possible nuclear arsenal futures.

Regardless of the specific projections, North Korea is expected to continue developing its nuclear weapons capabilities. At the March 31, 2013 plenary meeting of the Workers’ Party of Korea, Kim Jong Un said that North Korea “should increase the production of precision and miniaturized nuclear weapons and the means of their delivery and ceaselessly develop nuclear weapons technology to actively develop more powerful and advanced nuclear weapons.” He implied in this speech that North Korea would seek more precise nuclear-tipped ballistic missiles able to reach the United States.

In this context, North Korea’s nuclear program may focus on:

- Increasing production of fissile material and the size of its overall stockpile;
- Conducting more nuclear tests;
- Increasing the explosive yield of its nuclear weapons, including more advanced designs using composite cores or thermonuclear materials to achieve higher yields;
- Achieving additional miniaturization of warheads without sacrificing yield;
- Reducing the amount of plutonium or WGU needed in a nuclear weapon;
- Increasing the safety, security, and reliability of its nuclear weapons although it is highly unlikely to achieve the levels, for example, in the US arsenal;
- Continuing seeking a range of goods abroad for its nuclear programs, including classified and proprietary information; and
- Increasing level of self-sufficiency in order to avoid restrictions imposed by sanctions and export controls.

Key factors that will affect their ability to make these improvements are:

- Level of political and economic commitment;
- Overcoming technical barriers; and
- Level of foreign assistance.

Three projections through 2020 are developed in this section:

- **Low-End Projection through 2020:** Progress is slow as economic and technical constraints are numerous (including no further nuclear tests); difficulties are encountered in advancing current nuclear efforts and the North's political commitment wanes.
- **Medium Projection through 2020:** This projection assumes moderate growth based on a continuation of its current nuclear trajectory and development practices as well as political and economic commitment. The program is a mixture of successes and failures. Efforts to acquire technology/assistance from abroad make slow progress as does Pyongyang's effort to achieve self-sufficiency.
- **High-End Projection through 2020:** The general assumption underlying this projection is that nuclear weapons progress is steady and successful. North Korea steps up its commitment to build a nuclear arsenal, vigorously pursues technology development through, in part, increasing the number of nuclear tests and faces few economic constraints. Pyongyang also achieves a high level of success in acquiring technology/assistance from abroad as well as in achieving self-sufficiency.

Low-End Projection through 2020

North Korea's production of fissile material is limited to the 5 MWe reactor and centrifuge plant at Yongbyon. It either does not or cannot militarize the ELWR to make weapons-grade plutonium. The centrifuge plant is limited to 3,000-4,000 P2-type centrifuges, and North Korea does not deploy any more advanced than the P2-type. Moreover, the North will need to produce LEU for the ELWR. The centrifuges operate with poor efficiency, as they have done up through 2014. The 5 MWe reactor will experience outages and poor operational efficiencies, limiting production to an average of 2-3 kg per year of weapons-grade plutonium.

In this scenario, Pyongyang does not conduct any further nuclear tests. Nonetheless, it would make limited advances in its nuclear weapons skills and designs, such as achieving some additional miniaturization of warheads without sacrificing the explosive yield. However, the North would not be able to reduce the amount of plutonium or WGU needed in a nuclear weapon. Marginal improvements would be made in the safety, security and reliability of its nuclear weapons. Finally, without testing there would be limits to developing more advanced weapons. The North would be limited in using shells of fissile material or other shapes for the core that would permit significant additional miniaturization. It would be unable to develop boosted or thermonuclear weapons as well as a reliable source of tritium for thermonuclear devices.

North Korea's arsenal would be limited to fission-only weapons made from either plutonium or WGU. The explosive yields would not be high, likely on order of 10 kilotons. Its arsenal would involve a small number of weapon designs, or physics packages, and they would be adapted to various delivery systems, such as the Nodong and possibly longer-range missiles.

While Pyongyang will require foreign goods for its various nuclear programs, such as vacuum equipment, pumps, instrumentation, sophisticated computer-numerical control (CNC) machine tools and specialized chemicals and metals, it will experience difficulty procuring them. These procurement challenges will reduce the efficiency of its centrifuges and 5 MWe reactor. Moreover, the North will not succeed in procuring nuclear weapons data or designs overseas that would help further modernize its stockpile. Any nuclear cooperation with other countries—such as Iran—would be minimal and achieve few results.

Low-End Nuclear Arsenal. By 2020, North Korea would modestly increase the size of its nuclear arsenal, which would be comprised of fission weapons with explosive yields of about 10 kilotons. Miniaturization would allow the North to mount nuclear weapons on ballistic missiles but limited to existing types like the Nodong and a Taepodong deployed as an ICBM. Each weapon would be made from either separated plutonium or weapons-grade uranium. The stockpile would not include any composite cores or thermonuclear nuclear weapons.

To derive the total amounts of plutonium and weapons-grade uranium through 2020, the amounts of plutonium and weapons-grade uranium produced through 2014 under Scenario 2 (one centrifuge plant) are added to the values from the period 2015-2020, where the assumptions above are used to derive inventories in the latter period with the Crystal Ball™ software.

The median of the total plutonium estimates through 2020 is 50 kg with a standard deviation of 2 kg. The median of the WGU estimate through 2020 is 280 kg with a standard deviation of 60 kg. Assuming that each weapon contains either plutonium or WGU, the median of the number of nuclear weapon equivalents is 29 with a standard deviation of 5. About half of these weapons contain plutonium and half contain WGU. From 2014 through 2020, the number of weapon equivalents grows at an average rate of about 2.3 weapons equivalent per year.

Only a percentage of plutonium and WGU is used in the actual weapons—some will be tied up in the manufacturing process, lost to waste, or held in a reserve. In the low-end projection, with about 70 percent of the plutonium and WGU used in the weapons, the DPRK's total arsenal will consist of approximately 20 fission nuclear weapons at the end of 2020.

Medium Projection through 2020

North Korea operates the 5 MWe reactor reasonably well, producing an average of about 3-4 kg of weapons-grade plutonium per year. The ELWR is partially militarized and makes a moderate amount of weapons-grade plutonium—5 to 10 kg—each year. The plutonium from the ELWR will become available starting in 2018.

North Korea operates two centrifuge plants limited to a total of 6,000-7,000 P2-type centrifuges throughout this period. Moreover, the Yongbyon plant will need to produce LEU for the ELWR. The centrifuges will continue to work with relatively poor efficiency, but better than in the low-end projection. North Korea will conduct development work on a centrifuge similar to the Pakistani P3-type centrifuge, which has four maraging steel segments and three bellows, giving an output double the P2-type centrifuge. Nonetheless, during this period the North does not deploy any advanced centrifuges.

In this scenario, North Korea conducts nuclear tests at its current rate of about one every 3-4 years. Advances are made in nuclear weapons development skills and designs, such as achieving additional miniaturization of warheads without sacrificing explosive yield. The North makes progress in using shells of fissile material instead of solid core designs and developing non-spherical shapes of the plutonium or WGU core, allowing further miniaturization. However, it does not reduce the amount of plutonium or WGU needed in a weapon. Improvements are also achieved in the safety, security and reliability of the North's stockpile.

The North develops and deploys an additional weapon design that contains plutonium and weapons-grade uranium in the same core, allowing a significant increase in the weapon's explosive yield up to 50 kilotons. Fission weapons with either plutonium or weapons-grade uranium will remain the majority of its stockpile. However, their yields are larger on average, in the range of 10-20 kilotons, another benefit of continued nuclear testing and advances in design skills.

By the end of 2020, advances in miniaturization will result in a stockpile of warheads that can be deployed on missiles of various ranges beyond those in the low-end projection, including shorter-range ballistic missiles for battlefield use or more modern intermediate-range ballistic missiles (IRBMs) and ICBMs such as the Musudan and KN-08 road-mobile missiles.

In addition, Pyongyang will develop a more advanced nuclear weapon design although it will not be fully tested or deployed by 2020. It will develop a reliable but small source of tritium and deuterium. Both could be used to boost the explosive yield of a fission weapon and to achieve a one-stage thermonuclear weapon, which uses tritium, deuterium and lithium within a composite core of plutonium and weapons-grade uranium. The North will be able to test these designs, likely with a reduced yield because of test site limitations.

North Korea will continue to require foreign goods for its various nuclear programs but will experience only mixed success in procuring them. Progress will be made in producing some key materials and equipment domestically. Nonetheless, overseas procurement failures will reduce the efficiency of its centrifuges, reactors, and nuclear weapons program, but not as severely as in the low-end projection. While the North will not succeed in procuring nuclear weapons data or designs overseas, it will benefit from limited nuclear cooperation with Iran, which will aid Pyongyang's centrifuge program and procurement efforts.

Medium Nuclear Arsenal. By 2020, North Korea would increase the size of its nuclear arsenal several fold. The arsenal would consist of mostly fission weapons with explosive yields of about 10-20 kilotons. Several will have composite cores. These weapons could be mounted on a wide range of delivery systems.

The total amounts of plutonium and weapons-grade uranium is based on the amount of plutonium and weapons-grade uranium produced through 2014 under Scenario 1 (two centrifuge plants) added to the values from the period 2015-2020, where the assumptions above are used to derive inventories in the latter period with Crystal Ball™ software. The median of the total plutonium estimates through 2020 is 80 kg with a standard deviation of 5 kg. The median of the WGU estimate through 2020 is 790 kg with a standard deviation of 105 kg. Assuming that each weapon contains either plutonium or WGU, the median of the number of nuclear weapon equivalents is 69 with a standard deviation of 8. About one-third of these weapons contain plutonium and two-thirds contain WGU. From 2014 through 2020, the number of weapon equivalents grows at an average rate of almost eight weapons equivalent per year.

In this scenario, less fissile material is assumed to be tied up in-process or lost in waste than in the low-end estimate. In addition, some of the plutonium and WGU will be in nuclear weapons composite cores (say <5 weapons), reducing the total number of weapons as derived above, where each weapon is assumed to contain only plutonium or WGU. On balance, in the medium projection, the number of nuclear weapons is assumed to be about 75 percent of the nuclear weapons equivalent, giving an arsenal of about 50 nuclear weapons.

High-End Projection through 2020

In this projection, North Korea operates the 5 MWe reactor efficiently, making use of overseas procurements that allow an increase in reactor power to 25 MWe and effective maintenance. The result is an average production of about 5-6 kg of weapons-grade plutonium per year. Pyongyang militarizes the ELWR, enabling it to produce more weapons-grade plutonium than in the previous scenario, 15-20 kg each year. Also, the plutonium would become available two years earlier, starting in early 2016.

North Korea will operate two centrifuge plants with a combined 8,000-9,000 P2-type centrifuges. One will be the Yongbyon centrifuge plant with a capacity of 4,000 P2-type centrifuges starting at the beginning of 2015. The other will be an upgraded centrifuge plant at another location containing 4,000-5,000 P2-type centrifuges operating at this level in early 2015. As before, the Yongbyon centrifuge plant will need to produce LEU for the ELWR. The reactor will achieve higher capacity factors than in the medium scenario. The centrifuges will work with better efficiency than in the previous projections. Moreover, the North will complete development work on a new centrifuge similar to the Pakistani P3-type, with an output that is double that of the P2-type centrifuge. The first 2,000 P3-type centrifuges will become operational at the start of 2019. These centrifuges will be in addition to 8,000-9,000 P2-type centrifuges already in operation.

Under this scenario, nuclear weapons tests are increased to a rate of one per year enabling the North to make significant advances in its nuclear weapons skills and designs. It develops smaller diameter, lighter-weight nuclear weapons able to fit an increasing variety of shorter range missiles for battlefield use. Pyongyang is able to make further reductions in the amount of plutonium and WGU used in a nuclear weapon. It makes significant improvements in the safety, security and reliability of its nuclear weapons, allowing nuclear weapons to be deployed more easily.

As in the medium scenario, additional designs that contain plutonium and weapons-grade uranium in the same core are developed and deployed, allowing a significant increase in explosive yield up to 50 kilotons. The North also continues to field weapons with either plutonium or weapons-grade uranium, as in the two other projections. But in the high-end scenario, it increases the average yield of its fission weapons to 20 or more kilotons.

While developing a reliable source of tritium and deuterium for nuclear weapons development, the North makes significant progress in using both to boost the explosive yield of a fission weapon. A new boosted yield design is tested and incorporated into a significant number of composite core weapons although the bulk of the stockpile remains centered on weapons using either plutonium or uranium.

Pyongyang also develops a one-stage thermonuclear weapon, which uses tritium, deuterium and lithium within a composite core of plutonium and large quantities of weapons-grade uranium. One such device is tested by 2020, with a yield of about 100 kilotons. However, this one-stage weapon is too large for missile

delivery, but North Korea is aiming to make it deployable as soon as possible. Work is done on designing and developing a two-stage thermonuclear weapon but not tested by 2020.

North Korea will be very successful in procuring foreign goods for its various nuclear programs and will achieve greater self-sufficiency in making key materials and equipment domestically. Procurements, whether domestic or abroad, will be adequate and not interfere with the programs' progress. Moreover, Pyongyang will succeed in procuring nuclear weapons data and an advanced weapon design overseas, making an important contribution to speeding up the North's nuclear weapons developments. It cooperates actively with Iran on all nuclear areas, reducing inefficiencies in facilities and bottlenecks in procurements.

High-End Nuclear Arsenal

By 2020, North Korea would increase the size of its nuclear arsenal many fold. The arsenal would still consist of mostly fission weapons but the explosive yields would average 20 kilotons or more, which is greater than in the medium estimate. Several will have composite cores and North Korea will be working to deploy one-stage thermonuclear weapons with yields of about 100 kilotons. With the exception of thermonuclear weapons, the North's arsenal could be mounted on a wide range of delivery systems from short-range ballistic missiles (SRBMs) to the newer road-mobile Musudan IRBM to possibly the KN-08 ICBM currently under development.

To derive the total amounts of plutonium and weapons-grade uranium through 2020, plutonium and weapons-grade uranium produced through 2014 under Scenario 1 (two centrifuge plants) are added to the values from the period 2015-2020, where the above assumptions are used to calculate inventories in the latter period. The median of the total plutonium estimates through 2020 is 154 kg with a standard deviation of 8 kg. The median of the WGU estimate through 2020 is 1,230 kg with a standard deviation of about 110 kg. Assuming that each weapon contains either plutonium or WGU, the median of the number of nuclear weapon equivalents is about 125 with a standard deviation of 13. About 40 percent of these weapons contain plutonium and 60 percent contain WGU. From 2014 through 2020, the number of weapon equivalents grows at an average rate of about 17 per year.

In this projection, much less fissile material is assumed to be tied up in-process, lost to waste, or held in reserve than in the medium scenario. However, a couple factors reduce the number of weapons made from plutonium and WGU. An increased number of composite cores, namely 5-10, will contain plutonium and WGU, and one test of a single-stage thermonuclear device will have used several tens of kg of WGU. On balance, the number of nuclear weapons is taken as 80 percent of the nuclear weapons equivalent. The end result is an arsenal of about 100 nuclear weapons.

It is highly uncertain what the DPRK's nuclear weapons posture will look like in five years, but David Albright's assessment provides a spectrum of possibilities that would give a greater chance of predicting its nuclear arsenal in the coming decade. While an assessment of Pyongyang's push for improved nuclear technology and weaponization could be seen as part of its overall escalated rhetoric, it is important to note that such a capability could be used on various delivery systems and pose a significant threat to the ROK and Japan.⁹⁴²

Command and Control

Experts estimate that no DPRK nuclear bombs have been transferred to the KPA. Kim Jong-un apparently maintains control of all fissile material, possibly through the Second Economic Committee, which is responsible for the production of weapons and military equipment – including missiles and nuclear weapons.⁹⁴³

DPRK Nuclear Facilities

Figure V.14 to Figure V.17 show the DPRK possesses numerous known and suspected nuclear facilities – completed, under construction, or in planning. Most of the facilities are in Yongbyon county, including a small nuclear research reactor (the IRT-2000), a 5 MW(e) gas-graphite moderated reactor, an unfinished 50 MW(e) reactor, waste storage sites, and a spent fuel reprocessing facility. The cooling tower of the 5MW(e) facility was demolished in 2008, but construction of a light water reactor and uranium enrichment facility have since begun. There is also a testing site at Punggye and an unfinished, abandoned 200 MW(e) reactor in Taechon country (the same province as Yongbyon, North Pyongan Province).⁹⁴⁴

The DPRK's newest facilities are working with uranium enrichment – such as the facility revealed in 2010. A light-water reactor is also under construction near Yongbyon and could be operational by 2014. As **Figure V.17** shows, there are also a variety of milling, mining, testing, research/development, industrial, and educational facilities around the country.⁹⁴⁵

According to the World Nuclear Association,⁹⁴⁶

The Democratic People's Republic of Korea (DPRK, aka North Korea) generated 34 TWh in 2002 and 19 TWh in 2003, 71% from hydro and 29% from fossil fuels. Per capita consumption in 2002 was 1364 kWh. Recent estimates suggest that operable generating capacity is 2000-3000 MWe. In 1985, it brought into operation a small gas-cooled, graphite-moderated, natural-uranium (metal) fueled "Experimental Power Reactor" of about 25 MW (thermal) at Yongbyon. It exhibited all the features of a plutonium production reactor for weapons purposes and produced only about 5 MWe as an incidental feature. North Korea also made substantial progress in the construction of two larger reactors designed on the same principles, a prototype of about 200 MWe (potentially 50 MWe) at Yongbyon, and a full-scale version of about 800 MWe (potentially 200 MWe) at Taechon.

DPRK Nuclear Reactors⁹⁴⁷

The DPRK has an 8 MWe-capacity nuclear research reactor, the IRT-2000, constructed by the USSR and completed in 1965. It originally used 10% enriched uranium as fuel, but was upgraded to use highly enriched uranium; the USSR provided fuel rods until 1973. In 1992, DPRK officials admitted that 300 mg of plutonium had been separated in 1975; since 1992, due to a lack of fuel, the IRT-2000 has operated only intermittently. As it was not covered by the 1994 Agreed Framework, it was not frozen and continues to operate on occasion.

Construction on the Yongbyon 5 MWe reactor began in 1979, and the reactor was operational by 1986. It uses natural uranium as a fuel source. Although the DPRK claimed it was for electricity generation, it can easily produce weapons-grade plutonium – with which the DPRK has conducted nuclear weapons tests in 2006, 2009, and 2013. The reactor was shut down under the 1995 Agreed Framework, and the cooling tower was demolished in 2008 as part of a 2007 Six Party agreement. As of 2010, it appears to be inactive – though DPRK officials told US experts

that it was in stand-by status and received regular maintenance. The DPRK has threatened to restore the reactor, most recently in April 2013.

The Yongbyon 50 MWe reactor was started in 1985/1986 and was due to be completed in 1995. It would have been able to produce approximately 55 kg of plutonium per year. Construction was frozen within a year of completion under the 1994 Agreed Framework. Dr. Hecker reported in 2010 that it was being dismantled with large cranes and remains unfinished and abandoned.

The DPRK began construction of a 200 MWe reactor in Taechon in 1989 with an expected completion date of 1996. When completed, it could have been capable of producing about 220 kg of plutonium annually. Construction was frozen in 1994 under the US-DPRK Agreed Framework, and it appears to remain unfinished, without any significant changes since 2002.

The Geumho-Jigu Light Water Reactor site in Hamgyeongnam province was part of the 1994 Agreed Framework between the DPRK and the US. The Korean Peninsula Energy Development Organization (KEDO) was established to oversee the construction of two 1,000 MWe light water reactors (LWRs). While excavation began in 2001 and construction in mid-2002, the project was suspended in late 2003 due to the DPRK's suspected uranium enrichment and expelling of IAEA inspectors. The project, only 35% completed, was officially terminated in May 2006.

An experimental LWR (25-30 MWe / 100 MWe) at Yongbyon is apparently under construction. According to visiting US experts in 2010, the site was described as a "large excavated pit... roughly 40 meters by 50 meters by 7 meters deep" where "a concrete foundation 28 meters square with round concrete preforms for the reactor containment vessel was visible." Construction was reportedly begun in July 2010 with a target completion of 2012, though experts saw this as highly optimistic and instead projected an operational start date of 2014-15. The reactor will be fueled with 4.5% enriched UO₂ fuel, and all components of the reactor – and the fuel – will be manufactured domestically. The DPRK says this reactor will be used for electricity production.

A US expert analysis of satellite imagery on May 2, 2013 indicated that the DPRK was in the final "cleanup" stage of completing the reactor, and it appeared that the DPRK could begin startup activities "in the coming weeks."⁹⁴⁸

Recent Developments

The visit by Dr. Hecker to the DPRK in November 2010 shed additional light on developments in the DPRK's nuclear program, especially regarding the DPRK's potential uranium enrichment programs. Highlights of the information gleaned from his trip included:

A small, recently completed, industrial-scale uranium-enrichment facility. The sight of 2,000 centrifuges and an ultramodern control room stunned Dr. Hecker. "Instead of finding a few dozen first-generation centrifuges, we saw rows of advanced centrifuges, apparently fully operational."⁹⁴⁹

Initial construction on a small, experimental LWR designed to deliver roughly 25 to 30 megawatts of electric power. "The construction of the reactor raises a number of policy issues: an LWR requires enriched uranium, and once enrichment capabilities are established for reactor fuel, they can be readily reconfigured to produce HEU bomb fuel....The centrifuge facility...is most likely designed to make reactor, not bomb, fuel, because it would not make sense to construct it in a previously inspected site and show it to foreign visitors. However, it is highly likely that a parallel covert facility capable of HEU production exists elsewhere in the country."⁹⁵⁰

The 5 MWe reactor had not been restarted since it was shut down in July 2007. No new fuel had been produced and the fresh fuel produced prior to 1994 (sufficient for one more reactor core) is still in storage.

Pyongyang apparently decided not to make more plutonium or plutonium bombs for the time being. Dr. Hecker's assessment was that they could resume all plutonium operations within approximately six months and make one bomb's worth of plutonium per year for some time to come.⁹⁵¹

Dr. Hecker's report was followed by press reports that the IAEA suspected that the DPRK had at least one additional covert centrifuge site and might have significant additional sites.⁹⁵² These reports mean that the DPRK may have sizeable stocks of enriched uranium as well as plutonium. A December 2010 CRS report held that, all together, with all facilities operating, the DPRK could produce approximately 6 kg of plutonium per year and an unknown amount of HEU per year, depending on the status of their uranium enrichment program.⁹⁵³

On July 21, 2016, a report released by Institute for Science and International Security claimed that there might be such a secret enrichment facility at the Panghyon Aircraft Plant, 45 kilometers west of Yongbyon. According to an undisclosed official, the site could potentially house some 200 to 300 centrifuges. In addition, the hypothetical site partially matches the statements of defector Chun Sun Lee, a former DPRK general. While the report cautions that these findings are not confirmed or conclusive, it maintains that multiple government sources have indicated that the Panghyon Aircraft Plant is a likely enrichment site. The facility itself would presumably be located in an underground mountain complex, the entrances of which the report identifies with satellite imagery.⁹⁵⁴

Significant future growth in North Korea's arsenal would be possible only if larger reactors were completed and operating, and growth would also depend on any progress in the reported uranium enrichment program. At a minimum, this means the DPRK's future production of weapons-grade material is impossible to foresee, and that both targeting and arms control are far more difficult because of the inability to predict how many dispersed centrifuge facilities the DPRK may have.

**Figure V.14: North Korean Nuclear Power Reactor Projects
(as of January 2011)**

Location	Type/Power Capacity	Status	Purpose
Yongbyon	Graphite-moderated Heavy Water Experimental Reactor/5 MWe	Currently shut-down; cooling tower destroyed in June 2009 as part of Six-Party Talks; estimated restart time would be 6 months	Weapons-grade plutonium production
Yongbyon	Graphite-moderated Heavy Water Power Reactor/50 MWe	Never built; Basic construction begun; project halted since 1994	Stated purpose was electricity production; could have been used for weapons-grade plutonium production
Yongbyon	Experimental Light-Water Reactor/100 MWT (25-30 MWe)	US observers saw basic construction begun in November 2010	Stated Purpose was electricity production; could have been used for weapons-grade plutonium production
Taechon	Graphite-moderated Heavy Water Power Reactor/200 MWe	Never built; Basic construction begun; project halted since 1994	Stated purpose was electricity production; could have been used for weapons-grade plutonium production
Sinp'o	4 Light-water reactors/440 MWe	Never built; part of 1985 deal with Soviet Union when DPRK signed the NPT; canceled by Russian Federation in 1992	Stated purpose is electricity production; could have been used for weapons-grade plutonium production
Sinp'o	2 Light-water reactors (turn-key)/1000 MWe	Never built; part of 1994 Agreed Framework, reactor agreement concluded in 1999; Project terminated in 2006 after DPRK pulled out of Agreed Framework	Electricity production
Source: Mary Beth Nikitin, <i>North Korea's Nuclear Weapons: Technical Issues</i> , Congressional Research Service, February 12, 2013, 7.			

Figure V.15: List of Major North Korean Nuclear Sites

Hagap	The US Defense Intelligence Agency reported an underground nuclear-facility under construction in 1993, to be finished possibly by 2003. Commercial satellite images show tunnel entrances, but not other indications of the facility's use.
Hamhung	This branch of the Academy of Defense Science is known for training engineers and chemists, and is also near a site with uranium deposits.
Musudan	On the east coast, a long-range rocket was fired from here in April 2009.
Pakchon	Location of uranium mine and milling facility (known as the April Industrial Enterprise), declared to the IAEA in 1992. The uranium milling facility reportedly processes ore from mines in the Suncheon area. Current status is unknown.
Punggye	This is the site of the DPRK's underground nuclear tests in 2006, 2009, 2013, and 2016.
Pyongsan	Location of uranium mining and a uranium milling facility, which reportedly processes ore from the Pyongsan and Kumchon uranium mines. Current status is unknown.
Pyongyang	Laboratory-scale hot cells provided by the Soviet Union in the 1960s where believed to be used to extract small quantities of uranium; also in Pyongyang are the Colleges of Nuclear Physics at Kim Il Sung University and Kim Chaek University of Technology.
Sinpo	Location of two 1,000 MWe light water reactors constructed by the Korean Energy Developmental Organization (KEDO); under the terms of the Agreed Framework, given to the DPRK in return for freezing its nuclear program. Construction was halted and site abandoned after the outbreak of another crisis in late 2002.
Sunchon	Location of an important uranium mine.
Taechon	Location of incomplete 200MWe graphite-moderated nuclear power reactor. Construction began in 1989 and was frozen in 1994 (under the 1994 Agreed Framework). Current status is unknown.
Tongchang-ri	This site, on the Northwest coast, is where the new Sohae launch pad is located. The DPRK is getting ready to fire long-range rockets from this launch pad, and fired a rocket mounted with a satellite (SLV) from here in April, 2012.
Yongbyon	Location of a Nuclear Research Center, comprising a 5MWe graphite moderated prototype power reactor, reprocessing facility, uranium conversion plant, fuel fabrication plant, and spent fuel and waste storage facilities. Also location. Also Location of a Soviet-supplied IRT research reactor and radioisotope laboratory, and where the DPRK revealed a uranium enrichment facility under development in 2009. Satellite imagery from early 2012 showed progression in construction. Also located here are a 5 MWe, a 50 MWe reactor, and a plutonium reprocessing facility that has been shut down.
Youngdoktong	Reported location of site (active in the 1990s) for nuclear weapons-related high-explosive testing. In 2003, the CIA reportedly detected an advanced nuclear testing site, but ROK experts were skeptical.
Source: Chipman, <i>North Korea's Weapons Programs</i> , 46; Carnegie Endowment for International Peace, http://www.ceip.org ; Federation of American Scientists, http://www.fas.org ; NTI, http://www.nti.org ; and David Albright and Kevin O'Neill, <i>Solving the North Korean Nuclear Puzzle</i> , Institute for Science and International Security, 2000); "North Korea nuclear test prompts neighbors to mobilize militaries and scientists," CRS, February 2013.	

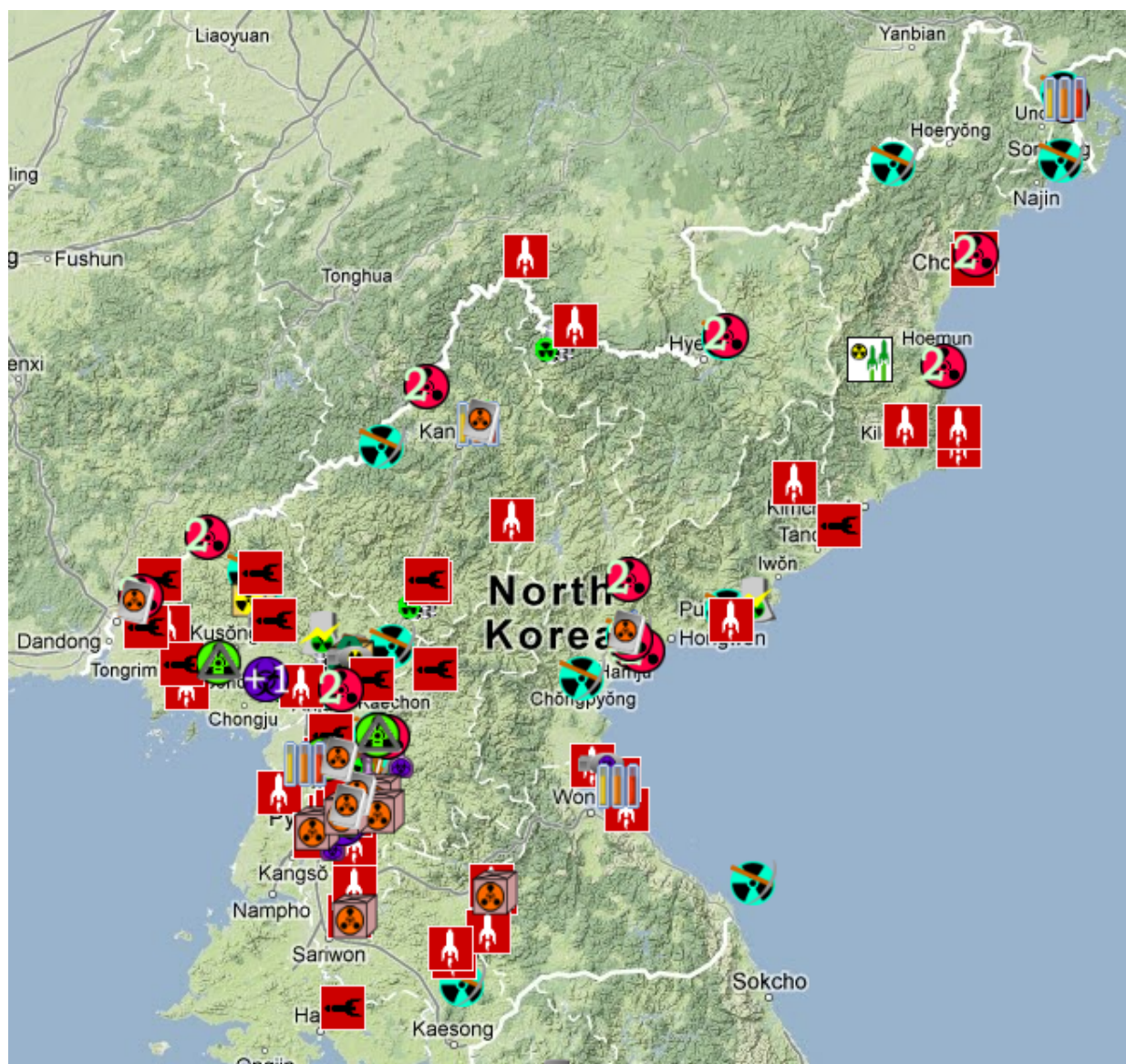
Figure V.16: Map of Major North Korean Nuclear Sites












Note: Locations on map are approximate.

Source: Chipman, *North Korea's Weapons Programs*, 45.

Figure V.17: Map of Possible DPRK Nuclear, Biological, Missile, and Chemical Sites



Source: "Interactive North Korea Facilities Map,"
<http://www.nti.org/gmap/?place=39.1195,127.2055,8&layers=nuclear,missile,biological>.

	MISSILE		BIOLOGICAL
	Base (15)		Dual-use infrastructure (1)
	Production (10)		Research & Development (10)
	R&D (1)		Production (1)
			Weaponization (1)

ROK and US Response to DPRK Nuclear Programs

As part of its new (pro) active deterrence strategy – the ROK has responded in kind to the DPRK’s elevated rhetoric. While dismissing DPRK threats as propaganda, the ROK MoD told reporters that, “If North Korean attacks South Korea with a nuclear weapon, Kim Jong-un’s regime will perish from the earth.”⁹⁵⁵

The ROK military also warned that if it was provoked by the DPRK, it would strike the North’s “command leadership.”⁹⁵⁶ At the same time, many analysts, as well as the ROK government, believe that Kim Jong-un is attempting to create an atmosphere of crisis within his country in order to enhance his own prestige and consolidate his leadership.⁹⁵⁷

ROK President Park Geun-hye stated in early April 2013 that, “Our military exists to defend our nation and its people from such threats... If [the North] stages any provocation against our people, you [the ROK MoD] should make a strong and swift response in initial combat without any political considerations.” The ROK MoD also unveiled a plan to accelerate the setup of a missile system called “Kill Chain” that works to pre-emptively detect, target, and destroy missile and military installations in the DPRK, as well as its command structure – in the event signs of an attack are detected. Although there was no update on the timeframe for deployment of the system, the ROK had previously announced it would be implemented by the end of 2015. The ROK also announced it would strengthen Cyberwarfare forces and develop measures to counter DPRK cyberattacks.⁹⁵⁸

To underscore its commitment to the ROK, the US flew B-52 bombers over the Peninsula in mid-March 2013, leading the DPRK to threaten to attack US military bases in Japan and Guam. Several days later, the DPRK announced that all of its long-range artillery and strategic rockets “are assigned to strike bases of the U.S. imperialist aggressor troops in the U.S. mainland and on Hawaii and Guam and other operational zones in the pacific as well as all the enemy targets in South Korea and its vicinity.”⁹⁵⁹

In response, the ROK MoD vowed a “thousandfold, ten-thousandfold retaliation” against any *Cheonan*-like provocation, while government officials stated that the ROK would retaliate by, among other measures, launching missiles at gigantic statues of Kim Il-sung and Kim Jong-il – to which the DPRK strongly reacted, saying that the monuments were “symbols of the dignity of the supreme leadership” and that the DPRK would in return “destroy the den of confrontation, including Chongwadae [the ROK presidential office], hotbed of all evils.”⁹⁶⁰

Following the 2016 testing, the US and ROK again demonstrated this policy of harsh reaction to developments in the DPRK nuclear program, responding with a B-52 flyover, a larger annual military exercise, the closing of the Kaesong Industrial Complex, and a greater focus on THAAD deployment.

These developments highlight the risk that the ROK may eventually deploy nuclear-armed aircraft and missiles. Few argue that the ROK and Japanese lack the capability to build long-range missiles and nuclear weapons, and doing so with minimal – if any – testing. In fact, the ROK would already have nuclear weapons if the US had not pressed the ROK to not continue its nuclear development, reaching an agreement on the matter with South Korea in 1975 – as previously discussed.

If the US wishes to prevent this, it may have to find new ways to support the ROK. The US faces the reality that the risks of a growing DPRK nuclear force – coupled to a large stock of

chemically armed bombs and missiles and possible biological weapons – means it cannot simply let a key ally like the ROK bear a one-sided threat or leave Japan in the position where it, too, has no balancing force. While arms control options are not impossible, it is also all too clear that they offer even less chance of success than negotiations with Iran.

This leaves the US with several alternatives, none of which offer the prospect of lasting stability, but which are similar to the options the US might use against Iran and would put pressure on both North Korea and China:

- The US could turn to China and say the US will offer extended nuclear deterrence to Japan and the ROK unless China can persuade the DPRK to halt and roll back its nuclear programs. It could confront China and aid the ROK with two major options:
 - The most “quiet” or discrete extended deterrence option would be nuclear armed submarine- or surface-launched cruise missiles backed with the deployment of conventionally armed cruise or ballistic missiles with terminal guidance systems capable of point attacks on North Korea’s most valuable civil and military assets.
 - The most decisive extended deterrence options would be the equivalent of the combination of Pershing II and ground-launched cruise missiles that were land-based, had US operating crews both deep inside South Korea and in or near its major cities, and had both nuclear and precision conventional warheads. The DPRK would be faced with the inability to strike at key ROK population centers without striking at US forces and still see mobile US nuclear armed forces in reserve. It also could not use conventional warheads without facing a more accurate and reliable US strike force in return.
- The US could work with the ROK to create the same kind of layered defenses against missiles and rockets being developed in Israel, and use the ROK model to help create layered defenses in the Gulf, allowing an indirect form of cooperation between Israel and the Gulf states without overt ties or relations.

As is the case in the Gulf, the US does not have to support proliferation by either South Korea or Japan. Experts may argue the timing, but none argue over ROK and Japanese capability in building long-range missiles and nuclear weapons, and doing so with minimal – if any – testing. In fact, the ROK would already have nuclear weapons if the US had not pressed the ROK to not continue its nuclear development, reaching an agreement on the matter with South Korea in 1975 – as previously discussed.

The US can put pressure on both the DPRK and China in ways that would allow several years for negotiation while not seriously opposing the ROK in any way that would bind or sanction its ally. While Japan is far less likely to take a decision to go nuclear, particularly in the near-term, the US could decide that the Missile Technology Control Regime had essentially outlived its usefulness – binding the US without binding China – and encourage Japan to create precision strike conventional missiles as well as missile defenses.

This would confront both the DPRK and China with the reality that once such a Japanese force was created, Japan could quickly arm them with nuclear weapons if it came under increasing North Korean or Chinese pressure. Such options would give the US, the ROK, and Japan growing leverage to pressure China to restrain the DPRK as well as deter and contain the expansion of Chinese nuclear forces.

In fact, one way to put pressure on China would be to start a dialogue that could be either official or think tank, including discussions of both missile defense and extended deterrence, and encourage the ROK and Japan to surface the nuclear option. If this succeeded in pushing China into far more decisive pressure on North Korea, there would be no need for either extended

deterrence or ROK or Japanese nuclear forces. Along these lines, and in response to recent ROK Foreign Ministry suggestions, on April 25, 2013 China signaled that it was “positively” considering holding a trilateral, informal US-China-ROK “1.5-track” security dialogue – which would include both government officials and academics – to discuss policy and security issues related to the DPRK.⁹⁶¹

Moreover, such options could be used to lever Chinese restraint in transferring missile technology to Iran. There also is no reason that the US, the ROK and Japan could not offer quid pro quos in terms of incentives for a North Korean roll back, including some formal agreement on all sides for a local WMD-free zone and economic incentives for a more open DPRK.

At the same time, the US may have to at least tacitly encourage ROK and Japanese creation of at least precision-guided conventional missile forces and possibly nuclear forces as a local regional counterbalance to the Chinese nuclear effort. This is scarcely a desirable option, or one that can easily be kept stable, but the DPRK is only part of the problem and the US should not passively allow itself to be trapped into a Chinese-US nuclear relationship. It should be clear to China that it faces other potential nuclear powers if its nuclear forces grow too much and are even indirectly linked to Chinese pressure on maritime and island disputes in the Pacific.

The Japanese Response to DPRK Nuclear Programs

Japan has also made it clear that it feels threatened by the DPRK’s actions, but Japan is less likely to take a decision to go nuclear than the ROK, particularly in the near-term. Once again, extended deterrence is an option, but the US could also decide that the Missile Technology Control Regime had essentially outlived its usefulness and encourage Japan to create precision strike conventional missiles as well as missile defenses.

Such a Japanese action would confront both the DPRK and China with the reality that once such a Japanese force was created, Japan could quickly arm them with nuclear weapons if it came under increasing North Korean or Chinese pressure. Such options would give the US, the ROK, and Japan growing leverage to pressure China to restrain the DPRK as well as deter and contain the expansion of Chinese nuclear forces.

Missile defense is another important option. In March 2013 the Japanese government was reportedly planning to give orders to intercept any DPRK missiles, while *Aegis* destroyers carrying SM-3 missiles were deployed to the northwest of Japan – as has happened in all previous DPRK missile launches.⁹⁶²

In early April 2013, Prime Minister Abe put the Self-Defense Forces (SDF), already mobilized for missile defense, on “full alert status” due to the DPRK threat. The Navy deployed two *Aegis* destroyers to the Sea of Japan, and the Air Force readied its land-based PAC-3 missile interceptors. This is the fourth time that Japan has undertaken its highest state of defense readiness in response to DPRK missile threats, with the first in March 2009 and the second and third in response to 2012 missile launches. The April 2013 orders were the first time Japan had gone to full alert status without any DPRK-stated intention to launch a missile.⁹⁶³

The DPRK’s bellicosity has also allowed Abe to call for a build-up in Japan’s military – a move the US has encouraged, so that Japan can play a larger role in the region’s security. According to Abe, Japan would be unable to shoot down any potential DPRK-launched missile aimed at the US, as it would not be in self-defense – and thus against the Japanese constitution. Other potential scenarios that are constitutionally forbidden but Abe argues should be permissible

include defending US military vessels under attack during joint US-Japan operations and providing logistical support to nations and/or protecting allied troops under attack while engaged in peacekeeping missions.⁹⁶⁴

According to Abe, Japan's military should have more latitude to fight a broader range of threats to Japan's allies in a new doctrine of "collective self-defense." Abe has other proposals, in addition to building up the Japanese military – including increasing Japanese military spending for the first time in 11 years (by .8%) and increasing the number of SDF personnel.

Japan's new military budget also calls for enhanced weapons – including F-35s, an attack submarine, amphibious troop carriers, and funding to develop new anti-ship missiles. Increased Japanese command and control in joint US-Japan military exercises is one manifestation of this trend. One newspaper poll found that 54% of respondents supported Abe's moves to increase the defense budget, while 36% were opposed. Military officials in both Japan and the US say that new DPRK threats justify a broader re-examination of long-standing Japanese regional defense policies. Japan is also worried about increasing tensions with China over disputed islands.⁹⁶⁵

The Russian and Chinese Response to DPRK Nuclear Programs

Russia has not taken a strong stand against DPRK nuclear weapons, but has expressed concern about the risk of escalation on the Korean Peninsula – at least in the period before the Ukraine crisis in 2014. Prime Minister Vladimir Putin remarked in early April 2013 that, "I would make no secret about, we are worried about the escalation on the Korean peninsula because we are neighbors... And if, God forbid, something happens, Chernobyl which we all know a lot about, may seem like a child's fairy tale. Is there such a threat or not? I think there is... I would urge everyone to calm down... and start to resolve the problems that have piled up for many years there at the negotiating table."⁹⁶⁶ The country has retained its relatively moderate stance following the 2016 nuclear test, releasing a statement in response to North Korean anger over ROK-US military exercises that warned the DPRK against provocative actions. It specifically hypothesized that such moves would create a legal basis for invasion and regime change; however, the statement also criticized the ROK and US for launching the exercises in the first place.⁹⁶⁷

As has been discussed previously, there seems to be a debate among Chinese citizens, government officials, and academics as to how much the DPRK's nuclear program should affect China's support of the DPRK. While one Chinese academic was suspended from his job after publishing an article pushing for abandonment of the DPRK – as discussed previously in this chapter – Xi Jinping, China's new president, said in an early April speech that no Asian country "should be allowed to throw a region and even the whole world into chaos for selfish gain," an indirect though clear criticism of the DPRK.⁹⁶⁸

According to US Joint Chiefs of Staff Chairman General Martin E. Dempsey, the Chinese government wants to limit the DPRK's nuclear ambitions though it remains unclear what China would do to realize that goal. General Dempsey stated, "Chinese leadership is as concerned as we are with North Korea's march toward nuclearization and ballistic missile technology. And they have given us an assurance that they are working on it, as we are. But I didn't gain any insights into particularly how they would do that."⁹⁶⁹ His interlocutor, Chief of the General Staff

Gen. Fang Fenghuim, said Beijing is firmly opposed to the DPRK's nuclear weapons program and believes it should be addressed through dialogue.⁹⁷⁰

It was also reported that the Chinese and ROK Foreign Ministers agreed in late April 2013 to set up a 24-hour hotline to facilitate policy consultations on the DPRK.⁹⁷¹

ROK Chemical Weapons Developments

The ROK has the technology base to create advanced chemical and biological weapons. It has conducted research on defense in both areas, and much of such research is indistinguishable from research on weapons. There are no meaningful indicators, however, that the ROK now has, or is seeking, stockpiles of such weapons.

The ROK signed the Chemical Weapons Convention (CWC) in 1993, ratified it in April 1997, and began destroying its CW stocks in 1999. It completed the destruction of its stockpile in July 2008 – the second CWC member to do so.⁹⁷²

The South's destruction of its CW stocks has largely gone unnoticed because Seoul has a confidentiality agreement with the Organization for the Prohibition of Chemical Weapons (OPCW) and neither confirms nor denies the existence of its abandoned CW program.⁹⁷³ The issue is sensitive in the ROK, and the government is divided. Diplomats in the Foreign and Trade Ministries generally favor disclosure, but the Defense Ministry prefers ambiguity because of the supposed residual deterrent effect on Pyongyang.⁹⁷⁴

According to many reliable sources, the ROK declared possession of several thousand metric tons of chemical warfare agents and one chemical weapons production facility to the OPCW upon its ratification of the CWC.⁹⁷⁵ Paul Walker, security and sustainability chief at Global Green USA, said that discussions with informed sources and his own research indicate that the ROK probably held between 3,000 and 3,500 metric tons of chemical warfare material, likely including 400 to 1,000 metric tons of sarin nerve agent in artillery shells.⁹⁷⁶ The rest could have been binary agents that would have become dangerous when mixed together.⁹⁷⁷

After the Yeonpyeong Island shelling, the South Korean National Emergency Management Agency provided 1,300 gas masks for the residents of the islands near the NLL and an additional 610,000 masks for the civil defense corps. The agency also reported that it would renovate subway stations and underground parking structures to better provide shelter in the case of a chemical attack. Yet, these measures could be more to mitigate public fears than legitimately protect civilians, as the gas masks would not be of much use in that the masks do not protect against many of the chemical weapons believed to be possessed by the DPRK.⁹⁷⁸ Moreover, the US chemical warfare battalion returned to South Korea in 2013, after previously being deployed elsewhere in 2004.⁹⁷⁹

ROK Biological Weapons Developments

The ROK ratified the Biological and Toxin Weapons Convention (BTWC) in June 1987, and while the country possesses a well-developed pharmaceutical and biotech infrastructure – the ROK was the 12th largest pharmaceutical market in the world in 2005 valued at USD 7.7 billion – which could serve as the basis for a biological weapons program, there is no evidence that Seoul has an offensive biological weapons (BW) program.⁹⁸⁰ Though the 2006 Defense White Paper, citing a biological threat from North Korea, stated the need for the ROK to conduct

defensive BW research and development, including the development of vaccines against anthrax and smallpox, this research was not discussed in the 2010 Defense White Paper.⁹⁸¹

ROK Nuclear Developments

As has been touched earlier, nuclear weapons present a different case. The ROK once had an ambitious nuclear weapons program of its own, although it currently does not seem to have one.

Initial Weapons Research

The ROK formally initiated nuclear activities when it became a member of the International Atomic Energy Agency in 1957. In 1958 the Atomic Energy Law was passed, and in 1959 the Office of Atomic Energy was established by the government. The first nuclear reactor to achieve criticality in South Korea was a small research unit in 1962.⁹⁸²

The ROK apparently began considering developing nuclear weapons in the late 1960s when it began to have worries about the strength of its US alliance guarantees as a result of the US's problems in Vietnam and regional reductions in the US military presence under the Nixon Doctrine.⁹⁸³ ROK President Park Chung Hee reportedly decided in 1970 to begin a nuclear weapons program, including the creation of a "Weapons Exploitation Committee," after US President Richard Nixon announced the withdrawal of 26,000 American troops from the ROK.⁹⁸⁴ Park is said to have decided to pursue a plutonium bomb, and in 1973 the ROK sought to acquire a reprocessing facility from France and a research reactor and heavy water reactor from Canada to produce bomb-grade plutonium.⁹⁸⁵

Seoul's weapons program ran into difficulties, however, when some of its supply arrangements fell through amidst international concern over India's 1974 nuclear test – which, inconveniently for Seoul, was just the sort of misappropriation of dual-use plutonium technology that the ROK hoped to achieve for itself.⁹⁸⁶

US officials soon threatened to cancel US alliance guarantees if Seoul continued its weapons program and pressured France into not delivering the reprocessing facility, effectively ending the ROK's attempt to develop nuclear weapons.⁹⁸⁷ Soon thereafter, the ROK ratified the NPT under pressure from the US. Seoul formally abandoned its program and signed the Treaty on the NPT in April 1975 before it had produced any fissile material and later became a state party to the Comprehensive Nuclear Test Ban Treaty (CTBT). President Park also stated in 1977 that Seoul would not develop nuclear weapons so long as the US nuclear umbrella continued to cover Seoul against Soviet and DPRK aggression, although it is believed he continued a clandestine program that only ended with his assassination in October 1979.⁹⁸⁸

Some ROK nuclear activities seem to have continued despite US security assurances and Park's assassination. The Korea Atomic Energy Research Institute (KAERI) contracted with the Youngnam Chemical Corporation to import phosphate compounds with a high level of uranium in the early 1980s. KAERI specifically selected phosphate rock with high uranium content for extraction and conversion, and between 1981 and 1984, yellow cake (U₃O₈) was converted to uranium oxide (UO₂), which was used to produce fuel rods for the Wolsong-1 Nuclear Power Reactor in 1985.⁹⁸⁹

Reprocessing and Enrichment Activities

Seoul continued to conduct several nuclear-related experiments in the 1990s dealing primarily with reprocessing and uranium enrichment. ROK scientists conducted a series of laboratory-scale experiments, allegedly without the government's knowledge, up to 2000, all without properly declaring them to the IAEA.⁹⁹⁰

Once the IAEA discovered these experiments, Seoul cooperated with the IAEA and no evidence emerged that the work had formed part of a possible nuclear weapons program, that the program had been continued since the 1970s, or that anything more than basic research was involved.⁹⁹¹ According to interviews of US diplomats conducted in 2004 by the *Washington Post*, during these experiments, ROK scientists enriched uranium to levels four times higher than had their counterparts in Iran (as of 2004).⁹⁹²

Further information on the ROK's nuclear efforts was brought to light in August 2004 when the ROK's Ministry of Science and Technology (MOST) reported to the IAEA that South Korea had conducted experiments to enrich uranium, extract plutonium, and had produced uranium metal.⁹⁹³ The Laboratory for Quantum Optics at KAERI conducted experiments to enrich uranium three times during January and February 2000.⁹⁹⁴ The experiments yielded about 0.2 grams of uranium enriched to an average of 10% in the three experiments, with the peak level of enrichment in the experiments reaching 77%.⁹⁹⁵

The ROK is interested in developing an indigenous, plutonium fuel cycle for its civilian power program and had negotiated with the IAEA and the US Department of Energy over safeguards for a "partially constructed, pilot pyroprocessing facility" that it wanted to complete by 2012, with a semi-commercial facility in place by 2025. While ROK officials have claimed that the desire for such a facility was the result of "scientific curiosity" or part of plans to localize the production of nuclear fuel, it should be noted that these actions do have applications for weapons development, and questions remain about past activities that appear to have had more direct weapons applications.

The ROK's experiments in plutonium extraction and uranium enrichment were technically violations of Seoul's NPT safeguards commitments that had been in effect since 1975 as well as a violation of the 1992 North and South Korean Joint Declaration on the Denuclearization of the Korean Peninsula, but it is important to understand that they do not appear to have been part of a robust program to develop nuclear weapons.

As Daniel Pinkston has observed, while the experiments "provided data and experience that could be applied to a bomb program or to a peaceful nuclear fuel cycle that could later be part of a 'virtual bomb program' under certain contingencies, [...] the experiments were insignificant in terms of bomb production."⁹⁹⁶ However, the ROK's past and current experiments, along with the recent ROK development of long-range land-attack cruise missiles⁹⁹⁷ and pursuit of a space-launch capability,⁹⁹⁸ will not help alleviate suspicions in Pyongyang or the region. This is another factor making it difficult to achieve a non-nuclear Korean peninsula.

2010-2016 and the ROK Nuclear Development Debate

The creation of an ROK nuclear weapons program became the subject of a new political debate after the DPRK's new military provocations in 2010. Conservatives of the Saenuri party wanted the US to redeploy tactical nuclear weapons, while an August 2011 survey of 2,000 South

Koreans revealed that 63% supported the idea that the ROK should indigenously develop nuclear weapons to counteract the DPRK.

A similar survey in 2010 reported that 56% supported such development. In 2012, 66% were in favor of a weapons program; approximately the same results were seen in a 2013 poll that was taken several weeks after the DPRK's third nuclear test. From 2010 to 2012, the number of those who "strongly supported" such a program rose from 13% to 25%. At the same time, the 2013 poll results show that the "most salient" issue facing the country was job creation (40%), not North-South relations (8-15%).⁹⁹⁹

Outgoing President Lee Myung-bak gave qualified support for the idea in mid-February, saying, "There are some people saying South Korea should also have nuclear weapons. Those remarks are patriotic and I think highly of them. I don't think the comments are wrong because they also serve as a warning to North Korea and China." Yet Lee still added, "It is premature and improper for our government to discuss nuclear armament because the ultimate goal is for Pyongyang to give up its nuclear program through international cooperation, in spite of the DPRK announcement that it was no longer interested in denuclearization."¹⁰⁰⁰ This announcement meant the ROK could make a case that the 1992 Korean Peninsula denuclearization agreement was dead.

Some ROK analysts have argued that the DPRK's third nuclear test was the ROK's Cuban missile crisis. Many in the South are now convinced that the DPRK may never give up its nuclear weapons, leading some to argue that the ROK should either develop its own or the US should restore the nuclear balance on the Peninsula by reintroducing US nuclear weapons, which had been removed in 1991.¹⁰⁰¹

A small but growing number of South Koreans are concerned that the US, either because of budget cuts or a lack of will, might not provide its nuclear umbrella indefinitely – perhaps even pulling out of the country, like in Vietnam. Koreans are also frustrated that the US and international community has been unable to end the DPRK's nuclear program.¹⁰⁰²

One prominent national assemblyman (and the controlling interest in Hyundai) recently spoke at the April 2013 Carnegie International Nuclear Policy Conference, arguing that the ROK could potentially think about temporarily withdrawing from the NPT. As the US was not stopping the DPRK's development of nuclear weapons, and the US would not trade Seattle for Seoul, Chung argued that the ROK might need to develop nuclear capabilities of its own. It has also been noted that if there was not powerful (government) support for his comments in the ROK, he would not be saying such things in a public forum.¹⁰⁰³

Facing an extraordinary threat to national security, South Korea may exercise the right to withdraw from the NPT as stipulated in Article X of the treaty. South Korea would then match North Korea's nuclear program step by step, while committing to stop if North Korea stops... South Korea should be given this leeway as a law-abiding member of the global community who is threatened by a nuclear rogue state.... The alliance has failed to stop North Korea from acquiring nuclear weapons. Telling us not to consider any nuclear weapons option is tantamount to telling us to simply surrender.

The 2016 test reignited the debate. Won Yoo-chul, the ruling party's floor leader in parliament, openly called for either the development of nuclear weapons or the redeployment of US nuclear weapons to the ROK, stating that "We can't borrow umbrellas from next-door every time it rains. We should wear a raincoat of our own". Furthermore, a poll taken in the aftermath of the test found that 2/3 of South Korean citizens were in favor of their government developing nuclear weapons.¹⁰⁰⁴

There have also been new calls for the ROK to be given the same right as Japan to build up plutonium levels from spent reactor fuels. At the same time, other prominent government officials like Prime Minister Hwang Kyo-ahn have maintained that the ROK's principle focus remained the complete denuclearization of the Korean Peninsula, and Defense Minister Han Min-koo insisted that the government was not planning on pursuing the development of nuclear weapons.¹⁰⁰⁵¹⁰⁰⁶

Yet, developing nuclear weapons would create major problems for the ROK's nuclear program and energy security. The ROK would run out of nuclear fuel and might not be able to access imported fossil fuels, while the US might remove its security guarantee as punishment. The ROK would also have to drop out of the NPT, freezing relations with China, Japan, and Russia, and correspondingly increasing the likelihood of a DPRK attack.¹⁰⁰⁷

The ROK possesses a large and extensive civilian nuclear power industry –with 25 reactors providing one third of the ROK's electricity.¹⁰⁰⁸ It has plans for a total of 40 reactors providing 59% of the ROK's electricity by 2030. Coupled with past weapons research, some estimate this technology could serve as a basis for any plans to develop nuclear weapons in the future should it feel that DPRK nuclear threats or a potential downturn in the US-ROK alliance warrant such a move.

The ROK is also interested in developing an indigenous, plutonium fuel cycle for its civilian power program and had negotiated with the IAEA and the US Department of Energy over safeguards for a “partially constructed, pilot pyroprocessing facility” that it wanted to complete by 2012, with a semi-commercial facility in place by 2025.¹⁰⁰⁹ While ROK officials have claimed that the desire for such a facility was the result of “scientific curiosity” or part of plans to localize the production of nuclear fuel, it should be noted that these actions do have applications for weapons development, and questions remain about past activities that appear to have had more direct weapons applications.¹⁰¹⁰

Bill Gates visited the ROK in April 2013 to meet with President Park Geun-hye in order to promote his project of developing a next-generation nuclear reactor. His plan is for his nuclear start-up (TerraPower) and the Korea Atomic Energy Research Institute to jointly develop a 600 megawatt prototype by 2022, after which a final decision could be made on the feasibility of more large-scale production. Gates argued that it could be an effective means of dealing with the ROK's nuclear waste stockpiles – discussed further in the following sections – and that TerraPower was developing a safer and more economical next-generation reactor.

One ROK nuclear expert with links to the current administration said it agreed to do a three-month feasibility study with Gates. The reactor is called a “traveling wave reactor,” similar to the ROK's sodium-cooled fast reactor development project. Both types use spent fuel from conventional reactors, and can greatly reduce the volume of nuclear waste and its toxicity, compared to existing reactors.¹⁰¹¹

Civilian Facilities and the 123 Agreement

It is important to understand just how developed the ROK's nuclear power program is. The ROK possesses a large and extensive civilian nuclear power industry – the world's fifth-largest, with 25 reactors providing one third of the ROK's electricity. It has plans for a total of 40 reactors providing 59% of the ROK's electricity by 2030.¹⁰¹²

It is projected that ROK nuclear energy capacity will increase by 56% to 27.3 GWe by 2030 and 43 GWe by 2030. Korea Hydro & Nuclear Power (KHNP) expects to spend 4.7 trillion won (\$3.68 billion) on nuclear plants in 2009 and complete 18 nuclear power plants by 2030 at a cost of 40-50 trillion won (\$32 to 40 billion).¹⁰¹³ The country plans to invest \$1.3 billion in research and development of a 150 megawatt fourth-generation reactor by 2028.¹⁰¹⁴ Currently, the ROK has four nuclear power reactor complexes and four nuclear research reactors.

Nuclear Power Reactors¹⁰¹⁵

The Kori Complex, located near Busan, houses eight reactors, though only five are currently operational. Three more are under construction, and an additional two are currently projected to be start construction in 2014. Kori-1, which commenced operation in 1978 and is planned to be closed in 2017, is a 576 MWe two-loop pressurized light water reactor (PWR). It was South Korea's first nuclear power reactor.

Kori-2 (1983) is a 637 MWe two-loop PWR and the ROK's second nuclear power reactor. Kori-3 (1985) produces 1007 MWe and is a three-loop PWR, as is Kori-4 (1986). Shin (New) Kori-1 (2011) is a 1000 MWe PWR, as is Shin Kori-2 (2011). Shin Kori-3, the ROK's first advanced PWR with a 1400 MWe capacity, is expected to begin operations in the end of fall 2013. Shin Kori-4, also an advanced PWR with a 1400 MWe capacity, is expected to commence operations by the end of 2014.

The Uljin Complex, located in North Gyeongsang province, is comprised of six power reactors, all of which are operational. Ulchin-1 (1988 – 945 MWe) and Ulchin-2 (1989 - 942 MWe) are both three-loop PWRs. Ulchin-3 (1998) is a two-loop PWR, as is the 998 MWe Ulchin-4 (1998). Ulchin-5 (2004) is a 1001 MWe PWR, and Ulchin-6 (2005) is a 996 MWe PWR.

Wolsong Complex is also located in North Gyeongsang province and has six reactors, four of which are operational and two of which are under construction. Wolsong-1 (1983) is a 597 MWe pressurized heavy water reactor (PHWR), Wolsong-2 (1997) is a 710 MWe PHWR, Wolsong-3 (1998) is a 707 MWe PHWR, and Wolsong-4 (1999) is a 708 MWe PHWR.

Shin (New) Wolsong-1 (2011) is an indigenously designed 960 MWe PWR, as is Shin Wolsong-2, which was expected to commence in late 2012 but does not yet seem to be connected to the grid. Plans for Shin Wolsong-3 and Shin Wolsong-4 are in place, but construction has not yet been scheduled. They will be Advanced Pressurized Reactors with a 1400 MW(e) generating capacity and have estimated operational dates of 2020 and 2021, respectively.

Yonggwang Complex, located in South Jeolla province, also has six reactors, all of which are operational. Yonggwang-1 (1986) is a 953 MWe PWR, Yonggwang-2 (1987) is a 947 MWe PWR, Yonggwang-3 (1989) is a 997 MWe PWR, Yonggwang-4 (1996) is a 994 MWe PWR, Yonggwang-5 (2002) is a 988 MWe PWR, and Yonggwang-6 (2002) is a 996 MWe PWR.

Nuclear Research Reactors¹⁰¹⁶

The Training, Research, Isotope, General Atomics Mark II (TRIGA-Mark II) Research Reactor was the ROK's first research reactor and is located in Seoul at the former location of the Korea Atomic Energy Research Institute (KAERI). The reactor began operations in 1960 and cost \$73,000 (of which \$35,000 was provided by the US). The original 100 KWt capacity was upgraded to a 250 KWt capacity in 1969. It used 20% enriched uranium for fuel. It was shut down at the end of 1995 and currently is part of a memorial display.

TRIGA-Mark III was South Korea's second research reactor, also under the aegis of KAERI; it used 70% enriched uranium fuel and had a capacity of 2 MWe. In the early 1980s, ROK scientists conducted plutonium extraction experiments in violation of the ROK'S NPT commitments, extracting .7 grams of fissile PU-239. Along with TRIGA-Mark II, TRIGA-Mark III was shut down in 1995 and completely dismantled by 2009.

The Aerojet General Nucleonics Model Number 201 (AGN-201) Research Reactor, located at Kyung Hee University (Suwon), was the ROK's first educational research reactor, donated by Colorado State University in 1976, becoming operational in 1982. The reactor uses 20% enriched uranium for fuel and has a 0.1 MWe capacity. The High-Flux Advanced Neutron Application Reactor (HANARO) has a capacity of 30 MWe. It began operations in 1996, and uses low-enriched uranium as fuel (19.75%).

Figure V.18 shows the reactors currently operating in the ROK, along with their type, date of initial operation, and net capacity. **Figure V.19** shows the ROK reactors that are either under construction or in the planning process, along with their type, start date of construction, projected date of operation, and capacity. Because the previous discussion of reactors and the figures below come from different sources, the declared net capacity of the various reactors may be slightly different.

The 123 Agreement

The possibility of an ROK weapons program could also affect the implementation of the ROK-US peaceful nuclear cooperation agreement. The 123 Civil Nuclear Agreement was initially signed 40 years ago and was renewed in April 2014.¹⁰¹⁷ Under the existing regime, the ROK works with US government agencies and companies to build a nuclear power infrastructure, including almost 20 reactors that generate 30% of the nation's electricity.¹⁰¹⁸

The ROK is building more reactors and also has facilities for nuclear waste treatment, disposal, equipment manufacture, engineering, research, medicine, and fuel fabrication – all together, the ROK's nuclear assets are likely worth several billion dollars. Korean firms are now partnering with American businesses to develop nuclear power plants based on US technology in the ROK, China, and the US, as well as working to sell to other countries. The ROK currently has a contract to build reactors in the UAE.¹⁰¹⁹

One ROK Assemblyman asked Bill Gates, during the latter's April 2013 trip to the ROK, to play a role in persuading the US government to let the ROK have more capabilities in its peaceful use of nuclear energy; without the revision in the 123 Agreement, Gates' plan to cooperate with the ROK in the development of next-generation nuclear technology would be difficult.¹⁰²⁰

However, an updated agreement was not reached despite two years of negotiations. The ROK asked it be allowed to extract uranium and plutonium from its thousands of tons of spent fuel, which originally came from the US. The ROK argued that reprocessing would be useful in reducing the used fuel stockpiles at its power plants, producing new fuel, and gaining public acceptance for building new reactors by showing it has a solution for nuclear waste issues.¹⁰²¹

South Korea also argued that even though the ROK had no current plans to build a pyroprocessing facility, it wanted a US commitment that when the ROK does decide to start construction, the US would support it.¹⁰²² Furthermore, the ROK asserted that this capability – the ability to offer full nuclear fuel cycle services – is key to its competitiveness in the strategic

export of nuclear services.¹⁰²³ President Park Geun-hye's Foreign Minister noted that the negotiations would be an important test of "trust" between the two countries.¹⁰²⁴

The ROK plans that nuclear services will become a significant export for the country in the future,¹⁰²⁵ with the government claiming that South Korea can enrich uranium more cheaply than others and that it plans to export 80 nuclear power reactors over the next 20 years (equivalent to 20% of the international market). Industry leaders, alternatively, believe it is more likely that approximately 10 reactors could be exported over that time frame. Especially in a post-Fukushima context, the market for reactors is saturated, and the industry is not a huge money-maker in any event.¹⁰²⁶ It is unlikely that the ROK would be able to reach the government's export goals; but, if the US refuses to allow pyroprocessing, the US becomes the scapegoat when the export goal fails, resulting in increased alliance tensions and hurting ROK public opinion of the US.¹⁰²⁷

The US has several problems with the ROK's request. It is unsure if pyro-processing is the most suitable method for the ROK to treat nuclear waste,¹⁰²⁸ and it does not want other countries enriching spent fuel because the same technology allows countries to produce the explosive core of a nuclear weapon.¹⁰²⁹ It has never granted reprocessing consent to countries that did not already have prior enrichment and reprocessing facilities.

Allowing the ROK to add this capability would set a precedent that others – like Taiwan, which also has a significant civilian nuclear program and waste issues – would also want to be allowed this capacity. Also, if the ROK is allowed to develop reprocessing, the DPRK (and Iran) could use this as an excuse to keep their programs, claiming equal treatment.

China's reaction to such an increase in ROK nuclear capabilities is uncertain. Continuation of the DPRK's program also pressures the ROK and Japan to withdraw from the NPT and develop their own nuclear deterrent – and ROK defense officials see a reprocessing capability as a shortcut to a potential nuclear option if future ROK-DPRK relations become worse.¹⁰³⁰ The US would like to wait for the results of the 10-year joint feasibility study recently undertaken and then revisit the issue.¹⁰³¹

There are also significant elements of pride and nationalism. South Korea argues that just because it did not have these capabilities 30 years ago when the initial agreement was negotiated, that shouldn't mean that they remain denied the capabilities – what the ROK sees as being relegated to a permanent second class status.¹⁰³²

Furthermore, the US-Japan nuclear cooperation agreement gives Japan the right to separate the plutonium from its spent fuel, and thus the ROK believes that it should be given the same right. On the other hand, the US-Japan agreement was signed in 1988 – when the Asia-Pacific had fewer nationalized territorial conflicts, the Cold War superpowers worked together against nuclear proliferation, and the DPRK was an NPT member without nuclear weapons.¹⁰³³ The ROK also likely sees India as another case that should be applicable to its situation.¹⁰³⁴

It was announced on April 24, 2013 that the deadline to renegotiate the agreement had been delayed until 2016, though unconfirmed reports of the deadline delay had been circulating for several days in the ROK. While a spokesman for the ROK Foreign Ministry said that the two countries had agreed to a treaty extension in order to give the negotiators more time to sort out "the complexity of details and technologies," the ROK media was not as supportive. One editorial in the *JoongAng Ilbo* stated, "Washington does not seem to trust South Korea as much

as it reiterates blood-tight relations... Just because the pact has been extended for two years does not assure that the two will narrow their differences. It is merely a makeshift move to avoid a dispute.”¹⁰³⁵

The new agreement was eventually signed in June 2015. Under its provisions, South Korea is now permitted to enrich uranium civilian energy purposes "in the future through consultations with the United States".¹⁰³⁶ It attempted to bypass the controversial issue of advanced consent over reprocessing and enrichment by setting up a bilateral commission to negotiate all potential developments in these areas.¹⁰³⁷

Figure V.18: Nuclear Power Reactors Operating in the ROK

Reactor	Type	Net Capacity	Commercial Operation	Planned Close
Kori 1	PWR (Westinghouse)	576 MWe	4/1978	2017
Kori 2	PWR (Westinghouse)	640 MWe	7/1983	2023
Wolsong 1	PHWR (Candu 6)	657 MWe	4/1983	2022 or 2036
Kori 3	PWR (Westinghouse)	1011 MWe	9/1985	2025
Kori 4	PWR (Westinghouse)	1010 MWe	4/1986	
Yonggwang 1	PWR (Westinghouse)	961 MWe	8/1986	
Yonggwang 2	PWR (Westinghouse)	977 MWe	6/1987	
Ulchin 1	PWR (Framatome)	963 MWe	9/1988	
Ulchin 2	PWR (Framatome)	965 MWe	9/1989	
Yonggwang 3	PWR (Syst 80)	1000 MWe	12/1995	
Yonggwang 3	PWR (Syst 80)	998 MWe	3/1996	
Wolsong 2	PHWR (Candu)	650 MWe	7/1997	
Wolsong 3	PHWR (Candu)	665 MWe	7/1988	
Wolsong 4	PHWR (Candu)	669 MWe	10/1999	
Ulchin 3	OPR-1000	997 MWe	8/1998	
Ulchin 4	OPR-1000	999 MWe	12/1999	
Yonggwang 5	OPR-1000	994 MWe	5/2002	
Yonggwang 6	OPR-1000	993 MWe	12/2002	
Ulchin 5	OPR-1000	998 MWe	7/2004	

Ulchin 6	OPR-1000	997 MWe	4/2005	
Shin Kori 1	OPR-1000	999 MWe	2/2011	
Shin Kori 2	OPR-1000	1000 MWe	7/2012	
Shin Kori 3	APR1400	1340 MWe	(5/2016)	
Shin Wolsong 1	OPR-1000	998MWe	7/2012	
Shin Wolsong 2	OPR-1000	10,000 MWe	7/2015	
Total: 25		23,017 MWe		

Source: “Nuclear Power in South Korea,” World Nuclear Association, updated June 2016, <http://www.world-nuclear.org/info/Country-Profiles/Countries-O-S/South-Korea/>.

Figure V.19: ROK Nuclear Power Reactors under Construction or Planned

Reactor	Type	Gross Capacity	Construction Start	Commercial Operation (Planned)
Shin Kori 4	APR-1400	1400 MWe	August 2009	2/2017
Shin Ulchin 1	APR-1400	1400 MWe	July 2012	4/2017
Shin Ulchin 2	APR-1400	1400 MWe	June 2013	2/2018
Shin Kori 5	APR-1400	1400 MWe	September 2016	3/2021
Shin Kori 6	APR-1400	1400 MWe	September 2017	3/2022
Shin Ulchin 3	APR-1400	1400 MWe	2018	12/2022
Shin Ulchin 4	APR-1400	1350 MWe	2019	12/2023
Cheonju 1	APR+	1500 MWe	2022	12/2026
Cheonju 2	APR+	1500 MWe	2023	12/2027
Shin Kori 7	APR+	1500 MWe		
Shin Kori 8	APR+	1500 MWe		
Total:11		11,600MWe (~11,580 MWe net)		

Note: “Start construction” in bold means the reactors are already under construction.

Source: “Nuclear Power in South Korea,” World Nuclear Association, updated June 2016, <http://www.world-nuclear.org/info/Country-Profiles/Countries-O-S/South-Korea/>.

VI. Korean Peninsula Military Modernization Trends

Military modernization efforts are a key variable when assessing the Korean Peninsula, and one where the shifting strategies and military efforts of the US and China play an increasingly important role. The modernization trends of all the countries involved in the region have great significance in determining the types of engagement that could be fought. Modernization affects deterrence and assessments of the potential course of any engagement, as well as estimate of types of forces the US needs to commit to the region, both in times of peace and in times of tension.

There are serious limits to the unclassified data available for comparisons of Northeast Asian military modernization – especially for China and the DPRK. Unclassified sources do not include many smart munitions, they only cover a limited amount of other weaponry, and they do not reflect investments in logistics and transport. They also often do not include battle management, ISR, or Command, Control, Communications, and Computer (C4) assets. These are becoming steadily more critical aspects of military modernization.

Later in this section, **Figure VI.1 to Figure VI.5** do show, however, that the ROK has modernized more rapidly and with more advanced equipment than the DPRK, while Pyongyang has focused on force expansion. The ROK has almost achieved a massive lead in modern aircraft and surface-to-air missiles. The figures also show that the ROK has an effective plan for force modernization through 2020 – a plan it has upgraded since 2005. There is no unclassified DPRK equivalent.

DPRK

The DPRK has limited economic means to support modernization and force expansion. As previously discussed, the CIA estimated in August 2016 that the DPRK had a 2013 GDP of approximately \$28 billion, while the ROK's 2014 GDP was approximately \$1.802 trillion. The DPRK had an estimated GDP per capita of \$1,800, while the ROK's GDP per capita was about \$35,700. This estimate made the ROK's GDP 64 times larger than the DPRK's, and the ROK's GDP 20 times larger.¹⁰³⁸

This disparity, however, has not stopped the DPRK's regime from devoting major resources to force expansion and modernization. The first annual DOD unclassified report on North Korean forces was issued in May 2013. The second report, released February 2014, described the DPRK's modernization programs as follows:¹⁰³⁹

North Korea's force modernization goals are aimed at maintaining the credibility of its conventional forces through more realistic training and the modest production of new systems; enhancing the credibility of its strategic deterrence by advancing its nuclear and missile programs; and developing new or improved means to support its coercive diplomacy – most notably via its cyber and missile programs. North Korea directs its limited resources to areas where it sees the potential for localized comparative advantage...

DPRK Modernization Priorities

Kim Jong Un gives high priority to the development of new weapons systems, as demonstrated by his numerous appearances with military units and research and development organizations. He has personally overseen land- and sea-based ballistic missile and anti-ship cruise missile testing activity in 2014 and 2015. Additionally, he oversaw events designed to demonstrate the proficiency of his conventional military forces.

The 2015 Department of Defense Report on the DPRK notes the military's emerging capabilities:¹⁰⁴⁰

The Korean People's Army (KPA) — a large, ground force-centric organization comprising ground, air, naval, missile, and SOF — has over one million soldiers in its ranks, making it the fourth largest military in the world. Four to five percent of North Korea's 24 million people serve on active duty, and another 25 to 30 percent are assigned to a reserve or paramilitary unit and would be subject to wartime mobilization. With approximately 70 percent of its ground forces and 50 percent of its air and naval forces deployed within 100 kilometers of the DMZ, the KPA poses a continuous threat to the ROK and U.S. forces stationed there. The general disposition of the KPA has not changed in the last two years.

The KPA primarily fields legacy equipment, either produced in or based on designs from the Soviet Union and China dating back to the 1950s, 1960s, and 1970s. Although a few weapons systems are based on modern technology, the KPA has not kept pace with regional military capability developments. The KPA has not acquired new fighter aircraft in decades, relies on older air defense systems, lacks ballistic missile defense, its Navy does not train for blue water operations, and recently unveiled artillery systems include tractor-towed rocket launchers while most other countries are improving the mobility of such systems.

Kim Jong Un seems to prioritize the development of new weapons systems, as demonstrated by his numerous appearances with military units and research and development organizations. He has personally overseen land- and sea based ballistic missile and anti-ship cruise missile testing activity in 2014 and 2015. He has also overseen events designed to demonstrate the proficiency of his conventional military forces.

Ground. The KPA's ground forces are predominantly regular and light infantry units, supported by armor and mechanized units and heavy concentrations of artillery. These forces are forward-deployed, fortified in several thousand underground facilities, and include long-range cannon and rocket artillery forces that are capable of reaching targets in Seoul from their garrisons.

The ground forces possess numerous light and medium tanks, and many armored personnel carriers. The KPA's large artillery force includes long-range 170-mm guns and 240-mm multiple rocket launchers (MRL), many deployed along the DMZ posing a constant threat to northern parts of the ROK.

In October 2015, North Korea paraded what appears to be a large-caliber MRL — larger than its 240-mm MRL — that carries eight tubes on a wheeled chassis. In recent years, North Korea has unveiled other new ground force equipment, including tanks, artillery, armored vehicles, and infantry weapons. The display of these systems shows that North Korea continues to produce, or at least upgrade, limited types and numbers of military equipment.

Air and Air Defense. The North Korean Air Force (NKAf), a fleet of more than 1,300 aircraft that are primarily legacy Soviet models, is primarily responsible for defending North Korean air space. Its other missions include SOF insertion, transportation and logistics support, reconnaissance, and tactical air support for KPA ground forces. However, because of the technological inferiority of most of its aircraft fleet and rigid air defense command and control structure, much of North Korea's air defense is provided by surface-to-air missiles (SAMs) and antiaircraft artillery (AAA).

The NKAf's most capable combat aircraft are its MiG-29s, procured from the Soviet Union in the late 1980s, its MiG-23, and its SU-25 ground-attack aircraft. However, the majority of its aircraft are less

capable MiG-15s, MiG-17s, MiG-19s (F-6), and MiG- 21s. The NKAF operates a large fleet of An- 2 COLT aircraft, which are 1940s vintage single-engine, 10-passenger biplanes, likely tasked with inserting SOF into the ROK. The Air Force is rounded out with several hundred helicopters that would be used for troop transport and ground attack, including predominantly Mi-2/HOPLITE and some U.S.-made MD-500 helicopters obtained by circumventing U.S. export controls in 1985.

North Korea possesses a dense, overlapping air defense system of SA-2, SA-3, and SA-5 SAM sites, mobile SA-13 SAMs, mobile and fixed AAA, and numerous man-portable air-defense systems like the SA-7. As the NKAF's aircraft continue to age, it increasingly relies on its ground-based air defenses and on hiding or hardening assets to counter air attacks. During a 2010 military parade, North Korea displayed a new mobile SAM launcher and accompanying radar, which bore external resemblance to the Russian S-300 and Chinese HQ-9.

North Korea publicized a March 2013 military live-fire drill that for the first time featured an unmanned aerial vehicle (UAV) in flight. The UAV appeared to be a North Korean copy of a Raytheon MQM- 107 Streaker target drone. North Korean press coverage of the event described the UAV as being capable of precision strike by crashing into the target. The drill also featured the UAV as a cruise-missile simulator, which was then shot down by a mobile SAM.

Naval. The North Korean Navy (NKN) is the smallest of the KPA's three main services. This coastal force is composed primarily of numerous, though aging, small patrol craft that carry a variety of anti-ship cruise missiles, torpedoes, and guns. The NKN maintains one of the world's largest submarine forces, with around 70 attack-, coastal-, and midget-type submarines. In addition, the NKN operates a large fleet of air-cushioned hovercraft and conventional landing craft to support amphibious operations and SOF insertion. The force is divided into East and West Coast Fleets, which each operate a variety of patrol craft, guided-missile patrol boats, submarines, and landing craft.

The NKN has displayed limited modernization efforts, highlighted by upgrades to select surface ships and a continued program to construct submarines. North Korea unveiled a new submarine in mid-2015, which it claims was developed domestically and can fire a ballistic missile.

Special Operations Forces. North Korean SOF are among the most highly trained, well-equipped, best-fed, and highly motivated forces in the KPA. As North Korea's conventional capabilities decline relative to the ROK and United States, North Korea appears to increasingly regard SOF capabilities as vital for asymmetric coercion.

Strategic SOF units dispersed across North Korea appear designed for rapid offensive operations, internal defense against foreign attacks, or limited attacks against vulnerable targets in the ROK as part of a coercive diplomacy effort. They operate in specialized units, including reconnaissance, airborne and seaborne insertion, commandos, and other specialties. All emphasize speed of movement and surprise attack to accomplish their missions. SOF may be airlifted by An-2 COLT or helicopters (and possibly Civil Air Administration transports), moved by maritime insertion platforms, or travel on foot over land or via suspected underground, cross-DMZ tunnels to attack high-value targets like command and control nodes or air bases in the ROK.

Ballistic Missile Force. North Korea has several hundred short- and medium-range ballistic missiles (SRBMs and MRBMs) available for use against targets on the Korean Peninsula and Japan. A developmental intermediate-range ballistic missile (IRBM), though untested and unreliable as a weapon, could also be launched at targets in the region.

North Korea has an ambitious ballistic missile development program in addition to its deployed mobile theater ballistic missiles. Since early 2012, North Korea has made efforts to raise the public profile of its ballistic missile command, now called the Strategic Rocket Forces. In 2014, Kim Jong Un personally oversaw several ballistic missile launch exercises, and North Korea launched an unprecedented number of ballistic missiles. The State media covered the usually secretive events, including reporting on two launch

cycles in the same week. Kim's public emphasis of the missile force continued into 2015, when he appeared at what North Korea portrayed as the test launch of a submarine-launched ballistic missile (SLBM). In late November 2015, the ROK's Yonhap news agency reported that North Korea appeared to conduct an SLBM test but it ended in failure with no indication that the missile successfully ejected from the vessel.

North Korea is committed to developing a long-range, nuclear-armed missile that is capable of posing a direct threat to the United States. Pyongyang displayed the KN08 ICBM, which it refers to as Hwasong-13, on six road-mobile transporter-erector launchers (TEL) during military parades in 2012 and 2013. If successfully designed and developed, the KN08 likely would be capable of reaching much of the continental United States, assuming the missiles displayed are generally representative of missiles that will be fielded. However, ICBMs are extremely complex systems that require multiple flight tests to identify and correct design or manufacturing defects. Without flight tests, the KN08's current reliability as a weapon system would be low. In October 2015, North Korea paraded four missiles on KN08 TELs. These missiles are noticeably different from those previously displayed on these TELs.

North Korea also continues to develop the TD-2, which could reach the continental United States if configured as an ICBM. In April and December 2012, North Korea conducted launches of the TD-2 configured as a SLV, which used ballistic missile technology. The April launch failed but the December launch succeeded.

Developing an SLV contributes heavily to North Korea's long-range ballistic missile development, since the two vehicles have many shared technologies. However, a space launch does not test a reentry vehicle (RV). Without an RV capable of surviving atmospheric reentry, North Korea cannot deliver a weapon to target from an ICBM.

Advances in ballistic missile delivery systems, coupled with developments in nuclear technology discussed in Chapter 4, are in line with North Korea's stated objective of being able to strike the U.S. homeland. North Korea followed its February 12, 2013 nuclear test with a campaign of media releases and authoritative public announcements reaffirming its need to counter perceived U.S. hostility with nuclear-armed ICBMs. North Korea continues to devote scarce resources to these programs, but the pace of its progress will also depend, in part, on how much technology and other aid it can acquire from other countries.

Cyberwarfare Capabilities. North Korea has an offensive cyber operations (OCO) capability. Implicated in malicious cyber activity and cyber effects operations since 2009, North Korea probably views OCO as an appealing platform from which to collect intelligence and cause disruption in South Korea and other adversaries including the United States. North Korea likely views cyber as a cost-effective, asymmetric, deniable tool that it can employ with little risk from reprisal attacks, in part because its networks are largely separated from the Internet and disruption of Internet access would have minimal impact on its economy. On November 24, 2014, North Korean cyber actors using the name "Guardians of Peace" attacked Sony Pictures Entertainment, shutting down employee access and deleting data. As a result of North Korea's historical isolation from outside communications and influence, it is likely to use Internet infrastructure from third-party nations.

Intelligence Services. North Korean intelligence and security services collect political, military, economic, and technical information through open-source, human intelligence, cyber, and signals intelligence capabilities. North Korea's primary intelligence collection targets remain South Korea, the United States, and Japan.

The Reconnaissance General Bureau (RGB) is North Korea's primary foreign intelligence service, responsible for collection and clandestine operations. The RGB is comprised of six bureaus with compartmented functions including operations, reconnaissance, technology and cyber, overseas intelligence, inter-Korean talks, and service support.

The Ministry of State Security (MSS) is North Korea's primary counterintelligence service and is an autonomous agency of the North Korean government reporting directly to Kim Jong Un. The MSS is responsible for operating North Korean prison camps, investigating cases of domestic espionage, repatriating defectors, and conducting overseas counterespionage activities in North Korea's foreign missions.

The United Front Department (UFD) overtly attempts to establish pro-North Korean groups in South Korea such as the Korean Asia-Pacific Committee and the Ethnic Reconciliation Council. The UFD is also the primary department involved in managing inter-Korean dialogue and North Korea's policy toward South Korea.

The 225th Bureau is responsible for training agents to infiltrate South Korea and establishing underground political parties focused on fomenting unrest and revolution.

Command, Control, and Communications. North Korea's National Defense Commission (NDC) is the official authority over the North's military and security services. The Ministry of People's Armed Forces (MPAF) is the administrative superior of the KPA, while operational command and control is exercised by the General Staff Department. The 1992 constitution gives control of North Korea's military to the NDC, and Kim Jong Un exercises control of the military as "First Chairman" of the NDC and "Supreme Commander" of the KPA. Kim Jong Un further exercises control as "First Secretary" of the Korean Worker's Party (KWP) and "Chairman" of the KWP's Central Military Commission.

North Korea has a nationwide fiber-optic network, and has invested in a modern nationwide cellular network. However, telecommunication services and access are strictly controlled and all networks are available for military use, if necessary.

Cell phone subscribership reportedly exceeds three million nationwide with continued growth of Koryolink, a joint venture between Pyongyang and Egypt's Global Telecom Holding. Mobile phone users are concentrated in major cities, with growth in small towns and villages. However, most cell phones cannot access the Internet and can only make domestic calls. In 2014, Orascom suggested the future of Koryolink was uncertain, in part because the North Korean Government had launched a competing cellular network. In addition, Global Telecom cited international sanctions and the absence of a free-floating currency exchange as impediments to the transfer of its profits out of North Korea. This could sour further investment by global investors into North Korea's telecoms sector. The Government restricts most North Koreans from using the Internet, but some are able to access the national intranet, which is insulated from the World Wide Web. The intranet hosts government-approved websites, primarily to support academic research and government businesses

Outside sources also assess the DPRK's modernization efforts as having a high priority within the limits imposed by its weak economy and technology base. For example, *Jane's World Armies* reported in 2014 that the DPRK had initiated a wide range of efforts in reorganization, reequipping, forward deployment, restructuring, and upgrading of forces since 1995. It reports that the KPA slowly worked to mechanize its forces starting in 1998, in particular the artillery. Key developments included:¹⁰⁴¹

[T]he production and deployment of small numbers of new tanks and long-range self-propelled artillery systems (240 mm and 300 mm multiple rocket launchers (MRL), 170 mm self-propelled guns, etc.); the restructuring of two mechanized corps, one tank corps and one artillery corps into divisions; the expansion of existing light infantry units, the establishment of a number of mechanized/motorized light infantry brigades and the conversion of the Ballistic Missile Testing Guidance Bureau into the Strategic Rocket Forces Command.

Jane's also noted KPA acquisition and possible production of lasers:¹⁰⁴²

Since the 1990s, and possibly earlier, the KPA has employed both laser range-finding and laser-designating equipment. In March 2003, however, the KPA demonstrated a new capability, employing a Chinese manufactured ZM-87 antipersonnel laser against two US Army Apache helicopters flying along the southern side of the DMZ. While none of the crew members were injured, the ZM-87 is capable of causing serious injury to the human eye at 2-3 km and less serious injuries out to 10 km. It is unclear how, and when, the KPA acquired the ZM-87. It is unknown whether the DPRK is attempting to produce this or similar antipersonnel lasers. Defectors have identified the Mangyo Jewel Processing Factory, Man'gyongdae-ri, P'yongyang-si, as a facility that produces lasers for precision-guided weapons. It is likewise unknown if the acquisition or production is the responsibility of the First Machine Industry Bureau, a component of the Second Academy of Natural Sciences, or the Nuclear-Chemical Defence Bureau.

Key DPRK Force Upgrades

The DPRK has had to make hard choices in modernizing and expanding its forces, and has focused its resources on expanding and further developing its asymmetric warfare capabilities, including WMD, special operations forces, ballistic missiles, and electronic/information warfare. For the DPRK leadership, these capabilities can project a greater threat to the ROK, Japan, and U.S. forces at a smaller cost than conventional capabilities.¹⁰⁴³

The recent annual threat assessments by the U.S. Director of National Intelligence (DPRK) and the Director of the Defense Intelligence Agency (DIA) have focused on the DPRK's nuclear and ICBM threats. In his 2012 Global Threat Assessment, however, Director of the Defense Intelligence Agency Ronald L. Burgess Jr. questioned North Korea's capability to modernize.¹⁰⁴⁴

North Korea's large, forward-positioned military can attack South Korea with little or no strategic warning, but it suffers from logistic shortages, aging equipment, and poor training. It has attacked South Korean forces in/near disputed territories in the past and maintains the capability for further provocations. Pyongyang is making some efforts to upgrade conventional weapons, including modernizing certain aspects of its deployed missile forces – short-, medium-, and intermediate-range systems.

While much of this remains true, it is clear that North Korea is increasingly adept at circumventing the substantial roadblocks it faces for military modernization. This is exemplified by its continually improving missile, nuclear, and cyber capabilities.

The DPRK has deliberately pursued an asymmetric strategy to enhance its long-range strike capability against civilian and military targets to compensate for declining conventional capabilities. Specific attention has been focused on self-propelled artillery, multiple rocket launchers, and ballistic missiles.

More reliance has also been given to the Special Forces, tasked with stealthy infiltration of the ROK rear.¹⁰⁴⁵ According to the 2010 ROK White Paper, DPRK Special Forces have been augmented to a 200,000 end-strength, up from 180,000 in 2008.

The DPRK has scarcely, however, halted its efforts to modernize its conventional forces. **Figure VI.1** provides a summary of DPRK modernization trends based on IISS data. **Figures VI.2 to VI.5** show how DPRK equipment trends compare with those of the ROK. In virtually every case, the DPRK has been able to acquire more systems than the ROK, though scarcely of the same quality.

Figure VI.1: Key DPRK Equipment Modernization, 2000-2014**Army**

Type	2000	2016	Remarks
MBTs	3,500	3,500+	IISS reported no changes in DPRK MBT holdings but the 2010 ROK White Paper noted the introduction of the <i>Pokpung-Ho</i> (Storm Tiger), believed to be modeled on the T-72

Air Force (and Air Defense)

Type	2000	2016	Remarks
SAMs	45 SA-2 7 SA-3 2 SA-5	179+ SA-2 133 SA-3 38 SA-5	Major reported increase in DPRK SAM holdings
Combat Aircraft	16 MIG-29 <i>Fulcrum</i>	18+ MIG-29A/S <i>Fulcrum</i>	
UAV		Pchela-1 <i>Shmel</i>	Introduced in 2005.

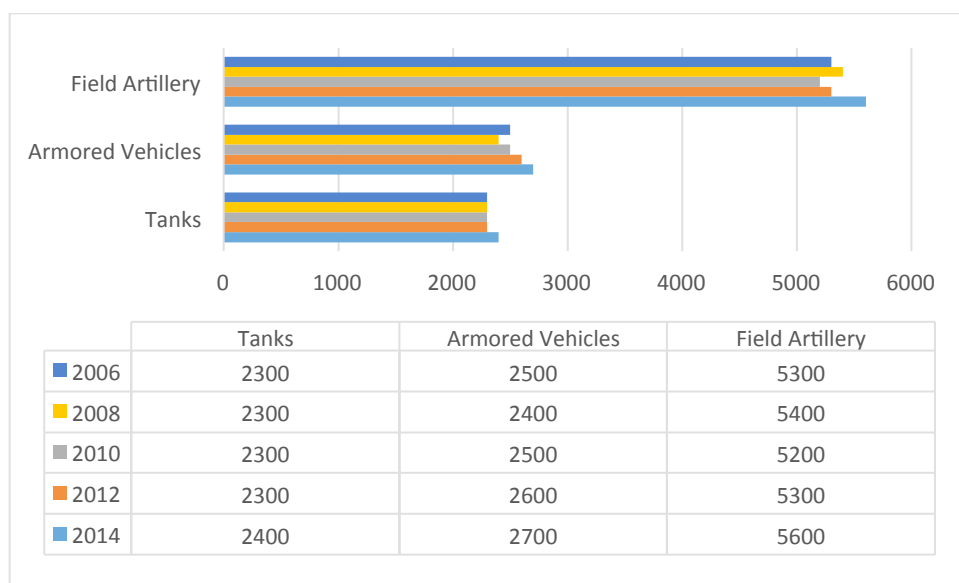
Navy

Type	2000	2016	Remarks
Submarines	26 SSK PRC Type-031/FSU <i>Romeo</i>	1 Sinpo with 1 KN-11 SLBM (underdevelopment) 20 SSK PRC Type-031/FSU <i>Romeo</i> 30 SSC <i>Sang-O</i> 2+ SSC <i>Sang-O II</i> 20+ SSW <i>Yugo</i> and <i>Yeono</i>	Aggregate decrease in total DPRK submarines with 4 SSKs either retired or not operational in 2013, increase in SSC and SSW (midget) submarines North Korea has also been working to develop a ballistic missile launching sub

Source: All figures unless otherwise noted are based primarily on material in IISS, *The Military Balance 2016*.

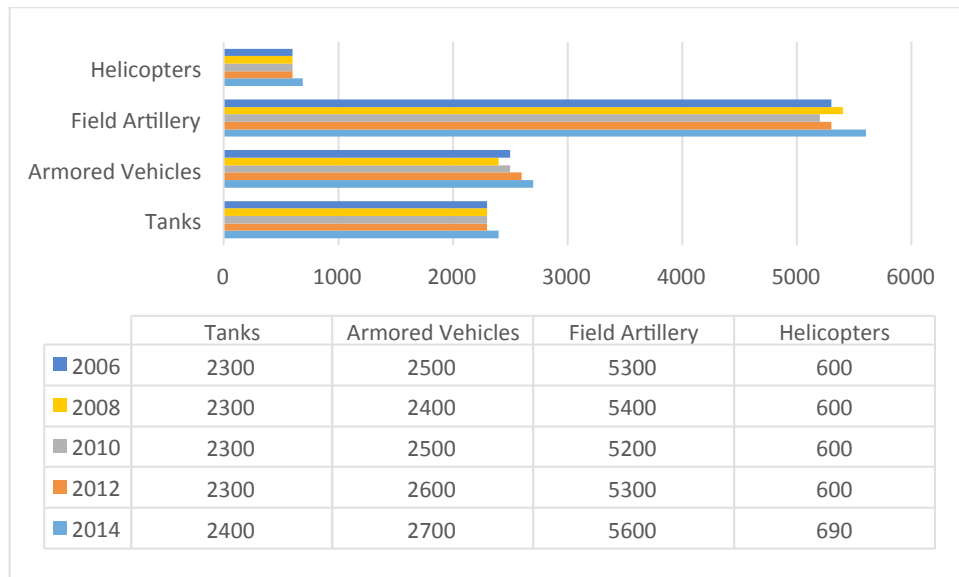
Figure VI.2: ROK Estimates of DPRK Equipment Trends from 2006 to 2014

DPRK



Source: Based primarily on material provided from Republic of Korea, Ministry of Defense, *Defense White Papers*, 2006, 2008, 2010, 2012, and 2014. Some equipment figures are estimates. All equipment figures represent equipment in active service.

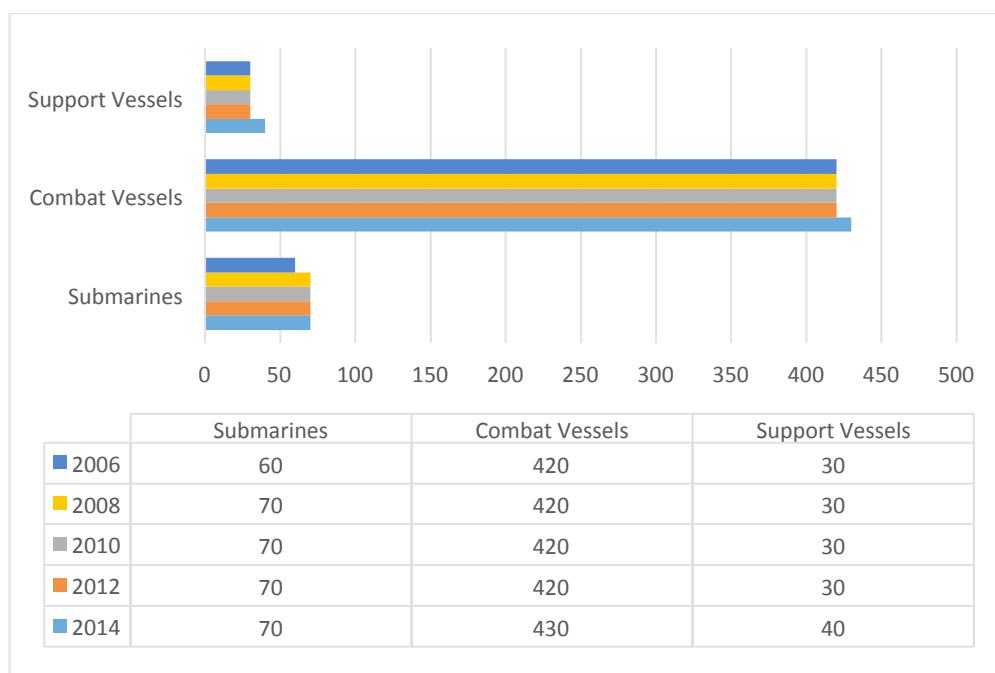
ROK



Source: Based primarily on material provided from Republic of Korea, Ministry of Defense, *Defense White Papers* 2006, 2008, 2010, 2014. Some equipment figures are estimates. All equipment figures represent equipment in active service. Helicopter figure for 2014 includes those in the Navy and Air Force

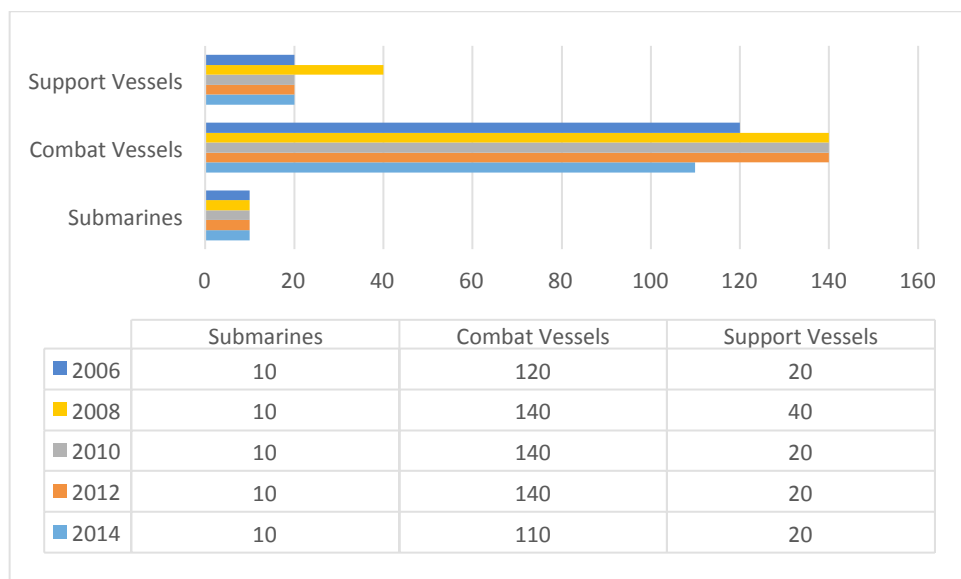
Figure VI.3: ROK Estimates of DPRK and ROK Navy Equipment Trends from 2006 to 2014

DPRK



Source: Based primarily on material provided from Republic of Korea, Ministry of Defense, *Defense White Papers* 2006, 2008, 2010, 2012, 2014. Some equipment figures are estimates. All equipment figures represent equipment in active service.

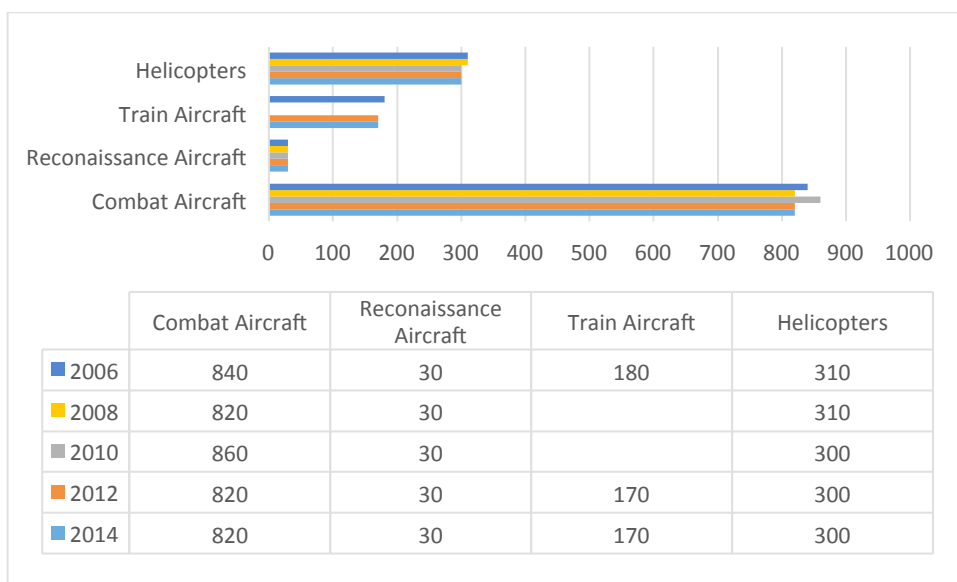
ROK



Source: Based primarily on material provided from Republic of Korea, Ministry of Defense, *Defense White Papers* 2006, 2008, 2010, 2012, 2014. Some equipment figures are estimates. All equipment figures represent equipment in active service.

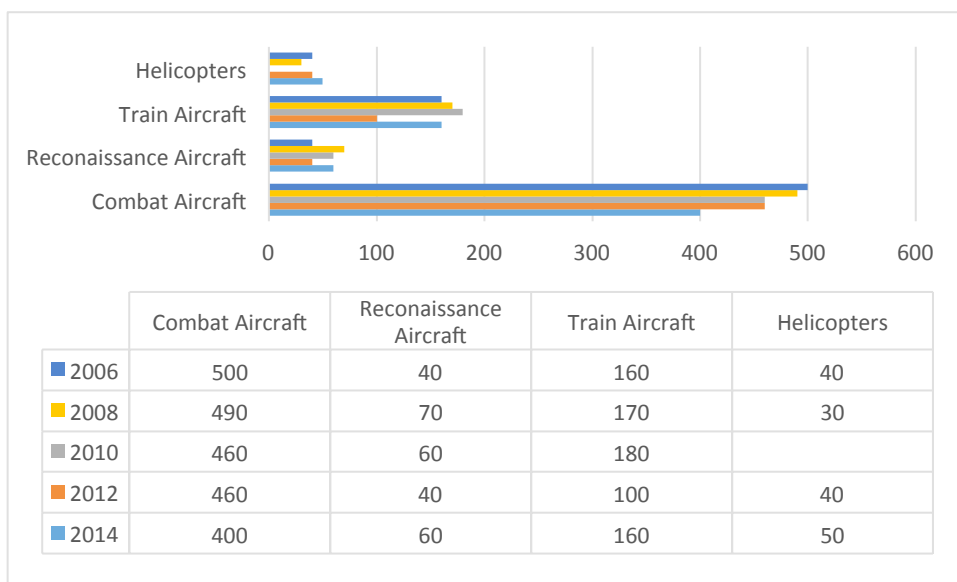
Figure VI.4: ROK Estimates of DPRK and ROK Air Force Equipment Trends from 2006 to 2014

DPRK



Source: Based primarily on material provided from Republic of Korea, Ministry of Defense, *Defense White Papers 2006, 2008, 2010, 2012, 2014*. Some equipment figures are estimates. All equipment figures represent equipment in active service.

ROK



Source: Republic of Korea Ministry of Defense, *Defense White Papers 2006, 2008, 2010, 2012, and 2014*. Some equipment figures are estimates. All equipment figures represent equipment in active service.

ROK

The ROK provides a great deal more public data on its modernization, spending, and force development efforts. As a result, there are a wide range of useful South Korean and outside estimates of current trends.

ROK Modernization Plans

The ROK is committed to significant future defense reforms, especially in light of increased DPRK provocations over the past several years, and particularly in terms of military hardware. It has “obtained additional stealth air-to-surface missiles and advanced cluster bombs and is developing deep-penetrating ‘bunker-buster’ bombs capable of destroying fortified artillery in the event of a new shelling attack.” Furthermore, in fall 2012 the Defense ministry requested approximately 2.5 trillion won (about \$2.1 billion) over a five-year period to improve missile capabilities.¹⁰⁴⁶

Different sources broadly agree on the ROK’s progress, but emphasize different aspects. The 2013 *IJSS Military Balance* summarized these trends by saying that:¹⁰⁴⁷

South Korea’s armed forces have to enhance deterrence; war-fighting and intelligence capabilities across the full range of contingencies vis-à-vis the North, while also taking into account the systematic military modernization of key neighboring powers.

Moreover, as the armed forces prepare for the transfer of OPCON, the South Korea–US Combined Forces Command has to be reconfigured. At the same time, Seoul’s military intelligence, C4ISR, network-centric warfare, and cyber-security capabilities all require upgrades.

The 2016 *IJSS Military Balance* added that:¹⁰⁴⁸

South Korea’s primary military concern remains its troubled relationship with North Korea. This has led to a defence policy that seeks to recapitalize conventional military capabilities in order to maintain Seoul’s qualitative edge, whilst simultaneously pursuing the niche capabilities required to deter North Korea’s artillery, ballistic missile and littoral submarine threats. Military procurement is therefore currently both extensive and widely spread, and includes new armored vehicles and artillery, tactical and tanker aircraft, UAVs, precision munitions, ballistic and cruise missiles, satellites, and cyber- and missile-defence equipment. Whilst most of these acquisitions are from indigenous defence industry, the lengthy timelines of key programs such as Korean Air and Missile Defence (KAMD) and ‘Kill Chain’ (intended to give Seoul the ability to detect and destroy North Korean ballistic missiles prior to their launch) have led to imports of key items, such as Spike NLOS and Patriot PAC-3 missiles. The US alliance remains a key element of defence strategy, and the transfer of wartime operational control of forces to Seoul, planned for the end of 2015, has been delayed again, and will now be ‘conditions based’ with no firm date set.

In April 2016, *Jane’s Sentinel Security Assessment* highlighted the following ROK recent modernization efforts:¹⁰⁴⁹

In parallel developments with long-term implications, the RoKA is finally obtaining unqualified advantage over the North Korean People’s Army (NKPA) in terms of modern weapons, widespread mechanization, and net-centric command, control, communications, and information (C3I), thereby permitting non-linear maneuver warfare as an alternative to the historical, bloody war of attrition in the mountains along the demilitarized zone (DMZ). However, modern maneuver and net-centric warfare require highly trained, capable, and motivated soldiers, which the RoKA is unlikely to adequately achieve with traditional conscription. The alternative - drastically reducing numbers of conscripts and building a leaner, more professional, and more lethal RoKA would be culturally painful for the army and society at large and no decision to take that route is likely, anytime soon. Meanwhile, two paramount issues loom over the immediate future of the country and the armed forces that require greater clarity - the state of the economy and the course of unfolding events in the DPRK.

Improvements in the national economy since 2013-14 have permitted a renewal of robust spending increases that had declined since 2009 in response to the global recession. Spending increases and major procurement programs across the armed forces are driven by rising concerns over North Korea's unstable, nuclear-armed regime. Alert levels are now at their highest levels since the security crisis of the 1990s. Given multiple North Korean military provocations since 2010 and growing uncertainty over what the Pyongyang regime is capable of, the RoKA leadership is determined to maintain the trend towards building and maintaining an overwhelming qualitative edge over the NKPA that essentially blunts a land campaign southward across the DMZ towards Seoul. At the same time, the army has to be prepared to move north and secure North Korea either as a counter-offensive or in case the regime collapses.

A Series of Defense Reform Plans and Modernization Efforts: 2005 Onwards

The ROK's modernization efforts have been shaped by a series of defense reform plans that have generally been driven by the DPRK's actions. In 2005 the ROK MND released "The Defense Reform 2020 Initiative." This plan was conceived during the Sunshine Policy era, and a key premise was that a decline in the threat of war from the DPRK military war threat meant that the number of ROK forces needed to balance this threat could be limited.

As a result, it outlined an ROK strategy to create a slimmer and more "self-reliant" military forces and that focused on technological improvements.¹⁰⁵⁰ The National Defense Reform Plan 2020 also focused on modernizing the military structure and force size and expanding the civilian base for national defense..

An estimate of the ROK's modernization plans, made by Bruce Bennett of the RAND Corporation in 2006, is shown in detail in **Figure VI.5**. Some key goals that were first set forth in the "The Defense Reform 2020 Initiative" included procuring advanced aircraft and transforming a largely coastal patrol force into a blue-water navy.¹⁰⁵¹ The ROK has focused on modernizing the Navy and Air Force to establish an omnidirectional military posture able to deal with all types of threats.

The Navy was to introduce domestically built destroyers, large transport ships, and submarines. The first mobile corps, with one Aegis-equipped vessel and six destroyers with plans for future expansion, was introduced in February 2010. The primary missions of these modernization efforts were to protect sea lanes, deter North Korea, and support the ROK's external policies. The ROK Air Force is also likely to seek domestic missile production.¹⁰⁵²

The ROK Air Force examined fielding F-15K fighters and developing a next-generation fighter program that included stealth capabilities, such as the KF-X fighter, a medium-sized two-engine aircraft similar to the Eurofighter Typhoon.¹⁰⁵³ As is noted later, progress was slow.

Figure VI.5. Defense Reform 2020 (2005) Plans for ROK Modernization – Part One

Comparison of the ROK Army, 2004 versus 2020

		2020 Force; Equipment	
Force Type	2004	Reduced	Sustained
Army active-duty personnel	560,000	370,000	390,000-400,000
Forward ground forces			
Top echelons	2 armies, 8 corps	1 command, 6 corps	
Active divisions	5 mechanized, 17 infantry	3 mechanized, 10 motorized	5 mechanized, 8 motorized
Reserve divisions	6 HRDs, 9 MRDs	5 HRDs [+4 MRDs]	
Heavy brigades	4 armor	3 armor, 1 mechanized	
Light brigades	3 infantry	4 security	
Rear ground forces			
Divisions	7 HRDs, 3 MRDs	6 HRDs	
Brigades	3 commandos	1 commando	
Reserve personnel	3,000,000	1,500,000	
Tanks	2,300	1,700	2,300
Armor vehicles	2,400	1,900	2,400
Artillery/multiple rocket launchers	5,300	3,700	5,300
Missiles	30	~50?	
Helicopters	600	400?	600?

Note: HRD = Homeland Reserve Division; 2020 forces estimated where possible; based on ROK National assembly data, 2004 *Defense White Paper*, IISS *Military Balance 2005*, *Jane's World Armies 2005*.

Source: Bruce Bennett, "A Brief Analysis of the Republic of Korea's Defense Reform Plan" (Washington, D.C.: RAND, 2006). http://www.rand.org/pubs/occasional_papers/2006/RAND_OP165.pdf.

Figure VI.5. Defense Reform 2020 (2005) Plans for ROK Modernization – Part Two

Comparison of the ROK Navy and Marine Corps, 2004 versus 2020

Force Type	2004	2020
Navy/Marine Corps personnel	67,000	64,000
Surface Combatants		
Destroyers	3 KDX I, 2 KDX II	3 KDX I, 6 KDX II, 6 KDX III
Frigates	9 Ulsan	17 FFX
Corvettes	28	0
Patrol	82	40 PKM-X
Submarines		
KSS-3	0	9?
KSS-2 (Type 214)	0	6
Type 209	9	3
Mini-sub (KSS-1)	11	0
Mine warfare	17	10?
Amphibious ships	4 LSTH, 4 LST	5 LPD, 7? LSTH
Major support ships	6	8?
Aircraft	8 P-3C, 8 S-2A, 5 Caravan	16 P-3C, 5 Caravan
Navy helicopters	30 Lynx	30 Lynx, 8 Mine Hunter, 60 KHP?
Marine divisions	2	2
Marine brigades/regiments	2	0
Tanks	60 K-1	60 K-1A1
Other armor	100	100
Artillery	150	150
Helicopters	6 SA-316	60 KHP?

Note: Based on ROK National assembly data, 2004 *Defense White Paper*, IISS *Military Balance 2005*, *Jane's Fighting Ships 2005*.

Source: Bruce Bennett, "A Brief Analysis of the Republic of Korea's Defense Reform Plan" (Washington, D.C.: RAND, 2006). http://www.rand.org/pubs/occasional_papers/2006/RAND_OP165.pdf.

Figure VI.5. Defense Reform 2020 (2005) Plans for ROK Modernization – Part Three

Comparison of the ROK Air Force, 2004 versus 2020

Force Type	2004	2020
Air Force personnel	64,000	65,000
Fighter aircraft	0 high end 150 F-16 380 F-4, F-5, A-37	60 KF-15, 60 KF-X 170 KF-16 130 A-50?
Forward air control	30 O-1, O-2	20 KO-1
Reconnaissance	27 RF-4C, RF-5, Hawker	24 RKF-16, Hawker
Search and rescue	6 CH-47, 3 AS-232	7 Ka-32
Airborne early warning and control (AWACS)	0	4
Tankers	0	4
Training aircraft	18 Hawk, 30 T-38, 15 T-41, 54 F-5, 25 T-33, 55 KT-1	90 KT-50, 80 KT-1
Transport helicopters	3 UH-60	?
UAVs	3 Searcher, 100 Harpy	More numerous, diverse
Air defenses	200 Nike, 110 I-Hawk	SAM-X, M-SAM

Note: Based on ROK National assembly data, 2004 *Defense White Paper*, IISS *Military Balance 2005*, *Jane's Sentinel Security Assessments 2005*.

Source: Bruce Bennett, "A Brief Analysis of the Republic of Korea's Defense Reform Plan" (Washington, D.C.: RAND, 2006). http://www.rand.org/pubs/occasional_papers/2006/RAND_OP165.pdf.

These plans were amended in June 2009 with the "Defense Reform Basic Plan (2009-2020)," further refining the modernization and civilian base expansion goals while reducing the previously planned force strength reduction (from a projected 500,000 to 517,000) and introducing the possibility of preemptive strikes against DPRK missile and nuclear facilities.

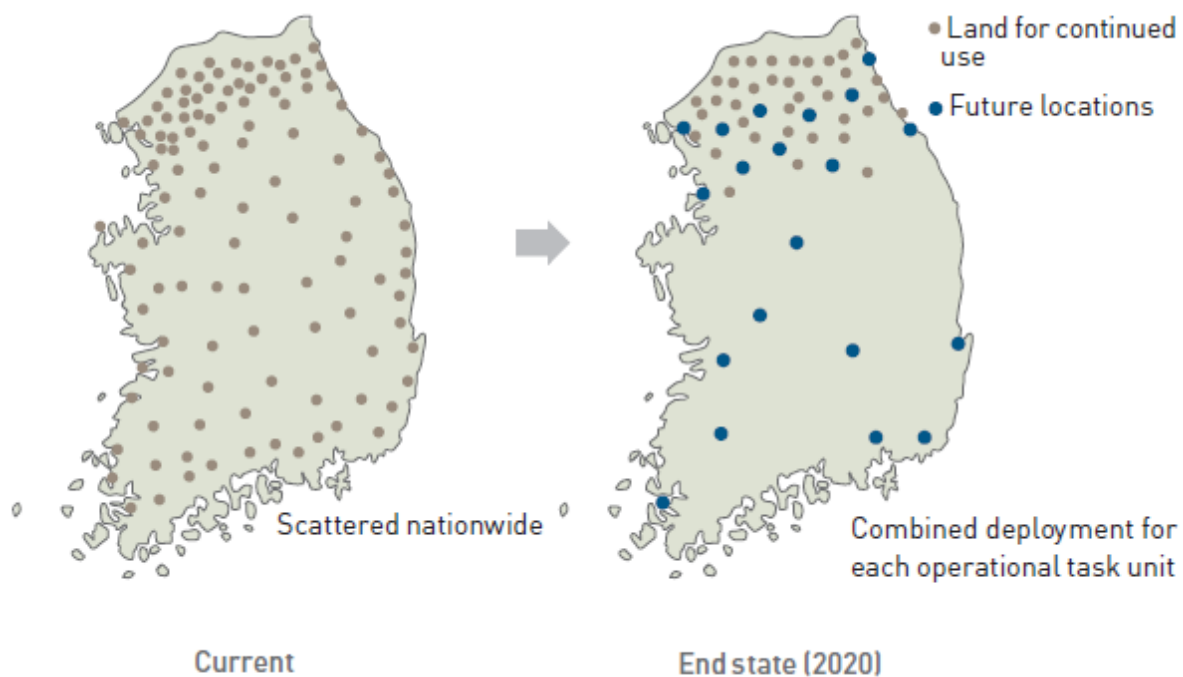
USFK described this evolution as follows in 2010:¹⁰⁵⁴

Three phases have been established that will allow for a quicker force that can operate more precisely in an ever-changing global environment. This includes a force that relies less on manpower and more on technology. This change in focus results in a shift from the fixed and slow moving force focused on threat-based situations to a rapidly deployable, capability-based force.

The current Defense Reform Plan 2020 includes downsizing of the military force, reducing the active components to 500,000 personnel and the reserve components to 1.5 million. These represent reductions in forces by 27 percent and 52 percent respectively. The expenses saved in personnel will be dedicated to develop a more technologically sophisticated force. By having already enhanced its ability to manufacture and produce weapons and equipment resulting from fulfilling the 1974 through 1981 Force Improvement Plan, the Korean government is able to use much of its military investments to enhance its industrial base and further establish a more self-reliant defense system.

At the end of 2009, South Korea began its plan to decrease the number of military installations. The plan entails a reduction from the current 1,900 to 700 by the year 2020 when the restructuring of the military was to be completed in accordance with the defense reform. The projected relocation plan is shown in **Figure VI.6**

Figure VI.6: Relocation of ROK Forces



Source: Republic of Korea, Ministry of National Defense, *2010 Defense White Paper*, 281.

Revised Plans, More Modernization and Key Force Upgrades: 2010-2014

Tensions with the DPRK did not ease as expected, and ROK faced many other challenges during years that followed, including reductions in manned US units on its territory, and a greater desire for autonomy within the US-ROK alliance. Combined with its assumption that it would face a continued hostile threat environment, these trends pushed the ROK to increase its capabilities in areas previously overseen by US forces, notably in surveillance, reconnaissance, and early warning. This led to substantial changes in the previous plans.

The following measures were given priority to deal with the increasing DPRK threat:¹⁰⁵⁵

- Organize frontline troops in a manner that allows them to exercise their combat strength immediately after the outbreak of war to secure the security of the metropolitan region;
- Boost surveillance/reconnaissance, precision strike, and interception capabilities in order to block and eliminate North Korea's asymmetric threats in enemy areas to the utmost extent;
- Secure strong reserve mobile power for each unit in order to counter enemies with a numerical advantage; and
- Secure combat sustainability by stabilizing noncombat zones and nurturing elite reserve forces.

In late 2009, President Lee commissioned 15 experts to reexamine and redesign the ROK Defense Reform Plan due to a perception that the DPRK threat had not eased as previously expected and the changing geostrategic environment. One year later, the Presidential Committee for Defense Reform submitted proposals for modifying 71 of the Defense Reform Plan projects.

Based on these proposals, the Ministry of National Defense (MND) released an updated version, focusing on military structure and the defense management system, to be implemented in short-, mid-, and long-term projects. This plan was entitled Defense Reform Plan 307, and took into account the ROK's experience with more recent provocation by the recent DPRK like *Cheonan* and Yeonpyeong. President Lee approved it in March 2011, and the proposal became the Defense Reform Basic Plan (2012-2030) after going through the legislative process.¹⁰⁵⁶

In a report describing the changes envisioned by the plan, the MND called for both reinforcement of its troops and reforms in its chain-of-command. Three priority areas were identified: increasing the integrity of the ROK armed forces through military restructuring, ensuring active deterrence capabilities, and maximizing the efficiency of the national defense administration and force structure. Early warning and surveillance capabilities, including increasing the number of UAVs, were also emphasized. In addition, eight priority issues were identified:¹⁰⁵⁷

- (1) Reorganization of the armed forces' chain-of-command
- (2) Establishment of an island defense command for the northwest (Yellow Sea)
- (3) Improvement of the national defense training structure
- (4) Organization of a priority order for strengthening military power
- (5) Response to North Korea's special forces and cyber threats
- (6) Enhancement of mental strength and assistance for educating national citizens about security
- (7) Improvement of the national defense personnel management system
- (8) Bettering the efficiency of the national budget

ROK military strategy had previously "placed greater emphasis on deterring North Korea's intention to provoke by mainly acquiring defensive capabilities." This was also termed "defense by denial" – whenever the DPRK made a provocation, the ROK would try to contain the action and prevent further escalation, maintaining peace on the Korean Peninsula.¹⁰⁵⁸

The updated 2012-2030 Plan, issued in 2012, focused on enabling the South Korean military to retaliate immediately, proportionally, and in a focused way against the DPRK that would take account of enhanced ROK offensive capabilities – and make the DPRK cease its provocations. The ROK Minister of National Defense at the time stated, "[i]f the enemy attacks our people and territory, I will use force to punish the enemy to make sure it doesn't even dare to think about it again. The enemy should be punished thoroughly until the source of hostility is eliminated."¹⁰⁵⁹

According to the ROK Deputy Minister for Defense Reform at the MND, the updated Plan "clearly reflects the guideline that a *proactive deterrence*, rather than a simple deterrence, is needed even during times of relative peace in order to deter North Korean provocations." The ROK's goal was to create deterrence based credible intimidation to dissuade the adversary from even planning provocations. In particular, special combat units in the Army, Navy, and Air Force would be newly activated or reorganized in response to the asymmetric threats.

The ROK had also relied on three mutually reinforcing strategic pillars: forward active defense, defensive deterrence, and alliance with the US. Now, it would reorganize its forces to provide a capability to increase proactive deterrence.¹⁰⁶⁰

In the case of the Army, the mountain brigade will be set up in response to the potential infiltration of the North Korean Special Operational Forces (SOF), which are currently estimated to number around 200,000 men. The Mountain brigade will be supplied with lightweight equipment and will operate in the mountainous region of the eastern front.

As for the Navy, the Submarine Command will be established as a part of the submarine modernization plan, by expanding the existing submarine group. Moreover, a next generation Korean destroyer, KDDX will be constructed and deployed after 2020. The size of this new destroyer will be between that of the currently operating 4,200-ton KDX-II and the Aegis Destroyer KDX-III, and will be assigned to a naval task force.

The Marine Corps will activate the Jeju Unit and become responsible for the integrated civil-governmental-military defense operations in the vicinity of Jeju Island in lieu of the Jeju Defense Command currently under the command of the Navy. Moreover, in order to reinforce the defense of the northwestern frontline Islands and to strengthen the Marines' amphibious capabilities, the Marine Aviation Group equipped with amphibious maneuverability and attack helicopters will also be activated.

The priority of the Air Force is to first establish the Air Intelligence Group by the year 2017, which will be responsible for aerial reconnaissance and intelligence support. The Air Intelligence Group will operate reconnaissance aircraft, mid- to high-altitude unmanned aerial vehicles (UAVs), as well as intelligence acquisition equipment for imagery intelligence (IMINT) and electronic signals intelligence (ELINT). Furthermore, the Satellite Surveillance Control Squadron responsible for the surveillance of military and civilian satellites passing over the Korean peninsula is also planned to be established by the year 2019. The satellite reconnaissance and surveillance capabilities will not only provide greater air and space operations capabilities but will also help the ROK military to detect any potential threats against the ROK in advance, to prevent any contingencies and to increase the effect of their response.

Finally, the ROK military is reorganizing its force structure in preparation against North Korea's SOF and cyberspace threats. The Ministry plans to reinforce rear area operation units and strengthen our homeland defense divisions. In order to improve their execution capabilities, the ROK military decides to upgrade rear area C2 & strike system. Furthermore, the ROK military is increasing the number of personnel allocated to the Cyber Command in response to asymmetric threats.

Cyber-warfare staffing was planned to increase by 1,000 in order to better prepare for the rising cyber-security threat.¹⁰⁶¹ The ROK also planned to improving the capabilities of its force structure capabilities to better respond to the DPRK's missile threats, while reorganizing its command and personnel structures.¹⁰⁶²

In addition to the reorganization plan for field units, plans for the development and allocation of weapons systems have been developed in order to effectively respond to enemy attacks. The plans include development of ballistic missile capabilities, procurement of ballistic missile detection radars in response to North Korea's ballistic missile threats, and development and deployment of mid-range surface-to-air missiles (M-SAMs) and long-range surface-to-air missiles (L-SAMs). Hereby, the capacity and competencies of the Missile Command will be significantly improved.

North Korea holds a higher strategic ground against South Korea in terms of missile and long-range artillery capabilities since it is currently assessed to be in possession of, and to have fielded mid-range Nodong (range: 1,300 km) and Musudan (range: 2,500 to 4,000 km) missiles, and to be developing a long-range missile, the Taepodong 2 (range: 6,000 km). Moreover, while there are some practical constraints on South Korea's ability to exercise its proactive deterrence strategy in reality, North Korea can strike any place, anywhere in South Korea as it targets. Hence, the extension of South Korea's missile range is imperative. Furthermore, acquiring deterrent capabilities to directly strike North Korean core facilities such as nuclear facilities and missile operating bases even during the armistice is of vital importance.

The ROK military intends to restructure its operational command structure. Under a new streamlined structure, the ROK military will unify its operational command and support by allowing the three Service Headquarters to directly participate in the operational chain of the ROK Chairman of the JCS. The purpose of restructuring operational command system lies in reducing inefficiency and ensuring more effective operational execution in any given theater. The Armed Forces Organization bill to realize such an idea was introduced to the National Assembly on September 24, 2012.

Under the proposed bill, the currently top-heavy command structure will be streamlined by integrating the Headquarters and Operations Command of individual Services. And, in turn, more personnel will be able to be assigned to the tactical units where they are most needed so that the ROK military can be transformed into a stronger warfighting force. A reduction in the overall number of flag officers is also planned. Such a reduction, however, is not intended to be a unilateral reduction. Rather, those areas more pertinent to actual combat operations will see an increase in the number of flag officers.

In anticipation of the effects of the low birth rate on the nation's population growth as well as reduced budget and the changing battlefield environment, the personnel structure reform characterized by downsized troops and increased number of non-commissioned officers (NCOs) will be implemented.

The overall manpower will be reduced from the current level of 636,000 to 522,000 service members by the year 2022. While the number of seamen, airmen, and marines will be maintained at the current level of 41,000, 65,000 and 28,000 respectively, that of the soldiers of the Army will be reduced in numbers from approximately 500,000 to 387,000. Moreover, the number of corps and divisions will also be reduced from eight to six and 42 to 28, respectively.

In order to guarantee that the reduction in the number of service members does not lead to any reduction of actual strength of the forces, the MND will acquire high-tech weaponry and equipment and progressively promote the officers and NCOs, mainly through expansion of the NCO's recruitment volume. Accordingly, the average proportion of officers and NCOs in individual Services is expected to be increased from the current level of 29.4 percent to 42.5 percent by the year 2025. In addition, the completion of the increase in the number of female service members, which was previously planned for the year 2020, will be completed by the year 2017. Consequently, the average percentage of female officers and NCOs will increase up to 7 percent and 5 percent, respectively. Also, additional Military Occupational Specialties (MOS) such as artillery, armor and air defense will be opened to female service members.

Meanwhile, in light of the changes in the military structure followed by the deactivation of the First and Third ROK Armies scheduled in 2015, a new operations execution system focusing on corps level units will be established. As for the battalion level, a special emphasis will be placed on strengthening the combat execution capabilities of infantry battalions responsible for frontline operations. Mid-range anti-tank guided weapons, dual-caliber air-burst assault rifles, and small UAVs will be provided to battalion level units. The number of officers and NCOs at the battalion level will also be increased from the current level of 90 to 152.

In order to carry out these reforms, the Deputy Minister estimated that the 2012-2016 defense budget would require 187.9 trillion won along with a continuing annual budget increase of 6-8%. The total cost would be 59.3 trillion won for force improvement programs with an annual estimated increase rate of 8.8%, and 128.6 trillion won for operations and maintenance. The ROK also released a Mid-Term Defense Plan for 2013-17, that focused on measures designed to counter the DPRK's growing nuclear, ballistic missile, cyber, and long-range artillery capabilities.¹⁰⁶³

The top priority lies in deploying the Hyunmu 2A SSM and the Hyunmu-3C cruise missiles after configuration tests are completed between 2012 and 2014. The ministry also stressed the need to deploy mid- and long-range surface-to-air missiles against North Korea's growing ballistic-missile inventory; the so-called L-SAM program (a Korean Patriot variant) is due to begin development in 2013, with an initial cost of some US\$87m. In total, the ministry plans to spend some US\$5.3bn up to 2016 in meeting current military threats from the North. Critics have said, however, that by focusing on countering near-term North Korean threats, South Korea has under-emphasized some emerging risks.

The mid-term defence plan also called for the general-purpose forces to be reduced from 636,000 to 520,000 by 2022, leaving 387,000 in the ground forces; 65,000 in the air force; 40,000 in the navy; and 28,000 Marines. By 2020, the army will reduce to eight corps and 37 divisions, and fall further to six corps and 28 divisions by 2030. Meanwhile, a Mountain Brigade will be created by 2020, together with extra ATGW units and short-range UAVs. The navy has announced a range of capability developments intended to better meet North Korean and regional contingencies and has said it will establish new marine, ground-defence and attack-helicopter units.

A South Korean analysis of these trends made by Paek Jaeok of the Korea Institute for Defense Analyses in 2012 noted that,¹⁰⁶⁴

In 2012, investment priorities [see **Figures VI.7 and VI.8**] associated with defense capability improvement expenditure are “securing core combat capability against the possibility of provocations from the North, the transfer of wartime operational control to the ROK in 2014, and bolstering defense R&D...” (**See Figure VI.9**)

In 2012, new procurement programs include Geomdoksuri-B (PKX-B) special warfare support ships/special infiltration boats; next-generation figure planes (F-X); large-sided attack helicopters (AH-X); production of Korean-type maneuver helicopters in large quantities; offshore operation helicopters; surveillance unmanned aerial vehicles (UAVs); Cheolmae-II (mid-range surface-to-air missiles); multi-purpose precision guided cluster bombs; and GPS-guided bomb-2. New R&D programs involve wheeled combat vehicles; ground tactical data link (KVMF); and 2.75-inch guided rockets. New performance improvement programs include K1A1 tank, KJCCS, and Cheolmae-II performance improvement. These new programs are targeted as investment priorities for defense capability improvement in 2012....

Securing core combat capability [see **Figure VI.10 against the possibility of provocation from the North and the transfer of wartime operational control to the ROK.**

“Core combat capability against the possibility of provocation from the North” refers to the early detection of enemy’s surprise attacks, advanced surveillance and reconnaissance capability, and precision strike capability against the origin of attack.

As to readiness against the North’s local provocations, the ROK puts priority on enhancement of combat capability (e.g. anti-artillery radars, sound-based target detection equipment, K-9 self-propelled guns, small-sized mid-range GPS-guided bombs, etc.) in the northwestern islands close to the North, and the overall reinforcement of tactical units.

The Army will bolster its infantry battalions by equipping troops with advanced equipment such as single-eye night vision goggles, individual firearms with sighting telescopes, K-11 rifles, etc.

The Navy will focus on expanding and improving its coastal operations through increased use of Geomdoksuri-A, special warfare support ships/special infiltration boats, offshore helicopters, detection radar placed on patrol boats/convoy ships.

The Air Force will prioritize enhancement of precision strike capability with the use of small-sized mid-range GPS-guided bombs, mid-range GPS-guided kits, JDAM, JASSM, etc. The military’s primary tactical response of coping with the threat of the North’s long-range artillery is by reinforcing its identification/detection capability (e.g. anti-artillery radar, sound-based detection equipment, division-level UAVs), command/control readiness, and counter-strike ability (K-9 self-propelled guns, multi rocket launchers, JDAM, etc.).

The transfer of wartime operational control to the ROK scheduled for 2015 necessitates the refinement of certain core command, tactical and logistic capabilities in order to adequately prepare for ROK-led all-theater-level operations, including the ability for surveillance, reconnaissance and early warning, operation of a command/control system for all theater operations, precision strike, and continued provision of support (particularly wartime ammunition). The C4I (Command Control, Communications, Computer and Intelligence) system currently stands in place for the operational linkage between the ROK military and the USFK.

Accordingly, the country will seek to reinforce surveillance, reconnaissance and early warning ability encompassing the entire Korean Peninsula with the expanded use of AWACs aircrafts, ballistic guided

missiles, early warning and long-range radar, the ability to collect image-based information from neighboring countries, including the North (through multi-purpose utility satellites, mid- and UAVs, corps-level UAVs), and the ability to collect three dimensional signal-based information.

For adequate provision of support, all-theater operational command/control requires a proper system allowing for timely command, control and decision which will be facilitated through performance improvement of the Allied Korea Joint Command and Control System (AKJCCS) and KJCCS, as well as a robust infrastructure communications system for real-time information dissemination [supported through the Military Satellite Communications System and the Joint Tactical Data Link System (JTDLs)].

The ability to strike core positions in the North with precision strike capability will be enhanced with the use of laser-guided bombs (GBU-24), GPS-guided bombs (JDAM), bombs for destroying underground facilities (GBU-28), long-range guided missiles (JASSM), and mid-range GPS-guided kits, along with the system for carrying such weapons (KDX-II/III, KSS-II, F-15K, F-X). Finally, the country aims to maintain at least 30 days worth of wartime ammunition, for continued provision of support.

In 2012, the defense R&D budget amounts at 2,321.0 billion won, up 12.8% over the preceding year.... [See **Figure VI.12**] Investment priorities in defense R&D systems development are aimed at the following six areas: surveillance/reconnaissance, command/control, information/electronic warfare, precision strike, new/special guided weapon capability, and infrastructure combat capability. Investment priorities in core technology development are placed on the following eight areas: sensors, information/communication, control/electronic, chemical-biological-radioactive warfare, and materials....

In reviewing the investment priorities for the 2012 defense budget, the factors shown to exert the most crucial impact on defense budget operation and allocation are: maintaining a proper ratio of officers and NCOs; the timely securing of combat capability against the possibility of provocation from the North and in preparation for the transfer of wartime operational control to the ROK in 2015; and the efficient promotion of defense R&D. These are also tasks to be carried out under the Basic Defense Reform Plan.

...[T]he mid-term (2012-2016) investment for improvement of defense capability is focused on how to cope with the North's local provocations and asymmetrical threats as well as the return of wartime operational control to the ROK in 2015. The South should first reinforce its command/control and precision strike systems to secure core military capability prior to the return of the wartime operational control by securing sufficient defensive capability improvement expenditure....

AN IISS discussion of the broad trends in ROK modernization spending in 2013 indicated that the ROK MND had judged that several areas of defense capability and policy needed special attention:¹⁰⁶⁵

- Improve C4ISR capabilities
- Enhance the 'jointness' of the armed forces
- Plan for the 2015 OPCON transfer (discussed in Chapter 6)
- Continue to follow the Basic Defense Reform Plan 2012-30 (discussed earlier in this chapter)
 - Upgrade military command-and-control structures
 - Increase R&D spending by 7%
 - Build up information-security and cyber-warfare capacity
- Streamline procurement and undertake other reforms to save \$400 million annually during the 2013-17 Mid-Term Defense Program
 - In addition, improved processes and standards, manpower and organization restructuring, outsourcing, and better financial efficiency should also help save money
- The 2012 military budget was split into 70% for force maintenance and 30% for force modernization; by 2017, modernization should increase to 33% of the budget

The ROK's short-term procurement goal was to increase deterrence against the DPRK's long-range artillery and ballistic missile capabilities. To do this, the ROK planned to develop medium- and longer-range SAMs, while also introducing a cruise missile (the Hyunmu-3C) and a surface-to-surface tactical ballistic missile (the Hyunmu-2A). The Navy worked to provide more integrated capabilities by 2020 – especially in the areas of surface, submarine, and naval-aviation capacities – and will develop six new destroyers (KDX-11A). The Navy also planned to create a Submarine Command by 2015 and increase procurement of Type-214 submarines.¹⁰⁶⁶

The ROK Air Force planned to increase surveillance systems significantly, especially after the OPCON transfer in 2015 (as discussed in Chapter II) – such as by developing electronic- and signals-intelligence systems, medium- and high-altitude UAVs, an airborne early warning unit in 2017 and a satellite surveillance control center in 2019. Air Force modernization became primarily oriented towards the FX-3 fighter replacement program – costing approximately \$7.6 billion; with 40 aircraft to be delivered starting in 2016. The announced candidates were the Eurofighter Typhoon, Lockheed Martin's F-35, and Boeing's F-15SE. The ROK also wants to replace its F-4s and F-16s.¹⁰⁶⁷

News reports indicated in early April 2013 that the US was selling 60 F-35s to the ROK for \$10.8 billion, and 60 F-15s for \$2.4 billion. Although actual delivery of the F-35s would not take place until many years in the future.¹⁰⁶⁸ Later reports in September 2014, indicated that the ROK would buy 40 F-35 fighters for 7.34 trillion won (\$7.06 billion) for delivery in 2018-2021.¹⁰⁶⁹

It was also reported on April 17, 2013 that the ROK Army, in order to modernize its aging helicopter fleet, had agreed to a \$1.6 billion contract with Boeing for 36 AH-64E Apache Guardian attack helicopters to be delivered by 2018, accompanied by related logistical support and training.¹⁰⁷⁰ In early May 2013 the US Congress agreed to sell four Global Hawk spy UAVs to the ROK – eight years after they were requested – though it is uncertain if the ROK still wants the equipment.¹⁰⁷¹

As for the FX-3 program, the IISS noted,¹⁰⁷²

However, air-force modernization is dominated by the FX-3 fighter replacement program. This is the armed forces' largest procurement program, with a budget of some US\$7.6bn for a total of 40 combat aircraft, to be introduced from 2016. Seoul is seeking to replace its ageing F-16s as well as its older F-4s. Reportedly, the latter are virtually inoperable. The three contenders for the FX-3 are Boeing's F-15SE, Lockheed Martin's F-35, and the Eurofighter Typhoon. The Defense Acquisition Program Administration (DAPA) has insisted that war-fighting capabilities, cost and maintenance efficiency, associated technology transfers, and interoperability will be the key criteria in the final decision. The original plan was for DAPA and the ministry to decide the winner by the end of October 2012 – a deadline that was not met.

In September 2014, there were media reports that the DAPA agreed to a deal for 40 F-35A fighters worth WON 7.3 trillion. This deal would include technology transfer in 17 sectors for use in KF-X. They included flight control and fire suppression technologies, which were an important aspect of the KF-X design.¹⁰⁷³

In March 2015, the Korean government chose Korean Aerospace Industries along with partner Lockheed Martin to develop 120 KF-Xs.¹⁰⁷⁴ The KF-X may be operational by the mid-2020s and is planned to initially deploy with, and then replace the KF-16. The goal is to promote domestic development and production by advancing the ROK defense industry as well as give the ROK better control over its configuration and systems.¹⁰⁷⁵

Some reports indicate the government estimated the project will cost approximately 6 trillion won (\$5.5 billion), though KIDA argues it would be at least 10 trillion won to develop. Constructing 120 units would cost 8 trillion won, and 30-year operation costs would be \$9 trillion. Experts for *Jane's* believe that 220-676 planes could be exported if priced at approximately \$70-90 million each, compared to Lockheed Martin's F-16 (\$70 million each) and the Boeng F/A-18E/F Super Hornet, the Eurofighter Typhoon, and the Dassault Rafale (\$83-132 million each). Countries in South East Asia, the Middle East, and Latin America have been proposed as potential customers. There remain significant hurdles to the actual development of the plane, especially technological readiness.¹⁰⁷⁶

Figure VI.7: Investment Priorities Related to Improvement of Defense Capabilities (KRW Billions or Percent)

	2006-2011			2012-2016 Mid-term Defense Plan		
	Amount (Won)	Share (%)	Increase/Decrease ¹⁰⁷⁷	Amount (won)	Share ¹⁰⁷⁸ (%)	Increase/Decrease
TOTAL	47,581	100	+ 10.9	60,752	100	+ 7.5
<i>Surveillance/ Reconnaissance</i>	2,044	4.3	- 57.7	2,094	3.4	+ 6.7
<i>Precision Strike and New/Special Guided Weapons</i>	6,063	12.7	-26.6	5,153	8.5	-8.2
<i>Firepower/Ammunition</i>	5,795	12.2	-20.1	8,486	14.0	+ 5.7
<i>Maneuverable Combat Capability</i>	4,788	10.1	-15.6	5,974	9.8	+2.0
<i>Defense R&D</i>	9,190	19.3	-13.8	13,737	22.6	-10.1
<i>Ships</i>	7,924	16.7	+ 9.8	9,251	15.2	+0.8
<i>Airplanes</i>	9,129	19.2	+ 0.8	13,789	22.7	-17.2
<i>Command/Control/ Communication</i>	1,742	3.7	+ 16.2	1,289	2.1	-62.4

Source: Paek Jaek, "The ROK's 2012 Defense Budget," *Korea Defense Issue & Analysis*, Korea Institute for Defense Analyses, May 11, 2012.

**Figure VI.8: 2012 Defense Capability Improvement Expenditure
(KRW Hundred Millions or Percent)**

Description	2011 Budget	2012 Government Proposal	2012 Budget	Increase/Decrease (amount)	Line item percentage of increased/decreased amount	Number of relevant programs
TOTAL	96,935	101,350	98,938	2,003	2.1	216
<i>Command, Control, and Communication</i>	625	384	369	-256	-41	5
<i>Maneuver Combat Capability</i>	9,719	10,990	10,772	+1,053	+10.8	21
<i>Ships</i>	17,336	17,941	16,665	-681	-3.9	17
<i>Airplanes</i>	14,749	15,951	15,951	+1,202	+8.2	13
<i>Firepower and Ammunition</i>	14,145	14,261	14,561	+416	+2.9	8
<i>Surveillance and Reconnaissance</i>	6,862	5,474	5,148	-1,714	-25.0	12
<i>Precision Strike/New Special Guided weapons</i>	8,872	7,453	7,031	-1,841	-20.7	23
<i>Defense R&D</i>	17,216	18,248	18,279	+1,063	+6.2	64
<i>Performance Improvement</i>	6,289	9,410	8,928	+2,639	+41.9	30
<i>Other</i>	1,122	1,238	1,244	+122	+10.8	23

Source: Paek Jaek, "The ROK's 2012 Defense Budget," *Korea Defense Issue & Analysis*, Korea Institute for Defense Analyses, May 11, 2012.

**Figure VI.9: Trends in Defense R&D Expenditures, 2004-2012
(Percent)**

	Share of Technological Development in R&D Expense	Share of Basic Research in Technological Development	Share of Core Technology in Technological Development	Share of Projects Led by Businesses-Universities-Research institutes in Core Technologies	Share of Projects Led by Private Businesses in Systems Development Expense
2004	22.0	0.9	28.1	--	28.8
2009	29.4	1.6	33.9	35.9	47.1
2012	27.9	1.9	39.0	40.5	56.9

Source: Paek Jaek, "The ROK's 2012 Defense Budget," *Korea Defense Issue & Analysis*, Korea Institute for Defense Analyses, May 11, 2012.

**Figure VI.10: 2012 Defense Budget and Combat Capability
Operation Expenditures (KRW hundred millions or Percent)**

Description	2011 budget	2012 Government Proposal	2012 Budget	Increase/Decrease (amount)	Percentage increase/decrease
Defense Budget	314,031	331,552	329,576	15,545	+ 5.0
* Combat Capability Operation	217,096	230,202	230,638	13,542	+ 6.2
-- Troop Operation	128,185	134,674	134,923	6,738	+ 5.3
- Personnel expense (including legal reserve)	111,725	117,579	117,579	5,854	+ 5.2
- Food	13,237	13,486	13,735	498	+ 3.8
- Clothing	3,223	3,609	3,609	386	+ 12.0
-- Maintaining Combat Capability	88,911	95,528	95,715	6,804	+ 7.7
- Defense-related Informatization	4,726	5,008	5,006	280	+ 5.9
- Enhancement of Servicemen's Health and Welfare	2,159	2,450	2,478	319	+ 14.8
- Logistics Support and Collaboration ¹⁰⁷⁹	37,329	38,704	38,752	1,423	+ 3.8
- Personnel Affairs, Education/Training	4,491	5,068	5,062	571	+ 12.7
- Facility Construction and Operation	23,547	25,626	25,646	2,099	+ 8.9
- Reserve Combat Capability Management	1,355	1,360	1,457	102	+ 7.5

- Operation of Military Institutions	779	845	869	90	+ 11.6
- Policy Planning and International Collaboration ¹⁰⁸⁰	8,088	8,186	8,186	98	+ 1.2
- Defense Administrative Support ¹⁰⁸¹	6,437	8,281	8,259	1,822	+ 28.3
*Defense Capability Improvement	96,935	101,350	98,938	2,003	+ 2.1

Source: Paek Jaek, "The ROK's 2012 Defense Budget," *Korea Defense Issue & Analysis*, Korea Institute for Defense Analyses, May 11, 2012.

Modernization and Key Force Upgrades: 2014-2015

The 2014 ROK Defense White Paper provided a new summary of the major achievements of the defense reform to date that is shown in **Figure VI.11**. It also described the progress of the various reforms as follows:¹⁰⁸²

In December 2005, the MND established the Defense Reform Basic Plan (2006-2020) to transform the "manpower-oriented quantitative military structure" into an "information- and knowledge-oriented qualitative military structure."

Since then, the MND has modified and amended the basic plan in two- to three-year cycles in accordance with the analysis and assessment results on the domestic and foreign security situations and the progress of defense reform based on the National Defense Reform Act.

In June 2009, the MND established the Defense Reform Basic Plan (2009-2020), which reflects the response system against military threats including North Korea's long-range missile launches and its second nuclear test, and other potential non-military threats.

In August 2012, the Defense Reform Basic Plan (2012-2030) was established to additionally reflect the changes in the domestic and foreign security environment and various military threats from North Korea such as the attack against the ROK Ship *Cheonan* and shelling of Yeonpyeong Island. In this plan, the target year for defense reform was modified from 2020 to 2030, considering the development of defense science technology and changes in the defense environment, such as existing and future threats.

After 2013, the necessity to prepare a deterrent force to respond against North Korea's provocation threats and asymmetric force buildup was raised. Also, the need to transform into a structure which not only allows a timely and proactive response under the changing warfighting paradigm but also reduces the response time in detecting, deciding, and striking through network development was brought up. Also, defense reform needed to be modified since a low birthrate and rapid aging of society limit the sustainment of the quantitative military structure, and the increase in public welfare requirements hinder the stable securing of the defense budget.

Against this backdrop, in March 2014, the Defense Reform Basic Plan (2014-2030) was established, reflecting the security situation changes while maintaining the basic principles of the Defense Reform Basic Plan (2012-2030) to secure the motivational drive for defense reform. The military structure will transform into an elite force structure which has the proper capability to simultaneously respond against North Korean asymmetric threats, local provocations and aggression threats, and with a larger number of officers and NCOs to prepare for the reduction of military resources. In the defense management area, an advanced defense management system with high efficiency will be established by improving combat power through realistic education and training and effective personnel management, and through innovative logistics management by improving the mobilization system, shaping elite reserve forces, and improving the logistics system.

Jane's Sentinel Security Assessment summarized the revised 2015 Mid-Term Defense Plan as follows in January 2016:¹⁰⁸³

In April 2015 The MND announced the new Mid-Term Defence Plan (MTDP) covering 2016-20 with defence spending projected to increase by an average of 7.2% a year with total funding of KRW232.5 trillion (USD200 billion) allocated for the period. While the parameters outlined in the plan certainly represent a positive outlook to defence the projected funding levels are unlikely to be achieved in practice with government officials suggesting only six months later that the defence budget would increase by just 4% in 2016. Upon approval in December the 2016 budget was increased by 3.6% to KRW38.8 trillion (USD33.5 billion) including a 5.7% increase for modernization activities.

Actual growth between 2016 and 2020 is therefore likely to be significantly lower than the rates outlined in the MTDP with *IHS Jane's Defence Budgets* projecting average annual growth of 4.9% over the five-year period. This rate of growth would see total spending over the period of KRW217.5 trillion with the annual defence budget increasing to around KRW44.2 trillion in real terms by 2020. Assuming expenditure on Force Improvement can be maintained at its current level of around 31% of the total defence budget, Korea could be expected to invest around 67.4 trillion on the modernization of its armed forces between 2016 and 2020.

Figure VI.11: ROK 2014 Force Improvement Plan – Part One

The MND will pursue a total of 290 force improvement projects from 2013 to 2017. It continues its 196 existing projects, including the K-21 IFV, and second batch of F-15Ks, and about 94 new projects, including the next generation destroyer and tanker aircraft programs.

Classification	Continuing Projects	New Projects
Surveillance, Reconnaissance, Command and Control Capabilities	<ul style="list-style-type: none"> Airborne Warning and Control System Ground Tactical C4I System 	<ul style="list-style-type: none"> Harbor Surveillance System Mobile Underwater Surveillance Sonar
Maneuver and Fire Capabilities	<ul style="list-style-type: none"> K21 Infantry Fighting Vehicles K-9 Self-propelled artillery 	<ul style="list-style-type: none"> Korean Utility Helicopter Improving the performance of K-55 Self-propelled artillery
Marine and Landing Capabilities	<ul style="list-style-type: none"> Kwanggaeto the Great III class destroyer [Aegis] Jangbogo II class submarine 	<ul style="list-style-type: none"> The 2nd Minesweeper Project Next-generation mine laying ship
Air Combat Capabilities	<ul style="list-style-type: none"> F-15K Fighter Advanced Trainer (T-50) 	<ul style="list-style-type: none"> Improving the performance of the C-130H
Research and Development	Intermediate-altitude unmanned UAVs, division-level UAVs	

Source: Republic of Korea, Ministry of National Defense, *2010 Defense White Paper*, 146–147.

Chart 4-8. Major Force Buildup Projects of 2013

Weapon Systems	Ongoing Projects	New Projects
Surveillance, Reconnaissance / Command and Control, Communications	<ul style="list-style-type: none"> High-altitude unmanned surveillance aerial vehicle (HUAU) Satellite all-military air defense warning system 	<ul style="list-style-type: none"> Performance upgrade of reconnaissance UAVs for corps Portable satellite / air-to-ground communication radio
Maneuver / Fire	<ul style="list-style-type: none"> K-2 tank K-10 ammunition supply vehicle 	<ul style="list-style-type: none"> Remote fire control system K-56 ammunition supply vehicle
Vessel	<ul style="list-style-type: none"> Next-generation amphibious ship Jangbogo II-class submarine 	<ul style="list-style-type: none"> Auxiliary training ship Amphibious helicopter
Aircraft	<ul style="list-style-type: none"> Intermediate-range GPS-guided bomb 	<ul style="list-style-type: none"> Tactical Air Control Wing Laser-guided bomb, 2nd

Chart 4-9. Major Force Buildup Projects of 2014

Weapon Systems	Ongoing Projects	New Projects
Surveillance, Reconnaissance / Command and Control, Communications	<ul style="list-style-type: none"> High-altitude unmanned surveillance aerial vehicle (HUAU) Next-generation thermal observation device (TOD-III) 	<ul style="list-style-type: none"> Mobile sea surveillance radar Air traffic control radar
Maneuver / Fire	<ul style="list-style-type: none"> K-2 tank Counter-fire radar 	<ul style="list-style-type: none"> Next-generation MLRS Remote controlled munitions
Vessel	<ul style="list-style-type: none"> PKX-B (batch-1) Jangbogo III-class submarine (batch-1) 	<ul style="list-style-type: none"> Amphibious ship transport helicopter Kwanggaeto the Great III, 2nd*
Aircraft	<ul style="list-style-type: none"> Next-generation fighter (F-X) FA-50 fighter 	<ul style="list-style-type: none"> Aerial refueling tanker* Patriot missile* Korea fighter (KF-X)

* Planned to be started in 2015 according to project conditions

Source: Republic of Korea, Ministry of National Defense, *2014 Defense White Paper*, p. 93.

Figure VI.11: ROK 2014 Force Improvement Plan – Part Two

Chart 4-1. Major Achievements of Defense Reform (2013-2014)

Areas	Major Achievements
Military Structure Reform	<ul style="list-style-type: none"> • Reform of the Joint Chiefs of Staff and the headquarters of the Army, Navy and Air Force, reinforcement of their functions and organizations, and consolidation of similar functions and organizations • Development of the military strategy basic concept (active deterrence → proactive deterrence) • Adjustment of force buildup priority (preparing against local provocation threats as a top priority → preparing against local provocation and aggression threats simultaneously) • Reinforcement of response forces against asymmetric threats and local provocations from North Korea • Standing troops reduced by 51,000, and the ratio of officers and NCOs increased by 5.1% (2006-2014)
Defense Management Reform	<ul style="list-style-type: none"> • Establishment of training sites for realistic training conditions, such as the 5th Corps regionalized training site and 2nd Fleet comprehensive maritime training site • Expansion of university-military agreements, including military science courses (six schools), NCO courses (four schools), and RNTC (Reserve NCO's Training Corps) (six schools) • Expansion of female personnel by increasing branches opened to female service members, and recruiting female cadets in the Korea Army Academy at Yeong-Cheon • Installation of mobilization support groups (3) in the Marine Corps and the 51st and 52nd Homeland Divisions and mobilization supplement battalions (32) • Pilot operation of enhanced military logistics system and establishment of defense logistics field automation system • Operating 18 organizations, such as the Joint Interoperability Technology Center, as military executive agencies • Replacement of military vehicles with commercial vehicles • Establishment of the Integrated Civilian-Government-Military Committee to improve the military medical system • Adjustment of functions and organizations between the Ministry of National Defense and Defense Acquisition Program Administration through the amendment of the Defense Acquisition Program Act • Establishment of a preventive system with a focus on respect for lives • Fostering disease prevention-oriented barracks environment, such as soldier health promotion projects

Source: Republic of Korea, Ministry of National Defense, *2014 Defense White Paper*, p. 83-84.

Modernization and Military Effectiveness in 2016

Figure VI.12 Summarizes the key developments these plans and efforts accomplished in terms of actual force modernization during 2000-2016.

The IISS analyzed the impact of modernization on the ROK's forces as follows in 2016:¹⁰⁸⁴

South Korea's army consists of 11 corps, with 52 divisions and 20 brigades. They can deploy some 2,300 main battle tanks, 2,500 armored personnel carriers and light tanks, 4,500 heavy-caliber artillery pieces, 6,000 mortars, an estimated 600 air defence guns, over 1,000 surface-to-air missiles, and about a dozen short-range surface-to-surface missiles. Usually, 12 army divisions are deployed along the DMZ in heavily fortified positions.

The South Korean air force has 538 combat aircraft and 117 attack helicopters. Meanwhile, the South Korean navy includes 39 principal surface combatants, 20 submarines, 84 patrol and coastal combatants, 15 mine warfare ships, 12 amphibious vessels, and 60 naval combat aircraft. South Korea's defence expenditure is several times more than that of North Korea. In 2002, as at average annual exchange rates, South Korea's defence budget amounted to \$13.2bn. However, this figure needs to be balanced as manpower costs in the South are greater.

... South Korea's ground combat weapon capabilities are rated higher than those of North Korea because of South Korea's qualitative edge. By the same measure, its air capabilities, when factoring in attack helicopters, are also superior – totaling about 2.5 F-16 wing equivalents. With the acquisition of the US Army Tactical Missile System (ATACMS) Block 1-A, due in service this year, South Korea's armed forces will increase their capabilities significantly. The missile system has a range of 300km and can target command and communications facilities, intelligence assets, and missile launching sites.

Although the ROK military is still less than half the size of the DPRK's in terms of force structure, personnel, and major equipment holdings; the ROK's equipment is significantly more technologically advanced. The two countries have quantitatively comparable naval and air forces, though the ROK's are much superior. The ROK's primary shortcomings are in precision munitions, biological and chemical defense, communications and control, and command. Due to a constrained budget, the ROK has also had to cut or delay several modernization programs.

Reporting by *Jane's in 2016* further highlighted the ROK's modernization efforts. The ROK Army planned the following procurement efforts:¹⁰⁸⁵

Main Battle Tanks (MBTs)

- **K2 (Black Panther MBT)-** In November 2013 Hyundai-Rotem noted that production was underway for delivery of K2s to South Korea. *IHS Jane's* reports that the initial delivery is expected to 100 units with potential to reach 600 going forward. The K2 is seen as a substantial improvement over South Korea's current MBT, K1A1.

Infantry Fighting Vehicles

- **K21 IFV-** The K21 is finishing production and set to enter service after solving problems in regards to buoyancy. K21s are the ROK's first IFV that has been indigenously produced.

Artillery

- **K9 Thunder-** After the Yeonpyeong Island attacks (see Chapter 4), the ROK MND was considering additional procurement – seeking an extra \$228 million (264 billion won) in the 2011 defence budget – of Samsung Techwin 155 mm/52 cal K9 Thunder self-propelled howitzers. The budget had already contained almost twice that amount (485 billion won) for K9 purchases.

The K9 is the primary ROK platform to offset the DPRK's numerical advantage in artillery. The ROK requires more than 500 systems and at least 300 had been purchased by 2010. The plan is to acquire a total of 1,000 K9 systems.

EVO-105 truck-mounted howitzer

- The ROKA plans to field **800 EVO-105 truck-mounted howitzers** by the year 2017. The EVO-105 offers an uptick in maximum rate of fire as compared to other towed versions of 105mm guns.

M270 Multiple Launch Rocket System (MLRS) [Artillery]

- Hanwha was granted a license in 2003 to domestically produce the Lockheed Martin 227 mm M270 MLRS rocket. Since 2005, approximately 4,000 missiles annually have been produced, worth around 600 billion won each year. The MLRS can also fire 300 km-range army tactical missile systems (ATACMS) that the ROK buys from the US. MLRS systems are assisting the ROK in OPCON transfer (discussed in Chapter 5), allowing the ROK to hit ground targets behind the DMZ.
- In April 2011, it was announced that a new multiple rocket launcher (MRL) was under development, with the initial prototype likely to be completed by 2013. It was projected to have an 80 km range and increase the ROK's artillery capability.

Long-range Multiple Rocket System

- Deployment of the Hanwha made Chun-Mu long-range multiple rocket system (LRMRS) was announced August 4, 2015 by the South Korean Defence Agency for Technology and Quality (DTAQ).

Air Defense

- Roughly 2,000 Chiron man-portable air defense systems have been deployed in the ROKA since 2005. They are planned to replace old MANPADs like Mistrals.

Anti-Tank [Infantry]

- The ROK's LIGNex1 Co Ltd was contracted to indigenously develop a Medium Range Infantry Missile (MRIM), as reported in May 2011. Development is projected to be finished by 2013, with production by 2014 and the first units in service in 2015.
- The MRIM will be deployed with a firing post and a vehicle-mounted launcher, though it is designed to be shoulder-fired. It is being developed to be comparable with Rafael's Spike and Raytheon's Javelin.

C4ISR

- South Korea appears to have acquired ground penetrating radar (GPR) system that they will attempt to attach on an unmanned mine detection vehicle.
- South Korea has previously bought four **Boeing 737 AEW&C** and there is plans to buy two more.

Korean Attack Helicopter [Army Aviation]

- "In June 2015, Korea Aerospace Industries (KAI) signed contracts to develop light helicopters for military and civilian applications, the company said in a statement. The deals feature the development of a Light Armed Helicopter (LAH) and a Light Civil Helicopter (LCH) and were signed with the Defense Acquisition Program Administration (DAPA) and Ministry of Trade, Industry and Energy (MOTIE) respectively.

KAI said the combined value of the two development programs is KRW1.6 trillion (USD1.4 billion) and that this figure consists of funding from the two government agencies as well as "the investment of the industrial participants". According to KAI, DAPA will invest KRW650 billion

and MOTIE KRW350 billion. KAI will invest KRW200 billion, with the remainder invested by KAI's program partner, Airbus Helicopters.”¹⁰⁸⁶

- In early 2015 Raytheon was awarded a contract for 35 million dollars to deliver air-to-air FIM 92 Stinger missiles for ROK AH-64E Apache helicopters. The Apache deal was concluded with Boeing in April 2013 and will lead to the delivery of 36 helicopters starting in 2016 and concluding in 2018.
- Following government certification in 2012, 16 **KAI Surion Korean Utility Helicopters (KUH-1 Surion)** were delivered to the army by 2014 testing. The number is expected to reach around 200 by 2020.

Unmanned Aerial Vehicles

- Heron I unmanned aircraft system (UAS) was selected by the Korean government to serve at the corps-level in December 2014. Produced by Israel Aerospace Industries' (IAI's) the Heron I will replace the Night Intruder 300 as the corps-level UAV system.
- In 2013 the South Korean government agreed to purchase 120 Foosung Group RemoEye 002B UAS vehicles. Deliveries were expected to start in the fall of 2015.
- IHS Jane's confirmed in January 2016 via company comment that Korean Air Aerospace Division (KAL-ASD), had gained a contract with the South Korean government to build a tactical UAV system. The system will fulfill an ISR role and it is expected to be operational starting in 2018.

Fighter Jets

- South Korea, in collaboration with Indonesia, has long in pursuit of a **KFX/IFX** program which they will eventually use to replace the F-16C/D. The production number is expected to be around 120 and will enter service in 2020. KAI and Lockheed Martin have partnered in a 8 billion dollar contract.
- **F-X fighter:**

“**Phase I:** In 2002 Boeing's F-15K Slam Eagle strike fighter was selected for the first phase of the F-X program, which aims to replace RoKAF's inventories of F-4 and F-5 fighters. A total of 40 aircraft were ordered in Phase I at a total cost of USD4.2 billion, all of which had been delivered by mid-2008.

Phase II: In 2008 South Korea signed a contract with Boeing for 21 additional F-15K Slam Eagles (20 plus an attrition replacement aircraft). The company was the sole bidder for the estimated USD2.4 billion contract for Phase II.

Phase III: On 24 September 2014 South Korea approved a deal to acquire 40 Lockheed Martin F-35A JSFs to satisfy the FX-III requirement for about KRW7.3 trillion. Deliveries to South Korea of the F-35A will start in 2018, according to USAF Lieutenant General Chris Bogdan, program executive officer for the F-35 Lightning II Joint Program Office. The RoKAF originally planned to buy 60 aircraft to replace the 1970s-era McDonnell Douglas F-4E Phantom IIs. However, the original cost estimate of USD10.8 billion prompted a reduction to just 40 aircraft.”¹⁰⁸⁷

Air Defense Radar

- South Korea announced in December 2013 that it is producing “low-altitude air-defense radar”. This has been named the LIG Nex1 FPS-303K.
- “**Patriot:** In November 2014 the United States approved the sale to South Korea of Patriot Advanced Capability (PAC-3) missiles, with associated equipment, parts, and logistical support for an estimated cost of USD1.405 billion. South Korea requested the sale of 136 PAC-3 missiles with containers and two flight test targets [Patriot-As-A-Target] modified short-range tactical ballistic missiles. Also included are two PAC-3 telemetry kits, 10 fire solution computers, 18 launcher stations modification kits, eight missile round trainers, eight PAC-3 Slings, 10 Patriot

automated logistics system kits, 13 installation kits for TPX-58 identification friend or foe (IFF) with KIV-77, PAC-3 ground support equipment (GSE), 10 shorting plugs, 77 Defence Advanced Global Positioning Receivers (DAGRs) and installation kits, Patriot fiber-optic modem, eight guided missile transporters, four AN/VRC-90E radios with installation kits, spare and repair parts, support equipment, communication equipment, publications and technical documentation, personnel training and training equipment, US government and contractor logistics and technical support services, quality assurance teams' support, and other related elements of logistics and program support.

The RoKAF-operated PAC-3 missiles will permit more effective BMD operations, while serving as a core component to RoK's future Korea Air Missile Defence (KAMD). The PAC-3s will supplement six batteries of PAC-2 Patriots obtained second-hand from Germany that are also scheduled for upgrade to PAC-3 standard.”¹⁰⁸⁸

Air-to-air weapons

- South Korea submitted a request to the US Defense Security Cooperation Agency to purchase Raytheon AIM-9X-2 Sidewinder Block II air-to-air missiles.

Air-to-surface weapons

- In 2013 South Korea completed a procurement of Taurus KEPD 350 air-to-ground standoff cruise missiles.

Submarines

- “The RoKN has embarked on an ambitious three-phase program to upgrade the submarine force:
 - Phase 1: Modernize nine older (Type 209/1200) KSS-I Chang Bogo submarines.
 - Phase 2: Build and commission nine advanced (Type 214) KSS-2 submarines by 2017, and at least nine larger, more capable KSS-3 boats beginning in 2020, thereafter retiring the Type 209s.
 - Phase 3: Replace the existing KSS-1 Dolgorae-class midget submarine force with Cosmos class midgets and a new KSS-500A class.”¹⁰⁸⁹

Frigates

- Incheon-class: In August and October 2014 South Korea's STX Offshore & Shipbuilding launched the RoKN's fourth and fifth Incheon-class guided-missile frigates at its facility in Changwon, Gyeongsangnamdo. Both will be commissioned in the second half of 2015 and should be fully operational by 2016. These are the first two Incheon-class frigates built by STX. The three previous ships in the class - *Incheon* (FFG-811), *Gyeonggi* (FFG-812), and *Jeonbuk* (FFG-813) - were built by HHI.

The Incheon-class was developed to replace Ulsan-class frigates and Dong Hae- and Po Hangclass corvettes, and are intended to deliver improved anti-air warfare (AAW) and ASW capabilities. Requirements call for at least 20 ships, with construction continuing into the 2020s.

Maritime helicopters

- In 2013 South Korea chose the Agusta Westland AW159 to be their naval ASW helicopter.

Figure VI.12: Key ROK Equipment Modernization, 2000-2016**Army**

Type	2000	2016	Remarks
Battle Tanks	800 Type-88 (K1)	Total: 2,418+ 1,484 K1/K1A1; 4+ K2; 253 M48; 597 M48A5; 80 T-80U; (400 M47 in store)	Armor holdings increased from about 2,130 to 2,410 by 2010 with an emphasis on shifting toward third-generation MBTs
APCs		Total: 2,790 APC (T) 2,560; 300 Bv 206; 1,700 KIFV; 420 M113; 140 M577 APC (W) 220; 20 BTR- 80; 200 KM-900/-901 (Fiat 6614)	
Artillery		300 K-9 <i>Thunder</i>	Introduced in 2005, the K-9 self-propelled howitzer was designed to replace the aging M109A2 and significantly increase the ROK's artillery capacity.
SAMs	110 MIM-23B <i>I-HAWK</i>	<i>Chung Ma Pegasus</i> (SP) 158 MIM-23B <i>I-HAWK</i> ; 48 Patriot PAC-2	

Navy

Type	2000	2016	Remarks
Submarines	3 KSS-1 <i>Dolgorae</i>	9 <i>Chang Bogo</i> 3 SSK <i>Son Won-ill</i> 2 KSS-1 <i>Dolgorae</i>	8 SSI <i>Dolphins</i> were phased out within this period
Destroyers	3 <i>King Kwanggaeto</i> 3 <i>Kwang-Ju</i>	6 <i>Chungmugong Yi Sun-Jhin</i> KDX-II	To reach their goal to become a blue-water navy by 2020, the decade saw major developments with new lines of indigenous destroyers being deployed. Older surface ships appear to have been retired.
Cruisers		3 <i>Sejong</i> KDX-III	
Frigates		3 <i>Gwanggaeto</i> <i>Daewang</i> KDX-I; 1 <i>Incheon</i> ; 9 <i>Ulsan</i>	
Corvettes		17 <i>Gumdoksuri</i> 19 <i>Po Hang</i>	
Naval Aviation	23 combat capable fixed-wing aircraft (15 S-2Es, 8 P-3C <i>Orion</i>) 12 <i>Lynx</i> (ASW)	16 combat capable fixed-wing aircraft (8 P-3C <i>Orion</i> , 8 P-3CK <i>Orion</i>) 24 <i>Lynx</i> MK99/MK99A (ASW)	Decrease in total naval aviation. Fixed-wing holdings fell from 23 to 16 and armed helicopters from 47 to 24. ASW capabilities were however doubled, with further increases anticipated.

Air Force

Type	2000	2016	Remarks
Combat Aircraft	88 KF-16C/D <i>Fighting Falcon</i> 130 F-4D/E <i>Phantom</i>	60 F-15K <i>Eagle</i> 118 KF-16C/D <i>Fighting Falcon</i>	Aircraft numbers remained stable but the F-4s were phased out in favor of fourth-generation fighters
REECE/ISR Aircraft		4 Hawker 800RA; 20 KO-1	
EW/ELINT/SIGINT		4 Hawker 800SIG	
UAVs (ISR)	3 <i>Searchers</i>	<i>Night Intruder</i> 3 <i>Searcher</i> 100 <i>Harpy</i>	

Source: All figures unless otherwise noted are based primarily on material in IISS, *The Military Balance 2016*.

Comparing the Military Resources Shaping the Korean Balance

It is not possible to make reliable comparisons of DPRK and ROK military expenditures using unclassified data. In the past, the US Department of State (DOS) issued comparable unclassified estimates of military efforts and arms transfers based on US intelligence models that estimated the size of each military effort based on comparable prices. These reports have long been discontinued, however, and no think tank or NGO has the resources or access to intelligence to make such estimates on its own.

Neither the DPRK nor the ROK provides unclassified official comparisons based on its own intelligence data and net assessments, and neither the International Institute for Strategic Studies (IISS) nor the Stockholm International Peace Research Institute (SIPRI) make estimates for the DPRK. Estimates of Chinese military expenditures are also controversial and raise major questions regarding the extent to which definitions of such estimates are comparable in terms of both what is included, the level of state control over the resource involved and market versus state “prices.” Moreover, there is no clear way to assess US military spending on the Korean balance and related power projection costs, although US military capabilities play a major role in that balance.

It is still possible, however, to make some broad comparisons of the economic bases and military expenditures of the primary countries that shape the Korean military balance, including the DPRK.

In spite of the uncertainties in the data, it is clear that the ROK has a far greater capacity to develop and support its forces than the DPRK. As **Figure VI.13** shows, the CIA estimated in June 2014 that the DPRK had an economy that was far less developed than that of the ROK.¹⁰⁹⁰ Over the past decade, the DPRK’s rankings in these key economic indicators have been decreasing, while those of the ROK have been steadily increasing.

Furthermore, the CIA estimated that the DPRK had a total population of 25.0 million in 2016, while the ROK’s population was 49.1 million, or nearly 2.1 times that of the DPRK. The ROK’s population was, however, aging more rapidly. The CIA estimated the median age of the DPRK’s population at 33.6 years, and that of the ROK at 40.8 years. Finally the CIA estimated in 2012 that the DPRK had 6.5 million males available for military service and 207,737 young men entering military age each year, while the ROK had 13.2 million available males and 365,760 males entering military age.¹⁰⁹¹ The length of military service for the ROK is approximately 2 years, while that of the DPRK is approximately 5-10.

As the earlier comparisons of CIA estimates of GDP and per capita income have shown, the ROK has far more resources to use in supporting its national security structure than the DPRK and that overall trends will remain significantly in the ROK’s favor. The World Bank and UN make somewhat different estimates of the size of the ROK and DPRK’s resources, but all agree that the ROK has a vastly larger economy, far better income distribution and personal wealth, and far more personnel that can be devoted to military service. The ROK’s disadvantages in this area are that its population has much higher expectations, it must pay far more for manpower, it must price military investment in market rather than command terms, and it is harder for the ROK to command popular sacrifices in the name of enhanced security.

Figure VI.13: Comparisons of Key Country-Level Indicators

Country	GDP (PPP)¹⁰⁹² (in \$US Trillion), (year)	GDP (PPP) per capita (\$US)	Total Population (millions), (year)	Median population age
China	19.39 (2015)	14,100	1367.4 (July 2015 est.)	36.8
Japan	4.83 (2015)	38,100	126.9 (July 2015 est.)	46.5
Russia	3.72 (2015)	25,400	142.4 (July 2015 est.)	39.1
US	16.72 (2013)	52.8	321.3 (July 2015 est.)	37.8
ROK	1.849 (2015)	36,500	49.1 (July 2015 est.)	40.8
DPRK	.04 (2014)	1,800	24.9 (July 2015 est.)	33.6

Source: CIA, *World Factbook*, 2016, accessed October 28, 2014, <https://www.cia.gov/library/publications/the-world-factbook/geos/>.

Korean and East Asian Military Spending – Less the DPRK

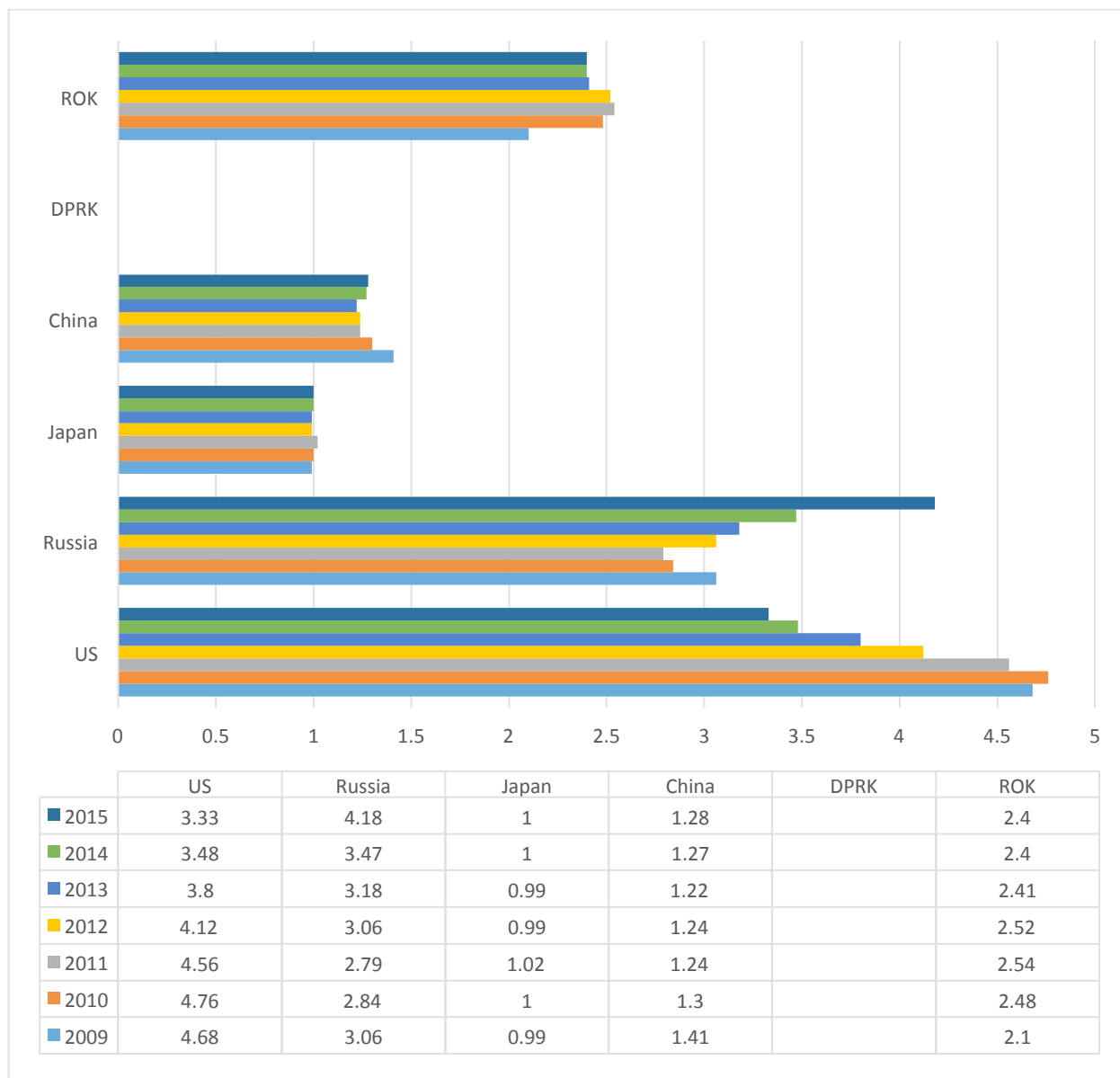
In spite of the problems in comparing military expenditures, it seems likely that the IISS is broadly correct in estimating that Asian nominal defense spending overtook NATO Europe's spending in 2012. The IISS estimates Asian spending rising from \$268.4 billion in 2011 to \$287.4 billion, while NATO spending fell from \$290.0 billion to \$262.7 billion over the same period.

Asian spending began to exceed official European defense spending in 2012, including non-NATO countries. Excluding Australia and New Zealand, nominal defense spending in Asia rose from \$261.7 billion in 2010 to \$321.8 billion in 2013, a 23% increase. Real defense spending in Asia rose “with real 2013 defense outlays 13.2% higher than in 2010.”¹⁰⁹³

The most the CIA provides in the military expenditures section of its World Factbooks has been an estimate that the ROK spent 2.8% of its GDP on defense, a statistic from 2012.¹⁰⁹⁴ The CIA presents no date or information for North Korea.¹⁰⁹⁵ Unfortunately, the numbers presented in other open sources are often questionable and/or lack comparability, and data are often missing for the DPRK. Figure VI.14 to Figure VI.18 do, however, provide data from leading sources that probably do provide a broadly accurate picture

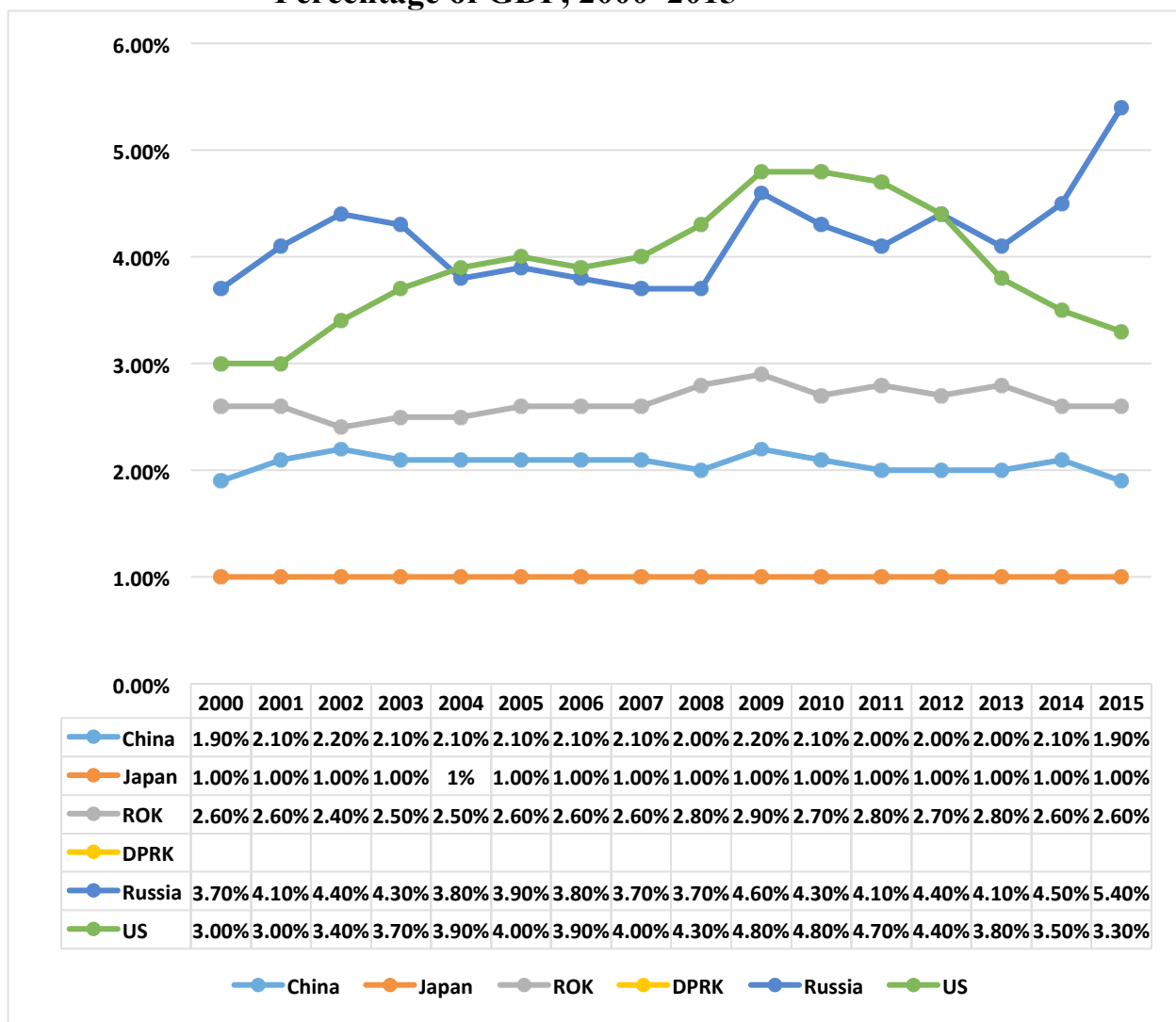
- **Figure VI.14** depicts the IISS's estimates of national defense spending as a percentage of GDP for 2009-2015.
- **Figure VI.15** shows SIPRI's estimates of the military expenditures of the countries involved on the Korean Peninsula as a percentage of GDP over 2000-2013.
- **Figure VI.16** gives the IISS's estimates of defense expenditures from 2009-2015.
- **Figure VI.17** assesses SIPRI's military expenditures data from 2000-2013.
- **Figure VI.18** shows the IISS's estimates of per-capita defense expenditures during 2009-2015.

Figure VI.14: IISS Estimate of National Defense Budgets as a Percentage of GDP, 2009–2015



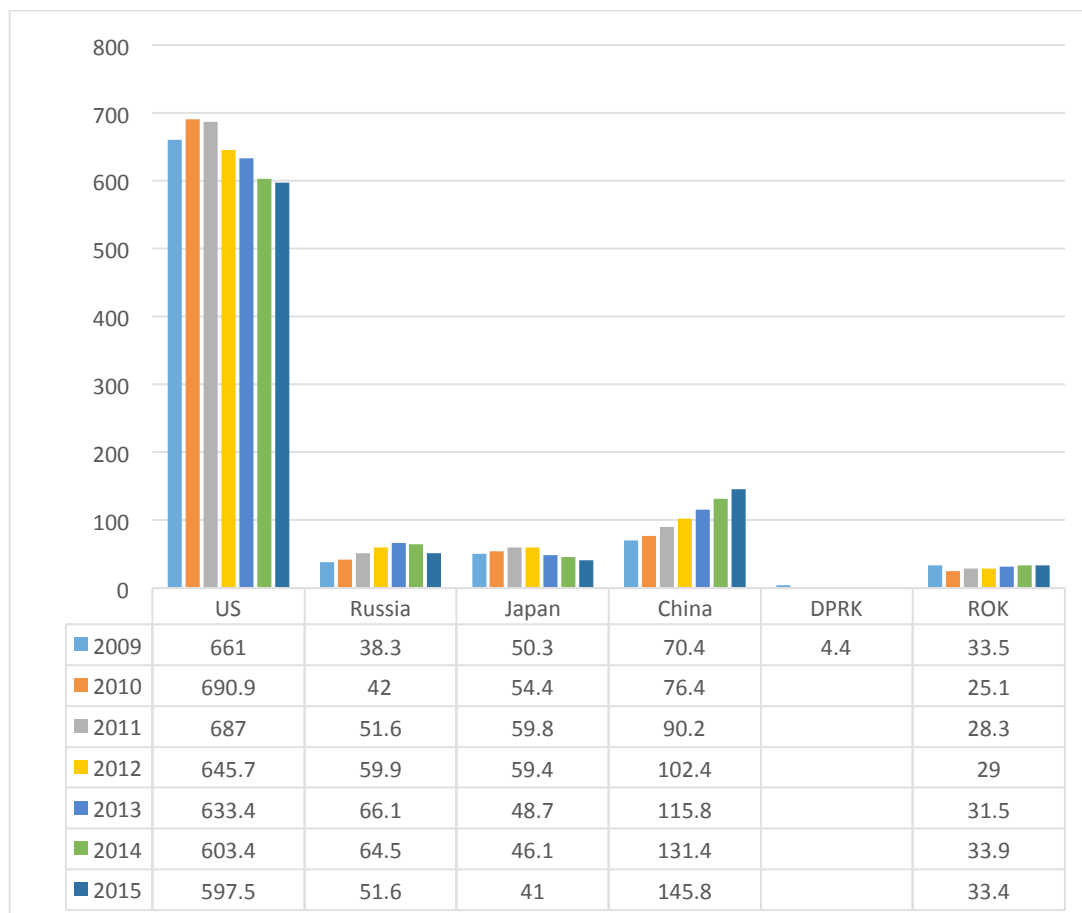
Source: IISS, *The Military Balance 2009, 2014, 2015, 2016*

Figure VI.15: SIPRI Estimate of Military Expenditures as a Percentage of GDP, 2000–2015



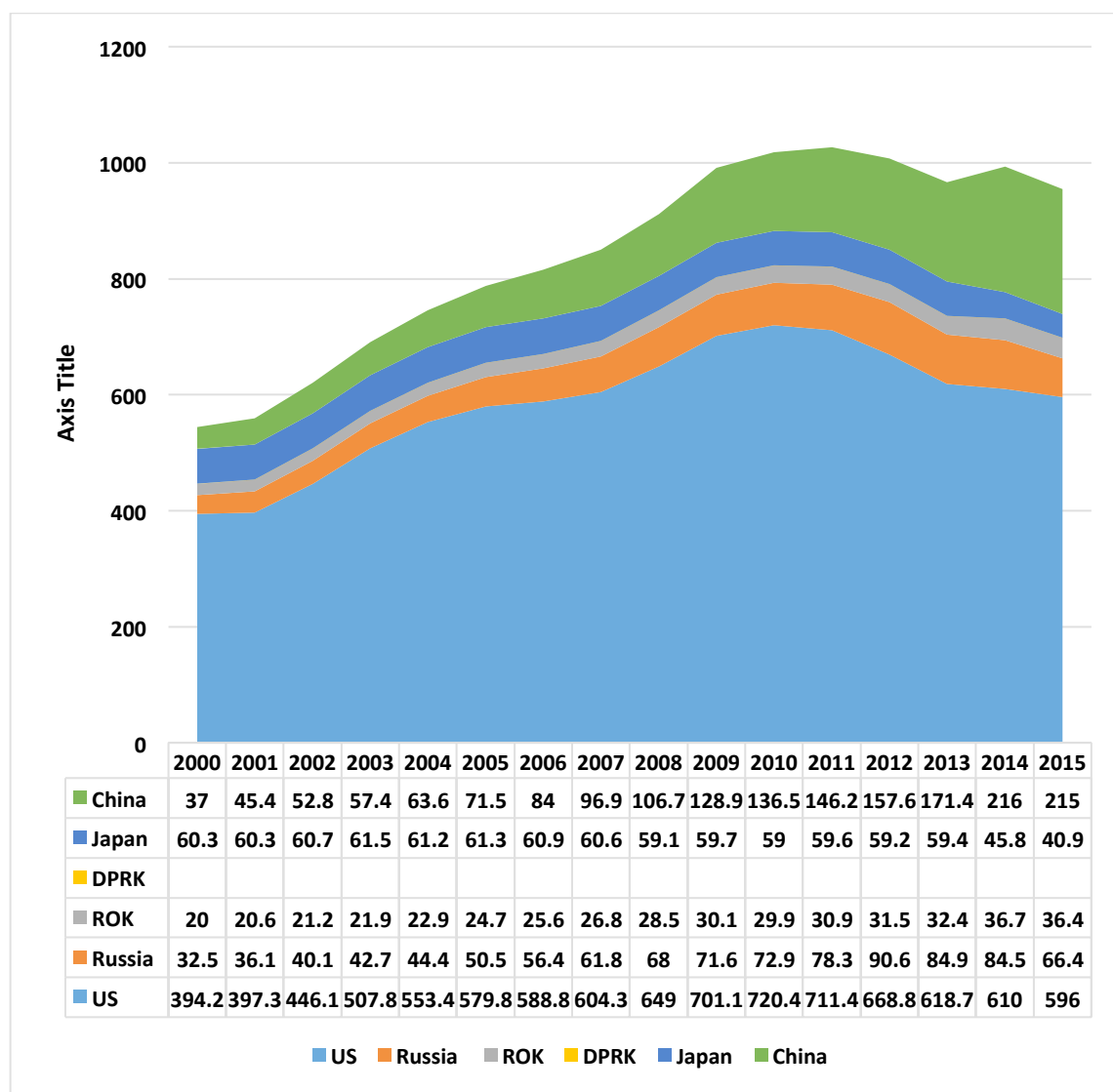
Based on data provided by 2015 SIPRI Military Expenditure Database, Stockholm International Peace Research Institute.
<http://www.sipri.org/databases/milex>. Data for North Korea is unavailable.

Figure VI.16: IISS Estimate of Northeast Asian Defense Expenditures, 2009–2015 (US\$ billions)



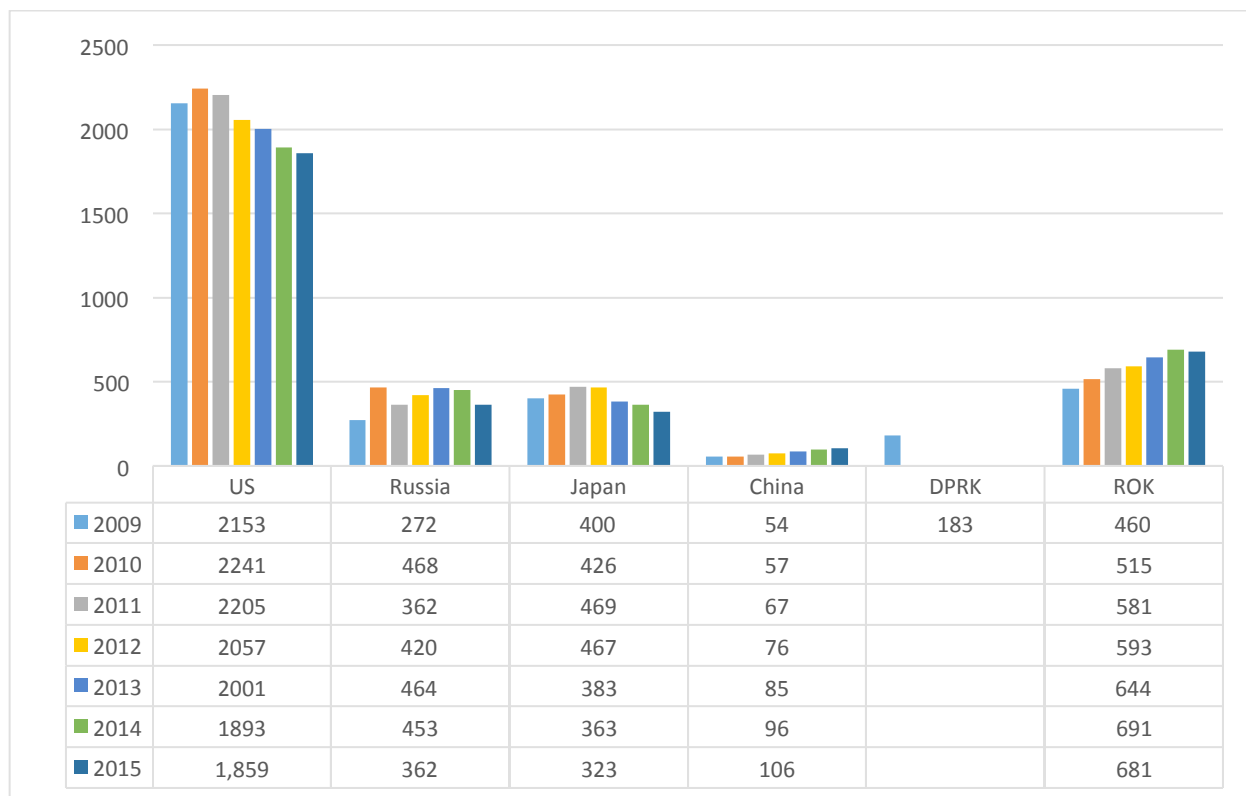
Source: Based primarily on material in IISS, *The Military Balance 2009, 2014, and 2016*. Only 2009 data were available for North Korea.

Figure VI.17: SIPRI Estimate of Northeast Asian Military Expenditures, 2000–2015(in constant 2011 US\$ billions)



Source: Based on data provided by 2013 SIPRI Military Expenditure Database, Stockholm International Peace Research Institute. <http://www.sipri.org/databases/milex>. Data for North Korea is unavailable.

Figure VI.18: IISS Estimate of Northeast Asian Per Capita Defense Expenditures, 2009–2015 (US\$)



Source: Based primarily on material in IISS, *The Military Balance 2009, 2014, and 2016*. Only 2009 data were available for North Korea.

DPRK

Even though the DPRK is one of the most militarized countries in the world, the previous Figures have already shown how difficult it is to provide any analysis of the scope of its spending. Some trends, however, are clear.

Militarizing a Crippled Economy

Regardless of the uncertainties in some of the data, it is clear that the DPRK's limited financial resources are a key factor in assessing what types of strategies it may employ in the case of any escalation on the Peninsula. The CIA draws a sharp contrast between the economies of the DPRK and the ROK in 2016. Its World Factbook estimated that the DPRK's GDP was \$40 billion in 2015 in purchasing power parity terms, and its per capita income was only \$1,800. In contrast, it estimated that the ROK's GDP was \$1.8 trillion in 2015 in purchasing power parity terms, and its per capita income was \$36,500.¹⁰⁹⁶

North Korea, one of the world's most centrally directed and least open economies, faces chronic economic problems. Industrial capital stock is nearly beyond repair as a result of years of underinvestment, shortages of spare parts, and poor maintenance. Large-scale military spending draws off resources needed for investment and civilian consumption. Industrial and power outputs have stagnated for years at a fraction of pre-1990 levels. Frequent weather-related crop failures aggravated chronic food shortages caused by on-going systemic problems, including a lack of arable land, collective farming practices, poor soil quality, insufficient fertilization, and persistent shortages of tractors and fuel.

The mid 1990s were marked by severe famine and widespread starvation. Significant food aid was provided by the international community through 2009. Since that time, food assistance has declined significantly. In the last few years, domestic corn and rice production has been somewhat better, although domestic production does not fully satisfy demand. A large portion of the population continues to suffer from prolonged malnutrition and poor living conditions. Since 2002, the government has allowed informal markets to begin selling a wider range of goods. It also implemented changes in the management process of communal farms in an effort to boost agricultural output.

In December 2009, North Korea carried out a redenomination of its currency, capping the amount of North Korean won that could be exchanged for the new notes, and limiting the exchange to a one-week window. A concurrent crackdown on markets and foreign currency use yielded severe shortages and inflation, forcing Pyongyang to ease the restrictions by February 2010. In response to the sinking of the South Korean warship Cheonan and the shelling of Yeonpyeong Island in 2010, South Korea's government cut off most aid, trade, and bilateral cooperation activities, with the exception of operations at the Kaesong Industrial Complex.

North Korea continued efforts to develop special economic zones and expressed willingness to permit construction of a trilateral gas pipeline that would carry Russian natural gas to South Korea. North Korea is also working with Russia to refurbish North Korea's dilapidated rail network and jointly rebuilt a link between a North Korean port in the Rason Special Economic Zone and the Russian rail network.

The North Korean government continues to stress its goal of improving the overall standard of living, but has taken few steps to make that goal a reality for its populace. In 2013-14, the regime rolled out 20 new economic development zones - now totaling 25 - set up for foreign investors, although the initiative remains in its infancy. Firm political control remains the government's overriding concern, which likely will inhibit changes to North Korea's current economic system.

... South Korea over the past four decades has demonstrated incredible economic growth and global integration to become a high-tech industrialized economy. In the 1960s, GDP per capita was comparable with levels in the poorer countries of Africa and Asia. In 2004, South Korea joined the trillion-dollar club of world economies.

A system of close government and business ties, including directed credit and import restrictions, initially made this success possible. The government promoted the import of raw materials and technology at the expense of consumer goods and encouraged savings and investment over consumption.

The Asian financial crisis of 1997-98 exposed longstanding weaknesses in South Korea's development model, including high debt/equity ratios and massive short-term foreign borrowing. GDP plunged by 7% in 1998, and then recovered by 9% in 1999-2000. South Korea adopted numerous economic reforms following the crisis, including greater openness to foreign investment and imports. Growth moderated to about 4% annually between 2003 and 2007.

South Korea's export focused economy was hit hard by the 2008 global economic downturn, but quickly rebounded in subsequent years, reaching over 6% growth in 2010. The US-Korea Free Trade Agreement was ratified by both governments in 2011 and went into effect in March 2012. Between 2012 and 2015, the economy experienced slow growth – 2%-3% per year - due to sluggish domestic consumption and investment. The administration in 2015 faced the challenge of balancing heavy reliance on exports with developing domestic-oriented sectors, such as services.

The South Korean economy's long-term challenges include a rapidly aging population, inflexible labor market, dominance of large conglomerates (chaebols), and the heavy reliance on exports, which comprise about half of GDP. In an effort to address the long-term challenges and sustain economic growth, the current government has prioritized structural reforms, deregulation, promotion of entrepreneurship and creative industries, and the competitiveness of small- and medium-sized enterprises.

In terms of the DPRK's capacity for military action, an IISS study published in 2013 noted that.¹⁰⁹⁷

Although it is difficult to know North Korea's precise intentions or aspirations, its forces are deployed along the DMZ in such a manner that they could support an invasion of South Korea. In particular, the percentage of North Korean forces deployed within 100km of the DMZ has significantly increased during the past two decades. Currently, North Korea deploys approximately 65% of its military units, and up to 80% of its estimated aggregate firepower, within 100km of the DMZ. This inventory includes approximately 700,000 troops, 8,000 artillery systems and 2,000 tanks. Because of these forward deployments, North Korea could theoretically invade the South without recourse to further deployments and with relatively little warning time.

Thus, it has been argued that North Korea's military strategy is designed around plans to launch an invasion of South Korea. At the same time, North Korea's armed forces are also positioned in order to deter an attack, being deployed to deliver a pre-emptive strike against the South if Pyongyang believes that an attack is imminent or to retaliate with overwhelming force if the North is attacked. This posture is dictated by the doctrine that 'attack is the best form of defence', a formulation that defined Soviet forward deployments in East Germany during the Cold War. The mass forward deployment of North Korean forces also helps to strengthen domestic political support for Pyongyang's 'military first' policy and heavy internal security apparatus.

The 2016 IISS report expressed heavy skepticism about the DPRK's various warfighting capabilities:

North Korea's armed forces remain dependent on increasingly obsolete equipment of Russian and Chinese origin, including indigenous derivatives. The recent appearance of freshly painted combat aircraft only disguises the underlying lack of new airframes over the past two decades, and there is only limited evidence of modernization across the services. North Korea's capability is arguably more reliant on its substantial personnel strength and its potential for asymmetric warfare. Whilst exercises are regularly conducted, they often appear staged and as such are not necessarily representative of wider operational capability. Though North Korean progress on nuclear-warhead miniaturization continues to be debated, its pursuit of missile delivery capability remains a priority. US officials now view the so-far-untested Hwasong-13 (KN-08) road-mobile ICBM as operational, a position perhaps reinforced by the subsequent parade appearance of a redesigned model, in contrast to previous mock-ups.

Guesstimating the DPRK's Military Spending

The DPRK does everything possible to disguise the level of its military effort, and this makes it difficult to find any unclassified estimates of the DPRK's annual military spending. There are, however, some useful unclassified estimates. A report by Jon Grevatt in *Jane's Defense Weekly* in 2009 provided some insights, but must again be treated as a rough estimate:¹⁰⁹⁸

The DPRK's defense budget reached nearly USD 9 billion in 2009, around 15 times more than the official amount declared by Pyongyang, the [ROK] state-run Korea Institute of Defense Analyses ("KIDA") has said in a report... The KIDA report—cited by the [ROK] state-funded *Yonhap* news agency on 18 January—said North Korea had previously announced a USD 570 million defense budget, although the real expenditure, calculated on an exchange rate based on Purchasing Power Parity ("PPP") terms, was USD 8.77 billion... *Yonhap* quoted the report as saying, "In spite of its economy shrinking since the mid-2000s, North Korea has gradually increased its military spending."

According to KIDA, official North Korea figures state that the defense budget increased to USD 570 million in 2009 from USD 540 million in 2008, USD 510 million in 2007 and USD 470 million in 2006, although these figures do not reflect PPP... Previous estimates have indicated that DPRK defense spending is equal to at least 15 per cent of [Gross Domestic Product] ("GDP"). In 2008 Pyongyang said it was allocating 15.8 percent of GDP on defense although it has not released any GDP figures for a number of years. In 2009 the US Department of State stated that the DPRK's defense spending was more than 22 percent based on its estimate that the DPRK's GDP in 2009 was USD 40 billion based on PPP... How much North Korea is allocating towards defense procurement is similarly contested but it is thought to be at least 40 per cent of its expenditure, with most of these finances directed at centrally controlled indigenous programs: a consequence of the DPRK's impoverished economy and its international isolation.¹⁰⁹⁹

The ROK's state-run Korean Institute of Defense Analyses [KIDA] reported that the total gross national income of the DPRK in 2009 was approximately \$25 billion, meaning that the DPRK spent about a third of its national income on its military.¹¹⁰⁰

The 2014 Japanese Defense White Paper noted that:¹¹⁰¹

Although North Korea has been facing serious economic difficulties and has depended on the international community for food and other resources, it seems to be maintaining and enhancing its military capabilities and combat readiness by preferentially allocating resources to its military forces. North Korea deploys most of its armed forces along the DMZ. According to the official announcement at the Supreme People's Assembly in April 2014, the proportion of the defense budget in the FY2014 national budget was 15.9%, but it is believed that this represents only a portion of real defense expenditures.

Again, it must be stressed that these numbers are little more than educated guesses, though they are almost certainly correct in indicating that the DPRK is willing to devote far more of its total economy to national security expenditures than the ROK. Given a DPRK GDP that experts estimate is around \$40 billion and the size of the DPRK's forces, it also seems likely that Western, ROK, and Japanese estimates that DPRK military spending is close to \$9-11 billion are far more accurate than the DPRK's official military budget of \$1 billion.¹¹⁰²

The DPRK's Defense Industry

In spite of its weak economy, the DPRK still maintains a significant defense industry, following the ideas of *juche* and *songun* described in Chapter I. A ROK think tank analysis by Tak Sung Han in 2013 still provides a useful overview of the history and current status of this sector. The development of the defense industry started in the 1950s with the "preparation stage," as the DPRK built or rebuilt factories and produced munitions and small arms with the help of the USSR and China. The 1960s saw the "foundation stage," when the DPRK expanded its production base, initiating development and increased production of conventional firearms by

copying Chinese and Soviet models. The “expansion stage” of the 1970s increased the emphasis on quality and modern technology, moving to indigenous production of many weapons types – such as tanks, self-propelled artillery, and combat vessels.¹¹⁰³

Tak Sung Han feels that since the 1990s, the DPRK:¹¹⁰⁴

...has maintained or increased the production level of its ammunitions, missiles, nuclear weapons, strategic materials, and other export-oriented products, and accelerated the technological development in spite of overall production reduction in the defense industry. As a result, North Korea has achieved the top-class level in certain military technologies including missiles, nuclear and bio-chemical weapons. Moreover, North Korea displays high-level military technologies in ammunitions, artilleries, and maneuvering equipment. Even though North Korea's technological level in aircraft, communications, and electronics is quite low, there has been substantial progress in digital weapons and jamming devices.

The “sophisticated development stage” spanned the 1980s and 1990s, when the DPRK further improved quality and modern technology. During this period, North Korea developed and produced missiles, nuclear weapons, and aircraft. In the 2000s, the DPRK “accelerated its efforts to improve existing weapons systems, develop GPS jamming devices, and advance asymmetric weapons technologies such as missiles and nuclear weapons, rather than increasing the quantity of conventional weapons that have already reached a saturation point.”¹¹⁰⁵

Tak Sung Han indicates there are three primary economic sectors in the DPRK – civilian, military, and “royal.” The latter two receive national priority in manpower and resources. In particular, the defense industry is the foundation of the DPRK's military power and identity, employing approximately 500,000 workers and accounting for 25-75% of the economy. While the DPRK's defense industry operated at 80% of capacity in the 1980s, this fell to 38% in the early 1990s and 22% in the late 1990s. Over the past decade, operating capacity has recovered somewhat and currently stands at approximately 30%. Production peaked at \$3-4 billion in the 1980s and is likely currently around \$1-1.2 billion.¹¹⁰⁶

He also estimates that the DPRK's economic development can be divided into three periods. Since the 1990s: “Arduous March” (1990-98), economic recovery (1999-2005), and now economic stagnation (2006-present). In each period, the DPRK tried to boost the defense industry despite economic hardship – as shown in **Figure VI.19**. In spite of the -4.18% average economic growth rate over 1990-98, the DPRK still maintained a 30.5% defense industry operating rate, compounding and prolonging the country's economic crisis. From 1999-2005, economic growth reached 2.74%, during which time the defense industry's operation rate was 24.9%. From 2001-06, economic growth dropped to .05%, and the industry's operating rate rose back to 30.9%.¹¹⁰⁷

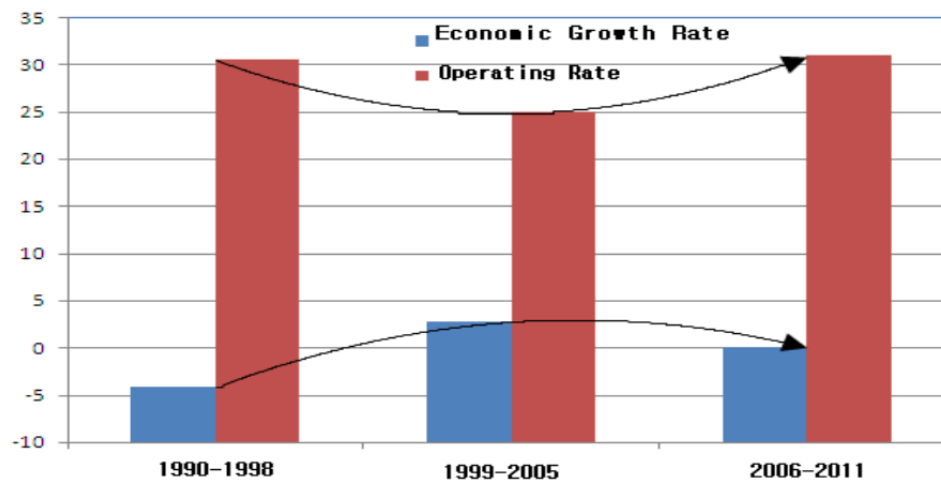
Jane's Sentinel Security Assessment from December 2015 notes regarding North Korea's budget and defense industry:¹¹⁰⁸

Assessing North Korea's actual defence budget is problematic since it only publishes fragmentary economic information, and then primarily for propaganda purposes. At the April 2014 annual meeting of the Supreme People's Assembly, North Korean Finance Minister Choe Kwang-jin informed the assembled members that the government had allocated 15.9% of its annual budget to national defence. However, the minister did not disclose what the total annual budget was, making it difficult to estimate the actual amount represented.

Both South Korean and US intelligence sources have variously estimated that the actual amount North Korea allocates to defence is equivalent to 25-30% of its gross domestic product (GDP). If the Bank of Korea's (South Korea) 2015 estimate for North Korea's 2014 GDP of KPW34.2 trillion (USD25.96 billion) is correct, this would represent KPW5.43-10.26 trillion (USD4.13-7.79 billion) available for defence spending. Historically, North Korea's 'military first' policy has ensured that priority is given to defence

spending. While how much it is allocating towards defence procurement is similarly contested, it is thought to be at least 40% of its expenditure. Most of these finances are directed at centrally controlled indigenous programs.

Figure VI.19: The DPRK's Economic Growth Rate and the Defense Industry's Average Operating Rate



Period	1990–1998 (Crisis)	1999–2005 (Recovery)	2006–2011 (Stagnation)
Economic Growth Rate (On Average)	-4.18%	2.74%	0.05%
Operating Rate of Defense Industry (On average)	30.5%	24.9%	30.9%

Source: Tak Sung Han, "North Korea's Defense Industry: An Assessment and Its Growth Prospect," *ROK Angle*, Korea Institute for Defense Analyses, March 28, 2013.

ROK

The ROK makes a sharp contrast to the DPRK. It has become one of the most advanced economies in Asia and now has a technology base that, in some areas, rivals that of the most advanced economies in the world. As **Figure VI.13** has already indicated, the CIA estimates that the DPRK's GDP was roughly \$40 billion in 2014 in purchasing power parity terms (114th the world), and the ROK's GDP in 2016 was approximately \$1.85 trillion (14th in the world). This made the ROK's GDP some 46 times larger. The DPRK had an estimated GDP per capita of \$1,800 in 2014 (210th in the world), while the ROK's GDP per capita was 20 times higher, at \$36,500 (48th in the world).¹¹⁰⁹ While the DPRK inherited a far larger industrial base after World War II, and was the more developed of the two economies for several decades after the Korean War, the ROK has vastly outpaced its rigid, over-militarized rival.

Defense Economics, Defense Spending, and Defense Reform

As noted earlier, the CIA portrays South Korea's economy in a far more positive light than that of the DPRK.¹¹¹⁰ The ROK has, however, had to devote significant resources to defense spending and military modernization. The economy's capacity to continue such development is essential for ROK preparedness in a potential conflict on the Peninsula.

Figure VI.20 shows past ROK and Japanese estimates of ROK defense spending and annual growth rates over 2006-2010. **Figure VI.21** compares the data in the ROK's 2013 defense budget to reporting on the overall ROK government budget and GDP from 2009-2013, showing spending by key category in the 2013 budget.

According to SIPRI, the 2014 budget totaled 35.7 billion, accounting for 2.6% of ROK GDP. This was the fourth largest national spending category, after healthcare, welfare, and labor; general public administration; and education. The increases focused on troop operation expenses, maintenance of combat capability expenses, and defense capability improvement expenses. \

The ROK's military expenditures amounted to \$36.4 billion in 2015, or approximately 2.6 percent of the country's GDP, while the IISS reports government spending at \$33.4 billion, roughly \$683 per person.¹¹¹¹ The ROK's FY2016 defense budget showed an increase of approximately 3.6% over the previous year down from 4.9% in 2015. Still, it marked the 17th consecutive year-on-year rise.¹¹¹²

The steadily rising levels of ROK defense spending reflect that fact the ROK is undergoing a defense reform project with an ultimate goal, according to the ROK Ministry of National Defense (MND) Deputy Ministry for Planning and Coordination, "to build a 'slim but strong military.'" The government plans to maintain fiscal soundness in budgeting, seeing mid- and long-term defense spending as a percentage of GDP and as a percentage of the government budget remaining approximately the same.¹¹¹³

Past commentary on the 2012 budget helps explain the more current trends and how they affect the balance. An analysis by Kim Kwang-woo, Deputy Minister for Planning and Coordination at the ROK MND, writing for the government-supported Korea Institute for Defense Analyses (KIDA), explained the 2012 budget's force maintenance and force improvement projects in detail:¹¹¹⁴

In order to foster a "combat-oriented" military, the Force Maintenance budget for the year 2012 prioritizes maximizing war-fighting capability by tightening military operation and watch systems on the front line and expanding scientific combat training equipment and personal combat equipment. It also focuses on improving the working and living conditions for military service members as well as boosting their morale and welfare by advancing military medical services and improving their living quarters. Consequently, the expenses for military uniforms, military service member health and welfare enhancement, military personnel management, and training and education show a rapid year-on-year increase of more than 10 percent.

The budget for dispatching ROK Forces overseas was set at KRW 22.6 billion, with 21.6 billion allotted for sending troops to multi-national forces (MNF) and 1 billion for PKO activities. The overseas deployments of the Cheonghae Unit (Somali Waters), the Danbi Unit (Haiti) and the Dongmyeong Unit (Lebanon), scheduled to end in late 2011, will continue their PKO activities with the ROK National Assembly approving a bill to extend the dispatch period for the three Units by one year until the end of 2012. As of January 1st, 2012, there are 1,448 Korean troops deployed in 18 areas of 15 countries.

Meanwhile, the cost for defense cost-sharing under the Special Measures Agreement on Defense Cost-sharing from 2009 to 2013 amounts to KRW 746.1 billion, taking into account past budget execution results and the estimated size of future spending.

The 2012 Force Improvement Programs (FIPs) budget prioritizes reinforcement of deterrence capabilities to actively cope with North Korean infiltration/local provocation as well as the threat of long-range artillery. Additionally, in preparation for the OPCON transition in 2015, the budget prioritizes on improving the command and control capacity of the ROK Joint Chiefs of Staff and strengthening core combat capabilities of each service. North Korea bombarded Yeonpyeong-do, an island within the territory of the Republic of Korea, on November 23, 2011. Since the YP-do shelling incident, the ROK Armed Forces have further fortified emergency shelters and protective facilities to ensure sustainability and survivability in the northwestern frontline islands.

To actively cope with various future threats, the ROK Armed Forces aim to secure strategic capabilities. Accordingly, projects for acquiring advanced fighter aircrafts, new submarines, and modernized destroyers are being planned. Along with projects to introduce new weapons systems, the ROK Forces are also improving existing ones. Performance improvement for the K1A1 tank, maritime patrol aircrafts, and KF-16 fighter jets are also underway.

Meanwhile, to prepare for the OPCON transition, the ROK Armed Forces are planning to newly develop or upgrade modeling & simulation systems and war-gaming simulation facilities, which are mainly led by the ROK Armed Forces, and expenses for such performance improvements are reflected in the 2012 defense budget. In a bid to develop ability to produce indigenous advanced weapons systems, the investment in defense R&D has been expanded to 7.0 % of the total defense budget, up from 6.4 % in the previous year.

The defense budget still increased by a substantial 3.5%, although a need for local economic stimulus did lead to defense cuts in 2014. An analysis by KIDA described the details of the 2014 budget as follows:¹¹¹⁵

The 2014 ROK defense budget was drawn up with a focus on the following objectives: maintenance of steadfast military readiness posture by strengthening the combat capability of frontline units and providing necessary logistics support, enhancement of military personnel welfare to boost their morale, and reinforcement of core combat capabilities to counter asymmetric threats and local provocations. Simultaneously, great efforts were made to eliminate waste and economize budget use.

South Korea's 2014 defense budget comes to about KRW 35.7 trillion, a 3.5% increase over that of 2013 (based on supplementary budget). It also accounts for 2.5% of the GDP (based on estimated figures) and 14.4% of the government budget (general accounts). The defense budget is the fourth largest after the budgets for health, welfare, and employment (KRW 97.4 trillion), general and provincial administration (KRW 55.8 trillion), and education (KRW 49.8 trillion), among the 12 categories of the government budget.

By item, the Force Operating Costs, which fall under the responsibility of the Ministry of National Defense (MND), stand at KRW 25.19 trillion, a 3.6% year-on-year increase, and Force Improvement Budget2), which falls under the responsibility of the Defense Acquisition Program Administration (DAPA), amounts to KRW 10.5 trillion, a 3.3% year-on-year increase. Defense capability improvement expenses were increased by 3% in the 2014 budget, compared to increases of a little over 2% for the past two years, despite a deep cut (KRW 366.4 billion) in the budget for the next-generation fighter aircraft projects caused by a delay in determining the final candidate. Apparently, this increase in Force Improvement Budget was the result of positive efforts made to enhance defense capabilities by the Government and the National Assembly. Another indicator of the positive view held by the National Assembly members regarding the need for a stable defense budget is a significantly reduced cut of KRW 94.5 billion in the defense budget deliberation process this year, compared to a cut of KRW 189.8 billion in the 2013 budget.

The 2014 Force Operating Costs focus on enhancing the troops' combat survival ability and maximizing their combat capability by improving the quality of uniforms and equipment and furnishing more training equipment and supplies. The monthly salary for enlisted soldiers was increased by 15% over the preceding year, and the basic meal expense was increased by 6.5%. These expense increases reflect the need to improve the barracks and recreation facilities in order to improve military welfare.

The 2014 defense budget also considered the need to replace or update exiting combat support facilities in order to ensure adequate logistics support capability and a higher rate of operation of recently adopted core equipment, such as AWACS, by securing maintenance expenses. As a result of these considerations,

logistics support and collaboration programs showed a 7.2% year-on-year increase in funding, far exceeding the percentage of year-on-year increase of the entire Force Operating Costs.

The 2014 budget for troops dispatched overseas, including the Araw Unit dispatched to the Philippines in December 2013 to provide disaster relief, comes to KRW 126.8 billion, a KRW 31.7 billion increase from 2013. Amounts of KRW 78.7 billion and KRW 48.1 billion were allocated for the dispatch of ROK troops to the Multinational Force and the UNPKO, respectively. As of January 1, 2014, the number of ROK troops dispatched overseas stands at 1,690 in 17 areas in 16 different countries.

As for the Force Improvement Budget, priority was given to the early establishment of the Kill Chain and the Korea Air and Missile Defense (KAMD) system to counter the North's asymmetric threats, including nuclear weapons and ballistic missiles. The 2014 defense budget includes the installation of artillery locating radar systems, next-generation thermal imaging cameras and surveillance systems, and the GOP Scientific Guard System in an effort to deter the North's local provocations and enhance the country's capability to deal with any provocations.

The ROK military plans to strengthen its future-oriented defense capabilities to counter diverse potential threats. Such efforts include adoption of next-generation Multiple Launch Rocket System (MLRS) and high-performance jet fighters, new submarine projects, and additional procurement of AEGIS warships, in addition to improving the performance of its KF-16 fighter jets.

Part of the budget has also been allocated to securing the country's endogenous weapons system through defense R&D. The 2014 defense budget includes a plan for the development of next-generation Korean-made fighter jets and small-sized gunships. The budget also shows a drastic increase in funding for the development of core technologies and military and civilian "dual use technologies," which is in step with the Park Geun-hye government's goal of creating a "creative economy."

The 2014 Special Accounts allocated to the MND include funding for the relocation of defense and military facilities (KRW 356 billion), the relocation of USFK bases (KRW 641.8 billion), and the construction of an 'Innovative City' (KRW 26.9 billion).

As for the Special Account for the relocation of USFK bases, an amount, which was increased by KRW 188.2 billion over the preceding year, is earmarked for full-fledged promotion of the said relocations. The Special Account also includes the Phase-2 Project for the relocation of USFK bases to Pyeongtaek, the Land Partnership Plan (LPP), the support programs for Pyeongtaek, and a project to investigate and deal with environmental pollution associated with the relocation of USFK bases. The Phase-2 Project for the relocation of USFK bases to Pyeongtaek concerns the base in Yongsan, Camp Nimble/H-220 (in Dongducheon), Camp Market (in Bupyeong), and Camp Kim (in Seoul). Its work progress stands at 62.1% as of the end of 2013, and a total of 26 USFK bases have been returned to the ROK government, with 21 more USFK bases to be returned in the future.

Special Account for the construction of the 'Innovative City' includes the project for the relocation of the National Defense University (KNDU) to Nonsan, Chungnam-do, by 2016.

Independent evaluations by groups like the IISS describe the trends in the ROK's military spending as follows:¹¹¹⁶

Defence outlays over the next five to ten years will be driven by the need to meet threats from North Korea, modernization imperatives, reducing the size of the armed forces, and moving to a 'leaner' and 'smarter' force. The armed forces' ability to achieve the latter two objectives depends on balanced investments between the services, given the historic army lead. As Seoul prepares for the transfer of full OPCON in 2015, some analysts think that it may be called on to shoulder an increased portion of the defence burden shared with the US. Defence exports are one area of potential growth, though South Korean firms will have to compete in an era of reducing budgets.

The 2012 defence budget amounted to US\$29bn or 14.8% of the central government budget and 2.5% of GDP. There is a growing consensus that defence spending should increase to at least 2.7% of GDP. The 'Mid-Term Defense Plan 2013-17' called for increased spending on capabilities including surface-to-surface missiles, standoff precision-guided weapons and airborne electronic-attack systems. However, additional outlays will be constrained by annual growth rates that, due to the country's maturing economy,

will likely hover around 2–3%, as well as by calls for increased social-welfare spending by presidential election candidates.

IHS Jane's Defence Weekly described the 2016 budget as follows:¹¹¹⁷

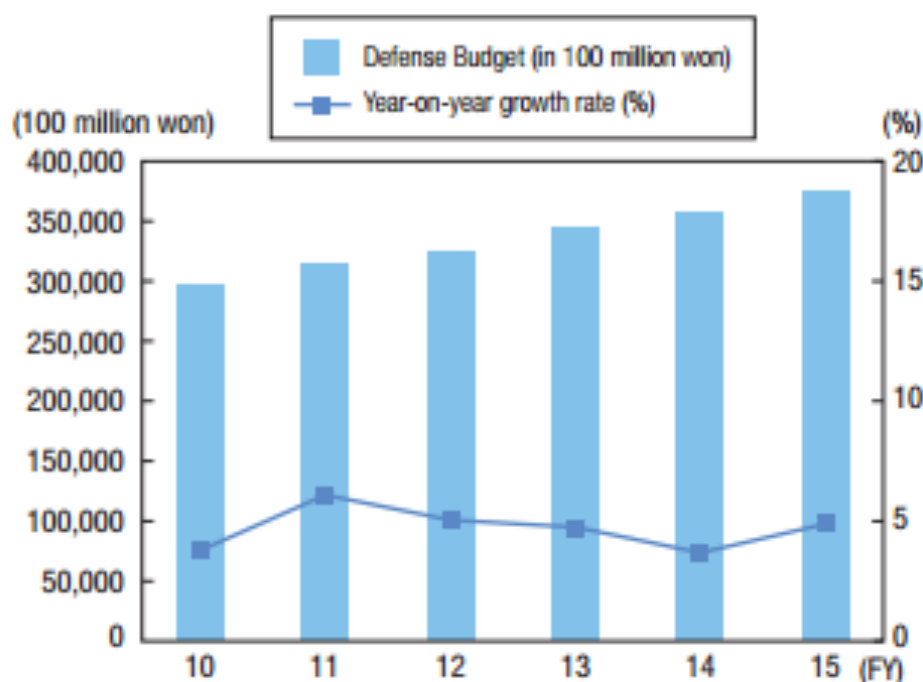
South Korea's National Assembly approved on 3 December a 2016 defence budget of KRW38.8 trillion (USD33.5 billion), representing a decrease against the expenditure earlier requested by the Ministry of National Defense (MND).

According to the MND, the approved expenditure represents a 3.6% increase against actual spending in 2015. However, it is less than the KRW40.1 trillion initially requested by the MND, which was later trimmed to KRW38.9 trillion. The approved defence budget also amounts to 10% of the total government expenditure for 2016 and nearly 2.5% of GDP.

The MND said in a statement to *IHS Jane's* that the approved 2016 budget encompasses a 2.7% increase in operating and personnel expenses to KRW27.16 trillion, and KRW11.64 trillion for defence modernization, an increase of 5.7%.

Figure VI.20: ROK Defense Budget and Annual Growth, 2006-2015

Japanese Estimate in 2015



Notes: 1. ROK Defense White Paper 2014 for FY2010 to 2014.
2. The Ministry of National Defense website for FY2015.

Source: Japanese Ministry of Defense, *Defense of Japan 2015*

Figure VI.21: The ROK 2016 Defense Budget (KRW Billions)**Spending: 2009-2016**

Classification	2009	2010	2011	2012	2013	2014	2015	2016
GDP	1,065,037	1,173,275	1,237,128	1,308,642	1,399,076	1,413,978	1,544,900	1,610,200
Government Budget	203,550	201,283	209,930	223,138	236,225	247,203	258,586	268,387
Defense Budget (Billion \$)	28,980 (\$22.3)	29,563 (\$25.7)	31,403 (\$27.3)	32,958 (\$30.8)	34,345 (\$30.4)	35,706 (\$31.9)	37,456 (\$36.4)	38,800 (\$34.0)
YoY Increase %	8.7	2	6.2	5	4.2	3.5	4.9	3.6
As % of GDP	2.72	2.52	2.54	2.52	2.45	2.53	2.42	2.41
As % of Government Budget	14.24	14.69	14.96	14.77	14.54	14.4	14.5	14.5

Break Out of Spending by Category

Classification	2016 Spending	Share (%)
Defense Budget	38,799.50	100
* Force Improvement Program	11,639.80	30
* Force Maintenance	27,159.70	70
- Personnel Expense	14,271.60	36.8
- Food & Clothing	2,135.10	5.5
- Defense Informatization	525.3	1.4
- Service Members Welfare	266.5	0.7
- Logistics Support	4,602.10	11.9
- Training & Education	532.6	1.4
- Installation Construction	2,656.70	6.8
- Others	2,169.80	5.6

Source: ROK Ministry of National Defense, "Defense Budget," accessed August 18, 2016

VII. Northeast Asian Military Modernization Trends

The DPRK and ROK exist in a security environment where the US and China share a common interest in avoiding serious conflict, and both the US and China have a reason to cooperate in deterring any use of force by the DPRK and the escalation of any conflict that does occur. This common interest would likely limit the scope of any potential conventional war.

The balance of DPRK and ROK “conventional” forces cannot be separated from the role US forces would play in a conflict, from Japan’s willingness to support US basing and staging into Korea, and from the role China would play in trying to limit any threat to the DPRK as a buffer state. It seems likely that US airpower, sea power, cruise missiles, stealth, precision strike capability, missile defenses, and ISR assets would be used to support the ROK immediately after any serious DPRK attack.

Moreover, the DPRK’s ideological hostility to the US could lead Pyongyang to escalate in ways that are unpredictable and make a “rational bargainer” approach to scenario planning and escalation prediction highly uncertain, because the perceptions of both sides can differ so much in any given scenario.

The perceptions and roles of external actors are uncertain and much of their individual reactions would depend on the actions of the others. US support of the ROK – coupled with any ROK military success that threatened the existence of the DPRK – would confront China with the risk of losing a key buffer state. China might or might not choose to intervene at any stage in such a conflict – either to limit or deter any action against the DPRK or to ensure that ROK and US forces did not “occupy” part of the DPRK.

Either side might try to use strategic air and/or missile power in support of its tactical forces, particularly if it appeared to be losing a more conventional conflict or came under serious military pressure from the opposing side. It is possible that a conflict could escalate to conventional fighting affecting Chinese bases as well as US bases and carrier task forces, including those as far away as Guam and the “second island chain,” which the US may use to base long-range bombers and stealth aircraft. Moreover, China might put pressure on Taiwan as a means of indirectly pressuring the US.

The naval dimension of any new Korean War is equally unpredictable. Pyongyang could use its submarines, smart mines, and longer-range anti-ship missiles in a wide variety of ways, including covert or asymmetric attacks on shipping, possibly even outside Korean waters. It might perceive a naval war, including some kind of attack or seizure of a US ship – such as the USS *Pueblo* in 1968 – as a safer way of exerting pressure. China might or might not become involved, and Japan would have to decide on its naval posture.

Japan and Russia are also significant nearby military powers. Though both have histories of involvement with the Peninsula, they are not likely to become directly involved in a Korean conflict; but their policies will have a major impact and their forces might become involved if a conflict escalated beyond control. Moreover, the build-up of North Korean and Chinese forces, and disputes over islands and maritime rights in the region, may push Japan towards a more active role in shaping the Asian balance in spite of the constitutional restrictions that have kept its role largely defensive in the past.

China

China does not have a military presence in North Korea, but might well support the DPRK in a conflict it felt could threaten the survival of the DPRK's regime, totally defeat the DPRK's forces, and/or bring ROK and US forces near the DPRK-Chinese border. The disposition of Chinese military forces near the Koreas can be seen in **Figures VII.1 to VII.4**, and **Figure VII.5** shows the command structure of the Chinese military. It is clear that China can already deploy massive amounts of ground and air forces in a Korean conflict if it chooses to do so, but faces major qualitative limits relative to the forces the US can project into the Koreas and the overall US power projection capabilities in the Pacific.

At the same time, China has strong incentives to avoid and contain any conflict in the Koreas or Northeast Asia that would lead to such a confrontation with the US, just as the US and ROK have equally strong reasons to avoid any conflict that would lead China to intervene on the DPRK's behalf. Such scenarios seem both unlikely and worst case contingencies which all three powers have every reason to avoid.

China also is aware that the US rebalancing of its forces in Asia and China's expansion of its sea-air-missile forces to deal with its many disputes over territory in the Pacific and to cover the outer island chain of US bases and forces has already altered the balance. The analyses of Chinese modernization efforts and missile developments show that the balance of forces in both the Pacific and the Koreas will be altered even more significantly in the future.

China's efforts to create a blue water navy in the Pacific and that can project power in the Indian Ocean are fully underway. China plans to build two nuclear aircraft carriers by 2020 and reinforce submarine warfare capabilities.¹¹¹⁸ At the same time, the PLA Army and Air Force have been modernizing as well, increasing the capabilities of their aircraft and ground forces. The PRC has also been making major efforts to modernize and build up conventional missile forces with a wide range of precision strike capabilities. Moreover, China has already made major progress in converting from a defensive land power to a modern military power with major air, sea, and missile capabilities.

The US View of the Direction of Chinese Military Modernization

US official views take careful note of these Chinese developments. Driven by President Xi Jinping's "China Dream", China has ambitions of reaching critical military and economic benchmarks by 2020 and becoming a world-class military and economic power by 2050. Thus, the PRC followed a pragmatic approach of modernizing the military, strengthening the economy, and solidifying the Communist Party's power.

Thus far, China's military modernization program has been successful: "despite continued gaps in some key areas, large quantities of antiquated hardware, and a lack of operation experience, the PLA is steadily closing the technological gap with modern armed forces."¹¹¹⁹ However, China has made up substantial ground in these areas, particularly in regards to technology and equipment.

In March 2013, DNI James R. Clapper reported to the Senate that:¹¹²⁰

China is pursuing a long-term comprehensive military modernization designed to enable China's armed forces to achieve success on a 21st century battlefield. China's military investments favor capabilities designed to strengthen its nuclear deterrent and strategic strike, counter foreign military intervention in a regional crisis, and provide limited, albeit growing, capacity for power projection. During 2012, China's

People's Liberation Army (PLA) introduced advanced weapons into its inventory and reached milestones in the development of key systems, thereby sustaining the modernization program that has been under way since the late 1990s. For example, in August, the PLA Navy commissioned the Liaoning, China's first aircraft carrier, which Beijing probably sees as a significant step in developing a military commensurate with great-power status. Additionally, China has continued to develop advanced ballistic missiles.

Developments in Chinese military capabilities support an expansion of PLA operations to secure Chinese interests beyond territorial issues. To expand operations—specifically in the Indian Ocean—China is pursuing more effective logistical support arrangements with countries in the region. Beijing is also maintaining a multi-ship antipiracy task force in the Gulf of Aden for the fourth straight year to protect commercial shipping. The task force operates independently of international efforts, but is making a tangible contribution to protecting shipping through this heavily pirated area.

China is also supplementing its more advanced military capabilities by bolstering maritime law enforcement (MLE) activities in support of its territorial claims in the South and East China Seas. In the territorial disputes with the Philippines and Japan last year, the Chinese Navy stayed over the horizon as MLE vessels provided Beijing's on-scene presence and response.

The DOD report on Chinese military power for 2016 provided a summary of US official views on Chinese military modernization, noting that China remains focused on Taiwan as its primary military priority but is expanding its power projection capabilities and broader role in Asia, specifically in regards to its maritime disputes.¹²¹

The long-term, comprehensive modernization of the armed forces of the People's Republic of China (PRC) entered a new phase in 2015 as China unveiled sweeping organizational reforms to overhaul the entire military structure. These reforms aim to strengthen the Chinese Communist Party's (CCP) control over the military, enhance the PLA's ability to conduct joint operations, and improve its ability to fight short-duration, high-intensity regional conflicts at greater distances from the Chinese mainland. China's leaders seek ways to leverage China's growing military, diplomatic, and economic clout to advance its ambitions to establish regional preeminence and expand its international influence. Chinese leaders have characterized modernization of the People's Liberation Army (PLA) as essential to achieving great power status and what Chinese President Xi Jinping calls the "China Dream" of national rejuvenation. They portray a strong military as critical to advancing Chinese interests, preventing other countries from taking steps that would damage those interests, and ensuring that China can defend itself and its sovereignty claims.

Throughout 2015, China continued to assert sovereignty claims over features in the East and South China Seas. In the East China Sea, China continued to use maritime law enforcement ships and aircraft to patrol near the Senkaku (Diaoyu) Islands in order to challenge Japan's claim. In the South China Sea, China paused its land reclamation effort in the Spratly Islands in late 2015 after adding more than 3,200 acres of land to the seven features it occupies in the archipelago. Although these artificial islands do not provide China with any additional territorial or maritime rights within the South China Sea, China will be able to use them as persistent civil-military bases to enhance its long-term presence in the South China Sea significantly.

China demonstrated a willingness to tolerate higher levels of tension in the pursuit of its interests, especially in pursuit of its territorial claims in the East and South China Sea; however, China still seeks to avoid direct and explicit conflict with the United States. China's leaders understand that instability or conflict would jeopardize the peaceful external environment that has enabled China's economic development, which is central to the perpetuation of the CCP's domestic legitimacy. In the near-term, China is using coercive tactics short of armed conflict, such as the use of law enforcement vessels to enforce maritime claims, to advance their interests in ways that are calculated to fall below the threshold of provoking conflict.

In the long term, Chinese leaders are focused on developing the capabilities they deem necessary to deter or defeat adversary power projection and counter third-party—including U.S.—intervention during a crisis or conflict. China's military modernization is producing capabilities that have the potential to reduce core U.S. military technological advantages.

China's officially-disclosed military budget grew at an average of 9.8 percent per year in inflation-adjusted

terms from 2006 through 2015, and Chinese leaders seem committed to sustaining defense spending growth for the foreseeable future, even as China's economic growth decelerates.

The PRC continues to focus on preparing for potential conflict in the Taiwan Strait, but additional missions, such as contingencies in the East and South China Seas and on the Korean peninsula, are increasingly important to the PLA. Moreover, as China's global footprint and international interests grow, its military modernization program has become more focused on investments and infrastructure to support a range of missions beyond China's periphery, including power projection, sea lane security, counterpiracy, peacekeeping, and humanitarian assistance/disaster relief (HA/DR). PLA global operations in 2015 included counterpiracy patrols, humanitarian assistance and disaster relief, exercises, and sea lane security operations. China's November 2015 public confirmation of its intention to build its first overseas military support facility in Djibouti likely reflects this more global outlook, as it will be utilized to sustain the PLA Navy's operations at greater distances from China.

During 2015, the PLA continued to improve key capabilities that would be used in theater contingencies, including cruise missiles; short, medium, and intermediate-range ballistic missiles; high performance aircraft; integrated air defense networks; information operations capabilities; and amphibious and airborne assault units. The PLA is developing and testing new intermediate- and medium-range conventional ballistic missiles as well as long-range, land-attack, and anti-ship cruise missiles, which once operational would extend the military's reach and push adversary forces further from potential regional conflicts. China is also focusing on counterspace, offensive cyber operations, and electronic warfare (EW) capabilities meant to deny adversaries the advantages of modern, information technology-driven warfare.

Despite the PLA's gains over the last two decades, its modernization program faces challenges. The organizational reforms unveiled by the leadership are part of a broader effort by President Xi to address the PLA's deficiencies, such as corruption. Since Xi took power in 2012, more than forty senior officers have fallen in a wide-ranging anti-corruption campaign that last year ensnared the former top officer in the PLA. Moreover, Xi's slogan exhorting the PLA to prepare to "fight and win" battles implies that the leadership is concerned about how the PLA, which has not fought a war in more than thirty years, would fare in combat.

The DOD's 2016 edition of *Military and Security Developments Involving the People's Republic of China* went into a new level of depth in discussing China's force modernization. The report pretty clearly depicts that China is developing a wide array of weapons focused on fighting an informationized local war with a highly likelihood of utilizing anti-access area-denial (A2/AD). Consequently, China has focused extensively on precision strike technology and a diverse attack missile force, advanced cyber and space capabilities, and air, sea, and land platforms that will increase regional power projection.

The DoD report noted both the links between China's strategy and modernization, and the major advances it was making in missile and nuclear forces:¹¹²²

Nuclear Weapons. China's nuclear weapons policy prioritizes maintaining a nuclear force able to survive an attack and to respond with sufficient strength to inflict unacceptable damage on an enemy. China insists the new generation of mobile missiles, with warheads consisting of multiple independently targeted reentry vehicles (MIRVs) and penetration aids, are intended to ensure the viability of China's strategic deterrent in the face of continued advances in U.S. and, to a lesser extent, Russian strategic ISR, precision strike, and missile defense capabilities. Similarly, India's nuclear force is an additional driver behind China's nuclear force modernization. The PLA has deployed new command, control, and communications capabilities to its nuclear forces to improve control of multiple units in the field. Through the use of improved communications links, ICBM units now have better access to battlefield information and uninterrupted communications connecting all command echelons. Unit commanders are able to issue orders to multiple subordinates at once, instead of serially, via voice commands.

China has long maintained a "no first use" (NFU) policy, stating it would use nuclear forces only in response to a nuclear strike against China. China's NFU pledge consists of two stated commitments: China will never use nuclear weapons first and China will never use or threaten to use nuclear weapons against any non-nuclear-weapon state or in nuclear-weapon-free zones. There is some ambiguity over the

conditions under which China's NFU policy would apply. Some PLA officers have written publicly of the need to spell out conditions under which China might need to use nuclear weapons first; for example, if an enemy's conventional attack threatened the survival of China's nuclear force or of the regime itself. However, there has been no indication that national leaders are willing to attach such nuances and caveats to China's NFU doctrine.

China will probably continue to invest considerable resources to maintain a limited, but survivable, nuclear force to ensure that the PLA can deliver a damaging responsive nuclear strike. Recent press accounts suggest China may be enhancing peacetime readiness levels for these nuclear forces to ensure responsiveness.

Land-Based Platforms. China's nuclear arsenal currently consists of approximately 75-100 ICBMs, including the silo-based CSS-4 Mod 2 (DF-5A) and Mod 3 (DF-5B); the solid-fueled, road-mobile CSS-10 Mod 1 and Mod 2 (DF-31 and DF-31A); and the more-limited-range CSS-3 (DF-4). This force is complemented by road-mobile, solid-fueled CSS-5 Mod 6 (DF-21) MRBM for regional deterrence missions.

Sea-based Platforms. China continues to produce the JIN-class nuclear-powered ballistic missile submarine (SSBN), with four commissioned and another under construction. The JIN will eventually carry the CSS-NX-14 (JL-2) SLBM with an estimated range of 7,200 km. Together these will give the PLAN its first credible long-range sea-based nuclear capability. JIN SSBNs based at Hainan Island in the South China Sea would then be able to conduct nuclear deterrence patrols.

Future Efforts. China is working on a range of technologies to attempt to counter U.S. and other countries' ballistic missile defense systems, including maneuverable reentry vehicles (MaRVs), MIRVs, decoys, chaff, jamming, and thermal shielding. China has acknowledged that it tested launched a hypersonic glide vehicle in 2014. China's official media also cited numerous training exercises featuring maneuver, camouflage, and launch operations under simulated combat conditions, which are intended to increase survivability. Together with the increased mobility and survivability of the new generation of missiles, these technologies and training enhancements strengthen China's nuclear force and bolster its strategic strike capabilities. Further increases in the number of mobile ICBMs and the beginning of SSBN deterrence patrols will force the PLA to implement more sophisticated C2 systems and processes that safeguard the integrity of nuclear release authority for a larger, more dispersed force.

Anti-Access/Area Denial. As China modernizes the PLA and prepares for various contingencies, it continues to develop capabilities that serve to dissuade, deter, or if ordered, defeat possible third-party intervention during a large-scale, theater campaign such as a Taiwan contingency. U.S. defense planners often refer to these collective PLA capabilities as A2/AD, though China does not use this term. China's military modernization plan includes the development of capabilities to attack, at long ranges, adversary forces that might deploy or operate within the Western Pacific Ocean in the air, maritime, space, electromagnetic, and information domains. As the PLA Academy of Military Science 2013 *Science of Strategy* states, "we cannot count on luck and must keep a foothold at the foundation of having ample war preparations and powerful military capabilities of our own, rather than hold the assessment that the enemy will not come, intervene, or strike."

Information Operations. An essential element, if not a fundamental prerequisite, of China's ability to counter third-party intervention is the requirement to control the information spectrum in all dimensions of the modern battlespace. PLA authors often cite the need in modern warfare to control information—sometimes termed "information blockade" or "information dominance"—and to seize the initiative early in a campaign so as to set the conditions needed to achieve air and sea superiority. China is improving information and operational security to protect its own information structures, and is also developing EW and other information warfare capabilities, including denial and deception. China's "information blockade" likely envisions the employment of military and non-military instruments of state power across the battlespace, including in cyberspace and space. China's investments in advanced EW systems, counterspace weapons, and cyberspace operations—combined with more traditional forms of control such as propaganda and denial through opacity—reflect the emphasis and priority China's leaders place on building capability for information advantage.

Cyber Operations. China believes its cyberspace capabilities and personnel lag behind the rest of the world. To deal with these perceived deficiencies, China is improving training and domestic innovation to achieve its cyberspace capability development goals. PLA researchers advocate seizing “cyberspace superiority” by deterring or stopping an adversary by developing and employing offensive cyberspace capabilities. Chinese offensive cyberspace operations could support A2/AD by targeting critical nodes to disrupt adversary networks throughout the region.

Long-Range Precision Strike. The development of China’s conventionally armed missile capability has been extraordinarily rapid. As recently as 10 years ago, several hundred short-range ballistic missiles could reach targets in Taiwan, but China had only a rudimentary capability to strike many other locations within or beyond the first island chain, such as U.S. bases in Okinawa or Guam. Today, however, China is fielding an array of conventionally armed short-range ballistic missiles (SRBMs), as well as ground- and air-launched land-attack cruise missiles (LACMs), special operations forces (SOF), and cyber warfare capabilities to hold targets at risk throughout the region. U.S. bases in Japan are in range of a growing number of Chinese MRBMs as well as a variety of LACMs. Guam could also possibly be targeted by air-launched LACMs, as demonstrated by H-6K bomber flights into the Western Pacific for the first time in 2015. At the September 2015 parade, China unveiled the DF-26. This system is capable of conducting intermediate precision strikes against ground targets, which could include U.S. bases on Guam.

China’s LACM and ballistic missiles have also become far more accurate and are now more capable against adversary air bases, logistic facilities, communications, and other ground-based infrastructure. PLA analysts have concluded that logistics and power projection are potential vulnerabilities in modern warfare, given the requirements for precision in coordinating transportation, communications, and logistics networks.

Ballistic Missile Defense (BMD). China has made efforts to go beyond defense from aircraft and cruise missiles to gain a BMD capability in order to provide further protection of China’s mainland and strategic assets. China’s existing long-range surface-to-air missile (SAM) inventory offers limited capability against ballistic missiles. New indigenous radars, the JL-1A and JY-27A, are designed to address the ballistic missile threat, with the JL-1A advertised as capable of the precision tracking of multiple ballistic missiles. China’s SA-20 PMU2 SAMs, one of the most advanced SAM systems Russia offers for export, has the advertised capability to engage ballistic missiles with ranges of 1,000 km and speeds of 2,800 meters per second. China’s domestic CSA-9 long-range SAM system is expected to have a limited capability to provide point defense against tactical ballistic missiles with ranges up to 500 km. China is proceeding with the research and development of a missile defense umbrella consisting of kinetic-

energy intercept at exoatmospheric altitudes (greater than 80 km), as well as intercepts of ballistic missiles and other aerospace vehicles within the upper atmosphere. In January 2010, and again in January 2013, China successfully intercepted a ballistic missile at mid-course, using a ground-based missile. The announced acquisition by China of the S-400 SAM system from Russia could provide China with a counter-MRBM capability depending on which interceptor variants are delivered to China.

Surface and Undersea Operations. China continues to build a variety of offensive and defensive capabilities that could permit the PLA to achieve sea control within what the PLAN calls the “near seas,” as well as to project limited combat power into the “far seas.” Of these, China’s coastal defense cruise missiles (CDCM), air- / surface- / sub-surface-launched anti-ship cruise missiles (ASCMs), submarine-launched torpedoes, and naval mines provide the PLAN with an ability to counter an adversary fleet’s intervention with multi-axis, high-intensity attacks that increase in lethality as adversary naval combatants approach China’s coast. Additionally, China has fielded CSS-5 anti-ship ballistic missiles (ASBMs) specifically designed to hold adversary aircraft carriers at risk 1,500 km off China’s coast. China is making gradual progress in the undersea domain as well, but continues to lack either a robust coastal or deep-water anti-submarine warfare capability. It is also unclear whether China has the capability to collect accurate targeting information and to pass it to launch platforms in time for successful strikes in sea areas beyond the first island chain.

Space and Counterspace. The PLA continues to strengthen its military space capabilities, which include advancements with the Beidou navigation satellite system, and its space surveillance capabilities that can monitor objects across the globe and in space. China is seeking to utilize space systems to establish a real-time and accurate surveillance, reconnaissance and warning system, and to enhance C2 in joint operations.

Publicly, however, China stands against the militarization of space. In 2009, the then-commander of the PLAAF Xu Qiliang retracted his earlier assertion that the militarization of space was a “historic inevitability” after former President Hu Jintao swiftly contradicted him.

PLA strategists regard the ability to use space-based systems—and to deny them to adversaries—as central to enabling modern informationized warfare. Although PLA doctrine does not appear to address space operations as a unique operational “campaign,” space operations will probably form an integral component of other PLA campaigns and would serve a key role in enabling actions that counter third-party intervention.

Ultimately, the 2016 DoD report characterized China’s modernization efforts as follows:¹¹²³

China is investing in military programs and weapons designed to improve extended-range power projection, anti-access/area denial (A2/AD), and operations in emerging domains such as cyberspace, space, and the electromagnetic spectrum. Current trends in China’s weapons production not only enhance China’s capabilities to cope with contingencies along its periphery, such as a Taiwan crisis, but will also enable the PLA to conduct a range of military operations in Asia beyond China’s traditional territorial claims. Key systems that either have been deployed or are in development include ballistic missiles (including anti-ship variants), anti-ship and land-attack cruise missiles, nuclear submarines, modern surface ships, and an aircraft carrier. The need to secure trade routes, particularly oil supplies from the Middle East, has prompted China’s Navy to conduct counterpiracy operations in the Gulf of Aden. Disputes with Japan over maritime claims in the East China Sea and with several Southeast Asian claimants to all or parts of the Spratly and Paracel Islands in the South China Sea have led to heightened tensions in these areas. Instability on the Korean Peninsula could also produce a regional crisis involving the PLA. The desire to protect energy investments in Central Asia, along with potential security implications from cross-border support to ethnic separatists, could also provide an incentive for military investment or intervention in this region if instability surfaces. China’s leaders have also charged the PLA with developing capabilities for missions such as UN Peacekeeping Operations (UN PKO), Humanitarian Assistance/Disaster Relief (HA/DR), and counterterrorism operations. These capabilities will increase China’s options for military influence to press its diplomatic agenda, advance regional and international interests, and resolve disputes in its favor.

Outside analysts agree that the Chinese Navy and Air Force are prioritizing their ability to support their strategic goals in the Asia-Pacific region. As one expert notes, China is developing stronger anti-air force and anti-navy capabilities, using missiles – often land based – to threaten naval bases, carrier strike groups, and regional air bases. This is exemplified by the deployment of the world’s first anti-ship ballistic missiles (ASBMs)—the DF-21D and DF-26. While PLA experts like Andrew S. Erickson note that the ASBM may still be lacking associated tracking and C4ISR capabilities to be fully effective¹¹²⁴, the ASBMs nonetheless mark a massive step forward in holding enemy capabilities across the Asia-Pacific at risk.

At the same time, the country is improving its integrated air defense system (IADS) to make it difficult to penetrate and strike these missiles. China is developing stronger radar, fifth-generation fighter jets (J-20 and J-31), and procuring more SAMs both indigenously and from Russia (SA-10, SA-20, and SA-X-21b).¹¹²⁵ The intention is to deter the US from entering important near-seas areas and force US forces back beyond their armaments and platforms ranges.¹¹²⁶ Indeed, the potential capability of China’s IADS has led some American defense strategists to suggest the USAF should procure more long-range stealth bombers like the B-21 as opposed to short-range jets like the F-35.¹¹²⁷

Andrew S. Erikson noted in 2012 that both services have emphasized other aspects of force modernization, aside from equipment development and acquisition and his views remain as relevant today:¹¹²⁸

Modernization (*xiandaihua*) of hardware is only one component of PLA development and reform. The others are regularization (*zhengguihua*) and revolutionization (*geminghua*). Revolutionization refers to the need to ensure that the PLA remains a Chinese Communist Party-controlled military even as it becomes more specialized and proficient. Regularization, or what U.S. specialists term software modernization, entails standardization and improvement of rules and regulations as well as organization to increase the PLA's ability to employ its hardware.

...Since the late 1990s, increasingly realistic training and organizational reforms (including downsizing of personnel, streamlining of bureaucratic structures, and reconfiguration of logistics and maintenance) have facilitated regularization of China's navy and air forces. Facilities, faculty, curricula, and research at military educational institutions are being improved, in part through increased funding and even monetary rewards. Consolidation and merging of institutions may also be in store, particularly for PLAAF and PLAN aviation. Officers of unprecedented intellectual and technical caliber are being recruited.... The quality and education level of noncommissioned officers remains a problem, however, necessitating targeted remedial education.

Overall, US sources have consistently agreed that the PLA is becoming increasingly modern.¹¹²⁹

The PLA has gradually increased its technological research and development, as well as its military and educational exchanges, and has conducted various combined exercises with such advanced militaries as those of Russia and Turkey. China's naval and air forces are receiving a larger proportion of PLA personnel and funding as the PLA becomes a leaner, more technology-intensive force through successive personnel reductions, particularly of ground forces.

Some analysts also feel China believes it can structure its modernization efforts in ways that exploit the US-PRC asymmetry of interest in near-sea disputes and overall regional influence. The PRC is using military, economic, and political carrots and sticks regionally to convince the US and its neighbors that PRC interests should be respected, that any attempts to restrain the PRC will fail, and that in this reemergence, the PRC is the natural leader of East Asia. China hopes that it can use military development to speed up their political goals without having to actually use the military in a battle.¹¹³⁰

Given the systems that China is developing and acquiring, the PLA appears to have a different definition of "modern." At present, for instance, it does not need high-end power-projection capabilities. The PLA already possesses cutting-edge missile technology and systems. It is not yet capable of sophisticated joint operations or complex real-time command, control, communications, computers, intelligence, surveillance and reconnaissance (C4ISR), but for high-priority near-seas missions, work-arounds may be available involving land-basing, temporal and spatial deconfliction of assets, and communications through secure fiber optic cable networks and high-powered line-of-sight. Such approaches may already be sufficient to convince leaders in Taiwan that the PLA has the capability to coerce the island while deterring U.S. intervention.

That said, for China to continue to improve its A2/AD capabilities, it must surmount several hurdles... Together with avionics and flight-control systems to some degree, [aeroengines] technology remains a major gap in Chinese aircraft development and production capabilities... Coordination of aircraft and surface-to-air missile operations represents another possible challenge... Other potential hurdles include the mastery of antisubmarine warfare and amphibious operations.... To enable truly robust out-of-area operations, China must increase its capabilities in satellite navigation and C4ISR, antisubmarine warfare, area air defense, long-range air power, production of military ships and aircraft, at-sea replenishment, remote repair, operational readiness, doctrine, training, human capital, and overseas facilities. Thus far, Beijing has many limitations in these areas; some voluntary, some less so. These will be key indicators to monitor.

A Transformation Underway: The Chinese View

The 2010 Chinese Defense White Paper discusses Chinese plans for military modernization in some detail. The People's Liberation Army (PLA) is working on switching from a focus on

scale, quantity, and manpower to efficiency, quality, and technology. The military aims to field high-technology weapons and develop into a more agile, smarter fighting force. In addition, the concept of “informationization” is emphasized, with a goal of integrating information systems into combat, support, and service support functions.

While the Army appears to be declining in size – along with the probability of a major land war – the PLA’s air, naval, and defense roles are projected to expand. In addition, the missile forces in the Second Artillery (now known as the PLA Rocket Force) are explicitly acknowledged as having responsibility for both conventional and nuclear missiles; the branch plans to enhance strategic deterrence and thus increase emphasis on its nuclear capacity. The 2010 White Paper states:¹¹³¹

To meet the new and changing needs of national security, the PLA tries to accentuate modernization from a higher platform. It strengthens the building of a new type of combat capability to win local wars in conditions of informationization, strengthens the composite development of mechanization and informationization with the latter as the leading factor, focuses informationization on raising its fighting capabilities based on information systems, and enhances the capabilities in fire power, mobility, protection, support and informationization.

...In line with the strategic requirements of mobile operations and tri-dimensional offense and defense, the PLA Army (PLAA) has invested additional efforts in reform, innovation and development, and advanced the overall transformation of the service. The PLAA has emphasized the development of new types of combat forces, optimized its organization and structure, strengthened military training in conditions of informationization, accelerated the digitized upgrading and retrofitting of main battle weaponry, organically deployed new types of weapon platforms, and significantly boosted its capabilities in long-distance maneuvers and integrated assaults.

...The PLAA has made great progress in strengthening its arms. The armored component has strengthened the development of digitized units, accelerated the mechanization of motorized units, and improved its combat system, which combines heavy, light, amphibious and air-borne assault forces. The artillery component has been working on new types of weapons, equipment, and ammunition with higher levels of informationization, forming an operational and tactical in-depth strike system, and developing the capacity to carry out precision operations with integrated reconnaissance, control, strike and assessment capabilities.

The air defense component has stepped up the development of new types of radar, command information systems, and medium- and high-altitude ground-to-air missiles. It has formed a new interception system consisting of anti-aircraft artillery and missiles, and possesses enhanced capabilities of medium- and low-altitude air and missile defense operations. The PLAA aviation wing has worked to move from being a support force to being a main-battle assault force, further optimized its combat force structure, and conducted modularized grouping according to different tasks. It has upgraded armed helicopters, transport and service helicopters, and significantly improved its capabilities in air strike, force projection, and support. The engineering component has accelerated its transformation into a new model of integrated and multi-functional support force which is rapid in response and can be used both in peacetime and in war. It has also strengthened its special capabilities in emergency rescue and disaster relief.

In this way, capabilities in integral combat support and military operations other than MOOTW missions have been further enhanced. The chemical defense component has worked to develop an integrated force for nuclear, biological and chemical defense which operates both in peacetime and in war, combines civilian and military efforts, and integrates systems from various arms and services. It has developed enhanced permanent, multi-dimensional and multi-terrain defense capabilities against nuclear, biological and chemical threats.

In line with the requirements of offshore defense strategy, the PLA Navy (PLAN) endeavors to accelerate the modernization of its integrated combat forces, enhances its capabilities in strategic deterrence and counterattack, and develops its capabilities in conducting operations in distant waters and in countering non-traditional security threats.

It seeks to further improve its combat capabilities through regularized and systematic basic training and actual combat training in complex electromagnetic environments. By organizing naval vessels for drills in distant waters, it develops training models for MOOTW missions. New types of submarines, frigates, aircraft and large support vessels have been deployed as planned. The PLAN enhances the construction of composite support bases so as to build a shore-based support system which matches the deployment of forces and the development of weaponry and equipment. The Navy has accelerated the building of surface logistical platforms... and is working to further improve its surface support capabilities. The Navy explores new methods of logistics support for sustaining long-time maritime missions....

To satisfy the strategic requirements of conducting both offensive and defensive operations, the modernization and transformation of the PLA Air Force (PLAAF) follows a carefully structured plan. It strengthens and improves the PLAAF development and personnel development strategies, and enhances its research into the operation and transformation of air forces in conditions of informationization. The PLAAF is working to ensure the development of a combat force structure that focuses on air strikes, air and missile defense, and strategic projection, to improve its leadership and command system and build up an informationized, networked base support system. It conducts training on confrontation between systems in complex electromagnetic environments, and carries out maneuvers, drills and operational assembly training in different tactical contexts.

The PLAAF strengthens routine combat readiness of air defenses, taking the defense of the capital as the center and the defense of coastal and border areas as the key. It has carried out MOOTWs, such as air security for major national events, emergency rescue and disaster relief, international rescue, and emergency airlift. It has gradually deployed airborne early warning and control aircraft, third-generation combat aircraft, and other advanced weaponry and equipment.

Following the principle of building a lean and effective force, the PLA Second Artillery Force (PLASAF) strives to push forward its modernization and improves its capabilities in rapid reaction, penetration, precision strike, damage infliction, protection, and survivability, while steadily enhancing its capabilities in strategic deterrence and defensive operations. It continues to develop a military training system unique with the strategic missile force, improve the conditions of on-base, simulated and networked training, conduct trans-regional maneuvers and training with opposing forces in complex electromagnetic environments.

It has set up laboratories for key disciplines, specialties and basic education, and successfully developed systems for automatic missile testing, operational and tactical command and control, strategic missile simulation training, and the support system for the survival of combatants in operational positions. It has worked to strengthen its safety systems, strictly implement safety regulations, and ensure the safety of missile weaponry and equipment, operational positions and other key elements. It has continued to maintain good safety records in nuclear weapon management. Through the years, the PLASAF has grown into a strategic force equipped with both nuclear and conventional missiles.

...The PLA takes the building of joint operation systems as the focal point of its modernization and preparations for military struggle, and strives to enhance its fighting capabilities based on information systems.

The 2013 Chinese Defense White Paper

China described its military force structure in depth for the first time in its 2013 Defense White Paper. It reported that it had a total of 850,000 officers in the Army, 235,000 officers in the Navy, and 398,000 officers in the Air Force. The Army had 18 corps in seven military commands (Beijing, Chengdu, Shenyang, Jinan, Nanjing, Guangzhou, and Lanzhou). The Air Force had the same seven military areas, while the Navy had three fleets: the Beihai, Donghai, and Nanhai.

The 2013 Defense White Paper also noted that China's Second Artillery Force is crucial for China's "strategic deterrence" and is at the same time "primarily responsible for deterring other countries from using nuclear weapons against China, and carrying out nuclear counterattacks and precision strikes with conventional missiles."¹³²

Key passages do much to explain China's emerging forces and the role they might play in deterring, containing, or escalating a Korean conflict:¹¹³³

China's armed forces are composed of the People's Liberation Army (PLA), the People's Armed Police Force (PAPF) and the militia. They play a significant role in China's overall strategies of security and development, and shoulder the glorious mission and sacred duty of safeguarding national sovereignty, security and development interests.

Over the years, the PLA has been proactively and steadily pushing forward its reforms in line with the requirements of performing its missions and tasks, and building an informationized military. The PLA has intensified the strategic administration of the Central Military Commission (CMC). It established the PLA Department of Strategic Planning, reorganized the GSH (Headquarters of the General Staff) Communications Department as the GSH Informationization Department, and the GSH Training and Arms Department as the GSH Training Department.

The PLA is engaged in the building of new types of combat forces. It optimizes the size and structure of the various services and arms, reforms the organization of the troops so as to make operational forces lean, joint, multi-functional and efficient. The PLA works to improve the training mechanism for military personnel of a new type, adjust policies and rules regarding military human resources and logistics, and strengthen the development of new- and high-technology weaponry and equipment to build a modern military force structure with Chinese characteristics.

The PLA Second Artillery Force (PLASAF) is a core force for China's strategic deterrence. It is mainly composed of nuclear and conventional missile forces and operational support units, primarily responsible for deterring other countries from using nuclear weapons against China, and carrying out nuclear counterattacks and precision strikes with conventional missiles. Following the principle of building a lean and effective force, the PLASAF is striving to push forward its informationization transform, relying on scientific and technological progress to boost independent innovations in weaponry and equipment, modernizing current equipment selectively by applying mature technology, enhancing the safety, reliability and effectiveness of its missiles, improving its force structure of having both nuclear and conventional missiles, strengthening its rapid reaction, effective penetration, precision strike, damage infliction, protection and survivability capabilities. The PLASAF capabilities of strategic deterrence, nuclear counterattack and conventional precision strike are being steadily elevated. The PLASAF has under its command missile bases, training bases, specialized support units, academies and research institutions. It has a series of "Dong Feng" ballistic missiles and "Chang Jian" cruise missiles.

The 2013 White Paper also emphasized sea control and coastal security, along with the role of the PLA Air Force.¹¹³⁴

The PLAN strengthens maritime control and management, systematically establishes patrol mechanisms, effectively enhances situational awareness in surrounding sea areas, tightly guards against various types of harassment, infiltration and sabotage activities, and copes promptly with maritime and air incidents and emergencies. It advances maritime security cooperation, and maintains maritime peace and stability, as well as free and safe navigation.

Within the framework of the Military Maritime Consultative Agreement (MMCA), the Chinese and US navies regularly exchange maritime information to avoid accidents at sea. According to the Agreement on Joint Patrols by the Navies of China and Vietnam in the Beibu Gulf, the two navies have organized joint patrols twice a year since 2006.

The border public security force is an armed law-enforcement body deployed by the state in border and coastal areas, and at ports. It assumes important responsibilities of safeguarding national sovereignty, and maintaining security and stability in border, coastal and sea areas, as well as entry and exit order at ports. It carries out diversified tasks of maintaining stability, combating crimes, conducting emergency rescues and providing security in border areas.... The border public security force takes strict and coordinated measures against cross-border fishing activities, strengthens law enforcement by maritime

The PLAAF is the mainstay of national territorial air defense, and in accordance with the instructions of the CMC, the PLAAF, PLAN and PAPF all undertake some territorial air defense responsibilities. In peacetime,

the chain of command of China's air defense runs from the PLAAF headquarters through the air commands of the military area commands to air defense units. The PLAAF exercises unified command over all air defense components in accordance with the CMC's intent. China's air defense system is composed of six sub-systems of reconnaissance and surveillance, command and control, aerial defense, ground air defense, integrated support and civil air defense.

China has established an air defense force system that integrates reconnaissance and early warning, resistance, counterattack and protection. For air situation awareness means, air detection radars and early warning aircraft are the mainstay, supplemented by technical and ECM reconnaissance. For resistance means, fighters, fighter-bombers, ground-to-air missiles and antiaircraft artillery troops are the mainstay, supplemented by the strengths from the PLAA air defense force, militia and reserves, as well as civil air defense. For integrated protection means, various protection works and strengths are the mainstay, supplemented by specialized technical protection forces.

...The PLAN is improving the training mode of task force formation in blue water. It organizes the training of different formations of combined task forces composed of new types of destroyers, frigates, ocean-going replenishment ships and shipborne helicopters. It is increasing its research and training on tasks in complex battlefield environments, highlighting the training of remote early warning, comprehensive control, open sea interception, long-range raid, anti-submarine warfare and vessel protection at distant sea.

Finally, the 2013 White Paper discussed joint training and exercises with other nations' militaries. Joint Navy, Army, Air Force, and health services provision training and exercises have all been increasing steadily, expanding in both depth and breadth. China has also conducted nine bilateral and multilateral anti-terrorism military exercises within the framework of the Shanghai Cooperation Organization.¹¹³⁵

In adherence to the principles of being non-aligned, non-confrontational, and not directed against any third party, as well as the guidelines of mutual benefit, equality and reciprocity, the PLA has held, together with other countries, bilateral and multilateral exercises and training featuring multiple levels, domains, services and arms. Since 2002, the PLA has held 28 joint exercises and 34 joint training sessions with 31 countries in accordance with relevant agreements or arrangements. This is conducive to promoting mutual trust in the political and military fields, safeguarding regional security and stability, and accelerating the PLA's modernization.

The 2015 Chinese Defense White Paper

The 2015 White Paper was not substantially different from the previous 2010 or 2013 White Papers. Its focus remained largely on modernization and building a fighting force capable of operating in "informationized" conflict spaces. However, it was unique in the fact it was the first white paper in the 21st century to focus solely on strategy.¹¹³⁶ In particular, there was a modern reorientation of the traditional concept of active defense.¹¹³⁷

...adherence to the unity of strategic defense and operational and tactical offense; adherence to the principles of defense, self-defense and post-emptive strike; and adherence to the stance that "We will not attack unless we are attacked, but we will surely counterattack if attacked."

Shortly after the founding of the PRC in 1949, the Central Military Commission (CMC) established the military strategic guideline of active defense, and later, in line with the developments and changes in the national security situation, had made a number of major revisions of it. In 1993 the military strategic guideline of the new era was formulated, which took winning local wars in conditions of modern technology, particularly high technology, as the basic point in making preparation for military struggle (PMS). In 2004, the guideline was further substantiated, and the basic point for PMS was modified to winning local wars under conditions of informationization.

China's socialist nature, fundamental national interests and the objective requirement of taking the path of peaceful development all demand that China unswervingly adhere to and enrich the strategic concept of active defense. Guided by national security and development strategies, and required by the situation and their tasks in the new historical period, China's armed forces will continue to implement the military

strategic guideline of active defense and enhance military strategic guidance as the times so require. They will further broaden strategic vision, update strategic thinking and make strategic guidance more forward-looking. A holistic approach will be taken to balance war preparation and war prevention, rights protection and stability maintenance, deterrence and warfighting, and operations in wartime and employment of military forces in peacetime. They will lay stress on farsighted planning and management to create a favorable posture, comprehensively manage crises, and resolutely deter and win wars.

To implement the military strategic guideline of active defense in the new situation, China's armed forces will adjust the basic point for PMS. In line with the evolving form of war and national security situation, the basic point for PMS will be placed on winning informationized local wars, highlighting maritime military struggle and maritime PMS. The armed forces will work to effectively control major crises, properly handle possible chain reactions, and firmly safeguard the country's territorial sovereignty, integrity and security.

To implement the military strategic guideline of active defense in the new situation, China's armed forces will innovate basic operational doctrines. In response to security threats from different directions and in line with their current capabilities, the armed forces will adhere to the principles of flexibility, mobility and self-dependence so that "you fight your way and I fight my way." Integrated combat forces will be employed to prevail in system-vs.-system operations featuring information dominance, precision strikes and joint operations.

To implement the military strategic guideline of active defense in the new situation, China's armed forces will optimize the military strategic layout. In view of China's geostrategic environment, the security threats it faces and the strategic tasks they shoulder, the armed forces will make overall planning for strategic deployment and military disposition, in order to clearly divide areas of responsibility for their troops, and enable them to support each other and act as an organic whole. Threats from such new security domains as outer space and cyber space will be dealt with to maintain the common security of the world community. China's armed forces will strengthen international security cooperation in areas crucially related to China's overseas interests, to ensure the security of such interests.

To implement the military strategic guideline of active defense in the new situation, China's armed forces will uphold the following principles:

- To be subordinate to and in the service of the national strategic goal, implement the holistic view of national security, strengthen PMS, prevent crises, deter and win wars;
- To foster a strategic posture favorable to China's peaceful development, adhere to the national defense policy that is defensive in nature, persevere in close coordination of political, military, economic and diplomatic work, and positively cope with comprehensive security threats the country possibly encounters;
- To strike a balance between rights protection and stability maintenance, and make overall planning for both, safeguard national territorial sovereignty and maritime rights and interests, and maintain security and stability along China's periphery;
- To endeavor to seize the strategic initiative in military struggle, proactively plan for military struggle in all directions and domains, and grasp the opportunities to accelerate military building, reform and development;
- To employ strategies and tactics featuring flexibility and mobility, give full play to the overall effectiveness of joint operations, concentrate superior forces, and make integrated use of all operational means and methods;
- To make serious preparations to cope with the most complex and difficult scenarios, uphold bottom-line thinking, and do a solid job in all aspects so as to ensure proper responses to such scenarios with ease at any time and in any circumstances;
- To bring into full play the unique political advantages of the people's armed forces, uphold the CPC's absolute leadership over the military, accentuate the cultivation of fighting spirit, enforce strict discipline, improve the professionalism and strength of the troops, build closer relations between the

government and the military as well as between the people and the military, and boost the morale of officers and men;

- To give full play to the overall power of the concept of people's war, persist in employing it as an ace weapon to triumph over the enemy, enrich the contents, ways and means of the concept of people's war, and press forward with the shift of the focus of war mobilization from human resources to science and technology; and

- To actively expand military and security cooperation, deepen military relations with major powers, neighboring countries and other developing countries, and promote the establishment of a regional framework for security and cooperation.

Furthermore, the White Paper outlined an increasingly expansive role for the PLAN:¹¹³⁸

In line with the strategic requirement of offshore waters defense and open seas protection, the PLA Navy (PLAN) will gradually shift its focus from “offshore waters defense” to the combination of “offshore waters defense” with “open seas protection,” and build a combined, multi-functional and efficient marine combat force structure. The PLAN will enhance its capabilities for strategic deterrence and counterattack, maritime maneuvers, joint operations at sea, comprehensive defense and comprehensive support.

Finally, the White Paper put a strong focus put on outer space capabilities and cyber for the first time:¹¹³⁹

Outer space has become a commanding height in international strategic competition. Countries concerned are developing their space forces and instruments, and the first signs of weaponization of outer space have appeared. China has all along advocated the peaceful use of outer space, opposed the weaponization of and arms race in outer space, and taken an active part in international space cooperation. China will keep abreast of the dynamics of outer space, deal with security threats and challenges in that domain, and secure its space assets to serve its national economic and social development, and maintain outer space security.

Cyberspace has become a new pillar of economic and social development, and a new domain of national security. As international strategic competition in cyberspace has been turning increasingly fiercer, quite a few countries are developing their cyber military forces. Being one of the major victims of hacker attacks, China is confronted with grave security threats to its cyber infrastructure. As cyberspace weighs more in military security, China will expedite the development of a cyber force, and enhance its capabilities of cyberspace situation awareness, cyber defense, support for the country's endeavors in cyberspace and participation in international cyber cooperation, so as to stem major cyber crises, ensure national network and information security, and maintain national security and social stability.

China's Improving Conventional Capabilities

China's offensive military and power projection capabilities have been steadily improving. China's first aircraft carrier (Liaoning) was commissioned in September 2012, and it appears that sea-training of pilots is underway; prototype J-15 aircraft – indicating a potential multi-role capability, as opposed to solely air defense – and Z-8 AEW helicopter landings and takeoffs have been documented. The JZY-01, a carrier-borne, fixed-wing AEW aircraft, is also under development. The carrier has significant weapons (such as two 12-tube anti-submarine rocket launchers and four 18-cell FL-3000N missile systems) and radar (such as the Sea Eagle 3D search radar and an active phased array radar) systems installed.¹¹⁴⁰

Other new systems like the DH-10 land-attack cruise missile launch tubes are now equipping a test vessel, while an air-launched version of the missile has been under development for over five years and may soon be deployed. A ship-based version of the DH-10 would be able to provide significant sea-based land-attack capabilities. An air-launched version of the DH-10, the CJ-10, is being fielded on China's fleet of upgraded H-6 bombers (H-6K), giving the bombers a very long range land attack capability.

Two new Type-052D destroyers have also been developed, indicating that the PLAN desires to enhance blue-water capabilities, though it remains unclear whether many ships will be built. Combined with other classes of ships as well as the Type-052Cs, the PLAN could develop a globally deployable destroyer fleet.¹¹⁴¹

China has growing regional security interests, focusing on disputed territories, Taiwan, and the Korean Peninsula. The PRC has been developing corvettes that are geared towards this focus – such as the Type-056 that is to replace the outdated Jianghu-I frigates. It was developed quickly and six were launched in six months in 2012.¹¹⁴²

This suggests the Type-056 will be utilized in significant numbers, while simultaneously closing China's anti-submarine warfare capability gap that regional countries have been trying to exploit. It also appears the country is developing a maritime patrol aircraft, the Shaanxi Y-8 MPA, which “will improve China's surveillance over its littoral and its ability to detect the growing number of submarines in the region.”¹¹⁴³

Informationization and Realistic Training for Joint Warfare

China's enhanced conventional capabilities are being built under the doctrine of fighting “local wars under conditions of informationization”:¹¹⁴⁴

Chinese military writings describe informationized warfare as an asymmetric form of warfare used to defeat a technologically superior, information-dependent adversary through dominance of the battlefield's information space. Information operations encompass defensive and offensive military actions and focus on defending PLA information systems, while disrupting or destroying an adversary's information systems. Chinese writings view informationized warfare as a way to weaken an adversary's ability to acquire, transmit, process, and use information during war and discuss it as a way to force an adversary to capitulate before the onset of conflict.

Joint warfare plays a prominent role in this doctrine, and the PLA has emphasized realistic training in a joint warfare context. The 2015 Chinese white paper is very clear on developing more realistic training:¹¹⁴⁵

Enhancing realistic military training. The PLA will continue to attach strategic importance to combat training in realistic conditions, and strictly temper the troops according to the Outline of Military Training and Evaluation (OMTE). It will constantly innovate operational and training methods, improve military training criteria and regulations, and work to build large-scale comprehensive training bases in an effort to provide real-combat environments for training. The PLA will continue to conduct live-setting training, IT-based simulated training, and face-on-face confrontation training in line with real-combat criteria, and strengthen command post training and joint and combined training. It will intensify training in complex electro-magnetic environments, complex and unfamiliar terrains, and complex weather conditions. It will also set up a training supervision and inspection system, so as to incorporate real-combat requirements into training.

The 2016 DOD report on Chinese military developments provides additional detail on recent developments in PLA training:¹¹⁴⁶

The PLA focused last year's training on developing the capability to execute large-scale, complex joint operations. This included greater realism during exercises, improved core service capabilities, strengthened strategic campaign training, and execution of long-distance maneuvers and mobility operations. Major exercises included new iterations of the exercise series STRIDE, JOINT ACTION, and FIREPOWER.

STRIDE 2015 was both larger in scale and had more rounds of force-on-force events than last year's iteration. Ten brigades from all seven MRs deployed to a training center for three rounds of force-on-force

drills. STRIDE 2015 also included intensified operational command training for PLA officers, the integration of PLAAF and PLAA aviation units in coordinated air-to-ground strikes, and increased nighttime combat training.

JOINT ACTION 2015 consisted of five separate exercises held in locations across China in which military units from all services and civilian support assets conducted complex, large scale joint operations. Exercises in western China focused on high altitude operations, with special emphasis on using space-based reconnaissance. Exercise activity in the Nanjing MR rehearsed second-echelon logistics, over-the-shore activity, and follow-on force combat operations in support of an island landing campaign.

> FIREPOWER 2015 included two large-scale evolutions: The first phase included a PLAAF “Blue Force”—or enemy force—flying more than 200 sorties with multiple types of aircraft and unmanned aerial vehicles (UAV) attacking the PLA “Red Force” air defense units in a complex electromagnetic environment. The second phase consisted of “Blue Force” Army units using artillery, anti-tank weapons, and motorized forces to attack a “Red Force” that was focused on both offensive and defensive operations.

Improving the quality of military education is another aspect of the PLA’s efforts to enhance the training of its personnel. Not only does this include emphasis on proficiency of use of new technology, but also on the development of joint command skills. The 2014 DoD report notes:¹¹⁴⁷

Additionally, the PLA is laying the foundation for future changes in military doctrine. To develop a new cadre of officers, the PLA is reshuffling its academies to cultivate junior officers proficient with and capable of leveraging technology in all warfighting functions for joint operations. The National University of Defense Technology, for example, launched a yearlong joint operations staff officer course to serve as a pilot for a future national-level program. The course allows junior officers to rotate to the command elements of other PLA services to enhance their skills in joint operations planning and preparation.

Ground Forces

Recent Chinese official descriptions of each service do not address the risk of conflict in the Koreas or the rest of Northeast Asia. They focus instead on the general role of forces or operations other than war. They do, however, provide some insights into the Chinese view of how such forces might be used in the Koreas and Northeast Asia.

The Chinese Defense White Paper for 2013 focused on the readiness and joint warfare capabilities of the PLA and the internal security functions of Chinese paramilitary forces. This discussion often deals with Chinese ground forces in different sections, but if all of these sections are assembled together, they provide a considerable amount of detail on the overall structure of both the Chinese army and other elements of Chinese ground forces:¹¹⁴⁸

People’s Liberation Army (PLAA)

The PLA Army (PLAA) is composed of mobile operational units, border and coastal defense units, guard and garrison units, and is primarily responsible for military operations on land. In line with the strategic requirements of mobile operations and multi-dimensional offense and defense, the PLAA has been reoriented from theater defense to trans-theater mobility. It is accelerating the development of army aviation troops, light mechanized units and special operations forces, and enhancing building of digitalized units, gradually making its units small, modular and multi-functional in organization so as to enhance their capabilities for air-ground integrated operations, long-distance maneuvers, rapid assaults and special operations.

The PLAA mobile operational units include 18 combined corps, plus additional independent combined operational divisions (brigades), and have a total strength of 850,000. The combined corps, composed of divisions and brigades, are respectively under the seven military area commands (MACs): Shenyang (16th, 39th and 40th Combined Corps), Beijing (27th, 38th and 65th Combined Corps), Lanzhou (21st and 47th

Combined Corps), Jinan (20th, 26th and 54th Combined Corps), Nanjing (1st, 12th and 31st Combined Corps), Guangzhou (41st and 42nd Combined Corps) and Chengdu (13th and 14th Combined Corps).

...The PLA has a regular system of combat readiness. It improves infrastructure for combat readiness, carries out scenario-oriented drills, and earnestly organizes alert duties, border, coastal and air defense patrols and guard duties. It keeps itself prepared for undertaking operational tasks and MOOTW at all times. Based on different tasks, the troops assume different levels of readiness (Level III, Level II and Level I, from the lowest degree of alertness to the highest).

The routine combat readiness work of the PLAA serves to maintain normal order in border areas and protect national development achievements. Relying on the operational command organs and command information system, it strengthens the integration of combat readiness duty elements, explores joint duty probability within a theater, and optimizes the combat readiness duty system in operational troops at and above the regiment level. It ensures the implementation of combat readiness work through institutionalized systems and mechanisms. It creates a combat readiness system with inter-connected strategic directions, combined arms and systematized operational support. Thus, the PLAA keeps sound combat readiness with agile maneuvers and effective response.

The PLA takes scenario-based exercises and drills as the basic means to accelerate the transition in military training and raise combat capabilities. It widely practices in training such operational concepts in conditions of informationization as information dominance, confrontation between different systems, precision strike, fusion, integration and jointness. It organizes training based on real combat needs, formations and procedures. It pays special attention to confrontational command training, live independent force-on-force training and training in complex battlefield environments. Thus, the warfighting capabilities based on information systems have been thoroughly improved.

Carrying out trans-MAC training. To develop rapid-response and joint-operation capabilities in unfamiliar environments and complex conditions, the divisions and brigades of the same specialty with similar tasks and tailored operational environments are organized to carry out a series of trans-MAC live verification-oriented exercises and drills in the combined tactical training bases. In 2009, the Shenyang, Lanzhou, Jinan and Guangzhou MACs each sent one division to join long-distance maneuvers and confrontational drills. Since 2010, a series of campaign-level exercises and drills code-named “Mission Action” for trans-MAC maneuvers have been carried out. Specifically, in 2010 the Beijing, Lanzhou and Chengdu MACs each sent one division (brigade) led by corps headquarters, together with some PLAAF units, to participate in the exercise. In 2011, relevant troops from the Chengdu and Jinan MACs were organized and carried out the exercise in plateau areas. In 2012, the Chengdu, Jinan and Lanzhou MACs and relevant PLAAF troops were organized and carried out the exercise in southwestern China.

Highlighting force-on-force training. The various services and arms are intensifying confrontational and verification-oriented exercises and drills. Based on different scenarios, they organize live force-on-force exercises, online confrontational exercises and computer-simulation confrontational exercises.

Joint army training is gradually being increased in breadth and depth. Since 2007, the PLAA has conducted a number of joint training sessions with its counterparts of other countries. The PLAA joined the “Hand-in-Hand 2007” and “Hand-in-Hand 2008” joint anti-terrorism training sessions with the Indian army, “Peacekeeping Mission-2009” joint peacekeeping exercise with the Mongolian army, “Cooperation-2009” and “Cooperation-2010” joint security training exercises with Singapore, “Friendship Operation-2009” and “Friendship Operation-2010” joint military training of mountain troops with the Romanian army, and joint SOF unit training with the Turkish army. The PLAA special forces held the “Strike-2007,” “Strike-2008” and “Strike-2010” joint anti-terrorism training with their Thai counterparts, “Sharp Knife-2011” and “Sharp Knife-2012” joint anti-terrorism training with their Indonesian counterparts, “Friendship-2010” and “Friendship-2011” joint anti-terrorism training with their Pakistani counterparts, and “Cooperation-2012” joint anti-terrorism training with their Colombian counterparts. In November 2012, joint anti-terrorism training was held with the Jordanian special forces and a joint humanitarian-assistance and disaster-relief tabletop exercise with the US army.

Border and Coastal Defense Forces

...The border and coastal defense forces of the PLAA are stationed in border and coastal areas, and on islands. They are responsible for defense and administrative tasks such as safeguarding the national

borders, coastlines and islands, resisting and guarding against foreign invasions, encroachments and provocations, and assisting in cracking down on terrorist sabotage and cross-border crimes. The border and coastal defense forces focus on combat-readiness duties, strengthen the defense and surveillance of major directions and sensitive areas, watercourses and sea areas in border and coastal regions, maintain a rigorous guard against any invasion, encroachment or cross-border sabotage, prevent in a timely fashion any violation of border and coastal policies, laws and regulations and changes to the current borderlines, carry out civil-military joint control and management, and emergency response missions promptly, and effectively safeguard the security and stability of the borders and coastal areas.

...The border public security force is an armed law-enforcement body deployed by the state in border and coastal areas, and at ports. It assumes important responsibilities of safeguarding national sovereignty, and maintaining security and stability in border, coastal and sea areas, as well as entry and exit order at ports. It carries out diversified tasks of maintaining stability, combating crimes, conducting emergency rescues and providing security in border areas. The border public security force establishes border control zones along the borderlines, establishes maritime defense zones in the coastal areas, establishes border surveillance areas 20 to 50 meters in depth along land border and coastline areas adjacent to Hong Kong and Macao, sets up border inspection stations at open ports, and deploys a marine police force in coastal areas.

In recent years, regular strict inspections, management and control in border areas and at ports have been carried out to guard against and subdue separatist, sabotage, violent and terrorist activities by the “three forces” or hostile individuals. The border public security force takes strict and coordinated measures against cross-border fishing activities, strengthens law enforcement by maritime security patrols, and clamps down on maritime offenses and crimes. Since 2011, it has handled 47,445 cases, seized 12,357 kg of drugs, confiscated 125,115 illegal guns, and tracked down 5,607 illegal border-crossers.

Militia Forces

The militia takes an active part in combat readiness duties, joint military-police-civilian defense efforts, post duties, and border protection and control tasks in the border and coastal areas. Militia members patrol along the borders and coastlines all year round.

...The militia is an armed organization composed of the people not released from their regular work. As an assistant and backup force of the PLA, the militia is tasked with participating in the socialist modernization drive, performing combat readiness support and defensive operations, helping maintain social order and participating in emergency rescue and disaster relief operations. The militia focuses on optimizing its size and structure, improving its weaponry and equipment, and pushing forward reforms in training so as to enhance its capabilities of supporting diversified military operations, of which the core is to win local wars in informationized conditions. The militia falls into two categories: primary and general. The primary militia has emergency response detachments; supporting detachments such as joint air defense, intelligence, reconnaissance, communications support, engineering rush-repair, transportation and equipment repair; and reserve units for combat, logistics and equipment support.

...In peacetime, the PAPF's main tasks include performing guard duties, dealing with emergencies, combating terrorism and participating in and supporting national economic development. In wartime, it is tasked with assisting the PLA in defensive operations. Based on the national information infrastructure, the PAPF has built a three-level comprehensive information network from PAPF general headquarters down to squadrons. It develops task-oriented weaponry and equipment and conducts scenario-based training so as to improve its guard-duty, emergency-response and counter-terrorism capabilities. The PAPF is composed of the internal security force and other specialized forces. The internal security force is composed of contingents at the level of province (autonomous region or municipality directly under the central government) and mobile divisions. Specialized PAPF forces include those guarding gold mines, forests, hydroelectric projects and transportation facilities. The border public security, firefighting and security guard forces are also components of the PAPF.

As previously noted, the 2015 white paper focused entirely on strategy and did not provide the force structure numbers and statistics of the 2013 White Paper. Nevertheless, it did provide insights into the changing strategic context for using the PLA's ground forces, and its increasing role in power projection:¹¹⁴⁹

In line with the strategic requirement of mobile operations and multi-dimensional offense and defense, the PLA Army (PLAA) will continue to reorient from theater defense to trans-theater mobility. In the process of building small, multi-functional and modular units, the PLAA will adapt itself to tasks in different regions, develop the capacity of its combat forces for different purposes, and construct a combat force structure for joint operations. The PLAA will elevate its capabilities for precise, multi-dimensional, trans-theater, multi-functional and sustainable operations.

...In line with the strategic requirement of performing multiple functions and effectively maintaining social stability, the PAPF will continue to develop its forces for guard and security, contingency response, stability maintenance, counter-terrorism operations, emergency rescue and disaster relief, emergency support and air support, and work to improve a force structure which highlights guard duty, contingency response, counter-terrorism and stability maintenance. The PAPF will enhance its capabilities for performing diversified tasks centering on guard duty and contingency response in informationized conditions.

The 2016 DOD report on Chinese military power provided more detail on both Chinese regular ground forces and China's internal security forces:¹⁵⁰

In November 2015, the PLA established a separate Army headquarters for its ground forces. The CMC creation in late 2015 of a separate Army headquarters set the conditions for joint operations by leveling the status of the services. This change has required an alteration in the organization of theater commands, which for the first time are establishing separate subordinate theater army headquarters to lead their ground components.

Other aspects of PLAA modernization continued in 2015. The PLA also continued to modernize and to restructure its ground force to create a fully modern army capable of fighting and winning multiple simultaneous regional land wars as the core element of a national joint force. In 2015, the PLAA emphasized mobility exercises across MRs, the mechanization of combat brigades, the creation of high-mobility infantry and combined-arms battalions, and the delivery of advanced command, control, communication, computers, and intelligence (C4I) equipment that provides real-time data-sharing at the division and brigade level.

Modernization also involves improved rotary-wing army aviation with precision-guided munitions (including dedicated air-to-air missiles for helicopter-to-helicopter aerial combat). The PLAA continued to field tracked and wheeled artillery systems, wheeled anti-tank guns, anti-tank guided missiles, wheeled and tracked armored vehicles, and air defense systems which incorporate advanced target-acquisition capabilities. Advanced long-range artillery systems—conventional and rocket—as well as supporting target-acquisition systems continued to enter the force, providing PLAA tactical- and operational-level units with world-class, long-range strike capabilities.

Two increasingly influential PLAA ground force exercise series are the STRIDE and FIREPOWER. In a STRIDE exercise, the PLAA assesses a maneuver brigade as it deploy across MR boundaries to a training center, where it then goes into carefully observed force-on-force combat against a non-cooperative dedicated opposition force (OPFOR). Battlefield success is determined primarily through extensive laser engagement systems keyed to each weapon system, much as U.S. Army units train at the National Training Center.

The FIREPOWER exercise series is for artillery brigades and air defense brigades, which deploy across MR boundaries and conduct extensive live-fire practice carefully observed and evaluated by dedicated observer-controllers. Last year, the PLAA placed even more emphasis on increasing its ability to deploy operational campaign-level forces across long distances quickly, entering immediately thereafter into force-on-force combined-arms combat. In 2015, 15 combat maneuver brigades undertook a STRIDE exercise iteration, more than double the seven maneuver brigades that conducted a STRIDE exercise in 2014.

In 2014, the FIREPOWER exercise series trained 10 brigades across a number of training areas. In contrast, the 2015 FIREPOWER series trained 14 brigades at two dedicated live-fire training areas in the Lanzhou MR. Seven artillery brigades deployed to the Qingtongxia training area and seven air defense brigades deployed to the Shandan training area.

In 2015, PLAA academies conducted command-post exercises (CPX) with units conducting STRIDE and acting as the dedicated OPFOR for FIREPOWER exercises. Rather than having commanders and staffs travel to the academies, the PLAA's command software system was used to support training units at their training centers, with the pertinent academy personnel remaining at their academies. Distributed training at this level of sophistication represents a considerable advance for the PLAA, especially since the first academy cadre OPFOR-unit training only was conducted in 2012.

PLAA exercises in 2015 continued the trend of improving rotary-wing army aviation operational capabilities and overall air-ground and C2 capabilities with improved networks providing real-time data sharing within and between units. The production and fielding of improved PLAA wheeled and tracked armored vehicles, advanced air defense systems, and EW capabilities continues, as does the spread of advanced long-range artillery systems along with their supporting target-acquisition systems, including SOF trained for deep-strike reconnaissance. All elements of the PLAA were major players in the extensive JOINT ACTION-2015 series of exercises which included a focus on SOF integration with long-range fire strike assets.

The IISS *Military Balance* for 2013 reported that China was modernizing its Army in order to make it a more flexible and quick-reaction force. This could allow it to significantly improve its capability to reinforce the DPRK if it chose to do so:¹¹⁵¹

...[T]he army is continuing to reorganize and receive substantial investment, in efforts to make it a more flexible, leaner force capable of rapid combined-arms operations. At the heart of this transformation is the 'brigadisation' process, whereby regiments and divisions have been recast as combined-arms brigades. By early 2012, PLA army aviation regiments and armored divisions were reforming as brigades. ...The development of 'heavy', 'medium' and 'light' formations, along with the brigadisation process of 'create, test and adjust' is similar to the Russian experience of army reform and arguably mirrors the experiences of Western armed forces; the same can be said of the developing capabilities of the PLA ground forces, with increased emphasis on platforms capable of adapting to differing firepower, protection and mobility demands.

The 2014 edition of the IISS *Military Balance* highlighted continued developments of this kind, and pointed towards China's efforts at rectifying its rotary-lift shortfall. This suggests continuing efforts to build a more flexible ground force:¹¹⁵²

In the latest phase of the PLA's ground forces restructuring, eight of the nine remaining armored divisions have been broken up, and two regiments from each used as the basis for 16 new brigades – eight armored and eight mechanized. One of the new mechanized brigades has been designated the PLA's first dedicated OPFOR formation. By contrast, the mechanized infantry divisions – and the Beijing based 6th Armored Division – remain untouched; these unreformed formations will continue to provide an insurance policy of sorts for the PLA as it gradually adapts to a brigade-based structure.

These organizational changes have also seen a considerable redistribution of new and existing equipment in an attempt to standardize tank, armored vehicle and artillery holdings in the new brigades. Surplus armored vehicles have been used to upgrade some previously motorized brigades to light mechanized status. Armored vehicle production appears to have settled into two streams, with the high-end Type-99A MBT, Type-04A AIFV and Type-09 APC being built in smaller numbers for select units, and the Type-96A MBT, Type-86A AIFV and Type-92 APC allocated to the rest.

Given the scale of the task, it is likely that the ageing Type-59 MBT and Type-63 APC will continue to form a substantial part of the PLA's AFV inventory for some time. The appearance of a new light tank, which seems to be a combination of Type-99A-style turret with a smaller chassis and main gun, could herald the final retirement of the Type-62.

The PLA had also begun to address its longstanding deficiency in rotary lift. Continuing production of the Z-10 and Z-19 attack helicopters, and the Z-8B transport helicopter, has allowed the expansion of several aviation regiments into full brigades with larger inventories.

However, the 2016 IISS *Military Balance* noted that the massive modernization efforts being directed towards various parts of the PLA were not necessarily being replicated in the PLAA. The IISS stated:¹¹⁵³

The Victory Day parade also gave an opportunity to demonstrate the PLA ground forces' modernization and mechanization programs, although the 112th Mechanized Division, from which the bulk of the armored vehicles on display were drawn, remains unrepresentative of the wider PLA.

Despite continuing to make progress in both equipment standardization and mechanization, the ground forces are clearly a lower priority than other PLA branches in terms of investment in new technology. The bulk of the new armored fighting vehicles being issued to units remain 'second-tier' models such as the ZTZ-96A main battle tank and the ZBL-92 infantry fighting vehicle/armored personnel carrier. Vehicle fleets in general remain heavily geared towards legacy platforms.

Naval Forces

China's Navy has undergone significant expansion over the past decade – driven in part by the 1995-6 Taiwan Strait Crisis, which convinced the PRC leadership of the importance of naval power in balance US force capabilities to serve its interests in the region. In general, China is rapidly developing its maritime capabilities – including its large and expanding merchant marine, significant offshore energy and minerals exploration, development in the global shipbuilding markets, an increasing fishing fleet, and its rapidly modernizing Navy. China is also increasingly relying on a “maritime militia” made up largely of civilian fisherman but supported by the military.¹¹⁵⁴

The 2013 Chinese Defense White Paper highlighted the expanding “blue water” range of Chinese naval forces, improved readiness and training, and joint warfare capabilities – all of which increased Chinese capabilities to project power and execute area denial activities. If all of the various sections in the White Paper that deal with the PLAN are assembled together, they provide a considerable amount of detail on both current PLAN capabilities and the trends in these forces:¹¹⁵⁵

The PLA Navy (PLAN) is China's mainstay for operations at sea, and is responsible for safeguarding its maritime security and maintaining its sovereignty over its territorial seas along with its maritime rights and interests. The PLAN is composed of the submarine, surface vessel, naval aviation, marine corps and coastal defense arms. In line with the requirements of its offshore defense strategy, the PLAN endeavors to accelerate the modernization of its forces for comprehensive offshore operations, develop advanced submarines, destroyers and frigates, and improve integrated electronic and information systems. Furthermore, it develops blue-water capabilities of conducting mobile operations, carrying out international cooperation, and countering non-traditional security threats, and enhances its capabilities of strategic deterrence and counterattack. Currently, the PLAN has a total strength of 235,000 officers and men, and commands three fleets, namely, the Beihai Fleet, the Donghai Fleet and the Nanhai Fleet. Each fleet has fleet aviation headquarters, support bases, flotillas and maritime garrison commands, as well as aviation divisions and marine brigades. In September 2012, China's first aircraft carrier Liaoning was commissioned into the PLAN. China's development of an aircraft carrier has a profound impact on building a strong PLAN and safeguarding maritime security.

...The PLAN strengthens maritime control and management, systematically establishes patrol mechanisms, effectively enhances situational awareness in surrounding sea areas, tightly guards against various types of harassment, infiltration and sabotage activities, and copes promptly with maritime and air incidents and emergencies. It advances maritime security cooperation, and maintains maritime peace and stability, as well as free and safe navigation. Within the framework of the Military Maritime Consultative Agreement (MMCA), the Chinese and US navies regularly exchange maritime information to avoid accidents at sea. According to the Agreement on Joint Patrols by the Navies of China and Vietnam in the Beibu Gulf, the two navies have organized joint patrols twice a year since 2006.

...Intensifying blue water training...The PLAN is improving the training mode of task force formation in blue water. It organizes the training of different formations of combined task forces composed of new types of destroyers, frigates, ocean-going replenishment ships and shipborne helicopters. It is increasing its research and training on tasks in complex battlefield environments, highlighting the training of remote early warning, comprehensive control, open sea interception, long-range raid, anti-submarine warfare and vessel protection at distant sea. The PLAN organizes relevant coastal forces to carry out live force-on-force training for air defense, anti-submarine, anti-mine, anti-terrorism, anti-piracy, coastal defense, and island and reef sabotage raids. Since 2007, the PLAN has conducted training in the distant sea waters of the Western Pacific involving over 90 ships in nearly 20 batches. During the training, the PLAN took effective measures to respond to foreign close-in reconnaissance and illegal interference activities by military ships and aircraft. From April to September 2012, the training vessel Zhenghe completed global-voyage training, paying port calls to 14 countries and regions.

To fulfill China's international obligations, the Chinese navy carries out regular escort missions in the Gulf of Aden and waters off Somalia. It conducts exchanges and cooperation with other escort forces to jointly safeguard the security of the international SLOCs. As of December 2012, Chinese navy task groups have provided protection for four WFP ships and 2,455 foreign ships, accounting for 49% of the total of escorted ships. They helped four foreign ships, recovered four ships released from captivity and saved 20 foreign ships from pursuit by pirates.

Chinese navy escort task forces have maintained smooth communication with other navies in the areas of joint escort, information sharing, coordination and liaison. They have conducted joint escorts with their Russian counterparts, carried out joint anti-piracy drills with naval ships of the ROK, Pakistan and the US, and coordinated with the European Union to protect WFP ships. It has exchanged boarding visits of commanders with task forces from the EU, NATO, the Combined Maritime Forces (CMF), the ROK, Japan and Singapore. It has exchanged officers for onboard observations with the navy of the Netherlands. China takes an active part in the conferences of the Contact Group on Piracy off the Coast of Somalia (CGPCS) and "Shared Awareness and Deconfliction" (SHADE) meetings on international merchant shipping protection.

Since January 2012, independent deployers such as China, India and Japan have strengthened their convoy coordination. They have adjusted their escort schedules on a quarterly basis, optimized available assets, and thereby enhanced escort efficiency. China, as the reference country for the first round of convoy coordination, submitted its escort timetable for the first quarter of 2012 in good time. India and Japan's escort task forces adjusted their convoy arrangements accordingly, thereby formulating a well-scheduled escort timetable. The ROK joined these efforts in the fourth quarter of 2012.

...The routine combat readiness work of the PLAN serves to safeguard national territorial sovereignty and maritime rights and interests. It carries out diversified patrols and provides whole-area surveillance in a cost-effective way. The PLAN organizes and performs regular combat readiness patrols, and maintains a military presence in relevant sea areas. All fleets maintain the necessary number of ships patrolling in areas under their respective command, beef up naval aviation reconnaissance patrols, and organize mobile forces to conduct patrols and surveillance in relevant sea areas, as required.

Joint maritime exercises and training are being expanded. In recent years, the Chinese navy has taken part in the "Peace-07," "Peace-09" and "Peace-11" multinational maritime exercises hosted by Pakistan on the Arabian Sea. The PLA and Russian navies held the "Maritime Cooperation-2012" military drill in the Yellow Sea off China's east coast focusing on joint defense of maritime traffic arteries. Chinese and Thai marine corps held the "Blue Strike-2010" and "Blue Strike-2012" joint training exercises. During mutual port calls and other activities, the Chinese navy also carried out bilateral or multilateral maritime exercises and training in such tasks as communications, formation movement, maritime replenishment, cross-deck helicopter landing, firing at surface, underwater and air targets, joint escort, boarding and inspection, joint search and rescue and diving with its counterparts of India, France, the UK, Australia, Thailand, the US, Russia, Japan, New Zealand and Vietnam.

...In combination with its routine combat readiness activities, the PLAN provides security support for China's maritime law enforcement, fisheries, and oil and gas exploitation. It has established mechanisms to coordinate and cooperate with law-enforcement organs of marine surveillance and fishery administration, as well as a joint military-police-civilian defense mechanism. Further, the PLAN has worked in

coordination with relevant local departments to conduct maritime survey and scientific investigation; build systems of maritime meteorological observation, satellite navigation, radio navigation and navigation aids; release timely weather and sea traffic information; and ensure the safe flow of traffic in sea areas of responsibility.

While the 2015 white paper only commented briefly on the PLAN, it still put forth a strategic vision for an expanded and more active PLAN:¹¹⁵⁶

In line with the strategic requirement of offshore waters defense and open seas protection, the PLA Navy (PLAN) will gradually shift its focus from “offshore waters defense” to the combination of “offshore waters defense” with “open seas protection,” and build a combined, multi-functional and efficient marine combat force structure. The PLAN will enhance its capabilities for strategic deterrence and counterattack, maritime maneuvers, joint operations at sea, comprehensive defense and comprehensive support.

The 2016 DOD report described a variety of naval developments in the PLA Navy:¹¹⁵⁷

Over the past 15 years, China’s ambitious naval modernization program has produced a more technologically advanced and flexible force. The PLAN now possesses the largest number of vessels in Asia, with more than 300 surface ships, submarines, amphibious ships, and patrol craft. China is rapidly retiring legacy combatants in favor of larger, multi-mission ships equipped with advanced anti-ship, anti-air, and anti-submarine weapons and sensors. China continues its gradual shift from “near sea” defense to “far seas” protection as espoused in its most recent DWP, with the PLAN conducting operational tasks outside the so-called “first island chain” with multi-mission, long-range, sustainable naval platforms that have robust self-defense capabilities.

The PLAN places a high priority on the modernization of its submarine force and currently possesses five SSNs, four nuclear-powered ballistic missile submarines (SSBN), and 53 diesel-powered attack submarines (SS/SSP). By 2020, this force will likely grow to between 69 and 78 submarines. In addition to the 12 KILO-class SS units acquired from Russia in the 1990s and 2000s, China has built 13 SONG-class SS (Type 039) and 13 YUAN-class SSP (Type 039A) with a total of 20 YUANs planned for production.

China continues to improve its SSN force, and four additional SHANG-class SSN (Type 093) will eventually join the two already in service. The SHANG SSN will replace the aging HAN-class SSN (Type 091). These improved SHANG SSNs feature a vertical launch system (VLS) and may be able to fire the YJ-18 advanced anti-ship cruise missile (ASCM). Over the next decade, China may construct a new Type 095 nuclear-powered, guided-missile attack submarine (SSGN), which not only would improve the PLAN’s anti-surface warfare capability but might also provide it with a more clandestine land-attack option.

Finally, China continues to produce the JIN-class SSBN (Type 094) with associated CSS-N-14 (JL-2) submarine-launched ballistic missiles (SLBM) that has an estimated range of 7,200 km. This platform represents China’s first credible, sea-based nuclear deterrent. China will probably conduct its first SSBN nuclear deterrence patrol sometime in 2016. Four JIN SSBNs are operational, and up to five may enter service before China begins developing and fielding its next-generation SSBN, the Type 096, over the coming decade. The Type 096 will reportedly be armed with a successor to the JL-2, the JL-3 SLBM.

Since 2008, the PLAN has continued a robust surface combatant construction program of various classes of ships, including guided-missile destroyers (DDG) and guided-missile frigates (FFG). During 2015, the final LUYANG II-class DDG (Type 052C) entered service, bringing the total number of ships of this class to six. Additionally, a second LUYANG III-class DDG (Type 052D) entered service in 2015. It has a multipurpose VLS capable of launching ASCMs, land-attack cruise missiles (LACM), surface-to-air missiles (SAM), and antisubmarine missiles.

China has also probably begun construction of a larger Type 055 “destroyer,” a vessel better characterized as a guided-missile cruiser (CG) than a DDG. China has continued to produce the JIANGKAI II-class FFG (Type 054A), with 20 ships currently in the fleet and five in various stages of construction. These new DDGs and FFGs provide a significant upgrade to the PLAN’s air defense capability, which will be critical as it expands operations into distant seas beyond the range of shore-based air defense systems.

Augmenting the PLAN's littoral warfare capabilities, especially in the South China Sea and East China Sea, is a new class of small combatant. Twenty-five JIANGDAO-class corvettes (FFL) (Type 056) are in service and the latest ships have been upgraded to anti-submarine warfare (ASW) variants with a towed array sonar. China may build more than 60 of this class, ultimately replacing older PLAN destroyers and frigates. China also has 60 HOUBEI-class wave-piercing catamaran guided-missile patrol boats (PTG) (Type 022) built for operations in China's "near seas."

The PLAN continues to emphasize anti-surface warfare (ASUW) as its primary focus, including modernizing its advanced ASCMs and associated over-the-horizon targeting systems. Older surface combatants carry variants of the YJ-83 ASCM (65 nm, 120 km), while newer surface combatants such as the LUYANG II are fitted with the YJ-62 (120 nm, 222 km). The LUYANG III and Type 055 CG will be fitted with a variant of China's newest ASCM, the YJ-18 (290 nm, 537 km), which is a significant step forward in China's surface ASUW capability.

Eight of China's 12 KILOs are equipped with the SS-N-27 ASCM (120 nm, 222 km), a system China acquired from Russia. China's newest indigenous submarine-launched ASCM, the YJ-18 and its variants, represents an improvement over the SS-N-27, and will be fielded on SONG, YUAN, and SHANG submarines. China's previously produced submarine-launched ASCM, the YJ-82, is a version of the C-801, which has a much shorter range.

The PLAN recognizes that long-range ASCMs require a robust, over-the-horizon targeting capability to realize their full potential, and China is investing in reconnaissance, surveillance, command, control, and communications systems at the strategic, operational, and tactical levels to provide high-fidelity targeting information to surface and subsurface launch platforms.

China's investments in its amphibious ship force signal China's intent to develop an expeditionary and over-the-horizon amphibious assault capability as well as HA/DR and counterpiracy capabilities. Since 2005, China has built three large YUZHAO-class (Type 071) amphibious transport docks (LPD) with a fourth soon to enter service, providing considerably greater and more flexible capability for "far seas" operations than the older landing ships. The YUZHAO can carry up to four of the new YUYI-class air-cushion medium landing craft (LCMA) and four or more helicopters, as well as armored vehicles and marines for long-distance deployments.

Additional YUZHAO construction is expected in the near-term, as is a follow-on amphibious assault ship that is not only larger, but incorporates a full flight deck for helicopters. Two YUTING II-class tank landing ships (LST) are currently being built to replace older LST units that are reaching the end of their service lives, and to support logistics operations, particularly in the South China Sea.

In 2015, the PLAN's first aircraft carrier, LIAONING, certified its first cohort of domestically trained J-15 operational pilots. The air wing is expected to deploy on the carrier in 2016. China also began construction of its first domestic aircraft carrier and could build multiple aircraft carriers over the next 15 years. Even when fully operational, LIAONING will not enable long-range power projection similar to U.S. NIMITZ-class carriers. LIAONING's smaller size limits the number of aircraft it can embark, while the ski-jump configuration limits aircraft fuel and ordnance loads. LIAONING will possibly be used for fleet air defense missions, extending air cover over a fleet operating far from land-based coverage. Although it possesses a full suite of weapons and combat systems, LIAONING will probably continue to play a significant role in training China's carrier pilots, deck crews, and developing tactics that will be used with later, more capable carriers.

A separate analysis by Andrew Erikson, Lyle Goldstein, and Carnes Lord in 2010 reported that¹¹⁵⁸

The platforms and weapons systems that have emerged... are asymmetric in nature and anti-access in focus; they target a full spectrum of vulnerabilities inherent in CSGs and other power-projection platforms. Navigation satellites, new-generation submarines, sea mines and cruise and ballistic missiles promise to give China an ability to defend its maritime periphery in ways that were simply impossible 15 years ago. It is unlikely, however, that the Chinese think they can or should prepare to challenge the United States in a head-to-head clash of major surface forces in the Pacific. For the time being, they value the U.S. Seventh Fleet as a means to reassure regional stability that underwrites Chinese commerce and costs China nothing.

However, they have recently shown signs of moving beyond a maritime strategy heavily reliant on submarines and land-based air and missile attack... toward one that also includes major surface combatants....

...[C]ommerce protection and the importance of sea lines of communication clearly resonate with the Chinese leadership. As China has become more dependent on seaborne oil imports from the Persian Gulf and Africa in recent years—a dependence that no amount of overland pipeline construction is likely to reduce anytime soon—it is plainly worried about a potential threat to its oil tankers in transit through the Strait of Malacca and the Indian Ocean... it appears to be in the process of helping to develop facilities and infrastructure of various kinds (most notably, the deep-water port at Gwadar in Pakistan) in friendly countries throughout this region.

China has worked to develop its submarine force with both conventional and nuclear submarines over the past 15 years. Andrew S. Erickson has summarized such developments as follows:¹¹⁵⁹

China's submarine force is one of its core strengths, but it contains considerable variety. On the nuclear-powered ballistic-missile submarine (SSBN) front, three Type 094 hulls are already in service. Their armament awaits deployment of the JL-2 submarine-launched ballistic missile (SLBM), which is currently undergoing flight testing. The underground base at Yalong Bay on Hainan Island, which is emerging as a likely center of Chinese SSBN operations, offers proximity to deep water in otherwise cluttered and possibly closely monitored water space. The Office of Naval Intelligence's most recent unclassified report characterizes the Type 094 as relatively noisy compared to equivalent Russian platforms. This noisiness, and the lack of an operational SLBM, leave it unable as yet to take full advantage of its South China Sea location. Follow-on variants of both hull and missile, as well as further training and operational experience, may be required before the system as a whole is capable of effective deterrence patrols. Moreover, command and control issues inherent in successful SSBN operations may give Beijing pause and slow development. Meanwhile, China's land-based, partially mobile nuclear-missile forces are already extensive and highly capable. Their stealth is greatly enhanced by use of decoys and secure fiber-optic communications, options unavailable to submarines. While China is heading toward a nuclear dyad (Second Artillery and PLAN), it is likely to be a slow and cautious road.

For current nonnuclear operations, the key platforms are not SSBNs but rather conventional and nuclear-powered attack submarines (SSN). The relative emphasis between them is an important indicator of China's prioritization of near-seas versus far-seas operations. China's conventionally powered submarines, already quiet but constrained by the speed and power limitations of their type, are relevant primarily to near-seas operations. This applies even to the advanced Yuan-class, whose likely air-independent propulsion (AIP) would permit several weeks of low-speed submerged operations without snorkeling, which makes antisubmarine warfare against them more difficult. AIP also saves batteries to support several hours of high-speed engagement and escape maneuvers. SSNs, by contrast, are important for far-seas power projection because of their unparalleled power and endurance. China's numbers and capabilities remain limited here, but this will be an important indicator to watch.

Erickson also provides useful background on China's commissioning of its first aircraft carrier on September 25, 2012:¹¹⁶⁰

According to China's Ministry of National Defense, Liaoning will facilitate PLAN integrated combat force modernization, help address sovereignty issues, and advance new historic missions by "developing far seas cooperation" and capabilities to deal with nontraditional security threats. Particularly important is its future significance for "enhancing protection operations capabilities" (*zengqiang fangwei zuozhan nengli*) by using air power to cover vessels operating out of area.

While *Liaoning* will initially serve as a training and test platform, and cannot threaten capable forces such as the U.S. Navy or the Japan Maritime Self-Defense Force, PLAN-affiliated experts advocate using its formidable symbolism and potential for future air power to deter smaller neighbors such as Vietnam from pursuing competing claims in the South China Sea. [C]arriers will constitute part of... lower-intensity tertiary layer of Chinese naval and air power development... China will probably develop multiple aircraft carriers so that one can always remain at sea while the others are undergoing refitting or being used for training.

Liaoning is a short takeoff but arrested recovery (STOBAR) carrier, which combines an un-catapulted, rolling takeoff assisted by a ski jump with a traditional arrested recovery system that permits the landing of fighter aircraft in short deck space. The STOBAR design entails several major limitations.... To increase its deck aviation capabilities substantially, China must develop a catapult-assisted takeoff but arrested recovery (CATOBAR) carrier; the question is how soon it will actually do so. It is uncertain whether China has started “indigenous construction,” and how that might be defined. Chinese shipyards may already be working on components. More broadly, will China seek to construct its own version of *Liaoning* first?... Alternatively, might China wait to master more complex processes, and then construct a CATOBAR carrier? The nature of China’s second indigenously constructed aircraft carrier will tell much about its deck aviation trajectory.

Chinese naval modernization includes operations as well. In 2011, the Chinese Navy undertook its first operational deployment to a distant part of the world (Africa and the Mediterranean) to protect its citizens, also its largest noncombatant evacuation operation, when it dispatched the frigate *Xuzhou* to Libya to support and protect Chinese citizen evacuation, most of which occurred on chartered merchant vessels, chartered aircraft, military aircraft, and overland buses.

The operation involved a significant level of interagency cooperation along with private industry assistance. It also indicates that the Chinese military is becoming more proficient in long-range operations, while transport logistics and the political will to send forces overseas have also risen markedly.¹¹⁶¹ The success of this operation will also likely increase naval procurement and the government’s investment in more robust long-range naval capability in general, as well as the aircraft carrier program.¹¹⁶²

The 2016 DOD report noted that:¹¹⁶³

China is expanding its access to foreign ports to pre-position the necessary logistics support to regularize and sustain deployments in the “far seas,” waters as distant as the Indian Ocean, Mediterranean Sea, and Atlantic Ocean. In late November, China publicly confirmed its intention to build military supporting facilities in Djibouti “to help the navy and army further participate in United Nations peacekeeping operations (PKO), carry out escort missions in the waters near Somalia and the Gulf of Aden, and provide humanitarian assistance.” This Chinese initiative both reflects and amplifies China’s growing geopolitical clout, extending the reach of its influence and armed forces.

- China’s expanding international economic interests are increasing demands for the PLAN to operate in more distant seas to protect Chinese citizens, investments, and critical sea lines of communication (SLOC).
- China most likely will seek to establish additional naval logistics hubs in countries with which it has a longstanding friendly relationship and similar strategic interests, such as Pakistan, and a precedent for hosting foreign militaries. China’s overseas naval logistics aspiration may be constrained by the willingness of countries to support a PLAN presence in one of their ports.

Air and Air Defense Forces

The Chinese Defense White Paper for 2013 focused on the expanded mission capabilities of Chinese air and air defense forces and key aspects of their modernization and joint warfare capabilities. Once again, this discussion dealt with Chinese forces in different sections; if all of these sections are assembled together, they provide considerable detail on the overall structure of Chinese air and air defense forces.¹¹⁶⁴

The PLA Air Force (PLAAF) is China’s mainstay for air operations, responsible for its territorial air security and maintaining a stable air defense posture nationwide. It is primarily composed of aviation, ground air defense, radar, airborne and electronic countermeasures (ECM) arms. In line with the strategic requirements of conducting both offensive and defensive operations, the PLAAF is strengthening the development of a combat force structure that focuses on reconnaissance and early warning, air strike, air

and missile defense, and strategic projection. It is developing such advanced weaponry and equipment as new-generation fighters and new-type ground-to-air missiles and radar systems, improving its early warning, command and communications networks, and raising its strategic early warning, strategic deterrence and long-distance air strike capabilities. The PLAAF now has a total strength of 398,000 officers and men, and an air command in each of the seven Military Area Commands (MACs) of Shenyang, Beijing, Lanzhou, Jinan, Nanjing, Guangzhou and Chengdu. In addition, it commands one airborne corps. Under each air command are bases, aviation divisions (brigades), ground-to-air missile divisions (brigades), radar brigades and other units.

...The PLAAF is the mainstay of national territorial air defense, and in accordance with the instructions of the CMC, the PLAA, PLAN and PAPF all undertake some territorial air defense responsibilities. In peacetime, the chain of command of China's air defense runs from the PLAAF headquarters through the air commands of the military area commands to air defense units. The PLAAF exercises unified command over all air defense components in accordance with the CMC's intent. China's air defense system is composed of six sub-systems of reconnaissance and surveillance, command and control, aerial defense, ground air defense, integrated support and civil air defense. China has established an air defense force system that integrates reconnaissance and early warning, resistance, counterattack and protection. For air situation awareness means, air detection radars and early warning aircraft are the mainstay, supplemented by technical and ECM reconnaissance. For resistance means, fighters, fighter-bombers, ground-to-air missiles and antiaircraft artillery troops are the mainstay, supplemented by the strengths from the PLAA air defense force, militia and reserves, as well as civil air defense. For integrated protection means, various protection works and strengths are the mainstay, supplemented by specialized technical protection forces.

The PLAAF organizes the following routine air defense tasks: reconnaissance and early warning units are tasked with monitoring air situations in China's territorial air space and surrounding areas and keeping abreast of air security threats. Command organs at all levels are tasked with assuming routine combat readiness duties with the capital as the core, and border and coastal areas as the key, and commanding air defense operations at all times. Routine air defense troops on combat duty are tasked with carrying out air vigilance and patrols at sea, conducting counter-reconnaissance in border areas and verifying abnormal and unidentified air situations within the territory. The air control system is tasked with monitoring, controlling and maintaining air traffic order so as to ensure flight safety.

...The PLAAF focuses its daily combat readiness on territorial air defense. It follows the principles of applicability in both peacetime and wartime, all-dimension response and full territorial reach, and maintains a vigilant and efficient combat readiness. It organizes air alert patrols on a regular basis to verify abnormal and unidentified air situations promptly. The PLAAF command alert system takes PLAAF command posts as the core, field command posts as the basis, and aviation and ground air defense forces on combat duty as the pillar.

...The PLAAF creates complex battlefield environments based on its training bases, organizes confrontational exercises on "Red-Blue" war systems under informationized conditions, either between MAC air forces or between a combined "Blue Team" and MAC air force ("Red Team").

Joint air force training is also making progress. The PLAAF contingent held the "Shaheen-1" joint training of operational aerial maneuvers with its Pakistani counterpart in March 2011. China's airborne commandos and their Venezuelan counterparts held the "Cooperation-2011" urban joint anti-terrorism training in October of the same year. China's airborne troops joined their Belarusian counterparts in the joint training code-named "Divine Eagle-2011" and "Divine Eagle-2012" respectively in July 2011 and November 2012.

The DOD report on Chinese military power for 2016 described Chinese progress in air and space modernization as follows:¹¹⁶⁵

The PLAAF is the largest air force in Asia and the third largest in the world, with more than 2,800 total aircraft (not including UAVs) and 2,100 combat aircraft (including fighters, bombers, fighter-attack and attack aircraft). The PLAAF is rapidly closing the gap with western air forces across a broad spectrum of capabilities from aircraft and command-and-control (C2) to jammers, electronic warfare (EW), and datalinks. The PLAAF continues to field additional fourth-generation aircraft (now about 600). Although it still operates a large number of older second- and third-generation fighters, it will probably become a majority fourth-generation force within the next several years.

The PLAAF and PLAN may become more prominent within the PLA if China proceeds with the personnel reductions announced in September 2015. Last year, the personnel levels of the PLAAF and PLAN were just 398,000 and 235,000 respectively, accounting for 27.5 percent of the PLA overall. The PLA's planned personnel reductions may increase the relative size of the PLAAF and PLAN; Chinese analysts speculate the absolute size of the two services may even increase.

China has developed the J-10B follow-on to its first indigenously designed fourth-generation fighter and it is expected to enter service in the near-term. The PLA is also likely to acquire the Su-35 Flanker aircraft from Russia along with its advanced radar system. If China does procure the Su-35, the aircraft could enter service by 2018. In November 2015, talks to purchase 24 Su-35 fighters reportedly concluded successfully.

China has been pursuing fifth-generation fighter capabilities since at least 2009 and is the only country other than the United States to have two concurrent stealth fighter programs. China seeks to develop these advanced aircraft to improve its regional power projection capabilities and to strengthen its ability to strike regional airbases and facilities. The PLAAF has observed foreign military employment of stealth aircraft and views this technology as a core capability in its transformation from a predominantly territorial air force to one capable of conducting both offensive and defensive operations. PLAAF leaders believe stealth aircraft provide an offensive operational advantage that denies an adversary the time to mobilize and to conduct defensive operations. In 2015, China began flight testing its fifth and sixth J-20 stealth fighter prototypes. Within two years of the J-20's first flight in January 2011, China tested a second next-generation fighter prototype. The prototype, referred to as the FC-31 (and unofficially as the J-31), is similar in size to a U.S. F-35 fighter and appears to incorporate design characteristics similar to the J-20. The FC-31 conducted its first flight on October 31, 2012, and debuted at China's 10th China International Aviation & Aerospace Exhibition in Zhuhai in November 2014. The Aviation Industry Corporation of China (AVIC) is actively marketing the FC-31 as an export fifth-generation multirole fighter to compete with the F-35 for foreign sales. AVIC is reportedly in negotiations with the PLAAF to sell the FC-31 for domestic use. In addition to manned fighter aircraft, the PLAAF also views stealth technology as integral to unmanned aircraft, specifically those with an air-to-ground role, as this technology would improve that system's ability to penetrate heavily protected targets.

China is also producing bomber-class aircraft. China continues to upgrade its H-6 bomber fleet (originally adapted from the late-1950s Soviet Tu-16 design) to increase operational effectiveness and lethality by integrating new standoff weapons. The PLAAF operates three different H-6 bomber variants. The H-6H and the more capable H-6M have been in service since the last decade. The PLAAF also employs the new, fully redesigned H-6K variant with new turbofan engines for extended range and the capability to carry six LACMs. Converting the H-6 into a cruise missile carrier gives the PLA a long-range standoff offensive air capability with precision-guided munitions capable of striking Guam. In 2015, China flew H-6Ks into the western Pacific Ocean in a demonstration of the airframe's long-range capability. PLA Navy Aviation utilizes a nearly identical version of the earlier H-6, known as the H-6G equipped with systems and four weapons pylons for ASCMs to support maritime missions. All of China's H-6 variants maintain their traditional bomb bay for gravity bombs, precision guided bombs, and naval mines. China also uses a modified version of the H-6, known as the H-6U to conduct aerial refueling operations for some of its indigenous fighter aircraft, increasing their operational ranges. China is also receiving receive IL-78s from Ukraine, which are outfitted as air-refueling tankers. China-Ukraine negotiations for additional tankers will likely continue. Although China can refuel fighter aircraft, to date no H-6 variants are capable of being refueled while airborne.

China is improving its airfields in the South China Sea with the availability of Woody Island Airfield in the Paracel Islands and construction of up to three new airfields in the Spratly Islands. All of these airfields could have runways long enough to support any aircraft in China's inventory. During late-October 2015 the PLAN deployed four of its most capable air superiority fighters, the J-11B, to Woody Island.

The PLAAF possesses one of the largest forces of advanced long-range SAM systems in the world, consisting of a combination of Russian-sourced SA-20 (S-300PMU1/2) battalions and domestically produced CSA-9 (HQ-9) battalions. In an effort to improve its strategic air defense systems even further, China plans to import Russia's S-400/Triumpf SAM system, as a follow-on to the SA-20, and may simultaneously develop its indigenous CSA-X-19 (HQ-19) to provide the basis for a ballistic missile defense capability.

China's development of fifth-generation stealth combat aircraft has led to the J-20 and the J-31, which have attracted much international attention. The 2016 DOD report described the following Chinese goals for its stealth aircraft:¹¹⁶⁶

The planned development of China's fifth-generation fighter force will bolster China's air-to-air capability. These fighters feature high maneuverability, low observability, and an internal weapons bay, based on the J-20 or FC-31/J-31 prototypes. Other key features of these aircraft are modern avionics and sensors that offer more timely situational awareness for operations in network-centric combat environments, radars with advanced tracking and targeting capabilities, protection against enemy electronic countermeasures, and integrated EW systems.

These fifth-generation aircraft, which could enter service as early as 2018, will significantly improve China's existing fleet of fourth-generation aircraft (Russian-built Su-27/Su-30 and J-11A, and indigenous J-10 and J-11B fighters) to support regional air superiority and strike operations. China's continuing upgrades to its bomber fleet will give them the capability to carry new, longer-range cruise missiles. In conjunction with procuring more capable military equipment, China is increasing the complexity and realism of air and air-defense training.

Though both planes display stealth design features, their true capabilities in terms of radar-absorbing coatings, sensors, and other stealth attributes remain unknown. It is also unknown when or if either plane will enter production.¹¹⁶⁷ There is also a possibility that the J-31 will be produced for export to compete with the F-35, though this is also uncertain.¹¹⁶⁸

According to the 2016 edition of the IISS *Military Balance*:¹¹⁶⁹

The PLAAF continued to introduce new and upgraded types of combat and support aircraft in 2015, as it moved from being a service previously focused on national air defence to one capable of mounting offensive operations at extended range in a high-threat environment.

The seventh Chengdu J-20 heavy combat aircraft 'prototype' (identification number '2016') joined the flight-test programme in September, and service entry for China's first reduced-signature combat aircraft will probably occur around the turn of this decade, if the present pace of development is sustained. Meanwhile, rival combat-aircraft manufacturer Shenyang continued to work on its J-31/FC-31 medium combat aircraft, with a second prototype of this design believed to be near completion in the third quarter of 2015, and a first flight anticipated in 2016. The extent to which this aircraft is being developed to meet any Chinese fleet requirement remains open to conjecture, though Shenyang is offering the FC-31 as a future export product.

As well as developing more capable combat aircraft designs, the PLAAF is also pursuing a range of air-to-air and air-to-surface weapons. Key among these are a successor short-range air-to-air missile (AAM), the PL-10, and the PL-15 active-radar guided AAM. The PL-10 is an imaging infrared guided missile that promises to be considerably more capable than any of those now in the PLAAF inventory. The design uses thrust-vector control and is capable of 'high-off bore-sight' engagements, and of engaging targets beyond 90 degrees. As of 2015, a small number of initial-production-standard missiles may have been provided to the air force for evaluation.

An upgraded variant of the Chengdu J-10 *Firebird* combat aircraft, the J-10B, also appeared to be nearing front-line service with the air force in 2015. Modifications to the J-10B include the introduction of a 'divertless' intake and an infrared search-and-track as well as a passive electronically scanned array radar. As of the end of 2015, around 50 J-10B airframes had been manufactured. Shenyang, meanwhile, flew the J-11D prototype in April 2015. The J-11D is a further development on the Russian Sukhoi Su-27 *Flanker* combat aircraft, but equipped with Chinese engines, avionics and weapons systems. Work also continues on addressing China's comparative weakness in terms of local design and the manufacture of military turbofan engines; indeed, the J-11D is likely fitted with the WS-10A turbofan. Meanwhile, in November 2015 it was announced that Russia had agreed to sell 24 Su-35 multi-role combat aircraft to China. The PLAAF will be the first foreign force to receive the aircraft.

In addition, manufacture of the Xian H-6K continued at a modest rate, with two PLAAF divisions now fielding the intermediate-range bomber. The H-6K is the latest iteration of the Russian Tupolev Tu-16 *Badger* design of the 1950s; the PLAAF is thought to be pursuing a successor design.

In 2015, the PLAAF also supplemented its Ilyushin Il-76-based KJ-2000 airborne early-warning aircraft with the KJ-500. The latter uses the Shaanxi Y-9 four engine turboprop, at least two of which were in service with the air force as of 2015. Development of the Y-20 heavy transport aircraft, intended to succeed the Il-76, continued during the year. Up to five aircraft were thought to be in the flight-test programme as of the fourth quarter of 2015.

A range of special-mission crewed aircraft and UAV projects was also pursued during the year. The GJ-1 armed UAV is now in service with the air force, while the first prototype of the *Divine Eagle* twin-fuselage long-endurance surveillance UAV also appeared to have been completed.

The Chinese defense industry has also been developing a diverse portfolio of new aircraft designs, including modernizing its traditional fighters and developing indigenous fourth-generation – and potentially fifth-generation – fighters:¹¹⁷⁰

These important advances owe to the implementation of a multi-pronged strategy across the sector's largest defence-industrial group, Aviation Industry Corporation of China (AVIC) and its five core prime contractors: Chengdu Aircraft Industry Corporation, Shenyang Aircraft Corporation, Hongdu Aviation Industry Group, Xi'an Aircraft Company and Changhe/Hafei Aviation. This strategy has included corporate reforms and organizational restructuring, coupled with sustained investment and expansion. China's aeronautic development strategy has also focused on key projects, such as indigenous platform and critical sub-system programs, and on building research, development and innovation capacity. Finally, this strategy has aimed to integrate civil and military aircraft manufacturing and leverage international commercial partnerships and acquisitions.

As AVIC upgrades its existing third- and fourth-generation fighters, it is also focusing on next-generation stealth fighters (J-31) and strategic transport aircraft (Y-20), designed to complement the PLA's long-term military transformation. These programs are currently in their development stages and have yet to overcome technical hurdles — AVIC is finding it particularly difficult to integrate reliable high-performance power plants. Nevertheless, these programs represent the Chinese defence industry's growing potential for innovation.

However, China still lacks the sophisticated technology required for highly advanced innovation in military equipment – in particular, in material selection, process standardization, quality control, and ensuring structural strength. When combined with integration, systems design, and management problems, the result has been cost overruns, extensive testing and delays, and many modifications of the design. Furthermore, the fragmented corporate structure of AVIC makes it difficult for the group to gain compliance from its sub-units.¹¹⁷¹

US analyst Andrew S. Erickson has assessed China's stealth prototype developments in further depth. In particular, Chengdu Aircraft Corporation's (CAC) production and design abilities are growing, and the company's Project 718 J-20 could become the PRC's first fifth-generation (or, in Chinese terminology, fourth-generation) aircraft – meaning it would include high maneuverability, supercruise, helmet-mounted sights, thrust vectoring, low observability, and sensor fusion characteristics. The J-20 prototype – which resembles the F-22 – is also large and has a significant weapons bay; when combined with China's strategic goals (as discussed in Chapter I), it is likely that the plane could have several different, important to attack aircraft and strike fighter missions.¹¹⁷²

One of these missions could be offensive counter-air, meaning that it would be able to strike high-value airborne assets due to its low-detection capabilities. The J-20 could also be used to destroy key targets in heavily defended areas inside an air-defense system. This capability could

be used against both land-based targets – like air-defense radars – or ship-based assets. However, to achieve these potential capabilities, the plane needs to overcome difficulties with avionics, engine design, and systems integration. One PLAAF deputy commander projected 2017-19 as a possible first deployment for the plane.¹¹⁷³

Shanghai Aircraft Corporation (SAC) is also working on its own stealth aircraft prototype, which has been called the F60, J-31, and J-21 in various sources. The plane could be exported, as well. A scale model was presented in 2010, and in 2012 photographs and videos – allegedly of the prototype – appeared online, depicting a plane with “31001” painted on it, indicating that J-31 is likely the best name for the plane until something more official is announced. The plane is the second significant fighter aircraft produced by SAC in less than a year. The other is the J-16, a plane that is similar to the Russian Su-30MKK and the US F-15E – a two-seat version of the Chinese J-11B. The J-31 is likely to be a multirole combat aircraft that can be used in both air-to-air and air-to-surface roles requiring modern precision munitions.¹¹⁷⁴

Because both the J-20 and the J-31 prototypes were completed at roughly the same time, it seems likely that CAC and SAC have developed a competitive relationship, instead of the previous geographic division of labor. Or, the J-31 could simply be a lighter J-20 (similar to the US F-35 as a complement to the F-22, or the Chinese J-10 is a complement to the J-11B). A key point, however, is that “Beijing has finally decided that it can sustain multiple overlapping advanced programs, with SAC alone currently working on four major fighter aircraft: the J-31 and the aforementioned J-16, as well as the J-16’s single-seat parent the J-11B and the carrier-borne J-15, also based on the J-11B.”¹¹⁷⁵

China is also working on the development of unmanned aerial vehicles. It would appear that China’s ability to sustain multiple overlapping advanced programs in its shipbuilding and aviation industries could be an important strategic breakthrough for the Chinese.¹¹⁷⁶

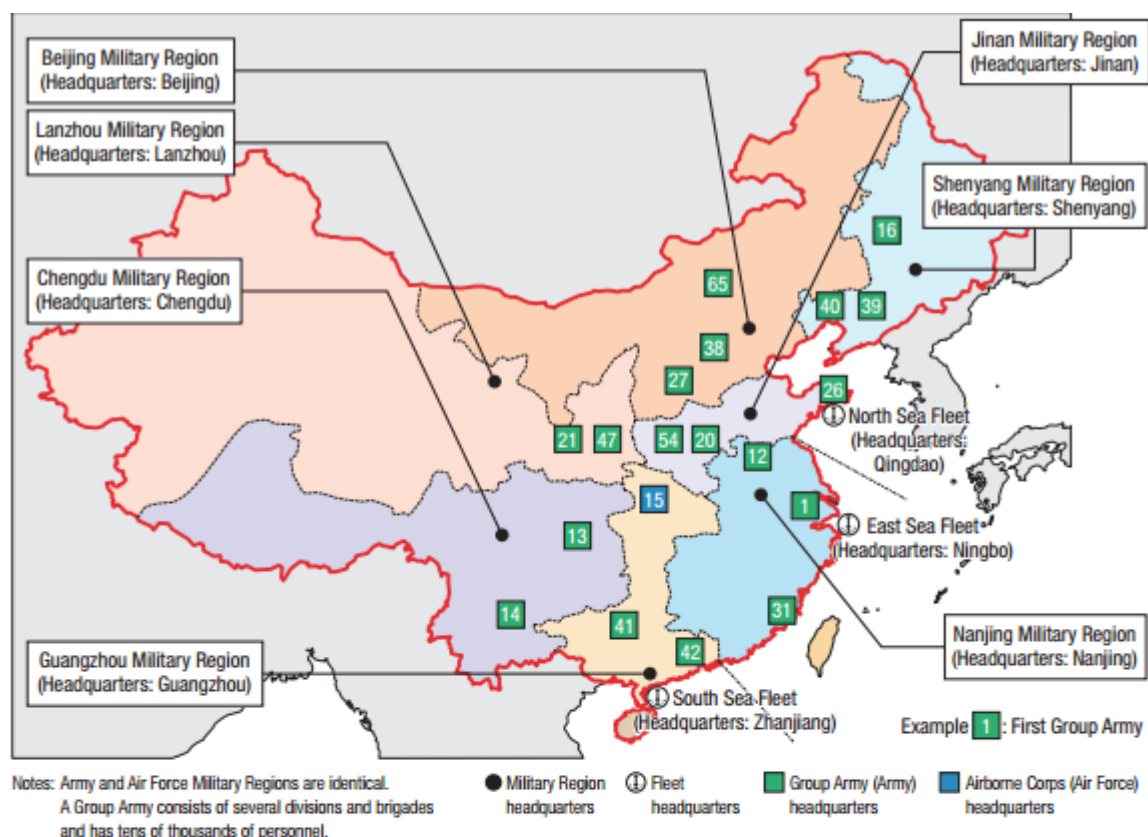
Finally, China is developing a wide range of information, ISR, and battle management systems to support all of its services, including its Air Force. The broad goals of this effort are described in Chapter I, and the space-related efforts in Chapter IX. The US Department of Defense does note, however, that they involve a new and much broader Chinese interest in electronic warfare that would affect Chinese tactical operations in any Korean or Northeast Asian contingency:¹¹⁷⁷

The PLA believes electronic warfare (EW) is one method to reduce or eliminate U.S. technological advantage. Chinese EW doctrine emphasizes using electromagnetic spectrum weapons to suppress or deceive enemy electronic equipment. PLA EW strategy focuses on radio, radar, optical, infrared, and microwave frequencies, in addition to computer and information systems.

Chinese strategy stresses that EW is a vital fourth dimension to combat and should be considered equal to ground, sea, and air, and that it can be decisive during military operations. The Chinese see EW as an important force multiplier and would likely employ it in support of all combat arms and services during a conflict.

PLA EW units have conducted jamming and anti-jamming operations, testing the military’s understanding of EW weapons, equipment, and performance, which helped improve confidence in conducting force-on-force, real-equipment confrontation operations in simulated EW environments. The advances in research and deployment of EW weapons are being tested in these exercises and have proven effective. These EW weapons include jamming equipment against multiple communication and radar systems and GPS. EW systems are also being deployed with other sea and air-based platforms intended for both offensive and defensive operations.

Figure VII.1 Chinese Military Forces and Regions (Japanese 2015 Summary)



		China	Taiwan (Reference)
Total military forces		Approx. 2.3 million troops	Approx. 290,000 troops
Ground forces	Group troops	Approx. 1.6 million troops	Approx. 200,000 troops
	Tanks, etc.	Type-99/A, Type-98/A, Type-96/A, Type-88A/B and others Approx. 7,300 vehicles	M-60, M-48A/H and others Approx. 1,200 vehicles
Maritime forces	Warships	Approx. 870 vessels / 1,470 thousand tons	Approx. 410 vessels / 201 thousand tons
	Destroyers & frigates	Approx. 70 vessels	Approx. 30 vessels
	Submarines	Approx. 60 vessels	4 vessels
	Marines	Approx. 10,000 troops	Approx. 15,000 troops
Air forces	Combat aircraft	Approx. 2,620 aircraft	Approx. 500 aircraft
	Modern fighters aircraft	J-10 x 294 Su-27/J-11 x 340 Su-30 x 97 (Fourth-generation fighters (total): 731)	Mirage 2000 x 56 F-16 x 145 F-CK-1 (IDF) x 128 (Fourth-generation fighters (total): 329)
Reference	Population	Approx. 1.370 billion	Approx. 23 million
	Term of service	2 years	1 year

Source: Japanese Ministry of Defense, *Defense of Japan 2015*

Figure VII.2: Chinese Ground Forces by Region



Source: Office of the Secretary of Defense, *Annual Report to Congress: Military and Security Developments Involving the People's Republic of China 2016*, Department of Defense, 2016.

Figure VII.3: Chinese Naval Forces by Region



Source: Office of the Secretary of Defense, *Annual Report to Congress: Military and Security Developments Involving the People's Republic of China 2016*

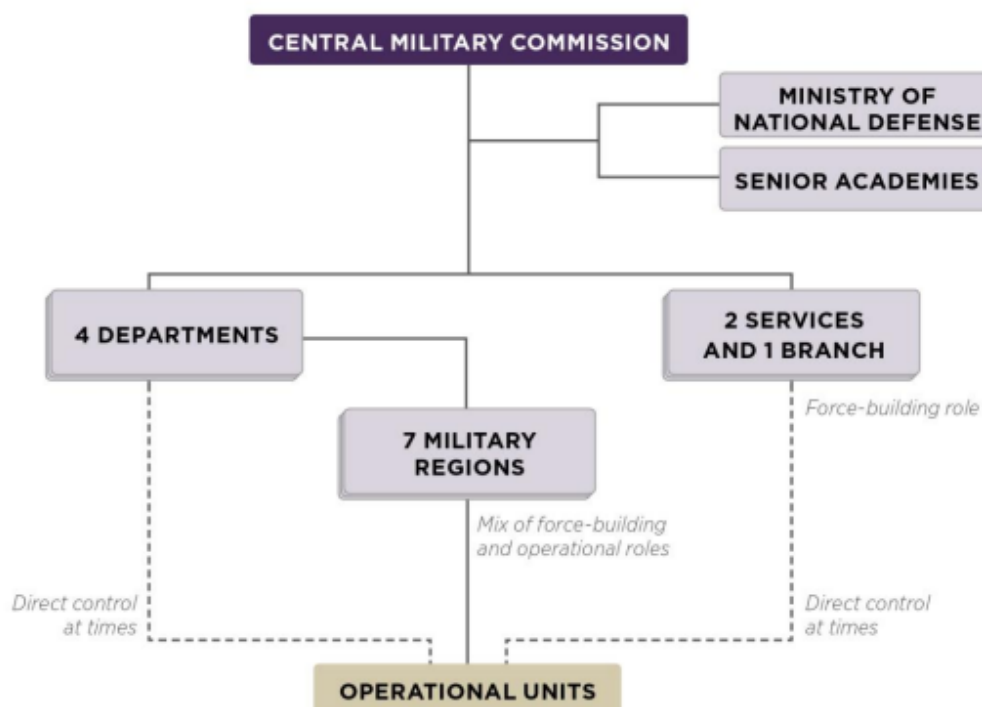
Figure VII.4: Chinese Air Forces by Region



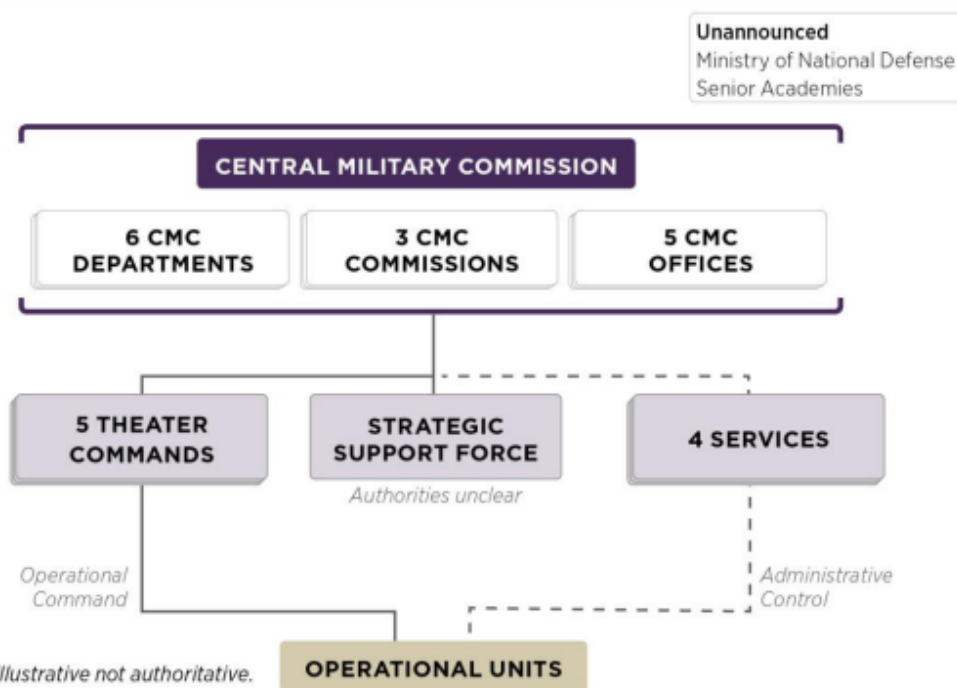
Source: Office of the Secretary of Defense, *Annual Report to Congress, Military and Security Developments Involving the People's Republic of China 2016*

Figure VII.5: The Chinese High Command (and Reform)

People's Liberation Army 1985–2015



People's Liberation Army's Reform Goals by 2020*



*Reform goals illustrative not authoritative.

Source: Office of the Secretary of Defense, *Annual Report to Congress: Military and Security Developments Involving the People's Republic of China 2016*.

Japan

Japan's public modernization plans are affected by its internal political debates, and Japan has not yet fully reacted to the increasing DPRK missile and nuclear threat, the uncertainties in the US "rebalance" to Asia, or the latest developments in China's strategy and military modernization efforts. However, there are clear shifts in Japan's defense policy that point to a more complete reaction to the security developments in Northeast Asia. Permission of collective self-defense, permission of arms exports, and updated guidelines for the US-Japan alliance are signs of Japan's shifting security stance and outlook.

The Limits on – and Options for – Increased Japanese Modernization and Capability

Japan is constitutionally limited as to how militarized it can be – it cannot have an offensive force, but can provide for its own self-defense. Article 9 of the Japanese Constitution renounces war, the possession of war potential, and the state's right of belligerency. At the same time, Japan may defend itself – which the government interprets as having the minimum level of armed forces necessary for self-defense.

The exact limit of this 'minimum level' varies based on available technology, the international situation, and other factors, and is discussed and decided annually by the Japanese Diet during budget considerations. Offensive weapons whose sole capability is massive destruction of another country – such as ICBMs or long-range strategic bombers – are not permissible. It should be stressed, however, that these conditions may change strikingly in the future in reaction to China's ongoing force modernization and the level of US-Chinese military cooperation or competition.

Japan's Basic Policy for National Defense was adopted in 1957, with the objectives of preventing indirect and direct invasions, eliminating any threat of invasion, and protecting Japan's democratic status, peace, and independence. The Policy also describes four tenets as the basic way to achieve these objectives:¹¹⁷⁸

- (1) Support the activities of the United Nations, cooperate with other nations, and aim to achieve world peace.
- (2) Establish the foundation necessary to ensure a stable quality of life for the people, boost nationalism, and guarantee the nation's safety.
- (3) Progressively develop efficient national defense capabilities to the necessary limit for self-defense in accordance with national power and circumstances.
- (4) Deal with foreign invasions of Japan based on security arrangements formed with the United States until the United Nations becomes able to effectively prevent the said threats.

In addition, Japan is unable to manufacture or possess nuclear weapons under the Atomic Energy Basic Law and has ratified the NPT. The country adheres to The Three Non-Nuclear Principles - Japan will not have, produce, or allow into the country nuclear weapons. The military is also under civilian control, meaning that the Japanese diet decides budgets and laws related to the Self-Defense Forces (SDF), such as the number of personnel and principal SDF institutions. National defense is part of the Cabinet's executive power – and Cabinet ministers are required by the Constitution to be civilians. The Prime Minister is the commander-in-chief, while the Minister of Defense has general control over SDF activities, and the Cabinet's Security Council discusses important national defense issues.¹¹⁷⁹

The Japanese government did state in 2012, however, that the exercise of the right of self-defense was legitimate if three conditions were met:¹¹⁸⁰

- (1) When an armed attack against Japan has occurred, or when an armed attack against a foreign country that is in a close relationship with Japan occurs and as a result threatens Japan's survival and poses a clear danger to fundamentally overturn people's right to life, liberty and pursuit of happiness.
- (2) When there is no appropriate means available to repel the attack and ensure Japan's survival and protect its people
- (3) Use of force to the minimum extent necessary.

Although self-defense is not necessarily confined to the boundaries of Japanese land, water, and airspace, the Constitution is interpreted to not permit armed troops to be sent to other countries with the purpose of using force – such as overseas troop deployments.¹¹⁸¹ As a result, Japan's defense policy is now shaped by policies and laws that limit its military capabilities.

The 2014 Japanese Defense White Paper did, however, revise the government's explanation of the legal basis for the “use of force.” The most notable change in interpretation was the permission to engage in collective self-defense under certain conditions.¹¹⁸²

The language of Article 9 of the Constitution appears to prohibit “use of force” in international relations in all forms. However, when considered in light of “the right (of the people) to live in peace” as recognized in the Preamble of the Constitution and the purpose of Article 13 of the Constitution which stipulates, “their (all the people's) right to life, liberty, and the pursuit of happiness” shall be the supreme consideration in governmental affairs, Article 9 of the Constitution cannot possibly be interpreted to prohibit Japan from taking measures of self-defense necessary to maintain its peace and security and to ensure its survival. Such measures for self-defense are permitted only when they are inevitable for dealing with imminent unlawful situations where the people's right to life, liberty, and the pursuit of happiness is fundamentally overturned due to an armed attack by a foreign country, and for safeguarding these rights of the people. Hence, “use of force” to the minimum extent necessary to that end is permitted. This is the basis, or so-called the basic logic, of the view consistently expressed by the Government to date with regard to “use of force” exceptionally permitted under Article 9 of the Constitution, and clearly shown in the document “Relationship between the Right of Collective Self-Defense and the Constitution” submitted by the Government to the Committee on Audit of the House of Councilors on October 14, 1972.

To date, the Government has considered that “use of force” under this basic logic is permitted only when an “armed attack” against Japan occurs. However, in light of the situation in which the security environment surrounding Japan has been fundamentally transformed and continuously evolving by shifts in the global power balance, the rapid progress of technological innovation, and threats such as weapons of mass destruction, etc., in the future, even an armed attack occurring against a foreign country could actually threaten Japan's survival, depending on its purpose, scale and manner, etc.

...As a matter of course, Japan's “use of force” must be carried out while observing international law. At the same time, a legal basis in international law and constitutional interpretation need to be understood separately. In certain situations, the aforementioned “use of force” permitted under the Constitution is, under international law, based on the right of collective self-defense. Although this “use of force” includes those which are triggered by an armed attack occurring against a foreign country, they are permitted under the Constitution only when they are taken as measures for self-defense which are inevitable for ensuring Japan's survival and protecting its people, in other words, for defending Japan.

The Roles of the Japanese Self Defense Forces

The Japanese SDF plays a variety of roles, concentrating on ISR activities and quick responses in the case of any uncertain situation. Japan described the role of its defense force in its 2016 White Paper:¹¹⁸³

The following points will be emphasized as effective means of deterrence and response to various situations: (1) ensuring the security of the sea and airspace surrounding Japan; (2) response to an attack on remote islands; (3) response to ballistic missile attacks; (4) responses in outer space and cyberspace; and (5) responses to major disasters.

Promoting training and exercises, defense cooperation and exchanges, securing of maritime security, international peace cooperation activities, and capacity building assistance in order to stabilize the Asia-Pacific region and to improve the global security environment.

In its efforts to maintain stability in the Asia-Pacific, Japan planned to:¹¹⁸⁴

- Promote bilateral and multilateral defense cooperation and exchanges as well as joint training and exercises in a multilayered manner.
- In the field of non-traditional security, Japan will promote practical cooperation by utilizing SDF capabilities including disposal of land mines and unexploded shells.
- Development and strengthening of regional cooperation practice and capacity building support for nations in the region.

In order to “improve the global security environment,” Japan would conduct the following:¹¹⁸⁵

- International peace cooperation activities, including peace building such as humanitarian and reconstruction assistance and ceasefire monitoring
- Arms control and disarmament, nonproliferation, and capacity building support.
- Tackling international terrorism, securing the safety of maritime traffic, and maintaining maritime order.

Japanese Security Policies

Japan has a variety of policies to defend itself; and combined Japan-US capabilities are a significant part of this defense. However, Japan recognizes that its own efforts are the primary force behind achieving its basic security goals. Japan’s “National Defense Program Guidelines (NDPG) set forth the basic policies for Japan’s security,” and the directions for SDF development.¹¹⁸⁶

The 2010 NDPG calls for the nation to undertake strategic and integrated activities as follows:¹¹⁸⁷

- a. The improvement of intelligence collection and analysis capabilities in the government ministries and agencies, a strengthened cross-governmental information security system, the promotion of space development and use of outer space from the perspective of information gathering, communications, and comprehensive strengthening of the posture and response capability to deal with cyber-attacks.
- b. Cooperation among government organizations under normal conditions; integrated response by the government in the occurrence of various contingencies; examination of functions and systems related to governmental decision making and response through initiatives such as regular simulations and comprehensive training and exercises; and consideration of necessary actions including legal measures.
- c. Establishment of a body in the Prime Minister’s Office which will be responsible for national security policy coordination among relevant ministers and for providing advice to the Prime Minister after examination of organization, functions, and structure of the cabinet regarding security issues, including the Security Council.
- d. Improvement of systems for responding to various disasters and for civil protection; and close cooperation between national and local governments to ensure an appropriate response.
- e. Cooperation among governmental organizations in the efforts to improve the global security environment; participation in international peace cooperation activities in an efficient and effective manner through collaboration and cooperation with non-governmental organization and other entities; review and

consideration of the five principles for participation in peacekeeping operations and other policies regarding Japan's participation in consideration of actual situation of U.N. peacekeeping operations.

f. Efforts to make Japan's security and defense policies easier to understand; and strengthened overseas information dissemination to further deepen international community's understanding of Japan's security and defense policies.

The 2012 Japanese Defense White Paper

At the same time, the Japanese military is now undergoing a major period of modernization and reorganization. The 2012 Japanese Defense White Paper discusses some basics of the organizational structure, which can also be seen in **Figure VII.6**.

As discussed previously, Japan is working to develop a "Dynamic Defense Force" to better handle any threat to the country. The Japanese-US Alliance is acknowledged as vital, while the US's military presence in Japan, as a deterrent against and responder to any potential military situation, provides security to the Asia-Pacific region. The US's presence also allows Japan to participate in multilateral security cooperation and more effectively respond to any global security challenges. Japan is working to develop and deepen the Alliance by:¹¹⁸⁸

- (1) Continuous engagement in strategic dialogue and specific policy coordination with the United States, including bilateral assessment of the security environment and bilateral consultations on common strategic objectives, and roles, missions and capabilities.
- (2) The promotion of cooperation in existing fields, including intelligence cooperation, deepening of bilateral contingency planning, various operational cooperation including that upon situations in areas surrounding Japan, ballistic missile defense and equipment and technology cooperation, as well as consultations to improve the credibility of extended deterrence and information security.
- (3) Studying measures to enhance Japan-U.S. cooperation with the United States in order to strengthen the U.S. forces' deterrent and response capability to regional contingencies.
- (4) Strengthening various regular cooperation, such as joint training and joint/shared usage of facilities, and promote regional and global cooperation through international peace cooperation activities, maintenance and enhancement of global commons such as outer space, cyberspace and sea lanes, as well as in the field of climate change.

Japan is also working with the US to reshape the US force posture in Japan, and the burden the US military presence on local communities. The country is also committing to provide more support for US forces stationed there.

The 2014 Japanese Defense White Paper and the New NDPG

2013 and 2014 saw further significant shifts in Japanese Defense Policy. These years saw the permission of collective self-defense, permission of defense exports, a revision of the Guidelines for Japan-US Defense Cooperation, and an updated National Defense Program Guidelines called the "new NDPG." The new NDPG was composed after an assessment of Japanese security environment that concluded:¹¹⁸⁹

- Deepening "interdependence among countries," which leads to a "growing risk that unrest in the global security environment or a security problem in a single country or region could immediately develop into a security challenge or destabilizing factor for the entire international community."
- An "increase in the number of so-called "gray zone" situation, that is, neither pure peacetime nor contingencies over territory, sovereignty and maritime economic interests."

- “Cases of undue infringement upon freedom of the high seas due to piracy acts as well as coastal states unilaterally asserting their rights and taking actions.”
- Growth of Asia-Pacific militaries, particularly Chinese military development with little transparency, and North Korean missile and nuclear development.
- The increasing difficulty of “securing the stable use of outer space and cyberspace,” as technological innovation progresses rapidly.
- Recognition of the need to prepare for large-scale disasters and other emergencies.

Figure VII.7 through **Figure VII.9** outlines past Japanese security assessments and the subsequent NDPGs. **Figure VII.10** details the new NDPG along with the National Security Strategy associated with it.

The core of the new NDPG was building a Dynamic Joint Defense Force. The Japanese Defense Ministry believed that, “optimal defense capabilities buildup has not been carried out for the SDF as a whole,” due to a capability assessments methodology that assessed the SDF services individually, rather than from a joint perspective.¹¹⁹⁰

As a result, the new NDPG carry with it great significance because it identifies functions and capabilities of particular emphasis from a comprehensive viewpoint based on capability assessments focused on the functions and capacities of the entire SDF, strictly focusing on the basic approach of responding to various situations by joint operations. By advancing defense capability buildup based on the results of these capability assessments, it has become possible to realize a more prioritized and efficient defense capability buildup, overcoming the boundaries of the Ground, Maritime and Air Self-Defense Forces more easily than ever. (2014, p. 211)

The new NDPG call for the building of a Dynamic Joint Defense Force, in place of the Dynamic Defense Force from the 2010 NDPG, as the cornerstone for the protection of Japan’s peace and security. (2014, p. 210)

The new NDPG...calls for the enhancement of deterrent and response capabilities by pursuing further joint operations, improving the operational standards of defense equipment, and further increasing defense activities, as well as ensuring the necessary and sufficient quality and quantity of defense capabilities underpinning various activities. Additionally, it requires the building of the most effectively operational posture, which will be accomplished through further enhancing the logistical support foundation on a broader scope.

The 2014 White Paper highlighted differences between the Dynamic Joint Defense Force of the new NDPG and the Dynamic Defense Force of the 2010 NDPG.¹¹⁹¹

Compared to the 2010 NDPG, the new NDPG calls for the establishment of a wider-ranging logistical support foundation. For example, SDF camps and bases will become important deployment staging grounds for the dispatch for disaster relief, and to minimize damages to these camps and bases, it is essential to improve survivability¹ including recovery capabilities.

Additionally, failure to provide adequate accommodations for personnel or family support measures will make it impossible to respond immediately during a situation and fully ensure readiness. In addition, taking into consideration a variety of elements, including “skills,” “experience,” “physical strength,” and “morale,” it is necessary to ensure the edge of SDF troops.

As such, it is important to carry out rigorous training and exercises in peacetime as well as comprehensively carry out personnel education measures, such as recruitment and support for re-employment, including the further utilization of female SDF personnel and reserve personnel. Furthermore, the collaboration and cooperation with local governments and relevant organizations as well as understanding and cooperation of the general public is indispensable to enabling the SDF to respond appropriately to various situations.

As a result, it is extremely critical to actively strengthen collaboration with local communities and boost communication capabilities. Given the vital importance of fundamentally enhancing the wide-ranging logistical support foundation compared to the 2010 NDPG to effectively carry out various activities, as explained above, the new NDPG calls for the strengthening of infrastructure for enabling a broad range of defense capabilities to be exhibited, such as training, exercise and operational infrastructure, personnel and education, defense production and technological bases, efficient acquisition of equipment, research and development, collaboration with local communities, boosting of communication capabilities, enhancing of intellectual base, and promotion of reform of the Ministry of Defense.

[Some] characteristics prioritized by the Dynamic Joint Defense Force, “resiliency” and “connectivity” which had not been expressed in the previous NDPG, are newly pointed out. This is based on the result of reviewing functions and capability to be especially prioritized from a comprehensive perspective after implementing capability assessments based on joint operations.

Specifically, “resiliency” refers to necessary and sufficient securing of “quality” and “quantity” of defense capabilities that underpin various activities, and further strengthen the basic foundation for SDF. “Connectivity” refers to the strengthening of posture to collaborate with relevant ministries and offices, local governments, private sector, and to cooperate with the U.S., to seamlessly respond to various situations, from peacetime to contingencies.

In order to build the Dynamic Joint Defense Force, the White Paper set a series of broad goals and requirements.

“allocate limited resources in a focused and flexible way to prioritize the functions and capabilities from a comprehensive perspective, identified through joint operation-based capability assessments against various situations.”

“Japan will regularly conduct persistent intelligence, surveillance, and reconnaissance (ISR) activities and swiftly build a response posture in accordance with the development of the situation to prevent further escalation of a situation. At the same time, new NDPG states that minimizing damage in dealing with situations by effective response through achieving necessary maritime supremacy and air superiority is essential.”

“Japan will attempt to enhance its deterrence and response capability by improving the mission-capable rate of equipment and its employment to conduct tailored activities swiftly and sustainably based on joint operations, as well as by developing defense capabilities adequate both in quantity and quality that underpin various activities to realize a more robust defense force.”

“the new NDPG states Japan will build a Dynamic Joint Defense Force, which emphasizes both soft and hard aspects of readiness, sustainability, resiliency and connectivity, reinforced by advanced technology and capability for C3I, with a consideration to establish a wide range of infrastructure to support the SDF’s operation.”

Following the release of new NDPG, the new Mid-Term Defense Program (MTDP, covering FY2014-FY2018) was also released in December 2013 and outlines a plan for realizing the new NDPG goals in national defense capabilities. The MTDP “paves the way for the realization of a Dynamic Joint Defense Force that follows the philosophy laid out in the new NDPG.”¹¹⁹² **Figure VII.11** outlines the details of the MTDP. The 2013 version has six fundamental objectives in order to develop Japan’s defense capacities:¹¹⁹³

- Address particularly important functions and capabilities
 - ISR capabilities, intelligence capabilities, transport capabilities, C3I capabilities, response to an attack on remote islands, response to ballistic missile attacks, response to outer space and cyber space threats, large-scale disasters, international peace cooperation efforts
- Development of Capacities to Ensure Maritime Supremacy and Air Superiority as well as Rapid Deployment Capabilities
- Efficiently Secure Defense Capabilities Adequate Both in Quantity and Quality

- Promote Measures to Reform the Personnel System
- Strengthen the deterrence and response capabilities of the Japan-US Alliance
- Achieve Greater Efficiencies and Streamline the Buildup of the Defense Forces

The 2014 White Paper continued to highlight deepening cooperation with the United States through the US-Japan alliance. Areas for enhanced cooperation that were noted in the revision of the Guidelines for Japan-US Defense Cooperation included:¹¹⁹⁴

- **Ballistic Missile Defense (BMD) Cooperation:** The Ministers confirmed their intention to designate the Air Self-Defense Force base at Kyogamisaki (Kyotango City, Kyoto Prefecture) as the deployment site for a second AN/TPY-2 radar (X-band radar) system.
- **Cooperation in Cyberspace:** The Ministers stressed the need for close coordination with the private sector, recognized the need to promote a whole-of-government approach to shared threats in cyberspace, and welcomed the signing of a Terms of Reference for a new Cyber Defense Policy Working Group (CDPWG).
- **Cooperation in Space:** The Ministers welcomed the conclusion of the Japan-U.S. Space Situational Awareness (SSA) Sharing Agreement, and welcomed the commitment of both countries to an early realization of the Japan Aerospace Exploration Agency's (JAXA) provision of SSA information to the United States.
- **Joint Intelligence, Surveillance, and Reconnaissance (ISR) Activities:** The Ministers welcomed the establishment of a bilateral Defense ISR Working Group.
- **Joint/Shared Use of Facilities:** The Ministers welcomed the efforts of the Joint/Shared Use Working Group in order to strengthen the Self-Defense Forces posture in areas, including Japan's Southwestern Islands. Progress in realizing the joint/shared use of U.S. and Japanese facilities and areas strengthens the Alliance's deterrent capabilities while building a stronger relationship with local communities.
- **Bilateral Planning:** The Ministers welcomed progress on bilateral planning and reaffirmed initiatives toward refining bilateral plans.
- **Defense Equipment and Technology Cooperation:** The Ministers welcomed the new linkage established between bilateral discussions at the Systems and Technology Forum and dialogue on Roles, Missions, and Capabilities. Through collaboration such as the participation of Japanese industries in the production of the F-35 aircraft, bilateral cooperation on equipment and technology should deepen as Japan examines its Three Principles on Arms Exports and their related policy guidelines.
- **Extended Deterrence Dialogue:** The Ministers noted with satisfaction the meaningful outcome of bilateral Extended Deterrence Dialogues. The Ministers also confirmed their Governments' continued commitment to holding the dialogue on a regular basis.
- **Information Security:** The SCC members welcomed the serious initiatives by Japan in establishing a legal framework for further ensuring information security.
- **Joint Training and Exercises:** The Ministers decided to take advantage of various opportunities to increase training outside of Okinawa, including in mainland Japan, which should reduce the amount of time located and training in Okinawa of MV-22 Osprey.
- **Host Nation Support:** The Ministers affirmed the continuing importance of the Host Nation Support (HNS) provided by Japan.

The broader objectives of the revised Guidelines for Japan-US Defense Cooperation -- which were announced in the Joint Statement of the October 2013 "2+2" meeting—also included:¹¹⁹⁵

1. Ensuring the Alliance's capacity to respond to an armed attack against Japan, as a core aspect of Japan-U.S. defense cooperation;

2. Expanding the scope of cooperation, to reflect the global nature of the Japan-U.S. Alliance, encompassing such areas as counter-terrorism, counter-piracy, peacekeeping, capacity building, humanitarian assistance/disaster relief, and equipment and technology enhancement;
3. Promoting deeper security cooperation with other regional partners to advance shared objectives and values;
4. Enhancing Alliance mechanisms for consultation and coordination to make them more flexible, timely, and responsive and to enable seamless bilateral cooperation in all situations;
5. Describing appropriate role-sharing of bilateral defense cooperation based on the enhancement of mutual capabilities;
6. Evaluating the concepts that guide bilateral defense cooperation in contingencies to ensure effective, efficient, and seamless Alliance response in a dynamic security environment that includes challenges in emerging strategic domains such as space and cyberspace; and
7. Exploring additional ways in which we can strengthen the Alliance in the future to meet shared objectives.

Organization, Equipment, and Disposition of the SDF under the New NDPG

The 2014 White Paper assessed the Japanese SDF's Specific Forces, especially in terms of their operational capabilities and disposition, in some detail:¹¹⁹⁶

The new NDPG states that based on the results of the capability assessments, in the defense capability buildup, the SDF will prioritize the development of capacities to ensure maritime supremacy and air superiority, which is the prerequisite for effective deterrence and response in various situations, including defense posture buildup in the southwestern region. Furthermore, the SDF will emphasize the establishment of rapid deployment capabilities with a consideration to establishing a wide-ranging logistical support foundation.

Ground Self-Defense Force (GSDF)

The GSDF needs to be able to respond swiftly and deal effectively and nimbly with an attack on offshore islands and various other situations. Therefore, the GSDF will maintain rapidly deployable basic operational units (rapid deployment divisions, rapid deployment brigades, and an armored division) furnished with advanced mobility and ISR capabilities. In addition, the GSDF will maintain mobile operating units sustaining specialized functions in order to effectively perform amphibious and other operations. The GSDF will maintain half of these units in Hokkaido, given its excellent training environment there.

The GSDF will review the organization and equipment with a particular focus on tanks/howitzers and rockets. Following thorough rationalization and streamlining, these units will be deployed appropriately, according to geographical characteristics.

The number of GSDF personnel will be maintained at around 159,000, which was the same level as at the end of FY2013, in order to ensure sufficient personnel available to respond to major disasters or other situations.

Maritime Self-Defense Forces (MSDF)

The MSDF will increase the number of destroyers from 48 in the 2010 NDPG (12 escort divisions) to 54 (14 escort divisions) by using new destroyers that offer improved response capabilities for various missions and have more compact designs and will maintain ship-based patrol helicopter units in order to secure the defense of surrounding waters and ensure the safety of maritime traffic. Furthermore, two Aegis-equipped destroyers⁵ will be added, bringing the fleet to eight.

The MSDF regularly carry out information gathering and warning and surveillance activities undersea and at sea. It will also maintain the augmented submarine fleet as well as patrol aircraft units in order to patrol surrounding waters⁶ and carry out defense operations effectively.

Air Self-Defense Forces (ASDF)

The ASDF will maintain air warning and control units in order to provide persistent ISR in most air space over Japan and the surrounding areas. By consolidating warning and control operations at air defense command centers, the ASDF will gradually change warning groups into warning squadrons as well as establish one new squadron in the air warning unit.

As for Fighter Aircraft Units, the 13th squadron will be newly established, and Air Reconnaissance Unit will be abolished. In addition, one squadron will be added to the Aerial Refueling/Transport Unit, making it a two-squadron architecture.

The ASDF will maintain surface-to-air guided missile units providing multi-layered defense for Japan against ballistic missile attacks, together with the Aegis destroyers, as well as protecting key areas in tandem with the surface-to-air guided missile units of the GSDF.

Figure VII.12 shows the force structure of the SDF under the new NDPG and how force structure has changed over past NDPG's.

Furthermore, Japan is increasing collaboration with other countries in defense research and industry. According to the 2013 edition of the IISS *Military Balance*,¹¹⁹⁷

In late 2011, Japan also eased its long-standing defence-export regulations and restrictions on the participation of its domestic defence industry in collaborative international defence-industrial programs. In June 2012, Japan signed an MoU with the United Kingdom that included an under-taking to cooperate on joint R&D and defence-equipment production. Later, in September 2012, Japan announced a similar bilateral agreement with Australia, which aimed to expand defence research ties and exchange information on areas of defence technology of common interest.

The 2016 edition of the IISS *Military Balance* noted new Japanese legislation:¹¹⁹⁸

A raft of new security legislation proceeded through the National Diet between May and September, including:

- The Law on Response to Contingencies, enabling Japan's exercise of the right of collective self-defense in scenarios in which an attack on another state in a close relationship with Japan poses a clear danger to the Japanese people's 'right to life, liberty and the pursuit of happiness, where there is no other appropriate means to repel the attack, and where the use of force is restricted to the minimum necessary to repel the attack';
- The Law to Ensure Security in Contingencies Significantly Affecting Japan, replacing the 1999 Regional Contingencies Law and designed to boost Japanese non-combat logistical support for the US and other states;
- The International Peace Support Law, removing the need for Japan to enact separate laws for each JSDF deployment providing logistical support to multinational forces;
- Revisions to the International Peace Cooperation Law enabling the JSDF to use force in pursuing certain UN peacekeeping duties rather than solely for the defence of JSDF personnel.

The 2016 Japanese Defense White Paper

Japan reiterated the importance and guidance of its National Security Strategy in its 2016 White Paper.¹¹⁹⁹

The "National Security Strategy" developed in December 2013 expresses Japan's fundamental principle of national security, which is that Japan will continue to adhere to the course that it has taken to date as a peace-loving nation and to contribute even more proactively in securing the peace, stability and prosperity of the international community, while achieving its own security as well as peace and stability in the Asia-Pacific region, as a "Proactive Contributor to Peace based on the principle of international cooperation.

In order to achieve this principle, the strategy defined Japan's national security, such as the maintenance of sovereignty and independence, defending territorial integrity, ensuring the safety of life, person and

properties of its nationals, economic development, and the maintenance and protection of the international order based on rules and universal values.

Based on that, the strategy clearly defines the security environment surrounding Japan and national security challenges, and specifies the strategic approaches centering on diplomatic and defense policies that Japan should implement, such as the establishment of a comprehensive defense architecture to protect Japan.

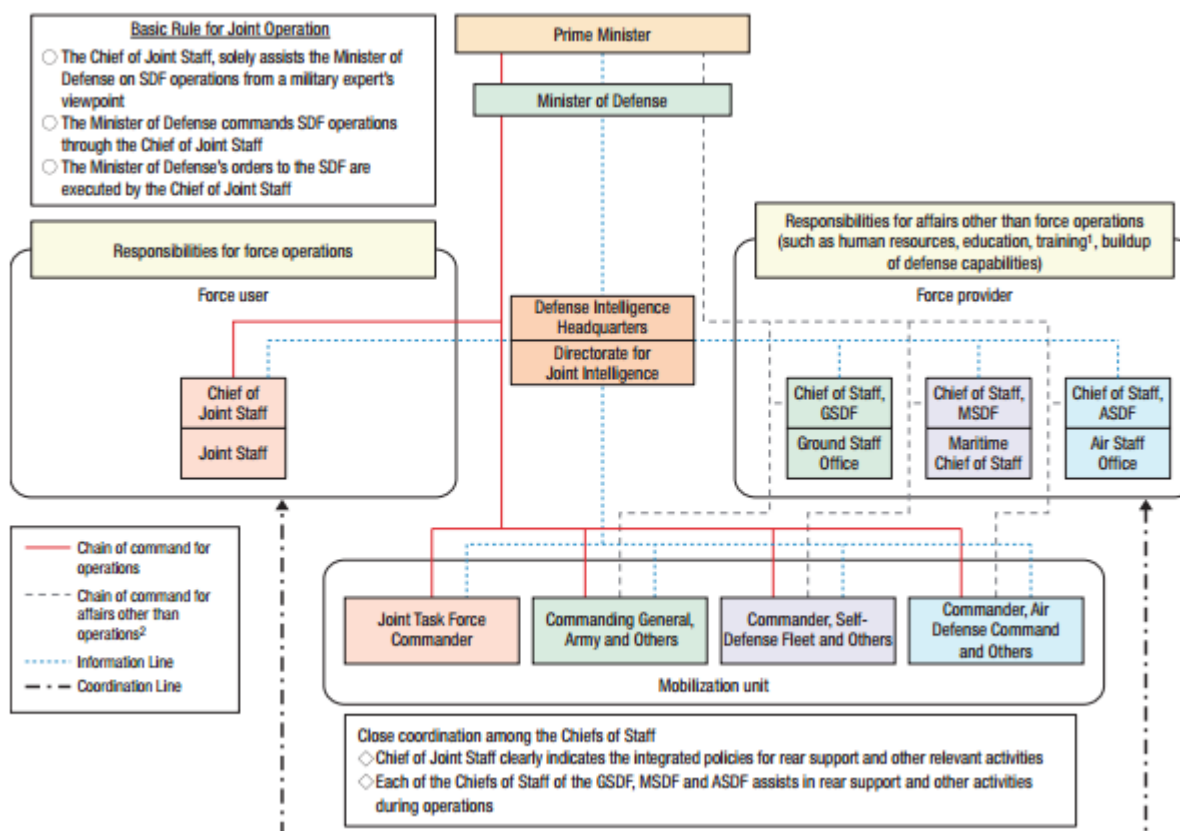
Furthermore, Japan outlined the ways that the DPRK had threatened regional security in the last year and summarized them as follows:¹²⁰⁰

North Korea seems to be maintaining and reinforcing its so-called asymmetric military capabilities. It has repeated provocative rhetoric and behavior militarily, including conducting a nuclear test in January 2016 and repeating ballistic missile launches since February 2016. Such military activities by North Korea heighten tension in the Korean Peninsula and constitute a serious and imminent threat to the security not only of Japan but also of the region and the international community. Therefore, it is necessary for Japan to pay utmost attention to them.

...The explosion of landmines in the Republic of Korea's area of the demilitarized zone (DMZ) in August 2015 deeply stirred tensions between the ROK and North Korea that included shelling. Since January 2016, tensions between the two sides have heightened due to North Korea's nuclear test and ballistic missile launches, as well as provocative rhetoric and behavior in protest against the U.S.-ROK combined exercise.

China is a vital political and economic partner for North Korea and maintains a degree of influence on the country. Meanwhile, North Korea went ahead with a nuclear test and ballistic missile launches despite China's request for the denuclearization of the Korean Peninsula. In this light, it is possible that North Korea-China relations are cooling.

Figure VII.6: Operational System of the SDF and the Roles of the Chiefs of Staff



Source: Japanese Ministry of Defense, *Defense of Japan 2015*.

Figure VII.7: Japanese Estimates of Japanese Self-Defense Forces

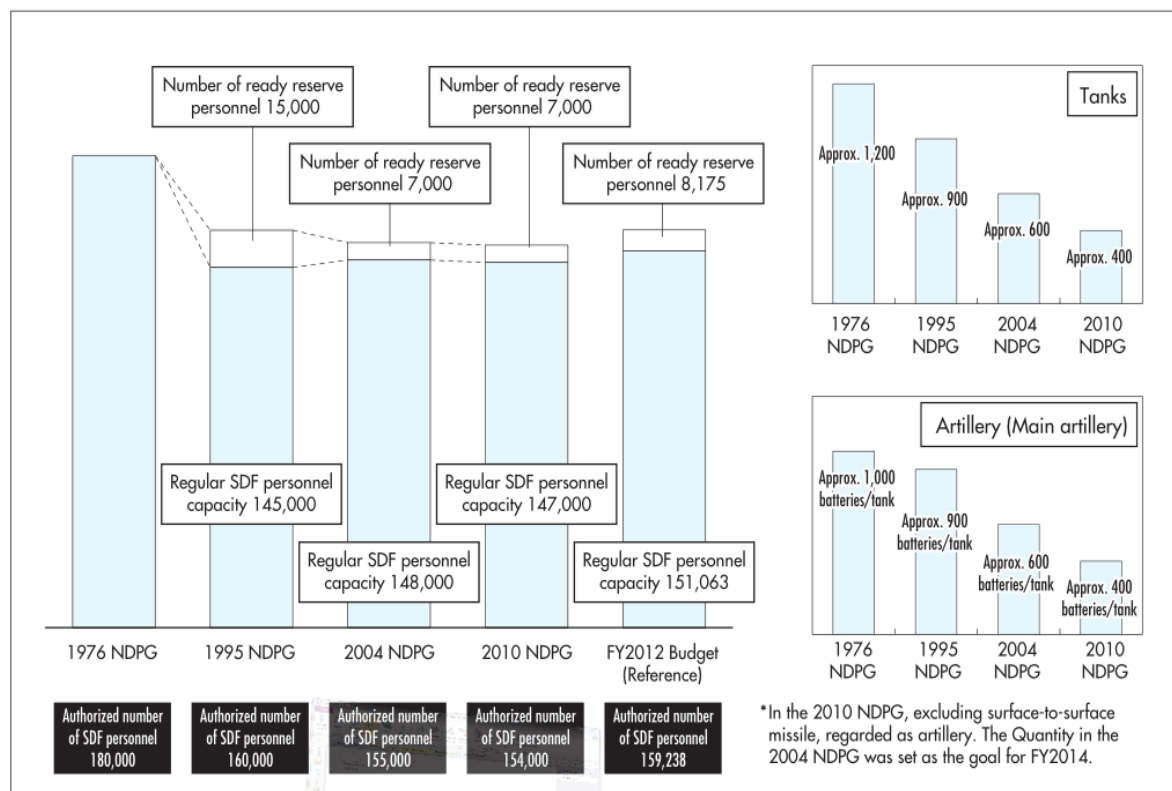
National Defense Program Guidelines Annex Table

Category		Present (as of the end of FY2013)	Future
GSDF	Authorized Number of personnel	approx. 159,000	159,000
	Active-Duty Personnel	approx. 151,000	151,000
	Reserve-Ready Personnel	8,000	8,000
	Major units	Central Readiness Force 1 armored division	3 rapid deployment divisions 4 rapid deployment brigades 1 armored division 1 airborne brigade 1 amphibious rapid deployment brigade 1 helicopter brigade
MSDF	Major units	8 divisions 6 brigades	5 divisions 2 brigades
		5 surface-to-ship guided missile regiments	5 surface-to-ship guided missile regiments
		8 anti-aircraft artillery groups/regiments	7 anti-aircraft artillery groups/regiments
		4 flotillas (8 divisions) 5 divisions 5 divisions 1 flotilla 9 squadrons	4 flotillas (8 divisions) 6 divisions 6 divisions 1 flotilla 9 squadrons
	Major equipment	47 (6) 16 approx.170	54 (8) 22 approx.170
ASDF	Major units	8 warning groups 20 warning squadrons 1 AEW group (2 squadrons) 12 squadrons 1 squadron	28 warning squadrons 1 AEW group (3 squadrons) 13 squadrons —
		1 squadron 3 squadrons	2 squadrons 3 squadrons
		6 groups	6 groups
		approx. 340 approx. 260	approx. 360 approx. 280
	Major equipment		

- Notes: 1. The current number of tanks and howitzers/rockets (authorized number as of the end of FY2013) are respectively approx. 700 and approx. 600, which will be reduced respectively to approx. 300 and approx. 300 in the future.
2. Regarding major equipment/units that may also serve for BMD missions, their acquisition/formation will be allowed within the number of Destroyers (Aegis-Equipped Destroyers), Air Warning & Control Units and Surface-to-Air Guided Missile Units specified above.

Source: Japanese Ministry of Defense, *Defense of Japan 2015*

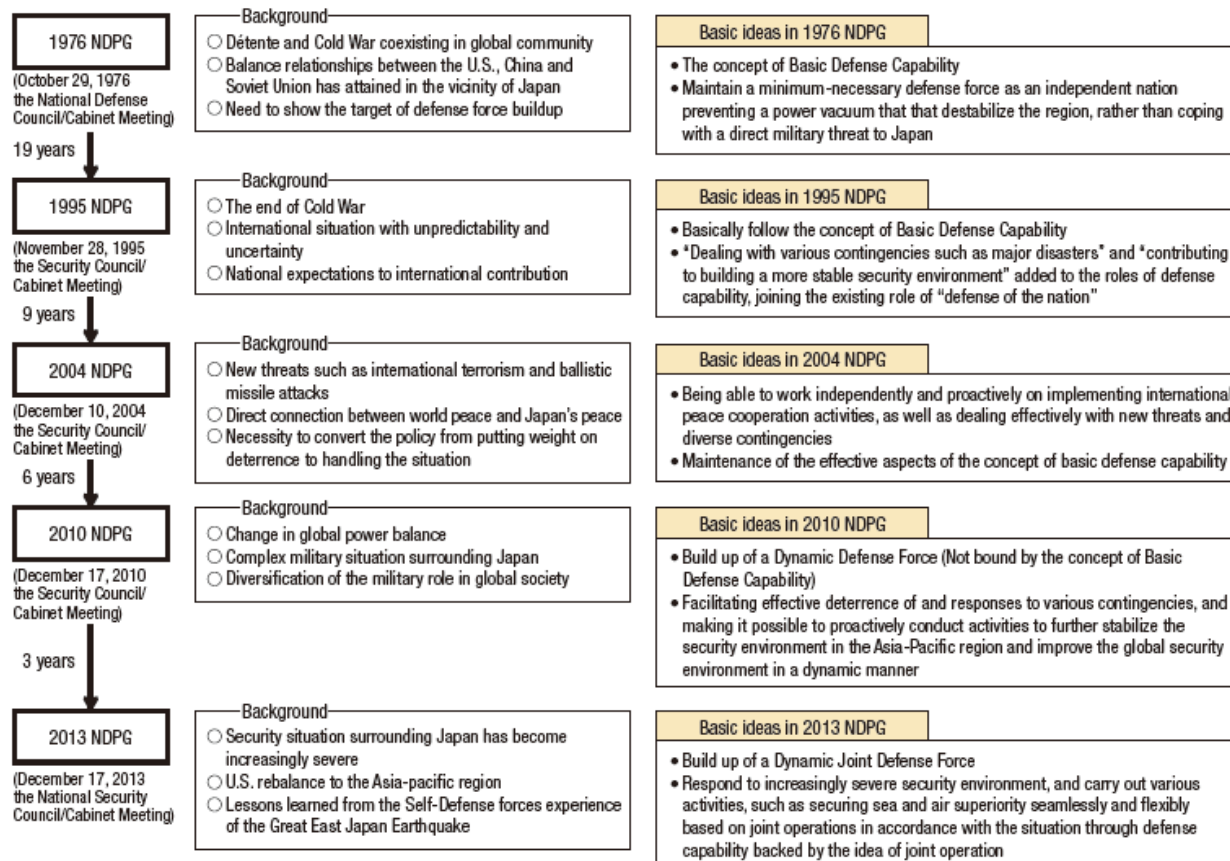
Figure VII.8: Personnel, Tanks, and Artillery under Japanese NDPGs, 1976-2010



Source: Japanese Ministry of Defense, *Defense of Japan 2012*, 122.

Figure VII.9: Changes of Japanese Views Regarding Defense Capability and Subsequent NDPG's

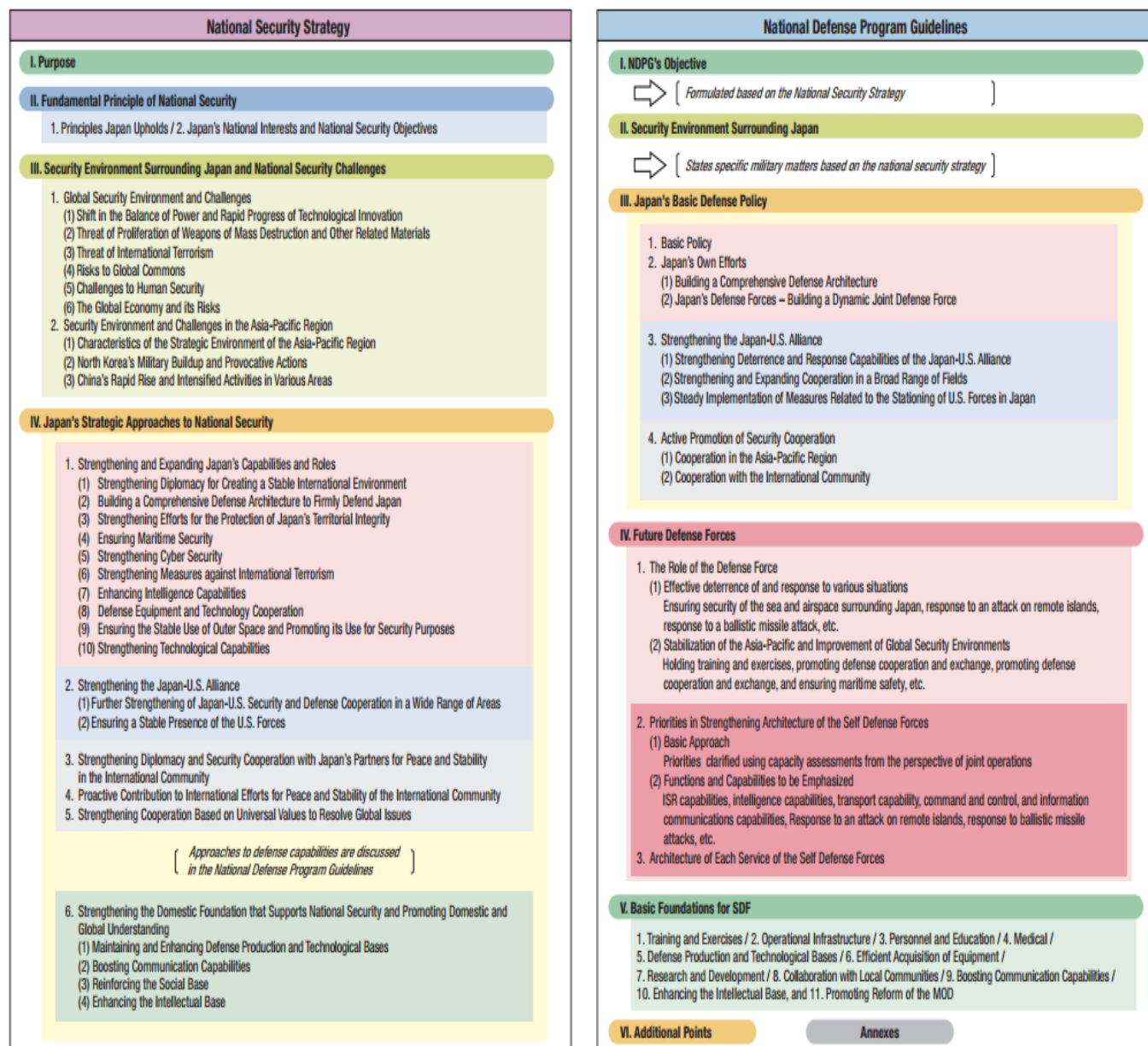
Fig. II-4-1-2 Changes of the Views regarding Defense Capability



Source: Japanese Ministry of Defense, *Defense of Japan 2014*, 206.

Figure VII.10: Japan's National Security Strategy and the New NDPG

Layout of the NSS and the NDPG



Source: Japanese Ministry of Defense, *Defense of Japan 2015*

Figure VII.11: Details of the New MTDP

Fig. II-2-3-2 Programs Related to Effective Deterrent of and Response to Various Situations	
Category	Main Programs
Ensuring security of the sea and airspace surrounding Japan	<ul style="list-style-type: none"> ○ Procure new airborne early warning (and control) aircraft (*1) and fixed air defense radar; introduce unmanned aerial vehicles (*2); improve airborne warning and control systems (AWACS) (E-767). ○ Steadily procure fixed-wing patrol aircraft (P-1), Aegis-equipped destroyers (DDG), submarines, and patrol helicopters (SH-60K). ○ Introduce the new destroyers, with additional multifunctional capability and with a compact-type hull
Response to attacks on remote islands	<ul style="list-style-type: none"> ○ Develop a coast observation unit to Yonaguni Island; introduce new airborne early warning aircraft; establish one squadron in the air warning unit and its deployment at Naha Air Base. ○ Prepare a deployment structure for mobile air defense radar on remote islands in the southwestern region.
	<ul style="list-style-type: none"> ○ Increase the number of fighter aircraft units at Naha Air Base from one squadron to two; steadily procure fighter aircraft (F-35A); replace fighter aircraft (F-15) unsuitable for modernization with more capable fighter aircraft. ○ Procure new aerial refueling/transport aircraft; equip transport aircraft (C-130H) with aerial refueling capabilities, and procure rescue helicopters (UH-60J).
	<ul style="list-style-type: none"> ○ Increase the number of Aegis-equipped destroyers. ○ Steadily procure patrol helicopters (SH-60K) and surface-to-ship guided missiles. ○ Introduce ship-based multipurpose helicopters.
	<ul style="list-style-type: none"> ○ Introduce tilt-rotor aircraft (*3); steadily procure transport aircraft (C-2). ○ Acquire amphibious vehicles; refit Tank Landing Ships (LST). ○ Consider active utilization of civilian transport capabilities, and implement necessary measures. ○ Newly establish rapid deployment regiments with a focus on improvement of mobility; newly establish area security units in charge of initial responses on remote islands in the southwestern region; newly establish an amphibious rapid deployment brigade. ○ Improve guidance capability of precision-guided bombs; increase firing range of ship-to-ship guided missiles.
	<ul style="list-style-type: none"> ○ Station GSDF, MSDF, and ASDF personnel in the main headquarters of each of the other services. ○ Extend the secured exclusive communication link for the SDF to Yonaguni Island; deploy mobile multiplex communication equipment at Naha Air Base.
Response to ballistic missile attacks	<ul style="list-style-type: none"> ○ Increase the number of Aegis-equipped destroyers; introduce advanced PAC-3 missiles (PAC-3 MSE); improve automated warning and control systems; procure and improve fixed air defense radar (FPS-7) systems. ○ Promote Japan-U.S. cooperative development of advanced interceptor missiles (SM-3 Block II-A). ○ Conduct studies on the best mix of the overall posture of the future BMD system, including the new BMD equipment. ○ In preparation for an attack by guerrilla or special operations forces concurrently, continue procurement of a variety of surveillance equipment, light armored vehicles, NBC reconnaissance vehicles, etc.
Response in outer space and cyberspace	<ul style="list-style-type: none"> ○ Continue enhancement of information gathering capabilities through the use of various space satellites; steadily develop a sophisticated X-Band satellite communications system; enhance the resiliency of satellites through space situational awareness efforts and research on satellite protection methods. ○ Enhance survivability of the various SDF systems; strengthen information gathering functions, etc.; develop a practical training environment.
Response to large-scale disasters	<ul style="list-style-type: none"> ○ Develop capabilities to respond immediately by transporting and deploying sufficient numbers of SDF units, as well as establish a rotating staff posture in the event of various disasters.
Strengthening intelligence capabilities	<ul style="list-style-type: none"> ○ Drastically reinforce capabilities to gather intelligence from diverse sources, including SIGINT, GEOINT, and HUMINT. ○ Recruit and train personnel who would engage in information gathering and analysis.

Notes: 1. E-2D airborne early warning aircraft has been acquired since FY 2015.
2. Acquisition of Global Hawk unmanned aircraft vehicle began in FY 2015.
3. Osprey (V-22) has been acquired since FY 2015.
4. Some of the programs above are reposted in categories that are different from the previous year.

Source: Japanese Ministry of Defense, *Defense of Japan 2015*

Figure VII.12: Comparison of NDPG's

	Category	1976 NDPG	1995 NDPG	2004 NDPG	2010 NDPG	2013 NDPG
GSDF	Authorized Number of personnel	180,000	160,000	155,000	154,000	159,000
	Active-Duty Personnel		145,000	148,000	147,000	151,000
	Reserve-Ready Personnel		15,000	7,000	7,000	8,000
	Major units	Regionally deployed units in peacetime ⁴ 2 combined brigades	8 divisions 6 brigades	8 divisions 6 brigades	8 divisions 6 brigades	5 divisions 2 brigades
		Rapid Deployment Units 1 armored division 1 artillery brigade 1 airborne brigade 1 training group 1 helicopter brigade	1 armored division 1 airborne brigade 1 helicopter brigade	1 armored division Central Readiness	Central Readiness 1 armored division	3 rapid deployment divisions 4 rapid deployment brigades 1 armored division 1 airborne brigade 1 amphibious rapid deployment brigade 1 helicopter brigade
		Surface-to-Ship Guided Missile units				5 surface-to-ship guided missile regiments
		Surface-to-Air Guided Missile Units	8 anti-aircraft artillery groups	8 anti-aircraft artillery groups	7 anti-aircraft artillery groups/regiments	7 anti-aircraft artillery groups/regiments
		Tanks ³ Artillery (Main artillery) ³	(approx. 1,200) (approx. 1,000/vehicle)	approx. 900 (approx. 900/vehicle)	approx. 600 (approx. 600/vehicle)	approx. 400 (approx. 400/vehicle)
	Major Equipment					(approx. 300) (approx. 300/vehicle)
MSDF	Major units	Destroyer units for mobile operations regional deployment Submarine units Minesweeper Units Patrol aircraft units	4 flotillas (Regional units) 10 units 6 divisions 2 flotillas (Land-based) 16 squadrons	4 flotillas (Regional units) 7 units 6 divisions 1 flotilla (Land-based) 13 squadrons	4 flotillas (8 divisions) 4 divisions 6 divisions 1 flotilla 9 squadrons	4 flotillas (8 divisions) 6 divisions 6 divisions 1 flotilla 9 squadrons
		Destroyers	approx. 60	approx. 50	47	54
		Submarines	16	16	22	22
		Combat aircraft	approx. 220	approx. 170	approx. 150	approx. 170
ASDF	Major units	Air Warning & Control Units	28 warning groups 1 squadron	8 warning groups 20 warning squadrons 1 squadron	8 warning groups 20 warning squadrons 1 AEW group (2 squadrons)	4 warning groups 24 warning squadrons 1 AEW group (2 squadrons)
		Fighter Aircraft Units Fighter-interceptor units Support fighter units	10 squadrons 3 squadrons	9 squadrons 3 squadrons	12 squadrons	12 squadrons
		Air Reconnaissance Units	1 squadron	1 squadron	1 squadron	13 squadrons
		Aerial refueling/transport units		1 squadron	1 squadron	2 squadrons
		Air transport units	3 squadrons	3 squadrons	3 squadrons	3 squadrons
		Surface-to-Air Guided Missile Units	6 groups	6 groups	6 groups	6 groups
	Major Equipment	Combat aircraft (Fighters)	approx. 430 (approx. 350) ³	approx. 400 approx. 300	approx. 350 approx. 260	approx. 340 approx. 260
		Aegis-equipped destroyers			4 ships	6 ships ²
Major equipment/units that may also serve for BMD missions ¹	Air Warning & Control Units			7 warning groups 4 warning squadrons	11 warning groups/units	8 ships
	Surface-to-Air Guided Missile Units			3 groups	6 groups	

Source: Japanese Ministry of Defense, *Defense of Japan 2015*

Russia

Russia's military modernization is now being reshaped by the ongoing Ukraine crisis, its involvement in Syria, its focus on the Color Revolution and strengthening its military ties with China and other nations outside the West, and the economic crisis caused by US and EU sanctions over Ukraine and the sharp cuts in its petroleum export revenues that began with a sharp cut in oil prices in late 2014.

While the updated Russian Military Doctrine of 2010 lacked specifics regarding the armed forces and does not discuss any role they might play in Asia and the Koreas, it did provide useful general guidelines as to what roles the Russian military were expected to play:¹²⁰¹

The main tasks of the Armed Forces and other troops in peacetime are:

- a) to defend the sovereignty of the Russian Federation and the integrity and inviolability of its territory;
- b) to ensure strategic deterrence, including the prevention of military conflicts;
- c) to maintain the composition and state of combat and mobilizational readiness and training of the strategic nuclear forces, forces and resources that support their functioning and use, and command and control systems at a level guaranteeing the infliction of the required damage on the aggressor whatever the conditions of the situation;
- d) to provide timely warning to the supreme commander in chief of the Russian Federation Armed Forces of an air or space attack and notification to the organs of state and military administration and the troops (forces) about military dangers and military threats;
- e) to maintain the capability of the Armed Forces and other troops for the timely deployment of groupings of troops (forces) in potentially dangerous strategic salients, and also to maintain their readiness for combat use;
- f) to ensure the air defence of the Russian Federation's most important military facilities and readiness to rebuff strikes by means of air and space attack;
- g) to deploy and maintain, in the strategic space zone, orbital groupings of space devices supporting the activities of the Russian Federation Armed Forces;
- h) to protect important state and military facilities, facilities on lines of communication, and special cargoes;
- i) to maintain the infrastructure of the Russian Federation's territory and prepare lines of communication for defence purposes, including the construction and modernization of special-purpose facilities and the construction and major refurbishment of highways of defence significance;
- j) to protect citizens of the Russian Federation outside the Russian Federation from armed attack;
- k) to participate in operations in the maintenance (restoration) of international peace and security, to adopt measures to avert (eliminate) a threat to peace, and to suppress acts of aggression (violation of the peace) on the basis of decisions of the UN Security Council or other bodies authorized to adopt such decisions in accordance with international law;
- l) to combat piracy and ensure the safety of shipping;
- m) to ensure the security of the economic activities of the Russian Federation on the high seas;
- n) to combat terrorism;
- o) to prepare for carrying out territorial defence and civil defence measures;
- p) to participate in the protection of public order and the safeguarding of public security; q) to participate in the elimination of emergencies and the restoration of special-purpose facilities;

r) to participate in securing a state of emergency.

... The main tasks of the Armed Forces and other troops during a period of direct threat of aggression are:

- a) to implement of a package of additional measures aimed at lowering the level of the threat of aggression and increasing the level of combat and mobilizational readiness of the Armed Forces and other troops with a view to carrying out mobilizational and strategic deployment;
- b) to maintain the nuclear deterrence potential at the established degree of readiness;
- c) to participate in maintaining a martial law regime;
- d) to fulfill the Russian Federation's international commitments with regard to collective defence and he rebuffing or prevention, in accordance with the norms of international law, of an armed attack on another state that has made the corresponding request to the Russian Federation.

... The main tasks of the Armed Forces and other troops in wartime are to rebuff aggression against the Russian Federation and its allies, to inflict defeat on the aggressor's troops (forces), and to force him to cease hostilities on terms that meet the interests of the Russian Federation and its allies.

The 2013 IISS *Military Balance* provided the following summary of the Russian military's capabilities before the Ukraine crisis began:¹²⁰²

Russia remains a significant continental military power, and is in the process of renewing its nuclear arsenal. The first of the Borey-class SSBNs, the Yury Dolgoruky, formally joined the fleet at the beginning of 2013, and is intended as part of a broader recapitalization of the country's nuclear capability. The Russian armed forces are undergoing a reform process, begun by Defence Minister Anatoly Serdyukov in 2008.

His replacement by Sergey Shoigu in November 2012 raised questions about the future of the reform process. However, main elements, such as the initiative to transform the army towards a combined arms brigade-based structure, appear to continue. Though pay rates were increased in 2012, the recruitment of contract personnel in adequate numbers remains a challenge, particularly for NCOs and specialist roles; this is also a reflection of demographic issues.

The warrant officer rank cut by the Serdyukov reforms – a class of long-serving specialists usually in roles demanding technical or administrative skills – was reinstated and an ambitious 50,000 recruitment target set. Conventional re-equipment continues with all three services taking delivery of modern combat systems, if sometimes in modest numbers.

Force restructuring – such as the establishment of the Special Operations Command – is intended to improve capability amid smaller armed forces. The deployment of the Russian Mediterranean Task Force in response to the 2013 Syria crisis and the Western naval presence was a significant show of maritime power. Deployments in Eurasia and on UN missions continue.

Russia released a further update of its their military doctrine in 2014 but there was minimal change from the 2010 version. The 2016 edition of the IISS *Military Balance* stated:¹²⁰³

In December 2014, Russia published an updated military doctrine. Overall, there were few significant departures from the version published in 2010, with changes reflecting Moscow's view of a contemporary international security environment 'characterized by the strengthening of global competition', as the document put it. The main external military dangers were listed as the build-up of NATO's capabilities and the process of 'bringing the military infrastructure of NATO member countries near the borders of the Russian Federation, including by further expansion of the alliance'.

The fourth group of military dangers was the 'establishment and deployment of strategic missile defense systems undermining global stability and violating the established balance of forces related to nuclear missiles, implementation of the global strike concept, intention to place weapons in outer space, as well as deployment of strategic non-nuclear systems of high-precision weapons'. The mention of 'strategic missile defence systems' as a military danger is reflective of a capability that is a long-held matter of concern for Moscow, exacerbated by technical developments in US missile defence, as well as by the NATO plan to activate *Aegis Ashore* missile-defence systems in Eastern Europe. Meanwhile, the reference to global strike

would seem directed at the US prompt-global strike concept, which Moscow fears could provide Washington with a conventional-missile-based strike option of such high speed and precision that it would lower the threshold for a disarming first strike.

With one eye on events in Ukraine since the toppling of the Yanukovich administration, the document also highlighted a military risk from the establishment of regimes whose ‘policies threaten the interests of the Russian Federation’ in states neighboring Russia, ‘including by overthrowing legitimate state administration bodies’, as well as subversive activities by foreign intelligence services against the Russian Federation. Events in Ukraine are also reflected in the doctrine’s new provision on the ‘participation in military operations of irregular military formations and private military companies [sic]’ as a characteristic of modern military conflicts, along with the ‘use of indirect and asymmetric’ forms of warfare.

The protection of Russia’s national interests in the Arctic has been added to the peacetime tasks of the Russian armed forces. Priorities for military–political cooperation now include ‘ensuring common defense and security’ with the breakaway Georgian regions of Abkhazia and South Ossetia, both recognized as independent states by Russia since 2008. Actions to improve the armed forces’ permanent and mobilization readiness, and the health of Russia’s defence industrial sector, are also given prominent emphasis in the new doctrine.

Figure VII.13 shows the Russian military districts and provides a chart of the primary force numbers and capabilities for each military branch, according to 2012 Japanese estimates. Furthermore, **Figure VII.14** shows the Russian forces that are stationed near the North Korean border – meaning, those that would be available in the short-term if a militarized situation escalated on the Peninsula.

In broad terms, Russia seems far more likely to use its diplomatic influence and military power to try to deter, limit, and end a Korean conflict than play a direct military role. It has far too many economic interests in the stability of Northeast Asia and few military or territorial ambitions. While a more direct role is possible, the odds are strongly against it and it would take radical shift in the regional power struggle that directly threatened Russian interest to cause the country to intervene in a war in the Koreas.

Modernization of Russian Forces

The 2010 Military Doctrine also discussed Russia’s military modernization plans before the Ukraine crisis began. It focused on the need to improve Russia’s ability to fight a high-precision conventional war using command-and-control networks and sophisticated communications. The document also urged the military to use its resources more efficiently and for its defense and intelligence communities to better anticipate future wars and the characteristics of such conflicts. It stressed the need for a high-technology defense industrial capacity to supply both the Russian military and foreign customers.¹²⁰⁴

The Doctrine declared the following modernization goals:¹²⁰⁵

The tasks of equipping the Armed Forces and other troops with armaments and military and specialized equipment are:

- a) to comprehensively equip (reequip) with up-to-date models of armaments and military and specialized equipment the strategic nuclear forces, permanent-readiness large formations and troop units of the general-purpose forces, antiterrorist formations, engineering and technical troop formations, and road building troop formations, and to maintain them in a condition that will support their combat use;
- b) to create multifunctional (multirole) systems of armaments and military and specialized equipment using standardized components;
- c) to develop forces and resources for information warfare;

- d) to improve the quality of means of information exchange on the basis of the use of up-to-date technologies and international standards, as well as the single information field of the Armed Forces and other troops as part of the Russian Federation's information space;
- e) to ensure the functional and organizational-technical unity of the arms systems of the Armed Forces and other troops;
- f) to create new models of high-precision weapons and develop information support for them;
- g) to create basic information management systems and integrate them with the systems for command and control of weapons and the automation systems of command and control organs at the strategic, operational-strategic, operational, operational-tactical, and tactical levels.

Western Analyses

In March 2013, DNI James R. Clapper provided the following summary of Russia's larger modernization efforts to the US Congress:¹²⁰⁶

Russian military forces, both nuclear and conventional, support deterrence and enhance Moscow's geopolitical clout. Since late 2008 the Kremlin has embraced a wide-ranging military reform and modernization program to field a smaller, more mobile, better-trained, and high-tech force during the next decade. This plan represents a radical break with historical Soviet approaches to manpower, force structure, and training. The initial phases, mainly focused on force reorganization and cuts in the mobilization base and officer corps, have been largely implemented and are being institutionalized. The ground forces alone have reduced about 60 percent of armor and infantry battalions since 2008, while the Ministry of Defense cut about 135,000 officer positions, many at field grade.

Moscow is now setting its sights on long-term challenges of rearmament and professionalization. In 2010, a 10-year procurement plan was approved to replace Soviet-era hardware and bolster deterrence with a balanced set of modern conventional, asymmetric, and nuclear capabilities. However, funding, bureaucratic, and cultural hurdles—coupled with the challenge of reinvigorating a military industrial base that deteriorated for more than a decade after the Soviet collapse—complicate Russian efforts.

The reform and modernization programs will yield improvements that will allow the Russian military to more rapidly defeat its smaller neighbors and remain the dominant military force in the post-Soviet space, but they will not—and are not intended to—enable Moscow to conduct sustained offensive operations against NATO collectively. In addition, the steep decline in conventional capabilities since the collapse of the Soviet Union has compelled Moscow to invest significant capital to modernize its conventional forces. At least until Russia's high precision conventional arms achieve practical operational utility, Moscow will embrace nuclear deterrence as the focal point of its defense planning. It still views its nuclear forces as critical for ensuring Russian sovereignty and relevance on the world stage and for offsetting its military weaknesses vis-à-vis potential opponents with stronger militaries.

Clapper's comments during the Congress's 2015 and 2016 Global Threat Assessment hearings provided substantially less detail regarding Russia's military modernization. In 2015, Clapper stated:¹²⁰⁷

Moscow has made headway in modernizing its nuclear and conventional forces, improving its training and joint operational proficiency, modernizing its military doctrine to integrate new methods of warfare, and developing long-range, precision-strike capabilities. Despite its economic difficulties, Moscow is committed to modernizing its military.

While in 2016 Clapper noted the economic slowdown in Russia and their reliance on information warfare:¹²⁰⁸

Despite Russia's economic slowdown, the Kremlin remains intent on pursuing an assertive foreign policy in 2016. Russia's willingness to covertly use military and paramilitary forces in a neighboring state continues to cause anxieties in states along Russia's periphery, to include NATO allies. Levels of violence in eastern Ukraine have decreased, but Moscow's objectives in Ukraine—maintaining long-term influence

over Kyiv and frustrating Ukraine's attempts to integrate into Western institutions—will probably remain unchanged in 2016.

Russia continues to take information warfare to a new level, working to fan anti-US and anti-Western sentiment both within Russia and globally. Moscow will continue to publish false and misleading information in an effort to discredit the West, confuse or distort events that threaten Russia's image, undercut consensus on Russia, and defend Russia's role as a responsible and indispensable global power.

The 2014 edition of the IISS Military Balance provided the following breakdown of Russia's modernization and highlighted the restructuring of its forces:¹²⁰⁹

Land Forces

Several new armored platforms were demonstrated at the Victory Day Parade on 9 May 2015. A main battle tank, the T-14, and a heavy infantry fighting vehicle (IFV) based on the *Armata* platform; the new *Koalitsiya-SV* self-propelled gun (SPG); a medium tracked IFV on the *Kurganets-25* platform; and the *Bumerang* wheeled armored personnel carrier were seen (see p. 8). Notably, all of these models have increased in size and weight compared to their Soviet-era predecessors. These changes are designed to improve both protection and conditions for the crew and mounted troops, as are the active protection systems *observed* on some of the vehicles.

The number of combat vehicles at the parade was less than that originally announced, which may indicate a delay in their production borne out by the situation with the new *Koalitsiya-SV* SPG. Instead of using the chassis of the *Armata* platform as stated originally, the SPGs shown at the parade used the chassis of the T-90 tank. It has not been announced if or when the SPG will use the new chassis.

The field trials of the prototypes displayed will not start until 2016. Depending on the results, serial production can be expected to start in 2017–19; the trial results will consequently determine the number of vehicles to be purchased. Their price has also yet to be decided, and there are serious differences between the defence ministry and industry as to the cost of the new vehicles. As a result, no contracts for the mass production of these new armored vehicles for the army have yet been placed.

Navy

The navy's shipbuilding program is still experiencing difficulties, with the construction of large surface combatants, frigates and corvettes chronically behind schedule. More progress has been made with the submarine fleet, including in the key project to renew the ballistic-missile-submarine (SSBN) fleet. The construction of three of the eight new *Borey*-class SSBNs has been completed and four more are under construction. The final submarine will be laid down in 2016. The fate of the four *Kirov*-class cruisers has been clarified, with the operational *Petr Velikiy* due to be joined by a fully modernized *Admiral Nakhimov* by 2018. Another cruiser of this class will remain mothballed. Work on dismantling of the first ship of the class, the *Kirov*, which was built in the 1970s, is scheduled to start in 2016.

Even though the contract for purchasing French *Mistral* helicopter carriers was abrogated, the plan to buy helicopters for the ships has not been cancelled, and in 2015 a contract was signed for 32 Ka-52K attack helicopters adapted for shipborne deployment. The Russian naval air arm is also on course for significant reinforcement. The air wing on the aircraft carrier *Admiral Kuznetsov* will be modernized with the arrival of the MiG-29K combat aircraft. It was announced in 2012 that 24 MiG-29Ks would be bought for the *Kuznetsov*. These will likely go to the newly established 100th Shipborne Fighter Aviation Regiment, the second such regiment in the navy. The regiments of shore-based fighters and attack aircraft will also be updated. From 2014, they started to take delivery of the Su-30SM. By 2020, the Russian Navy is due to get more than 50 of these multi-role fighters.

Aerospace Forces

On 1 August 2015, a new armed service was formed, the Aerospace Forces, incorporating the Air Force, army aviation and the Aerospace Defence Forces. This new armed service will also be responsible for both strategic and theatre missile defence. To develop strategic-missile-defence capabilities, elements of the A-235 *Samolyot-M* ballistic-missile-defence system have started to undergo testing. This is intended to replace the current Moscow missile-defence system, the A-135, and unlike the latter there will be not only silo-launched but also road-mobile versions. Meanwhile, the S-500 air-defence system will provide the

theatre missile-defence layer when it enters service; trials are expected in 2016. Deliveries of production S-400 systems are under way, maintained at a rate of three regiment sets per year. By the end of 2015, ten air-defence regiments had been re-equipped with S-400s.

The air force also continues to actively recapitalize. Missile armament for the Sukhoi T-50 future combat aircraft (developed for the PAK-FA requirement) was under test, though an accident with one of the test aircraft in 2014 delayed the program by at least six months. Procurement plans have also been revised: only 12 of the 56 planned production T-50s will be have been bought by 2020. Additionally, in 2014, air force line units took delivery of 179 reconnaissance- UAV sets. The maiden flight of a strike UAV, in the one-ton class, was scheduled for the end of 2015, although deliveries to line units were not scheduled to begin until 2019. The ongoing parallel development of attack UAVs in the 5- and 20-tonne classes will likely take even longer.

Strategic Rocket Forces

The modernization of the Strategic Rocket Forces (SRF) continues at a rate of around 40 missiles per year. Deliveries of *Yars* intercontinental ballistic missiles (ICBMs), both road-mobile and silo-based, are successfully under way, and in 2014 the armed forces took delivery of 16 *Yars* ICBMs and 22 submarine-launched ballistic missiles. Another 24 *Yars* ICBMs were due to be delivered in 2015.

The entry into service of a new heavy liquid fuel ICBM, the *Sarmat*, with a throw-weight of up to ten tons, has an important role to play in these modernization plans. The first prototype is due to be completed by March 2016 and, in line with plans previously announced, their entry into service is due to begin in 2019 in time to replace the SS-18, which is due to be withdrawn from service in 2022. *Sarmat* has been linked to the development of a 'hypersonic glide vehicle', dubbed Project 4202, which is estimated to require a 100-ton-class launcher – coincidentally, around the size of *Sarmat*. This might well provide an explanation for the development of a liquid-fueled ICBM at a time when the main SRF re-equipping effort was geared towards solid-fueled systems. Furthermore, in summer 2015, plans were officially confirmed regarding the development of a new rail based ICBM system (*Barguzin*). According to Deputy Defence Minister Yuriy Borisov, design work on this system is now in progress using the *Yars* missile.

The 2016 IISS *Military Balance* provided a more detailed overview of Russian modernization efforts. In general, reform processes continue, both in terms of bureaucracy and practical matters such as training and exercise regimens. The military plans to professionalize its forces by increasing contract troops while keeping some proportion of the conscription system intact, although it remains unable to attract enough non-commissioned officers and contract personnel at the same time as overall troop levels continue to decrease. Furthermore:¹²¹⁰

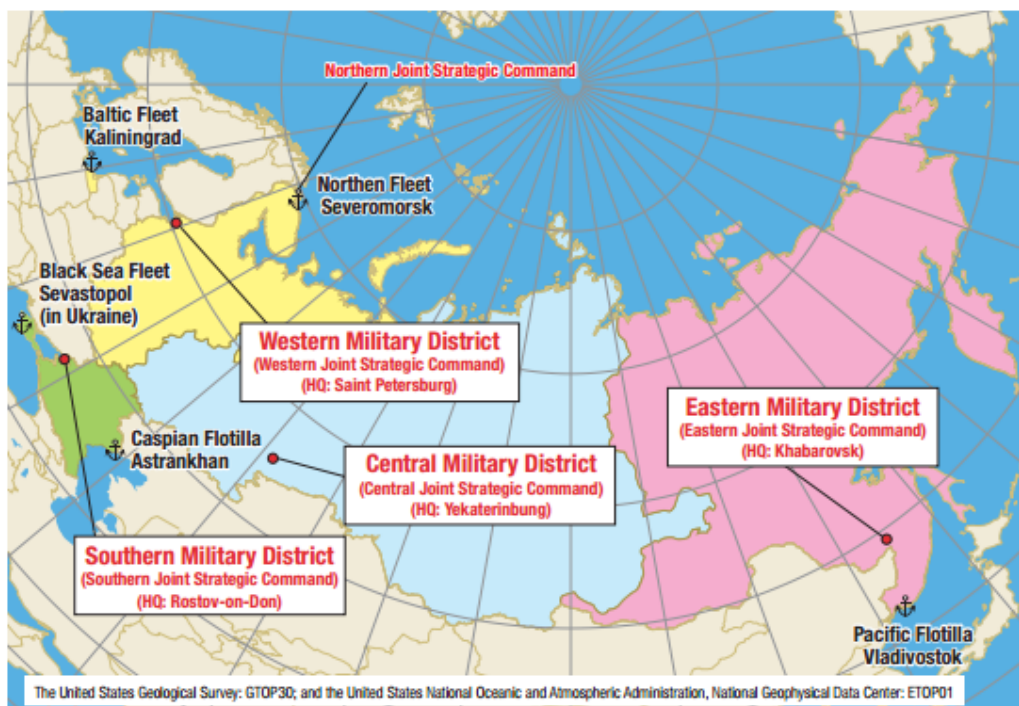
The pattern of the structural reform process generally remains as before: design, test, and then adjust or adapt if required. Some analysts believe that key elements of the reform process are largely complete, such as the initiative to transform the army towards a combined-arms brigade-based structure, though adjustments are still to be made, largely in the internal formation of these units. Some units retain established structures: the Airborne Forces (VDV) remain a divisional-level formation, and the 18th Machine Gun Artillery Division continues to be stationed in the Kuril Islands.

There are some outstanding issues: changes in unit-level combat training are still under development; there is a lack of clarity over how the Joint Strategic Commands... which are planned to operate in Military Districts in times of war, will actually work when activated; and the armed forces are still waiting for an integrated and automated command and control (C2) system to emerge. But the army has already changed substantially, while the armed forces in general have become more compact and mobile and have benefitted from improved frequency of training. Whether this translates directly into improved 'readiness' is less clear.

The authorities in Moscow increasingly see rearmament as a second stage in the reform process. The administration maintains its ambitions to field more and newer equipment, though in recent years budgetary problems as well as changing requirements have meant that some programs have not been realized on schedule, if at all. The latest program, The State Armaments Program 2011–2020, was signed by then-President Dmitry Medvedev on 31 December 2010. It saw around R19 trillion (\$US610bn) out of the

program's total R20tr allocated to the Ministry of Defence; the remainder going to other forces. Generating the industrial capacity to address new as well as established procurement ambitions remains a major problem...

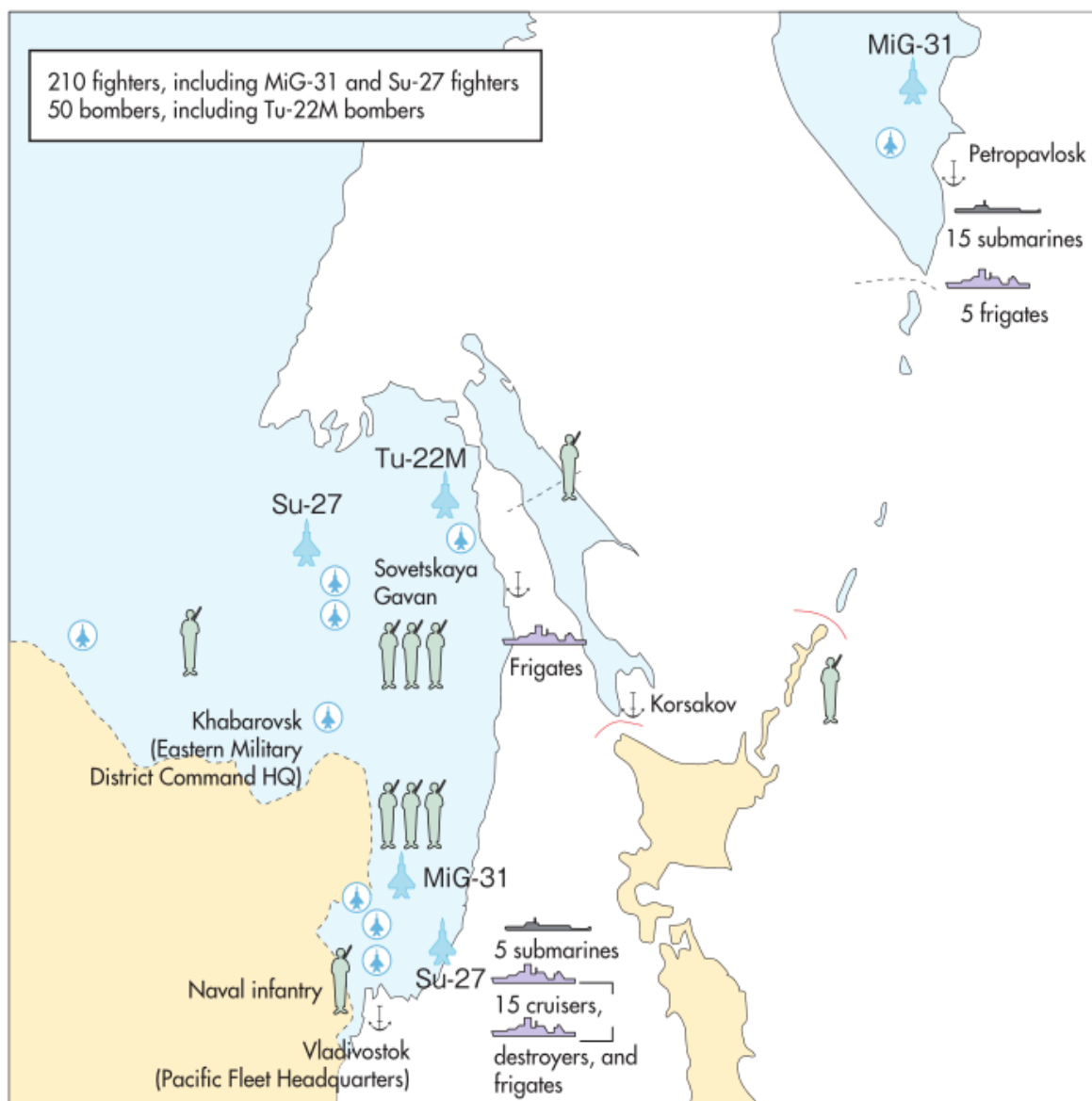
Figure VII.13: Russian Military Districts and Major Forces



Russia		
Total military forces		Approx. 770,000 troops
Ground forces	Ground troops	Approx. 260,000 troops
	Tanks	T-90, T-80, T-72, etc. Approx. 2,600 (Not including mothballed tanks) Approx. 20,100 including mothballed tanks)
Maritime forces	Warships	Approx. 960 vessels Approx. 1,968,000 tons
	Aircraft carriers	1 vessel
	Cruisers	5 vessels
	Destroyers	14 vessels
	Frigates	31 vessels
	Submarines	64 vessels
	Marines	Approx. 20,000 troops
Air forces	Combat aircraft	Approx. 1,410 aircraft
	Modern fighter aircraft	188 MiG-29 aircraft 32 Su-30 aircraft 150 MiG-31 aircraft 18 Su-33 aircraft 220 Su-25 aircraft 46 Su-34 aircraft 199 Su-27 aircraft 25 Su-35 aircraft (4th generation fighter aircraft: Total 878)
	Bombers	16 Tu-160 aircraft 62 Tu-95 aircraft 63 Tu-22M aircraft
Reference	Population	Approx. 142.50 million
	Term of service	1 year (In addition to conscription, there is a contract service system)

Source: Japanese Ministry of Defense, *Defense of Japan 2015*.

Figure VII.14: Russian Forces Arrayed Near the North Korean Border



- Notes:
1. represents the number of divisions and brigades.
 2. represents the locations of main naval bases.
 3. represents the locations of main air bases.
 4. Figures shown are approximate.
 5. In addition to above, 3 brigades are present in the western part of the Eastern Military District.

Source: Japanese Ministry of Defense, *Defense of Japan 2012*, 53.

Chinese Military Expenditures and Resources

China now dominates Asian military spending and is becoming the largest regional military power in terms of power projection as well as total forces. China maintains an alliance with and is a key material supporter of the DPRK. China will be a key player in shaping the pattern of any potential military escalation on the Korean Peninsula, as it was in the Korean War.

Moreover, an assessment of China's defense spending and modernization efforts shows that it not only plans to radically improve virtually every relevant aspect of its conventional and asymmetric warfare capabilities that affect the Koreas, but every aspect of its sea-air-missile-nuclear capabilities that affect US power projection capabilities and potentially Japan's willingness to support US action in defense of the ROK.

Critics of Chinese military spending and China's lack of transparency often do not discuss the strategic context in which Chinese military modernization and growth is taking place. Chinese analysts point to the surrounding environment and other countries' military budgets as major drivers of defense spending. Two leading Western analysts, Adam P. Liff and Andrew S. Erikson, point out that:¹²¹¹

First, in Beijing's view China faces numerous internal threats to stability ranging from secessionist movements in Tibet and Xinjiang to widespread – if localized – “mass incidents,” i.e. anti-government protests. While there is no open-source evidence of PLA involvement in PAP operations other than the March 2008 suppression in Lhasa, continued domestic security concerns necessarily affect military prioritization. Second, China has land borders with 14 nations – including four nuclear weapons states – and territorial disputes with two of them (primarily India, also Bhutan). Third, China retains maritime boundary or island disputes with all its maritime neighbors.

Thus, Beijing's political relations with all major military powers in its neighborhood are, at best, tepid. Combined with Taiwan's unresolved status, this makes the Near Seas and their immediate approaches a critical area of strategic contention and assertion for China. Fourth, for these and other reasons, China has tense, albeit not unstable, political and military relations with the world's sole superpower (the US), whose leaders will probably remain suspicious of China's intentions as long as it retains an authoritarian political system. Despite increasingly global security interests of the kind often used to justify US defence policy (e.g. secure sea lanes of communication for safe passage of the resources and commerce) and sincere concerns about its external environment, China's defence budget increases remain focused on irredentist but regional concerns, however controversial the means and desired ends of that approach may be to other states with interests in the region.

In March 2016, Prime Minister Li Keqiang announced that China's military budget would rise about 7.6 percent in 2016 to invest in high-tech equipment and further modernize the world's second largest military spender.¹²¹²

The 7.6% rise was a noteworthy decrease from the previous year's 10.2% raise and the regular double digit increases of the recent years. A former PLA general noted, “The whole economy is slowing, the pace of G.D.P. growth is slower than before, and military spending, the defense budget, should be in step with the pace of G.D.P.”¹²¹³

While China does provide these annual updates, they still have not provided much meaningful transparency regarding its overall military spending or details of much of its military modernization. This makes it difficult to assess both China's military capacity and how it influences the balance of forces in the Koreas and Northeast Asia.

Capacity for Military Efforts and Official Chinese Reporting

The abilities of a country to sustain a military, undertake modernization, and increase defense spending are all important variables when assessing the balance of potential forces on the Korean Peninsula. The CIA described China's growing economic capacity to support its military forces as follows in 2016:¹²¹⁴

Since the late 1970s, China has moved from a closed, centrally planned system to a more market-oriented one that plays a major global role; in 2010, China became the world's largest exporter. Reforms began with the phase out of collectivized agriculture, and expanded to include the gradual liberalization of prices, fiscal decentralization, increased autonomy for state enterprises, growth of the private sector, development of stock markets and a modern banking system, and opening to foreign trade and investment. China has implemented reforms in a gradualist fashion. In recent years, China has renewed its support for state-owned enterprises in sectors considered important to "economic security," explicitly looking to foster globally competitive industries. The restructuring of the economy and resulting efficiency gains have contributed to a more than tenfold increase in GDP since 1978. Measured on a purchasing power parity (PPP) basis that adjusts for price differences, China in 2015 stood as the largest economy in the world, surpassing the US in 2014 for the first time in modern history. Still, China's per capita income is below the world average.

After keeping its currency tightly linked to the US dollar for years, China in July 2005 moved to an exchange rate system that references a basket of currencies. From mid-2005 to late 2008, cumulative appreciation of the renminbi against the US dollar was more than 20%, but the exchange rate remained virtually pegged to the dollar from the onset of the global financial crisis until June 2010, when Beijing allowed resumption of a gradual appreciation. In 2015, the People's Bank of China announced it would continue to carefully push for full convertibility of the renminbi after the currency was accepted as part of the IMF's special drawing rights basket.

The Chinese Government faces numerous economic challenges including: (a) reducing its high domestic savings rate and correspondingly low domestic consumption; (b) facilitating higher-wage job opportunities for the aspiring middle class, including rural migrants and increasing numbers of college graduates; (c) reducing corruption and other economic crimes; and (d) containing environmental damage and social strife related to the economy's rapid transformation. Economic development has progressed further in coastal provinces than in the interior, and by 2014 more than 274 million migrant workers and their dependents had relocated to urban areas to find work. One consequence of population control policy is that China is now one of the most rapidly aging countries in the world. Deterioration in the environment - notably air pollution, soil erosion, and the steady fall of the water table, especially in the North - is another long-term problem. China continues to lose arable land because of erosion and economic development. The Chinese government is seeking to add energy production capacity from sources other than coal and oil, focusing on nuclear and alternative energy development.

Several factors are converging to slow China's growth, including debt overhang from its credit-fueled stimulus program, industrial overcapacity, inefficient allocation of capital by state-owned banks, and the slow recovery of China's trading partners. The government's 13th Five-Year Plan, unveiled in November 2015, emphasizes continued economic reforms and the need to increase innovation and domestic consumption in order to make the economy less dependent in the future on fixed investments, exports, and heavy industry. However, China has made only marginal progress toward these rebalancing goals. The new government of President XI Jinping has signaled a greater willingness to undertake reforms that focus on China's long-term economic health, including giving the market a more decisive role in allocating resources. In 2014, China agreed to begin limiting carbon dioxide emissions by 2030.

The PRC has rarely publically discussed its defense budgeting in depth, but the 2010 Chinese Defense White Paper did address military spending.¹²¹⁵

With the development of national economy and society, the increase of China's defense expenditure has been kept at a reasonable and appropriate level. China's GDP was RMB31,404.5 billion in 2008 and RMB34,090.3 billion in 2009. State financial expenditure was RMB 6,259.266 billion in 2008 and RMB7,629.993 billion in 2009, up 25.7 percent and 21.9 percent respectively over the previous year. China's defense expenditure was RMB417.876 billion in 2008 and RMB495.11 billion in 2009, up 17.5

percent and 18.5 percent respectively over the previous year. In recent years, the share of China's annual defense expenditure in its GDP has remained relatively steady, while that in overall state financial expenditure has been moderately decreased.

...In 2010, confronted by the residual impact of the global financial crisis and other uncertainties, the tension between revenue and expenditure in China's finances persists. Giving priority to socially beneficial spending in agriculture, rural areas and farmers, as well as in education, science and technology, health, medical care and social security, China has increased its defense expenditure moderately as needed. China's defense budget for 2010 is RMB532.115 billion, up 7.5 percent over 2009. The growth rate of defense expenditure has decreased.

US Analyses of Chinese Defense Budgets

The US DOD has long questioned Chinese reporting on the size of its defense budgets, issuing higher estimates of the growth in Chinese military spending. According to the 2016 DoD report on China:¹²¹⁶

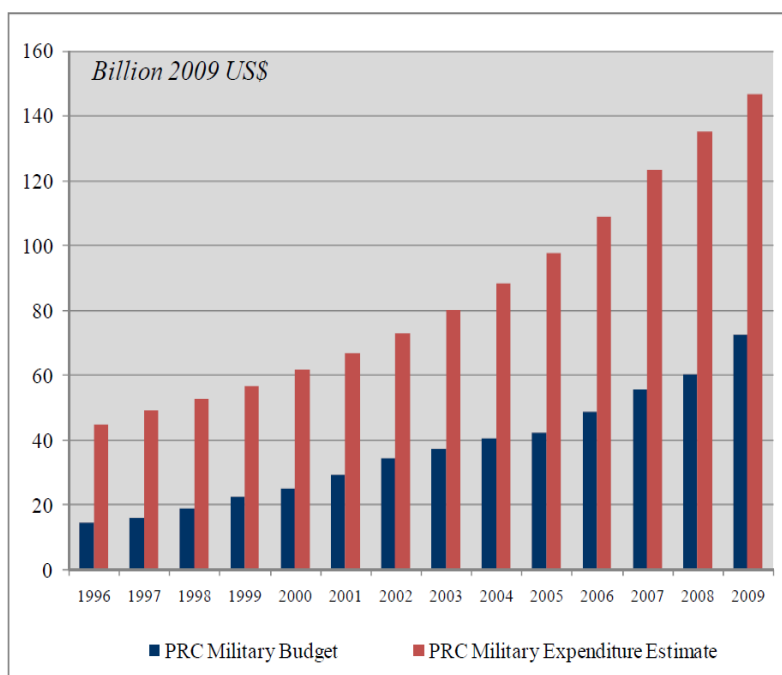
China's officially-disclosed military budget grew at an average of 9.8 percent per year in inflation-adjusted terms from 2006 through 2015, and Chinese leaders seem committed to sustaining defense spending growth for the foreseeable future, even as China's economic growth decelerates.

There are a variety of problems when attempting to assess China's actual defense spending. China's official military budget does not include major categories of defense-related expenditures, while including line items that are not usually included in other countries' military budgets. In addition, China still maintains a semi-command economy and a lack of accounting transparency.

The DOD does estimate that China's actual military-related spending for 2015 was over \$180 billion.¹²¹⁷ This compare with an official Chinese figure of \$144 billion. China argues that its defense budget expands in parallel with its economic growth, and is not directed at any other country. One Chinese Vice Foreign Minister remarked, "Strengthening China's defense capability will be conducive to further stability in the region and will be conducive to world peace."¹²¹⁸

Figure VII.15 addresses the differences between the defense budget numbers that the Chinese government reports and what the Department of Defense estimates the defense budget at.

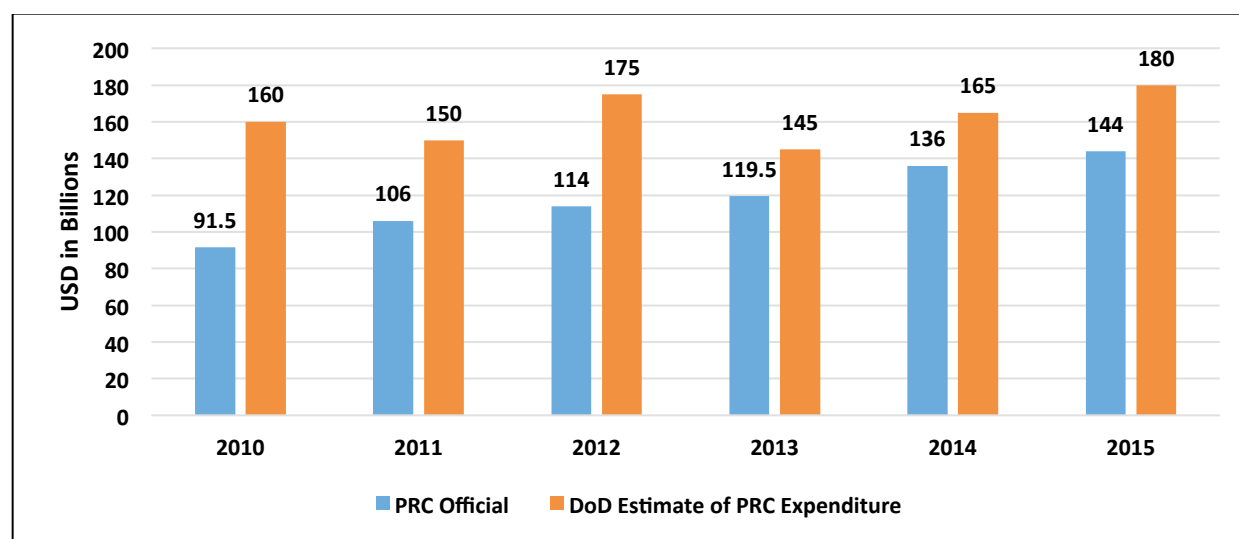
Figure VII.15: Historical PRC Defense Budget Compared to US Estimates of Total Defense Spending Pt. 1



China's Annual Real GDP and Military Budget Growth, 2000 - 2009.

Source: DoD, *Military and Security Developments Involving the People's Republic of China 2010*, 42, http://www.defense.gov/pubs/pdfs/2010_CMPR_Final.pdf.

Figure VII.15: Historical PRC Defense Budget Compared to US Estimates of Total Defense Spending Pt. 2



Source: DoD, *Military and Security Developments Involving the People's Republic of China 2011-2016*. Adapted by Anthony H. Cordesman and Joseph Kendall at the Center for Strategic and International Studies, August 2016.

Note: In the case of the 2011 and 2012 DoD reports the estimate of PRC spending was presented as a range. For statistical clarity, the ranges have been averaged and the average incorporated into the graph. Additionally, the

numbers are taken from the yearly DoD reports and thus not adjusted for inflation as they are in **Figure V.II.15 Pt. 1.**

The 2016 DoD report also noted estimates of what China's long-term defense spending is likely to look like:¹²¹⁹

IHS Jane's Defense Budgets expects China's defense budget to increase by an annual average of 7 percent, growing to \$260 billion by 2020. As of March 2015, the DoD Comptroller forecasted the US defense budget will reach \$598 billion in current dollars over the same period.

The China Power Program at CSIS notes a broad range of difficulties in estimating China's military budget:¹²²⁰

Estimates of China's military budget are further complicated by what China does include in its budget reporting. China's official defense figures likely include costs not typically included in many Western defense budgets. For instance, expenses incurred by military infrastructure construction is assumed to be included in the official figures, although many of these projects are designed to be dual use and draw funding from local and national nondefense coffers.

Disaster relief is also ostensibly funded through the defense budget and is to be reimbursed by nondefense agencies, but the mechanism and effectiveness of this reimbursement remains unclear. Perquisites for retired senior officers, including offices, assistants, cars, and special access to hospital facilities, are all funded through China's defense budget. Many of these functions and associated costs are typically incurred in Western countries by nonmilitary organizations, a discrepancy that further complicates estimates of China's military budget. Despite these factors, it remains unclear what percentage these expenditures constitute of China's total defense budget.

The inconsistencies in estimates of Chinese defense spending are further complicated by the lack of pricing information. Beijing does not release accurate cost data on military goods and services, making estimations that rely on purchasing power parity (PPP) difficult. It is possible that assumptions for the country's largely state-run market for military equipment and services are significantly different from average PPP assumptions used to calculate China's defense expenditure, and PPP assumptions for China vary widely as outside experts have no clear idea what assumptions are most accurate.

Attempts to estimate the market cost of military expenditures without pricing information can be unreliable. For instance, a lower cost may be assigned to domestic military purchases in China than would be determined by an economy with greater market competitiveness. Some of the chief challenges are uncertainty over which goods to place in China's defense spending basket, and which goods to compare between China and other countries. Independent organizations, such as IISS, caveat their PPP estimates, noting that no specific PPP rate applies to the Chinese military sector and that there is no definitive means through which elements of military spending can be calculated using PPP rates.

Outside Assessments of Chinese Military Spending

Outside experts also question China's reporting. SIPRI and IISS are the two most often used third party budget experts. Indeed, both have special methods they utilize in trying to discern China's actual budget outlay. SIPRI notes:¹²²¹

In its estimates of Chinese military expenditure, SIPRI seeks to take into account a number of sources of military expenditure outside the official defence budget. Such sources of military expenditure include funding from other central government ministries (some of which is publicly available, some of which is not), funding from local government and funding from internal People's Liberation Army (PLA) sources—the latter probably represents a much smaller share of the total than in the past. SIPRI's estimate of China's military spending is based on a methodology used in a study published in SIPRI Yearbook 1999, which provides estimates of Chinese military spending from 1989–1998, based on both the official defence budget and data and estimates for a number of items outside the budget (see below). [1]

SIPRI's estimates for China continue to be based on Professor Wang's methodology, adapted over time as new information has become available, or in some cases where data series have ceased to be available. The

figures come from the official defence budget, and estimates for the additional items identified by Professor Wang. These are based on additional data from various editions of the China Public Finance Yearbook, the China Statistical Yearbook and other official publications, but also in some cases require additional estimation for more recent years, where the data series used by Professor Wang are no longer available.

The items outside the official defence budget that are included in the estimates are:

- (a) spending on the paramilitary People's Armed Police (PAP);
- (b) soldiers' demobilization and retirement payments from the Ministry of Civil Affairs;
- (c) subsidies to the arms industry;
- (d) additional military research, development, testing and evaluation (RDT&E) funding outside the national defence budget;
- (e) additional military construction expenses;
- (f) Chinese arms imports; and
- (g) residual military-owned enterprises.

Professor Wang included one additional item, namely an estimate for PLA revenues from arms exports. However, to avoid the risk of double-counting, this item (which was a very small part of the total) has been removed. These figures and estimates are derived as follows:

- The figures for the PAP come from published expenditure figures up to 2014, while the figures for 2015 is estimated based on the rate of change of the Public Security budget.
- The figures for demobilization payments come from published expenditure figures up to 2012, with the figures for 2013–15 estimated based on the rate of change of the official budget.
- Estimates for subsidies to the arms industry are based on a share of the total budget for industrial subsidies. From 2005, this share is assumed to have declined due to the increasing profitability of most of the arms industry in China, and to have been zero from 2010 onwards.
- Estimates for additional military RDT&E from 2007–2015 are based on a share of total Central Government appropriations for Science & Technology (S&T). The share is based on information for 2011–2014 on the proportion of the S&T budget that is allocated to civilian agencies that disclose their spending in annual reports. The remainder is assumed to be allocated to the agencies that do not disclose annual reports, with military and security significance, and it is estimated that 90% of this is for military purposes. The estimates for 1997–2006 are based on a slightly smaller share of a previous series for Central Government S&T appropriations, which used a different classification system, giving somewhat higher figures than the new system. The estimates up to 1996 are Professor Wang's estimates, and are based on a share of overall government Research and Development and Science and Technology budget.
- Estimates for additional military construction are based on a share of the government's capital infrastructure budget. As these figures are not published beyond 2006, estimates for 2007–2015 are based on the average growth rate of this budget over the previous 5 years; estimates for arms imports use figures provided by Russia for the value of arms transfers to China for the years where this information is available, as Russia accounts for the vast majority of Chinese arms imports. For the years where these figures are not available, the estimates are based on the rate of change of China's arms imports as measured by the SIPRI Trend Indicator Value (TIV).
- Income from commercial activities of the PLA is assumed to have declined steadily since 1999, as a policy of divestment from such activities has been followed. The figures for 1989–98 are Professor Wang's, and are based on a share of the official defence budget.

The resulting SIPRI estimates for Chinese military spending for recent years come to around 1.5 times the official defence budget for most years.

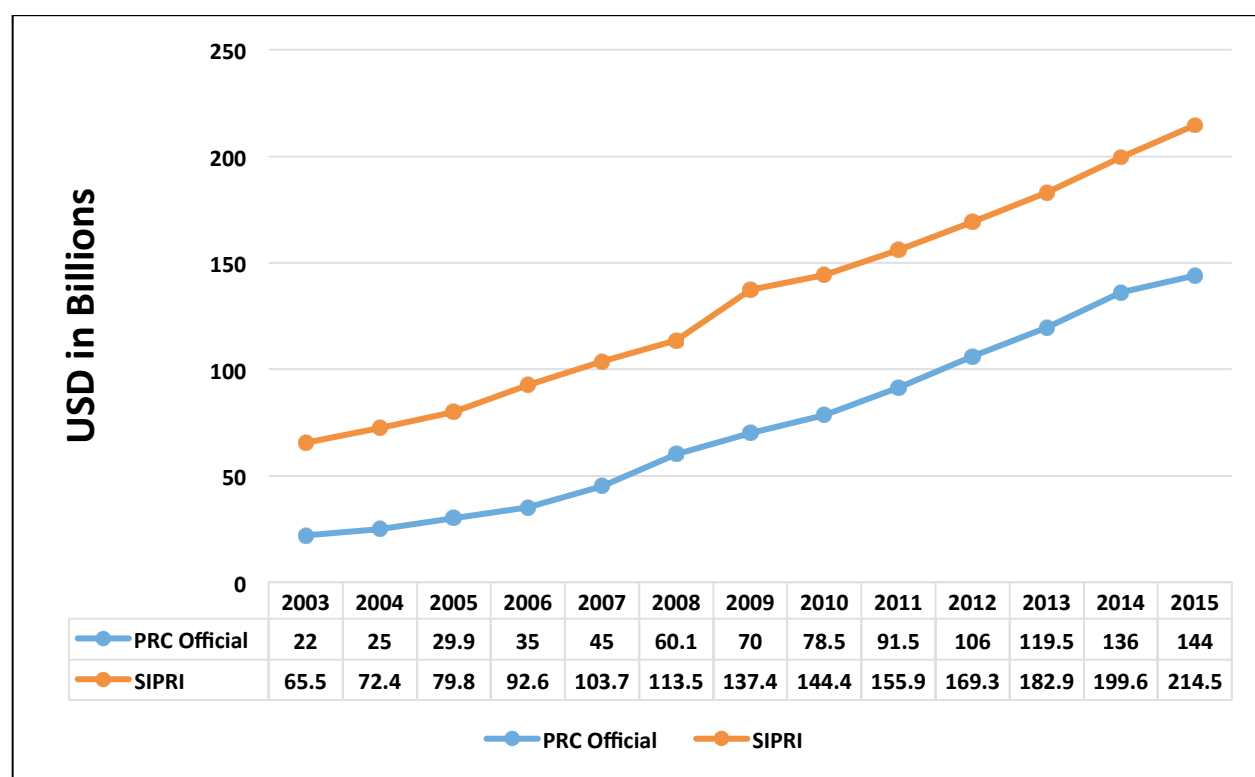
A 2006 report by the US-China Policy Foundation, based on an analysis of available Chinese-language sources, broadly concurs with the list of items included by SIPRI, but also adds various additional forms of

funding to the PLA from local government, as well as some higher education expenses for PLA officers and compensation for disaster relief activities. The report concludes, however, that there is not at present enough information to make a reasonable estimate of total Chinese defence-related spending.

While details of some elements of Chinese military spending outside the official defence budget are publicly available (such as the PAP budget) others—most importantly R&D spending—are not, and can at present only be the subject of educated guesswork. Further research based on publicly available Chinese-language sources could provide improved estimates, but without greater transparency on the part of the Chinese Government, a completely accurate figure is not currently possible.

Consequently, SIPRI estimates a substantially larger total than the official Chinese budget announcement every year. **Figure VII.16** shows the discrepancies between SIPRI estimates and what China claims is its budget spending.

Figure VII.16: Official Chinese Budget Announcements versus SIPRI Estimates 2003-2015



Source: Source: DoD, *Military and Security Developments Involving the People's Republic of China 2003-2016* for "PRC official" and SIPRI, *Military Expenditure Data 1988-2015*, <https://www.sipri.org/databases/milex>. Adapted by Anthony H. Cordesman and Joseph Kendall at the Center for Strategic and International Studies, August 2016.

Like SIPRI, IISS also has substantial discrepancies with Chinese official reporting. However, they still choose to report the official Chinese number. Alongside the official number they put forth two different estimates regarding actual Chinese defense spending. One of these metrics is defense expenditure. IISS elaborates:¹²²²

Where possible, official defence budgets for the current and previous two years are shown, as well as an estimate of actual defence expenditures for those countries where true defence expenditure is thought to be higher than official budget figures suggest. Estimates of actual defence expenditure, however, are only made for those countries where there is sufficient data to justify such a measurement. Therefore, there will

be several countries listed in *The Military Balance* for which only an official defence-budget figure is provided but where, in reality, true defence-related expenditure is almost certainly higher.

All financial data in the country entries is shown in both national currency and US dollars at current year – not constant – prices. US-dollar conversions are generally, but not invariably, calculated from the exchange rates listed in the entry. In some cases a US-dollar purchasing-power parity (PPP) rate is used in preference to official or market exchange rates and this is indicated in each case.

...For those countries where the official defence-budget figure is considered to be an incomplete measure of total military-related spending, and appropriate additional data is available, the IISS will use data from a variety of sources to arrive at a more accurate estimate of true defence expenditure. The most frequent instances of budgetary manipulation or falsification typically involve equipment procurement, R&D, defence-industrial investment, covert weapons programmes, pensions for retired military and civilian personnel, paramilitary forces and non-budgetary sources of revenue for the military arising from ownership of industrial, property and land assets.

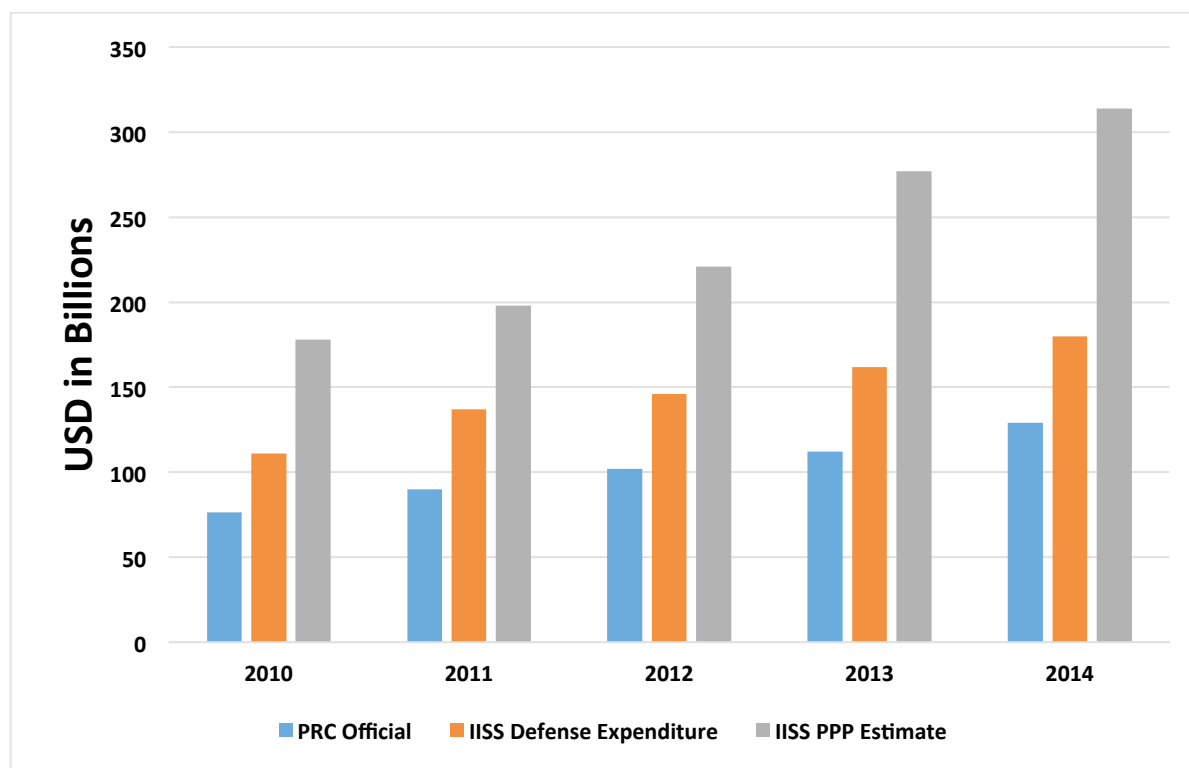
The second metric that IISS utilizes is using PPP to estimate defense expenditure. They make the argument that this particularly effective in addressing countries like China and Russia. IISS states:¹²²³

Typically, but not invariably, the exchange rates shown in the country entries are also used to calculate GDP and defence-budget and defence-expenditure dollar conversions. Where they are not used, it is because the use of exchange-rate dollar conversions can misrepresent both GDP and defence expenditure. For some countries, PPP rather than market exchange rates are sometimes used for dollar conversions of both GDP and defence expenditures. Where PPP is used, it is annotated accordingly.

The arguments for using PPP are strongest for Russia and China. Both the UN and IMF have issued caveats concerning the reliability of official economic statistics on transitional economies, particularly those of Russia, and some Eastern European and Central Asian countries. Non-reporting, lags in the publication of current statistics and frequent revisions of recent data (not always accompanied by timely revision of previously published figures in the same series) pose transparency and consistency problems. Another problem arises with certain transitional economies whose productive capabilities are similar to those of developed economies, but where cost and price structures are often much lower than world levels. No specific PPP rate exists for the military sector, and its use for this purpose should be treated with caution. Furthermore, there is no definitive guide as to which elements of military spending should be calculated using the limited PPP rates available. The figures presented here are only intended to illustrate a range of possible outcomes depending on which input variables are used.

Figure VII. 17 depicts the IISS numbers in all three categories for China from 2010-2014.

Figure VII.17: IISS Official, IISS Defense Expenditure, and IISS PPP Estimates of Chinese Defense Spending 2010-2014



The IISS *Military Balance 2013* projected a possible future convergence with US spending under a variety of scenarios that could take place as early as 2022 or as late as 2050 as shown in **Figure VII.18**.¹²²⁴

...[O]fficial Chinese defence budget figures probably underestimate the true extent of Beijing's defence spending. Although official figures include personnel, operations and equipment expenditure, it is widely held that other military-related expenditures are omitted – such as allocations for R&D and overseas weapons purchases. A fuller account of China's true military-spending levels should also include funding allocated to the People's Armed Police (PAP)...

[I]f estimates of these additional items are included, Chinese defence spending rises by a factor of approximately 1.4–1.5 relative to officially published figures, to an estimated RMB883.3bn (US\$136.7bn) using market exchange rates (MER). If these higher estimates of Chinese spending are projected into the future, convergence with US defence spending could occur as early as 2023 (if US FY13 proposed spending levels are accepted) or 2022 (if sequestration is instituted).

Of course, several factors might delay or even prevent such convergence. A lower trajectory of economic growth in China as the global economy slows, or a downshift in economic activity as the country attempts to move away from an export-oriented growth model, or economic turbulence as China attempts to modernize its fledgling financial markets and uncompetitive banking sector – these are all factors that could diminish economic growth, limiting the resources available for defence and, at the very least, delaying the date of convergence.

Figure VII.18: IISS Estimates on China-U.S. Defense Expenditure Convergence

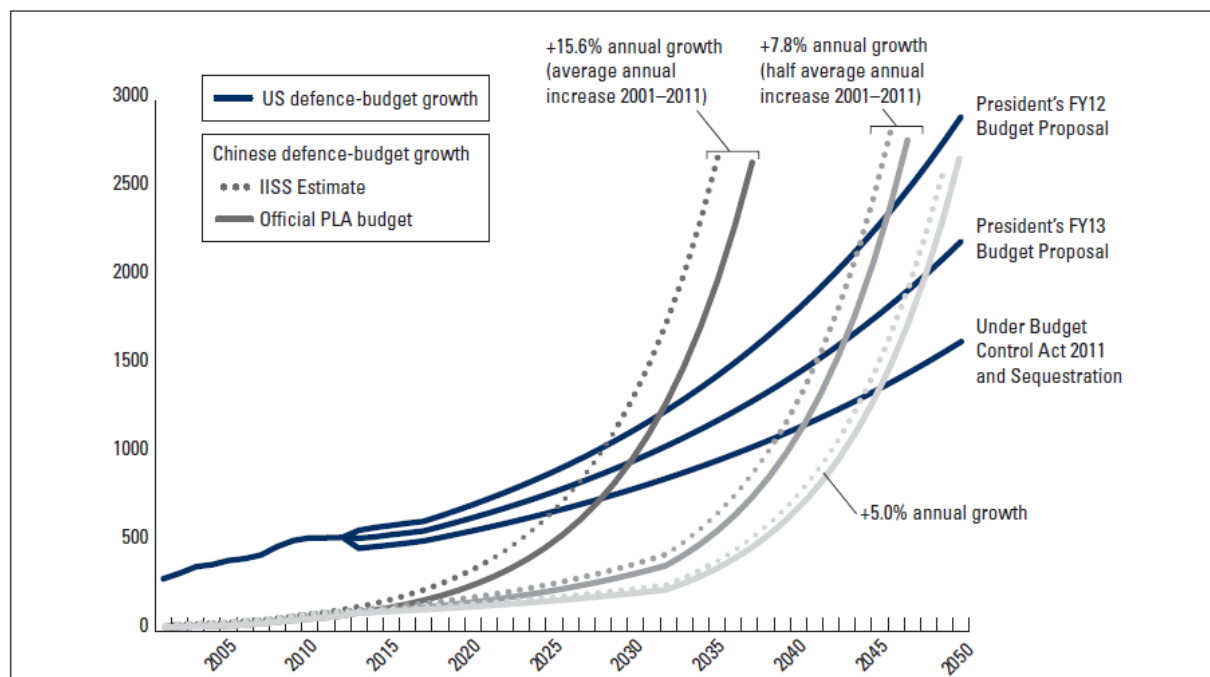


Figure 19 China–United States Defence Expenditure Convergence 2001–2050

Source: IISS, *Military Balance* 2013, 256.

A US analysis by Adam P. Liff and Andrew S. Erikson reached somewhat different conclusions and provided the data on Chinese military spending shown in **Figures VII.20 and VII.21**. It also summarized the issues in measuring the trends in Chinese defense spending. In particular, while the official Chinese defense budget has nominally increased at an average annual rate that exceeds 10% since 1990, there are important qualifications when assessing real spending. One qualification is the rampant inflation in the country, which has decreased that real-world impact of what look like large budget increases. Calculating China's defense budget at constant prices – and thus accounting for inflation effects – shows that China's effective defense spending growth rate has been much lower.¹²²⁵

The differences between the nominal (current price) and real (constant price) average annual growth rates are remarkable: 1.6 per cent vs. –3.2 per cent (1980–1989); 15.7 per cent vs. 7.8 per cent (1990–1999); 16.5 per cent vs. 12.5 per cent (2000–2009); and 10.4 per cent vs. 3.1 per cent over the 2010–2011 period. In other words, when calculated in real terms the average annual increases in the budget exceeded 10 per cent during only one of the ten-year periods in [see **Figure II.12**]: 2000–2009. This all suggests that unqualified statements along the lines of “China's official defence budget has increased by double-digits since year 19XX,” while in most cases technically true in nominal terms, may exaggerate the real-world effects of these budget increases.

Furthermore, the PRC's official defense budget growth has consistently been outpaced by even bigger increases in total national financial expenditures – both of which are roughly correlated with China's large yearly GDP growth. The official defense budget's proportion of state expenditures has still decreased from 9.5% in 1994 to 5.5% in 2011. If this is broadly correct, Chinese investment in its military forces has comprised a decreasing percentage of government

spending, providing some support to official Chinese statements that China's principal objective is economic development – and thus that defense modernization is subordinate to that goal.¹²²⁶

Ultimately, it appears that the Chinese will be flexible and pragmatic with their defense spending, especially as their economic growth levels off. Andrew S. Erickson noted in the aftermath of the 2016 disclosure of the defense spending:¹²²⁷

Bottom line and key takeaway: Beijing's latest defense spending figure shows that it is determined to avoid succumbing to Soviet-style military overextension, yet remains focused on enhancing capabilities to further its contested island and maritime claims in the East and South China Seas.

A Lack of Transparency

Western analysts also sometimes criticize what they feel is a lack of Chinese defense budget transparency and the exclusion of significant defense-related spending from the official budget. They argue that China underreports actual military spending intentionally. This is noted in all DoD China military power reports. Adam P. Liff and Andrew S. Erikson provide an excellent summary of the issues involved; and their list of things excluded from the official Chinese defense budget includes:¹²²⁸

- The budget of the 660,000-strong People's Armed Police (PAP);
- Some domestic procurement and research and development expenses;
- Overseas purchases of major weapons and platforms;
- Contributions from regional and local governments;
- Extra-budgetary revenues and resources from a limited number of military commercial enterprises (such as hospitals, and strategic infrastructure);
- Militarily relevant portions of China's space program;
- Central and local government defence mobilization funds;
- One-time entrance bonuses for college students;
- Authorized sales of land or excess food produced by some units;
- Personnel for motion pictures; and
- Donations of goods, services and money by local governments and enterprises to units and demobilized personnel.

One of the biggest exclusions from the official Chinese defense budget is the PAP. However, this force's primary focus is domestic, with responsibilities like firefighting, border security, and natural disaster relief. In the event of a war, the PAP would support the PLA in local defense, but neither supports the other in domestic operations in peacetime. The PAP's budget is categorized under public security expenditures, not national defense expenditures (where the PLA's budget is located).¹²²⁹

Specific weapons and equipment procurement costs from domestic defense industries and defense-related R&D funds given to civilian defense contractors and PLA armament research institutions are also not released publically. Parts of this funding do seem to come from several different parts of the government, such as the State Administration for Science, Technology, and Industry.

Although much of PLA procurement is domestic, a significant cost-based percentage is imported – in particular, advanced weapons technology and some weapons platforms. The PRC both

imports completed weapons systems and promotes foreign-assisted development, licensed production, and reverse engineering. It is believed that these exports are paid for from special accounts controlled by the State Council and thus are not part of the official defense budget. It seems likely that China will continue to rely on such imports for at least several more years due to continuing difficulties in developing key technologies.¹²³⁰

Chinese weapons exports, though small relative to its demographic and geographic size, have been increasing rapidly; from the 2002-2006 period to the 2007-2011 period, they rose 95%. SIPRI announced in 2016 that China had become the 3rd largest arms exporter by volume in the world.¹²³¹

China's defense budget also does not include provincial defense-related spending like military base operating costs. It is believed that this money comes from local governments and the Ministry of Civil Affairs. The former also contributes to militia and reserve expenses, including civilians working for some PLA departments. However, a 2010 government statistic showed that only 2.94% of defense expenditures were paid for by local governments, meaning that the exclusion of this spending from the official budget does not significantly affect the real spending numbers.¹²³²

Overall, these items and areas excluded from the official defense budget make guesstimating real Chinese defense spending relatively difficult. As Adam P. Liff and Andrew S. Erikson also note,¹²³³

China's general lack of transparency about how its official defence budget is calculated makes judging the validity of these Western criticisms very difficult. However, the potential significance of the above exclusions for assessing the size of China's actual defence budget is suggested in three important studies conducted by the International Institute for Strategic Studies (IISS).

In 2006, IISS estimated that including the costs of foreign weapons purchases, subsidies, R&D spending, new product expenditures, arms exports and PAP funding revealed a 72 per cent gap (in RMB terms) between China's FY2005 official defence budget and "actual" (i.e. IISS-estimated) defence spending. In 2010, IISS estimated a roughly 39 per cent difference between the FY2008 official defence budget and "actual" (i.e. IISS-estimated) defence spending. In 2012, the estimated gap for the FY2010 budget was 41 per cent.

It should be noted that, although large, the disparity between the official budget and IISS's estimates declined significantly over the initial three-year period before stabilizing. As argued in the next section, this shrinking gap, which is consistent with similar trends in estimates by the US Department of Defense, suggests that in recent years an increasing percentage of "actual" PLA funding has been placed "on the books"; that is, officially reported figures increasingly reflect actual spending.

...Although the exclusion of major items from China's official defence budget is undoubtedly an issue of concern, less widely known is that the budget also includes some items that are not included in those of its Western counterparts. For example, the PLA still engages in some infrastructure construction projects, although many are designed to be dual-use and paid for from local and national non-defence funds. It provides some medical help to civilians in remote areas and provides some support to domestic security operations (e.g. during the 2008 Olympics). The PLA also engages in disaster relief, such as the dispatch of over 200,000 personnel in response to the 2008 Wenchuan earthquake – the largest deployment of Chinese armed forces since the 1979 war with Vietnam. There are legal provisions for it to be reimbursed for these operations, but the processes, delays and extent of such reimbursements remain unclear. In Western countries, such tasks are assigned primarily to non-military organizations. The PLA also provides perquisites for retired senior officers (offices, assistants, cars, drivers, cooks, caregivers, and special hospital facilities) that their better-salaried Western counterparts do not receive.

The Chinese Response

Chinese commentators respond to such Western criticisms of PRC military transparency in three different ways:¹²³⁴

- (1) emphasize that there is no universal standard for military transparency;
- (2) compare the current level of transparency favorably to even greater opacity previously; or
- (3) contend that “the most fundamental and most important form of transparency” is the transparency of China’s strategic intentions, as opposed to the transparency of military capabilities or doctrine.

Western organizations and experts have tried to overcome this murky transparency by independently estimating “actual” defense spending – though many of these estimates are inconsistent for three primary reasons: (1) the difficulty of defining “defense spending”; (2) conversion of China’s RMB-denominated budget into US dollars, especially because of problems with the official exchange rates, application of PPP rates, and inflation and strengthening of the RMB since 2005 – meaning that conversions based on current exchange rates make recent budget increases look larger than they really are; and (3) the lack of transparency regarding the actual costs of individual items and which specific spending categories are already included in the official budget further complicates estimates of actual PLA military expenditures.¹²³⁵

...[I]n 2009, the US Department of Defense estimated China’s “actual” FY2008 defence budget at US\$105–150 billion: 1.8–2.6 times the official figure of US\$57.2 billion (RMB417.8 billion) and 2.5–3.6 per cent of GDP. Meanwhile, the Stockholm International Peace Research Institute (SIPRI)’s estimate that year was much lower: US\$84.9 billion – 1.48 times the officially released figure. The difference between SIPRI’s estimate and the upper bound of the Department of Defense’s estimate was US\$65.1 billion, a difference larger than China’s entire official defence budget that year.

While significant defence-related spending is undoubtedly excluded from China’s official defence budget, some of the items included in foreign estimates of the “actual” figure are controversial. For example, some Western institutions include expenditures for the (domestically focused) PAP in their calculations, labeling it one of the largest extra-budgetary sources of defence spending. But they do so without offering explicit justification. This single line-item can inflate estimates of the budget by as much as one-fifth above the official figure. Take the 2010 figures as an example: adding only official PAP expenditures (RMB93.4 billion) to the official budget (RMB533.4 billion) results in an estimate of “actual” Chinese defence spending 18 per cent higher.

Furthermore, many other nations, including the US, also have defense-related spending that is outside of their official defense budgets:¹²³⁶

For example, the US 051 (Department of Defense) budget excludes a significant amount of defence-related spending. In fact, one analysis of US “total defence-related spending” based on similar metrics to those regularly used by Western organizations to estimate China’s “actual” defence budget found a US\$187 billion gap between the United States’ official FY2006 defence budget and what this group of American PLA experts calculated as “actual” US defence-related spending that year.

The parallels they draw are intriguing: China is criticized for excluding some funding for officer pensions from its official defence budget, yet the Department of Veterans Affairs’ entire budget, retirement costs paid by the Department of Treasury, and veterans’ re-employment and training programs paid by the Department of Labor are not included in Department of Defense’s budget. China is criticized for excluding funding for its nuclear and strategic rocket programs from its official defence budget, yet atomic energy activities related to defence are funded by the Department of Energy and fall outside the Department of Defense’s budget. Finally, China is criticized for excluding the PAP’s budget and various defence activities that are paid for by local governments from its official defence budget, yet neither the Department of Homeland Security budget nor state funding for some US National Guard functions is included in the

Department of Defense's budget... [I]t is important to also stress that while "actual" US defence spending is larger than the official figure, most other relevant spending is relatively transparent, and can be assembled by a knowledgeable analyst. This is significantly less true of China's defence spending.

It should be noted, however, that other countries in the region— such as India — have similar problems in the transparency of their military spending data, and that China is scarcely an exception in this regard.¹²³⁷

Figure VII.19: PRC Defense Spending-related Comparative Statistics, 1980-2011

	1980-1989 (annual average)	1990-1999 (annual average)	2000-2009 (annual average)	2010-2011 (annual average)
Defense budget growth rate...				
... <i>At current prices</i>	1.6%	15.7%	16.5%	10.4%
... <i>At constant prices (base year of 1980)</i>	-3.2%	7.8%	12.5%	3.1%
GDP growth rate	9.8%	10.0%	10.3%	9.8%
State financial expenditures growth rate (aggregate – central and local)...				
... <i>At current prices</i>	8.6%	16.8%	19.3%	19.5%
... <i>At constant prices (base year of 1980)</i>	3.5%	8.8%	15.1%	11.6%

Source: Adam P. Liff and Andrew S. Erikson, "Demystifying China's Defence Spending: Less Mysterious in the Aggregate," *China Quarterly*, March 2013, 8.

Figure VII.20: PRC Official Defense Budget Annual Data, 2002-2012

	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012*
GDP growth rate at current prices	9.1%	10.0%	10.1%	11.3%	12.7%	14.2%	9.6%	9.2%	10.4%	9.2%	N/A
Defense budget (RMB billions)...											
... At current prices	170.8	190.8	220.0	247.5	297.9	355.5	417.9	495.1	533.3	602.7	670.0
... At 2002 constant prices	170.8	186.0	200.6	217.1	251.8	279.1	304.4	362.9	366.6	385.3	N/A
... As % of GDP	1.42%	1.40%	1.38%	1.34%	1.38%	1.34%	1.33%	1.45%	1.33%	1.28%	N/A
Defense budget growth rate...											
... At current prices	18.4%	11.7%	15.3%	12.5%	20.4%	19.3%	17.6%	18.5%	7.7%	13.0%	11.2%
... At 2002 constant prices	18.5%	11.4%	14.0%	11.0%	17.2%	15.2%	12.8%	13.6%	5.3%	8.3%	N/A

Note: 2012-2016 defense budget is an estimated figure reported in Xinhua.

Source: Adam P. Liff and Andrew S. Erikson, "Demystifying China's Defence Spending: Less Mysterious in the Aggregate," *China Quarterly*, March 2013, 10.

Chinese Arms Imports and Exports

The PRC both imports completed weapons systems and promotes foreign-assisted development, licensed production, and reverse engineering. It is believed that these exports are paid for from special accounts controlled by the State Council and thus are not part of the official defense budget. It seems likely that China will continue to rely on such imports for at least several more years due to continuing difficulties in developing key technologies.¹²³⁸

These are partly offset by exports, Chinese weapons exports, though small relative to its demographic and geographic size, have been increasing rapidly; from the 2002-2006 period to the 2007-2011 period, they rose 95%. SIPRI announced in early 2016 that China had become the 3rd largest arms exporter by volume in the world.¹²³⁹

The 2016 US Department of Defense report estimated that from 2010 to 2014:¹²⁴⁰

From 2010 to 2014, China's arms sales totaled approximately \$15 billion. As of this report's publication, data for 2015 arms sales was not yet available. China primarily conducts arms sales in conjunction with economic aid and development assistance to support broader foreign policy goals such as securing access to natural resources and export markets, promoting its political influence among host-country elites, and building support in international forums. To a lesser extent, arms sales also reflect the profit-seeking activities of individual arms trading companies in China and efforts to offset China's defense-related research and development costs.

From the perspective of China's arms customers, most of which are developing countries, Chinese arms are less expensive than those offered by the top international arms suppliers, although they are also generally considered to be of lower quality and reliability. Chinese arms also come with fewer political strings attached, which is attractive to those customers who may not have access to other sources of arms for political or economic reasons.

At the same time, the 2014 DOD report stated that China's efforts have gone far beyond the normal character of arms imports.¹²⁴¹

China relies on foreign technology, acquisition of key dual-use components, and focused indigenous research and development (R&D) to advance military modernization. The Chinese utilize a large, well-organized network to facilitate collection of sensitive information and export-controlled technology from U.S. defense sources. Many of the organizations composing China's military-industrial complex have both military and civilian research and development functions. This network of government-affiliated companies and research institutes often enables the PLA to access sensitive and dual-use technologies or knowledgeable experts under the guise of civilian research and development. The enterprises and institutes accomplish this through technology conferences and symposia, legitimate contracts and joint commercial ventures, partnerships with foreign firms, and joint development of specific technologies. In the case of key national security technologies, controlled equipment, and other materials not readily obtainable through commercial means or academia, China has utilized its intelligence services and employed other illicit approaches that involve violations of U.S. laws and export controls. (p. 12)

A high-priority for China's advanced technology acquisition strategy is its Civil-Military Integration policy to develop an innovative dual-use technology and industrial base that serve both military and civilian requirements. China's defense industry has benefited from integration with its expanding civilian economy and science and technology sectors, particularly sectors with access to foreign technology. Examples of technologies include: advanced aviation and aerospace (hot section technologies, avionics and flight controls), source code, traveling wave tubes, night vision devices, monolithic microwave integrated circuits, and information and cyber technologies. (p. 12)

Differentiating between civil and military end-use is very challenging in China due to opaque corporate structures, hidden asset ownership, and the connections of commercial personnel with the central government. Some commercial entities are affiliated with PLA research institutes, or have ties to and are subject to the control of government organizations such as the State-owned Assets Supervision and Administration Commission. (p. 12)

...China utilizes a large, well-organized network of enterprises, defense factories, affiliated research institutes, and computer network operations to facilitate the collection of sensitive information and export-controlled technology, as well as basic research and science that supports U.S. defense system modernization. Many of the organizations comprising China's military-industrial complex have both military and civilian research and development functions. This network of government-affiliated companies and research institutes often enables the PLA to access sensitive and dual-use technologies or knowledgeable experts under the guise of civilian research and development. The enterprises and institutes accomplish this through technology conferences and symposia, legitimate contracts and joint commercial ventures, partnerships with foreign firms, and joint development of specific technologies. (p. 51)

As in previous years, China utilized its intelligence services and employed other illicit approaches that involve violations of U.S. laws and export controls to obtain key national security technologies, controlled equipment, and other materials not readily obtainable through commercial means or academia. Based on investigations conducted by the law enforcement agencies of the Department of Defense, Department of Justice, Department of Homeland Security, and Department of Commerce, China continues to engage in activities designed to support military procurement and modernization. These include economic espionage, theft of trade secrets, export control violations, and technology transfer. (p. 51)

- In August 2010, Noshir Gowadia was convicted of providing China with classified U.S. defense technology. This assisted China in developing a low-signature cruise missile exhaust system capable of rendering a cruise missile resistant to detection by infrared missiles.
- In September 2010, Chi Tong Kuok was convicted for conspiracy to illegally export U.S. military encryption technology and smuggle it to Macau and Hong Kong. The relevant technology included encryption, communications equipment, and Global Positioning System (GPS) equipment used by U.S. and NATO forces.
- In September 2010, Xian Hongwei and Li Li were arrested in Hungary and later extradited to the United States for conspiring to procure thousands of radiation-hardened Programmable Read-Only

Microchips, classified as defense items and used in satellite systems, for the China Aerospace and Technology Corporation. Both defendants pleaded guilty and were sentenced in September 2011 to two years in prison.

- In January 2012, Yang Bin was arrested in Bulgaria and later extradited to the United States based on a December 2011 criminal indictment related to the attempted export of military-grade accelerometers used in “smart” munitions, aircraft, and missiles.
- In July 2012, Zhang Zhaowei, a naturalized Canadian citizen, was arrested while entering the United States, based on a sealed January 2011 indictment alleging Zhang attempted to illegally acquire and export military gyroscopes used in unmanned aerial systems and for tactical missile guidance.
- In September 2012, Zhang Mingsuan was arrested in the United States and indicted after attempting to acquire up to two tons of aerospace-grade carbon fiber. In a recorded conversation, Zhang claimed he urgently needed the fiber in connection with a scheduled Chinese fighter plane test flight.
- In addition, multiple cases identified since 2009 involved individuals procuring and exporting export controlled items to China. These efforts included attempts to procure and export radiation-hardened programmable semiconductors and computer circuits used in satellites, restricted microwave amplifiers used in communications and radar equipment, export-restricted technical data, and thermal imaging cameras. There were also at least two cases in 2011 in which U.S. companies working on Department of Defense contracts subcontracted manufacturing work on small arms and replacement parts to Chinese companies in violation of the Arms Export Control Act.
- In March 2012, Hui Sheng Shen and Huan Ling Chang, both from Taiwan, were charged with conspiracy to violate the U.S. Arms Export Control Act after allegedly intending to acquire and pass sensitive U.S. defense technology to China. The pair planned to photograph the technology, delete the images, bring the memory cards back to China, and have a Chinese contact recover the images.
- In June 2012, Pratt & Whitney Canada (PWC), a subsidiary of U.S. aerospace firm and defense contractor United Technologies Corporation (UTC), pleaded guilty to illegally providing military software used in the development of China’s Z-10 military attack helicopter.
- UTC and two subsidiaries agreed to pay \$75 million and were debarred from license privileges as part of a settlement with the U.S. Department of Justice and State Department.
- PWC “knowingly and willfully” caused six versions of military electronic engine control software to be “illegally exported” from Hamilton Sundstrand in the United States to PWC in Canada and then to China for the Z-10, and made false and belated disclosures about these illegal exports.
- In September 2012, Sixing Liu, aka “Steve Liu,” was convicted of violating the U.S. Arms Export Control Act and the International Traffic in Arms Regulations (ITAR) and possessing stolen trade secrets. Liu, a Chinese citizen, returned to China with electronic files containing details on the performance and design of guidance systems for missiles, rockets, target locators, and unmanned aerial vehicles. Liu developed critical military technology for a U.S. defense contractor and stole the documents to position himself for employment in China.
- In December 2012, federal prosecutors indicted Chinese nationals Yuan Wanli and Song Jiang for export-control and money laundering violations in connection with a scheme to obtain U.S. dual-use programmable logic devices tested to military specifications. While operating from China, Yuan used a fake website and e-mail addresses created using the name of a legitimate New York-based company to conceal his identity and mislead U.S. suppliers. Yuan is associated with China Wingwish Group Co., Ltd., a China-based company involved in the procurement of dual-use technology.
- In March 2013, Chinese national Liu Sixing received 70 months in prison for lying to Federal agents, transporting stolen property, and violating the Arms Export Control Act, the International Traffic in Arms Regulations, and the Economic Espionage Act. Despite his training in U.S. export control laws, Liu stole thousands of files from his U.S. employer in 2010 detailing the performance and design of guidance systems for missiles, rockets, target locators, and unmanned aerial vehicles and transported them to China. While there, Liu delivered presentations describing the technology at several Chinese

universities, the Chinese Academy of Sciences, and conferences organized by Chinese government entities.

- In May 2013, Chinese national Ma Lisong pled guilty to violating the International Emergency Economic Powers Act after attempting to export weapon-grade carbon fiber to China. Based in China and using an alias, Ma e-mailed a U.S. undercover agent in February 2013 and negotiated the purchase of five tons of export-controlled carbon fiber. Authorities arrested Ma in the United States after he attempted to ship a sample he requested back to China.
- In August 2013, Chinese national Zhang Mingsuan pled guilty to violating the International Emergency Economic Powers Act by attempting to export thousands of pounds of high-grade carbon fiber for use by the Chinese military. During a recorded conversation in 2012, Zhang claimed he urgently needed the fiber in connection with a scheduled test flight of a Chinese fighter plane.

Although China's defense industry is much less reliant on foreign imports than before, there are still niche areas where China still seeks advanced foreign systems:¹²⁴²

Key areas where China continues to supplement indigenous military modernization efforts through targeted foreign technologies include engines for aircraft and tanks, solid state electronics and microprocessors, guidance and control systems, and enabling technologies such as cutting-edge precision machine tools, advanced diagnostic and forensic equipment, and computer-assisted design, manufacturing, and engineering. China often pursues these foreign technologies for the purpose of reverse engineering or to supplement indigenous military modernization efforts.

China seeks some high-tech components and certain major end items, particularly from Russia, that it has difficulty producing domestically. China is pursuing advanced Russian defense equipment such as the SA-X-21b (S-400) surface-to-air missile system, Su-35 fighter aircraft, and a new joint-design and production program for diesel-electric submarines based on the Russian PETERSBURG/LADA-class. Between 2011 and 2012, Russia agreed to sell China IL-76 transport aircraft and Mi-171 helicopters. Russia's concerns about intellectual property protections affect the types and quantities of advanced arms or associated production technologies it is willing to transfer to China. China also has signed significant purchase contracts with Ukraine in recent years, including contracts for assault hovercraft and aircraft engines.

Japanese Military Expenditures and Resources

Japan has long treated military issues in terms of a purely defensive posture. Its constitution sharply limits the ways in which it can use military force, and it has kept military spending very low as a percentage of its economy. Yet, although Japan's defense capabilities are limited by its constitution, Japan may amend the document to include some allowance for offensive capabilities – or loosen the definition of “defense” in practice. Japan's proximity to the Peninsula (the DPRK launched a missile over Japan in 1998), alliance with the US, and growing cooperative relationship with the ROK show that Japan is increasingly involved in, and worried about, possible conflicts that involve the DPRK and ROK.

The Impact of the Japanese Economy

In 2016, the CIA summarized the state of Japan's economy and ability to support military forces as follows:¹²⁴³

Over the past 70 years, government-industry cooperation, a strong work ethic, mastery of high technology, and a comparatively small defense allocation (1% of GDP) have helped Japan develop an advanced economy. Two notable characteristics of the post-World War II economy were the close interlocking structures of manufacturers, suppliers, and distributors, known as keiretsu, and the guarantee of lifetime employment for a substantial portion of the urban labor force. Both features are now eroding under the dual pressures of global competition and domestic demographic change.

Scarce in many natural resources, Japan has long been dependent on imported raw materials. Since the complete shutdown of Japan's nuclear reactors after the earthquake and tsunami disaster in 2011, Japan's

industrial sector has become even more dependent than before on imported fossil fuels. A small agricultural sector is highly subsidized and protected, with crop yields among the highest in the world. While self-sufficient in rice production, Japan imports about 60% of its food on a caloric basis.

For three decades, overall real economic growth had been impressive - a 10% average in the 1960s, 5% in the 1970s, and 4% in the 1980s. Growth slowed markedly in the 1990s, averaging just 1.7%, largely because of the aftereffects of inefficient investment and an asset price bubble in the late 1980s, after which it took a considerable time for firms to reduce excess debt, capital, and labor. Modest economic growth continued after 2000, but the economy has fallen into recession four times since 2008. Government stimulus spending helped the economy recover in late 2009 and 2010, but the economy contracted again in 2011 as the massive 9.0 magnitude earthquake and the ensuing tsunami in March of that year disrupted economic activity. The economy has largely recovered in the five years since the disaster, although output in the affected areas continues to lag behind the national average.

Japan enjoyed a sharp uptick in growth in 2013 on the basis of Prime Minister Shinzo ABE's "Three Arrows" economic revitalization agenda - dubbed "Abenomics" - of monetary easing, "flexible" fiscal policy, and structural reform. In 2015, ABE revised his "Three Arrows" to raise nominal GDP by 20% to 600 trillion yen by 2020, stem population decline by raising the fertility rate, and provide more support for workers with children and aging relatives. ABE's government has replaced the preceding administration's plan to phase out nuclear power with a new policy of seeking to restart nuclear power plants that meet strict new safety standards, and emphasizing nuclear energy's importance as a base-load electricity source. Japan successfully restarted two nuclear reactors at the Sendai Nuclear Power Plant in Kagoshima prefecture. In October 2015, Japan and 11 trading partners reached agreement on the Trans-Pacific Partnership, a pact that promises to open Japan's economy to increased foreign competition and create new export opportunities for Japanese businesses.

Measured on a purchasing power parity (PPP) basis that adjusts for price differences, Japan in 2015 stood as the fourth-largest economy in the world after first-place China, which surpassed Japan in 2001, and third-place India, which edged out Japan in 2012. While seeking to stimulate and reform the economy, the government must also devise a strategy for reining in Japan's huge government debt, which amounts to more than 230% of GDP. To help raise government revenue, Japan adopted legislation in 2012 to gradually raise the consumption tax rate to 10% by 2015, beginning with a hike from 5% to 8%, implemented in April 2014. That increase had a contractionary effect on GDP, however, so PM ABE in late 2014 decided to postpone the final phase of the increase until April 2017 to give the economy more time to recover. Led by the Bank of Japan's aggressive monetary easing, Japan is making progress in ending deflation, but demographic decline - a low birthrate and an aging, shrinking population - poses a major long-term challenge for the economy.

Japanese Defense Spending

Overall, military outlays account for approximately 5% of Japan's budget. In comparison, social spending accounts for almost 30% and debt servicing requires almost a quarter of the budget.¹²⁴⁴ Japan can, however, easily afford to make major improvements in its forces if it chooses to do so.

Japanese defense spending has been kept at approximately 1% of GDP for quite some time, although Prime Minister Abe increased defense spending by 0.8% in early 2013, the first increase in 11 years - to 4.68 trillion yen (\$51.7 billion), according to the Japanese Defense Ministry. Including funds for relocating US troops and assisting Okinawan residents (where 75% of US bases in Japan are located), the total defense budget will be 4.8 trillion yen. Furthermore, the Coast Guard budget will increase 1.9% to 176.5 billion yen, its first expansion in six years - primarily in response to increased tensions with China over disputed islands.

Japanese defense spending for 2009-2012 is shown in **Figure VII.21**. According to the IISS,¹²⁴⁵

...[T]he JSDF has only been able to make incremental investments in new capabilities for its 'dynamic defence force' concept. However, with the government promising to protect all of Japan's seas and

territories, the budget request announced in September 2012 does cover procurements relating to maritime security and the defence of outlying islands. The MSDF has requested ¥72.3bn (US\$912m) for a new 5,000 ton anti-submarine destroyer; it will buy one extra submarine, and has started procuring the Kawasaki P-1 maritime patrol aircraft.

The GSDF has announced plans to buy four amphibious assault vehicles (AAV), costing ¥2.5bn (US\$32m) – an acquisition suggesting an attempt to generate an, albeit limited, amphibious assault capability, perhaps with an eye to any contingency on Japan's outlying islands. That said, the advanced age of the equipment and the low numbers could instead indicate that the procurement is designed so that Japan can learn about amphibious operations. The MoD is further investing around ¥21bn (US\$260m) in the creation of a 100-strong cyber defence force.

Figure VII.21: IISS Assessment of Japanese Defense-Related Expenditures (in billions of yen), 2009-2012

	FY 2009/10	FY 2010/11	FY 2011/12	FY 2012/13
Personnel & Provisions (Percentage of Total)	2,077 (43.5%)	2,285 (45.8%)	2,092 (43.8%)	2,070 (43.9%)
Equipment Procurement (Percentage of Total)	825 (17.3%)	774 (15.5%)	780 (16.3%)	757 (16.0%)
Maintenance (Percentage of Total)	1,034 (21.7%)	1,018 (20.4%)	1,071 (22.4%)	1,106 (23.5%)
Research & Development (Percentage of Total)	120 (2.51%)	159 (3.18%)	85.1 (1.78%)	94.4 (2.0%)
Other Expenditure				
Facility Improvements	133	132	120	100
Base Countermeasures	440	437	434	442
SACO-Related Projects	11.2	16.9	10.1	8.6
US Military Realignment	60.2	90.9	103	60
Other Miscellaneous Outlays	74.4	76	80.9	76.9
Other Expenditure Total (Percentage of Total)	718 (15.0%)	755 (15.1%)	747 (15.6%)	687 (14.6%)
Total	4,774	4,990	4,775	4,714

Source: IISS, *Military Balance 2013*, 269.

Russian Military Expenditures and Resources

Russia shares a border with the DPRK and has a history of involvement on the Peninsula – not the least in supporting the DPRK during the Korean and Cold Wars. In the case of an escalation on the Peninsula, Russian capacity for military efforts could potentially be important for the ultimate resolution of any conflict. The CIA describes Russia's current economic capacity to support its military efforts as follows:¹²⁴⁶

Russia has undergone significant changes since the collapse of the Soviet Union, moving from a centrally planned economy towards a more market-based system. Both economic growth and reform have stalled in recent years, however, and Russia remains a predominantly statist economy with a high concentration of wealth in officials' hands. Economic reforms in the 1990s privatized most industry, with notable exceptions in the energy, transportation, banking, and defense-related sectors. The protection of property rights is still weak, and the state continues to interfere in the free operation of the private sector.

Russia is one of the world's leading producers of oil and natural gas, and is also a top exporter of metals such as steel and primary aluminum. Russia's reliance on commodity exports makes it vulnerable to boom and bust cycles that follow the volatile swings in global prices.

The economy, which had averaged 7% growth during 1998-2008 as oil prices rose rapidly, has seen diminishing growth rates since then due to the exhaustion of Russia's commodity-based growth model.

A combination of falling oil prices, international sanctions, and structural limitations pushed Russia into a deep recession in 2015, with the GDP falling by close to 4%. Most economists expect this downturn will continue through 2016. Government support for import substitution has increased recently in an effort to diversify the economy away from extractive industries. Although the Russian Ministry of Economic Development is forecasting a modest growth of 0.7% for 2016 as a whole, the Central Bank of Russia (CBR) is more pessimistic and expects the recovery to begin later in the year and a decline of 0.5% to 1.0% for the full year. Russia is heavily dependent on the movement of world commodity prices and the CBR estimates that if oil prices remain below \$40 per barrel beyond 2016, the resulting shock would cause GDP to fall by up to 5%.

Russian Military Spending

As is the case with China and North Korea, it is difficult to estimate the true cost of Russian military efforts since the state can manipulate many costs through its control over given sectors of the economy, and there is no easy way to compare the price of professional and conscript forces.

Figure VII.22 shows an IISS estimate of Russian military spending trends over 2005-2017, which is almost certainly correct in reflecting a high level of growth over the last decade – although there is no way to know its level of accuracy in terms of the given figure shown or its comparability to other countries.

Russian defense spending as a share of GDP has been increasing in recent years, due in large part to the implementation of an ambitious State Armaments Program 2011-2020. It was reported in one source that Russian military spending rose 16% in 2012.¹²⁴⁷

While the Russian military has made limited investments in new equipment since the 1990s, the global financial crisis that began in 2008 and the post-Ukraine sanctions have made it harder for the military to carry out the necessary modernization. Russia has reported, however, that most major contracts through 2020 had been completed by late 2012

Contracts for the weapons systems called for in the Program have led to tension between the Ministry of Defense (MoD) and the defense industry due to the complexity of the process. The MoD has instituted a policy that primary contractors may have a maximum rate of profit of 20%, while their suppliers cannot charge more than 1%. This rule has led to increased tensions..

The IISS provided the following assessment of Russia's defense economics in 2016:¹²⁴⁸

When the Russian federal budget for 2015 was first drafted, in the first half of 2014, the oil price was high nuclear munitions; and economic prospects appeared relatively favorable. Consequently, government-spending plans were based on an assumed oil price of US\$100 per barrel, and the 'national defence' (defence-ministry) spending budget was set at R3.3 trillion (US\$86.0 billion at 2014 average exchange rates), or around 4.2% of GDP. This was a significant increase on the 2014 budget, caused partly by the government's commitment to fully fund its procurement program but also by the conversion, at a late stage, of a planned R235bn (US\$6.1bn) in state-guaranteed credits into budget funding due to concerns that Western financial sanctions would hinder foreign borrowing to raise the necessary credits.

The budget was subsequently amended in March 2015 to reflect the constraints of the large decline in the oil price, a depreciating currency and a forecast decline in GDP; the revised version was instead based on a more realistic oil price of US\$50 per barrel. Accordingly, the 2015 defence allocation was revised

downwards by around 6%, to R3.1tr (US\$51.3bn at 2015 average exchange rates). However, since the economy contracted more rapidly (in nominal terms), defence spending as a percentage of GDP rose slightly, to 4.3%. After accounting for defence-related expenditures elsewhere in the budget, total military spending according to the NATO definition rose to a forecast 5.4% of GDP (see Figure 10), placing Russia – for 2015 at least – among a very small group of countries to spend in excess of 5% of GDP on defence.

Amid increasingly uncertain economic prospects, it was decided that for 2016 a one-year budget would be drawn up, instead of the previous three-year budgets. According to the draft 2016 budget submitted for approval in late October 2015, spending on national defence will fall in nominal terms by around 2% (or R65bn) compared with the amended budget for 2015, with a corresponding decline in its GDP share to around 3.9%.

Furthermore, Russia is working to rebuild the capacity of its defense industry for both domestic supply and international export. An IISS estimate of Russian arms procurement trends can be seen in **Figure VII.23**, showing that Russia is both increasing its military capabilities in Asia and overall capacity to support its military efforts. Although the domestic defense industry is running into problems with investment, old equipment, worker shortage and skills, quality, reliability, and cost, the industry is working to solve these issues.¹²⁴⁹

Some of the domestic defense industry's new projects seem to have been successful (i.e., the Yars (RS-24/SS-X-29) ICBM and the Lainer (R-29RMU2) submarine-launched missile), while others have not gone as well. The Borei class strategic submarine's new Bulava missile had not completed testing as of late 2012, meaning that the entry to service of the first two boats could be delayed to 2013. A fifth-generation fighter (T-50) prototype remains in development, though three aircraft are currently being tested; the third includes an active electronically scanned array radar. The Air Force plans to procure 60 aircraft based on the T-50 over the 2016-2020 period. Russian domestic ability to design and produce UAVs is still uncertain; recently the country has twice bought Israeli UAVs to use for trials and Russia is now assembling them under license at a domestic factory. There are two projects to develop a new strike UAV under development, with the government having announced that it would allocate R400 billion to these projects.¹²⁵⁰

Regarding Russian defense development and procurement, the 2016 IISS report notes:¹²⁵¹

These disruptions notwithstanding, it seems clear that the SAP 2020's interim target of achieving a 30% share of modern weapons by the end of 2015 might in some cases be exceeded – particularly with respect to more mature platforms for which domestic industry has fully mastered all technical aspects. For example, deliveries of modernized T-72 tanks by Uralvagonzavod and Su-34 *Fullback* bomber production by the Novosibirsk Aviation Plant proceeded ahead of the most recent schedule. In fact, with the renewed emphasis on import substitution to offset overseas-supply disruptions, 2014 was one of the most successful years on record for Russia's defence industry in terms of output growth: defence industrial production grew by 15.5% in real terms, compared with just 1.7% for Russian industry as a whole. According to the Russian Federal Service for Military–Technical Cooperation, record export sales were also achieved in 2014, totaling US\$15.5bn in deliveries to 62 countries. New contracts worth US\$14bn were concluded in 2014, bringing the total order book to around US\$50bn. As in recent years, aircraft deliveries dominated sales (accounting for 44% of the total), followed by ground-forces equipment (26%), air-defence systems (15%) and naval equipment (12%). Consequently, driven by both an increased state-defence order and export contracts, overall military-equipment output grew by just over 20% in 2014, compared with nearly 18% in 2013, 13% in 2012 and 6% in 2011 (the first year of the SAP 2020).

However, it is likely that industry performance will be more modest in 2015, and that Russian firms will find the requirements of the second half of the SAP – covering 2016–20 – more demanding than those of the less ambitious 2011–15 phase. Nearly two-thirds of funding allocations under the SAP (R14tr, or around US\$365bn) is to be disbursed during the 2016–20 period, indicating that most deliveries were scheduled for the second five-year term.

Indeed, the new 2016–25 State Armament Programme may well re-scope the more ambitious elements of the previous plan's delivery aspirations. Redevelopment goals for a number of programmes are being reconsidered as technical challenges combine with fiscal constraints. The recasting of T-50/ PAK-FA procurement plans, delays to the PAK-DA next-generation bomber and growing caution over when the *Armata* heavy armored platform will enter full-rate production reflect these pressures.

As noted earlier, the air force will receive by 2020 an initial batch of only 12 of the T-50s being developed to meet the PAK-FA requirement, rather than the previously anticipated 56. Initial development-target dates for the S-500 air-defence system are also likely to have been overly optimistic. While the first *Borey*-class SSBNs (Project 955) are entering service with the *Bulava* ballistic missiles, it seems unlikely that all eight boats planned under the SAP will be completed by 2020; while in the land-systems arena the goal of delivering 2,300 T-14 *Armata* main battle tanks to the army may now not be attained until 2025, five years later than scheduled. Meanwhile, the armed forces are receiving modernized T-72s and, possibly, a new modernized variant of the T-90 main battle tank.

Russia is also investing in imported weapons systems such as “the Mistral amphibious assault vessel, the first of which is now under construction in France, and the Rys (Iveco LMV M65) armored vehicle, now being built at Voronezh under license, with an initial order for over 3,000.” But 2014 was a problematic year for Russia's high-profile order of two Mistral-class amphibious assault ships from France. After Russian involvement in Ukraine and its separatist movement, France suspended the delivery of the ships indefinitely.¹²⁵²

At the same time, government policymakers have indicated that Russia does not have any intention of becoming a significant arms importer, instead increasing domestic development at the same time:¹²⁵³

...[The] volume of new arms procurement, especially of aircraft, is now increasing steadily although still modest in scale. In 2011, the Federal Service for Military-Technical Cooperation, which oversees arms exports, reported record post-Soviet deliveries of US\$13.2bn (compared to US\$10.4bn in 2010) and has confidently forecast a similar volume of sales in 2012. However, these data need to be treated with some caution, as annual totals do not refer only to arms transfers. Thus, the Federal Service for Military-Technical Cooperation has revealed that the export of end-product weapons represents around 60% of the total, systems and components around 20%, and spares 10%, leaving another 10% for various military services. Recent developments suggest that a slowdown, or even contraction, of Russian arms sales is now possible. Major orders have been lost, for example air-defence systems to Libya and Iran, and new contracts with Syria must be in doubt, though new orders were announced with Iraq in 2012. Sales to Algeria, Venezuela and Vietnam have helped maintain overall export volumes...

Figure VII.22: Russian National Defense Expenditure Trends, 2005-2017

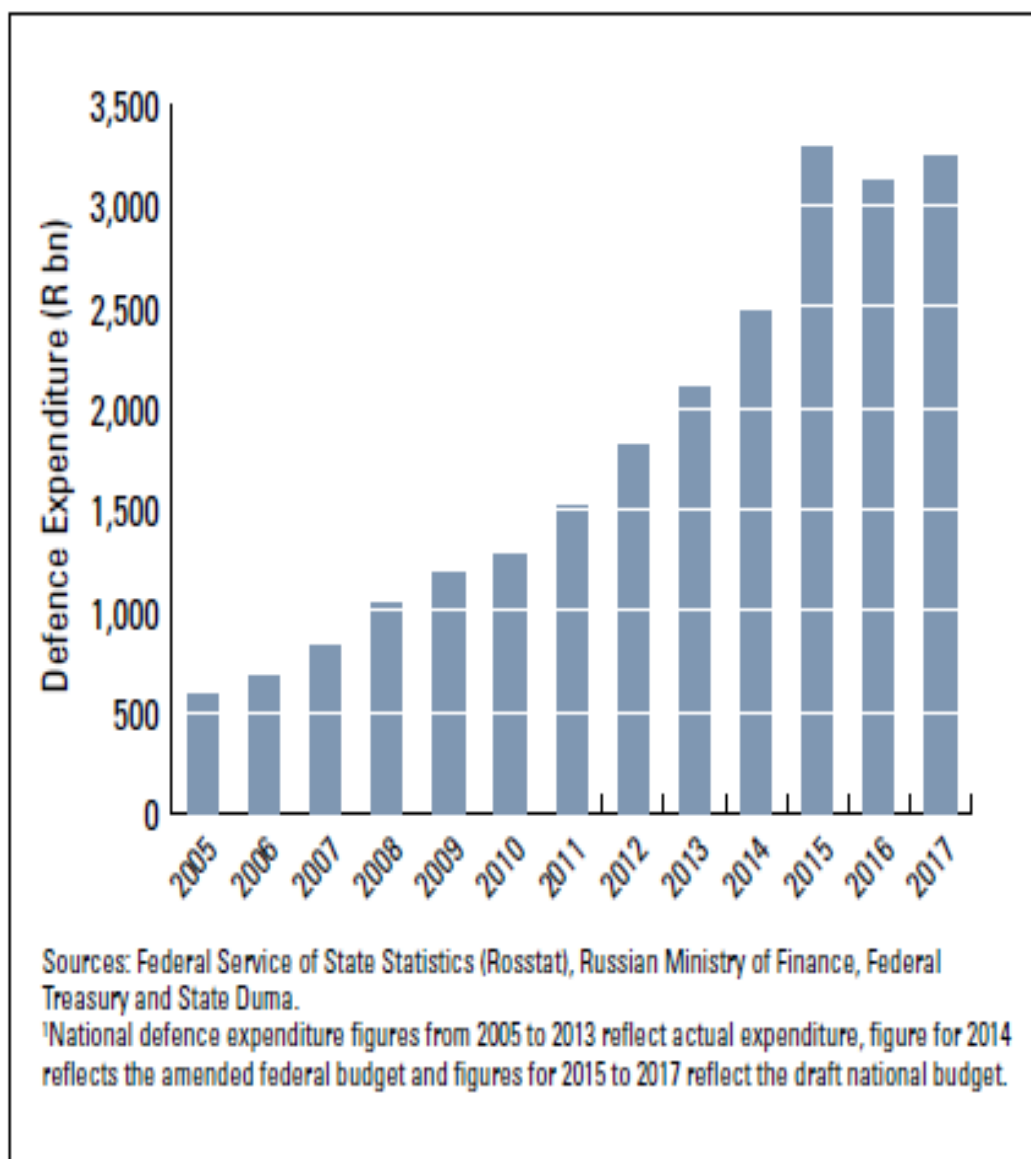


Figure 9 Russia Defence Expenditure Trends (2005–17)¹

Source: Adapted from IISS, *Military Balance 2015*, 166.

Figure VII.23: Russian Military Expenditure 2014-2015

Table 7 **Total Russian Military Expenditure^a (R bn)**

	2014 Actual Expenditure	2015 Amended Budget
Total 'National Defence'	2,479	3,117
<i>as a % of GDP</i>	3.47%	4.26%
Total 'National Defence' Less Arms Recycling & Mobilisation Preparation of the Economy ^b	2,452	3,094
Other Military Expenditure		
Other Ministry of Defence Expenditure ^c	587	607
Paramilitary Forces ^d	272	253
Support for Closed Towns of MoD, Rosatom & Baikonur Space Centre ^e	13	11
Total Other Military Expenditure	771	871
Total Military Expenditure	3,224	3,965
<i>as a % of GDP</i>	4.51%	5.42%

[a] According to the NATO definition

[b] Not included under the NATO definition

[c] Including pensions, social support, healthcare, education and housing expenses

[d] Interior troops of Ministry of Interior and Border Service of Federal Security Service

[e] The closed towns of the State Corporation for Atomic Energy Agency (Rosatom) are engaged in nuclear-munitions production

Source: Adapted from IISS, Military Balance 2016, 170.

VIII. US Forces in Korea and the Pacific

US forces in Korea and the Pacific aid the ROK and are an important component to the Northeast Asian military balance. The US plays a critical role in a wide range of scenarios ranging from limited DPRK probes to all-out war. In peacetime, they act as a tripwire in case of DPRK aggression. The ROK military also relies heavily on US capabilities in several areas, such as military intelligence – in particular, signals and imagery intelligence and analysis.

The US presence allows the ROK to counterbalance pressure and deter potential military intervention from nearby major powers, such as China or Japan, in the event of DPRK collapse and/or Korean reunification. Finally, US forces have also contributed to ROK economic development by reassuring foreign countries and investors that the ROK is a stable country.¹²⁵⁴ It is also clear to the DPRK and PRC that US can also offer the ROK extended deterrence in the face of DPRK nuclear and missile threat.

This role has been a constant in the relationship between the ROK and the U.S. The US command in Korea -- US Forces Korea (USFK) -- described its mission in a 2010 report in ways that still apply,¹²⁵⁵

Our mission remains to deter North Korean provocations and aggression and, if deterrence fails, to fight and win. We accomplish our mission with forward-stationed, agile, well-trained forces on the Korean peninsula, ready to fight tonight and defeat aggression side by side with our Korean allies... Should our deterrence options fail, we are prepared to defeat any aggression against the ROK.

The alliance had its 63rd anniversary in July 2016, and USFK's commander, General Vincent K. Brooks, set priorities that support all of these goals in his 2016 statement,¹²⁵⁶

- Sustain and Strengthen the Alliance.
- Maintain the Armistice. Be Ready to “Fight Tonight.” Deter and Defeat Aggression.
- Transform the Alliance.
- Sustain the Force and Enhance the Team –UNC/CFC/USFK.

USFK-ROK History

The United States has long seen the ROK as a critical ally; the US also has legal obligations to the country under UN Security Council Resolutions passed in 1950 that make the US the head of the United Nations Command, as well as under the ROK-US Mutual Security Agreement of 1954, which committed both nations to assist each other in case of attack from outside forces.

The US is part of a ROK-US Combined Forces Command (CFC) that was established in 1978. At that time, the lead role for defense and control of the ROK forces was transferred from the UN to the CFC. ROK and US national command authorities give guidance and direction to the CFC Commander through a bilateral Military Committee Meeting and a Security Consultative Meeting.

The USFK summarizes the history and nature of this command structure as follows:¹²⁵⁷

As early as 1965 it was recognized that what worked in the war could be significantly improved by increasing ROK participation in the planning structure. A combined operational planning staff, developed in 1968 as an adjunct to United Nations Command/United States Forces Korea/ Eighth United States Army Headquarters and the U.S.-led ‘I’ Corps (Group), evolved in 1971 as an integrated field army headquarters. However, it was not until 1978, as a bilateral agreement related to the planned U.S. ground combat force

withdrawal of that time (subsequently canceled in 1981), that the senior headquarters in Korea was organized, as a combined staff.

Hostilities today are deterred by this binational defense team that evolved from the multi-national UNC. Established on November 7, 1978, the ROK/U.S. Combined Forces Command (CFC) is the warfighting headquarters. Its role is to deter, or defeat if necessary, outside aggression against the ROK.

To accomplish that mission, the CFC has operational control over more than 600,000 active-duty military personnel of all services, of both countries. In wartime, augmentation could include some 3.5 million ROK reservists as well as additional U.S. forces deployed from outside the ROK. If North Korea attacked, the CFC would provide a coordinated defense through its Air, Ground, Naval and Combined Marine Forces Component Commands and the Combined Unconventional Warfare Task Force. In-country and augmentation U.S. forces would be provided to the CFC for employment by the respective combat component.

The CFC is commanded by a four-star U.S. general, with a four-star ROK Army general as deputy commander. Throughout the command structure, binational manning is readily apparent: if the chief of a staff section is Korean, the deputy is American and vice versa. This integrated structure exists within the component commands as well as the headquarters. All CFC components are tactically integrated through continuous combined and joint planning, training and exercises.

The major field training exercise was the Team Spirit series that began in 1976 and grew to nearly 200,000 ROK and U.S. participants commensurate with increased perceptions of the North Korean threat. U.S. participation in the exercise included augmentation forces of all services tactically deployed to the ROK from other Pacific bases and the continental United States. This exercise was last held in 1993.

Separate ROK and U.S. command post exercises were combined as Ulchi Focus Lens (UFL) in 1976. In December 2006, The CFC CDR ordered the name of UFL be changed. The ROK staff retained the name of the ROK government exercise "Ulchi" and changed the exercise name to "Ulchi Freedom Guardian". UFG is an annual joint and combined simulation-supported command post exercise that trains Combined Forces Command personnel and major component, subordinate and augmenting staffs using state-of-the-art wargaming computer simulations and support infrastructures.

At the unit level, frequent no-notice alerts, musters, and operational readiness inspections insure combat preparedness for ROK and U.S. forces. Both countries are pursuing ambitious modernization programs to maintain a viable ROK/U.S. military posture that will convince North Korea that any form of aggression or adventurism will fail. The ROK is making strides in equipment improvement through a rapidly expanding domestic defense industry, as well as purchases from foreign sources. U.S. efforts toward modernization include newer, more powerful weapon systems, greater mobility and helicopter lift capability, and vastly increased anti-armor capability.

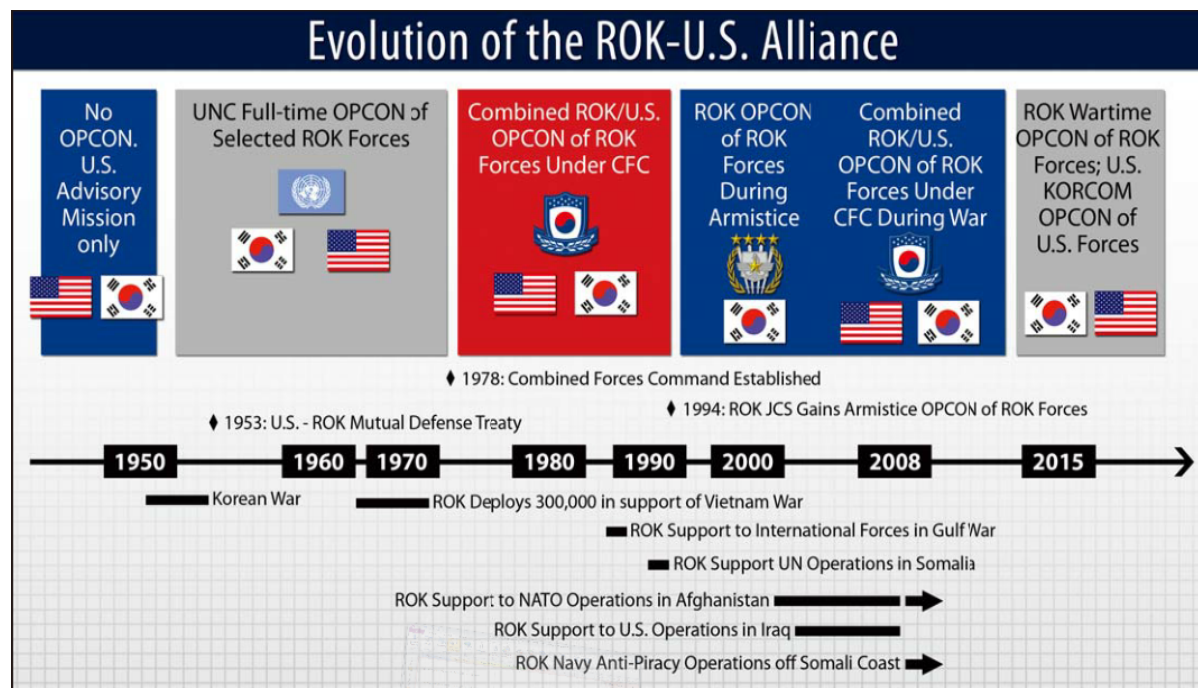
The Commander of USFK serves as Commander-in-Chief of both the UN Command (CINCUNC) and the CFC and is responsible for maintaining the armistice agreement that suspended the Korean War on July 27, 1953. **Figure VIII.1** provides a graphic representation of how the ROK-US alliance has progressed.

In 1994, armistice control of ROK military forces was returned to the ROK Joint Chiefs of Staff, though the US retained operational control in the event of armed conflict. Armistice control includes the ROK Joint Chiefs of Staff taking responsibility for organizing, training, equipping, and operating ROK military forces, as well as controlling daily defensive land, sea, and air missions.

In 2003, the US and ROK agreed to a realignment of US forces from the center and north of Seoul to south of the city. The two countries also agreed to a dismantlement of the US-ROK CFC and a transition of wartime operational control (OPCON) to the ROK Joint Chiefs of Staff by April 2012, though this was pushed back to 2015 and subsequently reevaluated to allow the transition to happen based on certain conditions met by both countries.

At a US-ROK summit meeting in June 2009, the two countries announced the “Joint Vision for the Alliance of the United States of America and Republic of Korea,” which promoted the evolution of the alliance through an expansion of the territorial scope and a widening of the partnership into non-military areas.

Figure VIII.1: The ROK-US Alliance (to 2010)



Source: US Forces Korea, *The New Korea: Strategic Digest*, October 2010, 9. Note: As will be discussed, the planned OPCON transfer to the ROK did not occur as planned in 2015.

The Current Status of the USFK-ROK Alliance

After new DPRK military provocations in 2010, OPCON transfer was delayed to December 1, 2015. This would have resulted in a change from the current “joint defense system” to a situation of ROK forces leading and US forces supporting, especially in key capability areas. Reasons given by the ROK Ministry of National Defense for the delay were:¹²⁵⁸

- (1) The change of the security environment on the Korean Peninsula, including an increase in military threats from North Korea.
- (2) A time of leadership change in and around the Korean Peninsula, including the presidential election of the Republic of Korea; and
- (3) Public demand, noting the necessity to adjust the period of the transfer, and the reflection of financial conditions necessary to fulfill future military capabilities.

A joint statement resulting from the October 2010 42nd Security Consultative Meeting described guidelines for US-ROK defense cooperation. The US-ROK Strategic Alliance 2015, a framework for OPCON transfer, was also signed at this time.¹²⁵⁹ It plans for synchronized and enabling initiatives to enhance ROK capabilities to take over OPCON for a smooth transition in the combined defense of the ROK.¹²⁶⁰

The key elements of Strategic Alliance 2015 consist of the following: refining and improving our combined ROK-U.S. defense plans, defining and developing new organizational structures required for the ROK to lead the war effort, implementing more realistic exercises based on the North Korea of today and the future, preparing for the transfer of wartime operational control to the ROK Joint Chiefs of Staff in late 2015, and consolidating U.S. military units within the two enduring hubs as part of the Yongsan Relocation Program and Land Partnership Program. United Nations Command will continue to enforce and maintain the Armistice Agreement even after the full implementation of SA 2015.

The goal of all ROK and U.S. Alliance initiatives, as laid out in the plan, is to build adaptive capabilities to deter and defeat future provocations and fight and win on the peninsula, should deterrence fail.

In terms of organizational structure and command and control, United States Forces Korea will become the United States Korea Command, or U.S. KORCOM, providing the necessary manpower for the command's supporting relationship to the ROK Joint Chiefs of Staff.

The KORCOM commander will maintain operational control of United States military forces and the ROK JCS Chairman retains full operational control of the ROK military forces. The ROK and U.S. national commands will function in a doctrinally supporting to supported relationship with ROK JCS in the lead.

The Republic of Korea will continue to strengthen and reinforce its intelligence, operations planning and execution, and joint battlefield management capabilities. The operational control transition time-line provides the Republic of Korea the time needed to field many critical, organic systems in their internal defense reform plan that will enable them to lead the war effort.

Strategic Alliance 2015 also provides renewed focus on ensuring realistic training that fully takes into account the current threat environment.

This was the driving focus in planning the recent annual Ulchi Freedom Guardian 2010 exercise, demonstrating the ROK and U.S. militaries are ready to address the full range of North Korean actions and provocations. Finally, the plan better synchronizes ongoing transformation efforts, such as the relocation of U.S. forces in Korea, to ensure all ongoing initiatives are aligned and mutually supportive.

The new bilateral plan reaffirms the U.S. commitment to the ROK and the region and ensures both nations are prepared to swiftly counter, deter, and defeat any North Korean provocations and aggression. This Strategic Alliance 2015 plan continues to build an even stronger ROK-U.S. partnership and alliance.

The two countries also agreed to an Extended Deterrence Policy Committee (EDPC) to institutionalize deterrence cooperation in October of 2010. In October 2011, the two countries drew up a "South Korea-United States Counter Provocation Plan," in which both "agreed to develop 'combined readiness capabilities' along South Korea's disputed maritime border with North Korea, the Northern Limit Line (NLL). It was agreed that a new consultative body called the Korea-US Integrated Defense Dialogue (KIDD) would be established to oversee collaboration efforts between the US and South Korea" – including the EDPC, the Security Policy initiative, and the Strategic Alliance 2015 Working Group.¹²⁶¹

In November 2011, the EDPC held a tabletop strategy exercise and further discussed a counter-provocation agreement in January 2012. At the first KIDD meeting in April 2012, the two countries' militaries discussed operational scenarios for possible DPRK nuclear attacks. Bilateral security exercises – like Foal Eagle and Key Resolve – continued, with Max Thunder held in May 2012; it was the largest air defense exercise to date, including 60 military aircraft. Also, the ROK has been participating in US missile defense exercises for years and is working to develop

its own missile defense system by 2015.¹²⁶² The US has also committed to “providing specific bridging capabilities until the ROK obtains full self-defense capabilities, and to contribute to enduring capabilities for the life of the Alliance.”¹²⁶³

The most recent KIDD was in Washington, DC, from February 21-22, 2013.¹²⁶⁴

The KIDD comprised the executive meeting, the Security Policy Initiative (SPI), the Strategic Alliance 2015 Working Group (SAWG), and the Extended Deterrence Policy Committee (EDPC). Over the course of the two-day KIDD, ROK Deputy Minister for Policy Lim, Kwan-bin met with Under Secretary of Defense for Policy James Miller, Assistant Secretary of Defense for East Asia Mark Lippert, and Deputy Assistant Secretary of Defense for East Asia David Helvey. The key results and significance of the meetings are as follows:

- The ROK and the U.S. agreed to enhance collaboration for deterrence and mutual response against North Korean nuclear threats.
- The ROK and the U.S. defined the North Korean nuclear test as a serious act of provocation and agreed to strengthen tailored deterrence for each nuclear situation.
- Alliance issues such as the USFK base relocation are on track.
- The ROK and the U.S. will continue to develop a future-oriented strategic alliance in commemoration of the 60th anniversary of the Alliance

In the course of OPCON transition, ROK forces have gradually assumed responsibility for an increasing number of mission areas previously undertaken by US forces, including:¹²⁶⁵

...front-line control along the DMZ and control of the Joint Security Area at Panmunjom, maritime counter-infiltration operations, rapid mine-laying, search and rescue, rear-area chemical and biological decontamination, military police operations and battlefield counter-battery artillery operations.

Despite speculation that the DPRK’s early 2013 provocations would lead to another delay in OPCON transfer, on April 22, 2013, the ROK Defense Ministry reaffirmed its commitment to keep to the scheduled 2015 transfer. The US Eighth Army commander, Lt. General John Johnson, also reaffirmed that OPCON transfer preparations were on track and that the US would help deter DPRK aggression even after the ROK takes control. At the same time, public opinion is increasingly supporting a delay in the process.¹²⁶⁶

Indeed, concerns within South Korean policymaking circles about the readiness of ROK forces to deal with different North Korean threats only increased as the 2015 deadline drew closer. As a result, a joint statement from both countries was released in October 2014. It stated that the OPCON transfer would now be determined by a “conditions-based approach” that would examine ROK military capabilities and the overall security situation when determining the transfer timing. USFK Commander General Curtis Scaparrotti laid out three general provisions for the OPCON transfer to occur during testimony to Congress:

- South Korea must develop the command and control capacity to lead a combined and multinational force in high-intensity conflict,
- South Korea must improve its capabilities to respond to the growing nuclear and missile threat in North Korea, and
- The Opcon transition should take place at a time that is conducive to a transition.

While these conditions could hypothetically be met at any time, the de facto result of the announcement seems to be a longer term delay to the transfer, with some sources estimating that it might not happen until 2020 or later.¹²⁶⁷

The tensions between the ROK and DPRK also led to a new US emphasis on the US-ROK alliance in the spring of 2013. Presidents Obama and Park both cited the strength of the US-ROK alliance at a joint press conference in Washington on May 7, 2013 and provided clear statements of each country's policies regarding the DPRK.

President Obama stated,¹²⁶⁸

President Park, in your first months in office South Korea has faced threats and provocations that would test any nation. Yet you've displayed calm and steady resolve that has defined your life. Like people around the world, those of us in the United States have also been inspired by your example as the first female President of South Korea. And today I've come to appreciate the leadership qualities for which you are known—your focus and discipline and straight-forwardness. And I very much thank you for the progress that we've already made together.

Today... We agreed to continue modernizing our security alliance. Guided by our joint vision, we're investing in the shared capabilities and technologies and missile defenses that allow our forces to operate and succeed together. We are on track for South Korea to assume operational control for the alliance in 2015. And we're determined to be fully prepared for any challenge or threat to our security. And obviously that includes the threat from North Korea.

If Pyongyang thought its recent threats would drive a wedge between South Korea and the United States, or somehow garner the North international respect, today is further evidence that North Korea has failed again. President Park and South Koreans have stood firm, with confidence and resolve. The United States and the Republic of Korea are as united as ever. And faced with new international sanctions, North Korea is more isolated than ever. In short, the days when North Korea could create a crisis and elicit concessions—those days are over.

Our two nations are prepared to engage with North Korea diplomatically and, over time, build trust. But as always -- and as President Park has made clear -- the burden is on Pyongyang to take meaningful steps to abide by its commitments and obligations, particularly the denuclearization of the Korean Peninsula.

And we discussed that Pyongyang should take notice of events in countries like Burma, which, as it reforms, is seeing more trade and investment and diplomatic ties with the world, including the United States and South Korea.

For our part, we'll continue to coordinate closely with South Korea and with Japan. And I want to make clear the United States is fully prepared and capable of defending ourselves and our allies with the full range of capabilities available, including the deterrence provided by our conventional and nuclear forces. As I said in Seoul last year, the commitment of the United States to the security of the Republic of Korea will never waver.

More broadly, we agreed to continue expanding our cooperation globally. In Afghanistan -- where our troops serve together and where South Korea is a major donor of development assistance -- we're on track to complete the transition to Afghan-led operations by the end of next year. We discussed Syria, where both our nations are working to strengthen the opposition and plan for a Syria without Bashar Assad. And I'm pleased that our two nations -- and our Peace Corps -- have agreed to expand our efforts to promote development around the world.

...President Park and myself very much share the view that we are going to maintain a strong deterrent capability; that we're not going to reward provocative behavior. But we remain open to the prospect of North Korea taking a peaceful path of denuclearization, abiding by international commitments, rejoining the international community, and seeing a gradual progression in which both security and prosperity for the people of North Korea can be achieved.

If what North Korea has been doing has not resulted in a strong, prosperous nation, then now is a good time for Kim Jong-un to evaluate that history and take a different path. And I think that, should he choose to take a different path, not only President Park and myself would welcome it, but the international community as a whole would welcome it.

And I think that China and Russia and Japan and other key players that have been participants in Six-Party talks have made that clear. But there's going to have to be changes in behavior. We have an expression in English: Don't worry about what I say; watch what I do. And so far at least, we haven't seen actions on the part of the North Koreans that would indicate they're prepared to move in a different direction.

President Park replied,¹²⁶⁹

First of all, the President and I shared the view that the Korea-U.S. alliance has been faithfully carrying out its role as a bulwark of peace and stability on the Korean Peninsula and in Northeast Asia, and that the alliance should continue to serve as a linchpin for peace and stability on the Korean Peninsula and in Asia. In this regard, I believe it is significant that the joint declaration on the 60th anniversary of our alliance we adopted spells out the direction that our comprehensive strategic alliance should take.

Next, the President and I reaffirmed that we will by no means tolerate North Korea's threats and provocations, which have recently been escalating further, and that such actions would only deepen North Korea's isolation. The President and I noted that it is important that we continue to strengthen our deterrence against North Korea's nuclear and conventional weapons threat, and shared the view that in this respect, the transition of wartime operational control should also proceed in a way that strengthens our combined defense capabilities and preparations being made toward that way as well.

We also shared the view that realizing President Obama's vision of a world without nuclear weapons should start on the Korean Peninsula and we stated that we would continue to strongly urge North Korea, in close concert with the other members of the Six-Party talks and the international community, to faithfully abide by its international obligations under the September 19th Joint Statement and the relevant Security Council resolutions.

Korea and the U.S. will work jointly to induce North Korea to make the right choice through multifaceted efforts, including the implementation of the Korean Peninsula trust-building process that I had spelled out.

I take this opportunity to once again send a clear message: North Korea will not be able to survive if it only clings to developing its nuclear weapons at the expense of its people's happiness. Concurrently pursuing nuclear arsenals and economic development can by no means succeed.

This is the shared view of the view of the other members of the Six-Party talks and the international community. However, should North Korea choose the path to becoming a responsible member of the community of nations, we are willing to provide assistance, together with the international community.

The President and I also had in-depth discussions on ways to enhance our global partnership. First, we noted together that Northeast Asia needs to move beyond conflict and divisions and open a new era of peace and cooperation, and that there would be synergy between President's Obama's policy of rebalancing to Asia and my initiative for peace and cooperation in Northeast Asia as we pursue peace and development in the region. We shared the view about playing the role of co-architects to flesh out this vision.

Furthermore, we decided that the Korea-U.S. alliance should deal not just with challenges relating to the Korean Peninsula and Northeast Asia, but confronting the broader international community.

...recently North Korea seems to be deescalating its threats and provocations -- what seems to be behind that? You asked these two questions. In fact, North Korea is isolated at the moment, so it's hard to find anyone that could really accurately fathom the situation in North Korea. Its actions are all so very unpredictable. Hence, whether the Syrian situation would have an impact is hard to say for sure.

Why is North Korea appearing to deescalate its threats and provocations? There's no knowing for sure. But what is clear and what I believe for sure is that the international community with regard to North Korea's bad behavior, its provocations, must speak with one voice -- a firm message, and consistently send a firm message that they will not stand, and that North Korea's actions in breach of international norms will be met with so-and-so sanctions and measures by the international community. At the same time, if it goes along the right way, there will be so-and-so rewards. So if we consistently send that message to North Korea, I feel that North Korea will be left with no choice but to change.

And instead of just hoping to see North Korea change, the international community must also consistently send that message with one voice to tell them and communicate to them that they have no choice but to

change, and to shape an environment where they are left with no choice but to make the strategic decision to change. And I think that's the effective and important way.

With regard to the North Korea issue, Korea and the United States, as well as the international community—the ultimate objective that all of us should be adopting is for North Korea to abandon its nuclear weapons and to induce it to become a responsible member of the international community. This serves the interest of peace on the Korean Peninsula and the world, and it also serves the interest of North Korea's own development as well. That is my view.

And so, in order to encourage North Korea to walk that path and change its perceptions, we have to work in concert. And in this regard, China's role, China's influence can be extensive, so China taking part in these endeavors is important. And we shared views on that.

With regard to China and Russia's stance, I believe that China and Russia -- not to mention the international community, of course -- share the need for a denuclearized Korean Peninsula and are cooperating closely to induce North Korea to take the right path. In the case of China, with regard to North Korea's missile fire and nuclear testing, China has taken an active part in adopting U.N. Security Council resolutions and is faithfully implementing those resolutions.

And with regard to Russia, Russia is also firmly committed to the denuclearization of the Korean Peninsula. And with regard to the adoption of U.N. Security Council resolutions on North Korea, it has been very active in supporting them. And they've also worked very hard to include a stern message to North Korea in the joint statement of the G8 Foreign Ministers meeting. Such constructive efforts on the part of China and Russia are vital to sending a unified message to North Korea that their nuclear weapons will not stand, and encouraging and urging North Korea to make the right decision.

...If North Korea engages in provocations, I will fully trust the judgment of our military. So if our military makes a judgment which they feel is the right thing, then they should act accordingly. And this is the instruction that I had made.

And North Korea has to pay a price when it comes not only with regard to provocations, but also with regard to the recent Kaesong industrial complex issue, where, based on agreements between the two sides, companies had believed in the agreement that was made and actually went to invest in the Kaesong industrial complex, but they suddenly completely dismissed and disregarded this agreement overnight, and denied various medical supplies and food supplies to Korean citizens left in that industrial complex, refusing to accept our request to allow in those supplies, which is what prompted us to withdraw all of our citizens from that park. This situation unfolded in the full view of the international community.

So who would invest, not to mention Korean companies, but also companies of other countries, who would invest in North Korea in a place that shows such flagrant disregard for agreements, and how could they, under those circumstances, actually pull off economic achievement? So I think in this regard, they're actually paying the price for their own misdeeds.

These close US and ROK relations at the official level have not always been mirrored at the popular level, but much depends on the circumstances at the time. Korean popular attitudes towards the US have been mixed, and much depends on the poll being referenced. The ROK's Asan Institute conducted a 2012 poll that showed that 94% of South Koreans supported the US-ROK alliance, only 67% supported a long-term US military presence, and just 57% had a favorable overall view of the US. In addition, only 40% thought that the US took ROK interests into proper consideration when making international policy disputes, and 19% thought that the US had taken a fair position during ROK-Japan territorial disputes in late 2012.¹²⁷⁰

A Pew poll at a time of crisis in ROK-DPRK relations in April 2013 found that some 78% of South Koreans had a favorable opinion of the US and confidence in President Obama's leadership – almost double Obama's approval rating in the US (45%) – and that this percent had not changed since President Obama took office in 2009. This is compared with a 70% favorable opinion at the end of President George W. Bush's second term, in itself a large increase from

only 46% after the US invasion of Iraq in 2003.¹²⁷¹ These favorable impressions of both the US and Obama have largely persisted or increased in the 2016 polling data from the Asan Institute.¹²⁷²

Polls of American attitudes towards the ROK also vary, depending in part on the level of US tension with the DPRK at the time. One March 2013 poll found that 21% of Americans believed that the DPRK was not a threat, and only 41% hold a favorable view of the ROK – the same percentage as has a favorable view of China.¹²⁷³ Another Gallup poll in April 2013 found that the majority of Americans (55%) said the United States should use its military forces to help defend the South, while only 34% said the U.S. should not do so.¹²⁷⁴

These results must be interpreted in light of the fact that only 7 of 10 Americans said they followed the development of issues in the Koreas. While 43% said it was likely the ROK and DPRK might have a clash or conflict in the next six months, 44% said it was not likely. Moreover, an earlier poll had found that 83% of Americans saw the DPRK's nuclear efforts as a threat, even though the poll was taken shortly before the DPRK's third test.¹²⁷⁵ A Pew poll in May 2013 found that 36% of Americans were following the news on the Koreas "very closely" – and 56% saying the US should take the threat "very seriously." But these attitudes appear to be largely because 47% of Americans thought the DPRK could already launch a nuclear missile at targets in the US – a threat that does not actually exist.¹²⁷⁶

In practice, public opinion polls on national security issues often do more to reflect the fact no current action is being debated or called for at a senior political level than provide insight into the strength of an alliance in a crisis.

US Forces in Korea

The major US force elements now stationed in Korea include the Eighth US Army, US Air Forces Korea (Seventh Air Force), and US Naval Forces Korea. At one point the US occupied some 85 active installations in the ROK, but it has cut its total military manning by over a third from about 44,200 personnel in 1990 and 36,300 personnel in 2000 to the current agreed force level of 28,500. US Army forces in the ROK are under the Eighth US Army. The only combat formation remaining in the ROK is the 2nd Infantry Division, with one infantry Brigade Combat Team, an aviation brigade, and a field artillery brigade.¹²⁷⁷

The key elements of U.S. Forces stationed in the ROK include: The US 8th Army and 2nd Infantry DIV; the 7th Air Force with the 51st Fighter Wing, and 8th Fighter Wing; U.S. Naval Forces Korea; MARFOR (Marine Force)-K; and the Far East District (FED) of the US Army Corps of engineers.¹²⁷⁸

The IISS summarizes this force structure and its personnel structure as follows:¹²⁷⁹

US Pacific Command • 28,500

US Army 19,200

1 HQ (8th Army) at Seoul; 1 div HQ (2nd Inf) located at Tongduchon; 1 armd bde; 1 (cbt avn) hel bde; 1 ISR, hel bn; 1 arty bde; 1 AD bde

M1 *Abrams*; M2/M3 *Bradley*; M109; M270 MLRS; AH-64 *Apache*; OH-58D *Kiowa Warrior*; CH-47 *Chinook*; UH-60 *Black Hawk*; MIM-104 *Patriot*/FIM-92A *Avenger*; 1 (APS) armd bde eqpt set

US Navy 250

USAF 8,800

1 (AF) HQ (7th Air Force) at Osan AB; 1 ftr wg at Osan AB with (1 ftr sqn with 20 F-16C/D *Fighting Falcon*; 1 atk sqn with 24 A-10C *Thunderbolt II*); 1 ftr wg at Kunsan AB with (2 ftr sqn with 20 F-16C /D *Fighting Falcon*); 1 ISR sqn at Osan AB with U-2S

USMC 250

Figure VIII.2 shows a brief Japanese estimate of how the forces the US still maintains in the ROK compare with those of the DPRK and the ROK. As has been noted previously, the Japanese data provides a useful estimate of how small the US forces in the ROK now are. It shows that they have been reduced to a size that is largely a demonstration of the continuing U.S. commitment to the ROPK -- providing a basis for rapid US power projection as well as a de facto trigger force in the face of a major DPRK attack.

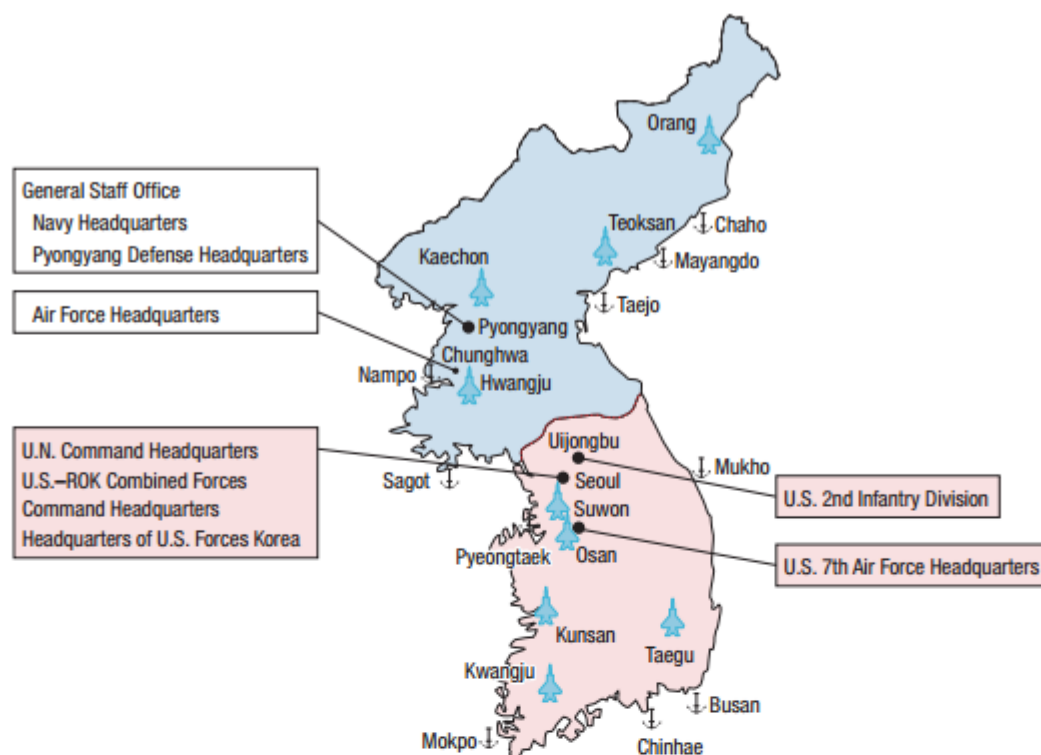
The US does not officially announce the details of its current equipment holdings in the ROK, nor does the IISS provide this information. Global Security estimates that US equipment now includes some 140 M1A1 tanks, 170 Bradley armored vehicles, 30 155mm self-propelled howitzers, 30 MRLs as well as a wide range of surface-to-surface and surface-to-air missiles (i.e., *Patriot*), and 70 AH-64 helicopters.¹²⁸⁰ These estimates seem dated and may exaggerate some aspects of the equipment in active US forces.

Global Security also estimated that US Air Forces Korea possessed approximately 100 aircraft: advanced fighters, (i.e., 70 F-16s), 20 A-10 anti-tank attack planes, various types of intelligence-collecting and reconnaissance aircraft including U-2s, and the newest transport aircraft. This number may not reflect recent force cuts, and the Japanese estimate of 60 US combat aircraft (including 40 modern F-16s) seems more correct. Of course, if necessary, US air strength could be rapidly reinforced by the Seventh Fleet and the Seventh Air Force Command.¹²⁸¹

ROK Ministry of Defense estimates of US equipment in Korea are shown in **Figure VIII.3**. A 2012 Brookings report, shown in **Figure VIII.4**, also provides an estimate of US military resources, with numbers similar to the Japanese figures. The report's brief comparison of US-ROK forces with DPRK forces is given in **Figure VIII.5**.

US Naval Forces Korea, US Marine Forces Korea, and Special Operations Command Korea are small headquarters and power projection support elements in peacetime. However, the US Pacific Command (USPACOM) can rapidly provide reinforcements. Depending on how a crisis unfolds in Korea, the US reinforced forces will act according to either the Flexible Deterrence Option (FDO) or the Force Module Package (FMP).¹²⁸² The FDO is the diplomatic, intelligence, military, and economic option to be implemented for the purpose of deterring war – should it appear imminent. The FMP refers to the major combat units and support units that will be reinforced in the early phase of a war. Included in the FMP reinforcements are major forces, such as immediate deployment of aircraft and the aircraft carrier battle group.

Figure VIII.2: Japanese Estimates of US, ROK, and DPRK Forces in the Korean Peninsula

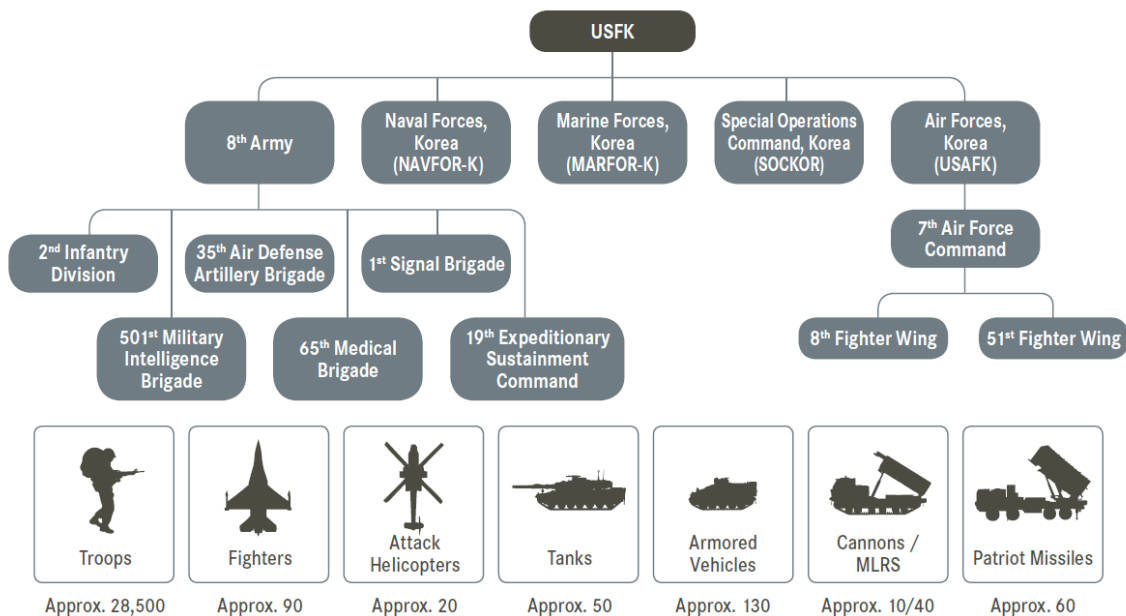


		North Korea	ROK	U.S. Forces in Korea
Total armed forces		Approx. 1.19 million personnel	Approx. 660,000 personnel	Approx. 29,000 personnel
Army	Ground troops	Approx. 1.02 million personnel	Approx. 520,000 personnel	Approx. 19,000 personnel
	Tanks	T-62, T-54/-55, etc. Approx. 3,500	M-48, K-1, T-80 etc. Approx. 2,400	M-1
Navy	Naval vessels	Approx. 780; 103,000 tons	Approx. 210; 197,000 tons	Supporting corps only
	Destroyers		12	
	Frigates	3	10	
	Submarines	20	12	
Air Force	Marines		Approx. 27,000 personnel	
	Combat aircraft	Approx. 560	Approx. 620	Approx. 60
	3rd and 4th generation fighter aircraft	Mig-23 x 56	F-4 x 70	F-16 x 40
		Mig-29 x 18 Su-25 x 34	F-16 x 164 F-15 x 60	
Reference	Population	Approx. 24.7 million	Approx. 49 million	
	Term of service	Army: 5-12 years Navy: 5-10 years Air Force: 3-4 years	Army: 21 months Navy: 23 months Air Force: 24 months	

Source: The Military Balance 2015, etc.

Source: Japanese Ministry of Defense, *Defense of Japan 2014*

Figure VIII.3: ROK Reporting on Major Organizations and Assets of the USFK



Source: The Republic of Korea Armed Forces, 2014 Defense White Paper.

Figure VIII.4: American Military Assets in the ROK

Asset	Number
Army troops	~18000
Air Force troops	~8400
U-2r [Aircraft]	3
F-16 [Aircraft]	60
A-10 [Aircraft]	21
AH-64 D Apache [Helicopter]	24
M2A1 Bradley IFV [Tank]	66
M1A2 Abrams [Tank]	48
M109 SP Howitzer [Artillery]	16
Stryker [Armored Fighting Vehicle]	900

Source: Peter W. Singer, "Separating Sequestration Facts from Fiction: Sequestration and What It Would Do for American Military Power, Asia, and the Flashpoint of Korea," Brookings, September 23, 2012.

Figure VIII.5: A Comparison of ROK, Combined US-ROK, and DPRK Military Assets

Platform	ROK Total	ROK-US ¹²⁸³ Total	DPRK Total
Multirole Fighters	400	686	74
Ground Attack and Bombers	70	103	162
Attack Helicopters	60	94	20
Main Battle Tank	2,414	2,483	3,500
Armored Combat Vehicle	220	1,163	2,500
Expeditionary/Fighting Vehicles	2,850	2,912	560
Towed and Self-Propelled Artillery	11,038	11,108	21,000

Source: Peter W. Singer, “Separating Sequestration Facts from Fiction: Sequestration and What It Would Do for American Military Power, Asia, and the Flashpoint of Korea,” Brookings, September 23, 2012.

Comparative Capabilities

General Walter L. Sharp, the former Commander of UNC/CFC/USFK, provided the following overview of the capabilities of DPRK and US-ROK forces, as well as the ongoing US force changes, in a speech to the East Asia Institute on July 9, 2010:¹²⁸⁴

...2010 has proven to be a very fast paced year. I’d like to begin our discussion today by sharing with you three things which I think greatly influence and impact our efforts: First, the North Korean threat, second, the North Korean attack on the *Cheonan*, and third, our combined transformation efforts.

First, North Korea poses a serious asymmetric threat to peace and stability in Northeast Asia. While the responsible nations of the world are looking to reduce their weapons of mass destruction, North Korea is continuing its development of these weapons systems and their delivery vehicles. Clearly this is a dangerous situation, not just for the United States, not just for the Republic of Korea, but also for the entire region.

Another unconventional threat posed by North Korea is in the size and disposition of their special operations forces. Even in armistice, North Korea has displayed the willingness to use these forces. The threats of the North Korean forces have shown themselves in their attack on the *Cheonan*, and the assassination team targeting the senior most individual to have defected from North Korea.

North Korea also continues to build their conventional capabilities and threaten their use as a means to manipulate the world community. One of North Korea’s largest capabilities, in terms of quantity and disposition, exists in the form of artillery and missile forces. This poses an asymmetric threat, one that holds at risk the capital of one of the world’s most important economies right here in Seoul.

While North Korea remains a potent military threat, they do not have the ability to reunify the peninsula by force. However, as demonstrated by the attack on the *Cheonan* and the asymmetric aspects of the North Korean threat that I discussed earlier, this merely changes the nature of the threat and how we are prepared to deter and defeat it. Let me be clear, by no means does North Korea’s inability to reunify the peninsula by force equate to an absence of a serious military threat. Rather, North Korea maintains a range of capabilities to engage in provocations. However these provocations and North Korea’s irresponsible behavior in the international arena to include events such as the continued oppression of its own people, the seizure of ROK assets at the Mt. Kumgang Resort, the sinking of the *Cheonan*, and the development of nuclear capabilities have significantly eroded their ability to effectively use other means to exercise national power in the region.

With very few diplomatic, informational, and economic options available, North Korea is forced to rely almost exclusively on military instruments when it decides to engage in provocations and we must therefore be ever vigilant.

Sun Tzu once said, “Thus the highest form of generalship is to attack the enemy’s strategy; the next best is to attack his alliances; the next, in order, is to attack the enemy’s army in the field...” More so than ever before, North Korea knows that they cannot defeat our strong and well prepared armies, air forces, navies, and marines, so they are now attacking us in other ways.

...However, the ROK-US Alliance needs more from the entire international community and all countries in the region, in particular China, to work with us in responding to North Korean provocations. We strongly desire Chinese cooperation in addressing North Korea’s aggressive behavior, and in particular would welcome Chinese action, even if behind the scenes, to assist in convincing North Korea that its path to security and prosperity lies in stopping its provocative behavior, better relations with its neighbors, and complete, irreversible denuclearization.

It is important that we be willing to have detailed discussions with the Chinese about interests related to the Korean peninsula. I believe it is safe to say that the US and ROK are willing and eager to engage in discussions about each of our interests. We hope that China will do the same. The more we can talk and reach a common understanding about regional security challenges, the better we are able to maintain stability and prosperity in this region. America’s five bilateral treaty alliances in Asia have long underpinned regional stability and prosperity. In Northeast Asia, our relationships with Korea and Japan serve as a foundation for American efforts to provide regional stability and prosperity. We look forward to the continued strengthening of these Alliances and the contributions that they make to the region.

USFK Relocation

As a result of these shifts, The USFK has planned force repositioning, and consolidating and relocating the US forces in the ROK, into two areas south of Seoul – a southwest and a southeast hub –. These plans are shown in detail in **Figure VIII.6.**¹²⁸⁵

The Southwest hub at Osan Air Base and U.S. Army Garrison Humphreys is to be the future centerpiece of the U.S. force structure within Korea. The southwest hub is already home to 7th Air Force headquarters and as U.S. forces realign south of the Han River, it will become home to the future U.S. KORCOM, 8th Army headquarters and 2nd Infantry Division. The Southeast hub at Daegu, Chinhae and Busan serve as the logistics distribution center and storage location for wartime and contingency preposition stocks. The two enduring hubs will be transformed into world-class enduring installations, promoting the Republic of Korea as an “assignment of choice.”

Two major ROK-U.S. bilateral agreements enable the consolidation and relocation effort: the 2002 Land Partnership Plan (LPP) and the 2004 Yongsan Relocation Plan (YRP). The LPP consolidates and relocates those U.S. forces north of the Han River, excluding forces from the greater Seoul metropolitan area, provides U.S. forces dedicated time on the ROK training areas and ranges, and ensures safety easements are provided and enforced. The YRP agreement relocates a majority of U.S. forces and UNC activities from Seoul to the USAG Humphreys. The YRP agreement also calls for a residual element to remain in Seoul to facilitate communications and maintain existing relationships with the ROK and other government and non-government agencies in the Seoul area.

The implementation of these plans will be accomplished in two phases - Phase 1 Consolidation and Phase 2 Relocation.

The ROK-U.S. Alliance is currently in Phase 1. As part of the U.S. relocation and camp consolidation efforts, the U.S. has returned an approximately 13.6 thousand acres of land that has been vacated by U.S. forces. In turn, the ROK procured approximately 3.5 thousand acres of land for U.S. use in expanding facilities within the two enduring hubs. Particularly important was the ROK’s grant of an initial 913 acres of land at USAG-Humphreys, enabling the ROK-U.S. Alliance to begin designing, planning and coordinating construction efforts. Funds required for land, facilities, moving services, and other expenses directly related to the YRP implementation are provided by the ROK, while the costs of LPP are shared between the ROK and U.S.

Approximately \$1.2 billion of facilities and infra-structure are under construction at USAG-Humphreys with an additional \$2.9 billion in facilities and infra-structure under design. The major facilities to be constructed are: medical facilities like the hospital, dental clinic and troop medical clinics; headquarters

facilities (KORCOM, 8th Army, 2nd Inf. Div. and Installation Management Command-Korea); family housing and schools; a communications center and the operational and support facilities necessary for the relocation of 2nd Inf. Div.

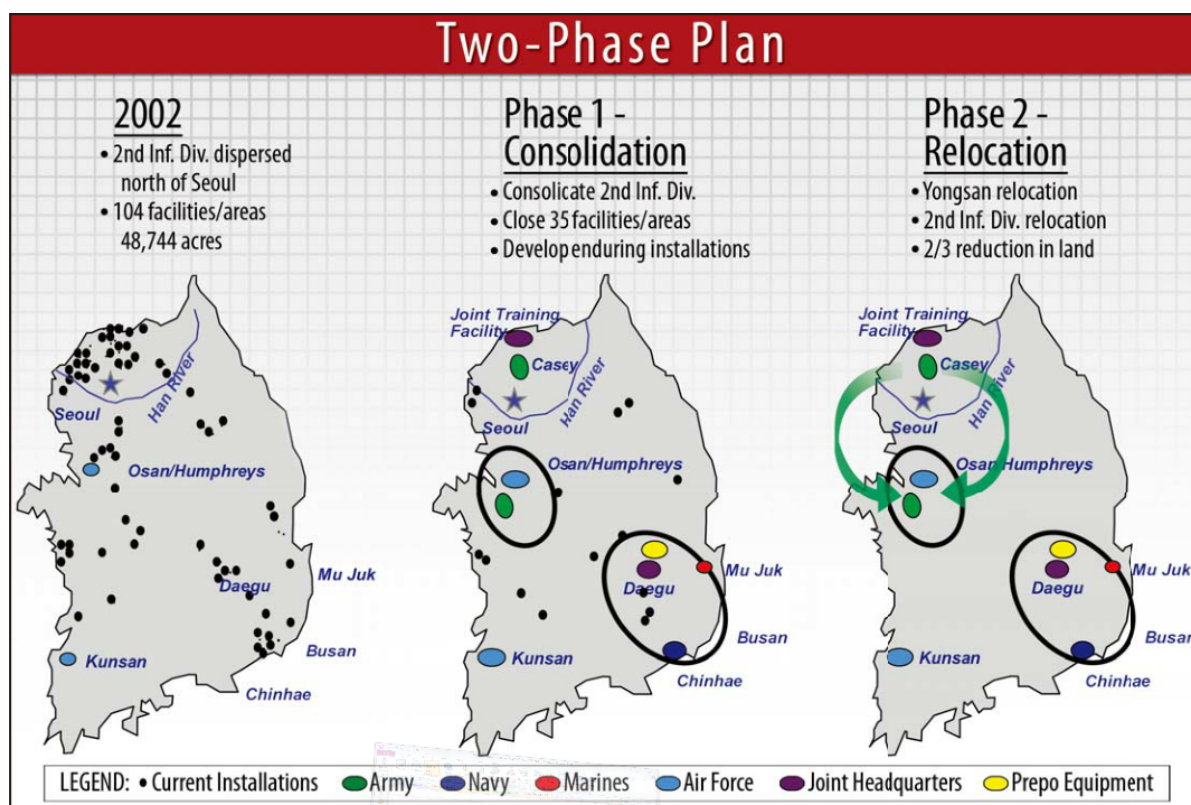
The success of the planned relocation is predicated upon sustaining the U.S. force's readiness to "fight tonight." Units will be packaged and moved in manageable components. Throughout the realignment, units will maintain their full spectrum of operational and support capabilities. Force relocation is a win-win for the Alliance as it optimizes ROK-U.S. use of land and enhances U.S. force protection, readiness, quality of life, safety and ultimately the ROK-U.S. mutual defense.

In summary, U.S. priorities remain focused on transforming to meet future security demands and to strengthen the ROK-U.S. Alliance. Critical to the strategy is the repositioning and consolidation of forces. The repositioning of U.S. forces is a major signal of continued U.S. military commitment to the ROK-U.S. Alliance. The consolidation of these forces increases readiness, efficiency and cost savings; enhances quality of life; increases training opportunities, and offers a less intrusive presence.

The ROK is providing significant support for this relocation, guaranteeing the commercial rights of the construction contractors for the next 45 years. Overall, the US and the ROK are working closely on a number of related issues through a variety of channels:¹²⁸⁶

The Special Measures Agreement (SMA) negotiation concerning South Korea's payment of part of the expenses for the USFK14; the transfer of wartime operational control to the ROK military on December 1, 2015 as agreed between President Lee Myung-bak and President Barack Obama at a summit on June 26, 2010; the development of the Strategic alliance 2015 adopted at the 42nd ROK-U.S. Security Consultative Meeting (SCM) held in Washington, D.C. on October 8, 2010; the development of the Extended Deterrence Policy Committee(EDPC) designed to heighten the effectiveness of extended deterrence; preparations for the Nuclear Security Summit to be held in Seoul in March 2012; and ways to enhance the efficacy of ROK-U.S. combined exercises.

While initially scheduled to be completed in 2008, the relocation has been postponed several times through a combination of construction and funding difficulties. As of the end of 2015, General Curtis Scaparrotti estimated that some 65% of the relocation plan had been implemented, with the majority of unit movements planned for 2018. The exception to these transfers is the U.S. counter-artillery forces near the DMZ, which will not be moved until a South Korean counter-fire reinforcement is completed in 2020.¹²⁸⁷

Figure VIII.6: Relocation of US Forces in Korea from 2006

Source: US Forces Korea, *The New Korea: Strategic Digest*, October 2010, 27.

Military Exercises

The ROK military engages in military exercises with the US and other countries on a regular basis. Major joint/combined exercises and training include ‘Foal Eagle’ (US-ROK), ‘Hoguk’ (US-ROK), ‘Reception, Staging, Onward Movement, and Integration’ (US-ROK), ‘Ulchi Focus Lens’ (ROK-US), and ‘Khaan Quest’ (US-ROK-Mongolia).¹²⁸⁸

US-ROK joint military exercises have led to DPRK protests for many years. The North’s reaction to Foal Eagle and Key Resolve in 2013 has been especially extreme. Key Resolve lasted from March 11-21 and worked to improve ROK and US combined forces’ “operation capabilities, coordinating and executing the deployment of US reinforcement forces, and maintaining the ROK military’s combat capabilities,” according to a USFK statement. 2013 was the first year that the exercise was led by the ROK Joint Chiefs of Staff instead of the CFC. Approximately 10,000 ROK and 3,500 US forces participated.¹²⁸⁹

Foal Eagle is an annual two-month long ROK-US military exercise, one of the largest and longest exercises in the world, in which the US and ROK practice responding to an invasion. According to the Pentagon, Foal Eagle is purely a way to train for a defensive operation, utilizing Army, Navy, Air Force, and Special Operations forces. In the 2013 Foal Eagle – spanning March and April – approximately 10,000 US troops are directly involved. Another purpose of the exercises is for ROK and US troops to meet their counterparts. As such, the exercise involves community service, tours, sports tournaments, and liaison exchange.¹²⁹⁰

In the first phase of the joint exercises, the US and ROK practiced deploying and coordinating their air forces; on the US side, equipment included F-16s, A-10s, E-3s – from Kunsan (8th Fighter Wing), Osan (51st Fighter Wing), and Kadena (18th Fighter Wing) Air Bases. Later in March, F-22 Raptors, B-2 stealth bombers, and B-52s also joined the exercises. According to USPACOM, “Th[e] mission by two B-2 Spirit bombers assigned to 509th Bomb Wing, which demonstrates the United States’ ability to conduct long range, precision strikes quickly and at will, involved flying more than 6,500 miles to the Korean Peninsula, dropping inert munitions on the Jik Do Range, and returning to the continental U.S. in a single, continuous mission.”¹²⁹¹

The F-22s could be one of the initial aircraft used by the US to escort bombers and/or destroy the North’s artillery in response to a war with the DPRK. They reportedly could operate with minimal risk of being target by the DPRK’s air defenses. According to one report,¹²⁹²

...[F]or the recent show of force, the U.S. Air Force simply put the advanced stealth fighters on “static display,” meaning they were parked while senior South Korean military leaders -- very publicly -- reviewed America’s premier fighter up close and personal. They also received an orientation and “familiarization training,” said Col. Kathy Wilkinson, a Pentagon spokeswoman. That training “includes pilots talking about how they fly to planners talking about integrating that asset into combined arms operations.”

The Navy was also involved in the exercises; by the middle of March four Arleigh Burke-class guided-missile destroyers had arrived in the ROK – the USS Fitzgerald, John S. McCain, Lassen, and McCampbell. The ships, hailing from the Japan-based Destroyer Squadron 15, conducted naval drills with ROK vessels. Furthermore, a Los Angeles-class fast attack submarine, the USS Cheyenne, conducted naval exercises and made port calls. While the submarine did not have nuclear weapons, it was equipped with Harpoon anti-ship missiles, Tomahawk cruise missiles, and Mark-48 torpedoes, which can be used against both land and sea targets, at close and far ranges.¹²⁹³

Aside from exaggerated propaganda over the threat of invasion and national security concerns, the DPRK also protests against US-ROK military exercises for a more practical reason – when the US and ROK undertake joint exercises, this forces the DPRK military to be on high alert and undertake military exercises in return. This, in turn, drains a significant amount of resources from the country – such as fuel for planes and tanks – which the DPRK cannot afford.¹²⁹⁴

The 2016 Key Resolve and Foal Eagle exercises came after the early 2016 nuclear and missile tests. They were the largest ever conducted, with around “17,000 U.S. troops and more than 300,000 ROK military personnel” directly participating. For the first time the forces involved carried out “OPLAN 5015, a classified war plan signed last year that includes surgical strikes against North Korea’s nuclear, missile and command and control facilities”, including so-call special forces “decapitation” raids against DPRK leadership. The DPRK responded with its usual denunciations and threats of an “all-out offensive” and attacking the US mainland with rockets.¹²⁹⁵

Military Operation Plans

The previous US-ROK military operation plan (OPLAN) 5027 had gone through many variations over the past 50 years, with different potential contingencies resulting in different responses. In the event of a DPRK invasion, OPLAN 5027 calls for the US to increase the number of ground troops by as many as 690,000, fighter planes by 2,000, and warships by 160. However, these are worst-case sizing requirements.

It had five different stages, including “first deploying the U.S. military’s flexible deterrence power, destroying strategic targets in the North, entering the north, controlling the military of the occupied territory and finally, unification of the peninsula under the control of the South Korean government.”¹²⁹⁶

Both countries realize, however, that such a large number of ground troops may not be necessary or practical and that a Korean War-type of major war of attrition may not be necessary or even likely. Since 2010, both the ROK and the US had been developing a new OPLAN better-suited to modern battlefield conditions, with ROK forces taking the lead and US forces providing support.¹²⁹⁷ These changes were to have been a key part of the planned OPCON transfer in 2015.

The US and the ROK have also been working over the past decade to transition a conceptual plan (CONPLAN 5029) to respond to a DPRK regime collapse, into an operational plan (OPLAN 5029).¹²⁹⁸ According to one South Korean article, OPLAN 5029 prepares for five or six different scenarios of DPRK upheavals, such as a civil war due to a coup d’état or regime change, a ROK hostage incident, a large natural disaster, the outflow of WMD, and a large-scale DPRK citizen defection. One ROK news source reported,¹²⁹⁹

The efforts to flesh out OPLAN 5029 are prompting some observers to comment that one of the most problematic aspects of the OPLAN 5029 discussion is that it places the CFC and not the South Korean government as the main agency in charge with handling the “sudden change” in North Korea, an issue that led to a dispute in 2005 between South Korea and the U.S.

A senior foreign policy and national security official from the Roh administration said, “The Roh Moo-hyun administration determined that a major issue with OPLAN 5029 involved the sovereignty of South Korea and thus halted drafting the plan in agreement with then-U.S. President George W. Bush during the June 2005 South Korea-U.S. summit.” This official also said that in the working plan discussed by South Korean and U.S. military authorities at the time, the CFC commander would take the initiative in responding to all situations, not just ones in the military sector, in the event of a North Korean upheaval. The official added, “If an upheaval takes place in North Korea, it is natural that the South Korean president should have the authority to lead the response, and it is appropriate that the South Korean president responds by giving directions to the South Korean Joint Chiefs of Staff.”

It was reported in February 2013, however, that US-ROK negotiations had stalled. Instead, there might be a new OPLAN 5015 developed that would replace both 5027 and 5029, incorporating strategies in both. The two countries were also reported to have had different opinions on how to deal with the DPRK after its December 2012 missile launch and February 2013 nuclear test. The ROK military requested USFK to include in OPLAN 5015 a counterplan against DPRK provocation and a plan for a pre-emptive strike against the DPRK’s nuclear test site(s). However, the US military maintained that in the case of DPRK provocation, OPLAN 5015 should focus on preventing the war from spreading in order to reduce the likelihood of an intervention by the Chinese military.¹³⁰⁰

However, a new operational plan does seem to have been approved in June 2015. In a review by Brookings, OPLAN 5015 was described as envisioning “limited warfare with an emphasis on preemptive strikes on strategic targets in North Korea and “decapitation raids” to exterminate North Korean leaders. It is considered to be a more offensive-oriented plan, making escalation more readily possible than its predecessor, OPLAN 5027, which emphasizes forward-defense postures.”¹³⁰¹

It should also be noted that some sources report that China has developed a contingency plan for sudden changes in the DPRK, entitled “the Chick plan.” Reportedly, this plan involves security measures to protect the areas near the DPRK-Chinese border. It was also reported that the

Chinese have already invested in bridges across the Yalu and Tumen rivers to support its planning, while gathering PLA Army troops in nearby Shenyang.¹³⁰² China has deployed four rapid deployment forces near the Korean Peninsula that can be used, among other things, in the event of a contingency situation on the Peninsula.¹³⁰³

A Preemptive Strike Option?

Some US media and analysts outside the US government have suggested that the US could preemptively strike the DPRK, forcing regime change. This does not reflect U.S. or ROK doctrine and policy, and would involve massive risks. In an analysis of this potential option, the IISS writes that despite US and ROK qualitative superiority, the allies were not “confident of winning an offensive war against North Korea without sustaining heavy military and collateral casualties.”¹³⁰⁴

Even a surprise US-led attack would not be able to prevent significant artillery bombardment of Seoul, located approximately 40 kilometers from the DMZ – where about 70% of DPRK artillery and forces are located. Many DPRK political and military leaders would be able to hide in the DPRK’s many underground, making it hard to find and attack them. Nor is there a clear line of approach to Pyongyang.¹³⁰⁵

Moreover, the DPRK’s armed forces – a total active-duty strength of over one million – seem to be determined, loyal, and believe in the DPRK regime’s political legitimacy. As such, they likely would not collapse or surrender in large numbers, requiring a correspondingly large number of US-ROK ground troops to sustain a strike. Furthermore, the DPRK has a large arsenal of ballistic missiles and unconventional weapons – discussed later in this report – which could be used against allied forces. An IISS analysis notes,¹³⁰⁶

Due to these considerations, a full scale pre-emptive attack to remove the North Korean regime is considered by Washington, Seoul and Tokyo to be an impractical option. More limited pre-emptive options include air strikes against known or suspected North Korean nuclear facilities, chemical weapons storage sites, missile launchers and firing bunkers, or North Korean artillery locations near the DMZ. But, these limited options suffer two basic disadvantages. Firstly, from a practical standpoint, it would be difficult to conduct a fully effective first strike, given the uncertainty and multiplicity of targets....Secondly, a limited pre-emptive attack runs the risk of provoking North Korean retaliation.

...[T]here is little enthusiasm in Washington, and much less in Seoul and Tokyo, for a surprise ‘surgical strike’ to knock out North Korea’s key military assets. However, if the allies believed that war was inevitable and that North Korea was preparing to attack, a pre-emptive strike would hold great advantages. Likewise, if Pyongyang feared an attack on its critical military assets, it would be under pressure to use its weaponry before these assets could be destroyed on the ground.

While senior US military officers and intelligence analysis are not on public record regarding these views, many seem to agree with the IISS’ analysis of the risks involved.

US Forces Japan (UFJ)

The US Force Japan (UFJ) Command describes its history, structure, and mission as follows:¹³⁰⁷

Originally established at Fuchu Air Station on July 1, 1957, USFJ, with its U.S. Army, U.S Marine Corps, U.S Navy, and U.S Air Force elements, consists of approximately 54,000 military personnel, 42,000 dependents, 8,000 DoD civilian employees, and 25,000 Japanese workers. U.S. forces are stationed in Japan pursuant to the U.S.-Japan Treaty of Mutual Cooperation and Security of 1960.

Headquarters U.S. Forces Japan is located at Yokota Air Base. Approximately 160 military, DoD civilians, and Japanese national employees comprise the Commander, U.S. Forces, Japan's, (COMUSJAPAN) joint staff. The joint staff administers unilateral and bilateral defense issues. HQ USFJ focuses on war planning,

conduct of joint/bilateral exercises and studies, administering the Status of Forces Agreement, improving combat readiness, and enhancing the quality of life of military and DOD civilian personnel and their dependents.

U.S. military strength in Japan is about 38,000 ashore and 11,000 afloat, and U.S. forces are dispersed among 85 facilities located on Honshu, Kyushu, and Okinawa. Total acreage of U.S. bases is approximately 77,000 acres. USFJ bases and facilities range in size from a several thousand acre training area to a single antenna site.

On mainland Japan, there are seven different bases/posts. Yokota and Misawa, representing the Air Force; Camp Zama, representing the Army; Iwakuni; the Marine Corps; and Yokosuka, Atsugi, and Sasebo, the Navy. The closest of these is Camp Zama, which is approximately 20 miles from Yokota.

...One of the most significant events in USFJ history took place on January 19, 1960. Christian A. Herter and Douglas MacArthur II signed the Treaty of Mutual Cooperation and Security for the United States. This treaty, with its related diplomatic notes and implementation arrangements, authorized the U.S. military presence in Japan. Of singular importance to USFJ was the signing of the Status of Forces Agreement (SOFA) on that same day. The U.S.- Japan Joint Committee established under the prior Administrative agreement was continued as the means for inter-governmental consultations on general matters regarding implementation of the [SOFA](#), on U.S. facilities.

COMUSJAPAN's mission stems directly from the treaty and the resulting presence of U.S. forces in Japan. The commander is responsible for developing plans for the defense of Japan and must be prepared, if contingencies arise, to assume operational control of assigned and attached U.S. forces for the execution of those plans. The commander's peacetime responsibilities include representing the Commander, U.S. Pacific Command, in relations among U.S. forces and other Department of Defense elements, the U.S. Ambassador, the Japan Ministry of Defense, and other Government of Japan agencies.

The USFJ insignia was approved by the Institute of Heraldry in May 1977. The insignia portrays the close professional working relationship between USFJ and the Japan Self Defense Forces.

Japan has implemented a series of "Defense Buildup Plans" since fiscal year 1958 which coincide with USFJ's longevity. The 1960s were a time of turmoil for USFJ, with the return of many of the bases and facilities held since the end of the war, the intense activities at depots and bases in support of American forces deployed in Southeast Asia, and anti-war and anti-base demonstrations among some elements of the Japanese public.

A major change in USFJ responsibilities occurred with the 1972 reversion of Okinawa to the Japanese government, and some related changes to the Status of Forces Agreement -- a major expansion of USFJ activities. Military-related problems formerly handled by the High Commissioner, Ryukyu Islands, became the responsibility of USFJ. An Okinawa Area Field Office was established to represent USFJ interests there.

In 1976, the Subcommittee for Defense Cooperation was established. This subcommittee, consisting of military and civilian members of both countries, permits consultation concerning mutual defense issues.

Return of U.S. facilities and areas, as well as joint usage, continued during the 1970s, especially on the main islands. The U.S. Air Force's Fifth Air Force transferred its tactical aircraft from the main islands and consolidated other activities in the Kanto Plain area. Support and military housing facilities in many areas were closed. Army depots were reduced or closed.

Besides reduction in facilities, there was a decrease in the number of Japanese nationals employed by USFJ. On July 1, 1957, USFJ was one of the largest employers in Japan with a main island workforce of 152,000. Overall labor costs were low -- with an average annual payroll cost of \$1,181 per employee. Today, the Japanese national workforce is about 25,000; with an average annual payroll of over \$56,000 per appropriated employee.

During the final four months of 1974, the headquarters of USFJ was relocated from Fuchu Air Station to Yokota Air Base.

A real milestone in U.S. and Japan military relations came in November 1978, when both governments approved a document known as the Guidelines for Defense Cooperation. This document formed the basis

for definitive and comprehensive military planning and other activities between U.S. forces and Japan Self Defense Forces. The two key elements of the guidelines are: guidance and direction for planning to meet other contingencies in the Far East that would affect Japan's security; and provisions for studies and analyses to be performed in several areas related to and supportive of the two main efforts.

Another milestone was the New Special Measures Agreement, signed by the Government of Japan in January 1991. This agreement, combined with previously-agreed-to Labor Cost Sharing agreements and a generous Facilities Improvement Program, clearly established Japan as our most generous ally in Host Nation Support. Japan pays most yen-based labor expenses (appropriated and non-appropriated funds) and a portion of utility costs (fuel, electricity, sewage, and water). The SMA was renewed in 2011.

...The National Defense Program Outline, approved in 1995, delineates the basic concepts for Japan's security policy, and reaffirms the importance of the U.S.-Japan security relationship and includes efforts that should strengthen Japan's regional and global role with the United States.

In September 1997, new Guidelines for U.S.-Japan Defense Cooperation were issued. The revised Defense Guidelines are designed to provide the foundation for more effective bilateral defense coordination and will improve peacekeeping operations, humanitarian relief operations, rear area support to U.S. forces, and intelligence sharing activities.

The U.S.-Japan alliance is essential to the free world posture in the Pacific. In the mutual security treaty, the United States and Japan acknowledge that they have a common stake in the security and peaceful progress of the Far East region. USFJ has made a positive contribution to the peace and security of the Far East and to the preservation of world peace.

The 50th anniversary of the Japan-US Security Treaty took place in 2010, and Japan 2010 White Paper describes Japan's intention to implement deepening military cooperation in the coming years. These areas of bilateral cooperation included extended deterrence, information security, missile defense, and space, as well as individual security areas including humanitarian assistance, disaster relief, and cyber issues. US forces stationed in Japan serve as a deterrent and can function as an offensive "spear" in the event of armed aggression against the country. In the wake of early 2013 DPRK provocations and Japan's increased threat perception, the US and Japan agreed on increased missile defense cooperation as well as coordination to monitor and respond to any DPRK escalations.¹³⁰⁸

US Deployments in Japan

Sources differ somewhat on the size of the US effort. USFJ describes its organization and strength as follows:¹³⁰⁹

United States Army Japan and I Corps (Forward)

U.S. Army, Japan, consists of about 2,000 soldiers and is charged, during peacetime, with operating port facilities and a series of logistics installations throughout Honshu and Okinawa. USARJ participates actively with the Japan Ground Self Defense Force in bilateral training exercises and the development of bilateral plans. It commands and supports U.S. Army assigned units, attached units, and augmentation forces and employs these forces in support of the Commander. USARJ maintains and strengthens the credibility of deterrent power in the Pacific through maintenance of defense facilities, war reserves and operational project stocks. USARJ/9th TSC is headquartered at Camp Zama.

III Marine Expeditionary Force

III MEF, which is under the operational command of Marine Forces Pacific, are garrisoned primarily on Okinawa and Southern Honshu. III MEF is headquartered at Camp Courtney, Okinawa.

Marine Corps Installations Command - Pacific

Marine Corps Installations Pacific provides oversight of Marine Corps installations in Hawaii, Japan and the Republic of Korea. MCIPAC's primary mission is to implement policies, develop regional strategies and

plans, prioritize resources and provide services, direction, and oversight to all assigned U.S. Marine Corps installations in order to support the operating forces, tenant commands and activities. Specifically in Japan, MCIPAC consists of two air stations and 10 camps/housing areas throughout Okinawa and mainland Japan. Headquarters for MCIPAC resides aboard Camp Foster in Okinawa.

The total number of Marines in Japan is approximately 18,000.

Commander, Naval Forces, Japan

Commander, Naval Forces, Japan, consisting of about 6,000 personnel, is responsible for maintaining and operating the port facilities and providing base and logistic support for those surface, subsurface, aviation and amphibious elements of the U.S. Seventh Fleet that operate from Japan as part of the Forward Deployed Naval Forces (FDNF). U.S. Commander Navy Forces, Japan, participates with the Japan Maritime Self Defense Force in exercises and planning. CNFJ is headquartered at Yokosuka.

Commander US 7th Fleet

U.S. Seventh Fleet, which is under the operation control of Commander, Pacific Fleet, has about 13,000 sailors, 18 ships, and 100 airplanes operating from Japan as part of the Forward Deployed Naval Forces.

5th Air Force

The Fifth Air Force supports the Defense of Japan, advances United States (US) interests, and promotes broader Asia-Pacific security and stability by advancing bilateral air, space, and cyberspace operations capability and interoperability, enabling United States Air Force (USAF) forces and capabilities in Japan, and rapidly responding to crises.

Figure VIII.7 shows a Japanese estimate of the US forces in Japan. This estimate demonstrates, US forces in Japan are larger than US forces in the ROK. More importantly, Japan provides the US with critical basing and staging facilities for any serious Korean conflict.

The IISS 2016 edition of the Military Balance has different figures. It estimates a total of 50,000 personnel, with 2,300 from the US Army, and 19,600 at the 7th Fleet Command (Yokosuka) and the Sasebo base. The naval forces include a carrier group with one carrier, three guided missile cruiser, eight guided missile destroyers, four mine warfare vessels, an amphibious command ship, and three amphibious warfare ships.¹³¹⁰

In addition, the IISS reports 12,400 personnel in the USAF 5th Air Force which is headquarter at Kadena Air Base in Okinawa with forces that include 18 F-16C/D, 2 E-3B, and 24 F-15C/Ds. It reports 15,700 US Marines and associated air units of the III Marine Expeditionary Force in Okinawa.¹³¹¹

These forward deployed forces make Japan a critical partner in any US effort to aid the ROK by building up US forces in Korea, and sustain a US presence in the event of war. Japan's security does depend on both US security guarantees and Japan's willingness to show it will support the US and ROK in any confrontation, crisis, or conflict with the DPRK.

Moreover, US ability to use Japan to stage its power projection forces would, however, be as important in a crisis as the force normally stationed there. Accordingly, the US "rebalancing" of its force posture throughout Asia will be critically dependent to some degree on the US and Japanese strategic alliance.

The Strengths and Weakness of the US-Japanese Alliance

An analysis by the US Congressional Research service summarizes the strengths and weakness of the US strategic relationship with Japan as follows,¹³¹²

The U.S.-Japan alliance has endured several geopolitical transitions, at times flourishing and at other moments seeming adrift. After the collapse of the Soviet Union, the organizing principles of the Cold War became obsolete, forcing the United States and Japan to adjust the alliance. The shock of the terrorist attacks on the United States in September 2001 ushered in a period of rejuvenated military ties, raising expectations that Japan would move toward a more forward-leaning defense posture and shed the pacifist limitations that have at times frustrated U.S. defense officials. However, the partnership struggled to sustain itself politically in the late 2000s; a softening of U.S. policy toward North Korea by the George W. Bush Administration dismayed Tokyo, and the stalled implementation of a base relocation on Okinawa disappointed Washington. After the Democratic Party of Japan (DPJ) came to power in September 2009, Tokyo hinted that it might seek a more Asia-centric policy and resisted fulfilling the 1996 agreement to relocate the Futenma air base in Okinawa.

A series of provocations by North Korea and increasingly aggressive maritime operations by China since 2010 appeared to have set the relationship back on course. From 2007 to 2012, unstable leadership and political paralysis in Tokyo slowed some bilateral security initiatives, but ultimately the turmoil that plagued Japanese politics may have reinforced Japan's commitment to the alliance. In the end, both the left-leaning DPJ and the conservative Liberal Democratic Party (LDP) reaffirmed the centrality of the partnership with the United States. The revision of the Mutual Defense Guidelines, which provide a framework for bilateral defense cooperation, in 2015 showed the enduring strength of the alliance and a vision for enhanced cooperation in the future.

Despite broad and increasing strategic alignment, both the United States and Japan face constraints on their ability to enhance the alliance. Fiscal conditions and sequestration-induced cuts put pressure on defense budgets. Hosting U.S. troops puts strain on Japanese communities, particularly in Okinawa. Despite Prime Minister Abe's drive to upgrade Japan's security capabilities, it remains unclear whether the Japanese public has the appetite to shift Japan's fundamental post-war military posture. Massive protests against the security legislation promoted by the Abe Administration in 2015 indicated the depth of opposition to even a moderate expansion of Japan's military capabilities. Budgetary, legal, normative, and political constraints on Japan's military activities remain. As some analysts point out, Japan still faces tighter restrictions on its use of military force than that of other U.S. allies, including the Republic of Korea, Canada, and European nations.

Meanwhile, China has continued its steep ascent as a regional giant. Emboldened by its own economic growth and a perception of U.S. decline, Beijing has asserted itself more forcefully in diplomatic and military arenas, including direct challenges to Japan's territorial rights over a set of islets in the East China Sea. As the United States extracted itself from wars in the Middle East in 2011, Washington's attention turned more toward the Asia-Pacific region.

On the economic front, the United States is seeking to build trade and strategic connections to the Asia-Pacific through the proposed 12-country Trans-Pacific Partnership free trade agreement. The Obama Administration's "rebalance" to the Pacific was seen by many as a reaction to China's rise, despite insistence by U.S. leaders that the "pivot" is not a containment policy. The U.S.-Japan alliance, missing a strategic anchor since the end of the Cold War, may have found a new guiding rationale in shaping the environment for China's rise.

Resolving the Okinawa Issue?

As a Congressional Research Service report mentions, many of the tensions between the US and Japan over the basing of US forces in Japan have centered around Japanese objections to the deployment of US forces in Okinawa, the size of the US Marine base there and its air activities, its proximity to civilians, and crimes by US military personnel. These issues seem to have been resolved in April 2013 – although the long history of the disputes involved indicates that more depends on actual implementation than agreement on a plan. A report by the US DOD notes that,¹³¹³

The realignment, including consolidation, of U.S. forces within Okinawa is a significant effort by the U.S. and Japanese Governments which recognize the importance of enhancing Japanese and U.S. public support

for the security alliance, which contributes to a sustainable presence of U.S. forces at facilities and areas in Japan as stated in the October 29, 2005 document of the Security Consultative Committee (SCC) entitled “U.S.-Japan Alliance: Transformation and Realignment for the Future”.

When implemented, the realignment will ensure a life-of-the-Alliance presence for U.S. forces in Japan as stated in the May 1, 2006 document of the SCC entitled “United States-Japan Roadmap for Realignment Implementation” (Realignment Roadmap) and will maintain deterrence and mitigate the impact of U.S. forces on local communities.

In order to realize the realignment, the U.S. and Japanese Governments have developed and will implement this consolidation plan. This consolidation plan, including sequencing steps, was jointly developed for facilities and areas remaining in Okinawa.

The U.S. and Japanese Governments reaffirm their commitment to the steady implementation of the realignment. The U.S. Government (USG) remains committed to return lands on Okinawa as designated U.S. Marine Corps forces relocate from Okinawa, and as facilities become available for units and other tenant activities relocating to locations on Okinawa.

The Government of Japan (GOJ) noted its responsibility to relocate all functions and capabilities that are resident in U.S. facilities designated for return, and that are required by U.S. forces remaining in Okinawa, including the housing necessary to support the remaining U.S. Marine Corps units, in coordination with the USG.

In the April 27, 2012 SCC Joint Statement, the U.S. and Japanese Governments confirmed that the total or partial return of the six facilities and areas designated in the Realignment Roadmap remains unchanged and that the land of aforementioned facilities and areas utilized by U.S. forces are eligible for return in three categories, as follows:

- 1) Areas eligible for immediate return upon completion of necessary procedures;
- 2) Areas eligible for return once the replacement facilities in Okinawa are provided; and,
- 3) Areas eligible for return as U.S. Marine Corps forces relocate from Okinawa to locations outside of Japan.

This consolidation plan was developed reflecting the precepts that regular training and exercise, as well as the availability of facilities and areas for these purposes, are essential to ensure the readiness, employability, and interoperability of U.S. forces, and that adequate capacity of U.S. facilities and areas is necessary, and the capacity above typical daily peacetime usage levels plays a critical and strategic role in meeting contingency requirements. This capacity can provide an indispensable and critical capability toward meeting local emergency needs such as in disaster relief and consequence management situations.

In addition, in the April 27, 2012 SCC Joint Statement, it was noted that the effort to develop this consolidation plan should consider the possible impact of the joint and shared use of facilities located on Okinawa and that joint and shared use of facilities was a key objective of the Realignment Roadmap. The U.S. and Japanese Governments confirmed that joint and shared use by Japan Self-Defense Forces will continue to be discussed at a variety of fora, including the Joint/Shared Use Working Group, which was established in December 2010. The discussion at this working group will be reflected in master planning for facilities and areas remaining in Okinawa to implement this consolidation plan.

Timelines for completing the implementation of this consolidation plan are event-driven. Recognizing the strong desires of Okinawa residents, this consolidation plan is to be implemented as soon as possible while ensuring operational capability, including training capability, throughout the process. The U.S. and Japanese Governments agree that no further significant changes will be required for the foreseeable future. The USG will implement this consolidation plan subject to the Agreement under Article VI of the Treaty of Mutual Cooperation and Security between Japan and the United States of America, Regarding Facilities and Areas and the Status of United States Armed Forces in Japan (SOFA), including continuing to observe the needs for facilities and areas for the purposes of SOFA. Timelines for the return of facilities and areas...of this consolidation plan will be updated by the U.S. and Japanese Governments and publicly released every three years.

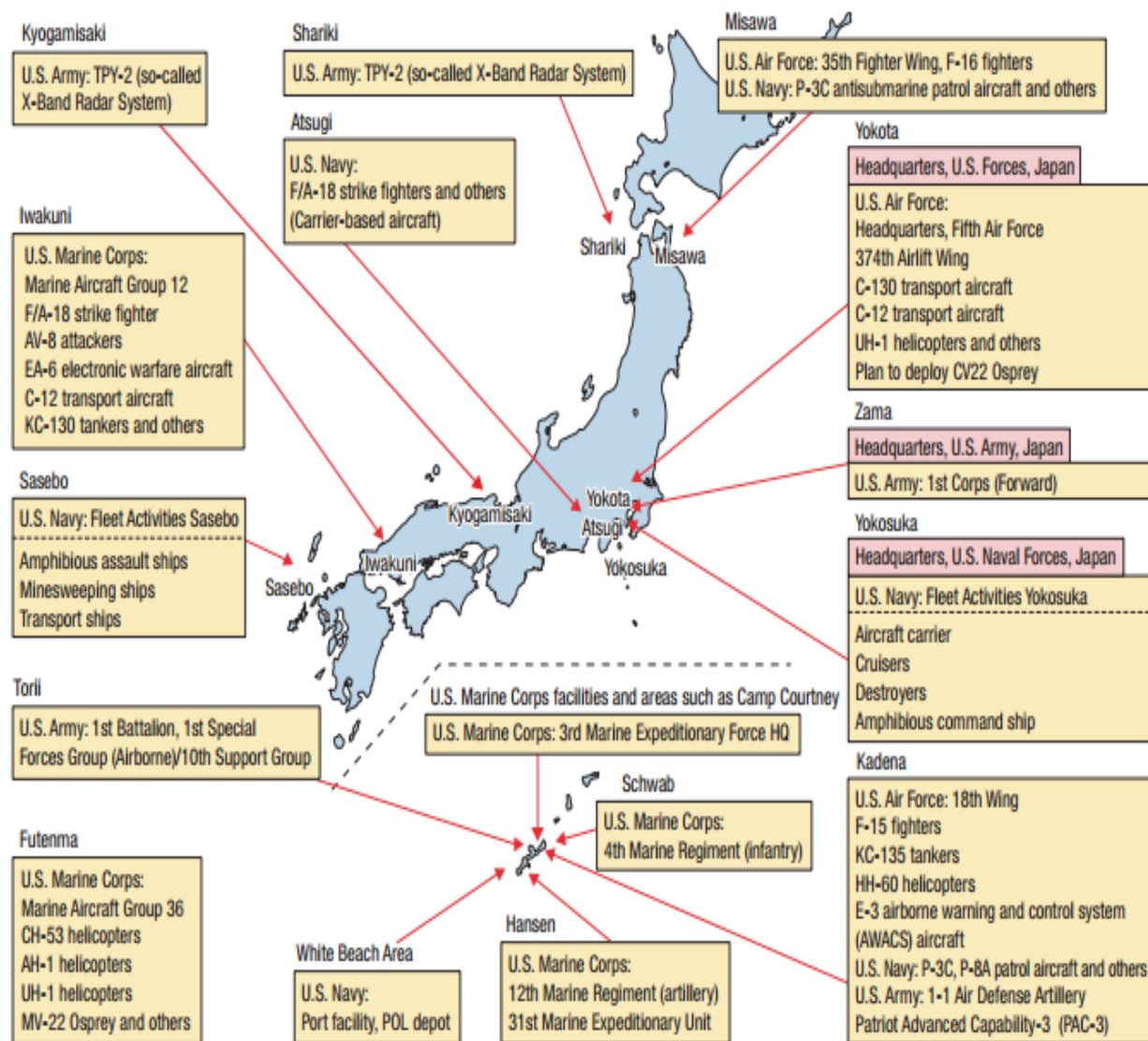
The Plan calls for 2,500 acres of land to be returned to Japan, including six major facilities and several smaller areas, while a coastal US Marine base would be expanded to include a new V-shaped runway built out into the sea. A US senior defense official remarked, “This is important because it lays out the plan for us to have a long-term presence in Okinawa, and one that is politically sustainable.”¹³¹⁴

However, in late 2014, voters of the Okinawa prefecture overwhelmingly voted for a governor that strongly opposed the relocation of the US Marine airbase and he later said, “my victory clearly shows prefectural residents will not let the base be built... I’d like to convey the message to the governments of Japan and the United States.”¹³¹⁵

In addition, the murder of a Japanese woman by a civilian contractor working on Okinawa in April 2016 renewed local opposition to the US military presence there, leading to sizable protests. In response, US officials reiterated their commitment to returning about 9,900 acres to the prefecture once Japan completes the construction of several replacement helipads.¹³¹⁶

The Japanese government has continued to try to find workable options, and the issue remains a challenge to the U.S.-Japanese alliance. If the plan is largely implemented in the form of some workable compromise, the “Consolidation Plan for Facilities and Areas in Okinawa” will consolidate and close dozens of US military bases and US-controlled locations across Okinawa. This could put an end to the tensions that began with the 2006 road map. Okinawa, however, has not accepted the plan, and its politics have raised steadily growing objections to the U.S. presence and relocation efforts. At present, it seems likely that these longstanding tensions will remain a problem for the foreseeable future.

Figure VIII.7: Japanese Estimates of US Forces Japan (USFJ) in 2015



Source: Japanese Ministry of Defense, *Defense of Japan 2015*.

United States Pacific Command (US PACOM)

The USPACOM Command shapes the overall strategy and planning for the U.S. military role in the Pacific, and this strategy clearly defines its broader role in dealing with the DPRK, defending the ROK, and seeking cooperation with China.¹³¹⁷

The U.S. regards coercive activities by North Korea, in particular its pursuit of nuclear weapons and ballistic missile capabilities, to comprise the most urgent security threat in the region. USPACOM is fully committed to maintaining peace on the Korean Peninsula by effectively working with our allies and other regional states to deter and defend against North Korean military provocations, weapons proliferation, and illicit trafficking; and to support enforcement of international sanctions restricting North Korean arms trade and other prohibited activities.

...North Korea's ongoing efforts to engage in WMD-related proliferation and arms sales in defiance of UN sanctions make it a primary actor of concern with respect to weapons of mass destruction (WMD). In addition, terrorist groups may leverage WMD-related expertise, technologies, dual-use material, and other resources to acquire chemical or biological weapons. This situation requires USPACOM, acting with domestic and foreign partners, to continue to enhance its capabilities to effectively counter the development and proliferation of WMD.

...USPACOM will enhance interoperability with allies and partners and develop the capacity of partners to cooperatively address regional challenges. This effort will move beyond traditional relationships to include security cooperation with China and others when there are shared interests and where cooperation can produce mutual benefits.

...The United States believes that a strong U.S.-China partnership is essential for peace, prosperity, and both regional and global security. The U.S. continues to welcome a prosperous and successful China that plays a greater role in global affairs, but China's growing military capabilities coupled with its lack of transparency is concerning. Therefore, the United States and China must continue to pursue a more transparent, enduring, stable, and reliable military-to-military relationship by maintaining a consistent and meaningful dialogue to prevent miscommunication or miscalculation. We see opportunities for cooperation in areas such as humanitarian relief and disaster response, counter-piracy efforts, non-proliferation, counter-terrorism, noncombatant evacuation operations (NEOs), military medicine, and maritime safety. Such opportunities will enhance our bilateral relationship with China as we work toward common goals, candidly address our differences, and demonstrate mutual commitment to the security and stability of the Asia-Pacific region.

The Prelude to "Rebalancing"

While the rebalancing of US forces in Asia has already been described in detail, it is important to note that the reinforcing and repositioning US troops in the Pacific that is part of the new US strategy described in *Sustaining US Global Leadership: Priorities for the 21st Century* – and made public in January 2012 – has long been a US goal.

Admiral Willard, former US PACOM Commander, summarized both the US role in the Pacific and the need to strengthen it, in his annual testimony to the Senate Armed Service Committee on March 24, 2010:¹³¹⁸

Five of our nation's seven mutual defense treaties are with nations in the Asia-Pacific region. We continue to work closely with these regional treaty allies—Australia, Japan, Republic of Korea, Republic of the Philippines and Thailand—to strengthen and leverage our relationships to enhance security within the region.

...The US-ROK alliance remains strong and critical to our regional strategy in Northeast Asia. General Sharp and I are aligned in our efforts to do what is right for the United States and the ROK as this alliance undergoes a major transformation. I will defer to General Sharp's testimony to provide the details of our relationship on the Peninsula, but note that General Sharp's progress in handling the transition of wartime Operational Control (OPCON) to the ROK military has been exceptional as has his leadership of US Forces

Korea.

The transformation of the US–ROK alliance will ultimately assist the ROK to better meet security challenges both on and off the peninsula. The ROK currently maintains a warship in the Gulf of Aden in support of counter-piracy and maritime security operations, and has provided direct assistance to Operation Enduring Freedom, including demonstrating strong leadership in its decision to deploy a Provincial Reconstruction Team to Afghanistan this year. Of particular note is the evolving trilateral security cooperation between the US, ROK, and Japan. Although there are still policy issues to be addressed in realizing its full potential, the shared values, financial resources, logistical capability, and the planning ability to address complex contingencies throughout the region make this trilateral partnership a goal worth pursuing.

...Our alliance with Japan is the cornerstone of our security strategy in Northeast Asia. Despite some recent challenges related to US basing in Japan, the military relationship, as well as the overall alliance, remain strong... That being said, we must make every effort—particularly as we celebrate the 50th anniversary of the alliance—to remind the citizens of both the US and Japan of the importance of our alliance to enduring regional security and prosperity.

US Pacific Command remains committed to the implementation of the Defense Policy Review Initiative (DPRI). Initiated by the US Secretaries of State and Defense with their Japanese counterparts in 2002, progress on Alliance Transformation and Realignment through the execution of the 2006 Roadmap for Realignment are critical next steps. Major elements of the Realignment Roadmap with Japan include: relocating a Marine Corps Air Station and a portion of a carrier air wing from urbanized to rural areas; co-locating US and Japanese command and control capabilities; deploying US missile defense capabilities to Japan in conjunction with their own deployments; improving operational coordination between US and Japanese forces; and adjusting the burden sharing arrangement through the relocation of ground forces.

The rebasing of 8,000 Marines and their dependents from Okinawa to Guam remains a key element of the Realignment Roadmap. Guam-based Marines, in addition to those Marine Forces that remain in Okinawa, will sustain the advantages of having forward-based ground forces in the Pacific Command AOR. Currently the Government of Japan (GOJ) is reviewing one of the realignment elements that addresses the Futenma Replacement Facility (FRF) and related movement of Marines Corps aviation assets in Okinawa; an action which is directly linked to the relocation of Marines to Guam and a plan to return significant land area to Japan. The GOJ has indicated it expects to complete its review by May of this year. The US remains committed to the 2006 DPRI Roadmap as agreed to by both countries.

The Japan Self-Defense Force is advancing its regional and global influence. In the spring and early summer of 2009, Japan deployed two JMSDF ships and two patrol aircraft to the Gulf of Aden region for counter-piracy operations. Although their Indian Ocean-based refueling mission recently ended, Japan remains engaged in the region by providing civil and financial support for reconstruction and humanitarian efforts in Afghanistan and Pakistan for the foreseeable future.

Although the Japanese defense budget has decreased each year since 2002, the Japan Self-Defense Forces continue their regular bilateral interactions with the US, and in some multi-lateral engagements with the US and our other allies, such as the Republic of Korea and Australia. Last year witnessed the completion of several successful milestones in our bilateral relationship, including the completion of a yearlong study of contingency command and control relationships and Ballistic Missile Defense (BMD) testing of a third Japan Maritime Self-Defense Force Aegis destroyer. Japan continues to maintain over \$4 billion in annual Host Nation Support (HNS) to our Japan-based force. Japan HNS contribution remains a vital strategic pillar of respective US and Japanese alliance commitments.

Shifts in Strategy

It is import to note, however, that no US strategy document ever used the term “pivot” in describing a limited rebalancing of U.S. forces from Europe to Asia, or called for a major build-up of US forces. The text of the key document that introduced the concept, *Sustaining US Global Leadership: Priorities for the 21st Century*, stated that,¹³¹⁹

U.S. economic and security interests are inextricably linked to developments in the arc extending from the Western Pacific and East Asia into the Indian Ocean region and South Asia, creating a mix of evolving challenges and opportunities. Accordingly, while the U.S. military will continue to contribute to security globally, *we will of necessity rebalance toward the Asia-Pacific region*. Our relationships with Asian allies and key partners are critical to the future stability and growth of the region. We will emphasize our existing alliances, which provide a vital foundation for Asia-Pacific security.

We will also expand our networks of cooperation with emerging partners throughout the Asia-Pacific to ensure collective capability and capacity for securing common interests. The United States is also investing in a long-term strategic partnership with India to support its ability to serve as a regional economic anchor and provider of security in the broader Indian Ocean region. Furthermore, we will maintain peace on the Korean Peninsula by effectively working with allies and other regional states to deter and defend against provocation from North Korea, which is actively pursuing a nuclear weapons program.

PACOM issued a strategic guidance for US priorities and engagement with the region in early 2012. Then PACOM Commander, Samuel J. Locklear III, outlined five priorities in implementing the program that year.¹³²⁰

- Strengthen and advance alliances and partnerships;
- Mature the US-China military-to-military relationship;
- Develop the US-India strategic partnership;
- Remain prepared to respond to a Korean Peninsula contingency; and
- Counter transnational threats.

Locklear identified North Korea as the most important trouble spot in the region, commenting that “If there is anything that keeps me awake at night, it’s that particular situation... We have to ensure that we maintain as much of a stable environment on the Korean Peninsula as we can.”¹³²¹ In a testimony to the Senate Armed Service Committee in September 2015 on freedom of navigation issues, Admiral Harris of PACOM outlined how the impact and goals of the “rebalance” in relation to PACOM.¹³²²

A fundamental factor in the feasibility of this new strategy has been the Rebalance to the Pacific. The Rebalance, initiated almost four years ago by President Obama, set the conditions for the implementation of this strategy. The Rebalance strengthened treaty alliances and partnerships, increased partner capacity and cooperation, improved interoperability, and increased security capabilities in the region. DoD’s new maritime strategy capitalizes on the momentum of the Rebalance and continues with its initiatives. In executing the new maritime strategy, PACOM will continue to:

- Employ the most advanced and capable platforms as they are deployed or assigned to the Pacific.
- Use the forward presence of military forces to engage allies and partners and deter aggression.
- Reinforce internationally accepted rules and norms including the concepts of freedom of navigation and innocent passage.
- Train and exercise with allies and partners to increase interoperability and build trust.
- Implement risk reduction mechanisms such as the Code for Unplanned Encounters at Sea and the U.S.-China Confidence Building Measures to help prevent accidents and tactical miscalculations.
- Continue deepening alliances and partnerships through strategic efforts in places like Japan, Korea, Australia, Thailand and the Philippines, while building new and deeper military relationships in places like Singapore, India, Vietnam, and with other like-minded friends and partners.

The Total Size of PACOM Forces

Figures VIII.8, VIII.9, and VIII.10 show that US forces in Japan and the ROK are only part of the resources the US could bring to bear assuming it relied on total PACOM forces. A PACOM estimate, summarized force strength as follows in 2016:¹³²³

Approximately 360,000 U.S. military and civilian personnel are assigned to the USPACOM area of responsibility.

- U.S. Pacific Fleet consists of approximately 200 ships (to include five aircraft carrier strike groups), nearly 1,100 aircraft, and 140,000 Sailors and civilians dedicated to protecting our mutual security interests.
- Marine Corps Forces, Pacific includes two Marine Expeditionary Forces and about 86,000 personnel and 640 aircraft assigned. U.S. Pacific Air Forces comprises of approximately 46,000 airmen and civilians and more than 420 aircraft.
- U.S. Army Pacific has approximately 106,000 personnel from one corps and two divisions, plus over 300 aircraft and five watercraft assigned throughout the AOR from Japan and Korea to Alaska and Hawaii.
- Of note, component command personnel numbers include more than 1,200 Special Operations personnel.
- Department of Defense civilian employees in the Pacific Command AOR number about 38,000.

It is important to note that while these force levels are impressive, they again represent a major cut in US forces and presence since 1990, cuts that have taken place during a period in which both China and the DPRK have made major increases in their conventional and WMD capabilities. There has been a steady downward trend in the total numbers of personnel, combat aircraft, and major combat ships from the end of the Cold War in 1991 onwards.

Figure VIII.8: US Forces in the Pacific in 2016, Equipment by Type and Location

Pacific Command (PACOM) Headquartered in Hawaii

Guam

Equipment Type	Quantity
Submarine, nuclear powered	4

Japan

Equipment Type	Quantity
Carrier, nuclear powered	1
Cruiser, with guided missiles	3
Destroyer, with guided missiles	8
Amphibious command ship	1
Mine countermeasures	4
Amphibious assault ship	1
Landing ship, dock	2
Landing platform, dock	1
Aircraft, fighter	110
Aircraft, airborne early warning	2
Aircraft, transport	13
Aircraft, CSAR	10
Aircraft, tanker	27
Helicopter, transport	34

ROK

Equipment Type	Model
Main battle tank	M-1 Abrams
Main battle tank	M-2/M-3 Bradley
Main battle tank	M-109
Helicopter, attack	AH-64 Apache
Helicopter, reconnaissance	OH-58D Kiowa Warrior
Helicopter, transport	CH-47 Chinook
Helicopter, utility	UH-60 Black Hawk
Artillery, multiple rocket launcher	MLRS
Air defense, surface-to-air missile	MIM-104 Patriot
Air defense, surface-to-air missile	FIM-92A Avenger
Aircraft, Fighter	F-16C/D
Aircraft, Fighter/Ground Attack	A-10C Thunderbolt II
Aircraft, ISR	U-2s

Pacific

Equipment Type	Quantity
Submarine, nuclear powered, with ballistic missiles	8
SSN, with dedicated, non-ballistic missiles	19
Submarine, nuclear powered	8
Carrier, nuclear powered	4
Cruiser, with guided missiles	9
Destroyer, with guided missiles	24
Frigate, aviation	5
Mine countermeasures	3
Amphibious assault ship	3
Landing platform, dock	3
Landing ship, dock	3

Source: Based primarily on material in International Institute for Strategic Studies, *The Military Balance 2016* (London: Routledge, 2013). Figures do not include equipment used for training purposes. All equipment figures represent equipment in active service.

Figure VIII.9: US Forces in the Pacific in 2016, Forces by Role and Location

Japan

Quantity	Role
Army	
Navy	
1	HQ (7th Fleet) – Yokosuka [1 base at Sasebo; 1 base at Yokosuka]
Air Force	
1	HQ (5th Air Force) – Okinawa-Kadena
1	FTR WING with: 2 FTR SQN with a total of 22 F-16C/D Fighting Falcon – Misawa
1	WING with: - Okinawa-Kadena 1 AEW&C SQN with 2 E-3B Sentry 1 CSAR SQN with 10 HH-60G Pave Hawk 2 FTR SQN with a total of 27 F-15C/D Eagle 2 C-12J
1	TPT WING with 10 C-130H <i>Hercules</i> - Yakota
1	3 Beech 1900C (C-12J)
1	Special Ops GRP – Okinawa-Kadena
Marines	
1	DIV (3rd)
1	FTR SQN with 12 F/A-18D Hornet
1	TKR SQN with 12 KC-130J Hercules
2	TPT HEL SQN with 12 MV-22B Osprey

ROK

Quantity	Role
Army	
1	HQ (8th Army) – Seoul
1	HQ (2nd Inf Div) – Tongduchon
1	ARMD BDE
1	CBT AVN BDE
1	ISR HEL BN
1	ARTY BDE
1	AD BDE
Air Force	
1	HQ (7th Air Force) – Osan
1	FTR Wing, with 1 FTR SQN with 20 F-16C/D Fighting Falcon – Osan
1	1 ATK SQN with 24 A-10 Thunderbolt II
1	ISR SQN with U-2S – Osan
1	FTR Wing, with 2 FTR SQN with 20 F-16C/D Fighting Falcon – Kunsan

Source: Based primarily on material in IISS, *The Military Balance 2016*. Figures do not include equipment used for training purposes. All equipment figures represent equipment in active service.

Figure VIII.10: Department of Defense Summary View of PACOM



Source: U.S. Department of Defense, http://www.defense.gov/News/Special-Reports/0415_Asia-Pacific-Rebalance, accessed August 10, 2016.

The US and Extended Regional Deterrence

Shifts in the wider military balance that affect the Koreans, Japan, and the rest of Asia help explain the fact that the US is simultaneously seeking arms control and examining developments for a new approach to regional extended deterrence as an alternative approach to enhancing regional stability.

As the US Nuclear Posture document issued in 2010 makes clear, this could involve further major changes in the military balance:¹³²⁴

The United States is committed to the long-term goal of a world free of nuclear weapons. The President has directed a review of potential future reductions in US nuclear weapons below New START levels. Several factors will influence the magnitude and pace of such reductions.

...[A]ny future nuclear reductions must continue to strengthen deterrence of potential regional adversaries, strategic stability vis-à-vis Russia and China, and assurance of our allies and partners.

This will require an updated assessment of deterrence requirements; further improvements in US, allied, and partner non-nuclear capabilities; focused reductions in strategic and non-strategic weapons; and close consultations with allies and partners. The United States will continue to ensure that, in the calculations of any potential opponent, the perceived gains of attacking the United States or its allies and partners would be far outweighed by the unacceptable costs of the response.

...Accordingly, the United States is fully committed to strengthening bilateral and regional security ties and working closely with its allies and partners to adapt these relationships to emerging 21st century requirements. We will continue to assure our allies and partners of our commitment to their security and to demonstrate this commitment not only through words, but also through deeds. This includes the continued forward deployment of US forces in key regions, strengthening of US and allied non-nuclear capabilities, and the continued provision of extended deterrence. Such security relationships are critical not only in deterring potential threats, but can also serve our non-proliferation goals—by demonstrating to neighboring states that their pursuit of nuclear weapons will only undermine their goal of achieving military or political advantages, and by reassuring non-nuclear US allies and partners that their security interests can be protected without their own nuclear deterrent capabilities. Further, the United States will work with allies and partners to strengthen the global non-proliferation regime, especially the implementation of existing commitments within their regions.

Security architectures in key regions will retain a nuclear dimension as long as nuclear threats to US allies and partners remain. US nuclear weapons have played an essential role in extending deterrence to US allies and partners against nuclear attacks or nuclear-backed coercion by states in their region that possess or are seeking nuclear weapons. A credible US “nuclear umbrella” has been provided by a combination of means—the strategic forces of the US Triad, non-strategic nuclear weapons deployed forward in key regions, and US-based nuclear weapons that could be deployed forward quickly to meet regional contingencies.

The mix of deterrence means has varied over time and from region to region...During the Cold War, the United States forward-deployed nuclear weapons in both Europe and Asia, and retained the capability to increase those deployments if needed. At the end of the Cold War, a series of steps were taken to dramatically reduce the forward presence of US nuclear weapons. Today, there are separate choices to be made in partnership with allies in Europe and Asia about what posture best serves our shared interests in deterrence and assurance and in moving toward a world of reduced nuclear dangers.

...In Asia and the Middle East—where there are no multilateral alliance structures analogous to NATO—the United States has mainly extended deterrence through bilateral alliances and security relationships and through its forward military presence and security guarantees. When the Cold War ended, the United States withdrew its forward-deployed nuclear weapons from the Pacific region, including removing nuclear weapons from naval surface vessels and general purpose submarines. Since then, it has relied on its central strategic forces and the capacity to re-deploy non-strategic nuclear systems in East Asia, if needed, in times of crisis.

The Administration is pursuing strategic dialogues with its allies and partners in East Asia and the Middle East to determine how best to cooperatively strengthen regional security architectures to enhance peace and security, and reassure them that US extended deterrence is credible and effective.

While official US policy hasn't shifted since this document was published, events in Northeast Asia have complicated the issue of US nuclear deterrence. North Korea's continued missile and nuclear developments have made the immutability and nuances of US protection more important, and have "prompted both Japan and South Korea to ask more detailed and complex questions about the extended deterrence relationship with regard to signaling, shared decision making, and C2 dynamics". In order to head off any interest in its allies developing nuclear weapons programs of their own, the US has inaugurated forums in both countries to determine exact deterrence relations.¹³²⁵

Barring major new limits to the DPRK's nuclear and missile efforts, these developments are almost certain to lead to some new mix of US, Japanese, and ROK efforts to build up radically more effective air and missile defenses, offer at least enhanced conventional deterrence in the form of weapons of mass effectiveness, and possibly include a more structured form of US theater nuclear umbrella or "extended deterrence."

In fact, as has been discussed in other parts of this analysis, this has already affected missile defense in the ROK. In July 2016, the U.S. and ROK issued the following joint statement,¹³²⁶

North Korea's nuclear test and multiple ballistic missile tests, including the recent intermediate-range ballistic missile (IRBM) launches, highlight the grave threat that North Korea poses to the security and stability of the Republic of Korea (ROK) and the entire Asia-Pacific region.

In response to the evolving threat posed by North Korea, the United States and the ROK have been conducting formal consultations regarding the feasibility of a Terminal High-Altitude Area Defense (THAAD) battery operated by U.S. Forces Korea (USFK) since early February, as a measure to improve the missile defense posture of the ROK-U.S. Alliance.

Based on these consultations, the ROK and the United States made an Alliance decision to deploy THAAD to USFK as a defensive measure to ensure the security of the ROK and its people, and to protect Alliance military forces from North Korea's weapons of mass destruction and ballistic missile threats.

Through the past months of review, the ROK-U.S. Joint Working Group confirmed the military effectiveness of THAAD on the Korean Peninsula and is in the final stage of preparing its recommendation for both the ROK Minister of National Defense and the U.S. Secretary of Defense regarding the optimal site in the Republic of Korea for the system's effectiveness and for environmental, health, and safety requirements.

The ROK and the United States are working closely to ensure the swift deployment of THAAD and will develop specific operational procedures.

When the THAAD system is deployed to the Korean Peninsula, it will be focused solely on North Korean nuclear and missile threats and would not be directed towards any third party nations. The THAAD deployment will contribute to a layered missile defense that will enhance the Alliance's existing missile defense capabilities against North Korean missile threats.

The U.S. does not make nuclear threats against the DPRK, but the DPRK can scarcely ignore the U.S. commitment to the ROK and the fact the US is a vastly superior nuclear and conventional power.

Uncertain US "Rebalancing" and Modernization Plans

The rate of US modernization is critical to assessing the likely types of escalation on the Peninsula, as well as the likely outcomes. As has been discussed, the US is now making major

cuts in its planned defense spending and reassessing its strategic “rebalance” of its forces from Europe to Asia. In spite of these pressures on US defense spending, however, the FY2017 defense plan and budget that President Obama submitted in February 2016 builds on the FY2016 plan of preserving most US force levels and while still calling for major levels of investment in US military modernization.

Much depends on whether the Congress supports such funding levels, and whether the Department of Defense can improve its use of defense funds to actually execute the programs it plans at the costs it claims. There is no clear way to assign probabilities to either set of actions, but it should be stressed that the analysis that follows assumes the Congress and Department of Defense will provide the necessary funding and effectiveness. There are a number of US and outside analysts that regard such assumptions as a triumph of hope over experience. With the passage of the 2015 Bipartisan Budget Act, and its easing of discretionary spending caps, there appears to be less chance for a damaging budget battle leading to a government shutdown this year. However, Congress must still reach an agreement on defense appropriations as it did last year, raising the possibility of more political jockeying.¹³²⁷

Restructuring, and “Rebalancing” US Forces for Asia and the Pacific

The US initiated a rebalance towards Asia after its announcement in 2011 and made it clear to allies and potential rivals that the US will increase its involvement in regional security. While the US is cutting total military spending and forces, it still has a force structure and resource pool to draw upon. The IISS estimates that the US accounted for 36.1% of global defense spending in 2014, more than the next top 9 countries combined.¹³²⁸ Additionally, in 2013 the IISS noted that “the pending end of a decade of complex wars centered on the land environment gave the US a chance to reassess force structures, roles and inventories,” for Asia and the Koreas with the aim of reducing force size and relying more on technological capabilities.¹³²⁹

The US issued a report in April 2013 that described specific programs for its rebalancing in Asia. It is important to compare the FY2017 strategic goals and budgetary requests with the intended goals for the Asia-Pacific rebalance in the 2013 report.

The 2013 report stated that the rebalancing in Asia included the following steps:¹³³⁰

- Creating a more operationally resilient Marine Corps presence in the Pacific, undertaking key presence initiatives in Australia, and investing in Guam as a joint strategic hub... DoD invested in Pacific bases in Guam and Pearl Harbor to enhance our capacity for submarine and CSG operations and to support our rebalancing to the Asia-Pacific region... The Department added \$78 million in FY 2014 to enable basing of another fast-attack submarine in Guam... The Department also added \$300 million across the FYDP to dredge Pearl Harbor to ease aircraft carrier access... The Department will procure a second Virginia-Class attack submarine in FY 2014; this will lessen the impact from the retirements of Los Angeles-Class attack submarines in the 2020s.
- Adding electronic attack EA-18Gs (Growlers) to offset the loss of retired Marine Corps EA-6B (Prowler) squadrons
- Investing in an array of critical munitions, particularly for countering anti-access/area denial (A2/AD) strategies. Our military’s weapons must be invulnerable to countermeasures and be able to out-reach our enemy’s defenses. Potential adversaries continue to improve their capabilities, challenging our ability to project power, especially in anti-access environments. In order to preserve tactical, operational, and strategic advantages, the FY 2014 submission increased investments in munitions that overcome and resist adversary countermeasures, outrange enemy weapons, and strike difficult targets.

For example, this budget:

- Increased procurement of advanced blocks of air-to-air missiles like AIM-9X
- Funded development and production of a new highly capable, long-range anti-ship cruise missile designed to out-range and resist adversary countermeasures
- Increased procurement of extended range Joint Air-to-Surface Standoff Missiles (JASSM-ER) to enhance our arsenal of advanced long-range strike missiles
- Funded improvements to weapons designed to destroy or defeat hard and deeply buried targets, such as the BLU-109 and BLU-113 penetrators
- Funded development of a new increment of the Guided Multiple Launch Rocket System (GMLRS) designed to strike targets at range from the ground
- Funded a service life extension for the existing Army Tactical Missile System (ATACMS) to bridge the gap until the new GMLRS increment is fielded and comply with our cluster munitions policy
- Integrated advanced Small Diameter Bombs (SDB-II) with all-weather and moving target capability on additional Navy aircraft
- Funded development and demonstrations of alternative uses of existing capabilities, expanding delivery platform options as well as broadening the type of targets munitions are able to strike
- Adjusted the apportionment of munitions around the globe to align with the strategy, emphasizing our shift to the Asia-Pacific region
- We also enhanced capability and effective capacity by integrating munitions on a broader set of platforms, funding demonstrations to expand applications of existing munitions, and ensuring that the right munitions were strategically located around the world. For example, we:
 - Integrated long-range air-launched JASSM-ERs on additional aircraft
 - Integrated advanced Small Diameter Bombs (SDB-II) with all-weather and moving target capability on additional Navy aircraft
 - Funded development and demonstrations of alternative uses of existing capabilities, expanding delivery platform options as well as broadening the type of targets munitions are able to strike
 - Adjusted the apportionment of munitions around the globe to align with the strategy, emphasizing our shift to the Asia-Pacific region
 - Increasing our joint and combined training capacity in and around Guam

This is only a small part of the measures the US has underway, however the US still faces major uncertainties as to what level of restructuring and systems it can afford, and has much to do in defining its future posture in the ROK and Asia. It is maintaining its stance toward the DPRK as a result of the cyber-attack to Sony Pictures in late 2014 and continued tests of their short range missile capability in March 2015.¹³³¹

Former USFK Commander General Walter Sharp discussed some of the issues involved at a CSIS forum in March 2013. He argued that the US and ROK should both increase defensive and offensive capabilities against the DPRK, as the North has become increasingly threatening and is approaching the capability to attack anywhere in the world with nuclear missiles. He proposed that the US and ROK develop layered, robust missile defense systems that could quickly strike anywhere in the DPRK; construct regional intelligence sharing systems, such as the December 2014 intelligence sharing agreement¹³³², and increase sharing of military secrets to better monitor the North; and continue tightening economic and diplomatic pressures on the DPRK.¹³³³

From a Focus on Asia and the Pacific to Global Contingency-Driven Rebalancing

By the beginning of 2015, however, the U.S. had shifted from a focus on Asia and the Pacific to global contingency-driven rebalancing. The IISS assessed the changes in U.S. by stating that it, “became more crowded... [with] the possible return of sequestration in FY2016; the Ukraine crisis and its effect on relations with Russia as well as on broader European security; the Ebola outbreak in Africa; and the increase in violence in Syria and Iraq – particularly the territorial gains made by the Islamic State of Iraq and al-Sham (ISIS).”¹³³⁴

The proposed FY2016 US defense budget that President Obama submitted to Congress in February 2015 continued the US focus on rebalancing US forces to provide more capability in Asia and to support the ROK, but put less emphasis on the overall Asia-Pacific rebalance as it had in previous years, and effectively shifted from rebalancing to Asia to a focus on global rebalancing driven by the crises and needs of the time.

The US FY2016 and FY2017 budget submissions made it clear that the US was giving equal priority to maintaining and improving capability in the Middle East and Europe, while improving its capabilities in Asia and the Pacific. They made it clear that the U.S. was restructuring its force to emphasize power projection to a range of key allies like the ROK and Japan rather than conducting a major build-up or making major shifts out of Europe to forward positions in Asia and the Pacific.

U.S. Plans and Policy in FY2016

The transitions in U.S. planning are illustrated by the FY2016 and FY2017 defense budget submissions and guidance. The US FY2016 defense budget outlined three strategic priorities maintained from the DOD’s 2014 Quadrennial Defense Review (QDR):¹³³⁵

Protect the homeland to deter and defeat threats to the nation and to mitigate the effects of potential attacks and natural disasters. This means making selective investments in missile defense, nuclear modernization, and cyber capabilities. It also means sustaining capacity to protect U.S. airspace and shores, as well as reshaping the ability of the military forces to provide support to civil authorities when needed. (p. 2-1)

Build security globally to preserve regional stability, deter adversaries, support allies and partners, and cooperate with others to address common security challenges. In practice, this means continuing to rebalance the Department’s posture and presence to the Asia-Pacific while maintaining a focus on the Middle East. It also means working closely with European partners to strengthen their capabilities, maximizing the impact of a relatively small U.S. presence in Africa, and working with interagency partners to counter illicit drug trafficking and transnational criminal organization activity. (p. 2-1)

Project power and win decisively to defeat aggression, disrupt and destroy terrorist networks, and provide humanitarian assistance and disaster relief. Sustaining superior forces remains a top priority for force planning and development, so the following focus. (p. 2-1)

The DOD continued to describe its rebalancing efforts in its FY2016 budget overview, but it did so in the context of a changing security environment and placing less emphasis on its contributions to the Asia-Pacific “pivot”.¹³³⁶

Rebalancing for a broad spectrum of conflict. Future conflicts could range from hybrid contingencies against non-state actors to high-end conflicts against states armed with weapons of mass destruction and/or advanced anti-access and area-denial capabilities. To address this diverse range of challenges, the U.S. military will broaden its capabilities to the full spectrum of possible operations. While preserving hard-won expertise in counterinsurgency and stability operations, the Joint Force must also be prepared to battle sophisticated adversaries employing advanced warfighting capabilities, to include space and cyber capabilities. The Department will sustain robust investments in science, technology, research, and

development in areas most critical to meeting future challenges or where there is greatest potential for game-changing advances. (p. 2-2)

Rebalancing and sustaining presence and posture abroad to protect U.S. national security interests.

In meeting its priorities, the Department will continue to rebalance and sustain its global posture. The Department will continue its contributions to the Asia-Pacific rebalance, while remaining fully committed to the security of allies and partners in the Middle East. The Department will continue to work with allies and partners in Europe to promote regional security, Euro-Atlantic integration, enhanced military capability, and enhanced interoperability. Across the globe, DoD will ensure that the Joint Force is properly manned, trained, and equipped in the event of a crisis. (p. 2-2)

Rebalancing capability, capacity, and readiness within the Joint Force. After more than 10 years of conflict and amid ongoing budget reductions, the Joint Force's full spectrum readiness capabilities have atrophied. Taking the prudent steps outlined in the QDR will improve the Department's ability to meet national security needs. (p. 2-2) Key force structure decisions in this QDR include:

- Sustaining a world-class Army capable of conducting the full range of operations on land including prompt and sustained land combat by maintaining a force structure that it can train, equip, and keep ready. Under the Quadrennial Defense Review (QDR), the Department will rebalance within the Army, across the Active, Guard, and Reserve components. The active component of the Army will reduce its planned post-war end strength from the 490,000 soldiers proposed in the budget for FY 2015 to 450,000 personnel by the end of FY 2018. The Army National Guard will reduce its planned force structure from 350,200 in FY 2015 to 335,000 soldiers by the end of FY 2017. If the Department returns to the funding levels in the Budget Control Act of 2011, the Army will be forced to downsize to 420,000 Active Component soldiers and 315,000 Reserve Component soldiers. These drawdowns would be detrimental to meeting the defense strategy outlined in the QDR. (2-2/3)
- Providing stability in shipbuilding to affordably deliver warfighting requirements. The FY 2016 budget includes construction of 48 ships across the Future Years Defense Program (FYDP), including the steady production of destroyers and submarines; construction of ten ships of each type is funded through FY 2020. The Department of the Navy will build 14 Littoral Combat Ships (LCS) in the FYDP, the last 5 of which will be of the modified LCS configuration. The modified configuration program begins in FY 2019 with no gap from earlier LCS production; it provides improvements in ship lethality and survivability, delivering enhanced naval combat performance at an affordable price. The FYDP shipbuilding construction program also includes one aircraft carrier; one LHA replacement; one Landing Ship, Dock replacement (LX(R)); five T-ATF(X) fleet ocean tugs; one afloat forward staging base platform; and four T-AO(X) fleet oilers. The FY 2016 budget also funds the overhaul/life extension of the USS GEORGE WASHINGTON (CVN-73), its Carrier Air Wing, and associated force structure. If the Department returns to sequester-level funding, the Navy will be forced to retire this carrier and air wing, and it will be unable to procure approximately 9 ships and 35 aircraft over the FYDP. These cuts would jeopardize the Navy's modernization and recapitalization plans, threatening both readiness and the industrial base. (2-3)
- Maintaining the role of the Marine Corps as a vital crisis response force, protecting its most important modernization priorities and ensuring readiness but reducing from 184,100 end strength in FY 2015 to a planned end strength of 182,000 active Marines by the end of FY 2017. If sequester-level cuts return, the Marines would continue their drawdown to an end strength of 175,000 by 2019, which would be detrimental to meeting the defense strategy outlined in the QDR. (2-3)
- Maintaining an Air Force with global power projection capabilities and modernizing next generation Air Force combat equipment — to include fighters, bombers, and munitions — particularly against increasingly sophisticated air defense systems. To make resources available for these programs and preserve investments in critical capabilities, the Air Force will reduce capacity in some single-role aviation platforms by the end of the FYDP. A return to sequester-level funding would necessitate additional force structure reductions plus cuts to flying hours and weapon sustainment that would delay readiness recovery. (2-3)
- Achieving the right balance between the Active Component (AC) and the Reserve Component (RC) is critical to the Department's overall efforts to size and shape the future joint force. The RC provides capabilities and capacity that complement those of the AC and bolster the ability of the joint force to

execute the national defense strategy. As the Department reshapes the joint force, it will continue to rely on the RC to maintain those complementary capabilities and capacity. (2-3)

As the joint force rebalances to remain modern, capable, and ready — while reducing end strength—the Department will take the following additional steps that are consistent with the President’s Budget submission to protect key capability areas:

- **Air/Sea.** The Department will increase the joint force’s ability to counter advanced anti-access and area-denial capabilities by continuing to invest in fifth-generation fighters and long-range strike aircraft, survivable persistent surveillance, resilient architectures, and undersea warfare capabilities.
- **Nuclear Deterrence.** The DoD will continue to invest in modernizing the triad’s essential nuclear delivery systems, command and control, and, in collaboration with the Department of Energy, nuclear weapons and supporting infrastructure.
- **Space.** The DoD will move toward less complex, more affordable, more resilient systems and system architectures and pursue a multi-layered approach to deter attacks on space systems.
- **Missile Defense.** The DoD will make targeted investments in defensive interceptors, discrimination capabilities, and sensors.
- **Cyber.** The Department will continue to invest in new and expanded cyber capabilities and forces to operate and defend DoD’s networks, enhance its ability to conduct cyberspace operations, support military operations worldwide; and to counter cyber-attacks against the U.S.
- **Precision Strike.** The DoD will procure advanced air-to-surface missiles that will allow fighters and bombers to engage a wide range of targets and a long-range anti-ship cruise missile that will improve the ability of U.S. aircraft to engage surface combatants in defended airspace.
- **Intelligence, Surveillance, and Reconnaissance (ISR).** The DoD will rebalance investments toward systems that are effective in highly contested environments while sustaining capabilities appropriate for more permissive environments in order to support global situational awareness, counter-terrorism, and other operations.
- **Counter-Terror and Special Operations.** The DoD will slightly increase Special Operations Forces growth to an end strength of 69,900 personnel, protecting DoD’s ability to sustain persistent, networked, distributed operations to defeat al Qa’ida and other terrorist networks, counter other emerging transnational threats, counter weapons of mass destruction, build the capacity of U.S. partners, and support conventional operations.

If the Department returns to sequester-level funding, the ability to hedge against future risk with these investments in key capability areas would be put at risk. The ability to hedge against near-term risk by bolstering readiness will also be undermined.

Rebalancing tooth and tail. The Department continues to rebalance internally to prioritize spending on combat power. Key ongoing activities include reducing the Department’s major headquarters’ operating budgets by 20 percent and reducing intelligence analysis and production at Combatant Commands.

The DoD will remain committed to increasing productivity in defense acquisition. The Better Buying Power initiative seeks to achieve affordable programs by incentivizing productivity and innovation in industry and government, eliminating unproductive processes and bureaucracy, promoting effective competition, improving tradecraft in contracted acquisition of services, and improving the professionalism of the total acquisition workforce.

The Department must eliminate unneeded infrastructure; it already has more infrastructure than needed, and the excess will increase as DoD reduces its end strength. The best way to eliminate unneeded infrastructure is through the Base Realignment and Closure (BRAC) process. Congress has denied the Department’s request for another BRAC in each of the past 3 years. If the Department is to make more effective use of taxpayer dollars, Congress must approve the Department’s request to authorize another BRAC round in 2017. The need to reduce unneeded facilities is so critical that, in the absence of authorization of a new round of BRAC, the Administration will pursue alternative options to reduce this wasteful spending. (2-4/5)

In spite of coming reductions in the total size of the US Army, there will also be changes that improve its power projection capabilities.¹³³⁷

The Army is fundamentally changing the organization and management of its forces. Its focus is on building rapidly deployable contingency capabilities in support of the Combatant Commanders while at the same time reducing its end strength across all components. These adaptations are informed by wartime experiences since 2001, which include operations in an increasingly joint, interagency, intergovernmental, and multinational environment. Key initiatives include:

Army Contingency Force (ACF): In the near-term, the Army is rebuilding readiness from FY 2013 sequester shortfalls while facing the challenges of limited funding and continued demand for Army forces. The FY 2015 budget enables the Army to realize the Chief of Staff's intent to develop a contingency response force which provides Combatant Commanders an initial response capability that can achieve early objectives for most contingency plans. This force consists of a mix of infantry, armor, and Stryker BCTs, an aviation task force, and associated enabling units. This budget funds the highest training level for the ACF BCTs and sustains or improves the readiness in critical enabling formations.

Regionally Aligning Forces: As the Army transitions, it must restore and even increase its level of commitment to Combatant Commanders to better provide presence, shape the environment, and win decisively. Regional alignment aids in deterring aggression and provides increased responsiveness to and focus on specific regional requirements, while preserving the strategic flexibility necessary to respond to emergent requirements. In FY 2013, the Army began to align forces regionally with the goal of increasing both the quantity and quality of forces available to Combatant Commanders. Simply described, the Army aligns units with specific geographic Combatant Commands (GCC) based on existing assignments, State Partnership Program, or anticipated demand. In doing so, the Army establishes operational and planning associations between aligned units and the combatant commands. Training is tailored to include an understanding of the languages, cultures, geography and militaries of the countries where the units are most likely to be employed. The Army's initial regionally aligned force began its relationship in 2013 with the assignment of a BCT to the U.S. Africa Command (USAFRICOM). The Army estimates by the end of 2015, GCCs will be able to plan for increased use of their assigned forces.

BCT Re-organization: The Army is continuing its comprehensive re-organization of Army units to provide more lethal, better aligned force structure with increased capability. This action serves to provide a fiscal situation that requires a more economical force structure driven by current and future fiscal reality. The centerpiece of this re-organization will be the enhancement of BCTs by adding maneuver, fires, and engineer organizations. Over half of the Active Component units will be directly impacted by this re-organization, either through realignment, unit moves, conversion, or inactivations. The BCT re-organization and inactivation combined with the effects of fiscal reductions and continued global demand for Army forces reduces the opportunity to build readiness in FY 2014 and FY 2015. However, only by quickly changing force structure can the Army once again begin to achieve balance among force structure, modernization, and readiness. The FY 2015 budget continues to support this transition by funding the movement of Soldiers and equipment, providing sustainment services, continuing reset, redistribution of equipment from Afghanistan, and funding logistics readiness centers.

Aviation Restructure: The Army is also undertaking a comprehensive Aviation restructure that optimizes the aviation force to better respond to contingencies at home and abroad. The Army must at once reduce its legacy fleet, modernize its primary aircraft, maintain readiness to meet operational demand, and balance active and reserve structure. The Kiowa Warrior will be divested, and the armed aerial scout mission will be assumed by the AH-64 Apache teamed with unmanned aerial vehicles. This comprehensive restructure not only ensures the timely modernization of the National Guard's existing aircraft, but also provides additional UH-60L Blackhawk helicopters that enable both Title 32 and Title 10 missions. The training fleet will be replaced with aircraft the Army already owns – the LUH-72, and aviation brigades will be streamlined into a single configuration. This approach will ensure Soldiers on the ground, and the entire Joint Force, continue to benefit from world-class aviation support.

U.S. Plans and Policy in FY2017

The FY 2017 budget request retained this general language, and focused on the larger range of

U.S. global security challenges as opposed to regional rebalancing to Asia-Pacific. It did, however, label North Korea and China as security challenges and mentioned the Asian rebalance in several places:¹³³⁸

The Department must balance the Joint Force and adapt to changes in the security environment. The Secretary of Defense has directed the Department to prioritize the challenges presented by ongoing or possible future aggression from China, Russia, Iran, and North Korea, as well as maintaining the capabilities to conduct ongoing counter-terrorism operations.

These five challenges are informative to balancing the Joint Force. Balancing for broad spectrum of conflict. Future conflicts could range from hybrid contingencies against state or non-state actors to high-end conflicts against states armed with weapons of mass destruction and/or advanced anti-access and area-denial capabilities. To address this diverse range of challenges, the U.S. military will continue to invest in a broad range of capabilities to support the full spectrum of possible operations.

While preserving hard-won expertise in counterinsurgency and stability operations, the Joint Force must also be prepared to battle sophisticated adversaries employing advanced warfighting capabilities, especially space and cyber. The Department will sustain robust investments in science, technology, research, and development in areas most critical to meeting future challenges or where there is greatest potential for game-changing advances. Balancing presence and sustaining posture abroad to protect U.S. national security interests. In meeting the defense priorities of the nation, the Department will continue to ensure the right balance is achieved to sustain a global posture that deters aggression and safeguards the nation's allies. The Department will continue its contributions to the Asia-Pacific rebalance, while remaining committed to the security of allies and partners in the Middle East.

The Department will continue to work with allies and partners in Europe to promote regional security, Euro-Atlantic integration, enhanced military capability, and enhanced interoperability. Across the globe, DoD will ensure that the Joint Force is properly manned, trained, and equipped in the event of a crisis. Balancing capability, capacity, and readiness within the Joint Force. The Department's greatest responsibility is to win the nation's wars. The Department will continue to invest in the most capable, ready, and efficient force that can project power globally for full-spectrum operations against a range of threats. The FY 2017 budget request supports this aim in the following ways:

- Sustaining a world-class Army capable of conducting the full range of operations on land, including prompt and sustained land combat, by maintaining a force structure that it can train, equip, and keep ready. The Department will maintain a balance of capability, capacity, and readiness across the Army's total force, including the Active, Guard, and Reserve components.

The active component of the Army is reducing its planned post-war end strength from 490,000 to 450,000 personnel by the end of FY 2018. The Army National Guard and the Army Reserve are reducing their planned force structure to 335,000 and 195,000 soldiers, respectively, by the end of FY 2017. The Army continues to move toward stabilizing its total force at 980,000.

- Providing stability in Navy shipbuilding while buttressing aviation and weapons to address emerging challenges. The FY 2017 budget request supports the construction funding for 38 ships across the FYDP and supports steady production of destroyers and submarines; ten destroyers and nine submarines are constructed through FY 2021 to support a fleet size of 308 ships. The FYDP shipbuilding construction program includes funding for the Ohio Replacement Program Advanced Procurement beginning in FY 2017; one LHA amphibious assault ship replacement; four T-AO(X) fleet oilers, and continued funding for the refueling and overhaul of the USS GEORGE WASHINGTON (CVN 73). The FY 2017 budget request also funds two littoral combat ships (LCS) and continues to finance the detailed design and construction of the second Ford Class carrier and provides for the procurement of carrier-based aircraft to address a looming strike-fighter shortage in the 2020s, and it bolsters funding for some of the Navy's most capable weapons to provide a powerful deterrent to potential aggressors.

- Resourcing the Marine Corps to be a force-in-readiness, immediately deployable to respond to crises and support contingencies. This budget provides a Marine Corps with an 182,000 active duty end strength, and capable of expeditionary operations across all warfighting functions. The Marine Corps is actively modernizing and preparing for future challenges, as demonstrated by its Joint Strike Fighter program

achieving initial operating capability this year, and is increasing this momentum with new technologies to enable its mission set.

- Maintaining an Air Force with global power projection capabilities and modernizing next generation Air Force combat equipment — to include fighters, bombers, and munitions — particularly against increasingly sophisticated air defense systems, while sustaining the health of the combat fleet. To make resources available for these programs and preserve investments in critical capabilities, the Air Force will reduce capacity in some single-role aviation platforms by the end of the FYDP.
- Achieving the right balance and integrated approach to warfighting readiness between the Active Component (AC) and the Reserve Component (RC), which is critical to the Department’s overall efforts to size and shape the future Joint Force.

As the Joint Force maintains this critical balance to remain modern, capable, and ready — while reducing end strength — the Department is taking the following steps in the President’s Budget submission to develop and protect key capability areas, including:

- Air/Sea: increasing the Joint Force’s ability to counter advanced anti-access and area-denial capabilities by continuing to invest in fifth-generation fighters and long-range strike aircraft and munitions, survivable persistent surveillance, resilient architectures, and undersea warfare capabilities;
- Nuclear Deterrence: continuing to invest in modernizing the triad’s essential nuclear delivery systems, to include the Ohio Class Submarine, command and control, and, in collaboration with the Department of Energy, nuclear weapons and supporting infrastructure;
- Space: moving toward more resilient systems and system architectures, and pursuing a multi-layered approach to deter attacks on space systems;
- Missile Defense: making targeted investments in defensive interceptors, discrimination capabilities, and sensors;
- Cyber: continuing to invest in new and expanded cyber capabilities and forces to operate and defend DoD’s networks; enhance DoD’s ability to conduct cyberspace operations; support military operations worldwide; and counter cyber-attacks against the United States;
- Precision Strike: procuring advanced air-to-surface weapons that will allow fighters and bombers to engage a wide range of targets, and a long-range anti-ship cruise missile that will improve the ability of U.S. aircraft to engage surface combatants in defended airspace;
- Intelligence, Surveillance, and Reconnaissance (ISR): continuing to invest in systems that are effective in highly contested environments, while sustaining capabilities appropriate for more permissive environments, in order to support global situational awareness, counter-terrorism operations, and other Combatant Command needs; and,
- Counter-Terror and Special Operations: improving the nation’s ability to counter terrorist activity by maintaining current SOF end-strength and improving the efficacy of counter-terrorism operations. This requires the Department to budget and plan to sustain persistent, networked, distributed operations to defeat trans-regional terrorist networks, counter other emerging transnational threats, counter weapons of mass destruction, build the capacity of U.S. partners, and support conventional operations.

U.S. Force Plans for FY2016 and FY2017

The U.S. has not announced clear and specific plans for its future rebalancing in Asia and the Pacific. In fact, its budget documents are so driven by the need to make annual adjustments to meet budget ceilings that they have little real detail beyond the coming fiscal year. In fact, a section of the Department of Defense web site on “top issues” that is titled “DoD Focus on Asia-Pacific rebalance” has a remarkable lack of any broader discussion of strategy, force plans, or strategic partnerships. A section entitled “Force of the Future: Harris Talks ‘Rebalance,’” does little more than quote Admiral Harry B. Harris Jr., the commander of PACOM in saying that,¹³³⁹

There are few regions as culturally, socially, economically, and geo-politically diverse as the Indo-Asia-Pacific. The region is home to more than 50 percent of the world's population and 3,000 different languages.

Harris says Americans should care about the Asia-Pacific 'rebalance' because of the wide range of opportunities in the region.

"I think the opportunities involve new ways in dealing with old problems. They involve partnerships and friendships with new countries."

Harris also believes that there are opportunities with China.

"I think that we can find common ground and we should try to find common ground. We should work through global issues together rather than be at odds with each other."

With that said, Harris says that we (Americans) have to be ready for any outcome from a position of strength. He says he looks through a lens darkly for a reason. "You don't pay me to be the Pacific Commander because I'm an unrealistic optimist. I think you pay me to do this job because I'm a realist."

With all the components of our national capacity focused on rebalance—economic, diplomatic, political, energy and the military—Harris says it's easy for people to focus on the military because it's the most visible. He wants Americans to look at the economic opportunities.

"The Indo-Asia Pacific clearly is the engine of our economy for the rest of the century."

Harris believes this an exciting time for the military and that as the new Pacific Commander he can't wait to get to know some of the men and women who will serve their first tour of duty in the Pacific alongside of him.

"They're entering military service at a time of great importance to our nation. At a time where we have brand new platforms, new ships, new air planes and opportunities for women. It's an important time and we need the best that our country has to offer."

The FY2017 plans for US force levels are shown in **Figure VIII.11**, however, and indicate that the U.S. will maintain the basic power projection capabilities of every US force element with the exception of some aspects of readiness and the size of total active and reserve ground forces. It is important to note that the US budget maintains every key aspect of forward deployed forces as well as the kinds of power projection that would be critical to rapid US intervention in the Koreas. It also places a major emphasis on the kind of joint exercises that support a US strategy based on partnership, rather than reliance on US forces.

At the same time, it is clear that the "rebalancing" of US forces to Asia will not mean a major military buildup in forward deployments. The overall capabilities of US forces will improve in spite of currently planned cuts in the total US defense effort. These points tend to be lost in the debate over US defense spending, but in many ways the current cuts really reflect the fact the US is adjusting its force posture as most combat forces have left Afghanistan, placing a new emphasis on regional partners and more attention on high technology forces and air and sea power.

Depending on both the global strategic situation and U.S. defense budgets, the primary focus of US rebalancing will be to improve its air and sea capabilities to support its allies. The Air Force will make major improvements in Strike fighter capabilities, stealth, ISR, and seek a new manned bomber.

The Navy plans to keep some 52 ships forward deployed in the PACOM area and slowly increase the number in future years. The IISS reported that "the current plan is to base ten of the planned 32 Littoral Combat Ships in the region, four of which will be in Singapore on a rotational basis. A fourth nuclear-powered attack submarine will deploy to Guam in FY15. Also

expected in 2015 is the deployment of amphibious-assault ship USS Wasp with a squadron of F-35Bs. Navy forces in Japan will also be reinforced by two BMD [ballistic missile defense] capable destroyers in FY17, while 7th Fleet will also receive the first Zumwalt-class destroyer, expected to commission in FY16.”¹³⁴⁰ A 2016 IISS report noted that the delivery of the first Zumwalt-class destroyers was delayed, but should still proceed within the year.¹³⁴¹ The US planned to reduce total US Army and Marine Corps forces to pre-2001 levels over the coming years while planning to increase presence around the Pacific Rim.¹³⁴²

Figure VIII.11: US Total Force Plans, FY2016-FY2017

Active Manning (in thousands)

Service	FY 2016 Estimate ^{1/}	FY 2017	Delta FY16 - FY17
Army	475.0	460.0	-15.0
Navy	327.3	322.9	-4.4
Marine Corps	182.0	182.0	--
Air Force	317.0	317.0	--
TOTAL^{2/}	1,301.3	1,281.9	-19.4

Reserve Forces (in thousands)

Service	FY 2016 Estimate ^{1/}	FY 2017	Delta FY16 - FY17
Army Reserve	198.0	195.0	-3.0
Navy Reserve	57.4	58.0	+0.6
Marine Corps Reserve	38.9	38.5	-0.4
Air Force Reserve	69.2	69.0	-0.2
Army National Guard	342.0	335.0	-7.0
Air National Guard	105.5	105.7	+0.2
TOTAL	811.0	801.2	-9.8

Total Forces

Service	FY 2016	FY 2017	Delta FY16- FY17
Army Active			
Brigade Combat Teams (BCT)	30	30	-
Combat Aviation Brigades (CAB)	11	11	-
Army National Guard			
BCT	28	26	-2
CAB/Aviation Restructure Initiative	8	8	-
Army Reserve			
CAB/Theater Aviation Brigade	2	2	-
Navy			
Number of Ships	280	287	+7
Carrier Strike Groups	11	11	-
Marine Corps Active			
Marine Expeditionary Forces	3	3	-
Infantry Battalions	24	24	-
Marine Corps Reserve			
Marine Expeditionary Forces	-	-	-
Infantry Battalions	8	8	-
Air Force Active			
Combat Coded Squadrons	40	41	+1
Aircraft Inventory (TAI)	4,031	4,056	+25
Air Force Reserve			
Combat Coded Squadrons	3	3	-
Aircraft Inventory (TAI)	332	326	-6
Air National Guard			
Combat Coded Squadrons	21	20	-1
Aircraft Inventory (TAI)	1,093	1,090	-3

Source: Adapted from OSD Comptroller, *FY2017 DoD Budget Request Overview*,
http://comptroller.defense.gov/Portals/45/Documents/defbudget/fy2017/FY2017_Budget_Request_Overview_Book.pdf

The Pace of U.S. Modernization

The US is still by far the largest spender of military forces. The IISS estimated that the U.S. spent \$597.5 billion on military forces in 2015 versus \$145.8 billion for China, \$65.6 billion for Russia, \$56.2 billion for the UK, \$46.8 billion for France, \$41 billion for Japan, and \$33.5 billion for South Korea.¹³⁴³ (The IISS states there are too little data to make an estimate for the DPRK).

The proposed levels of US investment in military modernization are shown in **Figure VIII.12**, and would still lead the world in terms of total modernization. If Congress largely accepts the President's proposals, the plans will not halt the US rebalancing to Asia or stop the US from modernizing key elements of its forces that directly affect the Korean balance and US capabilities in the rest of Asia. The broader political battles over the size of the entire U.S. federal budget and tax revenues have, however, led the U.S. to slow its pace of military modernization through program cuts, delaying the arrival times of new equipment, and cutting the size of total future buys.

OSD Comptroller describes the pace of US modernization investment in the FY2017 budget as follows:¹³⁴⁴

The Department's Science and Technology (S&T) Program's mission is to invest in and develop capabilities that advance the technical superiority of the U.S. military to counter new and emerging threats. The overall FY 2017 base budget S&T funding request for the Army, Navy, Air Force, and Defense Agencies is approximately \$12.5 billion, which is 2.4 percent of the Department's \$523.9 billion base budget. The FY 2017 request is slightly lower than the FY 2016 enacted level of \$13.0 billion for continued S&T focus on the rebalance of forces from Iraq and Afghanistan to the Asia Pacific region, and towards promising technologies to counter other nations' development of anti-access/area-denial capabilities.

The following changes in US modernization efforts will affect missile defense capabilities, although it is far from clear that the end result will not lead to more solid and effective modernization efforts:¹³⁴⁵

(BMD) capabilities to support the Administration's commitment to protect the U.S. homeland, deployed forces, allies, and partners. The FY 2017 budget request for missile defense is \$9.1 billion, which includes \$7.5 billion for the Missile Defense Agency and reflects a decrease of \$.7 billion below the FY 2016 enacted level of \$9.8 billion.

For homeland defense, the FY 2017 budget request maintains the commitment to increase the number of deployed Ground-Based Interceptors (GBI) to 44 (by delivering an additional 14 interceptors over the FY 2016 level of 30 fielded interceptors); continue development of the Redesigned Kill Vehicle (REKV); and proceed with the development of the Long-Range Discrimination Radar (LRDR). When combined with the planned GBI reliability, system engineering, and discrimination improvements, these enhancements will enable the missile defense system to deal effectively with the Intercontinental Ballistic Missile (ICBM) threat from North Korea and a potential ICBM threat from Iran.

The FY 2017 budget request also reflects the Department's commitment to building the regional missile defense forces that are interoperable with the North Atlantic Treaty Organization (NATO) Air Command and Control and Patriot Systems, Israeli Arrow and Patriot Weapon Systems, and Japan Aerospace Defense Ground Environment (JADGE), and Aegis Weapon Systems and SM-3 interceptors deployed by international partners.

The Department continues to support the European Phased Adaptive Approach (EPAA), which is designed to protect U.S. deployed forces and allies in Europe from ballistic missile attacks from the Middle East. The FY 2017 budget request supports the implementation of Phase 3 of the EPAA, to include the deployment of Aegis Ashore to Poland in the FY 2018 timeframe. The Aegis Ashore will be capable of launching Standard Missile-3 (SM-3) Blocks IA, IB, and IIA (delivery in 2018) variants.

The FY 2017 budget request also:

- Provides additional funding for key capabilities to meet the maturing threat from North Korean ICBMs and the potential threat from Iranian ICBMs, including GBI reliability and system engineering enhancements, GBI modifications to address the root causes of previous flight test failures, and operation of the Sea-Based X-band radar;
- Provides funding for advanced technologies to meet the future threat, including discrimination improvements, directed energy research, and multiple kill technologies;
- Provides funding for Terminal High Altitude Area Defense (THAAD) concept development and risk reduction activities for follow-on capabilities; and procures 24 THAAD interceptors in FY 2017;
- Procures 85 new Missile Segment Enhancement (MSE) missiles. The MSE is a significant evolutionary improvement over the Patriot Advanced Capability-3 (PAC-3) missile, and provides greater agility and lethality;
- Continues U.S. contributions to the Iron Dome system to defeat short-range missiles and rockets; continues support for the Arrow Weapon System, Israeli Upper Tier Interceptors, and the David's Sling Weapon System; and
- Continues conversion of Aegis ships to provide BMD capability and procures 35 SM-3 Block IB missiles to be deployed on Aegis BMD ships and at the Romania Aegis Ashore site.

While the US is cutting back in areas that affect the Korean balance and its total power projection capabilities, it is also now focusing on the kind of force structure, modernization, and readiness that affect its ability to both fight on the Korean Peninsula and project power in Northeast Asia. The US will also continue several key areas of modernization that will significantly increase its power projection capabilities.¹³⁴⁶

The Air Force's FY 2017 budget request is designed to preserve combatant commander requirements in support of the defense strategy. The Secretary of the Air Force's priorities of taking care of people, striking the right balance between today's readiness and future modernization, and making every dollar count continue to serve as the foundation for the FY 2017 budget request. The Air Force's FY 2016 budget request was built to invest in critical capabilities and restore capacity to meet the combatant commanders' most urgent requirements. In FY 2017, the Air Force again seeks to balance capability, capacity, and readiness while investing in modernization and recapitalization at the funding levels required to support the defense strategy. The FY 2017 budget request of \$166.9 billion (\$151.1 billion base; \$15.8 billion OCO) is informed by current geopolitical conditions and restores some capacity, funds readiness to executable levels, and makes additional investments in nuclear, space, cyber, command and control, and intelligence, surveillance, and reconnaissance (ISR) capabilities. The FY 2017 budget request seeks to build and maintain an Air Force that is capable of executing its core missions against future high-end threats and is ready for the full range of military operations. Airmen bring to the nation's military portfolio five interdependent and integrated core missions: (1) air, space, and cyber superiority; (2) ISR; (3) rapid global mobility; (4) global strike; and (5) command and control. While the methods for executing these missions have changed over time, the core missions have not fundamentally differed since the Air Force's inception.

The Army continues to meet the priorities in the National Security Strategy (NSS) and the National Military Strategy (NMS) with a trained and ready Army while transitioning to a smaller fighting force that seeks to increase lethality by balancing capacity, capability, and readiness. The principle purpose of the Army remains to preserve the nation's freedom by fighting and winning wars. The Army of today, under diminishing resources, faces an increasingly uncertain global security environment. To remain an effective instrument of the nation's military power will require intense planning and difficult decisions. Accordingly, to fulfill the security demands of the nation, in FY 2017, the Army will prioritize readiness, focus investment in key modernization programs, and ensure Soldiers receive the support required to sustain the world's greatest Army. As the Army approaches a total end strength of 980,000 (AC 450,000/ARNG 335,000/USAR 195,000) Soldiers by FY 2018, it must constantly assess threats, operational tempo and associated impacts on the health and viability of the force. The Army must preserve both the capability to respond to unforeseen demands and the capacity to sustain high levels of readiness in the force to meet current global requirements. In the past year, the Army developed and implemented the Army Operating

Concept, “Win in a Complex World,” to manage as the Army continues to downsize. The foundation of the Army Operating Concept is the ability to conduct combined arms maneuver. The Army Operating Concept endeavors to build a force, operating alongside many partners, able to respond to multiple adversarial dilemmas while providing commanders synchronizing and integrating options and effects from various domains. The Army Operating Concept envisions an Army that is expeditionary, tailorable, scalable, and prepared to meet the changing challenges of the global environment. The Army Operating Concept sets the foundation upon which leaders can focus the efforts and resources needed to maintain the strategic and operational flexibility to deter and operate in multiple regions simultaneously — in all phases of military operations — to prevent conflict, shape the security environment, and win wars now and in the future. Nevertheless, fiscal challenges strain the Army’s ability to meet NMS requirements and bring into balance readiness, modernization, and end strength. Operating in a fiscally constrained environment adds significant risk to the Army’s ability to satisfy its 2014 Quadrennial Defense Review obligations and fulfill its national security requirements. Although the Bipartisan Budget Acts of 2013 (BBA13) and 2015 (BBA15) provided two 2-year windows of fiscal predictability above the sequestration funding levels, funding in the second year of each act has been markedly lower than the initial program. A predictable and consistent fiscal topline is integral to prudent, resourced informed decision-making. (8-1)

The FY 2017 budget request balances current readiness needed to execute assigned missions while sustaining a highly capable fleet and allows the Department of the Navy (DoN) to take calculated risk in balancing today’s requirements and those required to counter emerging threats. In the near term, there are gaps in training and maintenance that create readiness risks in the event of a major contingency. In the longer term, there are also risks associated with a dynamic and increasingly dangerous security environment, especially as potential adversaries develop greater military capability, and smaller forces strain to handle multiple simultaneous contingencies. This budget reflects a Future Years Defense Program (FYDP) from 2017 to 2021 of \$826.4 billion in the base budget, \$1.6 billion higher than the FYDP presented with the FY 2016 budget; the FY 2017 budget for the DoN is \$155.4 billion, a decrease of \$8.2 billion (5 percent) from the FY 2017 plan in the FY 2016 budget request. The OCO request for FY 2017 is \$9.5 billion.

The FY 2017 budget request supports the construction funding for 38 ships across the FYDP. Providing stability in shipbuilding to affordably deliver warfighting requirements, the budget supports steady production of destroyers and submarines; ten destroyers and nine submarines are constructed through FY 2021. The FYDP shipbuilding construction program also includes funding for the Ohio Replacement Program Advanced Procurement beginning in FY 2017, one LHA amphibious assault ship replacement, four T-AO(X) fleet oilers, and continued funding for the refueling and overhaul of USS GEORGE WASHINGTON (CVN 73). The FY 2017 budget request also funds two littoral combat ships (LCS) and continues to finance the detailed design and construction of the second Ford Class aircraft carrier and provides the second year of Advanced Procurement for the third.

The budget supports a balanced manned and unmanned aviation procurement plan of 476 aircraft over the FYDP. The successful testing of the carrier variant (CV) of the F-35 Joint Strike Fighter (JSF) on USS NIMITZ (CVN-68) in 2014 followed by the successful operational testing of the short take off and vertical landing (STOVL) variant on the USS WASP (LHD-1) in 2015 continues JSF program progression. The F-35B reached initial operational capability in July 2015 with a squadron of 10 ready for deployment worldwide. The DoN will procure 161 JSF aircraft of both Navy and Marine Corps variants across the FYDP. The Marine Corps invests heavily in rotary wing aircraft, accelerating the procurement of the final 78 AH-1Z-1/UH-1Y Cobra helicopters, and procuring 24 MV-22 Ospreys. The first 24 Navy V-22 Carrier Onboard Delivery (COD) aircraft will be procured starting in FY 2018. Investment in unmanned systems includes 19 MQ 4 Triton Unmanned Aircraft Systems through FY 2021, with first deployment to the Pacific in FY 2017, and the procurement of 9 MQ-8C Vertical Takeoff Unmanned Aircraft Systems. Aviation investments in the FYDP also include procurement of airborne early warning aircraft (23 E-2D), presidential helicopters (17 VH-92A), heavy lift helicopters (40 CH-53K), aerial refueling tankers (10 KC-130J), and the final 30 P-8A Poseidon multi-mission maritime aircraft.

The FY 2017 budget request funds an FY 2017 fleet of 272 Battle Force Ships. As with the FY 2016 request, this budget funds baseline and OCO flight hours for the Navy and Marine Corps to deploy at a 2.0 T-rating, which indicates the Aviation Training and Readiness (T&R) score for requirements and resources. Ship depot maintenance is funded to 70 percent in the base budget and 100 percent with OCO. Aviation

depot maintenance is funded to capacity at the Fleet Readiness Centers, 85 percent of the total requirement in base plus OCO funding (76 percent in base). Marine Corps ground equipment maintenance is funded in base plus OCO at 79 percent of requirement. The FY 2017 base budget request funds sustainment of Navy and Marine Corps shore facilities at 70 percent.

To provide the required ability to deter aggression and respond to emerging security threats - including extremist organizations, pandemic diseases and natural disasters — the sea services must maintain the proper force strength. Both the Navy and Marine Corps are on path to align with the force structure required by strategy, following periods of reduction. The Navy has drawn down from 383,000 in FY 2002 and will end the FYDP at 323,100. The Marine Corps is coming down from a peak of 202,000 in FY 2009 to a sustained level of 182,000 in FY 2017 and beyond. The Marines have returned to their expeditionary roots, with an enhanced ability to operate from sea. Civilian personnel levels will slightly increase, strongly supporting the force as engineers, scientists, medical professionals and skilled laborers.

The DoN remains challenged to meet combatant commander demands for forces and associated higher-than-planned operational tempo over the past decade while dealing with constrained funding levels. The capacity to surge forces has decreased due to high operating tempo and deferred maintenance, a reduction in aircraft and weapons procurement, and risks taken against support infrastructure. This budget continues to put a priority on readiness while maintaining the minimum investment necessary to maintain an advantage in advanced technologies and weapons systems. While the DoN has accepted some risk in weapons capacity and delayed certain modernization programs, this budget request provides a plan to keep the Navy and Marine Corps as a ready, balanced force. The DoN prioritizes investments in modernization efforts to recapitalize the forces and maintain an effective, safe, and secure nuclear deterrent, including weapons and systems to enhance reliability and survivability of the nuclear strike capability and C2 networks.

Overall, the DoN's investments in readiness and infrastructure in the FY 2017 budget request are essential to generating the combat ready forces that support the DoD rebalance to the Asia-Pacific and enable critical presence in the strategic maritime crossroads that span the Middle East, Europe, Africa, the Western Pacific, and South America.)

It is also important to note that the US is stressing a far higher degree of partnership with key allies like the ROK and Japan. It is also focusing on IS&R, air and sea power projection capabilities, and Special Forces that can reinforce partners like the ROK rather than trying to fight a war by relying on US forces.

This increased reliance on partners does increase some risks, but it also reflects the underlying realities of the Korean balance. Unless the US deployed most of its ground forces to Korea, it would face major time problems in deploying massive ground reinforcements to the Peninsula.

Past US plans called for a ground force build-up that took more time than most scenarios allow. While increased reliance on partnership, ISR, stealth, and precision strike have their limits, they also offer the ability to rapidly support a key ally, increase deterrence in the areas where the DPRK has been most provocative, and offset the DPRK's advantages along the DMZ relative to the location of Seoul and other key Korean population and economic centers by creating a US deep strike capability that the DPRK cannot defend against or match.

This also does not mean that the US will not have to adapt to any changes in DPRK forces that involve further major increases in its deployments near the border or ground attack capabilities, or the overall mix of forces that might be deployed if China intervened on the DPRK's behalf. At the same time, the ROK is now capable of supporting the conventional forces needed to deal with the DPRK threat and assume the lead in the US-ROK partnership.

Figure VIII.12: US Military Investment Spending

	FY 2016 Enacted	FY 2017 Request	Change
Aircraft and Related Systems	50.6	45.3	-5.3
C4I Systems	7.1	7.4	0.3
Ground Systems	9.9	9.8	-0.1
Missile Defense Programs	9.1	8.5	-0.6
Missiles and Munitions	12.7	13.9	1.2
Mission Support	52.9	52.4	-0.5
Science & Technology (S&T)	13.0	12.5	-0.5
Shipbuilding and Maritime Systems	27.5	27.0	-0.5
Space-Based Systems	7.0	7.1	0.1
Rescissions	-1.8	-	+1.8
Total	188.0	183.9	-4.1

Source: Adapted from OSD Comptroller, *FY2017 DoD Budget Request Overview*,
http://comptroller.defense.gov/Portals/45/Documents/defbudget/fy2017/FY2017_Budget_Request_Overview_Book.pdf

US Budgetary Concerns

The US is a key ally of both Korea and Japan and would become involved in any military conflict that occurred on the Korean Peninsula – as the increased US military equipment sent to the region in March and April of 2013 in response to North Korean threats has shown. The US is, however, cutting its military expenditures as a response to the economic crisis that began in 2008 as well as cutting its forces in a post-Afghanistan and post-Iraq atmosphere of budget constraints and reduced spending.

Some US allies and regional partners are worried about the future US ability to maintain its current force levels and “rebalance” its military posture in Asia. US defense economics and military spending trends have become important not only as a measure of the force levels the US can commit to the Koreas and the Asia-Pacific region, but also as a measure of US capability to reassure its allies and deter potential enemies.

It is difficult to put these concerns in perspective. The US budget submission for FY2017 indicates that the US can fund effective forces for Asia, but only a global basis. This does, however, require a far more efficient use of resources by the US Department of Defense. It also requires the Congress to support President Obama’s request for higher defense spending levels that are currently authorized by the acts shaping US legislation on sequestration and future US defense spending ceilings.

Pressure on the US Economy: A CIA Assessment

It is interesting to compare the CIA assessment of the US economy to the assessments of the other economies that shape the Korean balance.¹³⁴⁷

The US has the most technologically powerful economy in the world, with a per capita GDP of \$54,800. US firms are at or near the forefront in technological advances, especially in computers, pharmaceuticals, and medical, aerospace, and military equipment; however, their advantage has narrowed since the end of World War II. Based on a comparison of GDP measured at Purchasing Power Parity conversion rates, the US economy in 2014, having stood as the largest in the world for more than a century, slipped into second place behind China, which has more than tripled the US growth rate for each year of the past four decades.

In the US, private individuals and business firms make most of the decisions, and the federal and state governments buy needed goods and services predominantly in the private marketplace. US business firms enjoy greater flexibility than their counterparts in Western Europe and Japan in decisions to expand capital plant, to lay off surplus workers, and to develop new products. At the same time, businesses face higher barriers to enter their rivals' home markets than foreign firms face entering US markets.

Long-term problems for the US include stagnation of wages for lower-income families, inadequate investment in deteriorating infrastructure, rapidly rising medical and pension costs of an aging population, energy shortages, and sizable current account and budget deficits.

The onrush of technology has been a driving factor in the gradual development of a "two-tier" labor market in which those at the bottom lack the education and the professional/technical skills of those at the top and, more and more, fail to get comparable pay raises, health insurance coverage, and other benefits. But the globalization of trade, and especially the rise of low-wage producers such as China, has put additional downward pressure on wages and upward pressure on the return to capital. Since 1975, practically all the gains in household income have gone to the top 20% of households. Since 1996, dividends and capital gains have grown faster than wages or any other category of after-tax income.

Imported oil accounts for nearly 55% of US consumption and oil has a major impact on the overall health of the economy. Crude oil prices doubled between 2001 and 2006, the year home prices peaked; higher gasoline prices ate into consumers' budgets and many individuals fell behind in their mortgage payments. Oil prices climbed another 50% between 2006 and 2008, and bank foreclosures more than doubled in the

same period. Besides dampening the housing market, soaring oil prices caused a drop in the value of the dollar and a deterioration in the US merchandise trade deficit, which peaked at \$840 billion in 2008. Because the US economy is energy-intensive, falling oil prices since 2013 have alleviated many of the problems the earlier increases had created.

The sub-prime mortgage crisis, falling home prices, investment bank failures, tight credit, and the global economic downturn pushed the US into a recession by mid-2008. GDP contracted until the third quarter of 2009, making this the deepest and longest downturn since the Great Depression. To help stabilize financial markets, the US Congress established a \$700 billion Troubled Asset Relief Program (TARP) in October 2008. The government used some of these funds to purchase equity in US banks and industrial corporations, much of which had been returned to the government by early 2011. In January 2009, Congress passed and President Barack OBAMA signed a bill providing an additional \$787 billion fiscal stimulus to be used over 10 years - two-thirds on additional spending and one-third on tax cuts - to create jobs and to help the economy recover. In 2010 and 2011, the federal budget deficit reached nearly 9% of GDP. In 2012, the Federal Government reduced the growth of spending and the deficit shrank to 7.6% of GDP. US revenues from taxes and other sources are lower, as a percentage of GDP, than those of most other countries.

Wars in Iraq and Afghanistan required major shifts in national resources from civilian to military purposes and contributed to the growth of the budget deficit and public debt. Through 2014, the direct costs of the wars totaled more than \$1.5 trillion, according to US Government figures.

In March 2010, President OBAMA signed into law the Patient Protection and Affordable Care Act, a health insurance reform that was designed to extend coverage to an additional 32 million Americans by 2016, through private health insurance for the general population and Medicaid for the impoverished. Total spending on healthcare - public plus private - rose from 9.0% of GDP in 1980 to 17.9% in 2010.

In July 2010, the president signed the DODD-FRANK Wall Street Reform and Consumer Protection Act, a law designed to promote financial stability by protecting consumers from financial abuses, ending taxpayer bailouts of financial firms, dealing with troubled banks that are "too big to fail," and improving accountability and transparency in the financial system - in particular, by requiring certain financial derivatives to be traded in markets that are subject to government regulation and oversight.

In December 2012, the Federal Reserve Board (Fed) announced plans to purchase \$85 billion per month of mortgage-backed and Treasury securities in an effort to hold down long-term interest rates, and to keep short term rates near zero until unemployment dropped below 6.5% or inflation rose above 2.5%. In late 2013, the Fed announced that it would begin scaling back long-term bond purchases to \$75 billion per month in January 2014 and further reduce them as conditions warranted; the Fed ended the purchases during the summer of 2014. In 2014, the unemployment rate dropped to 6.2%, and continued to fall to 5.5% by mid-2015, the lowest rate of joblessness since before the global recession began; inflation stood at 1.7%, and public debt as a share of GDP continued to decline, following several years of increases.

Pressures on US Defense Spending through FY2017

For several years, these pressures have led to cuts in US spending plans and led the US to rethink the best ways to reduce spending while maintaining a capable force. An IISS analysis published in early 2015 described the US defense budgetary issues as having three themes:¹³⁴⁸

Firstly, near-term US defence-spending plans seemed to stabilize in 2014 after several years of budgetary uncertainty, with the base budget avoiding sequestration and settling at real-terms levels higher than those seen during previous defence drawdowns.

Secondly, the Pentagon seemed to have brought its plans in line with statutory spending caps, despite considerable political rhetoric in Congress about the dangers of lower defence-spending levels.

Thirdly, the war-related budget looked set to remain in place to fund overseas operational requirements (despite the downscaling in Afghanistan operations for which it was initially created), but with a broader and more flexible interpretation than had been used in previous years. This could potentially open up a second, semi-permanent budget line to channel defence funding, which may in future be used to offset statutory pressures on the base budget.

As a result of spending pressures, the US Army plans to reduce its Active Component from the proposed 490,000 troop level in FY2015 to 450,000 by the end of FY2018. The Army warned Congress in its FY 2016 Budget Request that if the fiscal austerity measures from the Budget Control Act of 2011 return, then the Army will be forced to reduce troop levels to 420,000. Likewise, the Marines will contract from 184,100 to 182,000 by the end of FY2017 and warns that if sequester level funding returns then they will be forced to reduce to an end-strength of 175,000.¹³⁴⁹

While these reductions were avoided, the U.S. Department of Defense Overview of the FY2017 budget request notes that:¹³⁵⁰

The Bipartisan Budget Act of 2015 provided the Department with an FY 2016 base budget that grew by \$26 billion, the largest increase during this Administration, and also provided some funding stability for FY 2017, although in both cases the Department received fewer resources than required. As a result of this agreement, the Department can make key investments to address priority threats.

However, unless Congress acts, annual sequestration cuts are set to return after FY 2017. To protect the nation's security interests within the constraints imposed by the national imperative to reduce the deficit, and to maintain the U.S. military's competitive advantages in facing future threats, the FY 2017 budget request proposes a Defense base budget of \$523.9 billion. The base budget request is approximately \$2.2 billion above the Department's FY 2016 enacted appropriations.

Outside sources draw similar conclusions. In its review of the US Army, a 2016 IISS report on U.S. force developments notes that the Army has finalized almost all of the deactivations and reassignments initially revealed in 2013. This has included the deactivation of eleven brigade combat teams (BCTs), a combat aviation brigade, an artillery brigade, the final two active maneuver enhancement brigades, and two engineer brigades.

However, another round of deactivations and reassignments was called for in the FY16 presidential budget. Specifically, two more BCTs would be converted into "battalion-sized maneuver battle groups", a third based in Hawaii would relinquish its Stryker armored vehicles and become an infantry formation, the Strykers would be transferred to a Washington National Guard BCT as its heavy armor was shipped to Europe, and the 12th Combat Aviation Brigade would be stripped of its "organic assets" while becoming an HQ for rotating US aviation deployments.

While most regular-army BCTs have reorganized themselves with a three-combat-battalion structure as planned, National Guard reorganization has faced more political resistance and is proceeding much more slowly. Likewise, the plan to replace the OH-58D Kiowa Warrior recon helicopter with a combination of the AH-64 Apache helicopter and RQ-7 Shadow UV has only been completed by one Army Aviation battalion.

Budget concerns have also impacted the Army's vehicle development programs. The Joint Light Tactical Vehicle, intended to replace numerous HMMWVs with a design from Oshkosh Defense, has been put on hold due to a complaint from Lockheed Martin. Furthermore, the Army Combat Vehicle Modernization Strategy, which is intended to refurbish or replace aging army vehicles, now acknowledges that the Future Fight Vehicle meant to replace the Bradley armored vehicle is now unlikely to start till the next decade due to current funding levels.¹³⁵¹

The U.S. Department of Defense Overview of the FY2017 budget summarized the impact of the Navy budget. It noted that the Navy (including Marines and Coast Guard), announced a new strategy accounting for the development of A2AD capabilities. It called for achieving "all

domain access” by dominating cyberspace, space, and the electromagnetic spectrum with recent technological advances, “practically in the cyber and directed energy weapons”.

Funding for long-term shipbuilding and equipment development has been a source of debate, with particular concern that the Ohio Replacement Program, meant to field new ballistic missile submarines, might derail other shipbuilding programs. The Navy has recently increased its force goal to 308 ships, with the addition of two amphibious ships. Furthermore, the delivery of the first round of Zumwalt-class destroyers was delayed till the first half of 2016, with the potential of the third class being cancelled all together.

The Navy’s small surface ship combatant role is planned to be filled by the Littoral Combat Ship (LCS). Hulls 33-52 are to be completed with additional improvements to the original design and will be classified as frigates. These will replace the Oliver Hazard Perry frigates, which are scheduled to be decommissioned.

The Gerald R. Ford-class aircraft carrier program has also come under scrutiny due to its cost increases and delays. While there is an alternative carrier study being conducted, the Navy has already awarded the contract for the second Ford-class carrier (the USS John Kennedy) at a \$12 billion price tag. This is following the 2015 return to an 11-carrier force. The Navy has also received its first Afloat Forward Staging Base, designed to enhance power projection and presence in low threat environments, while the F-35B reached its initial operational capability (IOC) mark. The Navy plans for the F-35C to reach that milestone in 2018, and has retired its last EA-6B Prowler aircrafts.¹³⁵²

Meanwhile, the Air Force has been forced to balance the maintenance of its ageing fleet with acquiring new systems, all in the face of budget uncertainty. It is looking to replace its E-8A/B Joint Surveillance Target Attack Radar System, the E-3 Airborne Warning and Control System, the T-38 Talon Jet Fighter, and the EC-130 EW aircraft.

Its most significant equipment projects include the Long Range Strike Bomber, the KC-46A Pegasus Tanker, and the F-35 Joint Strike Fighter. The F-35A has reached its planned IOC in August 2016.¹³⁵³ Unfortunately, the KC-46A tanker is currently delayed, with the initial delivery of 18 aircraft now scheduled for August 2017.

The Air Force has also been faced with a shortfall in UAV operators, resulting in a reduction of operational UAV “orbits”. The USAF also conducted a study of UAVs operating in contested environments, exploring how current and future systems could deal with airspaces featuring more advanced air defenses or opposing aircraft.¹³⁵⁴

Ongoing Cuts but Still Funding the World’s Largest Military Power

The future impact of potential budget and sequestration cuts should not be exaggerated if the Congress supports the funding levels laid out in President Obama’s FY2017 budget proposal and FY2016-FY2020 Future Year Defense Plan (FYDP). As **Figure VIII.14** shows, the projected levels of US spending will remain extremely high by global standards and by those of the other powers that shape the Korean balance. The FY2016 budget request had called for all the cuts laid out in the sequestration legislation, set to begin once more in FY2016 if Congress did not change it, because the President sought to ease the pressure on defense spending through other measures like cuts in entitlement spending and additional tax revenues.¹³⁵⁵

The Department’s fiscal environment remains uncertain. Beginning in Fiscal Year (FY) 2013, the Department began a \$487 billion, 10-year reduction in spending, compared to the projections in the FY

2012 budget, to adhere to spending limits established by the Budget Control Act (BCA) of 2011. The subsequent failure of the Joint committee on Deficit Reduction resulted in a sequestration mechanism that triggered annual reductions to the discretionary caps established in the BCA.

In FY 2013, as a result of sequestration, the DoD base budget was reduced by \$30 billion from the original base budget request. The Bipartisan Budget Act of 2013 amended the BCA to provide modest relief from sequestration in FY 2014 and 2015 but, unless Congress acts, annual sequestration cuts are set to begin once more in FY 2016.

To protect the nation's security interests while maintaining the national security imperative of deficit reduction, the President's Budget proposes a Defense budget approximately \$36 billion above the sequestration level in FY 2016, and about \$155 billion above estimated sequestration levels over a 5-year period, to provide a balanced and responsible path forward. The base budget request is approximately \$38.2 billion above the Department's FY 2015 enacted appropriations.

There is no way to predict the outcome. The US is now debating and revising every aspect of its strategy and defense plans as part of the far broader debate over US government spending that could take place regarding sequestration and the final shape of the FY2017 budget and outyear plans. **Figure VIII.10** does, however, show the broad trends in US forces in the President's budget submission for 2017.

Figure VIII.13: US Military Spending

Total Spending: FY2001 to FY2016

(\$ in billions)	FY 2001	FY 2002	FY 2003	FY 2004	FY 2005	FY 2006	FY 2007	FY 2008	FY 2009
Base	287.4	328.2	364.9	376.5	400.1	410.6	431.5	479.0	513.2
OCO	22.9	16.9	72.5	90.8	75.6	115.8	166.3	186.9	145.7
Other*	5.8	--	--	0.3	3.2	8.2	3.1	--	7.4
Total	316.2	345.1	437.5	467.6	478.9	534.5	600.9	665.9	666.3

(\$ in billions)	FY 2010	FY 2011	FY 2012	FY 2013	FY 2014	FY 2015	FY 2016	FY 2017
Base	527.9	528.2	530.4	495.5	496.3	497.3	521.7	523.9
OCO	162.4	158.8	115.1	82.0	84.9	63.0	58.6	58.8
Other*	0.7	--	--	0.1	0.2	0.1	--	--
Total	691.0	687.0	645.5	577.6	581.4	560.4	580.3	582.7

*Other non-war supplemental funding

Numbers may not add due to rounding

Baseline (minus OCO) Spending: FY2017 to FY2021

Current \$ in Billions	FY 2017	FY 2018	FY 2019	FY 2020	FY 2021	FY17-FY21 TOTAL
FY 2016 PB	547.3	556.4	564.4	570.0	581.4	2,819.5
Change	-23.4	0.3	0.5	0.4	3.8	-18.5
FY 2017 PB	523.9	556.7	564.8	570.4	585.2	2,801.1
CORRECTION: (2-9-2016)						
FY17 PB % Real Change	-1.1%	+4.2%	-0.5%	-1.0%	+0.5%	+0.4%

*Average annual real growth of the FY 2017 President's Budget for FY 2017-FY 2021.

Numbers may not add due to rounding.

Source: Adapted from OSD Comptroller, *FY2017 DoD Budget Request Overview*,
http://comptroller.defense.gov/Portals/45/Documents/defbudget/fy2017/FY2017_Budget_Request_Overview_Book.pdf

IX. The Broader Balance of Missile, WMD, and Strategic Forces

It is unclear that China and the US will ever directly confront each other in a conflict in the Koreas, but both countries are developing a mix of new conventional missile, precision strike, nuclear-armed missile, nuclear weapon, and space warfare capabilities that have a major impact on the balance in the Koreas, Northeast Asia, and the entire Pacific region.

The interactions between these forces are growing steadily more complex and cannot be separated from the other patterns of force modernization. Like the differences between “conventional” and “asymmetric” warfare, the differences between conventional precision strikes and nuclear strikes can also be exaggerated; both can be involved as elements in deterrence, limiting escalation, or a nuclear-conventional conflict.

Any assessment of the balance in the Koreas and Northeast Asia must consider Chinese and US cooperation to avoid any confrontation or conflict that could escalate to the use of such forces, the potential impact that a DPRK-ROK use of missile and WMD forces could have on Chinese and US tension and escalation, and the impact that US rebalancing and Chinese emphasis on sea-air-missile capabilities for A2AD can have under worst case conditions.

Both China and the US have every strategic and economic reason to show restraint, negotiate, and avoid such worst case scenarios. Cooperation will not be easy, but the following analysis makes it all too clear that every effort needs to be made to avoid repeating the mistakes that drove the US and China into the Korean War and the “worst case” miscalculations that led to World War I and World War II. Even some Asian repetition of the Cold War, and even one limited to conventional air and missile combat, would be a costly tragedy of incredible proportions.

China’s Evolving Force Mix and Strategy

The US has long been a power with extensive conventional precision-strike, space-based, and nuclear capabilities. China, however, is rapidly modernizing and expanding its capabilities in all these areas. China does formally oppose all forms of nuclear, biological, and chemical proliferation in the Koreas. Its 2010 White Paper states that,¹³⁵⁶

China firmly opposes the proliferation of weapons of mass destruction (WMD) and their means of delivery, and consistently deals with non-proliferation issues in a highly responsible manner. China maintains that, in order to prevent proliferation at source, efforts should be made to foster a global and regional security environment featuring mutual trust and cooperation, and the root causes of WMD proliferation should be eliminated. It holds that non-proliferation issues should be resolved through political and diplomatic means. It holds that the authority, effectiveness and universality of the international non-proliferation regime should be upheld and enhanced.

The international community should ensure fairness and prevent discrimination in international non-proliferation efforts, strike a balance between non-proliferation and the peaceful use of science and technology, and abandon double standards. China has joined all international treaties and international organizations in the field of non-proliferation, and supports the role played by the United Nations in this regard, and has conscientiously implemented any relevant resolutions of the UN Security Council.

China advocates resolving the nuclear issue in the Korean Peninsula peacefully through dialogues and consultations, endeavoring to balance common concerns through holding six-party talks in order to realize the denuclearization on the Korean Peninsula and maintain peace and stability of the Korean Peninsula and

the Northeast Asia. China, always considering the whole situation in the long run, painstakingly urges related countries to have more contacts and dialogues in order to create conditions for resuming six-party talks as early as possible...

The 2013 Chinese white paper provided relatively little substantive data on China's policies and strategy regarding the use of nuclear weapons, but did describe China's strategic missile forces as follows,¹³⁵⁷

The PLA Second Artillery Force (PLASAF) is a core force for China's strategic deterrence. It is mainly composed of nuclear and conventional missile forces and operational support units, primarily responsible for deterring other countries from using nuclear weapons against China, and carrying out nuclear counterattacks and precision strikes with conventional missiles. Following the principle of building a lean and effective force, the PLASAF is striving to push forward its informationization transform, relying on scientific and technological progress to boost independent innovations in weaponry and equipment, modernizing current equipment selectively by applying mature technology, enhancing the safety, reliability and effectiveness of its missiles, improving its force structure of having both nuclear and conventional missiles, strengthening its rapid reaction, effective penetration, precision strike, damage infliction, protection and survivability capabilities.

The PLASAF capabilities of strategic deterrence, nuclear counterattack and conventional precision strike are being steadily elevated. The PLASAF has under its command missile bases, training bases, specialized support units, academies and research institutions. It has a series of "Dong Feng" ballistic missiles and "Chang Jian" cruise missiles.

...The PLASAF keeps an appropriate level of readiness in peacetime. It pursues the principles of combining peacetime needs with wartime needs, maintaining vigilance all the time and being ready to fight. It has formed a complete system for combat readiness and set up an integrated, functional, agile and efficient operational duty system to ensure rapid and effective responses to war threats and emergencies. If China comes under a nuclear threat, the nuclear missile force will act upon the orders of the CMC, go into a higher level of readiness, and get ready for a nuclear counterattack to deter the enemy from using nuclear weapons against China. If China comes under a nuclear attack, the nuclear missile force of the PLASAF will use nuclear missiles to launch a resolute counterattack either independently or together with the nuclear forces of other services. The conventional missile force is able to shift instantly from peacetime to wartime readiness, and conduct conventional medium- and long-range precision strikes.

The most striking aspect of the 2013 Defense White Paper was that it not only omitted China's previous commitments to "no first use" of nuclear weapons, but it also omitted any description of the fact China was making major improvements in its nuclear strike capability. China is improving its missile forces, is developing missile defense and counterspace capabilities, and is upgrading its nuclear capabilities in ways that affect the US and Chinese nuclear balance as well as the balance in the Koreas.

In China's 2015 White Paper, the "no first use" doctrine resurfaced, but was accompanied by a repeated call for an improvement to the effectiveness of Chinese missile forces (both nuclear and conventional):¹³⁵⁸

In line with the strategic requirement of being lean and effective and possessing both nuclear and conventional missiles, the PLA Second Artillery Force (PLASAF) will strive to transform itself in the direction of informationization, press forward with independent innovations in weaponry and equipment by reliance on science and technology, enhance the safety, reliability and effectiveness of missile systems, and improve the force structure featuring a combination of both nuclear and conventional capabilities. The PLASAF will strengthen its capabilities for strategic deterrence and nuclear counterattack, and medium- and long-range precision strikes...

The nuclear force is a strategic cornerstone for safeguarding national sovereignty and security. China has always pursued the policy of no first use of nuclear weapons and adhered to a self-defensive nuclear strategy that is defensive in nature. China will unconditionally not use or threaten to use nuclear weapons

against non-nuclear-weapon states or in nuclear-weapon-free zones, and will never enter into a nuclear arms race with any other country. China has always kept its nuclear capabilities at the minimum level required for maintaining its national security. China will optimize its nuclear force structure, improve strategic early warning, command and control, missile penetration, rapid reaction, and survivability and protection, and deter other countries from using or threatening to use nuclear weapons against China.

Growing Chinese Deterrent and A2AD Capabilities

Chinese military analysts publicly explore a wide range of innovative strategies designed to use missile and precision strike forces to deter or limit US military capabilities in the region, although many of these forces are now deployed in ways that focus on Taiwan. China already has conventionally armed missiles with terminal guidance systems and has improved such systems under development, including ballistic anti-ship missiles that pose a long-range strategic threat to US carrier task forces.

As Bonnie S. Glaser, a leading US expert on Chinese military forces, notes, “these strategies are laid out in publications by military academies and scholars on questions of military strategy and doctrine, including multiple editions of *Zhanlue Xue* (The Science of Strategy) and *Zhanyi Xue* (The Science of Campaigns) as well as *Zhanyi Lilun Xuexi Zhinan* (Campaign Theory Study Guide).”¹³⁵⁹

The US DOD puts heavy emphasis on these “anti-access” and “area denial” (A2AD) capabilities – and their potential impact on US power projection capabilities in the Koreas and Northeast Asia – in its annual report on *Military and Security Developments Affecting the People’s Republic of China*. A section from the 2016 report provides a good summary of what Chinese A2/AD capabilities entail.¹³⁶⁰

As China modernizes the PLA and prepares for various contingencies, it continues to develop capabilities that serve to dissuade, deter, or if ordered, defeat possible third-party intervention during a large-scale, theater campaign such as a Taiwan contingency. U.S. defense planners often refer to these collective PLA capabilities as A2/AD, though China does not use this term. China’s military modernization plan includes the development of capabilities to attack, at long ranges, adversary forces that might deploy or operate within the Western Pacific Ocean in the air, maritime, space, electromagnetic, and information domains. As the PLA Academy of Military Science 2013 Science of Strategy states, “we cannot count on luck and must keep a foothold at the foundation of having ample war preparations and powerful military capabilities of our own, rather than hold the assessment that the enemy will not come, intervene, or strike.”

Information Operations. An essential element, if not a fundamental prerequisite, of China’s ability to counter third-party intervention is the requirement to control the information spectrum in all dimensions of the modern battlespace. PLA authors often cite the need in modern warfare to control information—sometimes termed “information blockade” or “information dominance”—and to seize the initiative early in a campaign so as to set the conditions needed to achieve air and sea superiority. China is improving information and operational security to protect its own information structures, and is also developing EW and other information warfare capabilities, including denial and deception. China’s “information blockade” likely envisions the employment of military and non-military instruments of state power across the battlespace, including in cyberspace and space. China’s investments in advanced EW systems, counterspace weapons, and cyberspace operations—combined with more traditional forms of control such as propaganda and denial through opacity—reflect the emphasis and priority China’s leaders place on building capability for information advantage.

Cyber Operations. China believes its cyberspace capabilities and personnel lag behind the rest of the world. To deal with these perceived deficiencies, China is improving training and domestic innovation to achieve its cyberspace capability development goals. PLA researchers advocate seizing “cyberspace superiority” by deterring or stopping an adversary by developing and employing offensive cyberspace capabilities. Chinese offensive cyberspace operations could support A2/AD by targeting critical nodes to disrupt adversary networks throughout the region.

Long-Range Precision Strike. The development of China's conventionally armed missile capability has been extraordinarily rapid. As recently as 10 years ago, several hundred short-range ballistic missiles could reach targets in Taiwan, but China had only a rudimentary capability to strike many other locations within or beyond the first island chain, such as U.S. bases in Okinawa or Guam. Today, however, China is fielding an array of conventionally armed short-range ballistic missiles (SRBMs), as well as ground and air-launched land-attack cruise missiles (LACMs), special operations forces (SOF), and cyber warfare capabilities to hold targets at risk throughout the region. U.S. bases in Japan are in range of a growing number of Chinese MRBMs as well as a variety of LACMs. Guam could also possibly be targeted by air-launched LACMs, as demonstrated by H-6K bomber flights into the Western Pacific for the first time in 2015. At the September 2015 parade, China unveiled the DF-26. This system is capable of conducting intermediate precision strikes against ground targets, which could include U.S. bases on Guam. China's LACM and ballistic missiles have also become far more accurate and are now more capable against adversary air bases, logistic facilities, communications, and other ground-based infrastructure. PLA analysts have concluded that logistics and power projection are potential vulnerabilities in modern warfare, given the requirements for precision in coordinating transportation, communications, and logistics networks.

Ballistic Missile Defense (BMD). China has made efforts to go beyond defense from aircraft and cruise missiles to gain a BMD capability in order to provide further protection of China's mainland and strategic assets. China's existing long-range surface-to-air missile (SAM) inventory offers limited capability against ballistic missiles. New indigenous radars, the JL-1A and JY-27A, are designed to address the ballistic missile threat, with the JL-1A advertised as capable of the precision tracking of multiple ballistic missiles. China's SA-20 PMU2 SAMs, one of the most advanced SAM systems Russia offers for export, has the advertised capability to engage ballistic missiles with ranges of 1,000 km and speeds of 2,800 meters per second. China's domestic CSA-9 long-range SAM system is expected to have a limited capability to provide point defense against tactical ballistic missiles with ranges up to 500 km. China is proceeding with the research and development of a missile defense umbrella consisting of kinetic- energy intercept at exo-atmospheric altitudes (greater than 80 km), as well as intercepts of ballistic missiles and other aerospace vehicles within the upper atmosphere. In January 2010, and again in January 2013, China successfully intercepted a ballistic missile at mid-course, using a ground-based missile. The announced acquisition by China of the S-400 SAM system from Russia could provide China with a counter-MRBM capability depending on which interceptor variants are delivered to China.

Surface and Undersea Operations. China continues to build a variety of offensive and defensive capabilities that could permit the PLA to achieve sea control within what the PLAN calls the "near seas," as well as to project limited combat power into the "far seas." Of these, China's coastal defense cruise missiles (CDCM), air- / surface- / sub-surface launched anti-ship cruise missiles (ASCMs), submarine-launched torpedoes, and naval mines provide the PLAN with an ability to counter an adversary fleet's intervention with multi-axis, high-intensity attacks that increase in lethality as adversary naval combatants approach China's coast. Additionally, China has fielded CSS-5 anti-ship ballistic missiles (ASBMs) specifically designed to hold adversary aircraft carriers at risk 1,500 km off China's coast. China is making gradual progress in the undersea domain as well, but continues to lack either a robust coastal or deep-water anti-submarine warfare capability. It is also unclear whether China has the capability to collect accurate targeting information and to pass it to launch platforms in time for successful strikes in sea areas beyond the first island chain.

Space and Counterspace. The PLA continues to strengthen its military space capabilities, which include advancements with the Beidou navigation satellite system, and its space surveillance capabilities that can monitor objects across the globe and in space. China is seeking to utilize space systems to establish a real-time and accurate surveillance, reconnaissance and warning system, and to enhance C2 in joint operations. Publicly, however, China stands against the militarization of space. In 2009, the then commander of the PLAAF Xu Qiliang retracted his earlier assertion that the militarization of space was a "historic inevitability" after former President Hu Jintao swiftly contradicted him. PLA strategists regard the ability to use space-based systems—and to deny them to adversaries—as central to enabling modern informationized warfare. Although PLA doctrine does not appear to address space operations as a unique operational "campaign," space operations will probably form an integral component of other PLA campaigns and would serve a key role in enabling actions that counter third-party intervention.

Integrated Air Defense System (IADS). Within 300 nm (556 km) of its coast, China has a credible IADS that relies on robust early warning, fighter aircraft, and a variety of SAM systems as well as point defense primarily designed to counter adversary long-range airborne strike platforms. China continues to develop and to market a wide array of IADSs designed to counter U.S. technology, tailoring the threats to attempts to deny “high-tech” operations across a wide range of capabilities. In addition to improving China’s ability to counter traditional IADS targets such as fixed-wing aircraft, UAVs, helicopters, and cruise missiles, China’s airshow displays claim that new Chinese radar developments can detect stealth aircraft. China’s trade materials also emphasize the systems’ ability to counter long-range targets, such as long-range airborne strike and combat support aircraft. Long-range air surveillance radars and airborne early-warning aircraft, such as China’s indigenous KJ-2000 and KJ-500, are said to extend China’s detection range well beyond its borders. China has increasing numbers of advanced long-range SAMs, including its indigenous CSA-9 (HQ-9), Russian SA-10 (S-300PMU), and SA-20 (S-300PMU1/PMU2), all of which have the advertised capability to protect against both aircraft and low-flying cruise missiles. In fall 2014, China signed a contract for delivery of Russia’s extremely long-range SA-X-21b (S-400) SAM system (400 km), and is also expected to continue research and development to extend the range of the domestic CSA-9 SAM to beyond 200 km.

Air Operations. The planned development of China’s fifth-generation fighter force will bolster China’s air-to-air capability. These fighters feature high maneuverability, low observability, and an internal weapons bay, based on the J-20 or FC-31/J-31 prototypes. Other key features of these aircraft are modern avionics and sensors that offer more timely situational awareness for operations in network-centric combat environments, radars with advanced tracking and targeting capabilities, protection against enemy electronic countermeasures, and integrated EW systems. These fifth-generation aircraft, which could enter service as early as 2018, will significantly improve China’s existing fleet of fourth-generation aircraft (Russian-built Su-27/Su-30 and J-11A, and indigenous J-10 and J-11B fighters) to support regional air superiority and strike operations. China’s continuing upgrades to its bomber fleet will give them the capability to carry new, longer range cruise missiles. In conjunction with procuring more capable military equipment, China is increasing the complexity and realism of air and air-defense training. Similarly, the acquisition and development of longer-range UAVs will increase China’s ability to conduct long-range ISR and strike operations. China is advancing its development and employment of UAVs. In 2015, Chinese media reported the development of the Shendiao (Sacred Eagle or Divine Eagle) as the PLA’s newest high altitude, long-endurance UAV for a variety of missions such as early warning, targeting, EW, and satellite communications. Last year, the PLAAF also reported on its use of a UAV to assist in HA/DR in the aftermath of an earthquake in China’s west—the first public acknowledgment of PLAAF UAV operations. Photos of the UAV showed it was the Yilong (also known as the Wing Loong or Pterodactyl).

Chinese Conventional Missile Capabilities

China is acquiring the ability to project conventional missile power deep into the Pacific in ways that make the traditional discussion of “blue water” navies increasingly less relevant. The issue today is the overall mix of sea-air-missile-space capabilities, their increasing range and flexibility, and how they interact with both conventional forces and asymmetric forces, including new forms of conflict like cyberwarfare. One can only speculate on the pace of change that these shifts will trigger in US, Chinese, and other regional powers over the coming decades, but they are already a major new aspect of the balance.

Moreover, China’s emerging missile proficiencies include both conventional and nuclear strike capabilities in ways that interact even if China and the US never openly threaten to use nuclear forces. Chinese nuclear capabilities can deter or limit the US response to China’s use of conventionally armed missiles, and even a worst case escalation to the use of nuclear armed missiles may still lead China to use conventionally armed precision strike systems against US or politically sensitive targets in ways intended to limit or shape the process of escalation. Declassified US intelligence estimates of China’s missile strength are shown in **Figure IX.1**.

The DOD notes in its 2012 report on Chinese military power that:¹³⁶¹

The PLA Second Artillery Corps is modernizing its short range ballistic missile force by fielding advanced variants with improved ranges and payloads. It is also acquiring and fielding greater numbers of conventional medium-range ballistic missiles (MRBMs) to increase the range at which it can conduct precision strikes against land targets and naval ships, including aircraft carriers, operating far from China's shores beyond the first island chain. (p. 7)

Similarly, China continues to produce large numbers of advanced ground-launched cruise missiles capable of standoff, precision strikes. The PLA Second Artillery Corps faces several challenges in its force structure, including integrating both new and planned systems. (p. 7)

The DOD report for 2016 discusses the interlocking relationships between China's full range of missile and other precision strike systems in supporting the A2AD mission – all of which can potentially affect China's capabilities if it intervenes in a Korean conflict as well as have an effect in shaping the broader balance in Northeast Asia:¹³⁶²

- *Short-Range Ballistic Missiles (SRBMs) (less than 1,000 km).* The PLA Rocket Force, formerly called the PLASAF, had approximately 1,200 SRBMs at the end of 2015. The force fields advanced variants with improved ranges and accuracy in addition to more sophisticated payloads, while gradually replacing earlier generations that do not possess true precision strike capability.
- *Medium-Range Ballistic Missiles (MRBMs) (1,000-3,000 km).* The PLA is fielding conventional MRBMs to increase the range at which it can conduct precision strikes against land targets and naval ships operating far from China's shores out to the first island chain.
- *Intermediate-Range Ballistic Missiles (IRBMs) (3,000-5,500 km).* The PLA is developing a nuclear and conventional road-mobile IRBM, which increases its capability for near-precision strike out to the "second island chain." The PLAN also is improving its over-the-horizon (OTH) targeting capability with sky wave and surface wave over the horizon (OTH) radars, which can be used in conjunction with reconnaissance satellites to locate targets at great distances from China, thereby supporting long-range precision strikes, including employment of ASBMs.
- *Land-Attack Cruise Missiles (LACMs).* The PLA continues to field air- and ground-launched LACMs for standoff precision strikes. Air-launched cruise missiles include the YJ-63, KD-88, and the CJ-20 (the air-launched version of the CJ-10 ground-launched cruise missile still fielded in the PLASAF). China recently adapted the KD-88 LACM, with an advertised range of more than 100 km, and may be testing a longer-range version. China also is developing the CM-802AKG LACM, an export system that can strike both land and ship targets from fighters or bombers.
- *Ground Attack Munitions.* The PLAAF has a small number of tactical air-to-surface missiles (ASM) as well as precision-guided munitions including all-weather, satellite-guided bombs, anti-radiation missiles, and laser-guided bombs. China is developing smaller-sized ASMs such as the AR-1, HJ-10 anti-tank, Blue Arrow 7 laser-guided, and KD-2 missiles in conjunction with its increasing development of UAVs. Additionally, China is also adapting to UAVs GPS-guided munitions such as the FT-5 and LS-6 that are similar to the U.S. Joint Direct Attack Munitions (JDAM).
- *Anti-Ship Cruise Missiles (ASCMs).* The PLAN is deploying a wide range of advanced ASCMs. The most capable include the domestically produced ship-launched YJ-62 ASCM and the Russian SS-N-22/SUNBURN supersonic ASCM, which is fitted on China's SOVREMENNY-class DDGs acquired from Russia. China's submarine force is also increasing its ASCM capability, with the long-range YJ-18 ASCM replacing the older YJ-82 on the SONG, YUAN, and SHANG classes. The YJ-18 is similar to the Russian SS-N-27B/SIZZLER ASCM, which is capable of supersonic terminal sprint and is fielded on eight of China's 12 Russian-built KILO SS. In addition, PLAN Aviation employs the 200 km range YJ-83K ASCM on its JH-7 and H-6G aircraft. China has also developed the YJ-12 ASCM for the PLAN. The new missile provides an increased threat to naval assets, due to its long range and supersonic speeds. It is capable of being launched from H-6 bombers.
- *Anti-Radiation Weapons.* China is starting to integrate an indigenous version of the Russian Kh-31P (AS-17), known as the YJ-91, into its fighter-bomber force. The PLA imported Israeli-made HARPY UAVs and Russian-made anti-radiation missiles during the 1990s.

- *Artillery-Delivered High Precision Munitions.* The PLA is developing and deploying artillery systems with the range to strike targets within or even across the Taiwan Strait, including the PHL-03 300 mm multiple-rocket launcher (MRL) (greater than 100 km range) and the longer-range AR-3 dual-caliber MRL (out to 220 km range).

The PLA Rocket Force has continued “expanding its conventional MRBM force,” and is “developing IRBMs to extend the distance from which it can threaten other countries with conventional precision or near-precision strikes.”¹³⁶³

Work by Andrew S. Erickson further highlights the fact that these Chinese efforts have led to the development of a DF-21D anti-ship ballistic missile (ASBM).¹³⁶⁴

China’s DF-21D anti-ship ballistic missile (ASBM) is no longer merely an aspiration. Beijing has successfully developed, partially tested and deployed in small numbers the world’s first weapons system capable of targeting the last relatively uncontested U.S. airfield in the Asia-Pacific from long-range, land-based mobile launchers. This airfield is a moving aircraft carrier strike group (CSG), which the Second Artillery, China’s strategic missile force, now has the capability to at least attempt to disable with the DF-21D in the event of conflict. With the ASBM having progressed this far, and representing the vanguard of a broad range of potent asymmetric systems, Beijing probably expects to achieve a growing degree of deterrence with it.

In December 2010, then-PACOM Commander Admiral Robert Willard stated, “The anti-ship ballistic missile system in China has undergone extensive testing. An analogy using a Western term would be ‘Initial Operational Capability (IOC),’ whereby it has—I think China would perceive that it has—an operational capability now, but they continue to develop it. It will continue to undergo testing, I would imagine, for several more years.”¹³⁶⁵

In January 2011, Vice Admiral David Dorset said that the PLA “likely has the space-based intelligence, surveillance and reconnaissance (ISR), command and control structure, and ground processing capabilities necessary to support DF-21D employment...[and also] employs an array of non-space based sensors and surveillance assets capable of providing the targeting information,” several days later adding that the PRC had tested the DF-21D missile system over land “a sufficient number of times that the missile system itself is truly competent and capable... they have ISR, they have sensors onboard ship that can feed into the targeting aspect of it. So could they start to employ that and field it operationally? Yes, I think so.” In March 2011, it was reported by the Taiwanese National Security Bureau Director-General that the PLA had already tested and started deploying the DF-21D in 2010.¹³⁶⁶

During a 2015 military parade, China unveiled what it claimed was a new anti-ship missile alongside the DF-21D, the DF-26, which commentators claimed could hit enemy ships at twice the range of DF-21D, well into the “second island chain”.¹³⁶⁷ However, some US observers point to a number of factors to play down concerns about China’s ASBM capabilities. As of 2015, these systems have not been tested against “an ocean-going, non-cooperative target”. Furthermore, the missiles rely on a larger group of systems, such as command and control, ISR sensors, communications, that may not be as effective as the missiles themselves, especially when contending with advancing US countermeasures.¹³⁶⁸

Reportedly, China conducted another test of its missile interceptor system on January 27, 2013 in the Xinjiang Uyghur Autonomous Region. China has again stated the defensive nature of the test. In all likelihood, the system is a reconfigured DF-21C or DF-25 (KS/SC-19) – both of which are two-stage medium-range (1500-1700 km) ballistic missiles capable of carrying a 600 kg payload – in this case, an exo-atmospheric kill vehicle.¹³⁶⁹

Improvements to China's missile force are likely to prove decisive in any potential conflict. A 2015 Rand analysis noted that these updates have been "the most prominent aspect of the PLA's modernization since 1996", and that PRC systems have become "quite accurate, capable of hitting such targets as airfields and ports with a variety of warheads".¹³⁷⁰

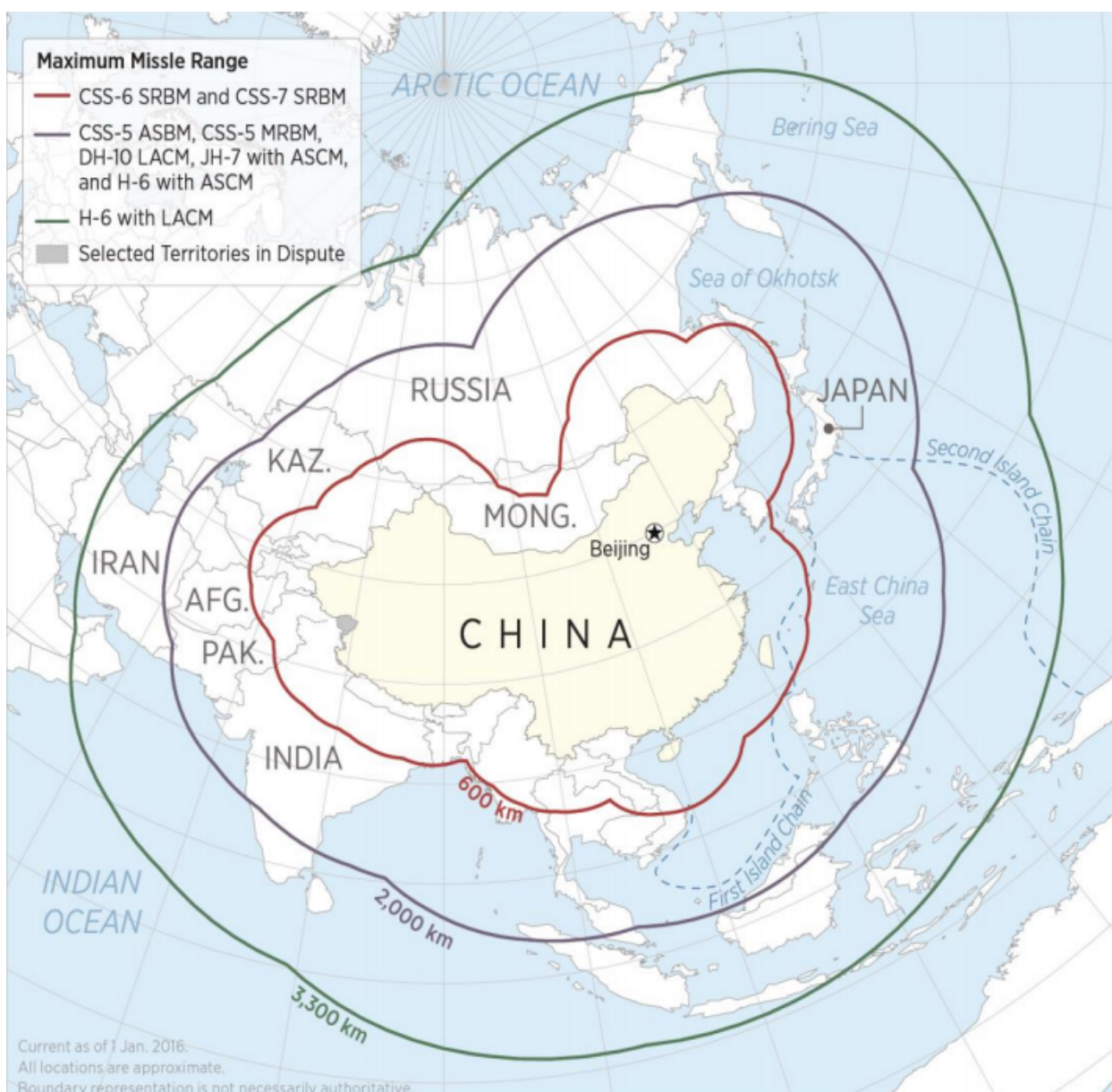
As the estimates in **Figure IX.2** show, this anti-ship ballistic missile is just one part of the interlocking extension of Chinese precision strike capabilities that affect the Koreas, Northeast Asia, and Pacific region. China can now use precision strike systems against US bases as far out as Guam and the rest of what is sometimes called the "second island chain."

Figure IX.1: Chinese Missile Forces, 2016

Chinese Missile Force			
System	Missiles	Launchers	Estimated Range
ICBM	75-100	50-75	5,400-13,000+ km
MRBM	200-300	100-125	1500+ km
SRBM	1,000-1,200	250-300	300-1,000 km
GLCM	200-300	40-55	1,500+ km

Source: Based on Appendix 1 in Office of the Secretary of Defense, *Annual Report to Congress: Military and Security Developments Involving the People's Republic of China 2016*, Department of Defense, April 2016, <http://www.defense.gov/Portals/1/Documents/pubs/2016%20China%20Military%20Power%20Report.pdf>

Figure IX.2: Range of Chinese Precision Strike Capabilities – Part One (US 2016 Estimate)



Source: Office of the Secretary of Defense, *Annual Report to Congress: Military and Security Developments Involving the People's Republic of China 2016*, 23.

Chinese Nuclear-Armed Missiles

China has a large variety of nuclear-armed ballistic missiles and is currently transitioning its arsenal from liquid-fueled, relatively inaccurate, silo- or cave-based missiles (such as the DF-3, DF-4, and DF-5) to solid-fuel, more accurate, mobile missiles (like the DF-11, DF-15, DF-21, DF-31 ICBM, and JL-2 SLBM). Japanese and US estimates of the ranges of these systems are shown in **Figure IX.3**.

Some of these newer missiles could eventually be equipped with multiple independent targetable reentry vehicle (MIRV) warheads. In December 2012, China successfully conducted a second test of its DF-31A missile, allowing it to reach any city in the US. The missile is believed to have three warheads per missile and a range of approximately 7,000 miles.

While the Chinese CSS-4 has similar capabilities, the CSS-4 requires a stationary launch pad and contains only one nuclear warhead. In contrast, the DF-31A is portable and can be launched from the back of a truck, train, or tank.¹³⁷¹ China appears to have supplied missiles to Saudi Arabia, Iran, Iraq, Libya, Pakistan, Syria, and North Korea.¹³⁷² These exported missiles have been shorter range missiles, with the one notable exception of DF-3A's (range of over 3000km) to Saudi Arabia.

U.S. Official Assessments

The US assessment of China's military capabilities has long focused on China's growing nuclear and missile forces and increasing capability to target the US and Japan in ways that directly affect the Korean balance and the potential risk of US and Japanese involvement in a Korean crisis or conflict. However, it has conspicuously, not tied these assessments to an analysis of Chinese development in nuclear weapons and warheads, either in terms of design and weight or weapons/warhead numbers.

The DOD report on *Military and Security Developments Affecting the People's Republic of China* for 2011 stated that,¹³⁷³

China has prioritized land-based ballistic and cruise missile programs. It is developing and testing several new classes and variants of offensive missiles, forming additional missile units, upgrading older missile systems, and developing methods to counter ballistic missile defenses.

The PLA is acquiring large numbers of highly accurate cruise missiles, many of which have ranges in excess of 185 km. This includes the domestically produced, ground-launched DH-10 land-attack cruise missile (LACM); the domestically produced ground- and ship-launched YJ-62 anti-ship cruise missile (ASCM); the Russian SS-N-22/SUNBURN supersonic ASCM, which is fitted on China's SOVREMENNY-class DDGs acquired from Russia; and, the Russian SS-N-27B/SIZZLER supersonic ASCM on China's Russian-built, KILO-class diesel-electric attack submarines.

China is modernizing its nuclear forces by adding more survivable delivery systems. In recent years, the road mobile, solid propellant CSS-10 Mod 1 and CSS-10 Mod 2 (DF-31 and DF-31A) intercontinental-range ballistic missiles (ICBMs) have entered service. The CSS-10 Mod 2, with a range in excess of 11,200 km, can reach most locations within the continental United States.

...China's nuclear arsenal currently consists of approximately 55-65 intercontinental ballistic missiles (ICBMs), including the silo-based CSS-4 (DF-5); the solid-fueled, road-mobile CSS-10 Mods 1 and 2 (DF-31 and DF-31A); and the more limited range CSS-3 (DF-3). This force is complemented by liquid-fueled CSS-2 intermediate-range ballistic missiles and road-mobile, solid-fueled CSS-5 (DF-21D) MRBMs for regional deterrence missions. The operational status of China's single XIA-class

ballistic missile submarine (SSBN) and medium-range JL-1 submarine-launched ballistic missiles (SLBM) remain questionable.

By 2015, China's nuclear forces will include additional CSS-10 Mod 2s and enhanced CSS-4s. The first of the new JIN-class (Type 094) SSBN appears ready, but the associated JL-2 SLBM has faced a number of problems and will likely continue flight tests. The date when the JIN-class SSBN/JL-2 SLBM combination will be fully operational is uncertain. China is also currently working on a range of technologies to attempt to counter U.S. and other countries' ballistic missile defense systems, including maneuvering re-entry vehicles, MIRVs, decoys, chaff, jamming, thermal shielding, and anti-satellite (ASAT) weapons. PRC official media also cites numerous Second Artillery Corps training exercises featuring maneuver, camouflage, and launch operations under simulated combat conditions, which are intended to increase survivability. Together with the increased mobility and survivability of the new generation of missiles, these technologies and training enhancements strengthen China's nuclear force and enhance its strategic strike capabilities.

The introduction of more mobile systems will create new command and control challenges for China's leadership, which now confronts a different set of variables related to deployment and release authorities. For example, the PLA has only a limited capacity to communicate with submarines at sea, and the PLA Navy has no experience in managing a SSBN fleet that performs strategic patrols with live nuclear warheads mated to missiles. Land-based mobile missiles may face similar command and control challenges in wartime, although probably not as extreme as with submarines.

Beijing's official policy towards the role of nuclear weapons continues to focus on maintaining a nuclear force structure able to survive an attack, and respond with sufficient strength to inflict unacceptable damage on the enemy. The new generation of mobile missiles, maneuvering and MIRV warheads, and penetration aids are intended to ensure the viability of China's strategic deterrent in the face of continued advances in U.S. and, to a lesser extent, Russian strategic intelligence, surveillance, and reconnaissance; precision strike; and missile defense capabilities.

Beijing has consistently asserted that it adheres to a "no first use" (NFU) policy, stating it would use nuclear forces only in response to a nuclear strike against China. China's NFU pledge consists of two stated commitments: China will never use nuclear weapons first against any nuclear-weapon state, and China will never use or threaten to use nuclear weapons against any non-nuclear-weapon state or nuclear-weapon-free zone. However, there is some ambiguity over the conditions under which China's NFU policy would apply, including whether strikes on what China considers its own territory, demonstration strikes, or high altitude bursts would constitute a first use.

Moreover, some PLA officers have written publicly of the need to spell out conditions under which China might need to use nuclear weapons first; for example, if an enemy's conventional attack threatened the survival of China's nuclear force, or of the regime itself. However, there has been no indication that national leaders are willing to attach such nuances and caveats to China's "no first use" doctrine.

Beijing will likely continue to invest considerable resources to maintain a limited nuclear force, also referred to by some PRC writers as "sufficient and effective" to ensure the PLA can deliver a damaging retaliatory nuclear strike.

The DOD provided further updates in the 2013 and 2014 editions of *Military and Security Developments Affecting the People's Republic of China*, describing China's latest nuclear-armed missile developments as follows:¹³⁷⁴

China's new generation of mobile missiles, with payloads consisting of Multiple Independently Targeted Reentry Vehicles (MIRVs) and penetration aids, are intended to ensure the viability of China's strategic deterrent in the face of continued advances in U.S. and, to a lesser extent, Russian strategic ISR, precision strike, and missile defense capabilities. The PLA has deployed new command, control, and communications capabilities to its nuclear forces. These capabilities improve the Second Artillery's ability to command and control multiple units in the field. Through the use of improved communications links, China's ICBM units now have better access to battlefield information and

uninterrupted communications connecting all command echelons, and unit commanders are able to issue orders to multiple subordinates at once, instead of serially, via voice commands.

China will likely continue to invest considerable resources to maintain a limited, survivable, nuclear force (sometimes described as “sufficient and effective”) to ensure the PLA can deliver a damaging retaliatory nuclear strike.

Land-Based Platforms. China’s nuclear arsenal currently consists of the silo-based CSS-4 (DF-5); the solid-fueled, road-mobile CSS-10 Mod 1 and Mod 2 (DF-31 and DF-31A); and the more limited-range CSS-3 (DF-4). This force is complemented by road-mobile, solid-fueled CSS-5 (DF-21) MRBMs for regional deterrence missions. By 2015, China’s nuclear forces will include additional CSS-10 Mod 2s. (2014, p. 28)

Sea-Based Platforms. China continues to produce the JIN-class SSBN, with three already delivered and as many as two more in various stages of construction. The JIN-class SSBNs will eventually carry the JL-2 submarine-launched ballistic missile with an estimated range of 7,400 km. The JIN-class and the JL-2 will give the PLA Navy its first long-range, sea-based nuclear capability. After a round of successful testing in 2012, the JL-2 appears ready to reach initial operational capability in 2013. JIN-class SSBNs based at Hainan Island in the South China Sea would then be able to conduct nuclear deterrence patrols. (2013, p. 31-32)

...Future Efforts. China is working on a range of technologies to attempt to counter U.S. and other countries’ ballistic missile defense systems, including MIRVs, decoys, chaff, jamming, and thermal shielding. China’s official media also cites numerous Second Artillery training exercises featuring maneuver, camouflage, and launch operations under simulated combat conditions, which are intended to increase survivability. Together with the increased mobility and survivability of the new generation of missiles, these technologies and training enhancements strengthen China’s nuclear force and enhance its strategic strike capabilities. Further increases in the number of mobile ICBMs and the beginning of SSBN deterrence patrols will force the PLA to implement more sophisticated command and control systems and processes that safeguard the integrity of nuclear release authority for a larger, more dispersed force. (2014, p. 29)

The 2016 Report focused primarily on China’s efforts to truly modernize its nuclear arsenal, stating:¹³⁷⁵

China continues to modernize its nuclear forces across the PLA. In 2015, China maintained nuclear-capable delivery systems in its missile forces and navy, giving it a dispersed and more survivable capability.

- The PLA Rocket Force’s (PLARF) arsenal contains 75-100 ICBMs. The PLARF is modernizing these airframes, including through the development of a new road-mobile ICBM capable of carrying multiple independent reentry vehicles (MIRVs). China has also tested a hypersonic glide vehicle, although official statements make no reference to its intended mission or potential capability to carry a nuclear warhead.
- The PLAN continues to produce the JIN-class SSBN, with four commissioned and at least one under construction. The JIN class and its SLBMs will give China its first reliable long-range, sea-based nuclear capability.

In 2015, China also continued to develop long-range bombers, including some Chinese military analysts have described as “capable of performing strategic deterrence”—a mission reportedly assigned to the PLA Air Force in 2012. There have also been Chinese publications indicating China intends to build a long-range “strategic” stealth bomber. These media reports and Chinese writings suggest China might eventually develop a nuclear bomber capability. If it does, China would develop a “triad” of nuclear delivery systems dispersed across land, sea, and air—a posture considered since the Cold War to improve survivability and strategic deterrence.

Outside Sources

Outside sources provide further insights into these developments. The IISS reported in 2013,¹³⁷⁶

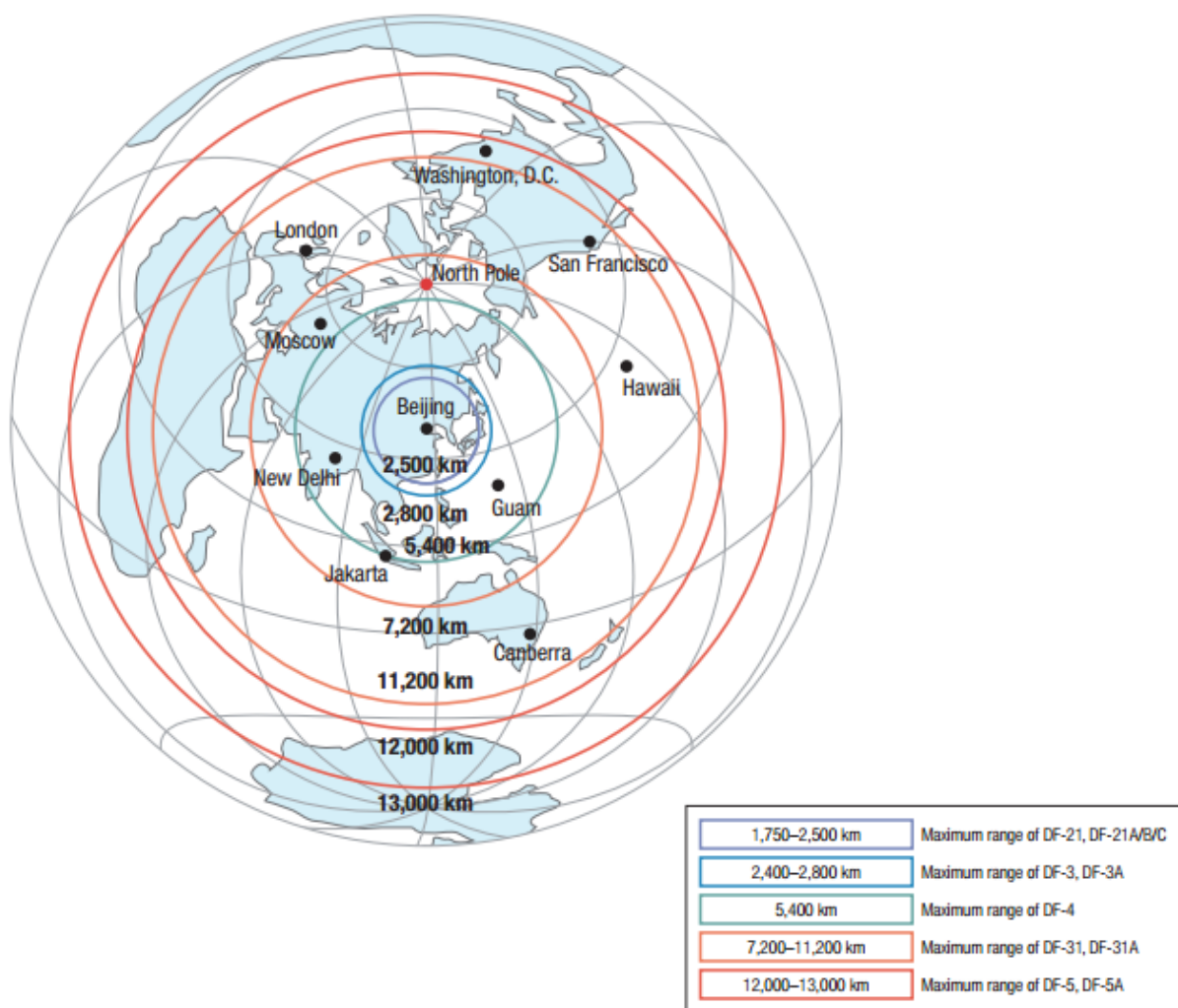
In July 2012, unnamed US officials reportedly said that China had test-fired a DF-41 intercontinental ballistic missile, although little information was provided. The DF-41 would, if deployed, be the first land-based missile able to reach the entire continental United States. The July test was reported to include a multiple independently targetable re-entry vehicle (MIRV), though it is unclear whether MIRVed warheads have yet been deployed on China's current longest-range ICBM, the DF-31A. This continues to be produced, with satellite imagery from 2011 suggesting that the 809 Brigade in Datong was receiving DF-31s in place of DF-21s. Taiwan's 2010 report on Chinese military power claimed that the Second Artillery had also deployed a few new DF-16 MRBMs.

Within a month, China also conducted a successful test of the JL-2 ballistic missile. The JL-2 is the submarine-launched version of the DF-31 road-mobile ICBM, to be deployed on the Type-094 nuclear-ballistic-missile submarine. Successful development and deployment of the hitherto troubled JL-2 would give China a more secure second-strike deterrent, as the four Type-094 submarines currently in the water would then be able to provide continuous at-sea deterrence.

A 2015 Rand study also offered an important assessment of China's nuclear modernization efforts:¹³⁷⁷

With the deployment of the DF-31A, however, it now has road-mobile, solid-fuel missiles that can strike anywhere in the United States. China has also deployed a new generation of SSBNs, the Jin class (Type 094), armed with the new JL-2 submarine-launched ballistic missile (SLBM), giving China its first credible sea-based deterrent.²⁰ Given these improvements, China's potential vulnerability to a hypothetical preemptive first strike has been greatly reduced

Figure IX.3: Chinese Ballistic Missile Ranges – Part One (2015 Japanese Estimate)



Note: The above image shows a simplified indication of the potential reach of each type of missile taking Beijing as a central point.

Source: Japanese Ministry of Defense, *Defense of Japan 2015*

Figure IX.3: Chinese Ballistic Missile Ranges – Part Two (2016 US Estimate)



Source: Office of the Secretary of Defense, *Annual Report to Congress: Military and Security Developments Involving the People's Republic of China 2016*

Chinese Missile Defense Capabilities

China's approach to missile defense resembles that of Russia in opposing U.S.-supported missile defenses near China, while steadily improving its own defenses. The 2010 Chinese Defense White Paper argued against international missile defense programs. The paper also included sections on the desire to prohibit biological and chemical weapons, prevent an arms race in outer space, promote military expenditure transparency, and work towards conventional arms control. In the section on non-proliferation, the PRC wrote,¹³⁷⁸

China maintains that the global missile defense program will be detrimental to international strategic balance and stability, will undermine international and regional security, and will have a negative impact on the process of nuclear disarmament. China holds that no state should deploy overseas missile defense systems that have strategic missile defense capabilities or potential, or engage in any such international collaboration.

The 2013 and 2015 Paper briefly mentioned missile defense but did not really address it. In contrast, the 2013 DOD report on *Military and Security Developments Involving the People's Republic of China 2013* noted that,¹³⁷⁹

China is pursuing ballistic missile defense capabilities in order to provide further protection of China's mainland and strategic assets. China's existing long-range SAM inventory offers limited capability against ballistic missiles. The SA-20 PMU2, the most advanced SAM Russia offers for export, has the advertised capability to engage ballistic missiles with ranges of 1,000 km and speeds of 2,800 meters per second (m/s). China's domestic CSA-9 long-range SAM system is expected to have a limited capability to provide point defense against tactical ballistic missiles with ranges up to 500 km. China is pursuing research and development of a missile defense umbrella consisting of kinetic energy intercepts at exo-atmospheric altitudes (>80 km), as well as intercepts of ballistic missiles and other aerospace vehicles within the upper atmosphere. In January 2010, China successfully intercepted a ballistic missile at mid-course using a ground-based missile. (p. 34)

The 2016 DOD report goes into more detail:

China has made efforts to go beyond defense from aircraft and cruise missiles to gain a BMD capability in order to provide further protection of China's mainland and strategic assets. China's existing long-range surface-to-air missile (SAM) inventory offers limited capability against ballistic missiles. New indigenous radars, the JL-1A and JY-27A, are designed to address the ballistic missile threat, with the JL-1A advertised as capable of the precision tracking of multiple ballistic missiles.

China's SA-20 PMU2 SAMs, one of the most advanced SAM systems Russia offers for export, has the advertised capability to engage ballistic missiles with ranges of 1,000 km and speeds of 2,800 meters per second. China's domestic CSA-9 long-range SAM system is expected to have a limited capability to provide point defense against tactical ballistic missiles with ranges up to 500 km.

China is proceeding with the research and development of a missile defense umbrella consisting of kinetic energy intercept at exo-atmospheric altitudes (greater than 80 km), as well as intercepts of ballistic missiles and other aerospace vehicles within the upper atmosphere. In January 2010, and again in January 2013, China successfully intercepted a ballistic missile at mid-course, using a ground-based missile. The announced acquisition by China of the S-400 SAM system from Russia could provide China with a counter-MRBM capability depending on which interceptor variants are delivered to China.

China tested an advanced missile defense system on January 11, 2010. The test, entitled the *Test of the Land-based Mid-course Phase Anti-ballistic Missile Interception Technology*, targeted a missile during the mid-course phase when the target was exoatmospheric. According to press reports, the US DOD stated: "We detected two geographically separated

missile launch events with an exoatmospheric collision also being observed by space-based sensors.”¹³⁸⁰

Reportedly, China carried out a second land-based mid-course missile interception test on January 27, 2013 in the Xinjiang Uyghur Autonomous Region. Although no other information was given, the Chinese Defense Ministry remarked that the test was “defensive in nature” and appeared to be successful.

In all likelihood, the system is a reconfigured DF-21C or DF-25 (KS/SC-19), both of which are two-stage medium-range (1500-1700 km) ballistic missiles capable of carrying a 600 kg payload – in this case, an exoatmospheric kill vehicle. However, China likely remains far from an operational anti-missile shield.¹³⁸¹

China is also working to increase its tactical ballistic missile defense capabilities – which add another level of deterrence and defense capabilities. China is beginning to produce its own variants of the S-300 and may be able to deploy significantly more advanced theater missile defense systems in the mid-term.

Chinese Counterspace Capabilities

China is developing counterspace capabilities that affect the entire spectrum of warfighting capabilities, from the tactical to the strategic levels. Both China and Russia “continue developing systems and technologies that can interfere with or disable vital U.S. space-based navigation, communication, and intelligence collection satellites.”¹³⁸² China has tested anti-satellite weapons that could also have a massive impact on US battle management and ISR systems, and may have some capability to use EMP weapons.

The DOD’s 2014 report on *Military and Security Developments Involving the People’s Republic of China* notes that,¹³⁸³

PLA strategists regard the ability to use space-based systems – and to deny adversaries access to space-based systems – as central to enabling modern, “informationized” warfare. Although PLA doctrine does not appear to address space operations as a unique operational “campaign,” space operations form an integral component of other PLA campaigns and would serve a key role in enabling A2/AD operations. A PLA analysis of U.S. and coalition military operations reinforced the importance of operations in space to enable “informationized” warfare, claiming that “space is the commanding point for the information battlefield.” , PLA writings emphasize the necessity of “destroying, damaging, and interfering with the enemy’s reconnaissance ... and communications satellites,” suggesting that such systems, as well as navigation and early warning satellites, could be among the targets of attacks designed to “blind and deafen the enemy.” The same PLA analysis of U.S. and coalition military operations also states that “destroying or capturing satellites and other sensors ... will deprive an opponent of initiative on the battlefield and [make it difficult] for them to bring their precision guided weapons into full play.”

The PLA is acquiring a range of technologies to improve China’s space and counterspace capabilities. In addition to directed energy weapons and satellite jammers, China demonstrated a direct-ascent kinetic kill capability against satellites in low Earth orbit when it destroyed the defunct Chinese FY-1C weather satellite during a test in January 2007. (2014, p. 32)

China has conducted several apparent anti-satellite (ASAT) weapons tests. In 2007, the PRC destroyed a weather satellite at 850 km following three other attempts, creating a cloud of debris that endangered other satellites and provoked international criticism. China conducted three successful tests of ground based ballistic missile interceptors in 2010, 2013, and 2014 using what many believe to be the same system as was used in 2007. The PRC also launched

a ground-based missile into space in 2013, potentially reaching a height of 10,000-35,000 km.¹³⁸⁴

Space

China is expanding its own space-based systems in ways that will enhance its deterrent, missile, and other military capabilities in the Koreas and Northeast Asia. The new Party leadership has emphasized such activities as long-range missiles and other aerospace programs in its military modernization push. Chinese companies are also looking at increasing domestic development and production through the acquisition of parts manufacturers, leasing businesses, cargo airlines, materials producers, and airport operators. However, many of these Chinese companies that are pursuing joint ventures and technical cooperation agreements alongside acquisitions have deep ties to the military, raising issues for American regulators.¹³⁸⁵

The main contractor for the country's air force, the state-owned China Aviation Industry Corporation, known as Avic, has set up a private equity fund to purchase companies with so-called dual-use technology that has civilian and military applications, with the goal of investing as much as \$3 billion. In 2010, Avic acquired the overseas licensing rights for small aircraft made by Epic Aircraft of Bend, Ore., using lightweight yet strong carbon-fiber composites — the same material used for high-performance fighter jets.

Provincial and local government agencies in Shaanxi Province, a hub of Chinese military aircraft testing and production, have set up another fund of similar size for acquisitions. Last month, a consortium of Chinese investors, including the Shaanxi fund, struck a \$4.23 billion deal with the American International Group to buy 80 percent of the International Lease Finance Corporation, which owns the world's second-largest passenger jet fleet.

The 2014 DOD report on China cited earlier remarks that,¹³⁸⁶

In 2013, China conducted at least eight space launches to expand its space-based intelligence, surveillance, reconnaissance, meteorological, and communications satellite constellations. In addition to expanding its in-orbit assets, China successfully launched its first “Kuaizhou” (“quick vessel”) space launch vehicle (SLV), which is designed to launch a small satellite of the same name quickly into a low-Earth orbit to support “natural disaster monitoring.” Chinese media also reported development of a second Chinese responsive space launch vehicle dubbed the Long March 11 (LM-11). The LM-11 will provide China with “a vehicle to rapidly enter space and meet the emergency launching demand in case of disasters and contingencies,” and could be launched as early as 2014 and no later than 2016. In parallel, China is developing a multi-dimensional program to improve its capabilities to limit or prevent the use of space-based assets by adversaries during times of crisis or conflict.

China continues to develop the LM-5 SLV, designed for lifting heavy payloads into space. The LM-5 will more than double the size of payloads China may place into geosynchronous orbits. More than just a single heavy-lift launch vehicle, the LM-5 has propulsion technologies that are reconfigurable to produce the LM-6 light-lift- and LM-7 medium-lift launch vehicles. The Wenchang Satellite Launch Center, designed to host these new launch vehicles, is expected to be complete in time for the first LM-7 launch in late-2014. The first LM-5 launch, delayed by recent manufacturing difficulties, is expected no sooner than 2015 (2014, p. 10-11).

China is the third country to develop an independent human spaceflight program, and early in 2012 the PRC achieved its first manned space docking at an orbital laboratory. The country has a stated goal of building a 60-ton space station for future missions. China has traditionally been relying on its manned Shenzhou spacecraft, capsule-based vehicles. It would appear that China is in the test-flight stages of a new Shenlong space plane, a drone that is similar to, though less capable than, the US's X-37B.¹³⁸⁷

China's growing space capabilities translate into military capabilities that affect all aspects of conventional and nuclear targeting, ground-air-sea operations, precision conventional strike capacities, and missile defense. China is also using its intelligence collection efforts to improve technological capacity. In his 2012 Senate testimony, DIA Director Ronald L. Burgess, Jr. remarked,¹³⁸⁸

China is beginning to develop and test technologies to enable ballistic missile defense. The space program, including ostensible civil projects, supports China's growing ability to deny or degrade the space assets of potential adversaries and enhances China's conventional military capabilities. China operates satellites for communications, navigation, earth resources, weather, and intelligence, surveillance, and reconnaissance, in addition to manned space and space exploration missions. China successfully tested a direct ascent anti-satellite weapon (ASAT) missile and is developing jammers and directed-energy weapons for ASAT missions. A prerequisite for ASAT attacks, China's ability to track and identify satellites is enhanced by technologies from China's manned and lunar programs as well as technologies and methods developed to detect and track space debris. Beijing rarely acknowledges direct military applications of its space program and refers to nearly all satellite launches as scientific or civil in nature.

China has used its intelligence services to gather information via a significant network of agents and contacts utilizing a variety of methods to obtain U.S. military technology to advance their defense industries, global command and control, and strategic warfighting capabilities. The Chinese continue to improve their technical capabilities, increasing the collection threat against the U.S. The Chinese also utilize their intelligence collection to improve their economic standing and to influence foreign policy. In recent years, multiple cases of economic espionage and theft of dual-use and military technology have uncovered pervasive Chinese collection efforts.

One example of Chinese space technologies is the Beidou satellite position, navigation, and timing system, which has been in development and regional use since 2000. The second generation version has been operational in the region since 2012 and is planned to be available globally by 2020. The system will "enable subscribers outside of China to purchase receivers and services that give civilian and military applications greater redundancy and independence in a conflict scenario that employs space assets."¹³⁸⁹ The 2014 DOD Report addressed the Beidou development.¹³⁹⁰

During 2013, China focused on testing the current constellation of Beidou navigation satellites (NAVSATs) and released the Beidou signal interface control document to allow for the production of ground receivers. Beidou NAVSAT launches will likely resume in 2014, with a global NAVSAT constellation expected to be completed by 2020. China launched five new remote sensing satellites in 2013, which can perform both civil and military applications. China also launched one communications satellite, four experimental small satellites, one meteorological satellite, and one manned space mission.

Over the next several years, China plans to put more than 20 new navigational satellites in medium-earth orbit to improve the functionality of its Beidou system. An editorial in the state-run *Global Times* stated, "it is necessary for China to have the ability to strike US satellites. This deterrent can provide strategic protection to Chinese satellites and the whole country's national security."¹³⁹¹

In its 2016 report, the DoD noted that:¹³⁹²

Using its on-orbit and ground-based assets to support its national civil, economic, political, and military goals and objectives, China's space program continues to mature. China has invested significantly in improving its space capabilities, with particular emphasis on satellite communications (SATCOM); intelligence, surveillance, and reconnaissance (ISR); satellite navigation (SATNAV); meteorology; as well as manned, unmanned, and interplanetary space exploration. In addition to its on-orbit assets, China's space program has built a vast ground infrastructure supporting spacecraft and space launch vehicle (SLV)

manufacturing, launch, C2, and data downlink. In parallel with its space program, China continues to develop a variety of counterspace capabilities designed to limit or to prevent the use of space-based assets by the PLA's adversaries during a crisis or conflict.

China's most recent DWP affirmed the PLA's focus on new, emerging security domains such as outer space. The report called space the "commanding height in international strategic competition." Although China continues to advocate the peaceful use of outer space, the report also noted China would "secure its space assets to serve its national economic and social development, and maintain outer space security."

As of December 2015, China launched 19 SLVs carrying 45 spacecraft, including navigation, ISR, and test/engineering satellites. Noteworthy 2015 accomplishments for China's space program include:

- **Two New Launch Vehicles:** September 2015 saw the successful debut of both the Long March (LM)-6 and the LM-11 "next generation" SLVs. The LM-6 is a small liquid-fueled SLV designed to carry up to 1000 kg into low Earth orbit (LEO), and the LM-11 is described as a "quick response" SLV designed to launch a small payload into LEO on short notice in the event of an emergency.
- **China's Largest Multi-Payload Launch and Smallest Satellites:** The 19 September 2015 inaugural launch of the LM-6 SLV carried the largest number of satellites (20) China has ever launched on a single SLV. Most of the satellites carried onto orbit by the LM-6 were technology-demonstration satellites smaller than 100 kg. Furthermore, the four Xingchen femtosatellites launched aboard the LM-6 are the smallest Chinese spacecraft to date, weighing just 100 g each.
- **Launches Begin for Beidou Global Network:** China's Beidou SATNAV constellation began the next step of its construction in 2015 with the launch of the Beidou I1-S, an inclined geosynchronous orbit (IGSO) satellite, on March 30. In 2015, China launched two more medium Earth orbit satellites and two more IGSO satellite. This phase of the project plans to extend the Beidou network beyond its current regional focus to provide global coverage by 2020.

Anti-Access/Area Denial Sea-based Space Programs

China's A2AD programs rely on a mix of space-based systems. China is relying on land and sea launch capabilities as well as sea-based systems that utilize "Long View" space support ships to perform tasks like monitoring and tracking space vehicles – such as spacecraft, missiles, and rockets – while also coordinating and communicating with ground-based assets. This system can increase space operations and situational awareness while also providing potential military applications.

In a conflict, ship-based C4ISR capabilities could have advantages over ground-based installations. Again, Andrew S. Erikson provides a history and more in-depth description of the program, which began in 1965 with Premier Zhou Enlai and was further developed in the 1970s under Project 718. In order to support Chinese ICBM sea tests, the Yuanwang program was initiated, though it was soon delayed by subsequent political events. It was jointly designed and developed by the Seventh Academy of the Sixth Ministry of Machine Building, the Seventh Ministry of Machine Building, and the Commission of Science and Technology for National Defense's concept-study team.¹³⁹³

Design and development of the Yuanwang started in 1974, with construction from 1975 and the first ships ready for trials in the late 1970s. Though six were originally built, only three are in operation today. It appears that the Yuanwang-class ship was first used in 1980 to retrieve the instrument package from China's first successful DF-5/CSS-4 ICBM test – showing that the ships were able to successfully track missiles from the sea. The ships were further deployed in support of civilian and military space launches and tracking of space operations, including communications satellites, ballistic missile tests, and manned spacecraft

(the Shenzhou). The fleet complements the PRC's two Tianlian data-relay satellites and many ground stations, facilitating communication between satellites and these stations.¹³⁹⁴

The Yuanwang fleet was technologically upgraded starting in the 1980s; for example, the ships were initially able to track almost 25,000 miles above Earth, later increasing to almost 250,000 miles. Better radars improved the communication and tracking systems; most of the ships in the fleet have C and S-band monopulse tracking radar, velocimetry systems, cinetheodolite laser ranging and tracking systems, computers, and navigation and positioning approaches. A variety of communications systems can secure data transfer, and the ships can operate in any maritime environment except polar areas. The ships could be used to detect and track foreign satellites and provide support to any PRC attempt to threaten them.¹³⁹⁵

While a ship-based tracking system has advantages such as flexibility, there are also disadvantages – it is expensive to operate and maintain, and during longer missions the lack of necessary engineers and equipment could make repairs difficult. Deploying such critical systems overseas makes them vulnerable targets, and any signals interference – or PRC supporting vessels – could affect their operation. Their sea-based nature also makes advanced communications connectivity difficult, especially during bad weather. There are still technological issues, such as calibration and stabilization that frustrate the ships' operations.¹³⁹⁶

As of mid-2008, the fleet had “completed 68 maritime space-tracking missions, sailed more than 1.4 million nautical miles safely, and performed more than 7,600 days of operations at sea.... During 2011-12, Yuanwang ships 3, 5, and 6 completed a cumulative 120,000-nautical-mile, 539-day trip to provide space-tracking and control support for the docking of the Tiangong-1 space-lab module and Shenzhou-8 spacecraft.”

There have also been reports that a seventh ship was under construction; in 2006 the chief engineer of Yuanwang 6 noted that another boat was in the pre-research stages and could potentially be used in deep-space exploration missions. There has also been significant research on ship-based multi-target simulators to track and control satellite launches or missiles, which the PLA sees as a key capability. The Yuanwang could also provide support to PRC development of ground-based laser and kinetic anti-satellite capabilities. Overall, Andrew S. Erikson notes,¹³⁹⁷

In reapplying indispensable positioning information and controlling space assets overseas, the *Yuanwang* fleet represents a vital node in China's aerospace infrastructure. The construction and proliferation of these ships over the past four decades underscores their importance and utility to the country's space and military operations. Space-tracking vessels have successfully participated in full-range ICBM tests, submarine-to-shore guided-missile underwater-launch tests, communications-satellite launches, manned and unmanned space-vehicle launches, and an Antarctic visit. They have played a significant role in the development and testing of technologies and weapons.... Chinese research literature also points to a larger role for space TT&C ships as the nation's space operations continue to expand.

Anti-Access/Area Denial Land-based Space Programs

China also has a broad range of land-based stations that enhance its space warfare capabilities in ways that can threaten or attack US power projection capabilities.¹³⁹⁸

China has three satellite launch centers and stations: Jiuquan (also known as Base 20 and Dongfeng Space City), Xichang (Base 27), and Taiyuan (Base 25). The country is currently constructing a station in Wenchang (also known as Wenchang Space City and Wenchang Satellite Launch Center), which

should be operational in 2013. Additionally, it has two control facilities: an Aerospace Command and Control Center in Xi'an (also known as Base 26). The Aerospace Telemetry Oceanic Ship Base is a crucial ground station, as it tracks *Yuanwang* data on both commercial satellites and spacecraft. Established in 1978 in Jiangyin, Jiangsu Province, the base sends the ships it operates primarily to the Pacific and Indian Oceans. China operates three integrated land-based space-monitoring and control network stations in Kashi, Jiamusi, and Sanya....

China has overseas tracking stations in Karachi, Pakistan; Malindi, Kenya; and Swakopmund, Namibia. The Malindi station, in an Indian Ocean coastal town, became operational in July 2005 to support the *Shenzhou 6* mission. In Swakopmund, the station works in conjunction with *Yuanwang 3* to provide telemetry, tracking and command (TT&C) support during *Shenzhou* spacecraft landings. China also had a ground station in Tarawa, Kiribati; but it was dismantled in 2003 after Kiribati recognized Taiwan. Beijing plans to construct three ground-control stations in South America by 2016 for deep-space network support. Additionally, China reportedly shares space-tracking facilities with France, Sweden, and Australia.

US Missile Forces

The US does not discuss details of its use of missile warfare in Asia in its unclassified military literature and has not made this a major part of its discussion of force rebalancing in Asia. It is clear, however, that conventional and nuclear missile capabilities are as important to the US side of the sea-air-missile-space balance as they are to China and the Koreans, that they sharply affect the land balance in terms of joint warfare, and that the degree of future US and Chinese cooperation or competition will affect every aspect of the Korean, Northeast Asian, and Pacific balances.

The US has a variety of liquid- and solid-fueled cruise and ballistic missiles that affect the military balance in any region in the world. Most of the longer-range US missile systems are nuclear-armed. These include the forces shown in **Figure IX.4**.

According to the NTI, nuclear-armed US missile forces now have the following characteristics:¹³⁹⁹

The United States produces highly sophisticated liquid- and solid-fueled ballistic missiles as well as cruise missiles. According to a 2015 estimate, Washington deploys 450 LGM-30G Minuteman III nuclear-tipped intercontinental ballistic missiles (ICBM) at bases in Montana, North Dakota, and Wyoming. The Navy deploys 288 UGM-133A Trident II D-5 submarine launched ballistic missiles (SLBM) on 14 Ohio-class nuclear-powered ballistic missile submarines (SSBN). The Air Force deploys 16 B-2A bombers that can carry up to 16 nuclear bombs and 44 B-52H Stratofortress bombers that can each carry up to 20 AGM-86B nuclear tipped air-launched cruise missiles (ALCM) each.

Following the Intermediate-Range Nuclear Forces Treaty (INF), the United States eliminated its entire stockpile of intermediate-range ballistic missiles (IRBM) and medium-range ballistic missiles (MRBM). [46] Pursuant to the restrictions of the INF, the United States does not possess ballistic or cruise missiles with ranges between 500 and 5,500 kilometers. In the 2010 Nuclear Posture Review, the United States decided to retire the Navy's nuclear-tipped Tomahawk sea-launched cruise missiles (TLAM-N).

The United States devotes considerable budgetary resources to missile defense systems, including those designed to intercept incoming missiles at the boost, midcourse, and terminal phases. Most proposed systems are hit-to-kill interceptors and many are in the early stages of research and development.

The "most mature" short-range system is the PAC-3 Patriot system (MIM-104F). Use of PAC-3 systems in the 2003 Iraq war produced mixed results: while it successfully intercepted the nine "most threatening" ballistic missiles, it failed to detect several low-flying Iraqi cruise missiles and ultralight aircraft, and friendly fire on coalition aircraft resulted in the deaths of three soldiers.

The Army has activated two batteries, with a total of 48 interceptors, of the land-based terminal-phase Terminal High Altitude Area Defense (THAAD) system.

The Navy operates 26 ships equipped with the Aegis Ballistic Missile Defense system, which has been deployed to Europe and sold to Japan.

Finally, the Air Force has deployed 30 Ground Based Midcourse Defense (GMD) interceptors in silos at Fort Greely, Alaska, and Vandenberg Air Force Base, California. In November 2014, the Aegis Ballistic Missile Defense system was successfully tested, with one ballistic missile target and two cruise missile targets destroyed.

On 22 June 2014, the United States successfully conducted a test of its homeland Ground-based Missile Defense System. This marked the first successful use of a "second-generation kinetic kill vehicle," mounted on a Ground Based Interceptor (GBI) against an intermediate-range missile target. The effectiveness of the new Exoatmospheric Kill Vehicle, dubbed the "CE-2," bolstered the popularity of the Defense Department's \$1 billion plan to station 14 more GBI missiles in Fort Greely, Alaska by 2017. Given the program's cost, however, some experts and former government officials remain circumspect, citing concerns with the technology's ability to perform consistently, and the fact the "CE-2" has yet to successfully intercept an ICBM—the primary objective of the anti-missile program.

The February 2010 Ballistic Missile Defense (BMD) Review reversed the Bush Administration's plans for an antiballistic missile shield in Eastern Europe, instead adopting a four-phase, adaptive approach that will focus new technologies on the threat from short- and medium-range missiles to U.S. and allied forces. In March 2013 the Obama Administration canceled Phase IV, which called for SM-3 IIB ground-based interceptors to be deployed to Europe by 2018. [59] Secretary of Defense Chuck Hagel announced that cancellation of the fourth phase would help fund an additional 14 GMD interceptors for Alaska by 2017. In June 2013, the House Armed Services Committee authorized funding for East Coast GMD interceptors, while the head of the Missile Defense Agency argued there was no security need for their deployment.

The United States is a member of the Missile Technology Control Regime (MTCR), whose goal is to restrict the proliferation of unmanned delivery systems capable of delivering weapons of mass destruction. Washington also subscribes to the Hague Code of Conduct Against Ballistic Missile Proliferation (HCOC), designed to supplement and bolster the MTCR.

Unlike China, which emphasizes the development of long-range conventionally armed ballistic missiles, the US emphasizes precision-guided cruise missiles and stand-off air-delivered precision-guided weapons. These now make up the conventionally armed part of the US inventory. The US is, however, examining new ways to use its strategic missiles and new conventional strike systems in Prompt Global Strike missions (PGS). These systems could become conventional weapons of mass effectiveness and play a major role in deterrence, defense, and countering the use of nuclear weapons by the DPRK or China.

A 2015 report by Amy Woolf of the US Congressional Research Service notes that,¹⁴⁰⁰

CPGS weapons would not substitute for nuclear weapons, but would supplement U.S. conventional capabilities. They would provide a "niche" capability, with a small number of weapons directed against select, critical targets. Some analysts, however, have raised concerns about the possibility that U.S. adversaries might misinterpret the launch of a missile with conventional warheads and conclude that the missiles carry nuclear weapons. The U.S. Department of Defense (DOD) is considering a number of systems that might provide the United States with long-range strike capabilities.

The Air Force and Navy have both considered deploying conventional warheads on their long-range ballistic missiles. The Navy sought to deploy conventional warheads on a small number of Trident II submarine-launched ballistic missiles. In FY2008, Congress rejected the requested funding for this program, but the Navy has continued to consider the possibility of deploying intermediate-range technologies for the prompt strike mission. The Air Force and the Defense Advanced Research Projects Agency (DARPA) are developing a hypersonic glide delivery vehicle that could deploy on a

modified Peacekeeper land-based ballistic missile—a system known as the conventional strike missile (CSM). In FY2008, Congress created a single, combined fund to support research and development for the CPGS mission. Congress appropriated \$65.4 million for this program in FY2014 and \$95.6 million in FY2015; the Obama Administration has requested \$78.8 million for FY2016.

Unclassified studies do not specifically mention the role of these missiles in deterring and defending against China, but the target types that are suggested clearly affect Chinese forces.¹⁴⁰¹

The United States might also be faced with circumstances during an ongoing conflict when it would need to destroy targets that could appear quickly and remain vulnerable for short periods of time. These might include leadership cells that could move during a conflict or mobile military systems that the adversary had chosen to keep hidden prior to their use. These types of targets might only be vulnerable to weapons that the United States could launch promptly and direct to their targets quickly. Analysts have noted that PGS might provide the means to attack such targets if the United States did not have the necessary weapons located near the conflict.

The Defense Science Board outlined several of these potential scenarios in a March 2009 report prepared by the Task Force on Time Critical Conventional Strike from Strategic Standoff. This report “formulated five representative scenarios” that might require a “very rapid strike response to a developing situation.”¹⁶ These scenarios included several cases:

- A near-peer competitor had used its emerging counter-space capability to destroy a U.S. satellite.
- The United States wanted to destroy a package of special nuclear materials that a terrorist organization had shipped to a neutral country.
- A small package of weapons of mass destruction was located temporarily in a rural area of a neutral country.

The US Navy and Air Force both have suggested programs, but the Air Force currently seems to have the most chance of sustained funding, and its programs illustrate the capabilities of the possible delivery systems.¹⁴⁰²

...[M]odified Minuteman II missiles might each be able to carry a single warhead that weighed between 500 and 1,000 pounds; a modified Peacekeeper could possibly carry between 6,000 and 8,000 pounds of payload, which would allow for multiple warheads or reentry vehicles...According to some estimates, these missiles could even destroy some targets without an explosive warhead, using the, “sheer force of impact of a reentry vehicle moving at 14,000 feet per second...”

According to the DSB study, Peacekeeper missiles could also carry a single reentry body that had been modified to improve accuracy by allowing for the maneuverability of the warhead, like the E2 warhead described above.

In addition, as was noted above, the United States could use a hypersonic glide vehicle, like the CAV under consideration in the Falcon Study, as the reentry body on a long-range ballistic missile. According to the Falcon Study, the CAV would be an unpowered, maneuverable hypersonic glide vehicle capable of carrying approximately 1,000 pounds in munitions or other payload....This vehicle is a cone-shaped winged body that, after launch aboard a booster derived from a ballistic missile, would fly within the atmosphere at hypersonic speeds and maneuver to its target. ...DOD has funded this program through the defense-wide Conventional Prompt Global Strike (CPGS) program since FY2008.

The US is also examining the option of deploying shorter-range systems called the Forward-Based Global Strike (FBGS),¹⁴⁰³

The United States could also deploy intermediate or long-range, land-based ballistic missiles at bases outside the continental United States. For example, they might be deployed in Guam, Diego Garcia, or Alaska. This system could use a two-stage rocket motor, to distinguish them from current nuclear-armed ICBMs, and could also, like the SLIRBM, carry either a guided warheads the AWH hypersonic

glider. In addition, because it would be launched from outside the continental United States, its trajectory would not resemble that of a land-based ICBM. Hence, some analysts argue that it would solve many of the questions about the potential for misunderstandings and misperceptions. If the missiles had a range of less than 5,500 kilometers, they would be inconsistent with the limits in the 1987 Intermediate-Range Nuclear Forces Treaty. However, the United States has recently charged that Russia is in violation of the INF Treaty, leading some to conclude that this agreement should no longer constrain U.S. plans for intermediate-range systems.

At the same time, the USAF is seeking to develop new manned strategic bombers for conventional munitions delivery as one of the procurement priorities in its FY2016 budget request, although some outside experts feel this may be a financial place holder for funding a future unmanned combat aerial vehicle (UCAV) or shifting future funds to make up for the cost-escalation in the F-35.

Missile Defense and Space

The US has long focused on the development of missile defense systems, including systems capable of intercepting missiles at the boost, midcourse, and terminal phases. Most of these systems are still in the early stages of research and development and focus on hit-to-kill capacities. According to NTI,¹⁴⁰⁴

The “most mature” short-range system is the PAC-3 patriot system (MIM-104F). Use of PAC-3 systems in the 2003 Iraq war produced mixed results: while it successfully intercepted the nine “most threatening” ballistic missiles, it failed to detect several low-flying Iraqi cruise missiles and ultralight aircraft, and friendly fire on coalition aircraft resulted in the deaths of three soldiers. The Army has activated two batteries, with a total of 48 interceptors, of the land-based terminal-phase Terminal High Altitude Area Defense (THAAD) system. The Navy operates 26 ships equipped with the Aegis Ballistic Missile Defense system, which has been deployed to Europe and sold to Japan. Finally, the Air Force has deployed 30 Ground Based Midcourse Defense (GMD) interceptors in silos at Fort Greely, Alaska, and Vandenberg Air Force Base, California.

In its FY2017 defense budget overview, the US summarized its strategy for dealing with deterrence and nuclear forces as follows:¹⁴⁰⁵

The FY 2017 budget request funds the development and deployment of ballistic missile defense (BMD) capabilities to support the Administration’s commitment to protect the U.S. homeland, deployed forces, allies, and partners. The FY 2017 budget request for missile defense is \$9.1 billion, which includes \$7.5 billion for the Missile Defense Agency and reflects a decrease of \$.7 billion below the FY 2016 enacted level of \$9.8 billion.

For homeland defense, the FY 2017 budget request maintains the commitment to increase the number of deployed Ground-Based Interceptors (GBI) to 44 (by delivering an additional 14 interceptors over the FY 2016 level of 30 fielded interceptors); continue development of the Redesigned Kill Vehicle (REKV); and proceed with the development of the Long-Range Discrimination Radar (LRDR). When combined with the planned GBI reliability, system engineering, and discrimination improvements, these enhancements will enable the missile defense system to deal effectively with the Intercontinental Ballistic Missile (ICBM) threat from North Korea and a potential ICBM threat from Iran.

The FY 2017 budget request also reflects the Department’s commitment to building the regional missile defense forces that are interoperable with the North Atlantic Treaty Organization (NATO) Air Command and Control and Patriot Systems, Israeli Arrow and Patriot Weapon Systems, and Japan Aerospace Defense Ground Environment (JADGE), and Aegis Weapon Systems and SM-3 interceptors deployed by international partners.

The Department continues to support the European Phased Adaptive Approach (EPAA), which is designed to protect U.S. deployed forces and allies in Europe from ballistic missile attacks from the Middle East. The FY 2017 budget request supports the implementation of Phase 3 of the EPAA, to

include the deployment of Aegis Ashore to Poland in the FY 2018 timeframe. The Aegis Ashore will be capable of launching Standard Missile-3 (SM-3) Blocks IA, IB, and IIA (delivery in 2018) variants.

The FY 2017 budget request also:

- Provides additional funding for key capabilities to meet the maturing threat from North Korean ICBMs and the potential threat from Iranian ICBMs, including GBI reliability and system engineering enhancements, GBI modifications to address the root causes of previous flight test failures, and operation of the Sea-Based X-band radar;
- Provides funding for advanced technologies to meet the future threat, including discrimination improvements, directed energy research, and multiple kill technologies;
- Provides funding for Terminal High Altitude Area Defense (THAAD) concept development and risk reduction activities for follow-on capabilities; and procures 24 THAAD interceptors in FY 2017;
- Procures 85 new Missile Segment Enhancement (MSE) missiles. The MSE is a significant evolutionary improvement over the Patriot Advanced Capability-3 (PAC-3) missile, and provides greater agility and lethality;
- Continues U.S. contributions to the Iron Dome system to defeat short-range missiles and rockets; continues support for the Arrow Weapon System, Israeli Upper Tier Interceptors, and the David's Sling Weapon System; and
- Continues conversion of Aegis ships to provide BMD capability and procures 35 SM-3 Block IB missiles to be deployed on Aegis BMD ships and at the Romania Aegis Ashore site.

Space

The US has long led the world in space capabilities, although Russia remains a competitor. As has already been described, however, this is a key priority in Chinese force development that is already affecting the balance in Asia. It is unclear how this competition and current US budget cuts will affect this lead.

The Department of Defense budget request for FY2017 included the following developments.¹⁴⁰⁶

The FY 2017 budget request includes \$7.1 billion for the DoD Space Investment Programs, which reflects an increase of \$0.1 billion above the FY 2016 enacted level of \$7.0 billion. For FY 2017, the Department continues to modify the space program portfolio based on the Space Strategic Portfolio Review, which recommended strategic goals and capabilities to implement an assured spaces strategy. The budget allows the United States to maintain supremacy in space and provides communications, navigation, missile warning, space situational awareness, and environmental monitoring capabilities.

The Air Force completes Global Positioning System (GPS) III space vehicles (SV) 01 and 02 for available launch activities and updates the procurement profile to position the program for a potential follow-on competition to procure SV 11-32.

The Air Force continues the development of the GPS Operational Control System (Blocks 1 and 2) and the Military GPS User Equipment Increment 1. The Air Force also funds the GPS Prime Integrator (Enterprise Integration) effort to synchronize space control and user segment programs and manage civil/military specifications and requirements.

The Air Force continues to explore an alternative architecture for Satellite Communications (SATCOM) and Overhead Persistent Infrared (OPIR). The FY 2017 budget request also sustains the existing SATCOM and OPIR systems through the transition, maintaining the Advanced Extremely High Frequency capability with vehicles 5/6 through 2027 and the Space-Based Infrared System geosynchronous orbit capability with vehicles 5/6 through 2025.

The Air Force is exploring cost-effective acquisition approaches for meeting the Department's future space based environmental monitoring (SBEM) capabilities. The request includes funding for the Weather System Follow-On (WSF), which will begin during in FY 2016. The FY 2017 budget request includes a reduction in scope for the Defense Meteorological Satellite Program (DMSP) to include only sustainment of the on-orbit constellation and divestment of Flight 20. The Department's overall SBEM approach leverages civil and partnerships while investing in WSF to meet DoD requirements.

The Evolved Expendable Launch Vehicle (EELV) program has been aligned with satellite launch schedules in FY 2017 while aggressively pursuing competition. The FY 2017 budget request also continues the block buy of five EELV launch services, three of which are set aside for competition and usually ordered 24 months prior to the planned mission, as well as activities such as launch preparation, site and operations activities, post mission analysis, and related tasks. The Air Force is taking steps to ensure the existence of two commercially-viable, domestically-sourced space launch service providers with the objective of also eliminating reliance on a foreign-made liquid rocket engine. The Air Force is also planning one or more Public-Private Partnership ventures for these efforts, which may include new upper stages as part of the development effort. The Air Force certified SpaceX as an EELV provider on May 19, 2015.

The FY 2016 budget request established a new account for Air Force major space procurement programs. The Congress approved the new space appropriation; however, in the Statement of Managers for the Consolidated Appropriations Act for 2016, the Congress directed that all space-related procurement line items should be included in this new appropriation. Therefore, the FY 2017 budget request transfers all space-related items requested in Other Procurement, Air Force appropriation to the Space Procurement, Air Force appropriation.

The FY 2017 budget requests 5-year availability for the Space Procurement, Air Force account. Although it is reasonable and appropriate for the overwhelming majority of acquisition programs to have a 3-year period of availability (POA), modern satellites are highly complex and can take up to a decade to design and build. The long development and production timelines are more like those of large Navy ships, which are funded in the Shipbuilding and Conversion, Navy appropriation with a base POA of 5 years.

The additional 2 years for the Space appropriation would provide time for obligations for engineering services, test and evaluation, and other activities that must be performed in the final stages of satellite development; thus, a 5-year POA would make the funds available for obligation for the duration of development and production.

The US is also China's only peer in ship-based space tracking:¹⁴⁰⁷

The U.S. Military Sealift Command, founded in 1958, has a Sepcal Mission Program that currently includes 25 ships supporting military and government tasks. It operates three active instrumentation ships... which "provide platforms for monitoring missile launches and collecting data that can be used to improve missile efficiency and accuracy." The *Observation Island* is fitted with Cobra Judy (AN/SPQ-11), a passive electronically scanned array radar that supports space and ballistic-missile tracking as well as other instrumentation. It is linked to two types of non-maritime radars: the ground-based Cobra Dane (AN/FPS-108) in Shemya, Alaska; and three Cobra Ball (RC-135S) aircraft. As part of the U.S. ballistic-missile defense system, the Military Sealift Command operations the Sea-based X-band Radar Platform (SBX-1).

These assets represent parts of a larger U.S surveillance network that includes such allied land-based components as the ballistic-missile detection radars at Fylingdales, U.K.; and Thule, Greenland. With its global ground- and space-based C4ISR, the United States is far less reliant than China on this sea-based approach. Few other countries even have space-event support ships. Russia today operates only the *Akademik Sergei Korolev*, and France the *Monge*. No other country maintains a significant presence in this field.

Nuclear Forces

There is no way to assess the exact probability that the US or China would make threats to use their nuclear weapons in a Korean conflict, or that they'd ever escalate to actually using them, but the probability they would even make explicit threats seems extremely low. Each side's nuclear weapons have a deterrent impact in restraining the other's behavior without such threats, and even raising the possibility of an actual nuclear exchange would threaten the stability of Asia, the global economy, and the US and Chinese economies in ways in which the end result could not be calculated.

Both sides seem likely to calculate that moving beyond the tacit threat posed by the existence of the other's nuclear forces and would almost certainly be so destructive as to be more costly than any strategic or military gains in a limited war could ever be worth.

At the same time, neither side can predict what would happen if the ROK and DPRK became involved in a conflict that led the DPRK to threaten the use of nuclear weapons or make extensive use of other WMD. A successful major offensive that threatened the existence of either the DPRK or ROK could trigger threats to use nuclear forces or even actual use.

The US offer of extended deterrence links the US to the nuclear balance in the Koreas and indirectly to China, while China's treaty alliance with the DPRK links it to the Korean nuclear balance and the US as well. The possible use of precision conventional-strike capability against high-value strategic and economic targets – “weapons of mass effectiveness” could produce a process of escalation neither side intended but both would then have to deal with. The possibility that the ROK or Japan might eventually develop nuclear weapons could add a further level of uncertainty in the future.

Unclassified estimates of the present structure of US, Chinese, and other outside nuclear forces are shown in the following figures:

- **Figure IX.4 compares the overall strength of US and major Northeast Asian nuclear powers.**
- **Figure IX.5 provides an estimate of the global holdings of nuclear weapons.**

These nuclear balances include Russia, and it is important to note that most US thinking about the nuclear balance still focuses on Russia and Europe. The forces on each side are also anything but static. The US is pursuing ways to reduce nuclear forces. China is increasing its forces and their capability, although there is little credible unclassified data on Chinese plans and activity.

It is also unclear that weapons numbers would be meaningful unless events forced both sides into a major nuclear engagement. The fact the US will have much larger weapons numbers for the foreseeable future might mean the US could theoretically “win” in terms of inflicting the most strikes and damage, but such a victory would be as pyrrhic a “victory” as a feared Cold War-era exchange between the US and Russia. Nevertheless, the US and China are major nuclear powers with boosted and thermonuclear weapons. While neither is likely to use these weapons, they have the capability and – at a minimum – their possession of nuclear weapons plays a major role in the balance of deterrence and in shaping the risks of asymmetric escalation.

Figure IX.4: US and Asian Nuclear Capable Forces**China**

Quantity	Role/Type
Strategic Missiles (figures are estimates)	
ICBM	
8	DF-31 (CSS-10 Mod 1)
24	DF31A (CSS-10 Mod 2)
10	DF-4 (CSS-3)
20	DF-5A (CSS-4 Mod 2)
MRBM	
80	DF-21/21A (CSS-5 Mod 1/2)
36	DF21C (CSS-5 Mod 4)
18	DF-21D (CSS-5 Mod 5 – ASBM)
12	DF-16
IRBM	
16	DF-26
SRBM	
108	DF-11A (CSS-7 Mod 2)
81	DF-15B (CSS-6 Mod 3)
LACM	
54	DH-10
Navy	
4	Jin

With up to 12 JL-2 (CSS-NX-14) strategic SLBM (operational status unknown)

United States

Quantity	Role/Type
Navy	
14	Ohio SSBN 730
	<i>Each with up to 24 UGM-133A Trident D-5 strategic SLBM</i>
Air Force	
6	SQN with B-52H Stratofortress
	<i>Each with up to 20 AGM-86B nuclear ALCM and/or AGM-129A nuclear ACM</i>
2	SQN with B-2A Spirit
	<i>Each with up to 16 free-fall bombs (or 80 when fitted with Small Diameter Bombs)</i>
9	SQN with 450 LGM-30G Minuteman III
	<i>Each with a capacity of 1-3 MIRV Mk12/Mk12A per missile</i>

Russia

Quantity	Role/Type
Navy	
3	Kalmar (Delta III) <i>Each with 16 RSM-50 (SS-N-18 Stingray) strategic SLBM</i>
6	Delfin (Delta IV) <i>Each with 16 R-29RMU Sineva (SS-N-23Skiff) strategic SLBM (1 vessel in repair, 2014 expected return to service)</i>
1	Akula (Typhoon) <i>Each with 20 RSM-52 Sturgeon strategic SLBM</i>
3	Borey <i>Each with 16 Bulava (SS-N-32) strategic SLBM</i>
Strategic Missiles	
54	RS-20 (SS-18) Satan (mostly mod 5, 10 MIRV per msl)
108	RS-12M (SS-25) Sickle
30	RS-18 (SS-19) Stiletto (mostly mod 3, 6 MIRV per msl)
60	RS-12M2 Topol-M (SS-27M1), silo based
18	RS-12M2 Topol-M (SS-27M1), road mobile
58	RS-24 (SS-27M2) Yars (estimated 3 MIRV per msl)
4	RS-24 Yars (SS-27M2; 3MIRV per msl) silo-based
Long-Range Aviation Command	
16	Tu-160 Blackjack <i>each with up to 12 Kh-55SM (AS-15A/B Kent) nuclear ALCM</i>
60	Tu-95MS/MSM Bear H <i>each with up to 6 Kh-55/SM (AS-15A/B Kent) strategic ALCM</i>

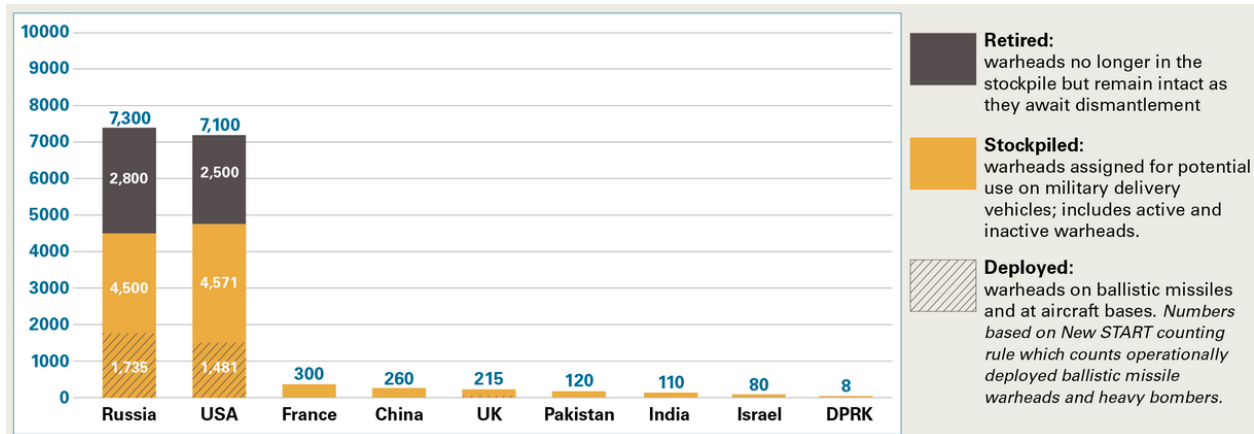
Source: Based primarily on material in IISS, *The Military Balance 2016*. Figures do not include equipment used for training purposes. Some equipment and personnel figures are estimates. All equipment figures represent equipment in active service.

Figure IX.5: Comparative Estimates of Global Holdings of Nuclear Weapons – Part One

Federation of American Scientists =FAS, and Center for Arms Control and Non-Proliferation=CAC

Country	Russia		US		China		DPRK	
Information Source	FAS ¹⁴⁰⁸	CAC ¹⁴⁰⁹	FAS	CAC	FAS	CAC	FAS	CAC
Operational: Strategic	1,790	2458	1,750	2018	0	n/a	0	n/a
Operational: Non-strategic	0	0	180	-	?	n/a	n/a	n/a
Non-deployed/ Reserve	2,700	2,000 (+ 3200 retired)	2,570	2,680 (+ 2,340 retired)	260	205	?	<20
Total Inventory	7300	7658	7,000	7,038	260	180-230	?	<20
Growth Trend	Decrease		Decrease		Growing		Growing	

Arms Control Association: Estimated 2016 Global Inventories



Source: FAS, Status of World Nuclear forces, May 26, 2016., <http://www.fas.org/programs/ssp/nukes/nuclearweapons/nukestatus.html>; prepared by Lesley McNiesh, updated by Justin Bresolin; "Fact Sheet: Global Nuclear Weapons Inventories in 2013," Center for Arms Control and Non-Proliferation, March 2013, http://armscontrolcenter.org/issues/nuclearweapons/articles/fact_sheet_global_nuclear_weapons_inventories_in_2012/. The ACA estimate is taken from work by Hans S. Kristensen and Robert S. Norris of the Department of State, Updated August 15, 2016, https://www.armscontrol.org/files/images/WarheadInventories_160815.png. and U.S. State Department, New START Treaty Aggregate Numbers of Strategic Offensive Arms, Fact Sheet Bureau of Arms Control, Verification, and Compliance, July 1, 2016 and <http://www.state.gov/t/avc/rls/2016/259273.htm>.

Chinese Nuclear Forces

China is one of the five nuclear weapons states acknowledged in the Nuclear Non-Proliferation Treaty (NPT). China's first nuclear test occurred in 1964. Since then, China has conducted 45 nuclear tests, including thermonuclear weapons and a neutron bomb.¹⁴¹⁰ It has also become a party to the Comprehensive Test Ban Treaty, the Biological and Toxin Weapons Convention, and the Chemical Weapons Convention.

Chinese and US Views of China's Nuclear Forces: No First Use

China was also the first nuclear weapons state to declare a “no first use policy, although it should be stressed that a policy is not a firm limit on actual warfighting capability.”¹⁴¹¹ China maintained this public no-first-use policy through at least 2010.

China's 2008 Defense White Paper stated that,¹⁴¹²

The Second Artillery Force is a strategic force under the direct command and control of the CMC, and the core force of China for strategic deterrence. It is mainly responsible for deterring other countries from using nuclear weapons against China, and for conducting nuclear counterattacks and precision strikes with conventional missiles.

The Second Artillery Force sticks to China's policy of no first use of nuclear weapons, implements a self-defensive nuclear strategy, strictly follows the orders of the CMC, and takes it as its fundamental mission the protection of China from any nuclear attack. In peacetime the nuclear missile weapons of the Second Artillery Force are not aimed at any country. But if China comes under a nuclear threat, the nuclear missile force of the Second Artillery Force will go into a state of alert, and get ready for a nuclear counterattack to deter the enemy from using nuclear weapons against China.

If China comes under a nuclear attack, the nuclear missile force of the Second Artillery Force will use nuclear missiles to launch a resolute counterattack against the enemy either independently or together with the nuclear forces of other services. The conventional missile force of the Second Artillery Force is charged mainly with the task of conducting medium- and long-range precision strikes against key strategic and operational targets of the enemy.

Similarly, China's 2010 White Paper argued that,¹⁴¹³

China has never evaded its obligations in nuclear disarmament and pursues an open, transparent and responsible nuclear policy. It has adhered to the policy of no-first-use of nuclear weapons at any time and in any circumstances, and made the unequivocal commitment that under no circumstances will it use or threaten to use nuclear weapons against non-nuclear-weapon states or nuclear-weapon-free zones. China has never deployed nuclear weapons in foreign territory and has always exercised the utmost restraint in the development of nuclear weapons, and has never participated in any form of nuclear arms race, nor will it ever do so. It will limit its nuclear capabilities to the minimum level required for national security

China's 2013 Defense White Paper did not address these issues. China is, however, in the process of a major modernization of its nuclear-armed missile forces and is developing a “stealth” strike aircraft – the J-20. It is also now MIRVing its nuclear systems. As a result, The US Department of Defense report on Chinese military power for 2013 provided the following analysis of how these developments interact with China's no first use policy.¹⁴¹⁴

China's official policy on nuclear weapons continues to focus on maintaining a nuclear force structure able to survive an attack and respond with sufficient strength to inflict unacceptable damage on an enemy. The new generation of mobile missiles, with warheads consisting of MIRVs and penetration aids, are intended to ensure the viability of China's strategic deterrent in the face of continued advances in U.S. and, to a lesser extent, Russian strategic intelligence, surveillance, and reconnaissance (ISR), precision strike, and missile defense capabilities.

The PLA has deployed new command, control, and communications capabilities to its nuclear forces. These capabilities improve the Second Artillery's ability to command and control multiple units in the field. Through the use of improved communications links, the ICBM units now have better access to battlefield information, uninterrupted communications connecting all command echelons, and the unit commanders are able to issue orders to multiple subordinates at once, instead of serially via voice commands.

China has consistently asserted that it adheres to a "no first use" (NFU) policy, stating it would use nuclear forces only in response to a nuclear strike against China. China's NFU pledge consists of two stated commitments: China will never use nuclear weapons first against any nuclear-weapon state, and China will never use or threaten to use nuclear weapons against any non-nuclear-weapon state or nuclear-weapon-free zone. However, there is some ambiguity over the conditions under which China's NFU policy would apply, including whether strikes on what China considers its own territory, demonstration strikes, or high-altitude bursts would constitute a first use.

Moreover, some PLA officers have written publicly of the need to spell out conditions under which China might need to use nuclear weapons first; for example, if an enemy's conventional attack threatened the survival of China's nuclear force or of the regime itself. However, there has been no indication that national leaders are willing to attach such nuances and caveats to China's NFU doctrine.

China will likely continue to invest considerable resources to maintain a limited, but survivable, nuclear force (sometimes described as "sufficient and effective"), to ensure the PLA can deliver a damaging retaliatory nuclear strike.

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Estimates of China's Nuclear Forces: No First Use

Estimates of Chinese nuclear forces differ by source, as has been seen in **Figures IX.4 and IX.5**. An estimate by the Nuclear Threat Initiative (NTI) estimated that as of April 2015 China has approximately 260 nuclear warheads, four operational Jin class submarines and

50-60 ICBMs that are nuclear capable. It also estimates that China has an unofficial moratorium on fissile material production. The country is estimated to have 20 +/-4 tons of HEU and 2 +/-5 tons of plutonium.”¹⁴¹⁵

The NTI describes the Chinese nuclear stockpile in detail:¹⁴¹⁶

On 16 October 1964 China exploded its first nuclear device. China has since consistently asserted that its nuclear doctrine is based on the concept of no-first-use, and Chinese military leaders have characterized the country’s nuclear weapons as a minimum deterrent against nuclear attacks. Although the exact size of China’s nuclear stockpile has not been publicly disclosed, reports indicate that as of 2011 China has produced a total of 200 to 300 nuclear warheads. In 2011, Robert S. Norris and Hans M. Kristensen estimated the size of China’s current nuclear stockpile to be approximately 240 warheads, with 178 deployed...

...China successfully tested its first atomic bomb on 16 October 1964 — with highly enriched uranium produced at the Lanzhou facility — and just 32 months later on 17 June 1967, China tested its first thermonuclear device. This achievement is remarkable in that the time span between the two events is substantially less than it was for the other nuclear weapon states. By way of comparison, 86 months passed between the United States’ first atomic test and its first hydrogen bomb test; for the USSR, it was 75 months; for the UK, 66 months; and for France, 105 months...

...China’s nuclear tests in the late-1980s and 1990s were geared toward further modernizing its nuclear forces. Although China officially declared in 1994 that these tests were for improving safety features on existing warheads, they were also likely intended for the development of new, smaller warheads for China’s next-generation solid-fueled ICBMs (e.g., DF-31 and DF-31A), and possibly to develop a multiple warhead (MRV or MIRV) capability as well... China’s last test was on 29 July 1996, and less than two months later on 24 September 1996 Beijing signed the Comprehensive Nuclear Test Ban Treaty (CTBT).... In order to sign the treaty China overcame several of its initial concerns, including allowing an exemption for Peaceful Nuclear Explosions and the use of national technical means and on-site inspections for verification. The National People’s Congress, however, has yet to ratify the treaty.

Since the inception of its nuclear weapons program, China has relied on a mixture of foreign and indigenous inputs to steadily develop and modernize its nuclear arsenal from its first implosion device to the development of tactical nuclear weapons in the 1980s... As a result, The Federation of American Scientists assesses China to have at least six different types of nuclear payload assemblies: a 15-40 kiloton (kt) fission bomb; a 20 kt missile warhead; a 3 megaton (mt) thermonuclear missile warhead; a 3 mt thermonuclear gravity bomb; a 4-5 mt missile warhead; and a 200-300 kt missile warhead. China is thought to possess a total of some 150 tactical nuclear warheads on its short-range ballistic, and possibly cruise missiles....

In its...(2011) Annual Report to Congress on the Military and Security Developments of the People’s Republic of China, the U.S. Department of Defense noted that “China is both qualitatively and quantitatively improving its strategic missile forces.”...The report stated that China’s nuclear capable missile arsenal consists of a total of 55-65 intercontinental ballistic missiles (ICBMs), including: silo-based, liquid-fueled DF-5 (CSS-4) ICBMs; solid-fueled, road-mobile DF-31 (CSS 10 Mod-1) and DF-31A (CSS-10 Mod 2) ICBMs; limited-range CSS-3 ICBMs; and liquid-fueled CSS-2 intermediate-range ballistic missiles; DF-21 (CSS-5) road-mobile, solid-fueled MRBMs; and JL-1 submarine-launched ballistic missiles (SLBM) for China’s single XIA-class SSBN.

China also possesses DF-15 (CSS-6) and 700-750 DF-11 (CSS-7) short-range ballistic missiles (SRBMs), though China maintains significantly fewer launchers, and 200-500 DH-10 (a cruise missile thought to be able to support a nuclear payload). The Department of Defense assesses that all Chinese SRBMs are deployed near Taiwan. Most recently, China has developed the long-range DF-31 and DF-31A ICBMs. The 2011 report assessed that while the JIN-class submarine appeared ready, its accompanying JL-2 SLBM system had failed several flight tests and remained in the development stage. It is currently uncertain when the JIN/JL-2 combination will become fully operational....

There is an ongoing effort to shift from liquid-fueled missiles to solid-fueled ones which, among other advantages, can be launched more rapidly...China has also continued to develop new missile launch sites and underground storage facilities in remote inland regions, including the Gobi Desert and the Tibetan highlands. As there is no evidence of long-range missiles being deployed to these new locations, the launch sites appear to be intended primarily as forward bases for potential launches against Russia and India.

Even as it continues to develop its arsenal, however, China has also slowly moved towards increased openness in its willingness to share a limited amount of deployment information and strategy. For example, the 2010 China Defense White Paper details Beijing's no-first-use policy and roughly outlines several stages of nuclear alert. The paper states that "nuclear-weapon states should negotiate and conclude a treaty on no-first-use of nuclear weapons against each other." The White Paper also states China's "unequivocal commitment that under no circumstances will it use or threaten to use nuclear weapons against non-nuclear-weapon states or nuclear-weapon-free zones."

...China's nuclear tests in the late-1980s and 1990s were geared toward further modernizing its nuclear forces. Although China officially declared in 1994 that these tests were for improving safety features on existing warheads, they were also likely intended for the development of new, smaller warheads for China's next-generation solid-fueled ICBMs (e.g., DF-31 and DF-31A), and possibly to develop a multiple warhead (MRV or MIRV) capability as well.

China's last test was on 29 July 1996, and less than two months later on 24 September 1996 Beijing signed the Comprehensive Nuclear Test Ban Treaty (CTBT). In order to sign the treaty China overcame several of its initial concerns, including allowing an exemption for Peaceful Nuclear Explosions and the use of national technical means and on-site inspections for verification. The National People's Congress, however, has yet to ratify the treaty.

China's 1996 signing of the CTBT was the latest in a series of policy shifts on nuclear nonproliferation issues. In fact, it was during the 1980s that China's position on nuclear proliferation first started to change. Since the 1960s, Beijing had criticized the Treaty on the Non-Proliferation of Nuclear Weapons (NPT) as imbalanced and discriminatory, but by the 1980s the country had also indicated that it accepted in principle the norm of nuclear nonproliferation ...

In August 1991, shortly after France acceded to the NPT, China also declared its intention to join, though it again expressed its reservations about the treaty's discriminatory nature...China formally acceded to the NPT in March 1992, as a nuclear weapon state. In its statement of accession, the Chinese government called on all nuclear weapon states to issue unconditional no-first-use pledges, to provide negative and positive security assurances to non-nuclear weapon states, to support the development of nuclear weapon-free zones, to withdraw all nuclear weapons deployed outside of their national territories, and to halt the arms race in outer space. Since its accession, China has praised the NPT's role in preventing the proliferation of nuclear weapons, and also supported the decision to indefinitely extend the NPT at the 1995 Review and Extension Conference...

However, China has continued to state that it views nonproliferation not as an end in itself, but rather as a means to the ultimate objective of the complete prohibition and thorough destruction of nuclear weapons. Despite this, China was embroiled in nuclear proliferation scandals throughout the late 1980's and early 1990's, particularly with respect to its sale of ring magnets to Pakistan in 1995. China provided Pakistan with a nuclear bomb design (used in China's October 1966 nuclear test). These designs were later passed to Libya by the A.Q. Khan network, and discovered by IAEA inspectors in 2004 after then President Muammar Qadhafi renounced his nuclear weapons program and allowed inspectors to examine related facilities.

The plans contained portions of Chinese text with explicit instructions for the manufacture of an implosion device....In the late 1990s, the U.S. Congress formed the Select Committee on U.S. National Security and Military-Commercial Concerns with China (also known as the Cox Committee). According to the Cox Committee Report, China engaged in an active espionage program and stole several nuclear bomb designs as early as the late 1970s. Designs compromised include the United States' then-most advanced W-88 warhead and a design for an enhanced radiation weapon (neutron

bomb). However, the Cox Report has been severely criticized by both experts and officials in the United States and China as a political document that has several technical inaccuracies.

...There is much speculation that China's nuclear modernization program may be geared toward developing the capacity to move from a strategy of minimum deterrence to one of limited deterrence. Under a "limited deterrence" doctrine, China would need to target nuclear forces in addition to cities, which would require expanded deployments. However, such a limited deterrence capability may still be a long way off. According to Alastair Johnston, "...is fairly safe to say that Chinese capabilities come nowhere near the level required by the concept of limited deterrence."...

Meanwhile, tensions between China and Taiwan have declined, and in the wake of Japan's 2011 nuclear crisis, China and Taiwan are taking concrete measures to cooperate on nuclear safety issues. Such cross-strait cooperation includes establishing a formal nuclear safety agreement and an official contact mechanism between the two sides, which will be used to facilitate information exchanges and emergency responses in case of an accident...

While China's decreased threat perception may not slow its nuclear modernization efforts, which are seen simply as representing the replacement of obsolete equipment, it does have the potential to slow acquisitions in key areas — for example, the buildup of short-range missiles. If sustained, the shift may also make both sides more amenable to nonproliferation efforts such as ratification of the Comprehensive Nuclear Test Ban Treaty.

Chinese Biological and Chemical Weapons

While China is a party to many of the international agreements regulating biological weapons, past US government reports have alleged that China maintains a small offensive weapons program and has engaged in proliferation of related items to countries such as Iran. There have also historically been concerns in the US about Chinese will to enforce export controls on dual use items, but the State Department concluded in 2011 that there were no compliance issues raised between the two.

In ratifying the Chemical Weapons Convention in 1997, China declared three former production facilities. While the US has doubted that China was fully declaring its previous and current activities in this area, the US reported most of its concerns resolved in 2011.¹⁴¹⁷

Role of Chinese Special Forces and Tunnel Facilities

The PLA has been building underground tunnels to protect and conceal its key assets since the early 1950s; the underground tunnel network reportedly stretches for over 5,000 km.¹⁴¹⁸ Experts like Phillip Karber note their value in terms of both missile deployments and the potential ability to stockpile much larger numbers of nuclear weapons than are normally estimated to be in China's forces.¹⁴¹⁹

The US DOD, however, sees these efforts as largely defensive:¹⁴²⁰

...China maintains a technologically advanced underground facility (UGF) program protecting all aspects of its military forces, including C2, logistics, missile, and naval forces. Given China's NFU nuclear policy, China has assumed it may need to absorb an initial nuclear blow while ensuring leadership and strategic assets survive.

China determined it needed to update and expand its military UGF program in the mid to late 1980s. This modernization effort took on a renewed urgency following China's observation of U.S. and NATO air operations in Operation Allied Force and of U.S. military capabilities during the 1991 Gulf War. A new emphasis on "winning hi-tech battles" in the future precipitated research into advanced tunneling and construction methods. These military campaigns convinced China it needed to build more survivable, deeply buried facilities, resulting in the widespread UGF construction effort detected throughout China for the last decade.

US Nuclear Forces

President Obama declared in April 2009 that the US was committed to the long-term goal of zero nuclear weapons, and there has been a unilateral Congressional moratorium on nuclear tests since 1992. Although the 2001 Nuclear Posture Review suggested that the US might develop new types of nuclear weapons, the 2010 Nuclear Posture Review reversed course. The new posture is that nuclear weapons research will only involve components based on previous designs, not new capabilities or missions.

Nuclear Forces

Since the end of the Cold War, the US has been removing its deployed nuclear weapons from Europe and Asia. In 2008, the US informed Japan it would be retiring its sea-based nuclear warhead Tomahawk cruise missiles from the region.¹⁴²¹

Figure IX.5 shows that the US had over 1,700 deployed strategic warheads as of 2016. It had an additional 180 active theater nuclear weapons.

The US summarized its strategy in dealing with deterrence and nuclear forces as follows in its FY2017 defense budget overview,¹⁴²²

Nuclear Deterrence: Strengthening the nuclear enterprise remains one of the Air Force's highest priorities. The Air Force continues its actions to deliver safe, secure, and effective nuclear capabilities within its Nuclear Deterrence Operations (NDO) portfolio. The Air Force's intercontinental ballistic missiles and bombers provide two legs of the nation's Nuclear Triad and dual-capable fighters and bombers extend deterrence and provide assurance to our allies and partners.

Intercontinental Ballistic Missile (ICBM): The FY 2017 budget request funds additional investments to sustain and modernize the ICBM force, including Ground Based Strategic Deterrent (GBSD) integrated design and development.

Manpower Supporting the Nuclear Enterprise: The FY 2017 budget request centralizes the oversight and control of the nuclear enterprise by transferring ownership of Kirtland Air Force Base from Air Force Materiel Command (AFMC) to Air Force Global Strike Command (AFGSC) and transferring the B-1 bomber / Long Range Strike Bomber (LRS-B) mission from Air Combat Command (ACC) to AFGSC. These moves transferred over 8,600 military and civilian authorizations into AFGSC's oversight.

One key question, however, is what would happen if the US was confronted by both North Korean nuclear forces and the need to deter or respond to Chinese theater or strategic nuclear forces. The US has several options: it can (1) rely on containment in peacetime and military restraint in advancing into the DPRK in wartime, (2) deter Chinese threats or use of strategic theater nuclear weapons by the threat of using its own strategic weapon, (3) it can deploy, threaten to use, or use theater nuclear weapons, or (4) it can create conventional strike options that will be weapons of "mass effectiveness" by precisely targeting key Chinese and DPRK facilities rather than using nuclear warheads.

US Theater Nuclear Forces

Theater nuclear weapons present another set of complex issues because US policy has changed and the current status of such forces in contingencies outside Europe remains somewhat ambiguous. A 2015 report by Amy Woolf of the US Congressional Research Service notes that,¹⁴²³

In 1991, the United States and Soviet Union both withdrew from deployment most and eliminated from their arsenals many of their nonstrategic nuclear weapons. The United States now has approximately 760 nonstrategic nuclear weapons, with around 200 deployed with aircraft in Europe and the remaining stored in the United States. Estimates vary, but experts believe Russia still has between 1,000 and 6,000 warheads for nonstrategic nuclear weapons in its arsenal. The Bush Administration quietly redeployed and removed some of the nuclear weapons deployed in Europe. Russia, however seems to have increased its reliance on nuclear weapons in its national security concept. Some analysts argue that Russia has backed away from its commitments from 1991 and may develop and deploy new types of nonstrategic nuclear weapons.

Recent discussions about the U.S. nuclear weapons policy have placed a renewed emphasis on the role of U.S. nonstrategic nuclear weapons in extended deterrence and assurance. Extended deterrence refers to the U.S. threat to use nuclear weapons in response to attacks, from Russia or other adversaries, against allies in NATO and some allies in Asia. Assurance refers to the U.S. promise, made to those same allies, to come to their defense and assistance if they are threatened or attacked. The weapons deployed in Europe are a visible reminder of that commitment; the sea-based nonstrategic nuclear weapons in storage that could be deployed in the Pacific in a crisis served a similar purpose for U.S. allies in Asia. Recent debates, however, have focused on the question of whether a credible U.S. extended deterrent requires that the United States maintain weapons deployed in Europe, and the ability to deploy them in the Pacific, or whether other U.S. military capabilities, including strategic nuclear weapons and conventional forces, may be sufficient....

In the 2010 Nuclear Posture Review, the Obama Administration stated that the United States “will continue to assure our allies and partners of our commitment to their security and to demonstrate this commitment not only through words, but also through deeds.” The NPR indicated that a wide range of U.S. military capabilities would support this goal, but also indicated that U.S. commitments would “retain a nuclear dimension as long as nuclear threats to U.S. allies and partners remain.” The Administration did not, however, specify that the nuclear dimension would be met with nonstrategic nuclear weapons; the full range of U.S. capabilities would likely be available to support and defend U.S. allies. In addition, the Administration announced that the United States would retire the nuclear-armed sea-launched cruise missiles that had helped provide assurances to U.S. allies in Asia. In essence, the Administration concluded that the United States could reassure U.S. allies in Asia, and deter threats to their security, without deploying sea-based cruise missiles to the region in a crisis.

Moreover, the possible use of nuclear weapons, and extended nuclear deterrence, were a part of a broader concept that the Administration referred to as “regional security architectures.” The NPR indicated that regional security architectures were a key part of “the U.S. strategy for strengthening regional deterrence while reducing the role and numbers of nuclear weapons.” As a result, these architectures would “include effective missile defense, counter-WMD capabilities, conventional power-projection capabilities, and integrated command and control—all underwritten by strong political commitments.” In other words, although the United States would continue to extend deterrence to its allies and seek to assure them of the U.S. commitment to their security, it would draw on a political commitments and a range of military capabilities to achieve these goals.

...In the past, U.S. discussions about nonstrategic nuclear weapons have also addressed questions about the role they might play in deterring or responding to regional contingencies that involved threats from nations that may not be armed with their own nuclear weapons. For example, former Secretary of Defense Perry stated that, “maintaining U.S. nuclear commitments with NATO, and *retaining the ability to deploy nuclear capabilities to meet various regional contingencies*, continues to be an important means for deterring aggression, protecting and promoting U.S. interests, reassuring allies and friends, and preventing proliferation (emphasis added).”

...Specifically, both during the Cold War and after the demise of the Soviet Union, the United States maintained the option to use nuclear weapons in response to attacks with conventional, chemical, or biological weapons. For example, in 1999, Assistant Secretary of Defense Edward Warner testified that “the U.S. capability to deliver an overwhelming, rapid, and devastating military response with the full range of military capabilities will remain the cornerstone of our strategy for deterring rogue nation ballistic missile and WMD proliferation threats. The very existence of U.S. strategic and theater

nuclear forces, backed by highly capable conventional forces, should certainly give pause to any rogue leader contemplating the use of WMD against the United States...”

The George W. Bush Administration also emphasized the possible use of nuclear weapons in regional contingencies in its 2001 Nuclear Posture Review. The Bush Administration appeared to shift towards a somewhat more explicit approach when acknowledging that the United States might use nuclear weapons in response to attacks by nations armed with chemical, biological, and conventional weapons, stating that the United States would develop and deploy those nuclear capabilities that it would need to defeat the capabilities of *any* potential adversary whether or not it possessed nuclear weapons. This does not, by itself, indicate that the United States would plan to use nonstrategic nuclear weapons. However, many analysts concluded from these and other comments by Bush Administration officials that the United States was planning for the tactical, first use of nuclear weapons. The Bush Administration never confirmed this view, and, instead, indicated that it would not use nuclear weapons in anything other than the most grave circumstances.

The Obama Administration, on the other hand, seemed to foreclose the option of using nuclear weapons in some regional contingencies. Specifically, it stated, in the 2010 NPR, that, “the United States will not use or threaten to use nuclear weapons against non-nuclear weapons states that are party to the Nuclear Non-Proliferation Treaty (NPT) and in compliance with their nuclear nonproliferation obligations.” Specifically, if such a nation were to attack the United States with conventional, chemical, or biological weapons, the United States would respond with overwhelming conventional force, but it would not threaten to use nuclear weapons if the attacking nation was in compliance with its nuclear nonproliferation obligations and it did not have nuclear weapons of its own...At the same time, though, the NPR stated that any state that used chemical or biological weapons “against the United States or its allies and partners would face the prospect of a devastating conventional military response—and that any individuals responsible for the attack, whether national leaders or military commanders, would be held fully accountable.”...

...Through the late 1990s and early in George W. Bush Administration, the United States maintained approximately 1,100 nonstrategic nuclear weapons in its active stockpile. Unclassified reports indicate that, of this number, around 500 were air-delivered bombs deployed at bases in Europe. The remainder, including some additional air-delivered bombs and around 320 nuclear-armed sea-launched cruise missiles, were held in storage areas in the United States...

After the Clinton Administration’s 1994 Nuclear Posture Review, the United States eliminated its ability to return nuclear weapons to U.S. surface ships (it had retained this ability after removing the weapons under the 1991 PNI). It retained, however, its ability to restore cruise missiles to attack submarines, and it did not recommend any changes in the number of air-delivered weapons deployed in Europe. During this time, the United States also consolidated its weapons storage sites for nonstrategic nuclear weapons. It reportedly reduced the number of these facilities “by, over 75%” between 1988 and 1994. It eliminated two of its four storage sites for sea-launched cruise missiles, retaining only one facility on each coast of the United States. It also reduced the number of bases in Europe that store nuclear weapons from over 125 bases in the mid-1980s to 10 bases, in seven countries, by 2000...

The Bush Administration did not recommend any changes for U.S. nonstrategic nuclear weapons after completing its Nuclear Posture Review in 2001. Reports indicate that it decided to retain the capability to restore cruise missiles to attack submarines because of their ability to deploy, in secret, anywhere on the globe in time of crisis. The NPR also did not recommend any changes to the deployment of nonstrategic nuclear weapons in Europe, leaving decisions about their status to the members of the NATO alliance.

Nevertheless, according to unclassified reports, the United States did reduce the number of nuclear weapons deployed in Europe and the number of facilities that house those weapons during the George W. Bush Administration. Some reports indicate that the weapons were withdrawn from Greece and Ramstein Air Base in Germany between 2001 and 2005. In addition reports indicate that the United States also withdrew its nuclear weapons from the RAF Lakenheath air base in the United Kingdom in 2006.⁵...According to a recent unclassified report, the United States now deploys 160-200 bombs at six bases in Belgium, Germany, Italy, the Netherlands, and Turkey. Some of these weapons are stored

at U.S. bases and would be delivered by U.S. aircraft. Others are stored at bases operated by the “host nation” and would be delivered by that nation’s aircraft if NATO decided to employ nuclear weapons.

The Obama Administration has not announced any further reductions to U.S. nuclear weapons in Europe and has indicated that the United States would “consult with our allies regarding the future basing of nuclear weapons in Europe.” In the months prior to the completion of NATO’s new Strategic Concept, some politicians in some European nations did propose that the United States withdraw these weapons. For example, Guido Westerwelle, Germany’s foreign minister, stated that he supported the withdrawal of U.S. nuclear weapons from Germany. Some reports indicate that Belgium and the Netherlands also supported this goal.... As was noted above, NATO did not call for the removal of these weapons in its new Strategic Concept, but did indicate that it would be open to reducing them as a result of arms control negotiations with Russia.

Moreover, in the 2010 NPR, the Obama Administration indicated that it would take the steps necessary to maintain the capability to deploy U.S. nuclear weapons in Europe. It indicated that the U.S. Air Force would retain the capability to deliver both nuclear and conventional weapons as it replaced aging F-16 aircraft with the new F-35 Joint Strike Fighter. The NPR also indicated that the United States would conduct a “full scope” life extension program for the B61 bomb, the weapon that is currently deployed in Europe, “to ensure its functionality with the F-35.” This life extension program will consolidate four versions of the B61 bomb, including the B61-3 and B61-4 that are currently deployed in Europe, into one version, the B61-12. Reports indicate that this new version will reuse the nuclear components of the older bombs, but will include enhanced safety and security features and a new “tail kit” that will increase the accuracy of the weapon....

On the other hand, the NPR indicated that the U.S. Navy would retire its nuclear-armed, sea-launched cruise missiles (TLAM-N). It indicated that “this system serves a redundant purpose in the U.S. nuclear stockpile” because it is one of several weapons the United States could deploy forward. The NPR also noted that, “U.S. ICBMs and SLBMs are capable of striking any potential adversary.” As a result, because “the deterrence and assurance roles of TLAM-N can be adequately substituted by these other means,” the United States could continue to extend deterrence and provide assurance to its allies in Asia without maintaining the capability to redeploy TLAM-N missiles....

The US remains committed to civil nuclear programs as well. It has 104 nuclear power reactors producing approximately 20% of US energy needs, and is considering the construction of 28 further reactors.¹⁴²⁴

Other US Nuclear-Related Programs

The documents submitted with the US proposed FY2014 budget describe several other current US plans for strategic forces, deterrence, and defense. It is not clear how they will affect the future US stockpile of nuclear weapons, but they do reflect both budget cutbacks and ongoing improvements in other areas:¹⁴²⁵

The Department continues to support the European Phased Adaptive Approach (EPAA), which is designed to protect U.S. deployed forces and allies in Europe from ballistic missile attacks from the Middle East. The budget request supports the implementation of Phase 3 of the EPAA, to include the deployment of Aegis Ashore to Poland in the FY 2018 timeframe. The Aegis Ashore will be capable of launching Standard Missile-3 (SM-3) Blocks IA, IB, and IIA (delivery in 2018) variants.

The FY 2016 President’s Budget request:

- Provides additional funding for key capabilities to meet the maturing threat from North Korean ICBMs and the potential threat from Iranian ICBMs, including GBI reliability and system engineering enhancements, GBI modifications to address the root causes of recent flight test failures, and operation of the Sea-Based X-band radar.
- Provides funding for advanced technologies to meet the future threat, including discrimination improvements, directed energy research, and multiple kill technologies.

- Provides funding for Terminal High Altitude Area Defense (THAAD) Extended Range concept development; and procures 30 THAAD interceptors in FY 2016.
- Procures 80 new Missile Segment Enhancement (MSE) missiles. The MSE is a significant evolutionary improvement over the Patriot Advanced Capability-3 (PAC-3) missile, and provides greater agility and lethality.
- Continues U.S. contributions to the Iron Dome system to defeat short-range missiles and rockets. Continues support for the Arrow Weapon System and the David's Sling Weapon System.
- Continues conversion of Aegis ships to provide BMD capability and procures 40 SM-3 Block IB missiles to be deployed on Aegis BMD ships and at the Romania Aegis Ashore site.

Since then, it is clear that the United States has embarked on a broad based modernization of its existing nuclear force. While these efforts do not increase the US's nuclear stockpile, it does seem likely to increase its effectiveness, by taking the following steps:¹⁴²⁶

- *Modernized Strategic Delivery Systems:* Existing U.S. nuclear delivery systems are undergoing continual modernization, including complete rebuilds of the Minuteman III ICBM and Trident II SLBM. The service lives of the Navy's 14 Trident *Ohio*-class ballistic missile submarines are being extended. Additionally, a new submarine, the SSBN(X), which will replace the *Ohio*-class ballistic missile submarines, is undergoing development and is expected to cost about \$139 billion to develop, according to the Defense Department. The B-2 strategic bomber, a relatively new system, is being upgraded, as is the B-52H bomber. The Air Force is also planning a new strategic bomber, the B-21, and a new nuclear-capable cruise missile, known as the Long-Range Standoff Weapon (LRSO) to replace the existing Air-Launched Cruise Missile (ALCM).
- *Refurbished Nuclear Warheads:* The U.S. stockpile of nuclear warheads and bombs is continually refurbished through NNSA's Life Extension Program (LEP). Existing warheads are certified annually to be safe and reliable. The JASON panel of independent scientists has found "no evidence" that extending the lives of existing U.S. nuclear warheads would lead to reduced confidence that the weapons will work. The panel concluded in its September 2009 report that "Lifetimes of today's nuclear warheads could be extended for decades, with no anticipated loss in confidence." The United States does not need to resume nuclear test explosions, nor does it need to build new "replacement" warhead designs to maintain the reliability and effectiveness of the U.S. nuclear stockpile. The NNSA is currently pursuing a controversial and expensive plan to consolidate the existing number of nuclear warhead types from 10 down to 5. Known as the "3+2" strategy, the five LEPs associated with this approach are estimated to cost over \$60 billion in then-year dollars.
- *Modernized Production Complex:* The nuclear weapons production complex is being modernized as well, with new facilities planned and funded. For example, the FY 2017 NNSA budget includes \$575 million for the Uranium Processing Facility (UPF) at Oak Ridge, Tennessee. The total construction cost for UPF is estimated at \$6.5 – 7.5 billion, according to an independent study conducted by the Corps of Engineers, although some estimates put the price tag at \$11 billion.
- *Command and Control Systems:* The Defense Department maintains command, control, communications, and early-warning systems that allow operators to communicate with nuclear forces, issue commands that control their use, and detect or rule out incoming attacks. The department plans to spend \$37.5 billion on these activities between FY 2016 and FY 2025.
- *Nuclear Force Improvement Program:* In the wake of revelations of professional and ethical lapses and poor morale in the U.S. nuclear force, Defense Secretary Chuck Hagel announced in November 2014 steps the department is taking to address the numerous setbacks. These include changing the conduct of inspections to reduce the burden on airmen and sailors, eliminating micromanagement of nuclear personnel seen as overtaxed by excessive bureaucratic and administrative requirements, and elevating the head of Air Force Global Strike Command, which oversees the Air Force's nuclear forces, from a three- to a four-star rank. Hagel also said the Defense Department will request a 10 percent annual increase in funding for nuclear weapons over the next five years. The FY 2016 budget request included \$1.1 billion in proposed new funding pursuant to this effort. The proposal would support

1,120 additional military and civilian personnel working on Air Force nuclear issues and accelerate investments in Navy shipyard infrastructure. To help fund improvements across the nuclear enterprise, the Pentagon requested an increase of approximately \$200 million in FY 2017 from FY 2016 and approximately \$10 billion more in the FY 2017 Future Years Defense Program (FYDP) relative to the President's Budget in 2016 to ensure the continued health of this enterprise.

Japan

Under the Japanese constitution, the country is allowed to possess the minimum necessary level of self-defense capability. What the “minimum necessary level” is can vary depending on available technologies, the general international situation, and other factors. However, any capability of “war potential” is prohibited by Article 9, Paragraph 2 of the Japanese Constitution. Furthermore, any arms deemed to be offensive weapons designed only for the mass destruction of another country by definition exceed the “minimum necessary level of self-defense,” and thus are never allowed. As such, the SDF is unable to have technologies such as ICBMs, attack aircraft carriers, or long-range strategic bombers.¹⁴²⁷

Maritime self-defense is charged with defending the seas surrounding Japan, ensuring sea lane security, and international peace cooperation activities. The force consists of destroyers, submarines, patrol aircraft, and minesweeping units. The Air Self-Defense Force works to conduct continuous intelligence, surveillance, and reconnaissance (ISR) in the air and seas around Japan and is in charge of air defense. Capacities include aircraft warning and control units, fighter units, and a Surface-to Air Guided Missile Squadron.¹⁴²⁸

A major reinterpretation of Article 9 in June 2014 redefined the parameters for a Japanese use of force. It was described as follows in the 2015 Japanese white paper:¹⁴²⁹

To date, the Government has considered that “use of force” under this basic logic is permitted only when an “armed attack” against Japan occurs. However, in light of the situation in which the security environment surrounding Japan has been fundamentally transformed and continuously evolving by shifts in the global power balance, the rapid progress of technological innovation, and threats such as weapons of mass destruction, etc., in the future, even an armed attack occurring against a foreign country could actually threaten Japan's survival, depending on its purpose, scale and manner, etc....

Under such recognition and as a result of careful examination in light of the current security environment, it has been concluded that not only when an armed attack against Japan occurs but also when an armed attack against a foreign country that is in a close relationship with Japan occurs and as a result threatens Japan's survival and poses a clear danger to fundamentally overturn people's right to life, liberty and pursuit of happiness, and when there is no other appropriate means available to repel the attack and ensure Japan's survival and protect its people, use of force to the minimum extent necessary should be interpreted to be permitted under the Constitution as measures for self-defense in accordance with the basic logic of the Government's view to date.

Oversea combat missions were authorized by the Japanese government in September 2015 following a lengthy and fraught legislative battle between Prime Minister Abe's rule LDP party and the opposition. The change came in the face of widespread public anger and protest from Japanese citizens, but was supported by the United States.¹⁴³⁰

Missile Defense

The US and Japan are cooperating in ballistic missile defense (BMD), initiating development in 2004. A timeline of Japanese missile defense progress can be seen in **Figure IX.6**, and a graphic showing the Japanese system is provided in **Figure IX.7**. As the 2015 Japanese Defense White Paper notes,¹⁴³¹

Japan's BMD is an effective multi-tier defense system with the upper tier interception by Aegis-equipped destroyers and the lower tier by Patriot PAC-3, both interconnected and coordinated by the Japan Aerospace Defense Ground Environment (JADGE). In case ballistic missiles or other objects¹² are launched against Japan as an armed attack, it will be dealt with by issuing a defense operation order for armed attack situations. On the other hand, if ballistic missiles are launched towards Japan, and the situation is not acknowledged as an armed attack, the Minister of Defense can order the SDF units to take measures to destroy the ballistic missiles with sufficient consideration taken to (1) carrying out prompt and appropriate response and (2) ensuring civilian control. As a response against ballistic missiles or other objects, the Joint Task Force-BMD is formed, with the Commander of the Air Defense Command serving as its Commander, and various postures for effective defense are to be taken under a united command through JADGE. Furthermore, the GSDF will play a leading role in dealing with damage caused by the impact of ballistic missiles

Recent exercises also show that the US and Japan are succeeding in developing steadily more integrated approaches to such capabilities. For example, the US Missile Defense Agency reported on October 29, 2010 that the Japan Maritime Self-Defense Force (JMSDF) and the United States Missile Defense Agency (MDA) had successfully completed an Aegis BMD intercept flight test, in cooperation with the US Navy, off the coast of Kauai in Hawaii. The event marked the fourth time that a JMSDF ship has engaged a ballistic missile target, including three successful intercepts, with the sea-based midcourse engagement capability provided by Aegis BMD.¹⁴³²

The JFTM-4 test event verified the newest engagement capability of the Japan Aegis BMD configuration of the recently upgraded Japanese destroyer, JS KIRISHIMA. At approximately 5:06 p.m. (HST), 12:06 p.m. Tokyo time on Oct. 29, 2010, a separating 1,000 km class ballistic missile target was launched from the Pacific Missile Range Facility at Barking Sands, Kauai, Hawaii. JS KIRISHIMA crewmembers detected and tracked the target. The Aegis Weapon System then developed a fire control solution and launched a Standard Missile -3 (SM-3) Block IA missile. Approximately three minutes later, the SM-3 successfully intercepted the target approximately 100 miles above the Pacific Ocean. JFTM-4 is a significant milestone in the growing cooperation between Japan and the US in the area of missile defense. Also participating in the test was USS LAKE ERIE and USS RUSSELL, Aegis ships which cooperated to detect, track and conduct a simulated intercept engagement against the same target.

In September 2012, the US and Japan agreed to develop a new missile defense system, upsetting China during a time of prolonged tension over the disputed islands in the East China Sea. Japan and the US agreed to deploy a second advanced missile-defense radar on Japanese territory.¹⁴³³ Former US Defense Secretary Leon Panetta remarked at the time, “[It] will enhance the alliance’s ability to defend Japan, our forward deployed forces and the US homeland from a ballistic missile threat posed by North Korea.”¹⁴³⁴

The new land-based X-band radar can track ballistic missiles up to 1,000 km away, allowing US forces to intercept the missiles. The model is smaller than a sea-based X-band radar, which can track missiles up to 4,800 km away. The current radars are based in Aomori Prefecture, while the new system will be deployed near Kyoto. Japanese Prime Minister Shinzo Abe also said that Japan intends to ease the domestic laws limiting the operational scope of the Japanese Self-

Defense Forces, allowing Japan to shoot down any missiles from North Korea. Japan has reportedly spent \$12 billion on its missile defense system.¹⁴³⁵

US and Japanese capabilities are likely to increase sharply in the near term as more advanced tactical and long-range, wide-area theater missile defense systems like the Standard SM-2 and SM-3 and THAAD enter service.

Japan has developed a ballistic missile defense that is a “multi-tier defense system consisting of an upper-tier defense through the SM-3-equipped Aegis destroyers and a lower-tier defense through the Patriot PAC-3 for base protection.”¹⁴³⁶ As regards the principal equipment and core units that make up Japan’s ballistic missile defense, the 2012 Defense White paper reported,¹⁴³⁷

(1) Under the four-ship structure for Aegis destroyers specified in the 2004 NDPG, if the necessity for regular maintenance, replenishment, recreation, and training is taken into account, basically two Aegis destroyers would be able at all times to execute their missions, and thus there would be limitations on maintaining a continuous readiness. In addition, in order to ensure the country’s defense against the threat of ballistic missiles, including response to the future threat of ballistic missiles equipped with capabilities to avoid interceptor missiles, Aegis destroyers would have to be equipped with an Aegis BMD system, which, in case advanced interceptor missiles are developed in the future, could operate them.

In view of these circumstances, the 2010 NDPG, taking into account factors such as the Government’s severe financial circumstances and the need for rapid improvement of anti-ballistic missile defense capabilities, provides a total of six Aegis destroyers equipped with ballistic missile defense capabilities, including two Aegis destroyers equipped with Aegis BMD systems capable of operating the advanced interceptor missiles mentioned above. In addition, the 2010 NDPG states that additional acquisition of BMD-capable Aegis destroyers, if to be provided separately, will be allowed within the number of destroyers after consideration of development of BMD-related technologies and fiscal conditions in the future, among other factors.

(2) As a result of the reorganization of units described in (1) above, the air warning and control unit capable of ballistic missile defense are to be reformed into an 11-unit warning group/squadrons from a seven-unit warning group and a four-unit warning squadrons. While three anti-aircraft groups used to possess Patriot PAC-3, the entire six anti-aircraft groups will be equipped with PAC-3, in order to make quick responses across the nation possible. On this occasion, the newly introduced PAC-3 will be limited to a one-unit FU6 under the 2010 NDPG in view of the severe financial circumstances, and together with the existing 16-unit FU (for anti-aircraft squadrons and that required for education), 17-unit FU are to be stationed uniformly throughout the country, creating the most efficient system possible.

Space

Japan is also working to develop its space capabilities. According to the 2012 Japanese Defense White Paper,¹⁴³⁸

Japan, a country which has an exclusively defense-oriented policy, is strongly required to use outer space, which does not belong to the national territory of any country and is not constrained by conditions such as surface topography, to strengthen information gathering functions for detecting signs of various contingencies in advance, and warning and surveillance functions in sea and air space surrounding Japan, and to ensure lines of communication during the international peace cooperation activities of the SDF.

The enactment of the Basic Space Law, passed by the Diet in May 2008, has made it clearer that the development and use of space by Japan shall be carried out under the pacifism enshrined in the Constitution of Japan in compliance with international commitments. The law also stipulates that the Government of Japan shall take necessary measures to promote the development and use of space that contributes to ensuring the peace and security of the international community, as well as to the security of Japan.

In 2009, the strategic Headquarters for Space Policy Cabinet Secretariat which was established based on the Basic Space Law formulated the Basic Plan for Space Policy, which includes the six key elements such

as the realization of a secure, pleasant, and affluent society utilizing space, as well as the enhancement of national security utilizing space.

Furthermore, the 2010 NDPG stipulate promotion of the development and the use of outer space with a view to strengthening information gathering and communications functions, etc.

Meanwhile, on January 2009, the Committee on Promotion of Space Development and Use established in the Ministry of Defense formulated the “Basic Guidelines for Space Development and Use of Space” (Basic Guidelines). The Basic Guidelines stipulates that it is extremely beneficial to take advantage of the nature of space for defense purpose and it will be an effective means to strengthen C4ISR capability in light of the focus of the buildup of defense capabilities on enabling accurate situational awareness, information sharing, command and control operations, and thereby achieving systemization – maximizing of the equipment’s performance as an ensemble.

The Ministry of Defense will promote new development and use of space for the national security in coordination with related ministries, based on the Basic Plan for Space Policy, the 2010 NDPG, and the Basic Guidelines. In FY2012, it will address projects such as 1) research for enhancement of C4ISR utilizing space, 2) enhancement, maintenance, and operation of X-band SATCOM functions, and 3) participation in the USAF Space Fundamentals Course.

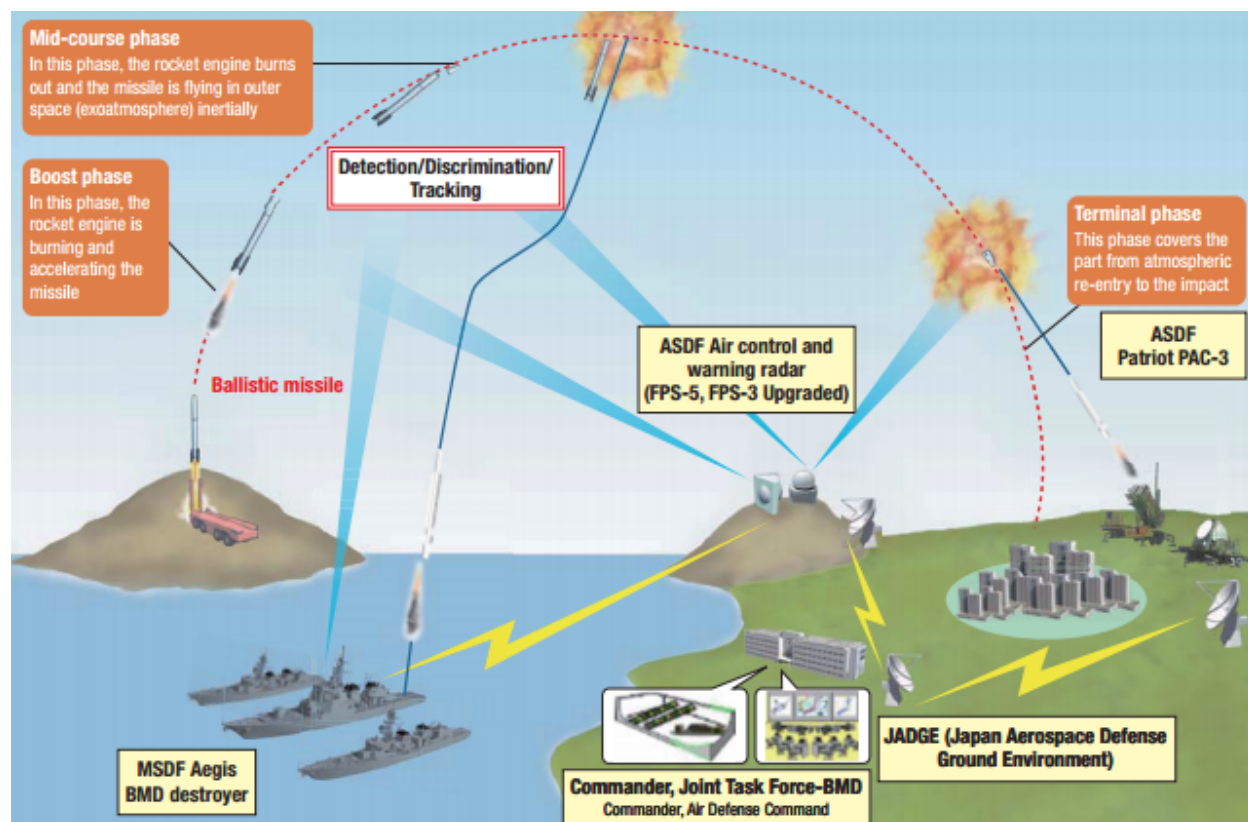
Of these, with regard to the enhancement of X-band SATCOM, in light of the fact that two of the communications satellites (Superbird-B2 and Superbird-D) used by the Ministry of Defense and Self-Defense Forces for command and control of tactical forces are due to reach the end of their service lives in FY2015, these satellite communications networks will be reorganized. This reorganization will facilitate high-speed, large capacity communications that are more resistant to interference, in order to accommodate the recent growth in communications requirements, as well as integrating communications systems, thereby contributing to the construction of a dynamic defense force. Moreover, from the perspective of maximizing cost-effectiveness, it has been decided to implement the project by means of the PFI (private finance initiative) system, and 19 years’ worth of costs (approximately 122.4 billion yen) has been allocated in the FY2012 budget, to cover expenses from the manufacture of the satellites through to the end of their service life. In this project, after guaranteeing transparency and fairness in tenders, etc. through open tendering, the content of the proposals will be screened impartially, from the perspective of security, with bidders being asked to implement the appropriate management systems and conservation measures.

Figure IX.6: Timeline of Japanese Missile Defense Development

1995	Commenced a comprehensive study on the posture of the air defense system of Japan and a Japan-U.S. joint study on ballistic missile defense
1998	North Korea launched a ballistic missile over Japanese territory The Security Council and the Cabinet meeting approved the commencement of the Japan-U.S. joint cooperative technical research on ballistic missile defense (BMD) for parts of the sea-based upper-tier system
1999	Started the Japan-U.S. joint cooperative technical research on four major components for advanced interceptor missiles
2002	Decision by the United States on the initial deployment of BMD
2003	The Security Council and the Cabinet meeting approved the introduction of BMD system and other measures, and the deployment of BMD in Japan started
2005	Amendment of the Self-Defense Forces Act (ballistic missile destruction measures) The Security Council and the Cabinet meeting approved the Japan-U.S. cooperative development of advanced interceptors for BMD
2006	North Korea launched seven ballistic missiles toward the Sea of Japan
2007	The deployment of Patriot PAC-3 units started SM-3 launch tests by Aegis destroyers started
2009	North Korea launched one ballistic missile toward the Pacific Ocean in April and seven toward the Sea of Japan in July. Orders for ballistic missile destruction measures were issued for the first time (March).
2012	North Korea launched missiles which it called "Satellites" in April and December April: The missile was in flight for over a minute before disintegrating and landing in the Yellow Sea December: Passed through Okinawa airspace toward the Pacific The Minister of Defense issued the operation order for the implementation of destruction measures against ballistic missiles, etc.
2014	North Korea launched several ballistic missiles in March, June, and July March 3: Two missiles were launched and landed in the Sea of Japan March 26: Two missiles were launched and flew over 600 km before landing in the Sea of Japan June 29: Several missiles were launched and flew approx. 500 km at most before landing in the Sea of Japan July 9: Several missiles were launched and flew approx. 500 km at most before landing in the Sea of Japan July 13: Two missiles were launched and flew about 500 km before landing in the Sea of Japan July 26: One missile was launched and flew approx. 500 km before landing in the Sea of Japan
2015	March 2: Two missiles were launched and flew approx. 500 km before landing in the Sea of Japan

Source: Japanese Ministry of Defense, *Defense of Japan 2015*.

Figure IX.7: Japanese Ballistic Missile Defense Systems



Source: Japanese Ministry of Defense, *Defense of Japan 2015*

Russia

It is unlikely that Russian forces would be involved in even a high level of conflict in the Korean Peninsula, but Russia's status as a nuclear power cannot be ignored. A 2013 IISS report estimated that Russia had 1,499 warheads that could be deployed on SLMs, ICBMs, and heavy bombers. A more recent assessment by the NTI found that Russia had some 1643 warheads; under the provisions of the New START Treaty, it is to only have 1550 by 2018. However, there is no accurate count of the country's tactical nuclear weapons, so the current total stockpile of tactical and strategic warheads is unknown. Furthermore, it is estimated that Russia possesses 695 metric tons of weapons grade-equivalent HEU and approximately 128 metric tons of plutonium; however, it should be noted that transparency in these areas is limited.¹⁴³⁹

All three arms of the Russian military are working to revamp its nuclear triad. The Russian Air Force has deployed a new strategic cruise missile, the Navy is building Borei-class SSBN (Project 995) with one currently deployed, and the Strategic Rocket Forces are looking into a new liquid-propelled ballistic missile while continuing to use the solid-fueled RS-24 Yars. It does not look like much progress has been made on previous proposals to create a unified strategic command. According to the Nuclear Threat Initiative,¹⁴⁴⁰

The Kh-101/Kh-102 (AS-2X) likely entered service with the Russian air force in 2012, carried on the Tupolev Tu-95MS Bear H. The Kh-102 is the nuclear variant of this large cruise missile, with the Kh-101 a conventionally armed derivative. It is not known if the missile also entered service during 2012 with the half-dozen or so Tu-160 Blackjack bomber aircraft the air force has operational at any one time.

The Kh-101/102 programme has been under way since at least the latter half of the 1980s. Development was hampered by the collapse in defence expenditure in the 1990s and 2000s, but funding has improved in the last few years.

After nearly 20 years in the doldrums the Russian air force now has a fifth-generation fighter in flight-test and also harbors ambitions to introduce a new strategic bomber (PAK-DA) after 2025. Tupolev, the USSR's main bomber design house, was selected in 2009 to develop the aircraft in preference to a bid from Sukhoi. Though the decision may seem obvious in that Tupolev has design history in bomber fleets, it has fared poorly since the collapse of the Soviet Union. Sukhoi, by comparison, has emerged as the country's pre-eminent combat-aircraft manufacturer.

The government and industry finally concluded a contract in May 2012 covering the purchase of five Project 955A Borei SSBNs following prolonged negotiations over price and the schedule for the delivery of boats.

Missile Capabilities

Russia has been working to modernize its rocket forces with both silo-based and mobile ICBMs as well as MIRVed variants. The country has had technical issues developing a new generation of SLBMs, though tests in December 2011 of the new Bulava SLBM were reported successful. Other modified and new missiles have also been under development.¹⁴⁴¹

In his early 2012 remarks on Russia, DIA Director Ronald L. Burgess, Jr. stated,¹⁴⁴²

Russia is upgrading massive underground facilities that provide command and control of its strategic nuclear forces as well as modernizing strategic nuclear forces as another top priority. Russia will field more road-mobile SS-27 Mod-2 ICBMs with multiple independently targetable reentry vehicles. It also will continue development of the Dolgorukiy/SS-NX-32 Bulava fleet ballistic missile submarine/submarine-launched ballistic missile and next-generation air-launched cruise missiles.

Russia progress has continued unabated, as a 2016 IISS report lays out:¹⁴⁴³

The modernization of the Strategic Rocket Forces (SRF) continues at a rate of around 40 missiles per year. Deliveries of Yars intercontinental ballistic missiles (ICBMs), both road-mobile and silo-based, are successfully under way, and in 2014 the armed forces took delivery of 16 Yars ICBMs and 22 submarine-launched ballistic missiles. Another 24 Yars ICBMs were due to be delivered in 2015. The entry into service of a new heavy liquid fuel ICBM, the Sarmat, with a throw-weight of up to ten tons, has an important role to play in these modernization plans. The first prototype is due to be completed by March 2016 and, in line with plans previously announced, their entry into service is due to begin in 2019 in time to replace the SS-18, which is due to be withdrawn from service in 2022. Sarmat has been linked to the development of a 'hypersonic glide vehicle', dubbed Project 4202, which is estimated to require a 100-ton-class launcher – coincidentally, around the size of Sarmat. This might well provide an explanation for the development of a liquid-fueled ICBM at a time when the main SRF re-equipping effort was geared towards solid-fueled systems. Furthermore, in summer 2015, plans were officially confirmed regarding the development of a new rail based ICBM system (Barguzin). According to Deputy Defence Minister Yuri Borisov, design work on this system is now in progress using the Yars missile.

Missile Defense

Russia is also working to increase its missile air defense capabilities. The IISS reported that Russia created an Aerospace Defense Command on December 1, 2011, in order to unify as one force (the Aerospace Defense Forces) the country's Space Forces, Air Force air-defense units, and Air-Space Defense Strategic Command. In 2015, this group was added to the even larger Aerospace Forces.

It has been reported that air-defense units that were previously part of the Air Force have been reorganized into 11 brigades that include both radio-radar and anti-aircraft missile regiments. It seems that this new Command will focus on medium- and upper-tier threats, leaving lesser threats to the geographical areas in which they appear. The IISS gives more detail on Russia's missile defense capabilities:¹⁴⁴⁴

On 1 August 2015, a new armed service was formed, the Aerospace Forces, incorporating the Air Force, army aviation and the Aerospace Defence Forces. This new armed service will also be responsible for both strategic and theatre missile defence. To develop strategic-missile-defence capabilities, elements of the A-235 Samolyot-M ballistic-missile-defence system have started to undergo testing. This is intended to replace the current Moscow missile-defence system, the A-135, and unlike the latter there will be not only silo-launched but also road-mobile versions. Meanwhile, the S-500 air-defence system will provide the theatre missile-defence layer when it enters service; trials are expected in 2016. Deliveries of production S-400 systems are under way, maintained at a rate of three regiment sets per year. By the end of 2015, ten air-defence regiments had been re-equipped with S-400s.

Space

In early 2012, DIA Director Ronald L. Burgess, Jr. also commented on Russia's use of space:¹⁴⁴⁵

Russia recognizes the strategic value of space as a military forces multiplier. Russia already has formidable space and counterspace capabilities and is improving its navigation, communications, ballistic missile launch detection, and intelligence-gathering satellites. It has extensive systems for space surveillance and tracking and others with inherent counterspace applications, such as satellite-tracking laser rangefinders. Russia is researching or expanding directed-energy and signal jamming capabilities that could target satellites.

A 2013 Marshall Institute report characterized Russia's space ambitions as follows:¹⁴⁴⁶

Russia, like the United States, wishes to assure undisturbed use of its space assets. Therefore, Russia builds and in some cases maintains in orbit reserve satellites, relies on multiple satellite families, creates redundancy through the inherent dual-usability of space-based assets, and continues to invest in new designs and solutions that allow for enhanced survivability of the satellite and increased protection of the satellite signal. Simultaneously, Russia works on counter-space capabilities that should provide it with the

option to blind the enemy, or at least to offset enemy's advantage should Russian "eyes" be attacked. The intensified work on counter-space capabilities, of which this paper considered only one kind, the ASAT systems, suggests that Russia anticipates the need for counter-space capabilities in a future war, i.e., it anticipates dealing with an enemy that has its own satellite networks and relies on them substantially.

Biological and Chemical Weapons

While Russia ratified the Biological and Toxin Weapons Convention in 1975, it continued development of a large program until the fall of the USSR in 1991. Russia continues dual-use research activities, and it remains unclear if Russia has fulfilled its Article 1 treaty obligations.

Russia also ratified the Chemical Weapons Convention in 1997, and as of January 2015 has destroyed over 84% of its stockpile (34,000 of 40,000 metric tons). The country anticipates completing destruction by December 2020 with adequate funding.¹⁴⁴⁷

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During the late 1960s and early 1970s, the DPRK received assistance from both the Soviet Union and China in developing its nascent chemical industry. The U.S. Defense Intelligence Agency (DIA) estimated in May 1979 that the DPRK had only a defensive capability in CW... Estimates vary as to when North Korea is believed to have acquired the capability for independent CW production.

Some sources suspect it was not until the early 1980s, and others speculate it was as early as the 1970s. By the late 1980s, the DPRK was capable of producing substantial amounts of CW agents and deployed a large number of chemical weapons munitions. In January 1987, the South Korean MND reported that the DPRK possessed up to 250 metric tons of chemical weapons, including [blister \(mustard\)](#) and some nerve agents, and by 2010, the MND’s estimate had climbed to 2,500 to 5,000 metric tons of chemical agents, including nerve agents...”

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- According to State Department [figures](#) from the latest New START data exchange, as of September 1, 2012, the United States had 1,722 deployed strategic warheads and Russia had 1,499 deployed strategic warheads. This is a respective drop of 15 and increase of 9 warheads since the data exchange six months previously. U.S. totals are lower than the estimates in the chart primarily because New START counts bombers as having one warhead each, even though up to 20 warheads can be assigned to each bomber. In Russia’s case, the number of warheads assigned to delivery systems in the chart also includes warheads assigned to submarines in overhaul, which are also not counted as deployed by the treaty. Under New START, both the United States and Russia must reduce their stockpiles of deployed strategic warheads to less than 1,550 warheads by 2018. According to the December 2012 State Department report, operations to reduce U.S. missile launchers will begin in 2015.
- The US government [disclosed](#) in April 2010 that as of September 30, 2009, the total US stockpile had 5,113 warheads. On March 1, 2013, Drs. Hans Kristensen and Robert S. Norris revised that total to an estimated 4,650 warheads. This number excludes approximately 3,000 warheads awaiting dismantlement, whereas the totals in the chart above include weapons awaiting dismantlement.

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