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South Korea's Civilian Vulnerabilities in War

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Revised: March 11, 2018

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Addendum: South Korea's Civilian Vulnerabilities in War

The Broader Range of North Korean Threats

Any effort to look beyond North Korea's nuclear threat must address the fact that we live in an age of unconventional and asymmetric warfare, and one in which that warfare may take a political and/or economic form or be prolonged and a war of attrition. It must also consider the grim lessons of recent wars. The cost to civilians may go far beyond the number of dead and wounded from direct military attacks in some relatively brief, intense conflict. It may be economic, it may be the impact of being turned into refugees and displaced persons, and it may be a tremendous loss of national wealth, security, and the services that support modern urban life, education, and health.

We are also dealing with a threat in North Korea that has a long, proven track record of pushing massive threat and low-level attacks to the edge of war. It is sometimes called irrational for doing so, but in practice it has so far been able to achieve consistent benefits for its leaders – albeit at considerable cost to its people. Kim Jong-un does take serious risks, but it is important to note that he is one of the world's only third generation dictators, and builds on nearly 70 years of using serious military threats and actual military probes, tests, attacks, and assassinations that have kept his regime in power and given it political status and success.

The Committee should also consider the fact that the North Korea is organized for unconventional and asymmetric warfare, as well as for theater-level nuclear and conventional conflict. It can use weapons of mass destruction and focus on mass casualties. It can also use biological warfare in ways that may be as lethal as or more lethal than nuclear weapons, or in a wide range of scenarios that go from intimidation to limited attacks to joint use of nuclear and biological weapons. This is why I have prepared a statement for the record that focuses on the key risks and uncertainties involved, and the range of options that North Korea might exploit in using such weapons.

At the same time, North Korea can inflict major casualties using more conventional weapons like massed, sustained artillery fire because of Seoul's proximity to the DMZ, and intensely concentrated urban populations in other parts of the country. It could sharply increase such casualties by using chemical weapons – and possibly biological weapons as well—in a direct fire mode.

South Korea's Vulnerabilities

Most strategic analysis tends to focus on military balances, deterrence, and warfighting, and not the vulnerability and cost to civilian populations. When estimates are made of civilian casualties, many lack credible modeling and data and are little more than guesstimates. The fact remains, however, that South Korea is an ally with some unique vulnerabilities.

South Korea has a relatively large total population—some 51 million compared to only around 25 million for North Korea. This population compares with only around 21 million at the time of the Korean War, and one that was heavily agricultural and to some extent self-sustaining in rural areas. Today the population is over 80% urbanized—only about 5% of work force is in agriculture. Over 70% is in largely urban services, and most of the rest in manufacturing. Like most Americans, it is a population geared to modern life in a country with a \$2 trillion dollar GDP in PPP terms, and

\$1.4 trillion in Market GDP terms. Peacetime living standards are high among global standards. South Korea has a GDP per capita of \$38,000.

To put these figures in perspective, the CIA estimates that North Korea has a GDP of only \$45-50 billion in PPP terms and \$30 billion in market or foreign exchange terms, and a per capita income of only \$1,700-1,800 per capita—with much of its wealth concentrated in its leaders, security forces, party members, and show piece capital.

South Korea also is extremely dependent on the constant flow of trade. South Korean exports total well over \$500 million, and imports total over \$400 million. Like Japan., South Korea is critically dependent on its seaports and airports for trade, but also for its energy supplies. Its economy is also “fragile” in the sense that the secure flow of trade movement, and services is just as critical as in any major American city.

The Risks Inherent in a Major War Involving a Modern Urbanized Trading Nation

South Korea’s population now lives in a country that is highly developed, but is also one where approximately 70% of the country is considered mountainous and it is concentrated in cities in the lowland areas, where the population density is very high in a limited number of target areas where displaced persons and refugees have few outside alternatives with any serious surplus capability to provide food, shelter, and services. Its population density also varies sharply in the areas nearest to North Korea. Gyeonggi Province in the northwest, which surrounds the capital of Seoul and contains the port of Incheon, is the most densely populated province. Gangwon in the northeast is the least populated.

The greater Seoul area alone has a population of over 25 million—close to half the 51 million population of the ROK and a far larger population than all of its other cities combined. More than 10 million people live in its city limits, and its core has a population density of well over 17,000 to people per square kilometer and 45,000 per square mile—twice the density of New York, four times that of Los Angeles, and eight times that of Rome. Just one of its 25 districts has 680,000 people. According to some sources, it is the largest single urban complex in the free world.

While Seoul is the key to the ROK’s short range vulnerability, five other urban centers also define South Korea’s broader vulnerabilities and ability to ride-out and recover from a major conflict. The CIA World Factbook lists the population of these cities as follows: Busan (Pusan) 3.216 million; Incheon (Inch'on) 2.685 million; Daegu (Taegu) 2.244 million; Daejeon (Taejon) 1.564 million; and Gwangju (Kwangju) 1.536 million (2015). These cities do not have the sheer scale of urban sprawl of many American cities, and—coupled with South Korea’s high levels of development—this adds to its urban and national vulnerability.

South Korea’s need for secure maritime routes and ports and air traffic and airports also adds to its vulnerability. South Korea depends on secure maritime and land transit/access traffic to 7 seaport(s): Busan, Incheon, Gunsan, Kwangyang, Mokpo, Pohang, Ulsan, Yeosu. It depends on 3 major container port(s) (TEUs): Busan (19,469,000), Kwangyang (2,327,000), Incheon (2,368,000) (2015). It can conduct naval raids, use midget or other submarines, and use cargo ships to release floating mines—as Iran did in 1987-1988. It is unclear that it has smart mines, but—if it does—any ship with a false flag or submarine could release mines that rest on the bottom, can

be set to activate at intervals, and rise up and strike given types of ships based on their sonic signature.

The CIA reports that current air traffic volume is 65+ million passengers a year and 11.2 billion metric tons-km. South Korea has 71 airports, but only 4 major airports, and up to 19 others that might handle some additional traffic. At least 40 are unpaved or unsuitable for long-range traffic. A few Man Portable SAM firings or airport killings could have a major impact in terms of wars of intimidation and threat and counter threats.

At a higher threshold of conflict, North Korea's current long-range conventional weapons seem to have sharp limits on their ability to strike point targets, but a number of reports make it clear that North Korea is developing a range of precision ballistic missiles, cruise missiles, and UCAVs and some reports indicate such capabilities may already exist.

Precision strikes with conventional warheads on South Korea's power grid, water purification and distribution facilities, sanitation facilities, key bridges and rail/road links, and key communications points could turn such weapons into "weapons of mass effectiveness." Sabotage, terrorism, or special forces raids could also have major impact.

The same is true of South Korea's energy situation. It gets 71% of its power from fossil fuels, and 21% from nuclear plants. It needs safe facilities to import 90%+ of its natural gas and around 3 MMB of crude oil plus 900,000 bpd in petroleum products. Moreover, *Oil & Gas Journal* (OGJ) and EIA reports that 3 of the 10 largest crude oil refineries in the world are located in South Korea, making it one of Asia's largest petroleum product exporters – as much as 1.3 mbpd. South Korea also depends heavily on imports from six LNG terminals: Incheon, Kwangyang, Pyeongtaek, Samcheok, Tongyeong, and Yeosu.

There are other areas of special vulnerability. South Korea is an "Internet society" with nearly 90% Internet access. There is no credible way to measure the cyber vulnerability of its economy and critical infrastructure, but it could be great. Some past estimates have downplayed North Korea's capabilities in these areas, but experts now question the extent to which North Korea has created an effective elite of attackers, and how difficult it is to create cadres that can exploit the weaknesses and vulnerabilities in civilian IT systems and networks. These are areas where there are severe open source limits to assessments of the capabilities of the KPA General Staff Department and Reconnaissance General Bureau (RGB), as well as the Ministry of State Security. Some South Korean sources claimed, however, in 2015 that North Korea had approximately 5,900 personnel engaged in cyber warfare.

War and the Greater Seoul Region

One truly successful nuclear or biological attack on Seoul alone could cripple South Korea's recovery capability for a decade, and create massive problems in the short term for the global economy that could severely restrict South Korea's ability to recover its markets and trade over time. Nuclear strikes on two to three cities would raise serious questions about South Korea's ability to recover over time, as would distributing infectious or highly lethal biological agents.

South Korea's very success, however, makes it highly vulnerable to a major conventional invasion and highly vulnerable to a range of unconventional attacks. A land war that swept down into Seoul and the eastern part of the DMZ area could have far worse displacement problems than the world has seen in Syria, Iraq, or Yemen – mountains, by sea, loss of key airport and possible ports. As

other recent wars have shown, water, power, sanitation, food, medical services, shelter, and any form of security and education for children would all be critical issues.

As the fighting in Mosul and other Iraqi, Syrian, and Yemeni cities has recently shown, conventional warfare can all too easily ruin the security of millions, and kill or cripple thousands of others in the process that are never reported as casualties of war.

This is why so many studies of the North Korean warn of the threat posed by North Korean shelter artillery posts near the DMZ. These artillery positions can be as close as 54 kilometers—33 miles from City center. North Korea, however, has a steadily increasing stock of multiple rocket launchers with much longer ranges, and some sources credit them with chemical and even biological warheads.

According to unclassified sources like IHS Janes, there are HARTS (hardened artillery shelters) all along DMZ tailored to region and topography. These hardened artillery sites are fortified fighting positions with gun emplacements, personnel shelters, fire direction centers, trenches for self-defense and communication, and protective cover for prime movers to alter weapons locations. Each weapon has its sheltered emplacement and ammunition supply with connecting passages and emplacements tailored to the local terrain and angles of fire. They are defended with wire and minefields. In many cases, it would take earth penetrators to destroy them and a delivery system with line-of-sight or imagery links to target them.

To quote from a recent IHS Jane's report,

North Korea possesses the largest rocket and ballistic missile force in the developing world. Within North Korea, ballistic missiles (i.e., Hwasong-6/-7, KN-02/-10, and KN-07/-08/-14) are controlled by the Strategic Force (see Strategic Weapon Systems), and artillery rockets are controlled by the General Staff and its Artillery Bureau.

Since 2010, North Korea has developed and deployed (sometimes in very limited numbers) new versions of 122 mm, 240 mm and 300 mm MRL systems. The most significant of these is the eight-round (in two, four-round, pods) 300 mm system, which reportedly has a range in excess of 100 km and may employ a GPS guidance system.

Some estimates almost certainly sharply exaggerate the probable number of direct casualties from the conventional use of such weapons, but direct military deaths are scarcely the only measure of human suffering. Moreover, North Korea has two other methods of unconventional attack that merit serious examination, but where unclassified reporting has severe – if not critical– limits.

The casualty, panic, and disruption impacts of such attacks would also be far greater if North Korea used chemical and/or biological weapons. The open source reporting on such North Korean capabilities is highly questionable. These issues are discussed in detail for biological weapons in separate testimony.

Reports that North Korea has stockpiled as many as 20 different chemical agents seem to sharply exaggerate the threat. However, North Korea probably does have a substantial stockpile of artillery rounds, rockets, missiles and bombs that can deliver effective persistent area denial weapons like Mustard Gas that could kill many civilians as well, and both short-term and persistent versions of nerve agents. Even a few rounds of such weapons could easily produce massive panic, and a major barrage could be a truly horrifying killing mechanism.

Special Forces, DMZ Tunnel, and Intelligence Branch Attacks

Again, the details in open source data are questionable. However, the broad nature of the threat is not. IHS Janes also reports that North Korea has built approximately 20-25 such tunnels under the DMZ, and only four have been publicly identified and neutralized by South Korean/US forces. One of the tunnels that has been discovered had a total length of 3,300 meters, and went 1,100 meters into South Korean territory. It was 50-150 meters deep, and two meters by two meters. Janes reports that as many as 8,000 troops an hour could move through them.

Sudden raids into the Seoul area might never come close to taking the city, but could have a massive disruptive effect. Moreover, such tunnels might be used to infiltrate large numbers of Special Forces who might be able to pass as civilians. According to IHS Janes and the IISS, North Korea is reported to have some 200,000 Special forces, organized into some 60,000 “storm” troops and 140,000 light infantries. IHS Janes quotes General Walter Sharp, who once commanded the South Korean-US Combined Forces Command as saying in 2014 that, “The havoc-raising potential of North Korea's special forces has grown as their numbers have increased and their training has shifted to terrorist tactics developed by insurgents in Iraq and Afghanistan...They are very capable, and they will employ these tactics.” A major infiltration into the Seoul area might never succeed in classic military terms, but could be intensely disruptive and have a major civil impact.

There also serious questions as to whether North Korea has sleepers or trained infiltrators outside its special forces in organization like its KPA General Staff Department and Reconnaissance General Bureau. Again, to focus on open source material, HIS janes reports that the RGB is the primary organization tasked with collecting foreign tactical and strategic intelligence, and co-coordinating or conducting all external special operations. It also exercises operational control over agents engaged in military intelligence activities and oversees the training, maintenance, and deployment of guerrilla teams available for operation in the south.

Guarding a Strategic Partner and Ally

It should be apparent that this analysis does focus on “worst cases” to some degree. One of the grim realities of war, however, is that war after war has escalated to a real-world “worst case” that none of those who launched or planned for the conflict intended. It is also probably fair to say that all major wars have been “unconventional” in terms of the actual fighting relative to the plans and intentions of the actors that began them.

If nothing else, the risks described in this testimony, and that are the focus of this committee, should remind us that we all have a deep moral and ethical responsibility to South Korea and all of our strategic partners. We must not simply plan to deter, or to win at a tactical or kinetic level. We must plan to do everything we can to protect an ally or partner’s civilians and living standards as well.