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China and the U.S.: Cooperation, Competition and/or Conflict

An Experimental Assessment

PART EIGHT: CHINESE FORCE DEVELOPMENT AND MODERNIZATION

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Photo: GOH CHAI HIN/AFP/ Getty Images

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China's Force Development and Modernization

China's 2019 Defense White Paper provides a whole new set of insights into China's military developments which are summarized in this section. At the same time, includes summaries of the U.S. Office of the Secretary of Defense (OSD) and Defense Intelligence Agency (DIA) estimates, and considerable additional detail on Chinese force developments and change in military organization and tactics. So do outside governments like Taiwan, Japan, and South Korea, and a number of think tanks and research centers – including the IISS, SIPRI, CSIS, and many other such groups. These studies cover many highly detailed aspects of China's force development – which has acquired all of the complexity and rapid pace of change in U.S., Russian, and the most advanced military forces in other states.

The summaries of Chinese views of its military modernization, and by major mission and military service that follow, highlight these developments when they are particularly important in understanding U.S. and Chinese competition and what might happen in a conflict – relying heavily on China's 2019 Defense White Paper, and OSD and DIA reporting in 2019. They cannot, however, cover many of the detailed changes in Chinese forces, and the possible ways they will affect the balance of deterrence and warfighting capability. There are simply too many variables, too many different estimates, and too many ways they can affect future confrontations, clashes, and wars.

There also are serious uncertainties in even the official data and summary judgments in many cases. Some outside sources also tend to exaggerate the probable strategic importance of a given capability or development. In other cases, experts may fail to anticipate military developments and progress that prove critical in a given conflict. Estimates of current and future performance, deployments, and comparability with other systems have proved wrong in the past and are certain to do so in the future, and are influenced by all of the differences in Chinese, U.S. and other perspectives cited earlier.

What is clear, however, is that Chinese military development has become far more modern and flexible, that it seeks to adopting as many advances in other forces as possible, and that it is often highly original in character. This depth of innovation is sometimes disguised by Chinese terminology, which can sometimes take the form of a near slogans while the actual level of military development involved is both sophisticated and more experimental. This includes the Chinese emphasis on advanced forms of joint warfare, precision strike and smart missiles, space, cyber, and many other areas of Chinese force development.

As is shown in this section, Chinese nuclear forces and weapons of mass destruction are a major area of uncertainty – as are many aspects of how U.S. and Russian nuclear forces will evolve. It is clear that China is developing a wide range of new delivery options. It is not clear which systems will be deployed over time, or how China's inventory of nuclear weapons will evolve to arm them. The same is true of China's future approach to missile defense, and nuclear strategy — including its somewhat uncertain existing claims regarding “no first use.” What is clear is that China's forces are developing to the point where the U.S. must consider China's future strategic nuclear forces in any evaluation of the U.S.-Russian nuclear balance, nuclear warfighting, and arms control.

Chinese Military Modernization: Key Goals and Trends

Chinese Military Modernization: Key Goals and Trends

China's military modernization and force capabilities are extremely difficult to characterize. China has not provided defense white papers in recent years, and the past papers have provided steadily fewer specifics and details. At the same time, the official estimates by OSD and DIA used in this study describe advances and changes in virtually every area of Chinese forces, tactics, military technology, and regional capability. This is particularly striking because these two sources are careful to avoid speculation, and are verified by far better collection capabilities than are available to other countries or any private source.

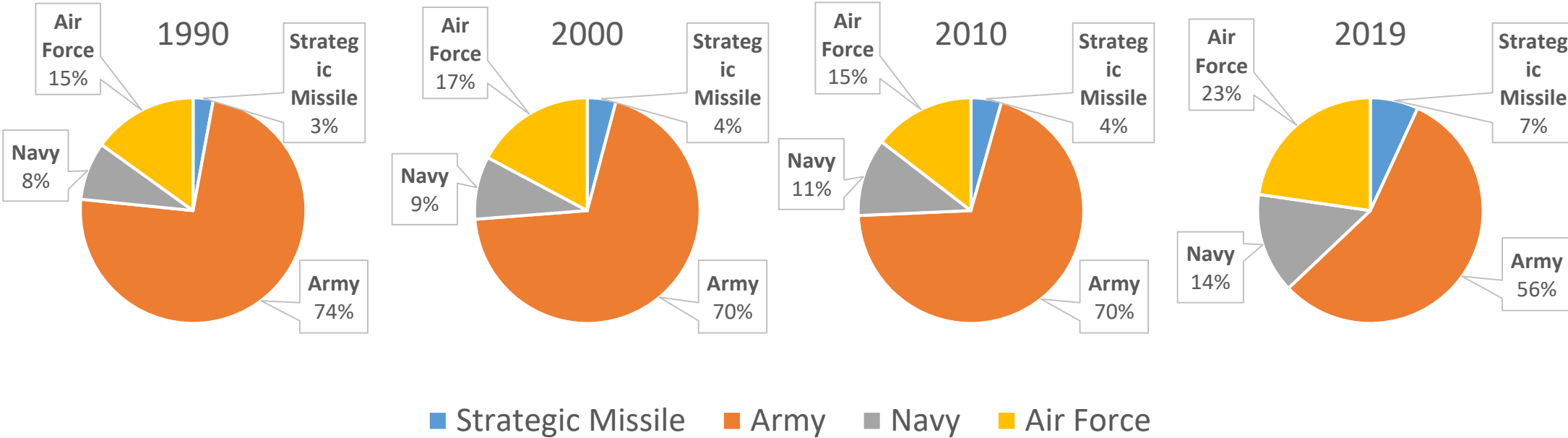
As noted earlier, this study can only highlight a limited number of such developments, and it is important to note that it does not cover several key internal political development in Chinese military modernization like new command and management systems, improved Communist Party Control, improve discipline, and the fight against corruption.

It is still clear, however, that China is acting on many of the goals it set in the past and is making advances in virtually every area of its military development, in each of its military services and paramilitary forces, and many cutting edge areas of military technology, tactics, and operational practice. It is also clear from U.S. official reports that China is actively improving its capability to perform the broad strategic tasks that it outlined in its 2015 Defense White Paper.

The graphics in this section summarize some key points in the Chinese White Paper and compare the 2017 and 2019 summary analyses in the OSD report on *Chinese Military Power*. They are, however, only a broad introduction to the full scale and diversity of Chinese efforts.

It should also be noted that they reflect Chinese claims and plans, and there is no way to independently assess how effective China has been in many of the areas involved, or to know actual performance and levels of technical progress.

China's Changing Military Personnel: 1990-2019



Category	Total	Strategic Missile	% of Total	Army	% of Total	Navy	% of Total	Air Force	% of Total	Paramilitary
1980	4,450,000	ND	ND	3,600,000	(80.9%)	360,000	(8.1%)	490,000	(11.0%)	ND
1990	3,030,000	90,000	(3.0%)	2,300,000	(75.9%)	260,000	(8.6%)	470,000	(15.5%)	12,000,000
2000	2,470,000	100,000	(4.0%)	1,700,000	(68.8%)	220,000	(8.9%)	420,000	(17.0%)	1,000,000
2010	2,285,000	100,000	(4.4%)	1,600,000	(70.0%)	255,000	(11.2%)	333,000	(14.6%)	660,000
2019	2,035,000	120,000	(5.9%)	975,000	(47.9%)	250,000	(12.3%)	395,000	(19.4%)	660,000

Source: World Bank, <https://data.worldbank.org/indicator/MS.MIL.TOTL.P1?end=2017&locations=CN&start=1985&view=chart>, and IISS, Military Balance.

China's Military Goals: 2015 Defense White Paper

China's national strategic goal is to complete the building of a moderately prosperous society in all respects by 2021 when the CPC celebrates its centenary; and the building of a modern socialist country that is prosperous, strong, democratic, culturally advanced and harmonious by 2049 when the People's Republic of China (PRC) marks its centenary.

It is a Chinese Dream of achieving the great rejuvenation of the Chinese nation. The Chinese Dream is to make the country strong. China's armed forces take their dream of making the military strong as part of the Chinese Dream. Without a strong military, a country can be neither safe nor strong.

In the new historical period, aiming at the CPC's goal of building a strong military in the new situation, China's armed forces will unswervingly adhere to the principle of the CPC's absolute leadership, uphold combat effectiveness as the sole and fundamental standard, carry on their glorious traditions, and work to build themselves into a people's military that follows the CPC's commands, can fight and win, and boasts a fine style of work.

In the new circumstances, the national security issues facing China encompass far more subjects, extend over a greater range, and cover a longer time span than at any time in the country's history. Internally and externally, the factors at play are more complex than ever before. Therefore, it is necessary to uphold a holistic view of national security, balance internal and external security, homeland and citizen security, traditional and non-traditional security, subsistence and development security, and China's own security and the common security of the world.

To realize China's national strategic goal and implement the holistic view of national security, new requirements have been raised for innovative development of China's military strategy and the accomplishment of military missions and tasks.

In response to the new requirement of safeguarding national security and development interests, China's armed forces will work harder to create a favorable strategic posture with more emphasis on the employment of military forces and means, and provide a solid security guarantee for the country's peaceful development. In response to the new requirement arising from the changing security situation, the armed forces will constantly innovate strategic guidance and operational thoughts so as to ensure the capabilities of fighting and winning.

In response to the new requirement arising from the worldwide RMA, the armed forces will pay close attention to the challenges in new security domains, and work hard to seize the strategic initiative in military competition. In response to the new requirement coming from the country's growing strategic interests, the armed forces will actively participate in both regional and international security cooperation and effectively secure China's overseas interests.

And in response to the new requirement arising from China's all-round and deepening reform, the armed forces will continue to follow the path of civil-military integration (CMI), actively participate in the country's economic and social construction, and firmly maintain social stability, so as to remain a staunch force for upholding the CPC's ruling position and a reliable force for developing socialism with Chinese characteristics.

China's Strategic Tasks: 2015 Defense White Paper

China's armed forces mainly shoulder the following strategic tasks:

- To deal with a wide range of emergencies and military threats, and effectively safeguard the sovereignty and security of China's territorial land, air and sea;
- To resolutely safeguard the unification of the motherland;
- To safeguard China's security and interests in new domains;
- To safeguard the security of China's overseas interests;
- To maintain strategic deterrence and carry out nuclear counterattack;
- To participate in regional and international security cooperation and maintain regional and world peace;
- To strengthen efforts in operations against infiltration, separatism and terrorism so as to maintain China's political security and social stability; and
- To perform such tasks as emergency rescue and disaster relief, rights and interests protection, guard duties, and support for national economic and social development.

China's Active Defense: 2015 Defense White Paper

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, has 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.

...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.

Chinese 2019 Defense White Paper: Military Modernization - I

Implementing the military strategic guideline for a new era, China's armed forces strive to keep in alignment with and contribute to the general strategies of the Communist Party of China (CPC) and the country, adopt a holistic approach to national security, strengthen the awareness of potential dangers, crises and wars, and actively adapt to the new landscape of strategic competition, the new demands of national security, and new developments in modern warfare, so as to effectively fulfill their tasks and missions in the new era.

To respond to the security threats facing the country, China's armed forces take solid steps to strengthen military preparedness and comprehensively enhance combat capabilities for the new era. Efforts have been made to build the military strategy into a balanced and stable one for the new era, which focuses on defense and coordinates multiple domains. Based on the idea that China's national defense is the responsibility of all Chinese people, China's armed forces give full play to the overall power of the people's war by innovating in its strategies, tactics and measures.

Building a fortified national defense and a strong military commensurate with the country's international standing and its security and development interests is a strategic task for China's socialist modernization. Drawing lessons from history, China strengthens its national defense and military to provide security guarantee for its peaceful development.

To strengthen China's national defense and military in the new era, it is imperative to comprehensively implement Xi Jinping's thinking on strengthening the military, thoroughly deliver on Xi Jinping's thinking on military strategy, continue to enhance the political loyalty of the armed forces, strengthen them through reform and technology, run them in accordance with the law, and focus on the capabilities to fight and win. Efforts will be made to advance the integrated development of mechanization and informationization, speed up the development of intelligent military, create a modernized military force structure with Chinese characteristics, improve and develop socialist military institutions with Chinese features, and constantly enhance the capabilities to fulfill the missions and tasks in the new era.

The strategic goals for the development of China's national defense and military in the new era are:

- to generally achieve mechanization by the year 2020 with significantly enhanced informationization and greatly improved strategic capabilities;
- to comprehensively advance the modernization of military theory, organizational structure, military personnel, and weaponry and equipment in step with the modernization of the country and basically complete the modernization of national defense and the military by 2035; and
- to fully transform the people's armed forces into world-class forces by the mid-21st century.

...Maintaining Combat Readiness

Maintaining combat readiness is an important assurance of effective response to security threats and fulfillment of tasks. The Central Military Commission (CMC) and the TCs' joint operations commands perform combat readiness duties strictly, and conduct regular inspections and drills to ensure combat readiness at all times. Consistent efforts are made to improve the capabilities of joint operations command to exercise reliable and efficient command over emergency responses, and to effectively accomplish urgent, tough and dangerous tasks. In 2018, the CMC conducted surprise inspections throughout the armed forces and organized readiness drills for the units, covering 21 provinces, autonomous regions and municipalities directly under the central government, and parts of the East China Sea and South China Sea.

Chinese 2019 Defense White Paper: Military Modernization - II

The PLA and the People's Armed Police Force (PAP) give greater priority to combat readiness. Efforts are made to strictly act on relevant regulations and procedures, fulfill readiness duties, conduct targeted exercises and training, and maintain standardized order, with a view to staying ready to act when required and effectively carrying out readiness (combat) duties.

Carrying Out Military Training in Real Combat Conditions

Military training is the basic practice of the armed forces in peacetime. China's armed forces put military training in an important position and take combat effectiveness as the sole and fundamental criterion. In order to enhance realistic training, they optimize the policy framework and criteria in this respect, establish and improve the relevant supervision system, conduct supervision on military training for emergencies and combat across the services, implement the responsibility system for training and readiness, and organize extensive contests and competitions to encourage officers and soldiers to step up military training.

Military training in real combat conditions across the armed forces is in full swing. Since 2012, China's armed forces have carried out extensive mission-oriented training tailored to the specific needs of different strategic directions and exercises of all services and arms, including 80 joint exercises at and above brigade/division level.

The history of the people's armed forces is a history of reform and innovation. In the new era, China is advancing defense and military modernization across the board and deepening reform in national defense and armed forces in all respects, with a focus on removing institutional barriers and solving structural and policy-related problems to adapt to the trends of worldwide RMA and the demands of national security. Historic strides have been made in strengthening the armed forces.

Reforming the Leadership and Command System

The reform in the leadership and command system is a significant measure in response to the call of a modern and specialized military capable of fighting and winning wars in the information age, aiming to improve the operational effectiveness and development efficiency of the military. Adhering to the general principle of "the CMC exercising overall leadership, the TCs responsible for military operations and the services focusing on developing capabilities", the PLA endeavors to enhance the CMC's centralized and unified leadership and its functions of strategic command and strategic management. The PLA has dismantled the long-established systems of general departments, military area commands (MAC) and the force composition with a dominating land force, and established new leadership, management and operational command systems.

Reorganizing and establishing new CMC functional organs. To optimize the functional and institutional setup of the CMC organs, the former General Staff Headquarters, General Political Department, General Logistics Department and General Armaments Department have been reshuffled into 15 organs under the centralized CMC leadership to advise, execute and serve. Thus, the chains of command, development, management and supervision are more streamlined, and the responsibilities of decision-making, planning, execution and assessment are more properly delegated.

Improving the leadership and management system for services and arms. The PLA has:

- Established the PLAA leading organs by integrating the functions of the former general departments concerning the development of the land force;

Chinese 2019 Defense White Paper: Military Modernization - III

- Established the PLASSF by combining strategic support forces across the services and CMC organs;
- Renamed the Second Artillery Force the PLARF; and
- Established the PLAJSF by integrating strategic and campaign level forces mainly for general-purpose support.

Thus, a CMC-Services-Troops leadership and management system has been put in place.

Establishing and improving the joint operations command system. By improving the joint operations command organ of the CMC and setting up those at the theater level, the PLA has established a lean and efficient joint operations command system composed of permanent and specialized commanding establishments for both peacetime and wartime operations. The former Shenyang, Beijing, Lanzhou, Jinan, Nanjing, Guangzhou and Chengdu MACs have been reorganized into 5 TCs: Eastern Theater Command (ETC), Southern Theater Command (STC), Western Theater Command (WTC), Northern Theater Command (NTC), and Central Theater Command (CTC). Thus, a CMC-TCs-Troops operations command system has been established.

Adjusting scale and proportion, and restructuring force composition. 300,000 personnel have been cut to keep the total active force at 2 million. Reform measures have been taken to transfer more officer positions to non-commissioned officers and civilian staff, downsize the leading organs at all levels by reducing their subordinate sections, leadership hierarchies and staff, and streamline the institutions and personnel in arts, sports, press, publication, logistical support, medical facilities, depots, and educational and research institutes. Thus, the number of personnel in the leading organs at and above regiment level has been cut by about 25%, and that of non-combat units by almost 50%. The PLA has significantly downsized the active force of the PLAA, maintained that of the PLAAF at a steady number, moderately increased that of the PLAN and PLARF, and optimized the force structures of all services and arms. The PLA has restructured the defense reserves. The deployment of combat forces has been adjusted for a strategic configuration that meets the demands of safeguarding China's national security in the new era.

Reorganizing the troops and rebuilding new-type combat forces. The previous 18 group armies have been reorganized into 13 new ones. All major combat units of the PLA follow a group army-brigade-battalion system. Reform measures have been taken to reinforce the combat capacity of the arms, reduce the command hierarchies and combine the troops at lower levels. New types of combat forces have been enhanced to conduct special operations, all-dimensional offense and defense, amphibious operations, far seas protection and strategic projection, aiming to make the force composition complete, combined, multi-functional and flexible.

Rebalancing and reorganizing military educational and research institutions. The PLA and the PAP have restructured the previous 77 universities and colleges into 44. The National Defense University (NDU) and the National University of Defense Technology (NUDT) have been reorganized. China's armed forces have established the CMC Steering Committee on Military Scientific Research and reorganized the Academy of Military Sciences (AMS) and the research institutes of the services. Thus, the military scientific research forces have been rebalanced with the AMS as the lead, the research institutes of the services and arms as the main forces, and the research components in educational institutions and the troops as supplements.

Chinese 2019 Defense White Paper: Military Modernization - IV

Reforming Military Policies and Institutions

China's armed forces take combat effectiveness as the criterion in the reform of military policies and institutions and encourage the initiative, enthusiasm and creativity of all members of the armed forces. Reform is designed to build and improve the system of socialist military policies and institutions with Chinese characteristics.

They have deepened reform in the institutions for Party building in the military to uphold the authority of the CPCCC and its centralized and unified leadership, and ensure the absolute leadership of the CPC over the military. Rules and regulations including the *Decision of China's Armed Forces on Strengthening Party Building in the Military in the New Era* have been formulated to improve the Party's institutions in the military in order to enhance its political and theoretical buildup, consolidate organizations, improve conduct, and enforce discipline.

They have innovated in policies and institutions for military force employment in a bid to effectively perform all missions and tasks in the new era. Rules and regulations have been formulated including the *Regulations on Vessel Protection Operations (Trial)*. The institutions of military strategic guidance, regulations on combat readiness duties, and rules and regulations on joint operations have all been optimized.

They have reformulated policies and institutions to further develop combat capabilities. Laws and regulations have been formulated and amended including the *Law of the People's Republic of China on National Defense Transportation*, the *Law of the People's Republic of China on the Protection of Military Installations* and the *Regulations on Civilian Personnel in the Military*. Newly-updated military training regulations and outlines have been promulgated. They have made progress in establishing the career officers system, optimizing the institutions of military welfare and support, improving the military honors system, and refining policies and institutions in training, equipment development, logistics, military research and national defense mobilization. Meanwhile, bigger legislative steps have been taken in relation to military officers and military service.

They have reformed the policies and institutions for military management to elevate the efficacy of military systems and boost quality development of the military. Rules and regulations have been formulated including the newly-updated *Regulations on Routine Service of the People's Liberation Army (Trial)*, the *Regulations on Discipline of the People's Liberation Army (Trial)*, the *Regulations on Formation of the People's Liberation Army (Trial)*, and the *Regulations on Military Legislation*. China's armed forces are enhancing institutional innovation in strategic management, defense expenditure management, and the military judicial system.

They have suspended all paid services. As of June, 2018, paid services provided by leading organs, operational units, and military-affiliated public institutions at all levels had been basically suspended, involving 15 sectors such as real estate lease, agricultural and associated products, and hospitality. Over 100,000 such projects have been suspended as scheduled, accounting for 94% of the total. The armed forces have achieved the goal of withdrawing from running businesses.

Chinese 2019 Defense White Paper: Military Modernization - V

...Promoting Defense and Military Development in All Respects

Placing theoretical and political buildup at the top of the agenda of the armed forces. China's armed forces unswervingly take Xi Jinping's thinking on strengthening the military as the guidance, firmly uphold General Secretary Xi Jinping as the core of the CPC and the whole Party, firmly uphold the authority of the CPC and its centralized and unified leadership, and follow the CMC Chairman responsibility system, in an effort to further strengthen the consciousness of the need to maintain political integrity, think in big-picture terms, follow the leadership core and keep in alignment. In accordance with the *Decision on Issues Relating to the Military Political Work in the New Era* issued in December 2014, China's armed forces have improved their political work and embarked on a new journey of development. In order to fully strengthen the Party leadership and Party building of the military in the new era, a CMC meeting on party building was held in August, 2018. Great efforts are being made to cultivate revolutionary officers and soldiers of the new era with faith, ability, courage and integrity, and build troops with iron-like faith, conviction, discipline and commitment.

Strengthening strategic management. Adopting demand-oriented planning and planning-led resource allocation, China's armed forces have established and improved the strategic management procedures of demand-planning-budgeting-execution-evaluation. They have completed a system of strategic plans and programs composed of the development strategies of the military as a whole, and its key areas, branches, and the PAP. They have regulated military strategic planning, promulgated and implemented the *Outline of the 13th Five-Year Plan for Military Development*, and optimized the mechanisms for evaluation, supervision and control.

...Building a combat-oriented modern logistics system. China's armed forces are putting in place a support mechanism combining centralized and decentralized support, as well as general and special-purpose supplies, with PLA JLSF as the backbone force and service logistics units as supplements. They are also building a joint, lean and efficient logistic support system with the strategic and campaign level forces as the main force, the affiliated forces as the support, and the civil sectors as supplements. Logistics units have been incorporated into TC-level joint training, trans-theater training by services and arms, and joint exercises and training with foreign militaries to strengthen the integrated training of logistical and operational forces. China's armed forces have acquired a rapid, multi-dimensional and precise support capability.

...The PLA Joint Logistic Support Force (PLA JLSF), as the main force for joint logistics as well as strategic and campaign level support, is an important component of the modern military force with Chinese characteristics. It comprises the support forces for inventory and warehousing, medical services, transport, force projection, oil pipelines, engineering and construction management, reserve assets management, and procurement. Under the PLA JLSF, there are 5 joint logistic support centers located respectively in Wuxi (Jiangsu Province), Guilin (Guangxi Zhuang Autonomous Region), Xining (Qinghai Province), Shenyang (Liaoning Province), and Zhengzhou (Henan Province), as well as the PLA General Hospital and the PLA Center for Disease Prevention and Control. In line with the requirements of joint support for joint operations and joint training, the PLA JLSF is being integrated into the joint operations system to enhance the capabilities of integrated joint logistics, so as to build a strong and modernized joint logistic support force.

...China attends to both development and security. It is making an integrated effort to build a prosperous country and a strong military, and striving for the coordinated development of national defense and the economy. Following the principle of building the armed forces through diligence and thrift, China takes into consideration the development of the economy and the demands of national defense, decides on the appropriate scale and composition of defense expenditure, and manages and applies these funds in accordance with law.

Chinese 2019 Defense White Paper: Military Modernization - VI

China's Defense Expenditure Since 2012

In the new era, to keep pace with the country's modernization, China is focusing on building a fortified national defense and a strong military commensurate with the country's international standing, and its national security and development interests. China is striving to narrow the gap between its military and the world's leading militaries, and make up the deficiencies in the military's capabilities in modern warfare. Defense expenditure is growing steadily and the breakdown of spending is being continuously optimized.

In terms of usage, China's defense expenditure is assigned to three sectors – personnel, training and sustainment, and equipment. Personnel expenses mainly cover the salaries, allowances, food, bedding, clothing, insurance, subsidies and pensions for officers, non-ranking officers, soldiers and contracted civilians, as well as retirees supported from the defense budget. Training and sustainment expenses mainly cover training of the troops, institutional education, construction and maintenance of installations and facilities, and other expenditure on routine consumables. Equipment expenses mainly cover R&D, testing, procurement, repairs, maintenance, transport and the storage of weaponry and equipment. In terms of scope, defense expenditure covers all active forces, reserve forces and militia.

Since 2012, the increase in defense expenditure has been primarily spent for the following purposes:

1. Adapting to national economic and social development, improving the wellbeing of service personnel, ensuring regular increases in military salaries, and bettering the working, training and living conditions of the troops;
2. Increasing input in weaponry and equipment development, phasing out the outdated, upgrading the old, and developing and procuring the new, such as aircraft carriers, fighters, missiles and main battle tanks, to steadily modernize weaponry and equipment;
3. Deepening national defense and military reform, supporting major reforms in military leadership and command systems, force structure and composition, and policies and institutions;
4. Supporting training in real combat conditions, enhancing strategic-level training, joint training at TCs' level and training of services and arms, and improving the conditions for simulated, networked and force-on-force training; and
5. Supporting diverse military tasks including the UNPKOs, vessel protection operations, humanitarian assistance operations and disaster relief efforts.

Building a More Capable PLA – Developments in 2017

China is committed to building a more capable PLA that can fight jointly, harness real-time, data-networked command and control and precision strike; and operate increasingly far away from China's shores.

- Highlights in 2017: cutting 300,000 personnel, flattening to a brigade structure, building expeditionary capability, and placing paramilitary forces solely under the control of the PLA.
- Notable 2017 exercise elements included air and ground operations coordination, incorporating multiple military services' intelligence, surveillance, and reconnaissance (ISR) data, and using joint air firepower guidance teams to provide targeting information to multiple services' assets.
- PLA Army reforms included disestablishment of five group army headquarters, reorganization of many divisions and regiments into combined arms brigades, and formation of some air assault brigades.
- The PLAN Marine Corps (PLANMC) is expanding. Previously consisting of 2 brigades, approximately 10,000 personnel, and limited in geography and mission, by 2020, the PLANMC will consist of 7 brigades, may exceed 30,000 personnel, and will have expanded its mission to include expeditionary operations.
- The PLAN conducted its longest goodwill tour in 2017, traveling to 20 countries in the Indo-Pacific region, Europe, Africa, and Oceania.
- In 2017, the PLAN launched an aircraft carrier and a cruiser, and three destroyers, additional surface combatants, support ships, and intelligence-collection ships entered service. The world's largest seaplane also completed its first flight in December 2017.
- The PLA Air Force (PLAAF) has been re-assigned a nuclear mission. The deployment and integration of nuclear-capable bombers would, for the first time, provide China with a nuclear "triad" of delivery systems dispersed across land, sea, and air.
- The Chinese Communist Party continued its vigorous efforts to root out armed forces corruption in 2017. In September 2017, two former Central Military Commission (CMC) members, the previous Joint Staff Department chief, Fang Fenghui, and previous Political Work Department director, Zhang Yang, were reportedly detained for questioning in an anti-graft probe, a first in decades for sitting CMC officers.
- Computer systems around the world, including those owned by the U.S. Government, continued to be targeted by China-based intrusions through 2017.

OSD on Chinese Military Power in 2018: Key Findings

China's strategy is to harness the initial two decades of the 21st century as a "period of strategic opportunity" to facilitate China's development and expand the country's "comprehensive national power," which includes improving its military, the People's Liberation Army (PLA).

- At the 19th Party Congress in October 2017, President Xi enumerated objectives for the "basic realization of socialist modernization" by 2035, which included China becoming one of the most "innovation-oriented" countries, significant enhancement of the country's soft power, and continued economic prosperity.
- Xi's speeches at the 19th Party Congress and the PLA's 90th anniversary highlighted recent progress "accelerating toward informatization" that will provide the PLA with a "great rise in strategic capability."
- China's military leaders want to achieve mechanization and make "major progress" toward informatization by 2020, reach a goal of "basic modernization" by 2035, and become a world-class military by the middle of this century.

China's leaders increasingly seek to leverage China's growing economic, diplomatic, and military clout to establish regional preeminence and expand the country's international influence.

- China uses the Belt and Road Initiative to develop strong ties with other countries to shape their interests to align with China's and deter confrontation or criticism of China's approach to sensitive issues.
- In July 2017, Sri Lanka and a Chinese-state owned enterprise signed a 99-year lease for Hambantota Port, following similar deals in Piraeus, Greece, and Darwin, Australia.
- In August 2017, China officially opened its first overseas base in Djibouti, deploying a company of marines and equipment to the base.

Source: Office of the Secretary of Defense, *Military and Security Developments Involving the Republic of China, Annual Report to Congress*, "Fact Sheet" May 16, 2018, Department of Defense.

China does not want to jeopardize regional stability, which remains critical to its economic development, but is willing to employ coercive measures to advance its interests and mitigate other countries' opposition.

- In 2017, China used economic and diplomatic pressure, unsuccessfully, in an attempt to urge South Korea to reconsider its deployment of the Terminal High-Altitude Area Defense (THAAD) system.
- In August 2017, China conducted a coordinated PLA Navy (PLAN), China Coast Guard (CCG), and People's Armed Forces Maritime Militia patrol around Thitu Island and planted a flag on Sandy Cay, a sandbar within 12 nautical miles of Subi Reef and Thitu Island, possibly in response to the Philippines' reported plans to upgrade its runway on Thitu Island.
- In 2017, China continued building infrastructure at three large Spratly Islands outposts. China also made political and economic overtures to Southeast Asian countries to diminish regional concerns over its actions in the South China Sea.
- In 2017, China entered within 12 nautical miles of the Senkaku Islands on average once every 10 days with multiple CCG vessels.
- After a 70-day standoff near Doka La Pass, India and China agreed to withdraw their military forces, but both countries maintain a heightened military presence in the surrounding region. India halted another Chinese road construction effort in disputed territory in Arunachal Pradesh in December 2017.

China also continues to employ persuasion and coercion vis-à-vis Taiwan.

- Taiwan lost an additional diplomatic partner in 2017 (Panama), and international fora denied participation or observership to Taiwan representatives.
- In 2017, the PLAAF significantly increased Taiwan circumnavigations, passing through both the Miyako Strait and the Bashi Channel in the same mission.
- In June 2017, the United States announced the sale of \$1.42 billion in defense articles and services to Taiwan, including MK-48 6AT Heavy-Weight Torpedoes, AGM-154 Joint Standoff Weapons, and AGM-88 High-Speed Anti-Radiation Missiles.

OSD on Chinese Military Developments in 2019: Key Findings - I

Key Takeaways

- China's leaders continue to emphasize developing a military that can fight and win.
- In 2018, China published a new *Outline of Training and Evaluation* that emphasized realistic and joint training across all warfare domains, and covered missions and tasks aimed at "strong military opponents."
- China's growing overseas interests have increasingly propelled the PLA to think about how it will operate beyond China's borders and immediate periphery.
- China typically publishes a white paper on its military strategy every two years, but has not released one since 2015.

China's military strategy, as outlined in its 2015 defense white paper *China's Military Strategy* and further delineated in the latest iteration of the PLA National Defense University's *Science of Strategy*, is to build strong, combat-effective armed forces capable of winning regional conflicts and employing integrated, real-time C2 networks. Throughout 2018, China's leaders stressed these tenets with a particular emphasis on developing a military that can fight and win.

- The 2015 defense white paper also echoed themes from previous publications, reflecting a growing emphasis on the importance of the maritime domain, the PLA Air Force's shift towards offensive operations, the PLA Army's long-distance mobility operations, and the need for superiority in the information domain, including through space and cyber operations. Typically released every two years, China did not release a new defense white paper in 2017 or 2018.
- In 2018, the PLA promulgated a new *Outline of Military Training and Evaluation* that emphasized realistic and joint training across all warfare domains, addressed changes in the PLA following recent military reforms, incorporated a global perspective, and covered missions and tasks aimed at "strong military opponents." The new outline also implemented standards for training that rely on the experiences of foreign militaries and absorbs the methods those militaries use.

The PLA is pursuing an ambitious modernization program that aligns with China's two centenary goals. China's military leaders want to achieve mechanization and make "major progress" toward informatization by 2020, ahead of the first centenary goal. The concept of "informatization" figures prominently in PLA writings and is roughly analogous to the U.S. military's concept of "net-centric" capability: a force's ability to use advanced information technology and communications systems to gain operational advantage over an adversary. PLA writings highlight the benefit of near real-time shared awareness of the battlefield in enabling quick, unified effort to seize tactical opportunities. They also seek to complete military modernization by 2035 and become a "world-class" military by the second centenary goal of 2049. Although China has not defined what that means, some observers have interpreted it as meaning developing capabilities on par with other global militaries, especially the United States.

Military Strategic Guidelines. In 2015, China's leadership directed the PLA to be capable of fighting and winning "informatized local wars" with an elevated emphasis on "maritime military struggle," adjusting its guidance on the type of war the PLA should be prepared to fight. China promulgated this revision through its "military strategic guidelines," the top-level directives derived from China's military strategy that prescribe concepts, assess threats, and set priorities for planning, force posture, and modernization. This update indicates China expects significant elements of a modern conflict to occur at sea.

OSD on Chinese Military Developments in 2019: Key Findings - II

Modernization

China is advancing a comprehensive military modernization program aimed at completing modernization by 2035 and making the PLA into a “world-class” military by 2049...China aims to complete military modernization by 2035 and make the PLA into a “world-class” military by 2049, through both modernization as well as structural and command changes. During the last decade, China has increased its capability to address a range of regional security objectives, beyond its continued emphasis on capabilities for Taiwan contingencies.

Modernization includes improvements to military capabilities to conduct A2/AD against potential third-party intervention, as well as nuclear deterrence and power projection operations. The PLA continues to develop capabilities to conduct space, counterspace, electronic warfare, and cyberspace operations. The PLA seeks enhanced joint operations C2, joint logistics support, and a real-time surveillance, reconnaissance, and warning system to bolster its warfighting capability. PLA modernization includes command and force structure reforms to improve operational flexibility and readiness for future deployments.

...Strategy

- China’s leadership has adjusted its national military strategic guidelines about how to fight local wars two other times since the fall of the Soviet Union. In 1993, Jiang Zemin directed the PLA to prepare for local war under modern, high-tech conditions after observing U.S. military operations in the Gulf War. In 2004, Hu Jintao ordered the military to focus on winning “local war under informatized conditions.”
- Taiwan persistently remains the PLA’s main “strategic direction.” One of the geographic areas the leadership identifies as having strategic importance, in authoritative military publications. Other strategic directions include the East China Sea, the South China Sea, and China’s borders with India and North Korea. PLA reforms have oriented each new theater command toward a specific strategic direction.
- In 2015, China’s military strategy outlined eight “strategic tasks,” or types of missions the PLA must be ready to execute: safeguard the sovereignty of China’s territory; safeguard national unification; safeguard China’s interests in new domains such as space and cyberspace; maintain strategic deterrence; participate in international security cooperation; maintain China’s political security and social stability; and conduct emergency rescue, disaster relief, and “rights and interest protection” missions.

Active Defense. China characterizes its military strategy as one of “active defense,” a concept it describes as strategically defensive but operationally offensive. It is rooted in a commitment not to initiate armed conflict, but to respond robustly if an adversary challenges China’s national unity, territorial sovereignty, or interests. According to this concept, China may conduct defensive counterattacks by responding to an attack or striking preemptively to disrupt an adversary’s preparations to attack. The PLA interprets active defense to include both de-escalation and seizing the initiative. Active defense is enshrined in the 2015 *National Security Law* and is included in the PLA’s major strategy documents. President Xi’s speech during the PLA’s 90th anniversary parade in 2017 further highlighted that China would never conduct “invasion and expansion,” but also would never permit “any piece of Chinese territory” to separate from China.

Coercive Approach. As part of its “active defense” strategy, China’s leaders use tactics short of armed conflict to pursue China’s strategic objectives. Activities are calculated to fall below the threshold of provoking armed conflict with the United States, its allies and partners, or others in the Indo-Pacific region. These tactics are particularly evident in China’s pursuit of its territorial and maritime claims in the South and East China Seas as well as along its borders with India and Bhutan.

OSD on Chinese Military Developments in 2019: Key Findings - III

In recent years, the PLA has also increased patrols around and near Taiwan using bomber, fighter, and surveillance aircraft to signal Taiwan. China additionally employs nonmilitary tools coercively, including economic tools during periods of political tensions with countries that China accuses of harming its national interests. After Australia's public debate on Chinese influence in Australian politics, China delayed customs approval for Australian beef and wine imports in early 2018. China's consulate in Sydney also warned Chinese students that studying in Australia was dangerous, and more than 20 Chinese school visits to Australia were cancelled.

Growing Global Presence. As China's overseas interests have grown over the past two decades, they have increasingly propelled the PLA to think about how it will operate beyond China's borders and its immediate periphery. In 2004, one of the new historic missions given to the PLA by then-Chinese President Hu Jintao was to support China's overseas interests and diplomacy. The PLAN's evolving focus – from “offshore waters defense” to a mix of “offshore waters defense” and “open seas protection” – reflects the high command's expanding interest in a wider operational reach. China's military strategy and ongoing PLA reform reflect the abandonment of its historic focus on control of geography through the use of expanding defensive perimeters in favor of a maritime strategy to defend interests abroad. Similarly, doctrinal references to a “forward edge defense” that would move potential conflicts far from China's territory suggest PLA strategists envision an increasing role for the PLA overseas.

A more robust overseas logistics and basing infrastructure would allow China to project and sustain military power at greater distances. China's leaders may assess that a mixture of military logistics models, including preferred access to overseas commercial ports and a limited number of exclusive PLA logistics facilities, probably collocated with commercial ports, most closely aligns with China's overseas military logistics needs. In August 2017, China officially opened a military base in Djibouti, its first overseas military base. Chinese officials claim that the base – which they describe as a logistics facility – will support China's anti-piracy operations in the Horn of Africa and its UN peacekeeping deployments. China will seek to establish additional military bases in countries with which it has a longstanding friendly relationship and similar strategic interests, such as Pakistan, and in which there is a precedent for hosting foreign militaries. China's overseas military basing will be constrained by the willingness of potential host countries to support a PLA presence. International press reporting in 2018 indicated that China sought to expand its military basing and access in the Middle East, Southeast Asia, and the western Pacific.

Stability and Security Operations. The PLA continues to emphasize the importance of stability and security operations, stressing training and equipment enhancements to improve force capabilities for these missions. These operations encompass emergency response, counterterrorism, international rescue, humanitarian assistance/disaster relief (HA/DR), peacekeeping operations (PKO), and various other security tasks falling into the category of military operations other than war (MOOTW). In recent years, the PLA has embraced MOOTW by revising doctrine and teaching materials and incorporating MOOTW into its readiness and modernization plans. In 2018, the PLA focused on regional counterterrorism cooperation in the midst of China's mass detention in Xinjiang of more than one million Uighurs, Kazakhs, and other Muslims in government camps, where their daily activities are restricted and heavily monitored.

- In a speech during the 8th Beijing Xiangshan Forum, Minister of National Defense General Wei Fenghe highlighted China's promotion of the “China-Afghanistan-Pakistan-Tajikistan” four-country counterterrorism cooperation mechanism known as the Quadrilateral Cooperation and Coordination Mechanism. In 2018, China engaged in counterterrorism exercises with Cambodia, Nepal, India, Pakistan, Kyrgyzstan, Tajikistan, Uzbekistan, Kazakhstan, and Russia.
- China also tasks the PAP with emergency response and counterterrorism operations, with PAP forces training for these missions through 2018.
- In 2018, the PLA continued to implement structural reforms, make progress on fielding indigenous systems, and strengthen the ability of the Strategic Support Force and the Joint Logistics Support Force to enable operational support capabilities and joint operations.

Changing Nuclear, Chemical, and Biological Forces and Delivery Systems

Nuclear, Chemical, and Biological Forces and Delivery Systems

The data in this section summarize the description of nuclear programs in China's 2015 and 2019 Defense White Papers. They then examine the assessments of China's current nuclear programs by OSD, the NPR, and DIA. They then examine the nuclear modernization programs of the U.S. and Russia, and the trends in the global nuclear balance. It is clear that China is still a small nuclear power by U.S. and Russian standards.

The data do show that China is modernizing and expanding virtually every element of its nuclear forces, including each element of its nuclear weapons and missile, sea, and air delivery systems. What are not clear are China's current and planned holdings of nuclear weapons, China's future plans for deploying additional delivery systems, its commitment to some form of no first use, first preemption, or launch on warning, and the extent to which it will accept what might be called a form of "minimum assured destruction." The charts and maps that follow provide some broad indications of the rate of increase in its nuclear weapons holding and its near-term plans to increase its delivery systems, but they do not indicate whether China will continue to rely on forces that can certainly inflict massive countervalue damage to U.S or Russian cities, but are too limited to have major value in any kind of counterforce exchange.

It is unclear, however, that China has reason to seek any form of parity with the Russia or the U.S. As is shown in one of the tables in this section, the Chinese ability to destroy 10-20 major Russian or the U.S cities would inflict unacceptable casualties by any standard other than total war. China's capability for "minimum assured destruction" still acts as a massive deterrent to any broad form of nuclear escalation.

Chinese restraint in deploying nuclear weapons might also have some value in decoupling China from any U.S. and Russian nuclear crisis or conflict and China may create other forms of counterforce capability by deploying large-scale precision guided conventionally-armed weapons. Similarly, the number of dual-capable missiles with conventional or nuclear warheads adds to the uncertainty any attack would face in analyzing the Chinese threat or executing a counterforce attack.

The data on Chinese biological and chemical weapons is too limited to provide useful indicators. China certainly has the ability to design and build such weapons, but it is unclear that it has done so.

Both OSD and DIA also make a point of describing Chinese underground facilities as defensive – possibly to refute arguments that China may be concealing large numbers of nuclear weapons in such facilities.

China's View of Nuclear Weapons: 2015 Defense White Paper

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.

...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 PLAAF will boost its capabilities for strategic early warning, air strike, air and missile defense, information countermeasures, airborne operations, strategic projection and comprehensive support.

The PLAN will enhance its capabilities for strategic deterrence and counterattack, maritime maneuvers, joint operations at sea, comprehensive defense and comprehensive support.

Chinese 2019 Defense White Paper: Nuclear Forces

International strategic competition is on the rise. The US has adjusted its national security and defense strategies, and adopted unilateral policies. It has provoked and intensified competition among major countries, significantly increased its defense expenditure, pushed for additional capacity in nuclear, outer space, cyber and missile defense, and undermined global strategic stability. NATO has continued its enlargement, stepped up military deployment in Central and Eastern Europe, and conducted frequent military exercises. Russia is strengthening its nuclear and non-nuclear capabilities for strategic containment, and striving to safeguard its strategic security space and interests. The European Union (EU) is accelerating its security and defense integration to be more independent in its own security.

The non-proliferation of weapons of mass destruction remains problematic. The international non-proliferation regime is compromised by pragmatism and double standards, and hence faces new challenges. Extremism and terrorism keep spreading. Non-traditional security threats involving cyber security, bio-security and piracy are becoming more pronounced. The Iranian nuclear issue has taken an unexpected turn, and there is no easy political solution to the Syrian issue. The security of individual countries is becoming increasingly intertwined, interlinked and interactive. No country can respond alone or stand aloof.

...China is always committed to a nuclear policy of no first use of nuclear weapons at any time and under any circumstances, and not using or threatening to use nuclear weapons against non-nuclear-weapon states or nuclear-weapon-free zones unconditionally. China advocates the ultimate complete prohibition and thorough destruction of nuclear weapons. China does not engage in any nuclear arms race with any other country and keeps its nuclear capabilities at the minimum level required for national security. China pursues a nuclear strategy of self-defense, the goal of which is to maintain national strategic security by deterring other countries from using or threatening to use nuclear weapons against China.

...Nuclear capability is the strategic cornerstone to safeguarding national sovereignty and security. China's armed forces strengthen the safety management of nuclear weapons and facilities, maintain the appropriate level of readiness and enhance strategic deterrence capability to protect national strategic security and maintain international strategic stability.

...The PLARF plays a critical role in maintaining China's national sovereignty and security. It comprises nuclear missile, conventional missile and support forces, and subordinate missile bases. In line with the strategic requirements of having both nuclear and conventional capabilities and deterring wars in all battlespaces, the PLARF is enhancing its credible and reliable capabilities of nuclear deterrence and counterattack, strengthening intermediate and long-range precision strike forces, and enhancing strategic counter-balance capability, so as to build a strong and modernized rocket force.

...China has played a constructive role in the political settlement of regional hotspots such as the Korean Peninsula issue, the Iranian nuclear issue and Syrian issue....

China actively participates in international arms control, disarmament and non-proliferation. ...China objects to arms race and strives to protect global strategic balance and stability. To this end, China has signed or acceded to dozens of relevant multilateral treaties including the Treaty on the Non-proliferation of Nuclear Weapons. In 2015 China announced the establishment of the USD1 billion China-UN Peace and Development Fund in the following decade, which was officially put into operation in 2016.

Chinese 2019 Defense White Paper: NBC and Other Arms Control Treaties

Major Multilateral Treaties on Arms Control, Disarmament and Non-Proliferation Joined by China		
Category	Treaties	Time
Nuclear	Protocol to the Treaty on a Nuclear-Weapon-Free Zone in Central Asia	Signed in May 2014, approved in Apr. 2015 by the Standing Committee of the National People's Congress
	Protocol Additional to the Agreement Between the People's Republic of China and the International Atomic Energy Agency for the Application of Safeguards in China	Signed in Dec. 1998, entered into force in Mar. 2002
	Comprehensive Nuclear Test Ban Treaty	Signed in Sep. 1996
	Protocol I and II to the African Nuclear-Weapon-Free Zone Treaty	Signed in Apr. 1996, instrument of ratification deposited in Oct. 1997
	Convention on Nuclear Safety	Signed in Sep. 1994, ratified in Apr. 1996
	Treaty on the Non-Proliferation of Nuclear Weapons	Acceded in Mar. 1992
	Treaty on the Prohibition of the Emplacement of Nuclear Weapons and Other Weapons of Mass Destruction on the Sea-Bed and the Ocean Floor and in the Subsoil Thereof	Acceded in Feb. 1991
	Convention on the Physical Protection of Nuclear Material	Acceded in Feb. 1989
	Agreement Between the People's Republic of China and the International Atomic Energy Agency for the Application of Safeguards in China	Signed in Sep. 1988, entered into force in Sep. 1989
	Additional Protocol II and III to the South Pacific Nuclear-Free Zone Treaty	Signed in Feb. 1987, instrument of ratification deposited in Oct. 1988
Chemical	Convention on the Prohibition of Development, Production, Stockpiling and Use of Chemical Weapons and on Their Destruction	Signed in Jan. 1993, instrument of ratification deposited in Apr. 1997
	Convention on the Prohibition of the Development, Production and Stockpiling of Bacteriological (Biological) and Toxin Weapons and on Their Destruction	Acceded in Nov. 1984
Biological	Protocol for the Prohibition of the Use in War of Asphyxiating, Poisonous or Other Gases, and of Bacteriological Methods of Warfare	Statement issued to acknowledge the Protocol in Jul. 1952

Category	Treaties	Time
Conventional	Protocol on Explosive Remnants of War (Protocol V) of Convention on Prohibitions or Restrictions on the Use of Certain Conventional Weapons Which May Be Deemed to Be Excessively Injurious or Have Indiscriminate Effects	Instrument of ratification deposited in Jun. 2010
	Protocol Against the Illicit Manufacturing of and Trafficking in Firearms, Their Parts and Components and Ammunition, Supplementing the United Nations Convention Against Transnational Organized Crime	Signed in Dec. 2002
	Protocol on Blinding Laser Weapons Annexed to the Convention on Prohibitions or Restrictions on the Use of Certain Conventional Weapons Which May Be Deemed to Be Excessively Injurious or to Have Indiscriminate Effects (Protocol IV)	Instrument of ratification deposited in Nov. 1998
	Amended Protocol on Prohibitions or Restrictions on the Use of Mines, Booby-Traps and Other Devices Annexed to the Convention on Prohibitions or Restrictions on the Use of Certain Conventional Weapons Which May Be Deemed to Be Excessively Injurious or to Have Indiscriminate Effects (Amended Protocol II)	Instrument of ratification deposited in Nov. 1998
	Convention on Prohibitions or Restrictions on the Use of Certain Conventional Weapons Which May Be Deemed to Be Excessively Injurious or to Have Indiscriminate Effects and Protocols I-III	Signed in Sep. 1981, instrument of ratification deposited in Apr. 1982; amendment of Article 1 of the Convention ratified in Jun. 2003, instrument of ratification deposited in Aug. 2003
	Convention on the Prohibition of Military or Any Other Hostile Use of Environmental Modification Techniques	Acceded in Jun. 2005
Others	Convention on Registration of Objects Launched into Outer Space	Acceded in Dec. 1988
	Agreement on the Rescue of Astronauts, the Return of Astronauts, and the Return of Objects Launched into Outer Space	Acceded in Dec. 1988
	Convention on International Liability for Damage Caused by Space Objects	Acceded in Dec. 1988
	Treaty on Principles Concerning the Activities of States in the Exploration and Use of Outer Space Including the Moon and other Celestial Bodies	Acceded in Dec. 1983
	The Antarctic Treaty	Acceded in Jun. 1983

U.S. Nuclear Posture Review on Chinese Nuclear Forces 2/2018 - I

While the United States has continued to reduce the number and salience of nuclear weapons, others, including Russia and China, have moved in the opposite direction. Russia has expanded and improved its strategic and non-strategic nuclear forces. China's military modernization has resulted in an expanded nuclear force, with little to no transparency into its intentions. North Korea continues its illicit pursuit of nuclear weapons and missile capabilities in direct violation of United Nations (U.N.) Security Council resolutions. Russia and North Korea have increased the salience of nuclear forces in their strategies and plans and have engaged in increasingly explicit nuclear threats. Along with China, they have also engaged in increasingly aggressive behavior in outer space and cyber space.

... Since 2010 we have seen the return of Great Power competition. To varying degrees, Russia and China have made clear they seek to substantially revise the post-Cold War international order and norms of behavior. Russia has demonstrated its willingness to use force to alter the map of Europe and impose its will on its neighbors, backed by implicit and explicit nuclear first-use threats. Russia is in violation of its international legal and political commitments that directly affect the security of others, including the 1987 Intermediate-Range Nuclear Forces (INF) Treaty, the 2002 Open Skies Treaty, and the 1991 Presidential Nuclear Initiatives. Its occupation of Crimea and direct support for Russia-led forces in Eastern Ukraine violate its commitment to respect the territorial integrity of Ukraine that they made in the 1994 Budapest Memorandum. China meanwhile has rejected the ruling of the Permanent Court of Arbitration Tribunal that found China's maritime claims in the South China Sea to be without merit and some of its related activities illegal under the U.N. Convention on the Law of the Sea and customary international law. Subsequently, China has continued to undertake assertive military initiatives to create "facts on the ground" in support of its territorial claims over features in the East and South China Seas.

... Russia and China are pursuing asymmetric ways and means to counter U.S. conventional capabilities, thereby increasing the risk of miscalculation and the potential for military confrontation with the United States, its allies, and partners. Both countries are developing counter-space military capabilities to deny the United States the ability to conduct space-based intelligence, surveillance, and reconnaissance (ISR); nuclear command, control, and communications (NC3); and positioning, navigation, and timing. Both seek to develop offensive cyberspace capabilities to deter, disrupt, or defeat U.S. forces dependent on computer networks. Both are fielding an array of anti-access area denial (A2/AD) capabilities and underground facilities to counter U.S. precision conventional strike capabilities and to raise the cost for the United States to reinforce its European and Asian allies and partners. While nuclear weapons play a deterrent role in both Russian and Chinese strategy, Russia may also rely on threats of limited nuclear first use, or actual first use, to coerce us, our allies, and partners into terminating a conflict on terms favorable to Russia. Moscow apparently believes that the United States is unwilling to respond to Russian employment of tactical nuclear weapons with strategic nuclear weapons.

The United States does not wish to regard either Russia or China as an adversary and seeks stable relations with both. We continue to seek a dialogue with China to enhance our understanding of our respective nuclear policies, doctrine, and capabilities; to improve transparency; and to help manage the risks of miscalculation and misperception. The United States and Russia have in the past maintained strategic dialogues to manage nuclear competition and nuclear risks. Given Russian actions, including its occupation of Crimea, this constructive engagement has declined substantially. The United States looks forward to a new day when Russia engages with the United States, its allies, and partners transparently and constructively, without aggressive actions and coercive nuclear threats. Nevertheless, this review candidly addresses the challenges posed by Russian, Chinese, and other states' strategic policies, programs, and capabilities, particularly nuclear, and the flexible, adaptable, and resilient U.S. nuclear capabilities required to protect the United States, allies and partners.

...Consistent with Chinese President Xi's statement at the 19th Party Congress that China's military will be "fully transformed into a first tier force" by 2050, China continues to increase the number, capabilities, and protection of its nuclear forces. While China's declaratory policy and doctrine have not changed, its lack of transparency regarding the scope and scale of its nuclear modernization program raises questions regarding its future intent. China has developed a new road-mobile strategic intercontinental ballistic missile (ICBM), a new multi-warhead version of its DF-5 silo-based ICBM, and its most advanced ballistic missile submarine armed with new submarine-launched ballistic missiles (SLBM). It has also announced development of a new nuclear-capable strategic bomber, giving China a nuclear triad. China has also deployed a nuclear-capable precision guided DF-26 intermediate-range ballistic missile capable of attacking land and naval targets. As with Russia, despite criticizing U.S. homeland missile defense—which is directed against limited missile threats—China has announced that it is testing a new mid-course missile defense system, plans to develop sea-based mid-course ballistic missile defense, and is developing theater ballistic missile defense systems, but has provided few details.

U.S. Nuclear Posture Review on Balance of Nuclear Forces 2/2018 - II

NEW NUCLEAR DELIVERY SYSTEMS SINCE 2010

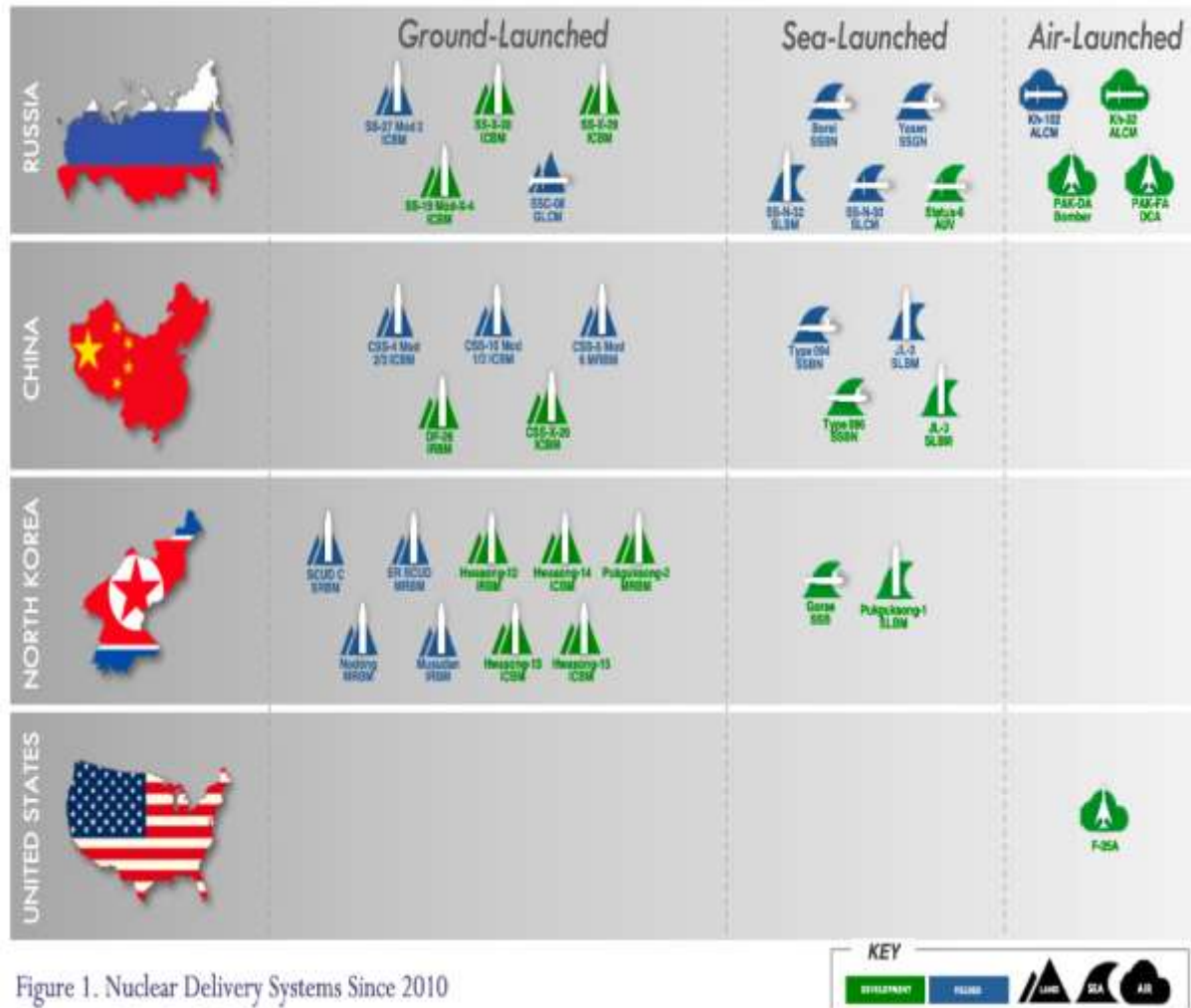
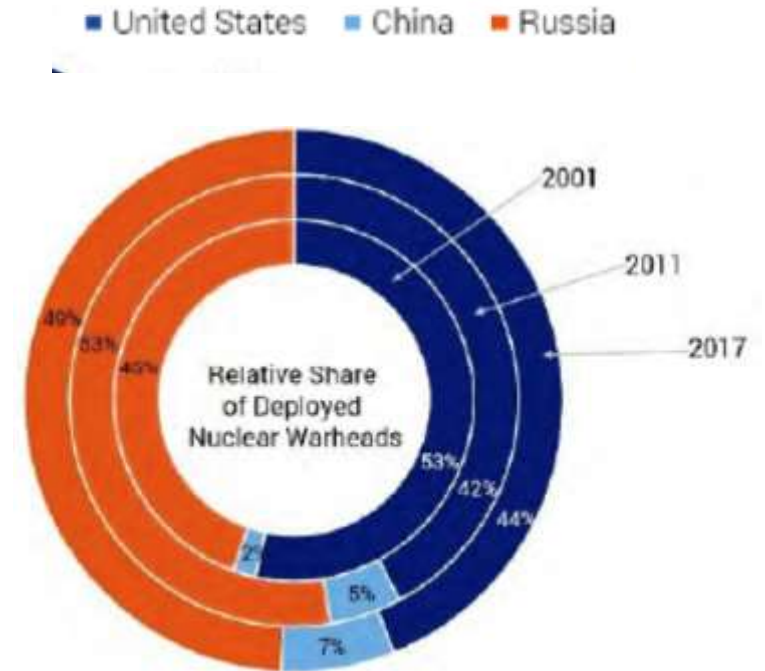


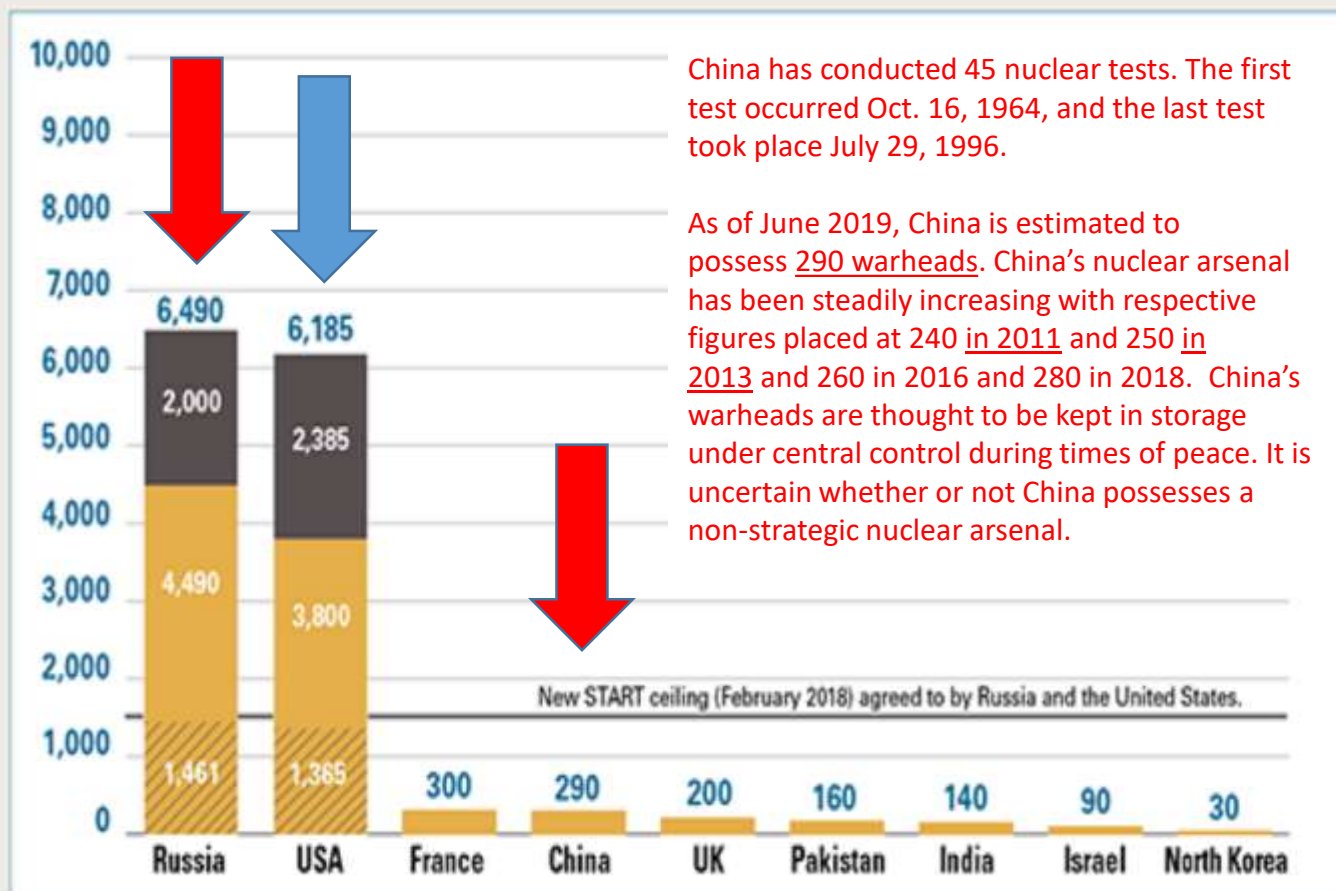
Figure 1. Nuclear Delivery Systems Since 2010

Data provided by the DoD



Arms Control Association Nuclear Assessment: 2019 - I

The world's nuclear-armed states possess a combined total of nearly 14,000 nuclear warheads; more than 90% belong to Russia and the United States. Approximately 9,500 warheads are in military service, with the rest awaiting dismantlement.



- Retired:** warheads no longer in the stockpile but remain intact as they await dismantlement
- Stockpiled:** warheads assigned for potential use on military delivery vehicles; includes active and inactive warheads.
- Strategic Deployed:** warheads on ballistic missiles and at U.S. bomber bases. *Numbers based on New START counting rules which attributes one deployed warhead per deployed heavy bomber no matter how many warheads each bomber actually carries.*

Sources: Hans M. Kristensen and Matt Korda; U.S. Department of State; Stockholm International Peace Research Institute. Updated June 2019.

Arms Control
Association

Arms Control Association Nuclear Assessment: 2019 - II

Nuclear Doctrine

China was the first nuclear-weapon state to declare publicly that it will not be the first to use nuclear weapons. Beijing has emphasized that this vow stands “at any time or under any circumstances.” However, the omission of China’s “No First Use” policy from its 2013 defense white paper caused [considerable concern](#) amongst U.S. analysts. Nevertheless, in its [2015 military strategy](#) white paper it reaffirmed its no first use policy and further pledged not to engage in a nuclear arms race. The report also states, “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.”

Regardless, [some theorize](#) that the modernization of China’s nuclear arsenal, its intent on increasing its nuclear warfare capabilities, and its posturing demonstrate a doctrine of counternuclear coercion or limited deterrence.

Fissile Material

Although China has not publicly declared a halt to the production of fissile material for weapons purposes, highly enriched uranium (HEU) and separated plutonium, general speculation is that Beijing has stopped its production. China is reported to have last produced HEU in 1989 and last produced separated plutonium in 1991.

The International Panel on Fissile Material's [2015 report](#) estimates that China maintains a stockpile of 18 ± 4 metric tons of military HEU and 1.8 ± 0.5 metric tons of weapon-grade plutonium. At the present, the [limited size](#) of China’s military stockpile restricts its ability to produce more warheads.

China has not declared a civilian HEU stockpile and, as of 2016, maintains an estimated [civilian plutonium stockpile](#) of only 25.6 kg.

Proliferation Record

China has a record of assisting states with nuclear and missile programs in the past, but in 2000, China made a [public commitment](#) not to assist “in any way, any country in the development of ballistic missiles that can be used to deliver nuclear weapons.”

China has aided Pakistan’s nuclear and missile programs among other states. Iran, Libya, North Korea, and Saudi Arabia have also been identified as recipients of sensitive technologies and materials from China.

The China Nuclear Energy Industry Corporation (CNEIC)—with government authorization—has [exported Miniature Neutron Source Reactors](#) (MNSR) to Pakistan, Iran, Syria, Ghana, and Nigeria. These reactors run on highly enriched uranium fuel, albeit a fraction of what is necessary for a nuclear warhead, which has been supplied by China to recipient states.

There have been efforts made by China to work with those states to convert these reactors to use low enriched uranium fuel, including a [2010 agreement](#) between the U.S. Argonne National Laboratory and the China Institute of Atomic Energy for a new facility in China to produce LEU replacement cores in MNSR's.

Nuclear Supplier Group (NSG) members, including the United States, saw enough improvement in China’s nuclear export behavior that they extended membership to China in 2004. Nonetheless, China [has sold](#) reactors to Pakistan, as was revealed in a 2010 agreement between the two nations. This trade, however, contravenes NSG guidelines. China’s bid to join the Missile Technology Control Regime failed in 2004, due to continuing concerns about Chinese missile and missile technology transactions. China, however, maintains that it voluntarily abides by the regime’s guidelines.

A 2017 [State Department Compliance report](#) cited that “in 2016, Chinese entities continued to supply missile programs of proliferation concern.”

Chinese entities have been regularly sanctioned for [nonproliferation violations](#) by the U.S. government. For example, several Chinese entities were sanctioned under the Iran, North Korea, and Syria Nonproliferation Act (INKSNA) sanctions in 2016.

The United States has also, at various times, imposed sanctions on Chinese entities for missile and [chemical weapons related transfers](#) to Pakistan and Iran such as the provision of dual-use chemical weapons precursors and production equipment to Iran beginning in 1997.

Arms Control Association Nuclear Assessment: 2019 - III

Nuclear Modernization

Hans M. Kristensen & Robert S. Norris [report](#) that, “The modernized force is more mobile, responsive, and accurate, and can overwhelm a limited US ballistic missile defense system.” According to the U.S. Department of Defense (DOD), China continues to field new and more advanced nuclear delivery systems with improved range and destructive capability. China’s decision to switch some of its missiles from [liquid to solid](#) fuel has improved their capabilities, in both range and promptness of launch.

Intercontinental Ballistic Missiles (ICBM)

China appears to maintain a minimal force of nuclear-armed ICBMs to ensure Beijing’s ability to execute a second strike.

Estimates place China as having around 143 nuclear-capable land-based missiles capable of delivering approximately 163 warheads. A 2016 Bulletin of the Atomic Scientists report [estimates](#) that around 50-75 of these land-based missiles are ICBMs, whereas the DOD’s annual military power report on China in 2017 [figures China’s ICBM](#) arsenal at around 75-100 ICBMs. Only 40-50 of China’s ICBMs are capable of targeting the continental United States. China’s ICBM arsenal contains:

DF-4 (CSS-3): 5,500+ km range.

DF-5A (CSS-4, Mod 2): 13,000+ km range.

DF-5B (CSS-4, Mod 3): ~12,000 km range. The DF-5B is a variant of the DF-5A upgraded to carry MIRVs.

DF-5C: on Jan. 31 2017, it was reported that China had [flight tested](#) the DF-5C, fixed with 10 warheads—a breakthrough in China’s nuclear weapons development. However, some experts are skeptical of this claim. The DF-5C is [reported](#) to be a two-stage, liquid-fueled missile with a range of around 8,000 miles (approximately 13,000 km).

DF-31 (CSS-10, Mod 1): 7,000+ km range.

DF-31A (CSS-10 Mod 2): 11,000+ km range.

DF-41: in development; [flight-tested](#) in 2016 with two MIRVs. It is a three-stage, solid propellant missile with an [estimated range](#) of 12,000-15,000 km and is believed to be able to carry up to ten warheads. The DF-41 is intended to replace the older liquid-fueled DF-5As.

China is in the process of replacing the older liquid-fueled missiles such as the DF-4 and DF-5A with the solid-fueled ICBMs.

In January 2017, the DF-41, never publically displayed before, was [alleged to have been deployed](#) at the Russian border, although many experts believe it has not completed development.

China’s land-based missiles, both conventional and nuclear, are under the control of the PLA Rocket Force, a command of [100,000 personnel](#).

Submarines and Submarine-Launched Ballistic Missile (SLBM)

As of March 2017, China has a fleet of 4 *Jin*-class (Type 094) nuclear-powered ballistic missile submarines (SSBNs). The *Jin*-class SSBNs are designed to carry the new JL-2 SLBMs.

An additional 4 *Jin*-class SSBNs have been commissioned and at least one is under construction.

[China possesses](#) two SLBM types:

JL-1 (CSS-NX-3): [estimated range](#) of 1,000+ km. JL-1 missiles are being replaced by JL-2s.

JL-2 (CSS-NX-14): a modified version of the DF-31 ICBM; estimated range of 7,000+ km but some [estimates](#) place the number at 8,000-9,000 km.

Five *Jin*-class submarines [may enter service](#) before China begins developing and fielding its next-generation SSBN, the Type 096, over the coming decade. The type 096 submarine is expected to carry both the JL-2 and a new missile, the JL-3, which is to be the JL-2’s anticipated successor.

Despite various claims to the contrary, it is unclear whether or not Chinese submarines have undergone any deterrent patrols. Beginning in early 2015, it was [reported](#) that a Chinese SSBN has undergone a 95-day patrol.

Strategic Bombers

China has begun to update its outdated nuclear-capable bomber fleet. According to a DOD report, China continued, in 2015, to develop long-range bombers, including some that Chinese military analysts have described as “capable of performing strategic deterrence.”

The PLA air force was assigned a “strategic deterrence” mission in 2012.

As of December 2016, China’s [fleet of nuclear-capable bombers](#) consisted of about 20 Hong-6 (H-6) bombers based on Soviet designs, with a range of only 3,100+ km.

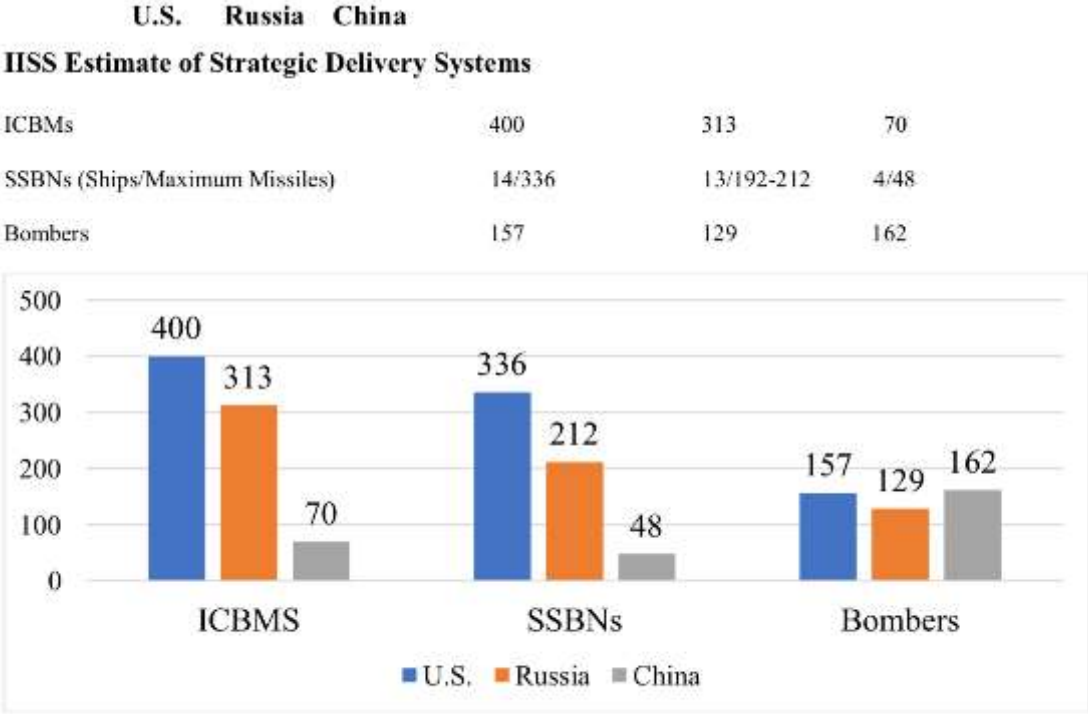
The H-6 bombers are only capable of delivering an unspecified number of gravity-based bombs but are [not believed](#) to be assigned an active nuclear mission.

[Media](#) reports suggest that China may [develop a new nuclear bomber](#) capability in the future.

The PLA Air Force operates a [fully redesigned](#) H-6 variant known as the H-6k that has an extended range and is capable of carrying six land attack cruise missiles.

In March 2017 it was [announced](#) that the 5th generation Chengdu J-20 stealth fighter jet had entered into service, putting China one step closer to rivaling U.S. air superiority in East Asia.

US State Department Estimate of Chinese, Russian and U.S. Delivery Systems in 2019



U.S. State Department Estimate of START forces (September 1, 2018) versus Chinese Forces

Deployed ICBMs, Deployed SLBMs, and Deployed Heavy Bombers	659	577	N/A
Warheads on Deployed ICBMs, on Deployed SLBMs, and Nuclear Warheads Counted for Deployed Heavy Bombers	1,358	1,420	N/A
Deployed and Non-deployed Launchers of ICBMs, Deployed and Non-deployed Launchers of SLBMs, and Deployed and Non-deployed Heavy Bombers	800	775	N/A

U.S. State Department, Bureau of Arms Control, Verification, and Compliance, *New START Treaty Aggregate Numbers of Strategic Offensive Arms*, Fact Sheet, September 1, 2018; IISS, *Military Balance 2018*, p. 22

This figure shows an IISS estimate of U.S, Russian, and Chinese forces based on the IISS *Military Balance* for 2018, along with a comparison of the START data on the accountable holdings of U.S. and Russia reported by the U.S. State Department in September 2018. In contrast, a January 2018 study by Gregory Kulacki of the Union of Concerned Scientists states the Department of Defense indicated that China had 75-100 ICBMs compared to 400 for the U.S.¹⁸ While the Department reported that Chinese was beginning to deploy missiles that were capable of carrying MIRV/d warheads, all existing U.S. ICBMs could carry three nuclear weapons while deployed China's ICBMs could still only carry one. Kulacki also reports that China had four nuclear submarines with a total launch capability of 48 missiles, and a fifth under construction that could launch 12 more. The U.S had 248 submarine- launched ballistic missiles (SLBMs) on 12 SSBNs. Once again, Chinese missiles could only carry one. The U.S. missiles could carry up to 12 warheads – for a total of 2,976 – although the START Treaty limited the total to 1,152, and the U.S. actually deployed only 890. Although only START has limited the number of strategic nuclear weapons the U.S. can load on its bombers, Kulacki estimates the U.S. has a total of 1,100 nuclear bombs that its bombers and fighter could carry, and 526 nuclear warheads on air-launched cruise missiles. He notes the U.S. evidently has several hundred "dual capable" CJ-10 land-launched and CJ-20 air launched cruise missiles, but their actual nuclear capability is unclear.

Chinese Nuclear Forces in 2018

Type	NATO designation	Number of launchers	Year deployed	Range (kilometers)	Warhead x yield ^a (kilotons)	Number of warheads
Land-based ballistic missiles						
sDF-4	CSS-3	~5	1980	5,500+	1 x 3,300	~10
DF-5A	CSS-4 Mod 2	~10	1981	13,000+	1 x 4,000–5,000	~10
DF-5B	CSS-4 Mod 3	~10	2015	~13,000	3 x 200–300	~30
DF-15	CSS-6	?	1990	600	1 x ?	? ^b
DF-21	CSS-5 Mods 2, 6	~40	1991, 2000, 2016	2,150	1 x 200–300	~80 ^c
DF-26	?	16	(2017)	4,000+	1 x 200–300	16
DF-31	CSS-10 Mod 1	~8	2006	7,000+	1 x 200–300	~8
DF-31A	CSS-10 Mod 2	~32	2007	11,000+	1 x 200–300	~32
DF-31AG ^d	(CSS-10 Mod 3?)	(16)	(2017)	?	(1 x ?)	?
DF-41	CSS-X-20	n.a.	?	?	n.a.	n.a.
Subtotal:			~121			~186 ^e
Submarine-launched ballistic missiles^f						
JL-2	CSS-N-14	48	(2016)	7,000+	1 x 200–300	48
Aircraft						
H-6 ^g	B-6	(~20)	1965	3,100+	1 x bomb (1 x ALBM)	(~20)
Fighters ^h	?	?	?	n.a.	1 x bomb	?
Cruise Missilesⁱ						
Total						~254 (280)^j

Source: Hans M. Kristensen & Robert S. Norris (2018) "Chinese nuclear forces, 2018," *Bulletin of the Atomic Scientists*, 74:4, 289-295, DOI: 10.1080/00963402.2018.1486620
To link to this article: <https://doi.org/10.1080/00963402.2018.1486620> 290

^aThe Chinese nuclear testing program demonstrated a wide range of warhead yields. While older and less accurate missiles were equipped with megaton-yield warheads, new and more accurate missiles carry warheads with much lower yields, possibly in the low hundreds of kilotons. It is possible that some warheads have even lower yield options.

^bThe CIA concluded in 1993 that China "almost certainly" had developed a warhead for the DF-15, but it is unclear whether the capability was fielded.

^cThis table only counts nuclear versions DF-21 (CSS-5 Mod 1) and DF-21A (CSS-5 Mod 2), each of which has fewer than 50 launchers deployed. The conventional DF-21C and DF-21D are not counted.

^dThe US designation for the DF-31AG (sometime called DF-31B) is not known. Nor is it clear if the DF-31AG TEL is simply an improved launcher for the existing DF-31A ICBM or carries a new missile. Rumors about MIRV capability have not been confirmed.

^eThe missile and warhead inventory may be larger than the number of launchers, some of which can be reused to fire additional missiles.

^fThe former JL-1 SLBM and its warheads are thought to have been retired and dismantled.

^gBombers were used to conduct at least 12 of China's nuclear test explosions between 1965 and 1979. Gravity bomb models are displayed in museums, and China is apparently developing a possible nuclear-capable air-launched ballistic missile for the H-6. Although they do not have an active nuclear mission, we estimate that a small number of the bombers may have a secondary nuclear capability. Aircraft range is equivalent to combat radius, which for some H-6 bombers can be extended with air refueling.

^hA fighter-bomber was used in a nuclear test in 1972 and models of tactical gravity bombs are exhibited at Chinese museums, but it is not clear whether a tactical bomb capability has been fielded.

ⁱUS military publications have from time to time attributed nuclear capability to various Chinese cruise missiles, an air-launched cruise missile being the most consistent candidate.

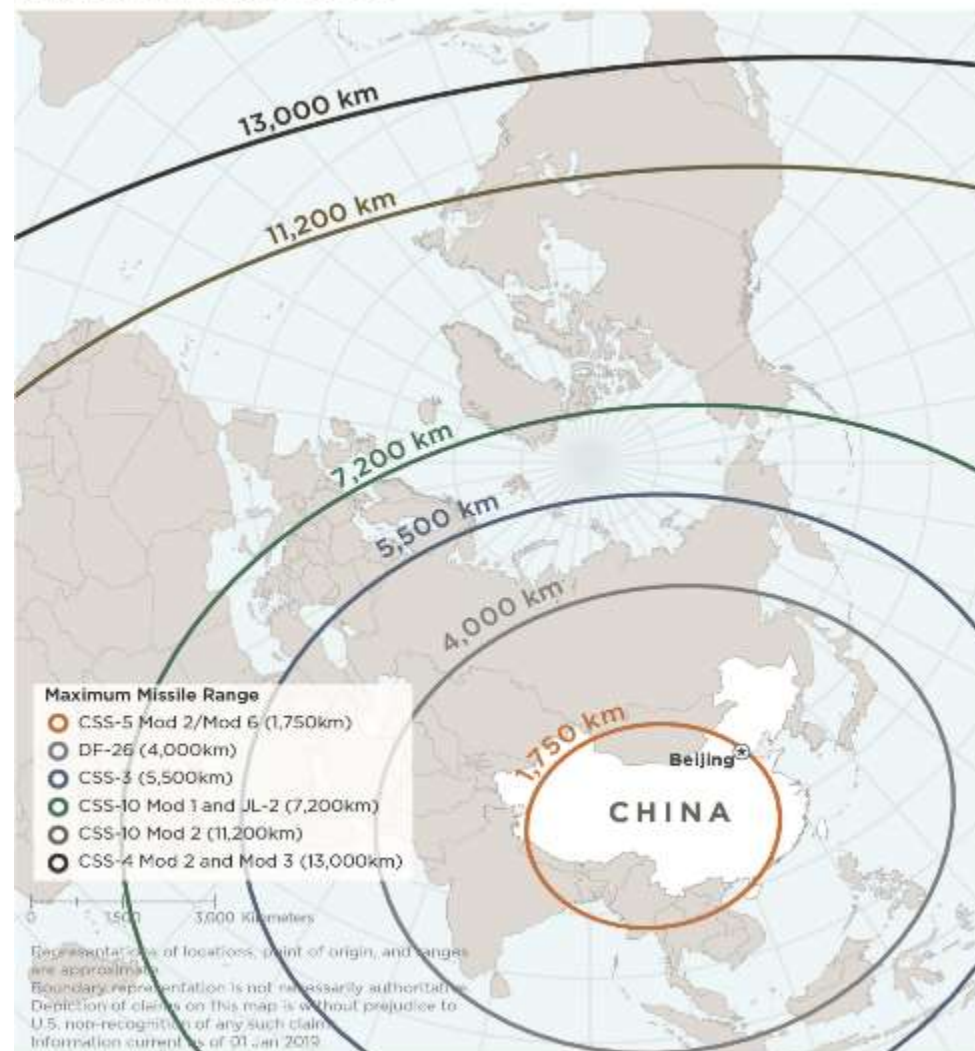
^jThe number in parentheses includes nearly 30 warheads produced for additional DF-26s and the DF-41, for a total stockpile of approximately 280 warheads.

OSD Estimate of Chinese Nuclear and Conventional Strike Ranges in 2019

Conventional Strike Capabilities



Nuclear Ballistic Missiles



The Uncertain Nuclear Future: Global Nuclear Warhead Stockpiles in 2019

	Country	Total	ICBMs	IRBMs/ MRBMs	SRBMs	GLCMs	Air-launched ¹	SLBMs	NSNWs & Defensive weapons	Reserve
Major Powers	U.S.	3800	800				850	1920	230 (NSNW only)	2050
	Russia	4490	1165				786	720	1820	2890
Middle Powers	China	280+	110	96			20	48		21+ ²
	UK	225						120		105
	France	300					54	240		6
	Pakistan	140-150		36	66	12	36			
	India	130-140		24	46 ³		48	12		
Minor Power	DPRK	20⁴								

This table includes all nuclear-capable launchers even if not deployed.

1. The "Air-launched" category includes air-launched cruise missiles, gravity bombs, and any potential air-launched ballistic missiles.

2. In the BAS 2018 report, 30 warheads are estimated to be split between the DF-26 and DF-41, but it is unclear how many are allocated to each missile. Nine have been allocated to China's new ICBMs, but the rest remain counted as reserve warheads. Additionally, it is unclear how many of the new missiles noted in OSD's 2019 annual report on Chinese military power are assigned nuclear warheads, which raises the possibility that China's true inventory is greater than 280.

3. The number of India's SRBMs includes four launched by the two Sukanya-class patrol vessels.

4. North Korea is believed to have enough special nuclear material for 30–60 warheads, but likely has fewer than 20 in inventory. The data is sourced from the previously cited Nuclear Notebook articles published by the Bulletin of Atomic Scientists, SIPRI's 2017 Annual Yearbook, and Hollande, "Discours sur la dissuasion nucléaire."

Mutual Minimal Assured Destruction: An Illustrative Target Base (Urban Population in Millions)

(Population in Millions)

Rough estimate by the authors based on different databases. China's cities are now showing extremely rapid growth relative to those of U.S. and Russia. Note that even high yield thermonuclear weapons would leave many survivors given the size of most urban areas.

<u>United States</u>			<u>Russia</u>		<u>China</u>	
<u>Rank</u>	<u>Name</u>	<u>Population</u>	<u>Name</u>	<u>Population</u>	<u>Name</u>	<u>Population</u>
1	New York	8,537,673	Moscow	10,381,222	Shanghai	22,315,474
2	Los Angeles	4,030,668	Saint Petersburg	5,028,000	Beijing	11,716,620
3	Chicago	2,687,682	Novosibirsk	1,419,007	Tianjin	11,090,314
4	Houston	2,340,814	Yekaterinburg	1,349,772	Guangzhou	11,071,424
5	Phoenix	1,679,243	Nizhniy Novgorod	1,284,164	Shenzhen	10,358,381
6	Philadelphia	1,573,688	Samara	1,134,730	Wuhan	9,785,388
7	San Antonio	1,541,456	Omsk	1,129,281	Dongguan	8,000,000
8	San Diego	1,438,060	Kazan	1,104,738	Chongqing	7,457,600
9	Dallas	1,359,133	Rostov-na-Donu	1,074,482	Chengdu	7,415,590
10	San Jose	1,030,796	Chelyabinsk	1,062,919	Nanjing	7,165,292
Top 10		26,219,213		24,968,315		106,376,083
11	Austin	983,366	Ufa	1,033,338	Nanchong	7,150,000
12	Jacksonville	907,529	Volgograd	1,011,417	Xi'an	6,501,190
13	Fort Worth	893,997	Perm	982,419	Shenyang	6,255,921
14	San Francisco	888,653	Krasnoyarsk	927,200	Hangzhou	6,241,971
15	Columbus	880,182	Saratov	863,725	Harbin	5,878,939
16	Charlotte	873,363	Voronezh	848,752	Tai'an	5,499,000
17	Indianapolis	860,902	Tol'yatti	702,879	Suzhou	5,345,961
18	Seattle	746,046	Krasnodar	649,851	Shantou	5,329,024
19	Denver	719,116	Ulyanovsk	640,680	Jinan	4,335,989
20	Washington DC	702,756	Izhevsk	631,038	Zhengzhou	4,253,913
Top 20		34,675,123		33,259,614		163,167,991
21	El Paso	692,100	Yaroslavl	606,730	Changchun	4,193,073
22	Boston	687,584	Barnaul	599,579	Dalian	4,087,733
23	Nashville	673,008	Vladivostok	587,022	Kunming	3,855,346
24	Detroit	665,713	Irkutsk	586,695	Qingdao	3,718,835
25	Portland	658,347	Khabarovsk	579,000	Foshan	3,600,000
26	Oklahoma City	653,865	Khabarovsk Vtoroy	578,303	Puyang	3,590,000
27	Las Vegas	653,840	Orenburg	550,204	Wuxi	3,543,719
28	Memphis	649,243	Novokuznetsk	539,616	Xiamen	3,531,347
29	Louisville	619,287	Ryazan'	520,173	Tianshui	3,500,000
30	Baltimore	601,188	Tyumen	519,119	Ningbo	3,491,597
Top 30		41,229,298		38,926,055		200,279,641

OSD on Chinese Nuclear Posture in 2019

Key Takeaways

- China's nuclear weapons policy prioritizes the maintenance of a limited but survivable nuclear force.
- China has long maintained a "no first use" (NFU) policy, though ambiguity remains over the conditions under which China's NFU policy would no longer apply.
- China continues to improve its ground and submarine-based nuclear capability and is pursuing a viable nuclear "triad" with the development of a nuclear capable air- launched ballistic missile.

China's nuclear weapons policy prioritizes the maintenance of a nuclear force able to survive a first strike and respond with sufficient strength to inflict unacceptable damage on an enemy. China invests considerable resources to maintain a limited, but survivable, nuclear force. China is enhancing peacetime readiness levels for these nuclear forces to ensure their responsiveness. In addition, China insists its new generation of mobile missiles, with warheads consisting of MIRVs and penetration aids, are intended to ensure the viability of its strategic nuclear forces in the face of continued advances in U.S. and, to a lesser extent, Russian strategic ISR, precision strike, and missile defense capabilities.

China has long maintained a 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 at any time and under any circumstances, and will unconditionally refrain from using or threatening to use nuclear weapons against any non-nuclear-weapon state or in nuclear-weapon-free zones.

There is some ambiguity, however, in the narrative in China 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. There has been no indication that national leaders are willing to attach such nuances and caveats to China's existing NFU policy. China's lack of transparency regarding the scope and scale of its nuclear modernization program, however, raises questions regarding its future intent as it fields larger, more-capable nuclear forces.

China's commingling of some of its conventional and nuclear missile forces, and ambiguities in China's NFU conditions, could complicate deterrence and escalation management during a conflict. Potential adversary attacks against Chinese conventional missile force-associated C2 centers could inadvertently degrade Chinese nuclear C2 and generate nuclear use-or-lose pressures among China's leadership. Once a conflict has begun, China's dispersal of mobile missile systems to hide sites could further complicate the task of distinguishing between nuclear and conventional forces and, thus, increase the potential for inadvertent attacks on the latter. China's leadership calculus for responding to conventional attacks on nuclear forces remains a key unknown.

Land-Based Platforms. China's nuclear arsenal currently consists of approximately 90 ICBMs, including the silo-based CSS-4 Mod 2 (DF-5A) and Mod 3 (DF-5B); the solid-fueled, road-mobile CSS-10-class (DF-31, DF-31A and DF-31AG); and the more limited range roll-out-to-launch CSS-3 (DF-4). This strategic arsenal is complemented by road-mobile, solid- fueled CSS-5 Mod 2 and Mod 6 (DF-21) MRBMs and DF-26 IRBMs capable of ranging targets in the Indo-Pacific region.

OSD on Chinese Nuclear Posture in 2019 - II

Sea-Based Platforms. China has constructed six JIN-class SSBN, with four operational and two outfitting at Huludao Shipyard. China's JIN SSBNs, which are equipped to carry up to 12 CSS-N-14 (JL-2) SLBMs, are the country's first viable sea-based nuclear deterrent. China's next-generation Type 096 SSBN reportedly will be armed with the follow-on JL-3 SLBM, and it will likely begin construction in the early- 2020s. Based on the 40-plus-year service life of China's first generation SSNs, China will operate its JIN and Type 096 SSBN fleets concurrently.

Future Developments. The PLA is upgrading its aircraft with two new air-launched ballistic missiles, one of which may include a nuclear payload. Its deployment and integration would, for the first time, provide China with a viable nuclear "triad" of delivery systems dispersed across land, sea, and air forces.

- The PLA justifies developing a range of technologies China perceives are necessary to counter U.S. and other countries' ballistic missile defense systems, including MaRV, MIRVs, decoys, chaff, jamming, thermal shielding, and hypersonic glide vehicles.
- The PLA will likely continue deploying sophisticated C2 systems and refining C2 processes as growing numbers of mobile ICBMs and future SSBN deterrence patrols require the PLA to safeguard the integrity of nuclear release authority for a larger, more dispersed force.

PLA writings express the value of a "launch on warning" nuclear posture, an approach to deterrence that uses heightened readiness, improved surveillance, and streamlined decision-making processes to enable a more rapid response to enemy attack. These writings highlight the posture's consistency with China's nuclear NFU policy, suggesting it may be an aspiration for China's nuclear forces. China is working to develop a space-based early warning capability that could support this posture in the future.

DIA on China's Nuclear Posture – 1/2019

“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. China unconditionally will not use or threaten to use nuclear weapons against non-nuclear-weapon states or in nuclear-weapons-free zones and will never enter into a nuclear arms race with any other country. 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.”

—Excerpts from *China's Military Strategy*, May 2015

China invests considerable resources to maintain a limited, survivable nuclear force that can guarantee a damaging retaliatory strike. As part of this, 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. There is some ambiguity, however, 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. Nevertheless, there has been no indication that national leaders are willing to attach such nuances and caveats to China's NFU doctrine.

China is developing a new generation of mobile missiles, with warheads consisting of multiple independently targetable reentry vehicles (MIRVs) and penetration aids, intended to ensure the viability of its 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. China is enhancing peacetime readiness levels for these nuclear forces to ensure responsiveness. China maintains nuclear-capable delivery systems in its Rocket Force and Navy. As of 2017, the Air Force had been reassigned a nuclear mission, probably with a developmental strategic bomber. The bomber's deployment would provide China with its first credible nuclear triad of delivery systems dispersed across land, sea, and air—a posture considered since the Cold War to improve survivability and strategic deterrence.

PLA writings express the value of a “launch on warning” nuclear posture, an approach to deterrence that uses heightened readiness, improved surveillance, and streamlined decision making processes to enable a more rapid response to enemy attack. These writings highlight the posture's consistency with China's NFU policy. China is working to develop a space-based early warning capability that could support this posture in the future.

The PLA is developing a range of technologies to counter U.S. and other countries' ballistic missile defense systems, including maneuverable reentry vehicles (MARVs), MIRVs, decoys, chaff, jamming, thermal shielding, and hypersonic glide vehicles. In addition, the PLA is likely to continue deploying more sophisticated C2 systems and refining C2 processes as growing numbers of mobile intercontinental ballistic missiles (ICBMs) and future nuclear-powered ballistic missile submarine (SSBN) deterrence patrols require the PLA to safeguard the integrity of nuclear release authority for a larger, more dispersed force.

China maintains a stockpile of nuclear warheads and continues research on and development and production of new nuclear weapons. The PLA probably has multiple nuclear warhead designs that are decades old and require routine observation, maintenance, or refurbishment to maintain effectiveness. China's nuclear weapon design and production organization—the China Academy of Engineering Physics—is the key organization in developing and maintaining China's nuclear force. It employs tens of thousands of personnel, and its scientists are capable of conducting all aspects of nuclear weapon design research, including nuclear physics, materials science, electronics, explosives, and computer modeling.

China has the required industrial capacity to enrich uranium and produce plutonium for military needs. The China National Nuclear Corporation operates several uranium enrichment facilities organized under three plants. China probably intends the bulk of its enrichment capacity to support its burgeoning nuclear power industry but could devote some enrichment capacity to support military needs. China's plutonium production reactors probably ceased operation in the 1980s. However, China's reprocessing facilities can extract plutonium from spent reactor fuel.

DIA on Russia and China's Nuclear Trends – 5/2019 - I

...So let me first begin with Russia. After working together for decades to achieve real nuclear reductions, Russia is upgrading the capacity of its nuclear forces. We assess its overall nuclear stockpile is likely to grow significantly over the next decade.

This assessed growth is primarily driven by a significant projected increase in the number of Russia's non-strategic nuclear weapons. Russia is adding new military capabilities to its existing stockpile of nonstrategic nuclear weapons, including those employable by ships, aircraft, and ground forces. These nuclear warheads include theater- and tactical-range systems that Russia relies on to deter and defeat NATO or China in a conflict.

Russia's stockpile of non-strategic nuclear weapons—already large and diverse and is being modernized with an eye towards greater accuracy, longer ranges, and lower yields to suit their potential warfighting role...We assess Russia to have dozens of these systems already deployed or in development. They include, but are not limited to: short- and close-range ballistic missiles, ground-launched cruise missiles, including the 9M729 missile, which the U.S. Government determined violates the Intermediate-Range Nuclear Forces or INF Treaty, as well as antiship and antisubmarine missiles, torpedoes, and depth charges.

For comparison, the United States currently has a single non-strategic nuclear weapons system: the B-61 gravity bomb.

We assess Russia possesses up to 2,000 such non-strategic nuclear warheads not covered by the New Start Treaty and because of a lack of Russian transparency we have uncertainty in our understanding of the scope and disposition of their stockpile....Accurately accounting for these non-strategic nuclear weapons delivery systems is not only complicated by a lack of transparency but their dual-capable nature. Most Russian systems lack externally distinguishing features that would allow observers to differentiate between conventional and nuclear variants.

Where limits or reductions have existed, such as with the INF Treaty or the 1992 Presidential Nuclear Initiatives, the United States assesses that Russia has not fulfilled them. This is exemplified by the development of the 9M729 ground launched cruise missile...By 2015, Russia had completed a comprehensive flight test program consisting of multiple tests of the 9M729 missile from both fixed and mobile launchers that appeared to be purposefully designed to disguise the true nature of their testing activity, as well as the true capacity of the missile.

While compliance determinations such as the INF Treaty are ultimately made by the U.S. interagency policy community, I want to be clear about the role of the Intelligence Community. It is the job of the Intelligence Community (IC) to analyze those activities that have implications for a country's international obligations. The IC does not use the word compliance but rather characterizes actions as "inconsistent" with the intent of such treaties and uses those assessments to help inform the interagency process.

From an interagency standpoint, the U.S. has determined Russia's actions have strained other key pillars of arms control architecture, including the Chemical Weapons Convention, Open Skies Treaty, the Vienna Document, and the Treaty on Conventional Armed Forces in Europe.

In addition to the anticipated growth in non-strategic nuclear weapons, Russia claims to be developing new warhead designs for strategic systems, such as new high-yield and earth-penetrating warheads to attack hardened military targets like U.S., Allied, and Chinese command and control facilities.

Russia's development of new warhead designs and overall stockpile management efforts have been enhanced by its approach to nuclear testing. The United States believes that Russia probably is not adhering to its nuclear testing moratorium in a manner consistent with the "zero-yield" standard...Our understanding of nuclear weapon development leads us to believe Russia's testing activities would help it to improve its nuclear weapons capabilities. The United States, by contrast, has forgone such benefits by upholding a "zero-yield" standard.

Russia's ongoing, comprehensive build-up in both its strategic and nonstrategic nuclear forces is made possible by sustained and prioritized investments in its nuclear weapons development and production infrastructure. By 2013, Rosatom had modernized dozens of its experimental facilities, and Rosatom's budget has increased roughly 30 percent in real terms from 2010 to 2018 to support these and other operations.

In contrast to the United States, during the past decade, Russia has improved and expanded its production complex, which has the capacity to process thousands of warheads annually.

An increase in its overall nuclear warhead stockpile is not the only source of concern stemming from Russia's broad-based nuclear modernization program...Within the confines of the New START Treaty, Russia claims its overhaul of its strategic rocket forces is roughly 70% complete. Every leg of Russia's triad is being modernized and Russia is fielding new strategic systems, including road-mobile and silo-based intercontinental ballistic missiles (ICBMs), a submarine-launched ballistic missile, an upgraded strategic nuclear bomber, and a strategic air-launched cruise missile.

Many of these new systems have a greater warhead delivery capacity than the systems they are replacing. For example, Russia's aging SS-25 road-mobile ICBM carries a single nuclear

DIA on Russia and China's Nuclear Trends – 5/2019 - II

ICBM carries a single nuclear warhead, while its replacement—the SS-27—can carry multiple warheads, providing Russia significant capability to “upload” additional warheads onto its strategic delivery systems. The SS-18—Russia’s aging heavy ICBM—carries up to 10 nuclear warheads, while the Russian president claims the Sarmat—its replacement—will carry even more warheads or Russia’s new nuclear-armed “Avanguard” hypersonic glide vehicle.

While we assess Russia is currently adhering to the New START Treaty limits on deployed warheads, this upload capacity will give Russia the ability to increase the number of deployed warheads in a time of crisis.

Russia is also pursuing novel nuclear delivery systems that create a strategic challenge for the U.S. and which are difficult to manage under current arms control agreements.

In March 2018, President Putin unveiled these systems, which include: an intercontinental-range, nuclear-powered and nuclear-armed underwater drone; a nuclear-powered, nuclear-armed intercontinental-range cruise missile; and an air-launched ballistic missile. Russia also continues to modernize its existing automated nuclear command and control launch system, known as “Perimeter.”..President Putin’s high-profile announcement in March 2018 makes clear that Russia is continuing to prioritize investment in its nuclear forces, even at a time of domestic budgetary constraints.

These new nuclear capabilities have come at the expense of other Russian defense priorities, such as the development of a new aircraft carrier, because Russia sees its nuclear weapons as the ultimate guarantor of the country’s survival, perceives a warfighting role for their use, and directs its scarce resources to its nuclear modernization effort...These quantitative and qualitative improvements to Russia’s nuclear arsenal have security implications for the United States and our allies. Russia’s large and diverse stockpile facilitates a doctrine that envisions the potential coercive use of nuclear weapons.

Russia assesses that the threat of nuclear escalation or actual first use of nuclear weapons would serve to “de-escalate” a conflict on terms favorable to Russia. Russian defense officials have spoken publicly about “de-escalating” a conflict through limited nuclear use and it is a fact that the Russian military has prepared plans and is well trained to transition rapidly to nuclear use in order to compel an end to a conventional conflict. Russia’s perception that nuclear use could terminate a conflict on terms favorable to Russia increases the prospect for miscalculation.

Let me now turn to China as Russia is not the United States’ only strategic competitor expanding its nuclear capability.

Over the next decade, China is likely to at least double the size of its nuclear stockpile in the course of implementing the most rapid expansion and diversification of its nuclear arsenal in China’s history. Last year, China launched more ballistic missiles for testing and training than the rest of the world combined. We expect this modernization to continue and this trajectory is consistent with Chinese President Xi’s vision for China’s military, which he laid out at the 19th Party Congress and stated that China’s military will be “fully transformed into a first tier force” by 2050.

China has developed a new road-mobile ICBM, a new multi-warhead version of its silo-based ICBM, and a new submarine-launched ballistic missile. With its announcement of a new nuclear-capable strategic bomber, China will soon field their own nuclear triad, demonstrating China’s commitment to expanding the role and centrality of nuclear forces in Beijing’s military aspirations. And like Russia, China is also working to field nuclear, theater-range precision-strike systems. While China’s overall arsenal is assessed to be much smaller than Russia’s does not make this trend any less concerning.

Based on the United States’ experience in developing nuclear weapons, we understand the efforts required for China’s substantive and rapid expansion in their nuclear weapons program and capabilities.

US Government information indicates that China is possibly preparing to operate its test site year-round, a development that speaks directly to China’s growing goals for its nuclear forces. Further, China continues to use explosive containment chambers at its nuclear test site and Chinese leaders previously joined Russia in watering down language in a P5 statement that would have affirmed a uniform understanding of “zero-yield” testing. The combination of these facts and China’s lack of transparency on their nuclear testing activities raise questions as to whether China could achieve such progress without activities inconsistent with the Comprehensive Nuclear-Test-Ban Treaty.

It is also important to note that—in addition to modernizing their nuclear forces—China and Russia are also pursuing emerging technologies that have the potential to revolutionize undersea warfare and challenge U.S. superiority in the maritime domain.

As our annual threat assessments, national security, and defense strategies have highlighted, the resurgence of great power competition is a geopolitical reality. It is the mindset Russia and China have embraced, the mindset that is guiding their approach to nuclear modernization and investment. Nuclear weapons remain central to Russia and China’s military plans and intentions and therefore remain a critical area of analysis for the Defense Intelligence Agency to provide our senior leadership with decision advantage. .

China's Over-Water Bomber Capabilities

Office of the Secretary of Defense,
*Military and Security Developments
Involving the Republic of China, Annual
Report to Congress*, May 16, 2018,
Department of Defense. China Military
Power 2018, p. 118.



China Nuclear Weapon-Related Facilities

China maintains a stockpile of nuclear warheads and continues research on and development and production of new nuclear weapons.⁸⁸ The PLA probably has multiple nuclear warhead designs that are decades old and require routine observation, maintenance, or refurbishment to maintain effectiveness.

China's nuclear weapon design and production organization—the China Academy of Engineering Physics—is the key organization in developing and maintaining China's nuclear force.⁹⁰ It employs tens of thousands of personnel, and its scientists are capable of conducting all aspects of nuclear weapon design research, including nuclear physics, materials science, electronics, explosives, and computer modeling.

Source: DIA, *China Military Power: Modernizing a Force to Fight and Win*, 2019, DIA-02-1706-085, 2019, p. 38.



Select Advanced PLA Rocket Force Nuclear Systems Entering Service and under Development—November 2018

Equipment	Mission Area	Estimated Service Entry	Implications
DF-41 intercontinental ballistic missile (ICBM)	Deterrence, Assured Retaliation	2018	The DF-41 will be China's first MIRV-capable, road-mobile ICBM. The solid-fuel missile will enhance China's deterrence capabilities.
DF-17 medium-range ballistic missile (MRBM) with Wu-14 (DF-ZF) hypersonic glide vehicle	Strike, Deterrence; A2/AD	2020	The DF-17 is reportedly designed for use with a hypersonic glide vehicle (tested with the Wu-14 [DF-ZF]) and capable of delivering both conventional and nuclear payloads. Its range reportedly falls between 1,800 and 2,500 km. This system will pose challenges to U.S. and allied missile defense systems.

Equipment	Mission Area	Estimated Service Entry	Implications
CH-AS-X-13 nuclear-capable air-launched ballistic missile	Strike; Deterrence	2025	According to DOD, China is developing "two new air-launched ballistic missiles, one of which may include a nuclear payload." The nuclear-capable version is reportedly a two-stage, solid-fueled ballistic missile with a range of 3,000 km, intended for use with a modified H-6N bomber that has a 6,000-km combat radius. This missile will bolster China's deterrence capabilities.

Select Advanced PLN Naval and PLAF Air Nuclear Systems Entering Service and under Development— November 2018

Equipment	Mission Area	Estimated Service Entry	Implications
Type 096 nuclear-powered ballistic missile submarine (SSBN)	Deterrence	Early 2020s (construction)	Complementing China's four JIN-class nuclear-powered ballistic missile submarines (comprising China's sea-based second strike capability) will be the next-generation Type 096. According to DOD, it may be armed with the JL-3 submarine-launched ballistic missile, which will be capable of striking the continental United States from China's periphery.
Type 093B SHANG-class guided-missile nuclear attack submarine (SSGN)	ASUW; A2/AD; Strike	2020–2030 (construction)	According to DOD, the Type 093B SSGN submarine will improve the PLA Navy's anti-surface warfare capability and "might also provide [the PLA Navy a] more clandestine land-attack option."

Equipment	Mission Area	Estimated Service Entry	Implications
H-20 long-range stealth bomber	Strike; Nuclear Deterrence; A2/AD	2025	China's next-generation bomber will integrate fifth-generation technologies and be capable of carrying nuclear weapons, according to DOD. Replacing the H-6, the H-20 will have an increased range of at least 5,000 miles (mi), boosting China's ability to operate farther from its shores and putting Hawaii at risk.

OSD on Reasons for U.S. Nuclear Modernization: 4/2019 - I

Today's Strategic Environment: Increasingly Complex and Dangerous: For decades, the United States led the world in efforts to reduce the role and number of nuclear weapons. Successive treaties enabled reductions in accountable strategic U.S. nuclear warheads, first to 6,000, and ultimately to 1,550. Thousands of shorter-range nuclear weapons not covered by any treaty were almost entirely eliminated from the U.S. nuclear arsenal. Overall, the U.S. nuclear weapons stockpile has drawn down by more than 85 percent from its Cold War high.

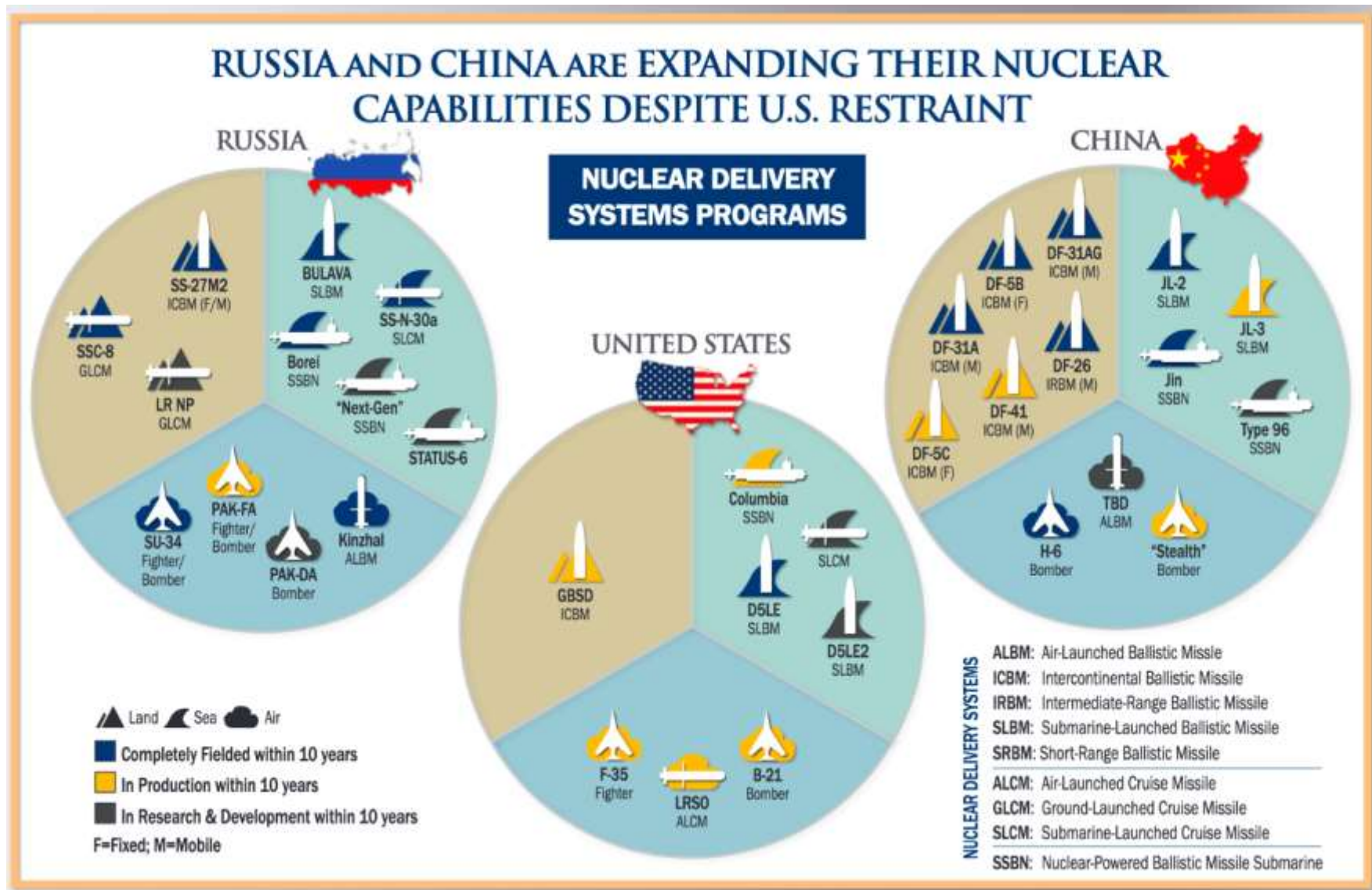
Many hoped conditions had been set for even deeper reductions in global nuclear arsenals. Unfortunately, the United States and our allies now face a security environment with increased complexity and worsening strategic threats. Today's central challenge to our security is the reemergence of long-term strategic competition with Russia and China. While the United States has focused on maintaining its existing nuclear systems, Russia and China have increased the role of nuclear weapons in their strategies and have been actively increasing the size and sophistication of their nuclear forces. Further, North Korea's nuclear capabilities threaten our allies and homeland and add to an already complex strategic picture.

- Russia has been developing, testing, and fielding new systems for its nuclear triad over the past decade. This includes new road-mobile and silo-based ICBMs, ballistic missile submarines and missiles, bomber aircraft, and cruise missiles. Russia is also actively testing never-before-seen nuclear weapon capabilities, such as hypersonic glide vehicles, nuclear-powered cruise missiles, and nuclear-powered unmanned underwater vehicles.
- China is developing, testing, and fielding new generations of land-based ballistic missiles, increasing the range of its submarine-launched ballistic missiles, and pursuing a new bomber. China is also expending significant resources on advanced nuclear-capable systems and hypersonic vehicles.
- North Korea has conducted six increasingly sophisticated nuclear tests and three ICBM flight tests that demonstrated its ability to strike the U.S. homeland.

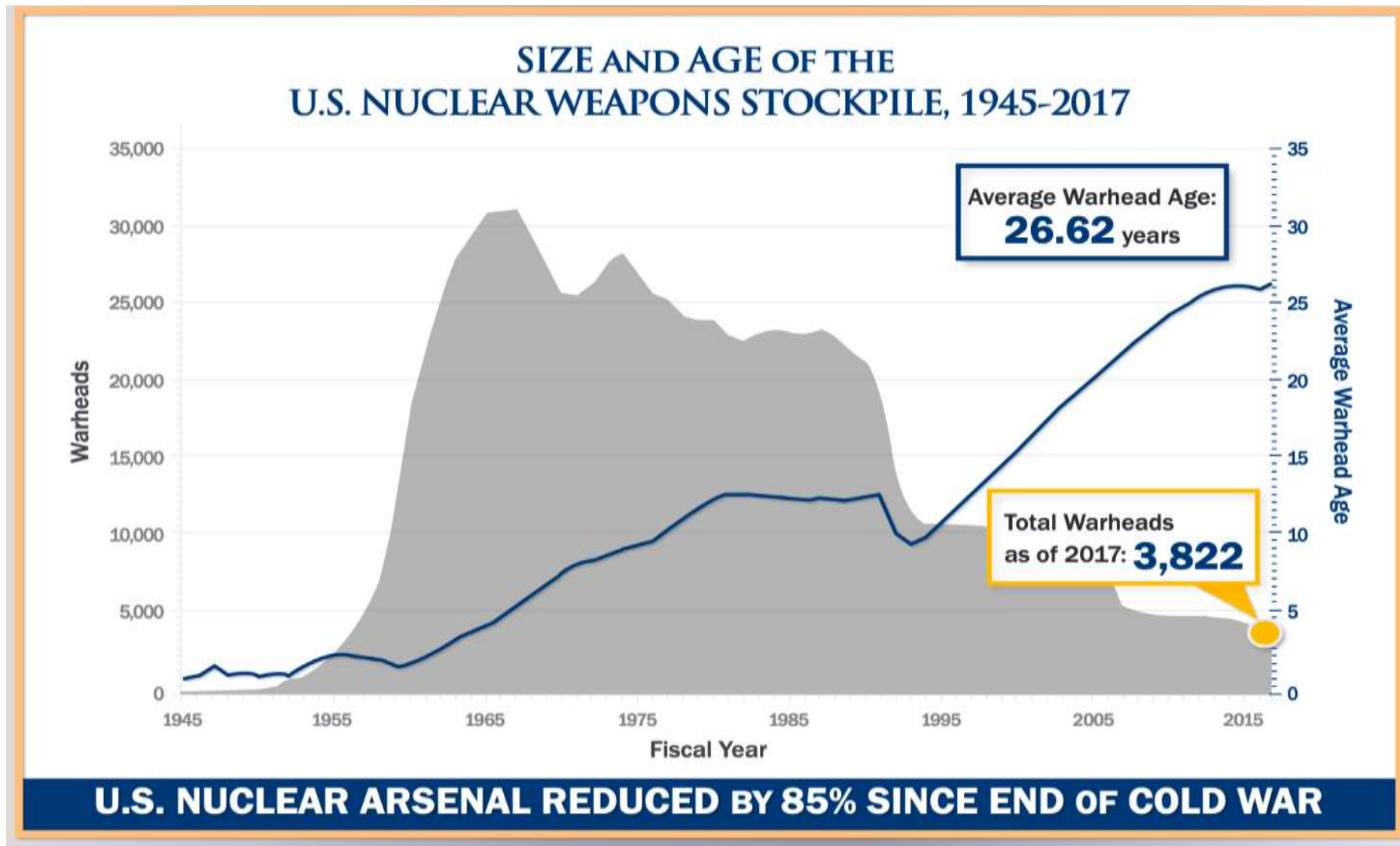
Nuclear Deterrence is the Bedrock of U.S. National Security. Given the strategic environment, nuclear deterrence is more important now than at any time since the end of the Cold War. A potential nuclear attack against the United States and its allies is the most serious threat to our security. Our nuclear arsenal is the nation's ultimate insurance policy against such an attack.

Nuclear forces, along with our conventional forces and other instruments of national power, also help prevent competition and conflict from escalating to large-scale conventional warfare. For these reasons, nuclear deterrence is the #1 priority mission of the Department of Defense. For any President, the use of nuclear weapons is contemplated only in the most extreme circumstances to protect our vital interests and those of our allies and partners. Effective deterrence requires a credible nuclear posture—a credibility based on effective nuclear capabilities and the resolve to use them if required. Our nuclear posture does not imply we seek to fight or win a nuclear war, but rather strengthens deterrence and helps ensure nuclear weapons are never employed.

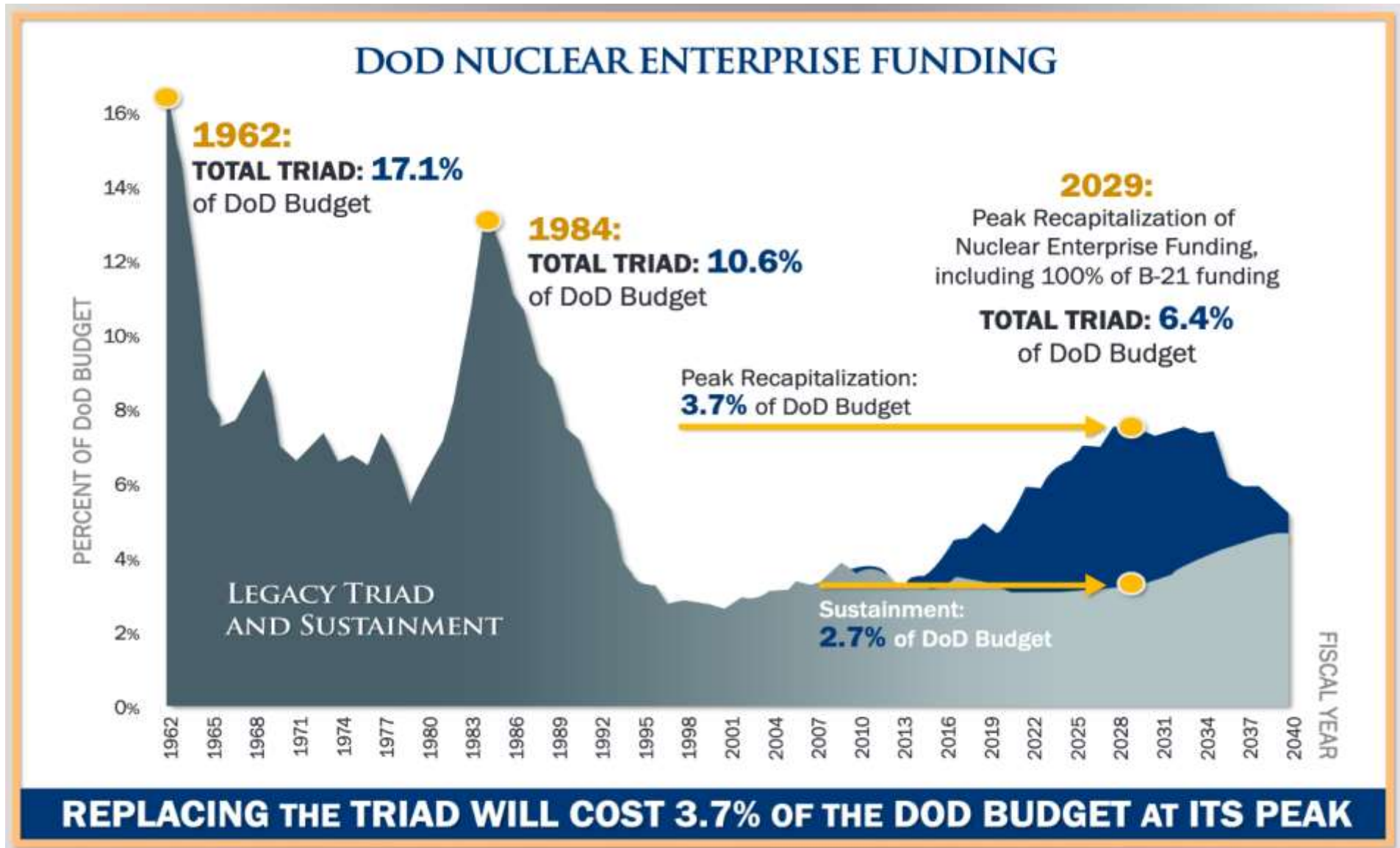
OSD on Reasons for U.S. Nuclear Modernization: 4/2019 - II



OSD on Reasons for U.S. Nuclear Modernization: 4/2019 - III



OSD on Reasons for U.S. Nuclear Modernization: 4/2019 - IV



OSD on Reasons for U.S. Nuclear Modernization: 4/2019 - V

FY 2020 BUDGET REQUEST FOR NUCLEAR FORCES HIGHLIGHTS (PROCUREMENT, RDT&E, AND MILCON)

PROGRAM	FY2020	FYDP (2020–24)	INITIAL FIELDING
F-35 Dual-Capable Aircraft (certification)	\$71M	\$246M	FY2024
B-21 Strategic Bomber	\$3B	\$20.1B	Mid-2020s
Ground Based Strategic Deterrent (GBSD) ICBM	\$678M	\$11.3B	FY2029
B61-12 Tailkit Assembly	\$108M	\$157M	–
Long Range Standoff (LRSO) Cruise Missile	\$713M	\$2.4B	Early-2030s
Columbia Class SSBN	\$2.2B	\$20.2B	FY 2031
Low-yield Ballistic Missile	\$19.6M	–	–
Sea-launched Cruise Missile	\$5M	\$5M	TBD

After 25 years of primarily sustaining our Cold War-era systems as we steadily reduced their number, recapitalizing U.S. nuclear forces will require an increase in spending over the next 20 years. Most of the nation's nuclear delivery systems, built in the 1980s and prior, will reach their end-of-service life in the 2025-2035 timeframe and cannot be sustained further. If not recapitalized, these forces will age into obsolescence. Our choice is not between replacing our Cold War systems or keeping them, but between replacing them or losing them altogether.

WARHEADS	FIRST PRODUCTION UNIT (FY)
W76-1 (SLBM)	Complete
W76-2 (SLBM)	FY2019
B61-12 (Bomber/DCA)	FY2020
W88 Alt 370 (SLBM)	FY2020
W80-4 (LRSO)	FY2025
W87-1 (ICBM)	FY2030

RUSSIAN NON-STRATEGIC NUCLEAR WEAPONS



Russia has approximately 2,000 non-strategic nuclear weapons—of over a dozen different types—including nuclear torpedoes, nuclear air and missile defenses, nuclear depth charges, nuclear landmines, and nuclear artillery shells. None of these are limited by any arms control treaty. In contrast, the U.S. retains a small number of just one type—the B61 nuclear gravity bomb.

U.S. Nuclear Posture Review on US Nuclear Force Changes - I

The United States does not wish to regard either Russia or China as an adversary and seeks stable relations with both. We have long sought a dialogue with China to enhance our understanding of our respective nuclear policies, doctrine, and capabilities; to improve transparency; and to help manage the risks of miscalculation and misperception....We hope that China will share this interest and that meaningful dialogue can commence. The United States and Russia have in the past maintained strategic dialogues to manage nuclear competition and nuclear risks. Given Russian actions, including its occupation of Crimea, this constructive engagement has declined substantially. We look forward to conditions that would once again allow for transparent and constructive engagement with Russia....Nevertheless, this review candidly addresses the challenges posed by Russian, Chinese, and other states' strategic policies, programs, and capabilities, particularly nuclear. It presents the flexible, adaptable, and resilient U.S. nuclear capabilities now required to protect the United States, allies, and partners, and promote strategic stability.

Enhancing Deterrence with Non-strategic Nuclear Capabilities...The triad and non-strategic nuclear forces, with supporting NC3, provides diversity and flexibility as needed to tailor U.S. strategies for deterrence, assurance, achieving objectives should deterrence fail, and hedging.

The increasing need for this diversity and flexibility, in turn, is one of the primary reasons why sustaining and replacing the nuclear triad and non-strategic nuclear capabilities, and modernizing NC3, is necessary now. The triad's synergy and overlapping attributes help ensure the enduring survivability of our deterrence capabilities against attack and our capacity to hold at risk a range of adversary targets throughout a crisis or conflict. Eliminating any leg of the triad would greatly ease adversary attack planning and allow an adversary to concentrate resources and attention on defeating the remaining two legs. Therefore, we will sustain our legacy triad systems until the planned replacement programs are deployed.

The United States currently operates 14 OHIO-class SSBNs and will continue to take the steps needed to ensure that OHIO SSBNs remain operationally effective and survivable until replaced by the COLUMBIA-class SSBN. The COLUMBIA program will deliver a minimum of 12 SSBNs to replace the current OHIO fleet and is designed to provide required deterrence capabilities for decades.

... ongoing life extension program for the B61 bomb, it will be a key contributor to continued regional deterrence stability and the assurance of allies by initiating a capability study leading to an Analysis of Alternatives (AoA) for the rapid development of a modern SLCM.

...The ICBM force consists of 400 single-warhead Minuteman III missiles deployed in underground silos and dispersed across several states. The United States has initiated the Ground-Based Strategic Deterrent (GBSD) program to begin the replacement of Minuteman III in 2029. The GBSD program will also modernize the 450 ICBM launch facilities that will support the fielding of 400 ICBMs.

The bomber leg of the triad consists of 46 nuclear-capable B-52H and 20 nuclear-capable B-2A "stealth" strategic bombers. The United States has initiated a program to develop and deploy the next-generation bomber, the B-21 Raider. It will first supplement, and eventually replace elements of the conventional and nuclear-capable bomber force beginning in the mid-2020s....The B83-1 and B61-11 gravity bombs can hold at risk a variety of protected targets. As a result, both will be retained in the stockpile, at least until there is sufficient confidence in the B61-12 gravity bomb that will be available in 2020.

Beginning in 1982, B-52H bombers were equipped with ALCMs. Armed with ALCMs, the B-52H can stay outside adversary air defenses and remain effective. The ALCM, however, is now more than 25 years past its design life and faces continuously improving adversary air defense systems...The Long-Range Stand-Off (LRSO) cruise missile replacement program will maintain into the future the bomber force capability to deliver stand-off weapons that can penetrate and survive advanced integrated air defense systems, thus supporting the long-term effectiveness of the bomber leg.

The current non-strategic nuclear force consists exclusively of a relatively small number of B61gravity bombs carried by F-15E and allied dual capable aircraft (DCA). The United States is incorporating nuclear capability onto the forward-deployable, nuclear-capable F-35 as a replacement for the current aging DCA. In conjunction with the ongoing life extension program for the B61 bomb, it will be a key contributor to continued regional deterrence stability and the assurance of allies.

... **Nuclear Command, Control, and Communications Modernization...** While once state-of-the-art, the NC3 system is now subject to challenges from both aging system components and new, growing 21st century threats. Of particular concern are expanding threats in space and cyber space, adversary strategies of limited nuclear escalation, and the broad diffusion within DoD of authority and responsibility for governance of the NC3 system, a function which, by its nature, must be integrated...

U.S. Nuclear Posture Review on US Nuclear Force Changes - II

In light of the critical need to ensure our NC3 system remains survivable and effective, the United States will pursue a series of initiatives. This includes: strengthening protection against cyber threats, strengthening protection against space-based threats, enhancing integrated tactical warning and attack assessment, improving command post and communication links, advancing decision support technology, integrating planning and operations, and reforming governance of the overall NC3 system.

Nuclear Command, Control, and Communications Modernization... While once state-of-the-art, the NC3 system is now subject to challenges from both aging system components and new, growing 21st century threats. Of particular concern are expanding threats in space and cyber space, adversary strategies of limited nuclear escalation, and the broad diffusion within DoD of authority and responsibility for governance of the NC3 system, a function which, by its nature, must be integrated. In light of the critical need to ensure our NC3 system remains survivable and effective, the United States will pursue a series of initiatives...This includes: strengthening protection against cyber threats, strengthening protection against space-based threats, enhancing integrated tactical warning and attack assessment, improving command post and communication links, advancing decision support technology, integrating planning and operations, and reforming governance of the overall NC3 system.

...Nuclear Weapons Infrastructure... Over the past several decades, the U.S. nuclear weapons infrastructure has suffered the effects of age and underfunding. Over half of NNSA's infrastructure is over 40 years old, and a quarter dates back to the Manhattan Project era. All previous NPRs highlighted the need to maintain a modern nuclear weapons infrastructure, but the United States has fallen short in sustaining a modern infrastructure that is resilient and has the capacity to respond to unforeseen developments. There now is no margin for further delay in recapitalizing the physical infrastructure needed to produce strategic materials and components for U.S. nuclear weapons. Just as our nuclear forces are an affordable priority, so is a resilient and effective nuclear weapons infrastructure, without which our nuclear deterrent cannot exist....The U.S. must have the ability to maintain and certify a safe, secure, and effective nuclear arsenal. Synchronized with DoD replacement programs, the United States will sustain and deliver on-time the warheads needed to support both strategic and non-strategic nuclear capabilities by:

- Completing the W76-1 Life Extension Program (LEP) by Fiscal Year (FY) 2019;
- Completing the B61-12 LEP by FY2024;
- Completing the W88 alterations by FY2024;
- Synchronizing NNSA's W80-4 life extension, with DoD's LRSO program and completing the W80-4 LEP by FY2031;
- Advancing the W78 warhead replacement one year to FY19 to support fielding on GBSD by 2030 and investigate the feasibility of fielding the nuclear explosive package in a Navy flight vehicle;
- Sustaining the B83-1 past its currently planned retirement date until a suitable replacement is identified; and,
- Exploring future ballistic missile warhead requirements based on the threats and vulnerabilities of potential adversaries, including the possibility of common reentry systems between Air Force and Navy systems.
- The United States will pursue initiatives to ensure the necessary capability, capacity, and responsiveness of the nuclear weapons infrastructure and the needed skills of the workforce, including the following:
- Pursue a joint DoD and Department of Energy advanced technology development capability to ensure that efforts are appropriately integrated to meet DoD needs.
- Provide the enduring capability and capacity to produce plutonium pits at a rate of no fewer than 80 pits per year by 2030. A delay in this would result in the need for a higher rate of pit production at higher cost.
- Ensure that current plans to reconstitute the U.S. capability to produce lithium compounds are sufficient to meet military requirements.
- Fully fund the Uranium Processing Facility and ensure availability of sufficient low enriched uranium to meet military requirements.
- Ensure the necessary reactor capacity to produce an adequate supply of tritium to meet military requirements.
- Ensure continuity in the U.S. capability to develop and manufacture secure, trusted strategic radiation-hardened microelectronic systems beyond 2025 to support stockpile modernization.
- Rapidly pursue the Stockpile Responsiveness Program established by Congress to expand opportunities for young scientists and engineers to advance warhead design, development, and production skills.
- Develop an NNSA roadmap that sizes production capacity to modernization and hedging requirements.
- Retain confidence in nuclear gravity bombs needed to meet deterrence needs.
- Maintain and enhance the computational, experimental, and testing capabilities needed to annually assess nuclear weapons.

OSD on U.S. Nuclear Delivery Developments in FY2020

- **Ground Based Strategic Deterrent (GBSD).** The GBSD system will replace the Minuteman III Intercontinental Ballistic Missile Weapon System (WS), including new flight, WS Command and Control, and ground systems; and conversion, modernization, and replacement of the MM III infrastructure, beginning in 2028. The program is in the Technology Maturation and Risk Reduction (TMRR) phase and is planning for a Milestone B decision and entry into the Engineering and Manufacturing Development (EMD) phase in FY 2020.
- **Long-Range Stand Off (LRSO) cruise missile.** The LRSO effort will develop a weapon system to replace the AGM-86B Air Launched Cruise Missile, which has been operational since 1986. The LRSO weapon system will be capable of penetrating and surviving advanced Integrated Air Defense Systems from significant stand-off ranges to hold strategic targets at risk in support of the Air Force's nuclear deterrence operations core function. The LRSO is also critical for serving as a hedge against risks in the more complex nuclear deterrence system development programs and enhancing the credibility of the DoD deterrent to assure U.S. allies. The program is in the TMRR phase and is planning for a Milestone B decision and entry into the EMD phase in FY 2022.
- **COLUMBIA class Ballistic Missile Submarine (SSBN).** The COLUMBIA class SSBN is being developed to replace the OHIO-class SSBNs starting in October 2030. The Navy will sustain the OHIO class to ensure a smooth transition for the sea-based leg of the Triad with the COLUMBIA class SSBN. The COLUMBIA class program successfully completed Milestone B in January 2017 and has entered the Engineering and Manufacturing Development (EMD) phase. Lead ship construction is planned to begin in 2021.
- **Trident II (D5) Submarine-Launched Ballistic Missile (SLBM) Life Extension (D5LE).** The D5LE program extends the service life of the D5 SLBM and will be deployed on both OHIO-class and COLUMBIA-class SSBNs. The D5LE is in production and achieved Initial Fleet Introduction in February 2017. The Navy will initiate development efforts for a follow-on system to the D5LE in FY 2020.
- **B-21 Raider Strategic Bomber.** The B-21 Raider is being developed to acquire an affordable, long range, penetrating aircraft that incorporates proven, mature technologies. This bomber represents a key component to the joint portfolio of conventional and nuclear deep-strike capabilities.
- **F-35A Dual-Capable Aircraft (DCA).** The F-35A DCA will replace the Air Force's F-15 DCA to support extended deterrence. The F-35A DCA is scheduled to achieve nuclear certification in FY 2024.

IISS on Russian Nuclear Force Changes 2018 - I

- Russia's military doctrine, last updated in 2014, states that the country reserves the right to use its nuclear capability in response to the use of nuclear weapons – or other weapons of mass destruction – against Russia or its allies, and in circumstances where aggression with conventional weapons would put at risk the very existence of the state. While this language indicates that the range of conditions for the use of Russia's nuclear weapons is relatively constrained, it is nuanced enough to allow Moscow to suggest that it can resort to nuclear weapons in a number of scenarios.
- While the Russian political and military leadership clearly understands the catastrophic consequences of a large-scale nuclear exchange, Moscow appears to be maintaining a degree of ambiguity about its intentions and capabilities that make it very difficult to completely rule out the possibility of a limited use of nuclear weapons in some eventualities. Indeed, in its military exercises, Russia has practiced scenarios that involve the use of such weapons.
- During the financially lean years of the 1990s, Russia focused on maintaining the core components of its strategic arsenal, preserving key defense-industrial enterprises, and consolidating development and production in Russia...As more funds became available in the 2000s, the modernization effort was intensified and subsequently expanded to include a number of new programs. To a large extent, this expansion was driven by the defense industry, although the factors that helped justify the modernization effort included the need to maintain numerical parity with the United States and to counter US missile defense developments.
- ...key enterprises involved in the development and production of Russia's strategic systems include the Moscow Institute of Thermal Technology, which leads the development of land and sea-based solid-propellant ballistic missiles (RS-12M2 Topol-M (SS-27 mod 1), RS-24 Yars (SS-27 mod 2) and Bulava), and the Votkinsk Machine Building Plant, which produces the missiles.
- The Makeyev State Rocket Center is the lead developer of liquid-fuel missiles, including modifications of the R-29RM Sineva (SS-N-23 Skiff) submarine launched ballistic missile (SLBM) and the new silo based Sarmat.
- The Tupolev Design Bureau is the main contractor for work on the current range of strategic bombers. Upgrades to old bombers are carried out at several plants, but it is planned that new aircraft production will be concentrated at the Gorbunov Aviation Plant in Kazan.
- ...the Bulava missile program encountered some difficulties at the development and serial-production stages; development of the Sarmat missile is now several years behind schedule; and the industry still has to demonstrate that it can resume the production of strategic bombers.
- Russia is carrying out an active ICBM modernization program, which has accelerated in recent years. The missile system at the center of this modernization is the single-warhead Topol-M (SS-27 mod 1), which was deployed in 1997–2009...When START expired in 2009, Russia switched to deployment of the RS-24 Yars (SS-27 mod 2), which is a version of the Topol-M (probably somewhat upgraded) that uses multiple independently-targetable re-entry vehicles (MIRVs). Both of these missiles are deployed in silos as well as on road-mobile launchers. As of early 2017, Russia was estimated to have 78 single-warhead Topol-M missiles and 96 multiple-warhead Yars ICBMs.
- The relatively new Topol-M and Yars missiles carry about half of all the ICBM warheads in Russia's inventory. The other half are deployed with the older ICBMs that were introduced in the early 1980s. One of these missiles, the UR-100NUTTH (SS-19 mod 3), is in the process of being withdrawn from active service.
- The other, the heavy R-36M2 (SS-18 Satan mod 5), is currently deployed with two missile divisions. With each missile carrying ten warheads, 46 ICBMs of this type account for 460 deployed warheads. These missiles are expected to stay in service until about 2020. After that they will be replaced by Sarmat, a new silo-based liquid- fuel ICBM that is currently under development.
- Russia is working to revive the idea of building a rail-mobile ICBM. Even though the project, known as Barguzin, was not included in the earlier State Armament Program, development is under way and the first missile ejection test took place in November 2016.
- Another missile under development, known as the RS-26 Rubezh, is nominally considered an ICBM, since it demonstrated a range of more than 5,500km in one of its flight tests. Rubezh, however, is believed to be an intermediate-range missile that is based on the first two stages of Yars. Russia completed flight tests of the

IISS on Russian Nuclear Force Changes 2018 - II

missile in 2014 and initially planned to begin deployment in 2015 to missile units near Irkutsk and at Edrovo/Vypolzovo. However, the deployment was postponed and is not expected to begin until at least mid- 2018.

In 2014 the Russian Navy received the third Project 955 Borey-class ballistic-missile submarine. This delivery was part of Moscow's strategic fleet modernization program, which calls for the construction of eight submarines of this class. The fourth submarine, which is expected to join the fleet in 2019 – and subsequent boats that are currently at various stages of construction – appears to be an upgraded design, called Project 955A Borey-A. Each submarine carries 16 Bulava solid-propellant SLBMs, with up to six warheads on each missile. This construction program is now expected to be completed in 2021.

It seems likely that Delta-III submarines will be withdrawn from service when they are replaced by the new Project 955 Borey, although Delta-IV-class boats will probably remain in service for some time after 2025...Most likely, Russia will continue the Project 955 line along with the development of a new submarine with a solid-propellant missile. Given Bulava's patchy test record, it is possible that the missile will be new as well.

To equip submarines of the Delta-IV class, Russia has relaunched a production line for R-29RMU2 Sineva (SS-N-23) SLBMs and developed an upgraded version of that missile, known as the R-29RMU2.1Layner. This latter missile, accepted for service in 2014, is said to be capable of carrying up to ten warheads, although it is perhaps deployed with only four, like Sineva... no decision about the direction of the SLBM program is understood to have been taken at the time of writing.

The recent overhaul and modernization of the Tu-160 (heavy bomber) fleet has given these aircraft the capability to use conventional weapons as well. Both aircraft can carry the Kh-555 ALCM, which is a conventional version of the Kh-55. They can also carry the new conventional Kh-101 ALCM, and its nuclear version, which is known as Kh-102. The capability of the Tu-160 and Tu-95MS to use conventional ALCMs (Kh-555 as well as Kh-101) was first demonstrated in 2015, when these aircraft were used to attack targets in Syria.

Modernization plans for Russia's strategic aviation currently include two main projects: the development of a new long-range bomber, known as PAK-DA, and revived production of the Tu-160; these newly produced versions are designated Tu-160M2. PAK-DA, meanwhile, is reported to be a subsonic flying-wing aircraft, although there is only scant information on the project.

In order to allow its bombers to conduct stand-off operations, Russia is reportedly working on a new ALCM, known as Kh-BD, with a range that will be considerably greater than that reported for the Kh-101/-102. PAK- DA may conduct its first flight in the 2020s. Once in service, it will replace the old Tu-95MS bombers, although the air force has not yet indicated how many new bombers it would like to procure.

The first Tu-160M2 is also expected to be ready in 2019, with serial production starting in 2021, and the air force is considering an order of up to 50 of the aircraft.

It is estimated that Russia's current active arsenal includes about 2,000 nuclear warheads assigned to non- strategic delivery systems.

The development and deployment of new nuclear-capable delivery systems is clearly under way, although most of the new systems are designed to be dual-capable. One major project in this area is the development of the Iskander-M system, which includes a short-range ballistic missile and a short-range cruise missile. The system is widely believed to be nuclear-capable and has apparently been used in some exercises to simulate nuclear strikes. Russia will soon complete the deployment of Iskander-M in all 12 army and navy missile brigades, where they are replacing older Tochka-U missiles.

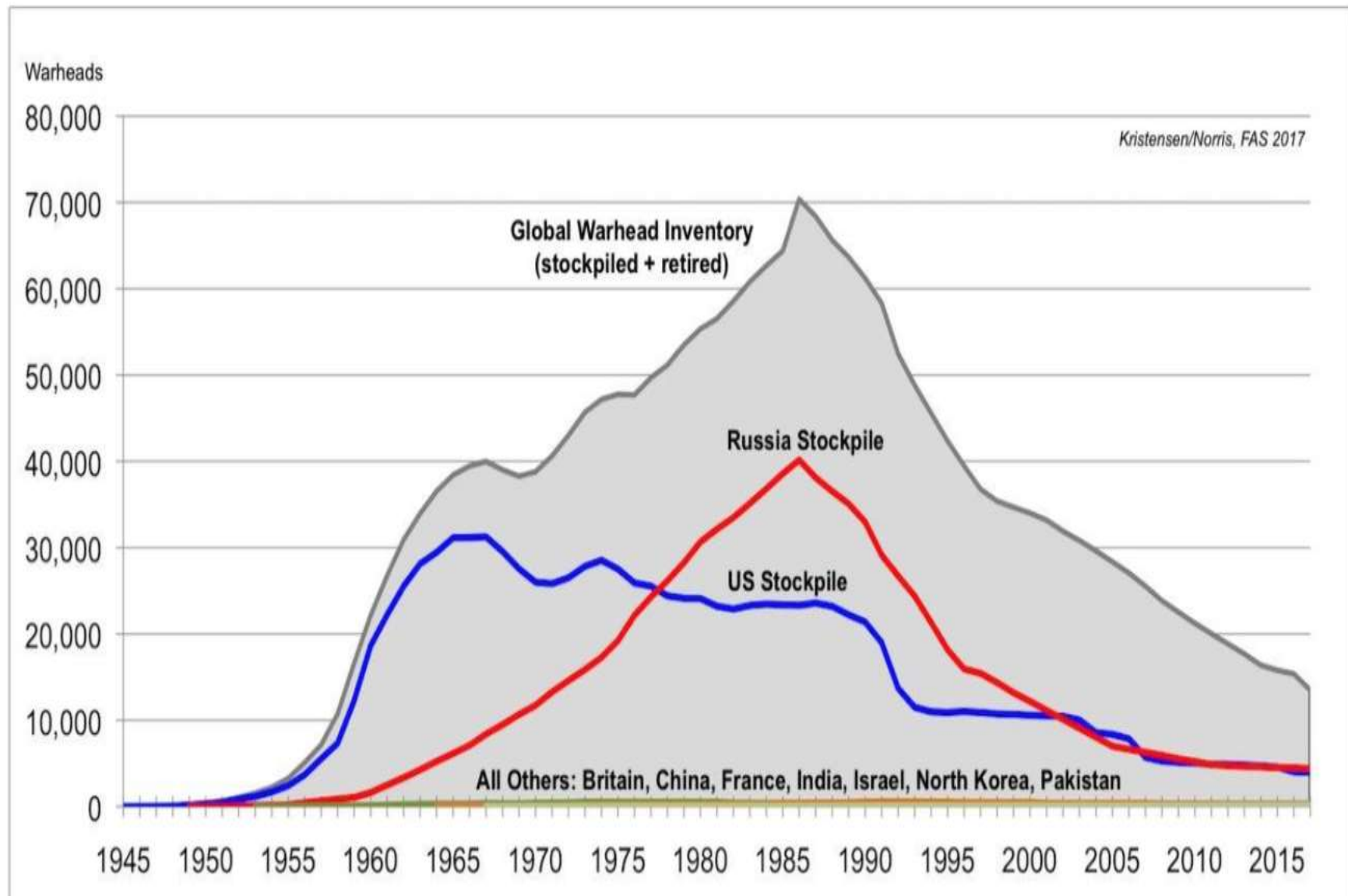
Another important program is the development of a family of long-range cruise missiles that can be deployed on submarines, surface ships and potentially on land-based launchers. This family includes the long-range missile known as the 3M14, a land-attack cruise missile (LACM) that is part of the Kalibr weapon system. Starting in 2015, Russia repeatedly demonstrated the capability of this missile in attacks against targets in Syria...Russia has announced a plan to deploy Kalibr missiles on a range of surface ships and submarines. The first multipurpose submarine of the Project 885 Yasen class, Severodvinsk, has demonstrated the capability to launch...Older types of submarine are being modified to carry these missiles in their torpedo compartments; Yasen, in contrast, is believed to have a mix of vertical launch tubes and missile-capable torpedo tubes.

Putin on Russian Nuclear Force Changes 3/1/2018

President Putin highlighted additional nuclear force developments in a speech on March 1, 2018. He described these developments as defensive modernization, and partly as a reaction to the U.S. Nuclear Posture Review. He did not highlight the ongoing improvements listed by the IISS, but focused on new systems that he made clear were symbols of Russian innovation and ability to compete with the U.S. His 23 page speech is well worth reading in full, but the key new development he described were:

- **The New Russian RS-28 Sarmat ICBM**, “...the Defence Ministry and enterprises of the missile and aerospace industry are in the active phase of testing a new missile system with a heavy intercontinental missile. We called it Sarmat. Sarmat will replace the Voevoda system made in the USSR....the capabilities of the Sarmat missile are much higher. Weighing over 200 tons, it has a short boost phase, which makes it more difficult to intercept for missile defense systems. The range of the new heavy missile, the number and power of its combat blocs is bigger than Voevoda’s. Sarmat will be equipped with a broad range of powerful nuclear warheads, including hypersonic, and the most modern means of evading missile defense. The high degree of protection of missile launchers and significant energy capabilities the system offers will make it possible to use it in any conditions.”
- **(Nuclear Powered?) Hypersonic Cruise Missile**: “...a small-scale heavy-duty nuclear energy unit that can be installed in a missile like our latest X-101 air-launched missile or the American Tomahawk missile – a similar type but with a range dozens of times longer, dozens, basically an unlimited range. It is a low-flying stealth missile carrying a nuclear warhead, with almost an unlimited range, unpredictable trajectory and ability to bypass interception boundaries. It is invincible against all existing and prospective missile defense and counter-air defense systems. I will repeat this several times today....In late 2017, Russia successfully launched its latest nuclear-powered missile at the Central training ground. During its flight, the nuclear-powered engine reached its design capacity and provided the necessary propulsion. Now that the missile launch and ground tests were successful, we can begin developing a completely new type of weapon, a strategic nuclear weapons system with a nuclear-powered missile.... As the range is unlimited, the missile can maneuver for as long as necessary...
- **Unmanned, High Speed Submersible Vehicle (Status 6 or Canyon Nuclear Torpedo)** “we have developed unmanned submersible vehicles that can move at great depths (I would say extreme depths) intercontinentally, at a speed multiple times higher than the speed of submarines, cutting-edge torpedoes and all kinds of surface vessels, including some of the fastest. It is really fantastic. They are quiet, highly maneuverable and have hardly any vulnerabilities for the enemy to exploit. There is simply nothing in the world capable of withstanding them....Unmanned underwater vehicles can carry either conventional or nuclear warheads, which enables them to engage various targets, including aircraft groups, coastal fortifications and infrastructure...In December 2017, an innovative nuclear power unit for this unmanned underwater vehicle completed a test cycle that lasted many years. The nuclear power unit is unique for its small size while offering an amazing power-weight ratio. It is a hundred times smaller than the units that power modern submarines, but is still more powerful and can switch into combat mode, that is to say, reach maximum capacity, 200 times faster...The tests that were conducted enabled us to begin developing a new type of strategic weapon that would carry massive nuclear ordnance.
- **Hypersonic Air Attack System** “Countries with high research potential and advanced technology are known to be actively developing so-called hypersonic weapons...The speed of sound is Mach 1, speeds between Mach 1 and Mach 5 is called supersonic, and hypersonic is above Mach 5....Military experts believe that it would be extremely powerful, and that its speed makes it invulnerable to current missile and air defense systems, since interceptor missiles are, simply put, not fast enough. In this regard, it is quite understandable why the leading armies of the world seek to possess such an ideal weapon...The unique flight characteristics of the high-speed carrier aircraft allow the missile to be delivered to the point of discharge within minutes. The missile flying at a hypersonic speed, 10 times faster than the speed of sound, can also maneuver at all phases of its flight trajectory, which also allows it to overcome all existing and, I think, prospective anti-aircraft and anti-missile defense systems, delivering nuclear and conventional warheads in a range of over 2,000 kilometers. We called this system *Kinzhal* (Dagger).
- **Gliding Wing Delivery System: Project 4202 or Yu-71**: “...in the near future, the Russian Armed Forces, the Strategic Missile Forces, will receive new hypersonic-speed, high-precision new weapons systems that can hit targets at inter-continental distance and can adjust their altitude and course as they travel. This is a very significant statement because no country in the world as of now has such arms in their military arsenal...Unlike existing types of combat equipment, this system is capable of intercontinental flight at supersonic speeds in excess of Mach 20. As I said in 2004, in moving to its target, the missile’s gliding cruise bloc engages in intensive maneuvering – both lateral (by several thousand km) and vertical. This is what makes it absolutely invulnerable to any air or missile defense system.

Shifts in U.S.-Soviet/Russian Weapons: 1945-2017



Source: Source: Hans M. Kristensen and Robert S. Norris, "Status of World Nuclear Forces," Federation of American Scientists (FAS), 26 May 2016, available at: <http://fas.org/issues/nuclear-weapons/status-world-nuclear-forces/>.

U.S.-Russian Weapons Limits Under New Start

The New START Treaty contains three central limits on U.S. and Russian strategic offensive nuclear forces; these are displayed in **Table 1**, below. First, it limits each side to no more than 800 deployed and nondeployed ICBM and SLBM launchers and deployed and nondeployed heavy bombers equipped to carry nuclear armaments. Second, within that total, it limits each side to no more than 700 deployed ICBMs, deployed SLBMs, and deployed heavy bombers equipped to carry nuclear armaments. Third, the treaty limits each side to no more than 1,550 deployed warheads. Deployed warheads include the actual number of warheads carried by deployed ICBMs and SLBMs, and one warhead for each deployed heavy bomber equipped for nuclear armaments. **Table 1** compares these limits to those in the 1991 START Treaty and the 2002 Moscow Treaty.

Table 1. Limits in START, Moscow Treaty, and New START

Treaty	START (1991)	Moscow Treaty (2002)	New START (2010)
Limits on Delivery Vehicles	1,600 strategic nuclear delivery vehicles	No limits	800 deployed and nondeployed ICBM launchers, SLBM launchers and heavy bombers equipped to carry nuclear weapons Within the 800 limit, 700 deployed ICBMs, SLBMs, and heavy bombers equipped to carry nuclear weapons
Limits on Warheads	6,000 warheads attributed to ICBMs, SLBMs, and heavy bombers 4,900 warheads attributed to ICBMs and SLBMs 1,100 warheads attributed to mobile ICBMs 1,540 warheads attributed to heavy ICBMs	1,700-2,200 deployed strategic warheads No sublimits	1,550 deployed warheads No sublimits
Limits on Throwweight	3,600 metric tons	No limit	No limit

Source: State Department fact sheets.

Table 2. U.S. Strategic Nuclear Forces Under New START

(Estimated current forces and potential New START forces)

	Estimated U.S. Forces, 2010		U.S. Forces, February 5, 2018 ^a			Permitted Forces Under New START ^b		
	Deployed Launchers	Warheads	Total Launchers	Deployed Launchers	Warheads	Total Launchers	Deployed Launchers	Warheads
Minuteman III	450	500	454	400		454	400	400
Peacekeeper	0	0	0	0		0	0	0
Trident	336	1,152	280	203		280	240	1,090
B-52	76	300	46	36		47	41	41
B-2	18	200	20	13		19	19	19
Total	880	2,152	800	652	1,350	800	700	1,550

Source: CRS estimates, Air Force estimates.

- U.S. Department of State, Bureau of State, Bureau of Arms Control, Verification, and Compliance, *New START Treaty Aggregate Numbers of Strategic Offensive Forces*, Fact Sheet, Washington, DC, July 6, 2018, <https://www.state.gov/documents/organization/284376.pdf>. The fact sheet does not display warhead subtotals for each delivery system; it includes only an aggregate across the force.
- This force assumes that the United States retains 14 Trident submarines, with two submarines in overhaul, but that each has only 20 deployed launchers. It also assumes that the Air Force maintains all 450 Minuteman III silos, but places 50 in "warm" status. This appears to be the Air Force preferred option at this time, although the final force structure decision is still pending.

Table 3. Russian Strategic Nuclear Forces Under New START

(Estimated current forces and potential New START forces)

	Estimated Forces 2010		Potential Forces under New START		
	Launchers	Warheads	Total Launchers	Deployed Launchers	Deployed Warheads
SS-18 ICBM	68	680	68	20	200
SS-19 ICBM	72	432	0	0	0
SS-25 (mobile)	180	180	0	0	0
SS-27 (mobile)	13	13	27	27	27
SS-27 (silo)	50	50	60	60	60
RS-24 (mobile)	0	0	85	85	340
SS-N-18 (Delta III SSBN)	64 (4 SSBNs)	192	0	0	0
SS-N-23 (Delta IV SSBN)	96 (6 SSBNs)	384	64 (4 SSBNs)	64	256
Bulava (Borey SSBN)	0	0	64 (4 SSBNs)	64	384
Blackjack Bomber	14	168	13	13	13
Bear Bomber	63	688	63	63	63
Total	620	2,787	444	396	1,335

Source: United States Department of State, Fact Sheet, *START Aggregate Numbers of Strategic Offensive Arms*, November 30, 2012; Nuclear Notebook: Russian Nuclear Forces, 2010, *Bulletin of the Atomic Scientists*, January/February 2010; Russian Nuclear Forces <http://russianforces.org/>.

U.S.-Russian Strategic Offensive Weapons in 2017

Below are each party's aggregate numbers of strategic offensive arms as of September 1, 2017, as drawn from the exchange of data by the parties.

NEW START TREATY AGGREGATE NUMBERS OF STRATEGIC OFFENSIVE ARMS

Category of Data	United States of America	Russian Federation
Deployed Intercontinental Ballistic Missiles (ICBMs), Deployed Submarine-Launched Ballistic Missiles (SLBMs), and Deployed Heavy Bombers	660	501
Warheads on Deployed ICBMs, on Deployed SLBMs, and Nuclear Warheads Counted for Deployed Heavy Bombers	1393	1561
Deployed and Non-deployed Launchers of ICBMs, Deployed and Non-deployed Launchers of SLBMs, and Deployed and Non-deployed Heavy Bombers	800	790

The New START Treaty does not require annual reductions in strategic offensive arms. The Treaty obligates the parties to reduce and limit their forces so that seven years after entry-into-force of the treaty, February 5, 2018, each Party's aggregate numbers of strategic offensive arms as counted in accordance with the Treaty do not exceed: 700 for deployed ICBMs, deployed SLBMs, and deployed heavy bombers; 1,550 for warheads on deployed ICBMs, warheads on deployed SLBMs, and nuclear warheads counted for deployed heavy bombers; and 800 for deployed and non-deployed ICBM launchers, deployed and non-deployed SLBM launchers, and deployed and non-deployed heavy bombers.

DIA on Chinese Biological and Chemical Weapons- 2019

China has consistently claimed that it has never researched, produced, or possessed biological weapons and would never do so. Beijing says China has researched only defensive biological technology necessary for China's defense. China acceded to the Biological Weapons Convention (BWC) in 1984. It declared the Academy of Military Science's Institute of Microbiology and Epidemiology in Beijing as a biodefense research facility. China regularly and voluntarily submits to confidence-building measures under the BWC.

Although China is not a member of the Australia Group, China's export control regulations have been in line with Australia Group guidelines and control lists since 2002. China's biotechnology infrastructure is sufficient to produce some biological agents or toxins on a large scale. The Australia Group (AG) is an informal forum of countries which, through the harmonization of export controls, seeks to ensure that exports do not contribute to the development of chemical or biological weapons. Coordination of national export control measures assists Australia Group participants to fulfil their obligations under the Chemical Weapons Convention and the Biological and Toxin Weapons Convention to the fullest extent possible.

China has declared that it once operated a small chemical weapons program for offensive purposes; however, Beijing has consistently maintained that the program was dismantled and all agents and munitions were used before China ratified the Chemical Weapons Convention (CWC) in 1997. Beijing also has declared two historical chemical warfare production facilities that may have produced mustard gas, phosgene, and lewisite. In 1998, Beijing published chemical export control regulations consistent with Organization for the Prohibition of Chemical Weapons (OPCW) standards. It also has consistently updated its chemical control list to reflect changes made to the Australia Group chemical control list. China continues to reaffirm its compliance with the CWC as well as its support for the activities conducted by the OPCW. Since acceding to the CWC, China has declared hundreds of dual-use facilities and has hosted hundreds of facility inspections and OPCW-led seminars.

China's chemical infrastructure is sufficient to research, develop, and produce some chemical agents on a large scale. China probably has the technical expertise to weaponize chemical and biological warfare (CBW) agents, and China's robust armaments industry and numerous conventional weapon systems, including missiles, rockets, and artillery, probably could be adapted to deliver CBW agents. China has the technical expertise, military units, and equipment necessary to detect CBW agents and to defend against a CBW attack. Entities and individuals in China continue to supply countries of concern with technologies, components, and raw materials applicable to weapons of mass destruction and missile programs. Such material and technology transfers could assist countries in developing their own production capabilities

Arms Control Association CBW Assessment

Biological Weapons

China contends it is in compliance with the Biological Weapons Convention (BWC) despite U.S. allegations asserting the contrary. U.S. State Department compliance assessment reports have said that China possessed an offensive biological weapons capability prior to joining the BWC in 1984.

The [2015 report](#) indicates that China "engaged during the reporting period in biological activities with potential dual-use applications. However, the information did not establish that China is engaged in activities prohibited by the BWC." The [2017 compliance report](#) does not cite any Chinese violations.

Chemical Weapons

China has declared that it has destroyed all chemical weapon agent production facilities and solely conducts defensive chemical warfare research.

Beijing's official position emphasizes the complete prohibition and destruction of chemical weapons. In the past, the U.S. government has alleged that China may be violating its Chemical Weapons Convention (CWC) commitments by secretly pursuing chemical weapons programs.

The State Department's [2010 compliance report](#) concluded that "available information does not allow the United States to confirm whether China has fully declared or explained its historical CW [chemical weapon] activities, including CW production, disposition of produced CW agents, and transfer of CW agents to another country." The [State Department's 2017 CWC report](#) did not list any Chinese compliance issues.

China inherited [approximately](#) 700,000 abandoned chemical weapon (ACW) munitions from the Imperial Japanese Army at the end of World War II. Many of these ACWs are not easily located or properly stored; many of them are buried.

Japan, as of 2017, [continues to jointly work with China](#) to destroy these ACWs. Destruction began in March 2010. In November 2014, the Chinese Foreign Ministry urged Japan to [speed up the destruction process](#). As of December 2014, 50,800 ACWs [had been recovered](#) in China, of which 37,373 were verifiably destroyed.

DIA on Chinese Underground Facilities

OSD

The PLA continues to maintain a robust and technologically advanced underground facility (UGF) program to protect all aspects of its military forces, including C2, logistics, missile systems, and naval forces. China has thousands of UGFs and it continues to construct more each year. The PLA utilizes these UGFs to protect valuable assets from the effects of missile strikes and to conceal military operations from adversaries. China's NFU policy also contributed to the construction of UGFs for the country's nuclear forces, which may have planned to survive an initial nuclear first strike by an adversary.

China began to update and expand its military UGF program in the mid- to late-1980s. This modernization effort took on renewed urgency following China's observation of U.S. and Coalition air operations during the 1991 Gulf War and their use in OPERATION ALLIED FORCE. These military campaigns convinced China it needs to build more survivable, deeply buried facilities to protect military assets from the effects of penetrating conventional munition and nuclear strikes. China will likely continue to develop and expand its UGF program to support its expanding forces.

DIA

The use of underground facilities for warfighting protection and concealment enhances China's military capacity, with particular emphasis on protecting C4I functions and missile assets. The PLA maintains a robust, technologically advanced underground facility (UGF) program. Given its NFU nuclear policy, China assumes it might have to absorb an initial nuclear strike while ensuring that leadership and strategic assets survive.

China determined in the mid-to-late 1980s that it needed to update and expand its military UGF program. This modernization effort took on a renewed urgency after China observed U.S. and coalition air operations during the 1991 Persian Gulf War and in the Balkans in 1999. The resultant emphasis on "winning high-tech battles" 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 we have detected throughout China for the past decade .

Changing Bomber, SLBM, and Missile Strike Capability and Countervailing Power

Changing Strike Capability and Countervailing Power

The previous section has already highlighted the advances that China is making in strategic nuclear missiles. China also, however, is developing a full spectrum of advanced precision guided conventional missiles to strike at land and naval targets and new air and missile defenses. These developments are outlined in the tables and maps in this section — along with some comparisons of the data for 2017-2019 that provides a picture of the speed of China's progress — progress that affects the capabilities of each of the military services described in following sections.

These developments in missile strike capability are closely linked to China's steadily improving IS&R and targeting capabilities and battle management systems and are key aspect of its capability to carry out "informationized" warfare and execute A2 D2 operations. As such they are also tools for China to use in executing "countervailing power" — What Andrew Marshall defined as the ability to exploit the limits of an opponent's military forces with less expensive systems that had sufficient effectiveness to have a major strategic impact.

As the previous sections on the South China Sea and Taiwan have shown, missiles give China a substitute for comparable naval and air forces and considerable ability to exert influence operations over its neighbors. For example, long range missiles can now threaten U.S. carrier forces at considerable range — extending to the edge of the second island chain.

The following charts and maps illustrate both the growing spectrum of Chinese precision strike capabilities at every level of warfare, and their growing strike range. They also again demonstrate China's capability to exploit the strategic ambiguity of systems that can carry both nuclear and conventional weapons.

One key caution. Like most such data, there are no credible open source data on the real world operational accuracy, lethality, and reliability of such data. The data that are available are generally based on nominal range-payload calculations and estimates of the potential CEP of the guidance platform or system — an accuracy that may well not be achievable in practice and that is defined in ways that make it the maximum accuracy for only half the missiles fired.

(Wikipedia notes that: CEP is defined as the radius of a circle, centered on the mean, whose boundary is expected to include the landing points of 50% of the rounds; said otherwise, it is the median error radius. That is, if a given bomb design has a CEP of 100 m, when 100 are targeted at the same point, 50 will fall within a 100 m circle around their average impact point. (The distance between the target point and the average impact point is referred to as [bias](#).)

Chinese 2019 Defense White Paper: Missile and Rocket Forces

The PLA Rocket Force (PLARF) plays a critical role in maintaining China's national sovereignty and security. It comprises nuclear missile, conventional missile and support forces, and subordinate missile bases.

In line with the strategic requirements of having both nuclear and conventional capabilities and deterring wars in all battlespaces, the PLARF is enhancing its credible and reliable capabilities of nuclear deterrence and counterattack, strengthening intermediate and long-range precision strike forces, and enhancing strategic counter-balance capability, so as to build a strong and modernized rocket force.

...The PLA Rocket Force (PLARF) has organized force-on-force evaluation-oriented training and training based on operational plans at brigade and regiment levels, strengthened training for joint strikes, and completed regular exercises such as *Heavenly Sword*.

...Old equipment is being phased out, and a system created that mainly comprises new and high-tech weaponry and equipment. Type 15 tanks, type 052D destroyers, J-20 fighters, and DF-26 intermediate and long-range ballistic missiles have been commissioned.

... Since 2012, the increase in defense expenditure has been primarily spent for the following purposes:

1. Adapting to national economic and social development, improving the wellbeing of service personnel, ensuring regular increases in military salaries, and bettering the working, training and living conditions of the troops;
2. Increasing input in weaponry and equipment development, phasing out the outdated, upgrading the old, and developing and procuring the new, such as aircraft carriers, fighters, *missiles* and main battle tanks, to steadily modernize weaponry and equipment

...The PLA has significantly downsized the active force of the PLAA, maintained that of the PLAAF at a steady number, moderately increased that of the PLAN and PLARF, and optimized the force structures of all services and arms.

OSD on Chinese SLBM and Bomber Force in 2019

- China has constructed six JIN-class SSBN, with four operational and two outfitting at Huludao Shipyard. China's JIN SSBNs, which are equipped to carry up to 12 CSS-N-14 (JL-2) SLBMs, are the country's first viable sea-based nuclear deterrent. China's next-generation Type 096 SSBN reportedly will be armed with the follow-on JL-3 SLBM, and it will likely begin construction in the early- 2020s. (p. 66) (The PLA Navy's Jin class nuclear powered ballistic missile submarines, armed with the JL-2 submarine launched ballistic missile, provide China its first viable sea-based nuclear deterrent and credible second-strike nuclear capability. The JL-2 submarine-launched ballistic missile (SLBM) has nearly three times the range of the Xia SSBN's JL-1 SLBM, which was able to reach targets only in China's immediate vicinity. The JL-2 SLBM underwent successful testing in 2012. The Jin/JL-2 weapon system will provide China with a capability to strike targets in the continental United States from some patrol areas. To maintain a continuous at-sea nuclear deterrent, the PLAN probably would require a minimum of five Jin SSBNs; four are in service. (DIA, pp. 41-42)
- China's bomber force is comprised of H-6 BADGER variants and it has worked to maintain and enhance the operational effectiveness of these aircraft. The latest H-6 variant, the H-6K, is being fielded in greater numbers and integrates standoff weapons and features more efficient, turbofan engines. This extended-range aircraft has the capability to carry six LACMs, giving the PLA a long-range standoff precision strike capability which can range Guam. Since at least 2016, Chinese media have been referring to the H-6K as a dual nuclear-conventional bomber. PLAN Aviation fields the H-6G with systems and four weapons pylons for ASCMs to support maritime missions. In addition, the PLAAF is seeking to extend its reach with the development of a new, stealth strategic bomber. Former PLAAF Commander General Ma Xiaotian publicly announced the program in 2016, and commentators anticipate the new platform will debut sometime around 2025. (p. 41)
- The PLAAF employs the medium-range H-6K bomber, which can carry up to six precision-guided CJ-20 ALCMs each, giving it the ability to engage U.S. forces as far away as Guam. Since 2016, the PLAAF has steadily increased H-6K operating areas into the western Pacific Ocean and the South China Sea. China's acquisition of three IL-78 MIDAS aerial refueling tankers from Ukraine probably allowed the PLAAF to extend the range of Su-30 fighter aircraft beyond the first island chain when supporting H-6K bombers. (p. 58)
- Following PLAAF Commander General Ma Xiaotian's 2016 public statement that China was developing a new generation of long-range bombers, a number of reports suggest the new bomber, likely named the H-20, could debut sometime in the next decade with the following features: a stealthy design, employing many fifth- generation technologies; a likely range of at least 8,500 km; a payload of at least 10 metric tons; and a capability to employ both conventional and nuclear weaponry. A photograph of a possible H-20 prototype depicted a flying wing airframe akin to the B-2 bomber and X-47B stealth (p. 61)
- Similarly, the acquisition and development of longer-range UAVs is increasing China's ability to conduct long-range ISR and strike operations. Multiple armed UAV types are under development, in testing, or in the initial phases of deployment. In addition, China successfully tested the AT-200, which it claims is the "world's first large cargo UAV." This drone can carry up to 1.5 tons of cargo and can operate from unimproved runways as short as 200 meters, and it may be especially suited to provide logistic support to PLA forces in the South China Sea. (p. 58)
- China displayed its largest ever suite of Unmanned Aerial Vehicles (UAVs) at the Zhuhai Air Show in November 2018. In addition to displays of armed-capable reconnaissance UAVs such as the YUNYING, CAIHONG CH-4 and CH-5, and YILONG (Wing Loong) series of aircraft, there were multiple of displays of low-observable flying- wing aircraft such as the CH-7, TIANYING, and YAOYING-III to complement earlier flying wing UAVs such as the ANJIAN and LIJIAN. The Tengden Company also displayed armed UAVs, such as the TW328... (p. 40)

DIA on Chinese Submarines in 2019

China's modernizing force includes several types of submarines. For its diesel-electric force alone, between 2000 and 2005 China constructed Ming diesel attack submarines (SSs) and Song SSs and the first Yuan air-independent attack submarine (SSP), and purchased eight Kilo SSs from Russia. Although all of these classes remain in service, only the Yuan SSP is in production. Over time, reducing the number of classes in service helps streamline maintenance, training, and interoperability. The submarine force comprises 6 nuclear attack submarines, 4 nuclear-powered ballistic missile submarines, and 50 diesel attack submarines. By 2020 the submarine force probably will increase to about 70 submarines.

The Yuan SSP is China's most modern conventionally powered submarine. Seventeen are in service, with possibly three more slated for production. The Yuan SSP's combat capability is comparable to that of the Song; both can launch Chinese-built antiship cruise missiles, but the Yuan has the added benefit of an air-independent propulsion (AIP) system and may have incorporated quieting technology from the Russian-designed Kilo SS. The AIP system provides a submarine a source of power other than battery or diesel engines while still submerged, increasing its underwater endurance and reducing its vulnerability to detection.

The remainder of the conventional submarine force is a mix of Song, Ming, and Russian-built Kilo SSs. Of these, only the Ming and four of the older Kilos lack an ability to launch ASCMs. Eight of China's 12 Kilos are equipped with the SS-N-27 ASCM, which provides a long-range ASUW capability out to about 120 nautical miles. China's newest domestic submarine-launched ASCM, the CH-SS-N-13, extends a similar capability to the Song, Yuan, and Shang classes.

China also continues to modernize its nuclear-powered attack submarine force, although these make up a small percentage of the total number of submarines. Two Shang nuclear-powered attack submarines (SSNs) have been launched, one each in 2002 and 2003. After nearly 10 years, China is continuing production with four additional hulls of an improved Shang variant. These six submarines will replace the aging Han SSN on a nearly one-for-one basis during the next several years. After the completion of the improved Shang SSN, the PLAN is expected to begin production on another modified variant of the Shang SSN class, the Type 093B.207 Thereafter, the PLAN probably will progress to the Type 095 nuclear-powered cruise missile submarine (SSGN). This class of submarine may provide a generational improvement in many areas, such as quieting and weapons capacity.

The PLA Navy's Jin class nuclear powered ballistic missile submarines, armed with the JL-2 submarine launched ballistic missile, provide China its first viable sea-based nuclear deterrent and credible second-strike nuclear capability. The JL-2 submarine-launched ballistic missile (SLBM) has nearly three times the range of the Xia SSBN's JL-1 SLBM, which was able to reach targets only in China's immediate vicinity. The JL-2 SLBM underwent successful testing in 2012. The Jin/JL-2 weapon system will provide China with a capability to strike targets in the continental United States from some patrol areas. To maintain a continuous at-sea nuclear deterrent, the PLAN probably would require a minimum of five Jin SSBNs; four are in service.

OSD on Chinese A2 D2 Capabilities in 2019

- PLA capabilities in development provide options for China to dissuade, deter, or, if ordered, defeat third-party intervention during a large-scale, theater campaign such as a Taiwan contingency. U.S. defense planners often term these collective capabilities as A2/AD.
- The PLA is additionally developing power projection capabilities and concepts of operation in order to conduct offensive operations within the second island chain, in the Pacific and Indian Oceans, and in some cases, globally.
- In addition to strike, air and missile defense, anti-surface, and anti-submarine capabilities improvements, China is focusing on information, cyber, and space and counterspace operations.
- PLA A2/AD capabilities are currently most robust within the first island chain, though China aims to strengthen its capabilities to extend farther into the Pacific Ocean.

China's military modernization plan includes the development of A2/AD capabilities to conduct long-range attacks against adversary forces who might deploy or operate within the western Pacific Ocean. PLA capabilities are currently most robust within the first island chain, though China aims to strengthen its capabilities to extend farther into the Pacific Ocean. These capabilities span the air, maritime, space, electromagnetic, and information domains.

DIA on PLA Rocket Force (PLARF) in 2019

The Rocket Force is fielding conventional MRBMs to increase the range at which it can conduct precision strikes against land targets and naval ships (including aircraft carriers) operating from China's shores out to the first island chain—the islands running from the Kurils, through Taiwan, to Borneo, roughly encompassing the Yellow Sea, East China Sea, and South China Sea.

The CSS-5 Mod-5/ DF-21D has a range exceeding 1,500 kilometers and has a maneuverable warhead. During the PLA's 90th anniversary parade in 2017, China displayed a new MRBM designated the DF-16G, which China claims features high accuracy, short preparation time, and an improved maneuverable terminal stage that can better infiltrate missile defense systems.

China unveiled the DF-26 intermediate-range ballistic missile (IRBM) during its September 2015 military parade in Beijing. The DF-26 is capable of conducting precision strikes against ground targets and contributes to China's counterintervention posture in the Asia-Pacific region. During the parade, official public statements also referenced a nuclear version of the DF-26, which, if it has the same guidance capabilities, would give China its first nuclear precision-strike capability against theater targets.

The PLARF also continues to enhance its nuclear deterrent, maintaining silo-based nuclear ICBMs and adding more survivable, mobile nuclear delivery systems. China currently has 75 to 100 ICBMs, including the silo-based CSS-4 Mod 2/DF-5A and MIRV-equipped CSS-4 Mod 3/DF-5B; the solid-fueled, road-mobile CSS-10 Mod 1/DF-31 and CSS-10 Mod 2/ DF-31A; and the shorter range CSS-3/DF-4. The CSS-10 Mod 2/DF-31A has a range of more than 11,200 kilometers and can reach most locations within the continental United States. China also is developing a new MIRV-capable road-mobile ICBM, the CSS-X-10/DF-41.

The CJ-10 ground-launched cruise missile (GLCM) has a range in excess of 1,500 kilometers and offers flight profiles different from ballistic missiles, enhancing targeting options. Because of overlap in the kinds of targets China is likely to engage with either ballistic missiles or cruise missiles, GLCMs and air-launched land-attack cruise missiles provide key operational and planning flexibility. These weapons are likely to reduce the burden on ballistic missile forces as well as create somewhat safer strike opportunities for Chinese aircrews, allowing them to engage from much greater distances and from more advantageous locations. This will complicate an adversary's air and missile defense problem.

DIA on PLA Rocket Force (PLARF) in 2019

System	Type	Warheads	Propellant	Deployment Mode	Max Range km
CSS-3/DF-4	ICBM	Nuclear	Liquid	ROTL**	5,500+
CSS-4/DF-5	ICBM	Nuclear	Liquid	Silo	12,000-13,000
CSS-7/DF-11	SRBM	Conventional	Solid	Mobile	300-600
CSS-6/DF-15	SRBM	Conventional	Solid	Mobile	600-850+
CSS-11/DF-16	SRBM	Conventional	Solid	Mobile	800-1,000
CSS-5/DF-21	MRBM	Nuclear and Conventional Variants	Solid	Mobile	1,500-1,750+
CSS-5 Mod-5/DF-21D	ASBM	Conventional	Solid	Mobile	1,500+
DF-26	IRBM	Nuclear and Conventional Variants	Solid	Mobile	4,000
CSS-10/DF-31	ICBM	Nuclear	Solid	Mobile	7,200-11,200
CJ-10	GLCM	Conventional	Solid	Mobile	1500+

**This chart does not include systems in development.*

*** Rollout to Launch*

The PLARF operates China's strategic land-based nuclear and conventional missiles and is a critical component of China's deterrence strategy and efforts to counter third-party intervention in regional conflicts. The PLARF also is charged with developing and testing several new classes and variants of long-range missiles, forming additional missile units, upgrading older missile systems, and developing methods to counter ballistic missile defenses.

Principal Weapon Systems

The PLARF has about 1,200 short-range ballistic missiles (SRBMs), and China is increasing the lethality of its conventional missile force by fielding the CSS-11/DF-16 ballistic missile, with a range of 800 to 1,000 kilometers. The CSS-11/DF-16, coupled with the already deployed conventional land-attack and antiship variants of the CSS-5/DF-21 medium-range ballistic missile (MRBM), will improve China's ability to strike not only Taiwan but other regional targets.

OSD on Chinese Missile and GLCM Force in 2019

- China's nuclear arsenal currently consists of approximately 90 ICBMs, including the silo-based CSS-4 Mod 2 (DF-5A) and Mod 3 (DF-5B); the solid-fueled, road-mobile CSS-10-class (DF-31, DF-31A and DF-31AG); and the more limited range roll-out-to-launch CSS-3 (DF-4). This strategic arsenal is complemented by road-mobile, solid-fueled CSS-5 Mod 2 and Mod 6 (DF-21) MRBMs and DF-26 IRBMs capable of ranging targets in the Indo-Pacific region. (pp. 66, 115, 117)
- The PLA Rocket Force also continues to enhance its fixed ICBMs and is adding more survivable, mobile delivery systems. China's ICBM arsenal to date consists of 90 ICBMs, including the silo-based CSS-4 Mod 2 (DF-5A) and multiple independently targetable reentry vehicle (MIRV)-equipped Mod 3 (DF-5B); the solid-fueled, road-mobile CSS-10 class missiles; and the shorter range CSS-3 (DF-4). The CSS-10 Mod 2, with a range in excess of 11,200 km, can reach most locations within the continental United States. Development of the CSS-X-20 considering additional DF-41 launch options, (DF-41), a new MIRV-capable, road-mobile including rail-mobile and silo basing. ICBM, continued in 2018. China appears to be considering additional DF-41 launch options, including rail-mobile and silo basing. (pp. 44-45, 117)

System	Launchers	Missiles	Estimated Range
ICBM	90	90	>5,500km
IRBM	80	80-160	3,000-5,500km
MRBM	150	150-450	1,000-3,000km
SRBM	250	750-1500	300-1,000km
GLCM	90	270-540	>1,500km

- The PLARF fields multiple missiles capable of conducting strikes beyond the first island chain. Among these are the CSS-5 Mod 5 ASBM with a range of 1,500 km and a MaRV to challenge ballistic missile defenses. China also deploys the land-attack CSS-5 Mod 4 and the ground-launched CJ-10 LACM, placing targets on Okinawa and the main Japanese islands at risk. The DF-26 IRBM has a maximum range of 4,000 km and is capable of conducting precision strikes against ground and ship targets, potentially threatening U.S. land and sea-based forces as far away as Guam. Dual capability is unclear. (p. 62)
- Military modernization has resulted in the rapid transformation of the PLA's missile force. U.S. bases in Japan are in range of a growing number of Chinese MRBMs and LACMs. H-6K bomber flights into the western Pacific Ocean demonstrate China's ability to range Guam with air-launched LACMs. The DF-26, which debuted publicly in 2015 and was paraded by China again in 2017, is capable of conducting precision conventional or nuclear strikes against ground targets, which could include U.S. bases on Guam. PLA writings see logistics and power projection assets as potential vulnerabilities in modern warfare – a judgement in accord with an expanding ability to target regional air bases, logistics and port facilities, communications, and other ground-based infrastructure. (p. 55)

OSD on Conventional Precision Strike Capabilities: 2019

Short-Range Ballistic Missiles (300-1,000 km). The Rocket Force has approximately 750-1,500 SRBMs. These missile systems include advanced variants with improved ranges and accuracy as well as more sophisticated payloads; earlier generations are being phased out and replaced by variants with true precision strike capability.

Medium-Range Ballistic Missiles (1,000-3,000 km). The PLA is fielding approximately 150-450 conventional MRBMs to increase the range at which it can conduct precision strikes against land targets and naval ships operating out to the first island chain.

Intermediate-Range Ballistic Missiles (3,000-5,500 km). The PLA's DF-26 is a road-mobile, nuclear and conventional capable IRBM capable of near-precision strike capability as far away from China as the second island chain. The PLAN is also expanding its network of sky wave and surface wave OTH radars. In conjunction with reconnaissance satellites, these OTH systems provide targeting capabilities at extended distances from China to support long-range precision strikes, including employment of ASBMs.

Land-Attack Cruise Missiles. The PLA fields approximately 270-540 ground-launched LACMs for standoff precision strikes. The PLA continues to develop additional LACM-variants for deployment with the PLAN and PLAAF.

Anti-Ship Cruise Missiles. China deploys a wide range of advanced ASCMs with the YJ-83 series as the most numerous, and it is equipping the majority of China's ships as well as multiple aircraft. China has also outfitted several ships with YJ-62 ASCMs. The YJ-18 is a long-range, torpedo tube-launched ASCM with a supersonic terminal sprint. It has likely replaced the older YJ-82 on SONG, YUAN, and SHANG class submarines, and China claims the new LUYANG III-class DDG and RENHAI CG are outfitted with a vertically launched variant of the YJ-18. China has also developed the long-range supersonic YJ-12 ASCM for the H-6 bomber. At a 2018 exhibition, China displayed a ship-to-ship variant of the YJ-12 called the YJ-12A and the ground-launched anti-ship variant YJ-12B. China has deployed the YJ-12B to several outposts in the South China Sea. China also carries the Russian SS-N-22 SUNBURN on four Russian-built SOVREMENNY-class DDGs and the Russian SS-N-27b SIZZLER on eight Russian-built KILO-class submarines.

Ground Attack Munitions. The PLAAF has a small number of tactical air-to-surface missiles (ASM) as well as precision munitions; guidance options include satellite positioning, laser, electro-optic, and imaging infrared. China is developing or adapting a range of smaller ASMs and guided bombs for use on its increasing range of armed UAVs.

Anti-Radiation Weapons. The PLA imported Israeli-made HARPY UAVs and Russian-made anti-radiation missiles during the 1990s. China is integrating the YJ-91, an indigenous version of the Russian Kh-31P (AS-17), into its fighter-bomber force and advertising the ASN-301 anti-radiation drone, an improved domestic variant of the HARPY.

Artillery-Delivered High Precision Munitions. The PLA is fielding long-range rocket artillery systems with the range to strike targets within or even across the Taiwan Strait. The most common of these systems is the PHL-03 12x300 mm multiple-rocket launcher – similar to the Russian 9A52-2 SMERCH – with a 150 km range. Improved warheads for these rockets may include vertical penetrators and sensor-fuzed munitions.

Rough Estimate of Increasing Accuracy of Guidance Systems in Chinese Missile Forces - 2018

Name	Type	Guidance	CEP (m)
DF-5A ²	ICBM	INS	300
DF-5B ³	ICBM	INS	800
DF-11 ⁴	SRBM	INS	600
DF-15 ⁵	SRBM	INS	300
DF-15A ⁶	SRBM	INS, GPS, and terminal radar	30-45
DF-15B ⁷	SRBM	INS, GPS, radar seeker, and laser range finder	5-10
DF-16 ⁸	SRBM	INS and GPS	5
DF-21 ⁹	MRBM	INS	700
DF-21A/C ¹⁰	MRBM	INS	50
DF-21D ¹¹	MRBM	INS and terminal radar	20
DF-26 ¹²	IRBM	Unknown	150-450
DF-31 ¹³	ICBM	INS	300
DF-41 ¹⁴	ICBM	Stellar-INS and GPS	100-500
JL-2 ¹⁵	SLBM	INS and GPS	150-300
HN-3 ¹⁶	CM	INS, SATNAV, TERCOM, and DSMAC	5

² Missile Defense Project, "Dong Feng 5 A/B/C (DF-5A/DF-5B/CSS-4 Mod 2/3)," *Missile Threat*, Center for Strategic and International Studies, August 12, 2016, last modified June 15, 2018, <https://missilethreat.csis.org/missile/df-5-ab/>.

³ Ibid.

⁴ Missile Defense Project, "Dong Feng 11 (DF-11)," *Missile Threat*, Center for Strategic and International Studies, January 29, 2018, last modified June 15, 2018, <https://missilethreat.csis.org/missile/dong-feng-11/>.

⁵ Missile Defense Project, "Dong Feng 15 (CSS-6)," *Missile Threat*, Center for Strategic and International Studies, January 11, 2017, last modified June 15, 2018, <https://missilethreat.csis.org/missile/df-15-css-6/>.

⁶ Ibid.

⁷ Ibid.

⁸ "Dong Feng-16 (CSS-11)." *Missile Defense Advocacy Alliance*. <https://missiledefenseadvocacy.org/missile-threat-and-proliferation/missile-proliferation/china/dong-feng-16/>.

⁹ Missile Defense Project, "Dong Feng 21 (DF-21/CSS-5)," *Missile Threat*, Center for Strategic and International Studies, April 13, 2016, last modified April 23, 2019, <https://missilethreat.csis.org/missile/df-21/>.

¹⁰ Ibid.

¹¹ Ibid.

¹² Missile Defense Project, "Dong Feng-26 (DF-26)," *Missile Threat*, Center for Strategic and International Studies, January 8, 2018, last modified January 15, 2019, <https://missilethreat.csis.org/missile/dong-feng-26-df-26/>.

¹³ Missile Defense Project, "Dong Feng 31 (DF 31/DF 31A/CSS 10)," *Missile Threat*, Center for Strategic and International Studies, August 12, 2016, last modified June 15, 2018, <https://missilethreat.csis.org/missile/df-31/>; "Dong Feng-31 (CSS-10)" *Missile Defense Advocacy Alliance*. <https://missiledefenseadvocacy.org/missile-threat-and-proliferation/missile-proliferation/china/dong-feng-31-css-10/>.

¹⁴ Missile Defense Project, "Dong Feng 41 (DF-41 / CSS-X-20)," *Missile Threat*, Center for Strategic and International Studies, August 12, 2016, last modified June 15, 2018, <https://missilethreat.csis.org/missile/df-41/>.

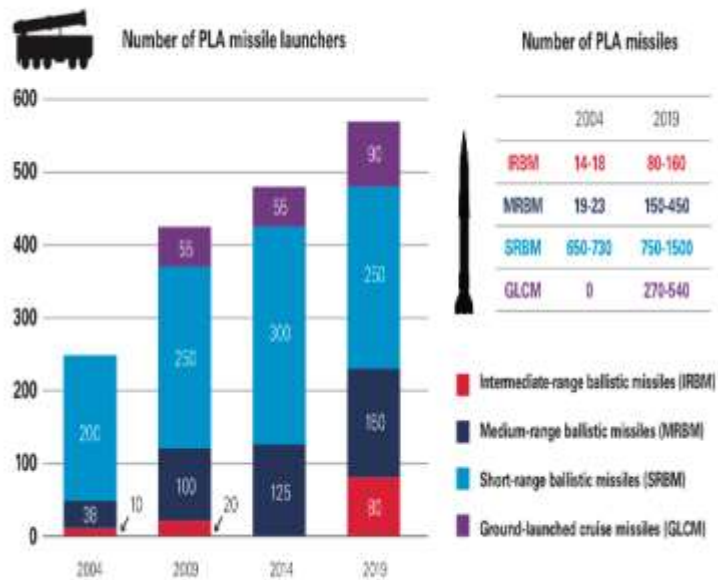
¹⁵ Missile Defense Project, "Ju Lang-2 (JL-2/CSS-NX-14)," *Missile Threat*, Center for Strategic and International Studies, August 12, 2016, last modified June 15, 2018, <https://missilethreat.csis.org/missile/jl-2/>; "JL-2" *Missile Defense Advocacy Alliance*. <https://missiledefenseadvocacy.org/missile-threat-and-proliferation/missile-proliferation/china/jl-2/>.

¹⁶ Gormley, Dennis M., Andrew S. Erikson, and Jingdong Yuan. "A Potent Vector: Assessing Chinese Cruise Missile Developments." *National Defense University Press*, September 30, 2014. <https://ndupress.ndu.edu/Media/News/News-Article-View/Article/577568/jfq-75-a-potent-vector-assessing-chinese-cruise-missile-developments/>.

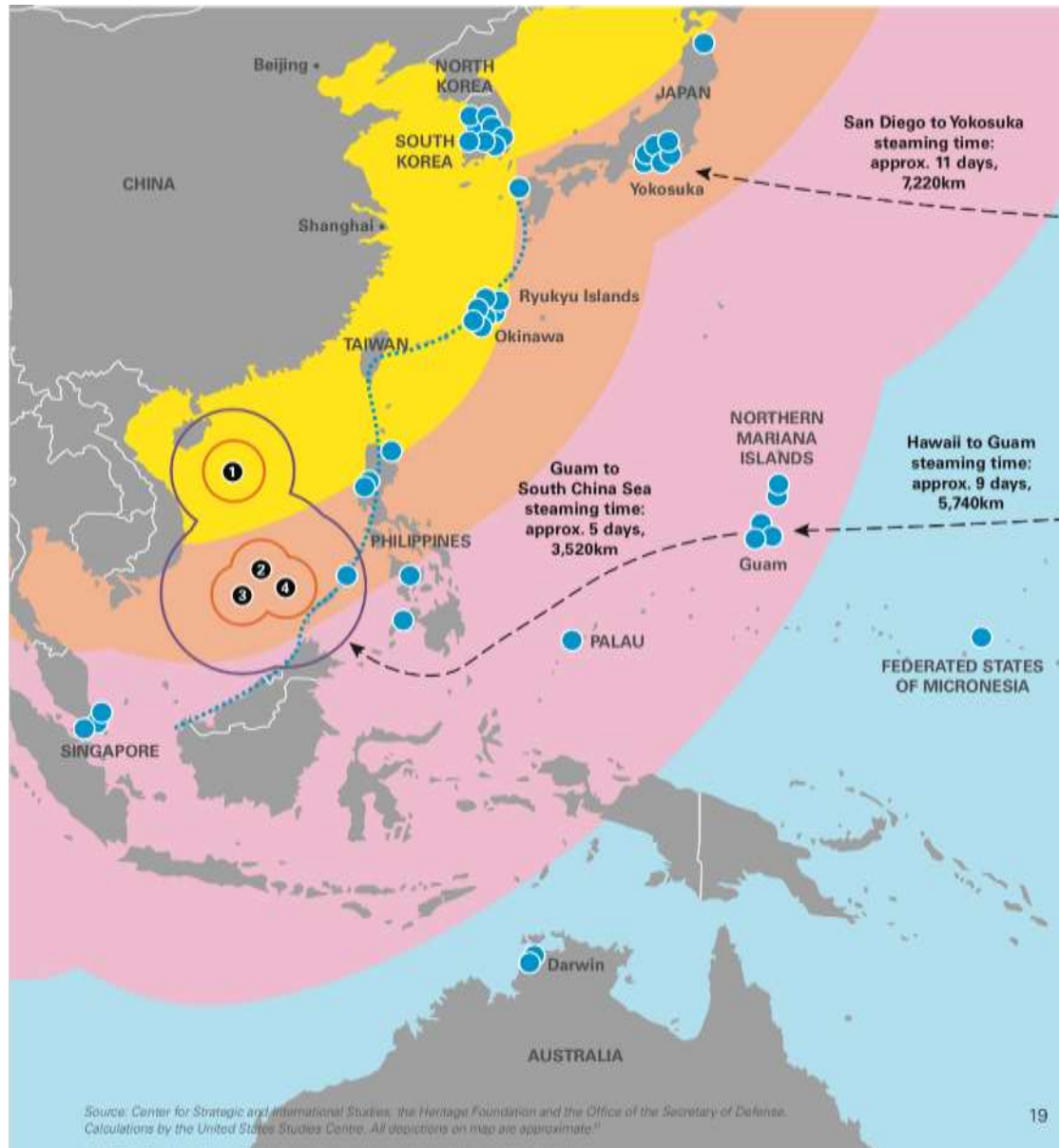
University of Sydney Estimate of China's Growing Missile Threat to US bases and Regional Access Locations



Figure 3: China's missile inventory, 2004-2019



Source: Office of the Secretary of Defense, Calculations by the United States Studies Centre



Source: Center for Strategic and International Studies, the Heritage Foundation and the Office of the Secretary of Defense. Calculations by the United States Studies Centre. All depictions on map are approximate.

Source: Ashley Townshend and Brendan Thomas-Noone and Matilda Steward with Matilda Steward, *Averting Crisis: American Strategy*, United States Studies Centre, University of Sydney, August 2019, pp. 17, 19



CHINA'S BALLISTIC MISSILES



China has the most active and diverse ballistic missile development program in the world, upgrading its missile forces in number, type, and capability. China is modernizing its ICBMs, developing multiple independently-targetable reentry vehicles and maneuvering boost-glide vehicles, and has begun deploying a new fleet of nuclear ballistic missile submarines. Short- and medium-range cruise and ballistic missiles form a critical part of its regional anti-access and area denial efforts.



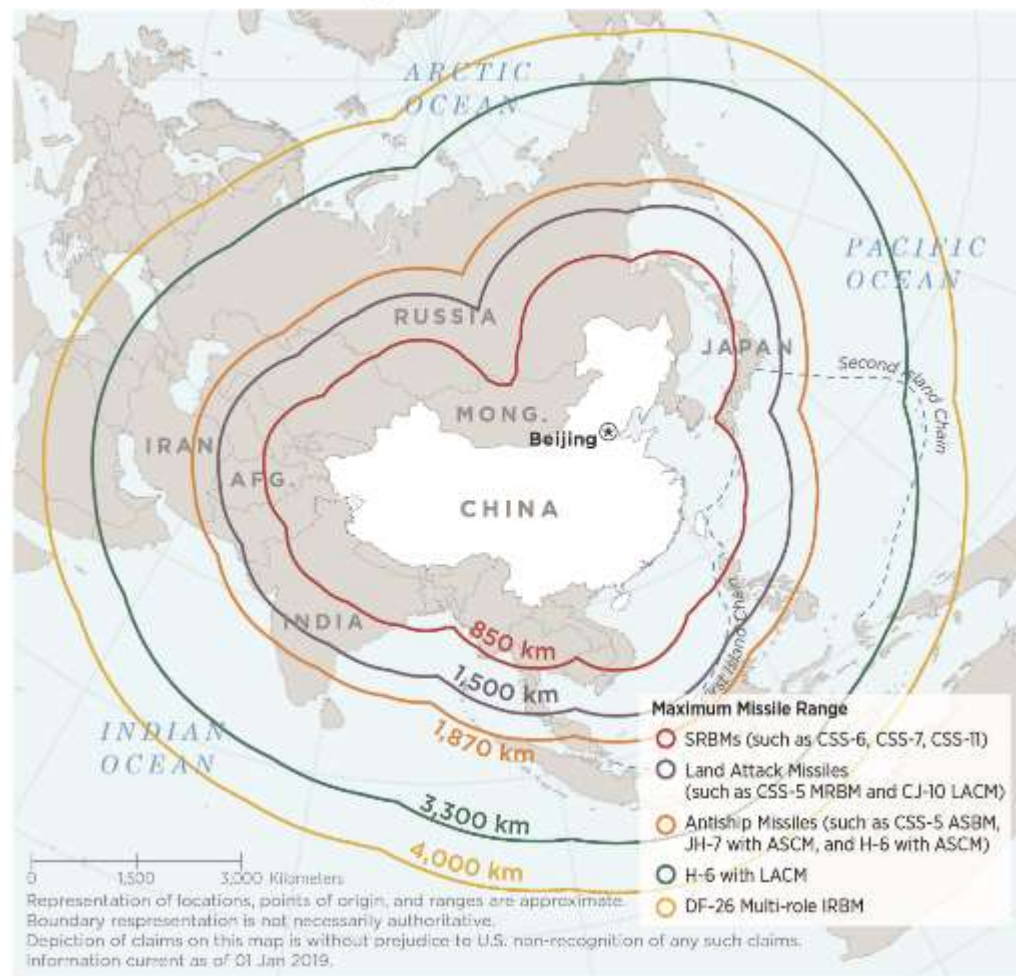
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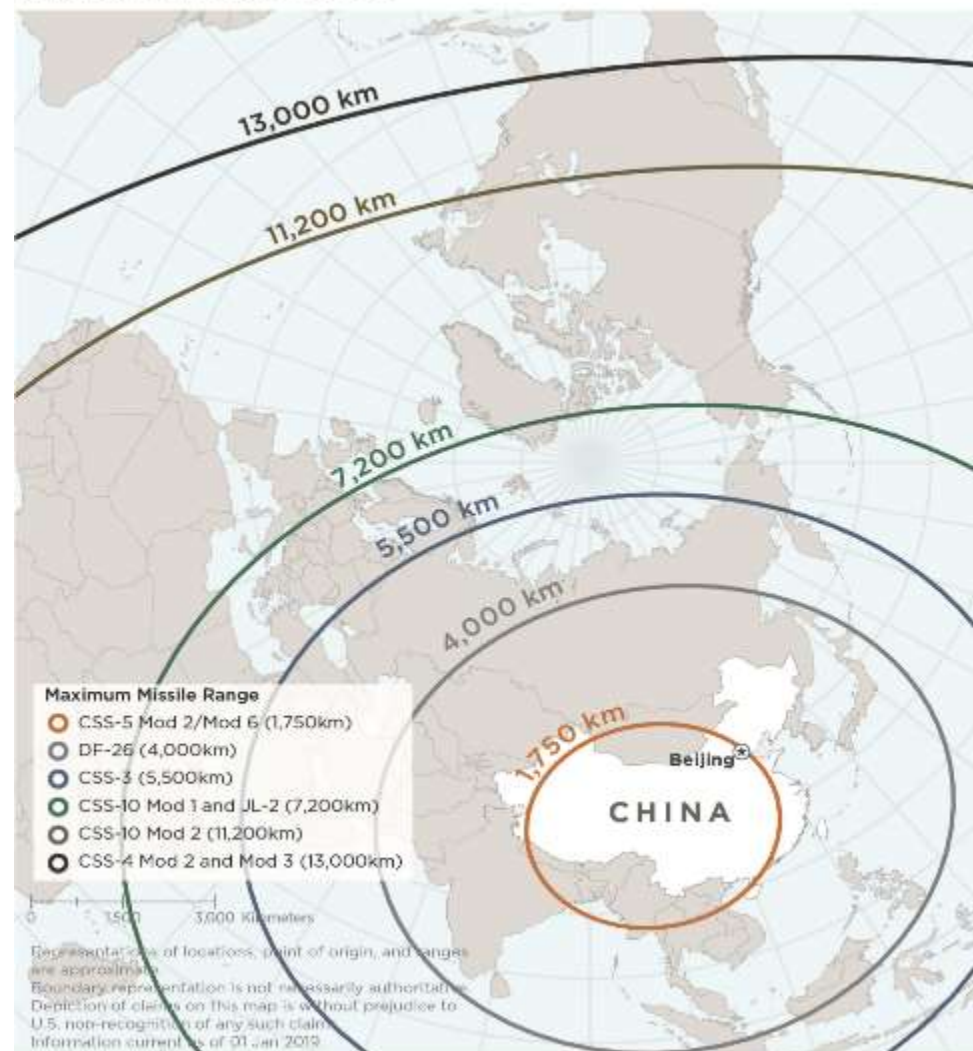
MISSILE DEFENSE PROJECT

OSD Estimate of Chinese Nuclear and Conventional Strike Ranges in 2019

Conventional Strike Capabilities

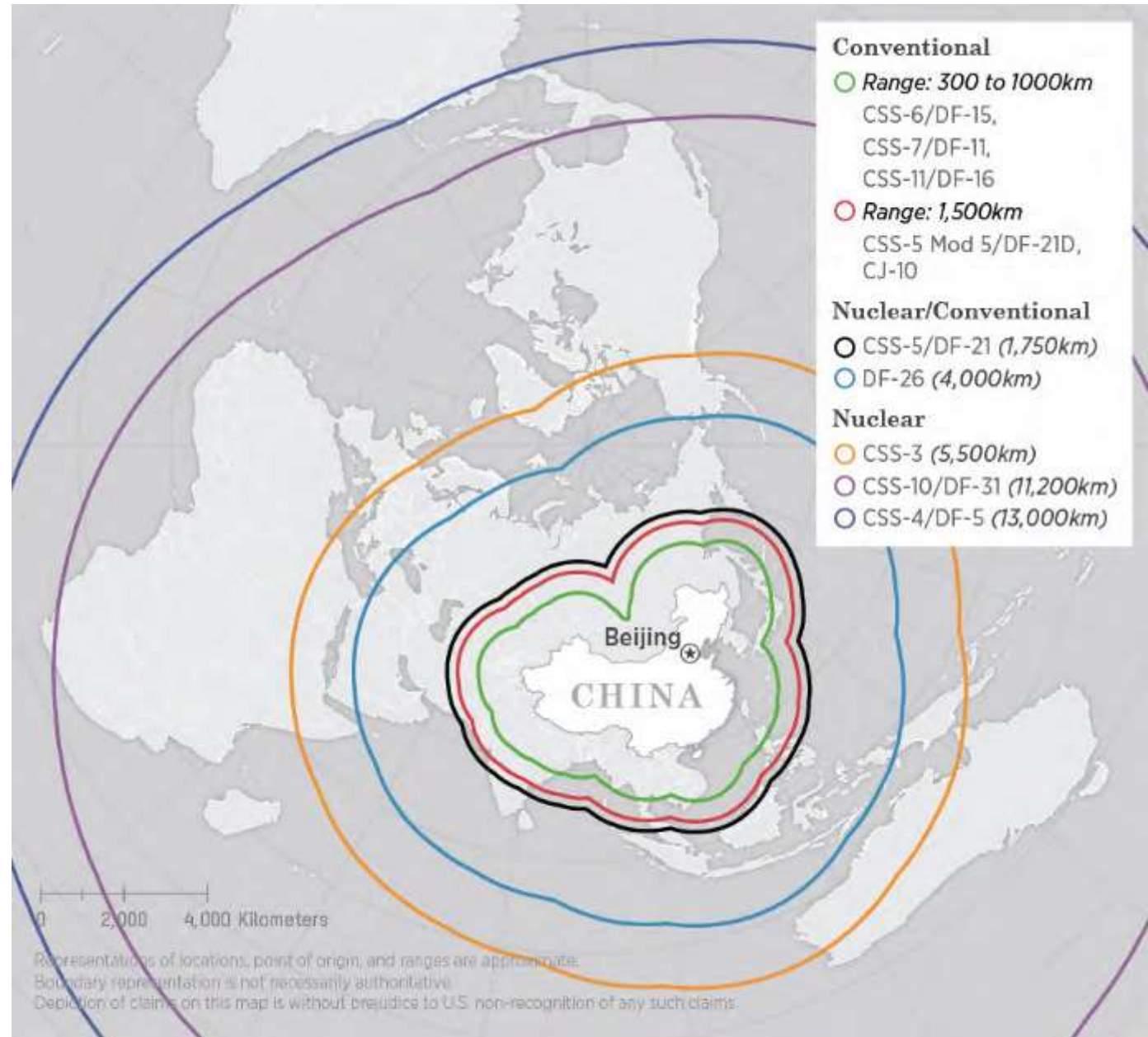


Nuclear Ballistic Missiles

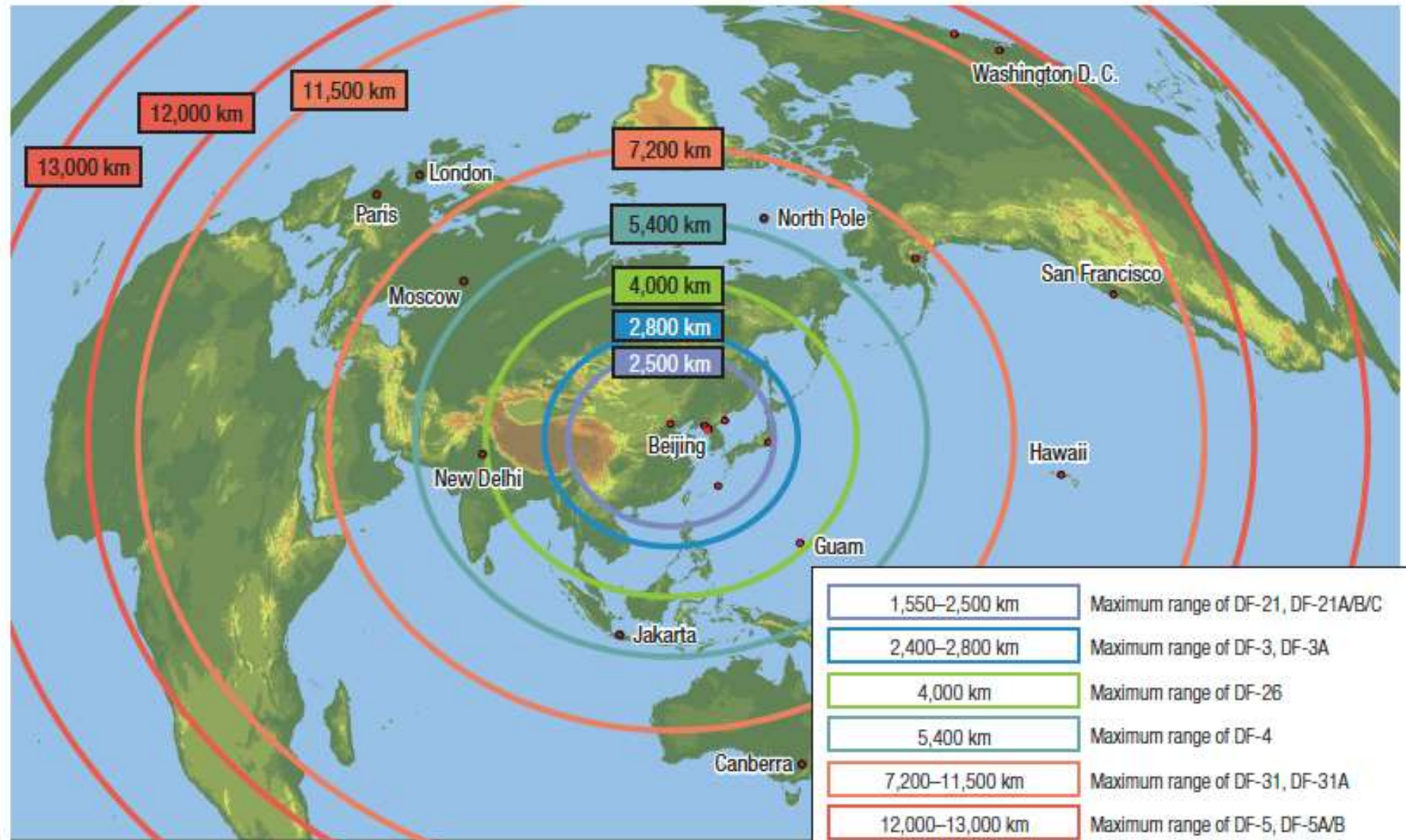


Source: OFFICE OF THE SECRETARY OF DEFENSE, *Annual Report to Congress: Military and Security Developments Involving the People's Republic of China, China Military Power, 2019*, May 2019, p. 67; and DIA, *China Military Power, Modernizing a Force to Win - 2019*, Department of Defense, 2019, p. 41; 35-36.

DIA Estimate of PLA Rocket Force (PLARF) Types and Ranges in 2019



Japanese Estimate of Chinese Missile Ranges - 2018



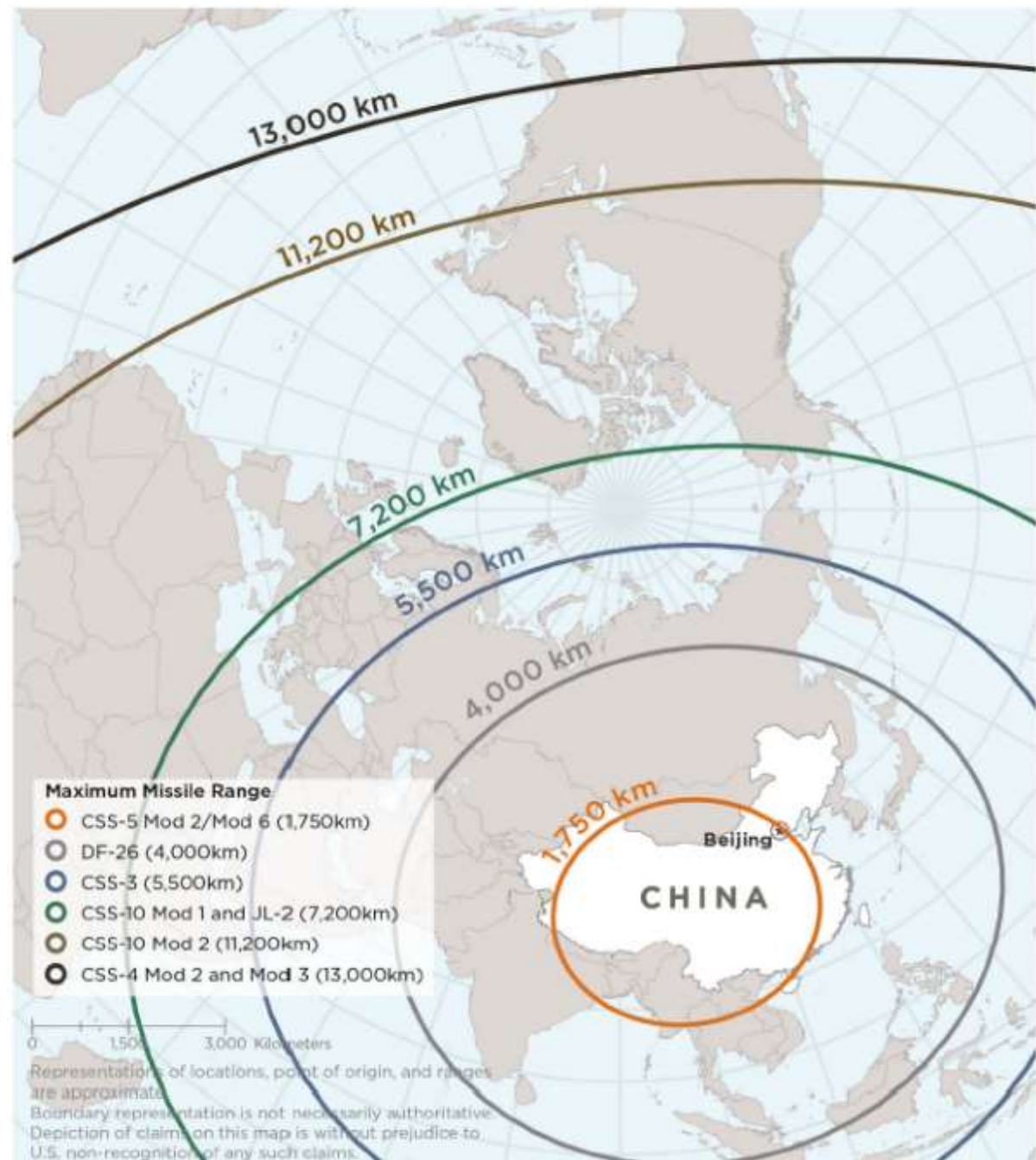
* The figure above shows a rough image of the distance each missile can reach from Beijing for the sake of convenience.

China's Nuclear-Armed Missile Forces and Strike Ranges: 2018

China's Rocket Force

System	Launchers	Missiles	Estimated Range
ICBM	50-75	75-100	5,400-13,000+ km
IRBM	16-30	16-30	3,000+ km
MRBM	100-125	200-300	1,500+ km
SRBM	250-300	1,000-1,200	300-1,000 km
GLCM	40-55	200-300	1,500+ km

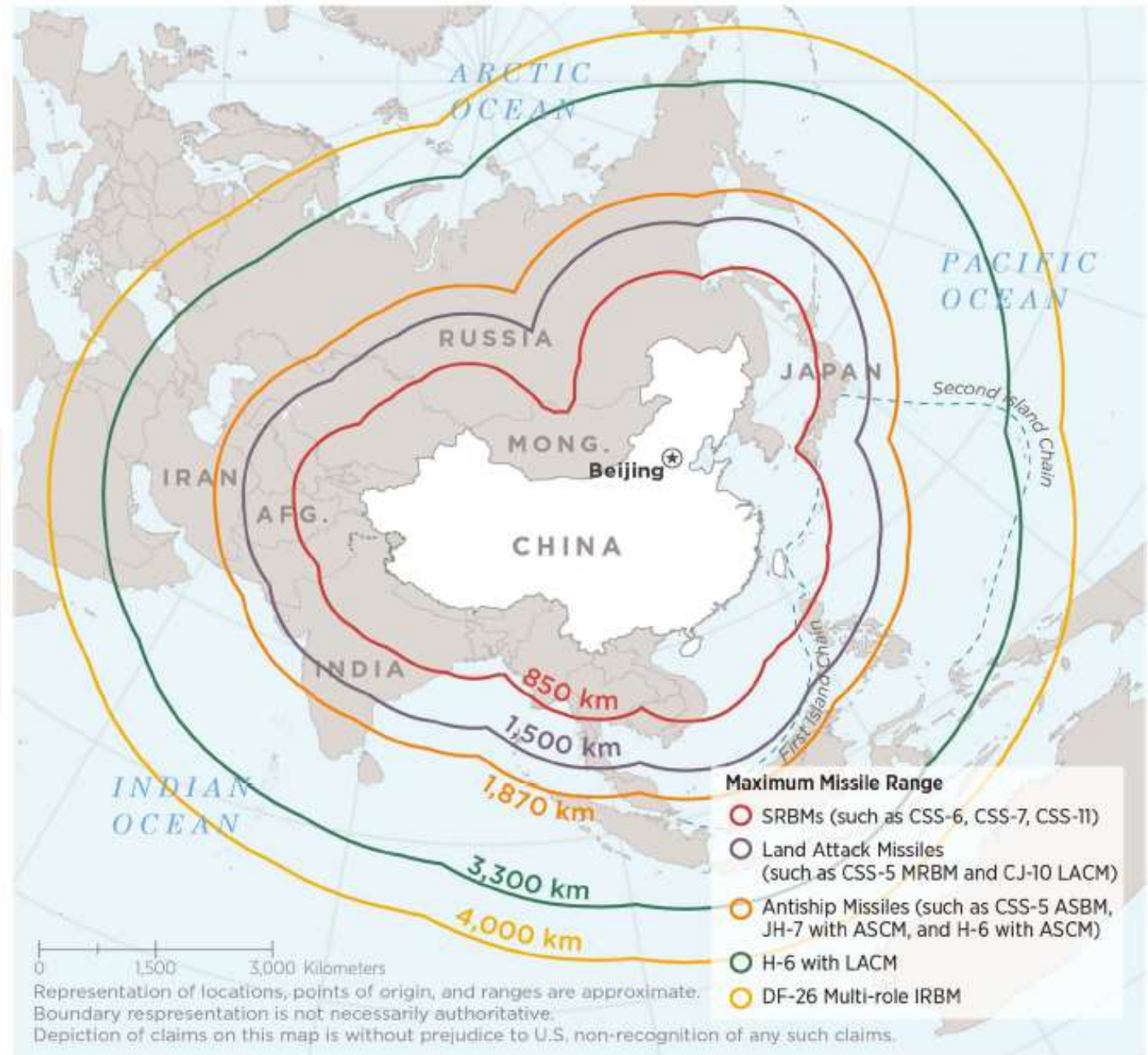
Source: Office of the Secretary of Defense, *Military and Security Developments Involving the Republic of China, Annual Report to Congress*, May 16, 2018, Department of Defense. China Military Power 2018, p. 37, 125.



OSD Estimate of Missile Strike Capabilities - 2018

China's Rocket Force

System	Launchers	Missiles	Estimated Range
ICBM	50-75	75-100	5,400-13,000+ km
IRBM	16-30	16-30	3,000+ km
MRBM	100-125	200-300	1,500+ km
SRBM	250-300	1,000-1,200	300-1,000 km
GLCM	40-55	200-300	1,500+ km

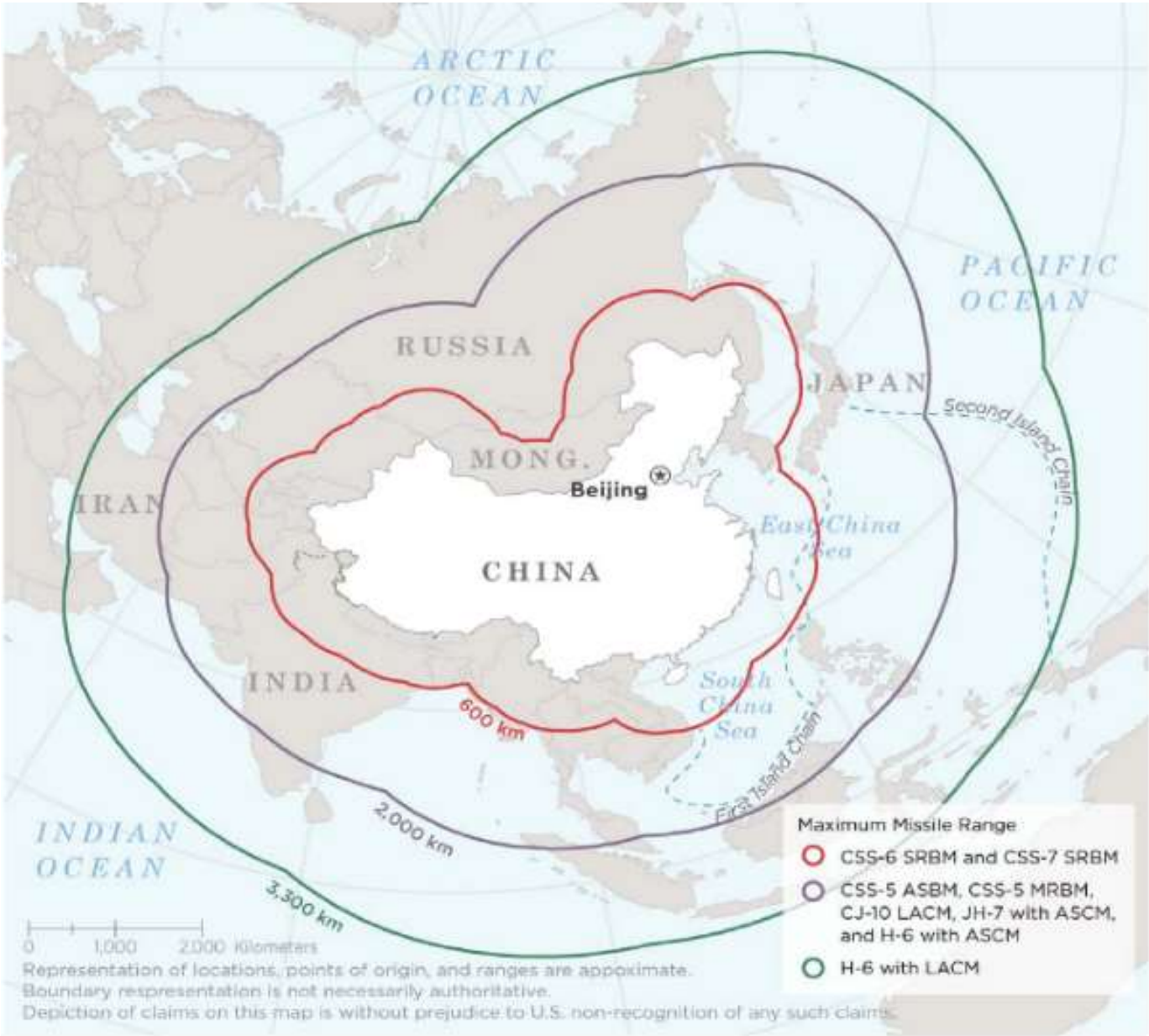


Source: Office of the Secretary of Defense, *Military and Security Developments Involving the Republic of China, Annual Report to Congress*, May 16, 2018, Department of Defense. China Military Power 2018, p.37.

OSD Estimate China's Missile Strike Capabilities - 2017

China's Missile Forces			
System	Missiles	Launchers	Estimated Range
ICBM	75-100	50-75	5,400-13,000+ km
MRBM	200-300	100-125	1,500+ km
SRBM	1,000-1,200	250-300	300-1000 km
GLCM	200-300	40-55	1,500+ km
LACM	200-300	40-55	1,500+ km

Source: Office of the Secretary of Defense, *ANNUAL REPORT TO CONGRESS Military and Security Developments Involving the People's Republic of China* 2017, May 15, 2017, https://www.defense.gov/Portals/1/Documents/pubs/2017_China_Military_Power_Report.PDF, p. 32, 95



NTI Estimate of Chinese Missile Forces: 2014

Name	Other Names	Type	Length (m)	Diameter (m)	Payload (kg)	Range (km)	Circular Error Probable (CEP) (M)	Propellant	Status
DF-3/3A ¹	CSS-2	IRBM	21.2	2.25	2150	2800	2000	Liquid	Deployed
DF-4 ²	CSS-3	ICBM	28.05	2.25	2200	5400	1500	Liquid	Deployed
DF-5/5A ^{3*}	CSS-4	ICBM	36.0	3.35	3900/3200 (MIRV)	1200/13000	800/500 (MIRV)	Liquid	Deployed
DF-21/21A ⁴	CSS-5 Mod 1&2	MRBM	10.7/12.3	1.40	600	2150-2500	700/N/A	Solid	Deployed
DF-21C ⁴	CSS-5 Mod 3	MRBM	12.3	1.40	600	1750	N/A	Solid	Deployed
DF-21D ⁴	CSS-5 Mod 5	ASBM	12.3	1.40	600	1550	N/A	Solid	Deployed
DF-15 (M-9) ⁵	CSS-6	SRBM	9.10	1.00	320-750	600	300	Solid	Deployed
DF-15A ⁵		SRBM	10.0	1.00	320-750	900	45		Deployed
DF-15B ⁵		SRBM	10.0	1.00	320-750	800	5		Deployed
DF-11 (M-11) ⁶	CSS-7	SRBM	7.5	0.80	800	280	600	Solid	Deployed
DF-11A ⁶		SRBM	8.50	0.80	500	350	200		Deployed
M-7/8610 ⁷	CSS-8	SRBM	10.8	0.65	190-250	150	N/A	Solid	Deployed
DF-31	CSS-10 Mod 1	ICBM	13.0	2.00	1750	8000	300	Solid	Deployed
DF-31A ⁸	CSS-10 Mod 2	ICBM	18.7	2.00	1750	12000	300	Solid	Deployed
DF-41 ⁹		ICBM	21.0	2.25	2500 ¹⁰	12000-15000	100-500	Solid	Development
JL-1/1A ¹¹	CSS-N-3	SLBM	10.7/12.3	1.40	600/500	2150-2500	700-50	Solid	Deployed
JL-2 ¹²	CSS-N-5	SLBM	13.0	2.00	1050-2800	8000	300	Solid	Deployed
HN-1		CM	6.4	0.52	N/A	650	N/A	Turbojet ¹³	Deployed
DH-10 (CI-10)		CM	N/A	N/A	N/A	1500-2200	5 ¹⁵	N/A	Development
YJ-62 (C-602) ¹⁶		CM	6.1	0.54	300	280	N/A	Turbojet	Deployed

Source and data on supporting footnotes: "Design Characteristics of China's Ballistic and Cruise Missile Inventory." Nuclear Threat Initiative. November 2014.
https://media.nti.org/pdfs/design_characteristics_of_chinas_ballistic_cruise_missiles_3.pdf.

OSD on U.S. Missile Defense Developments in 2019: No Plans for Deployments that Can Counter Chinese or Russian Strategic Systems

The FY 2020 budget funds enhancements to U.S. missile defense capabilities to defend the homeland, deployed forces, allies, and partners against an increasingly complex adversarial missile threat. In accordance with direction from the 2019 Missile Defense Review (MDR), this budget request increases missile defense capacity and capability to keep pace with advancing threats, while investing in advanced technologies that go beyond traditional missile defense activities, to include, initiating multiple space-based interceptors/discrimination studies to develop a government reference architecture for a space-based kinetic interceptor layer for a boost-phase defense. The FY 2020 budget request includes \$13.6 billion for missile defense, which includes \$9.4 billion for the Missile Defense Agency (MDA).

The Department will develop an additional missile field in Alaska and increase the number of operational, deployed Ground-Based Interceptors (GBI) to 64 missiles as early as FY 2025. The Department is also investing in the infrastructure required to maintain an operational fleet of 64 GBIs into the future. The FY 2020 request would continue development of the Redesigned Kill Vehicle (RKV) to address the evolving threat and improve kill vehicle reliability, continue development of a 2-/3-stage booster selectable capability to expand battlespace for GBI engagements for homeland defense. The budget also uses available technology to improve existing sensors, battle management, fire control, and kill vehicle capabilities. The budget supports development and deployment of new sensors to improve Missile Defense System (MDS) discrimination capability and allow for more efficient use of the GBI inventory, to include a Long-Range Discrimination Radar in Alaska, a Homeland Defense Radar in Hawaii, and an additional Medium Range Discrimination Radar in the Pacific. The MDA will deliver an experimental space-based kill assessment capability for defense of the homeland as part of an integrated post intercept assessment solution.

The budget reflects the Department's commitment to building integrated regional missile defenses that are interoperable with systems deployed by international partners to protect deployed forces, allies and international partners against Short Range Ballistic Missiles (SRBM), Medium Range Ballistic Missiles (MRBM), and Intermediate Range Ballistic Missiles (IRBM).

For U.S. missile defense capabilities, the FY 2020 budget request:

- ...Provides the funding for the development of advanced missile defense technologies to counter future threats, including discrimination improvements, hypersonic threat missile defeat, and high-powered lasers.
- ...Begins exploratory studies and technology feasibility assessments towards the possible future deployment of a space based sensor layer and interceptor capability.

Select Air Force Missile Defense Systems Entering Service and Under Development—November 2018

Equipment	Mission Area	Estimated Service Entry	Implications
S-400 surface-to-air missile (SAM) system	Air Defense; A2/AD	2018	Receiving its first regiment of S-400 SAM systems in April 2018 from Russia, China reportedly will receive four to six battalions as part of a 2014 deal. The S-400's 250-mi range expands China's air coverage over the South China Sea and Taiwan if deployed near either area.
HQ-19 SAM system	Air Defense; A2/AD; Ballistic Missile Defense	Unknown	DOD assesses the HQ-19 "may fill the mid-tier of China's [ballistic missile defense] network," and testing so far has focused on intercepting 3,000 km-ranged ballistic missiles. This system will increase China's ability to challenge an adversary's attempt to control airspace or conduct strike operations in China's periphery.

OSD on Chinese Missile and Missile/Air Defense Developments in 2019

PLA Rocket Force. The PLARF fields multiple missiles capable of conducting strikes beyond the first island chain. Among these are the CSS-5 Mod 5 ASBM with a range of 1,500 km and a MaRV to challenge ballistic missile defenses. China also deploys the land-attack CSS-5 Mod 4 and the ground-launched CJ-10 LACM, placing targets on Okinawa and the main Japanese islands at risk. The DF-26 IRBM has a maximum range of 4,000 km and is capable of conducting precision strikes against ground and ship targets, potentially threatening U.S. land and sea-based forces as far away as Guam.

Long-Range Precision Strike. Military modernization has resulted in the rapid transformation of the PLA's missile force. U.S. bases in Japan are in range of a growing number of Chinese MRBMs and LACMs. H-6K bomber flights into the western Pacific Ocean demonstrate China's ability to range Guam with air-launched LACMs. The DF-26, which debuted publicly in 2015 and was paraded by China again in 2017, is capable of conducting precision conventional or nuclear strikes against ground targets, which could include U.S. bases on Guam. PLA writings see logistics and power projection assets as potential vulnerabilities in modern warfare – a judgement in accord with an expanding ability to target regional air bases, logistics and port facilities, communications, and other ground-based infrastructure.

Ballistic Missile Defense (BMD). China is working to develop ballistic missile defenses consisting of exo-atmospheric and endo-atmospheric kinetic-energy interceptors. In 2016, official media confirmed China's intent to move ahead with land- and sea-based mid-course missile defense capabilities. The HQ-19 mid-course interceptor has undergone tests to verify its capability against 3,000 km-class ballistic missiles, and an HQ-19 unit may have begun preliminary operations in western China. Indigenous radars including the JY-27A and JL-1A – the latter advertised as capable of precision tracking of multiple ballistic missiles – reportedly provide target detection for the system.

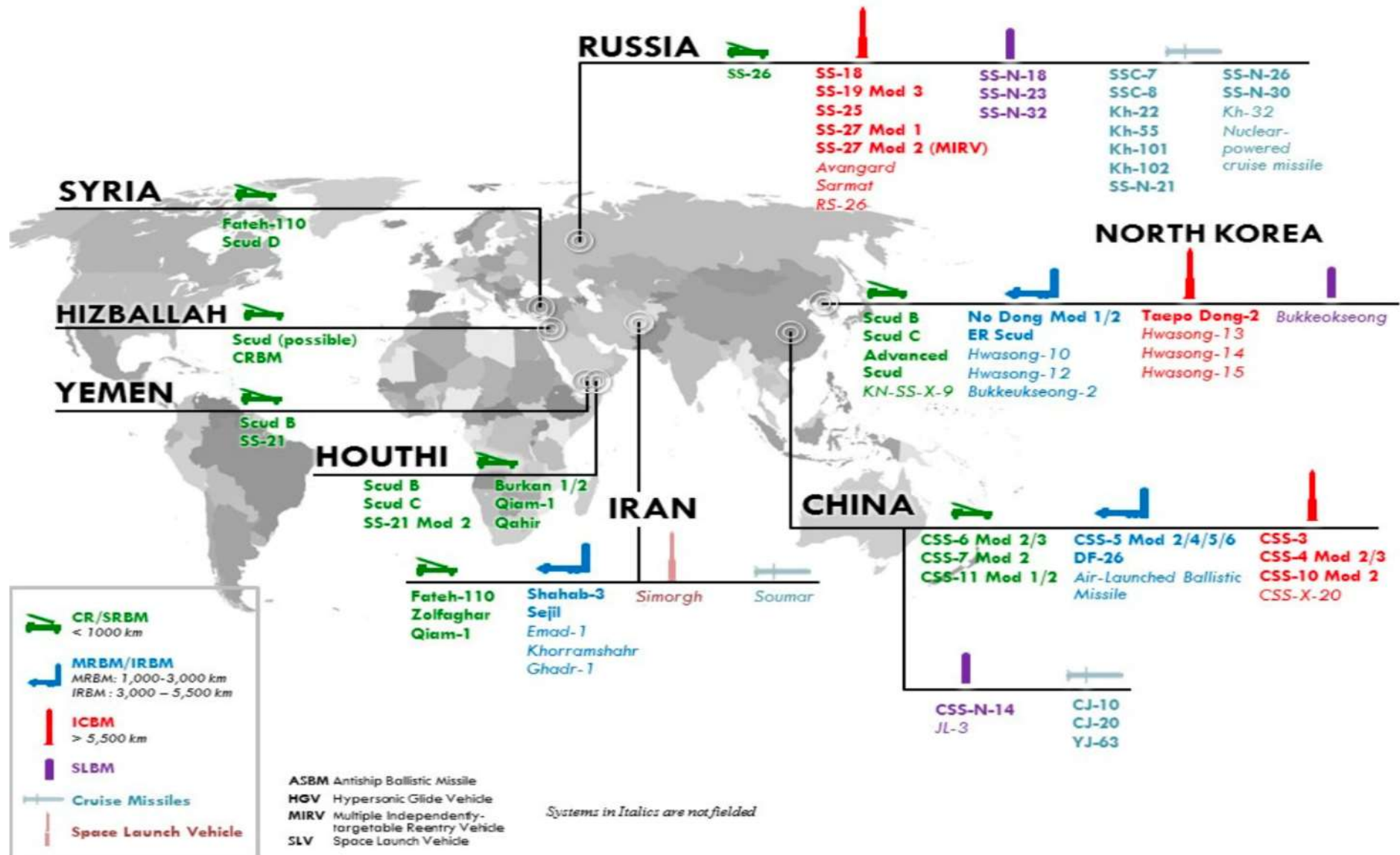
The PLA's long-range SAM inventory also offers a limited capability against ballistic missiles. China's domestic CSA-9 (HQ-9) long-range SAM system likely has a limited capability to provide point defense against tactical ballistic missiles. China has fielded SA-20 (S-300 PMU2) SAMs, and its SA-21 (S-400) SAMs may have some capability to engage ballistic missiles, depending on the interceptors and supporting infrastructure.

Integrated Air Defense System (IADS).

China has a robust and redundant IADS architecture over land areas and within 300 nm (556 km) of its coast that relies on an extensive early warning radar network, fighter aircraft, and a variety of SAM systems. China is also placing radars and air defense weapons on outposts in the South China Sea, further extending its IADS. It also employs point defenses, primarily to defend strategic targets against adversary long-range cruise missiles and airborne strike platforms.

China has increasing numbers of advanced long-range SAMs, including its indigenous CSA-9, Russian SA-10 (S-300 PMU), and SA-20 (S-300 PMU1/PMU2), all of which have the advertised capability to protect against both aircraft and low-flying cruise missiles. To improve its strategic air defenses, China has taken initial delivery of the Russian-built S-400 Triumf SAM system as a follow-on to the SA-20. Compared to these other systems, the S-400s feature a longer maximum range, improved missile seekers, and more sophisticated radars. China manufactures a variety of long-range air surveillance radars, including models claiming to support ballistic missile defense and other models asserting the ability to detect stealth aircraft. Marketing materials also emphasize these systems' ability to counter long-range airborne strike and combat support aircraft. PLAAF airborne early warning and control (AEW&C) aircraft such as the KJ-2000 and KJ-500 can further extend China's radar coverage well past the range of its ground-based radars.

US Missile Defense: China and the Widening Missile Threat: 2019 - I



US Missile Defense: China and the Widening Missile Threat: 2019 - II



China

China is also developing missile capabilities intended to deny the United States the capability and freedom of action to protect U.S. allies and partners in Asia. A key component of China's military modernization is its conventional ballistic missile arsenal designed to prevent U.S. military access to support regional allies and partners. China is augmenting its SRBM force as well as improving its ability to strike regional targets, such as U.S. bases and naval assets, at greater ranges with the addition of a growing number of medium- and intermediate-range ballistic missiles. This includes sophisticated anti-ship ballistic missiles that pose a direct threat to U.S. aircraft carriers.

China also has ground- and air-launched LACMs, and is developing HGVs and new MaRVs. These and other wide-ranging developments in China's expansive offensive missile arsenal pose a potential nuclear and non-nuclear threat to the U.S. forces deployed abroad, and are of acute concern to U.S. allies and partners in the Indo-Pacific region.

"A simple comparison of missile ranges with geography suggests where Chinese missiles would most likely be targeted — SRBMs against Taiwan and U.S. carrier strike groups operating at sea, IRBMs against U.S. bases in Japan and Guam, and ICBMs against the continental U.S. China's pursuit of advanced hypersonic missile technologies portends even greater challenges over the next few years."

— Then Commander, U.S. Pacific Command, Admiral Harry Harris
Statement before the House Armed Services Committee, February 14, 2018



Russia

Not only is Moscow expanding and modernizing its strategic offensive missile forces, it also is fielding an increasingly advanced and diverse range of nuclear-capable regional offensive missile systems that threaten deployed U.S. forces, allies, and partners. These missile systems are a critical enabler of Russia's coercive escalation strategy and nuclear threats to U.S. allies and partners.

Russian offensive missile modernization programs go well beyond traditional ballistic missiles, to include missiles with unprecedented characteristics of altitude, speed, propulsion type, and range. Russia is developing a new generation of advanced, regional ballistic and cruise missiles that support its anti-access/area denial (A2/AD) strategy intended to defeat U.S. and allied will and capability in regional crises or conflicts. Indeed, Russia has demonstrated its advanced cruise missile capability since 2015 by repeatedly conducting long-range precision strikes into Syria.

Russia has also fielded a ground-launched, intermediate-range cruise missile, the SSC-8, in violation of the Intermediate-Range Nuclear Forces (INF) Treaty. These highly effective LACMs fly at low altitudes below a radar's line of sight, which presents a potentially major threat to U.S. regional military operations and deterrence goals. While the majority of LACMs presently fly at subsonic speeds, in the future it appears that some will be able to reach hypersonic speeds.

US Missile Defense: China and the Widening Missile Threat: 2019 - III



Figure 9. Short-Range Ballistic Missiles. Select missiles shown for illustrative purposes.



Figure 10. Medium- and Intermediate-Range Ballistic Missiles. Select missiles shown for illustrative purposes.

Source: OFFICE OF THE SECRETARY OF DEFENSE, *Missile Defense Review*, Department of Defense, 2019, pp. 14-15.

US Missile Defense: China and the Widening Missile Threat: 2019 - IV

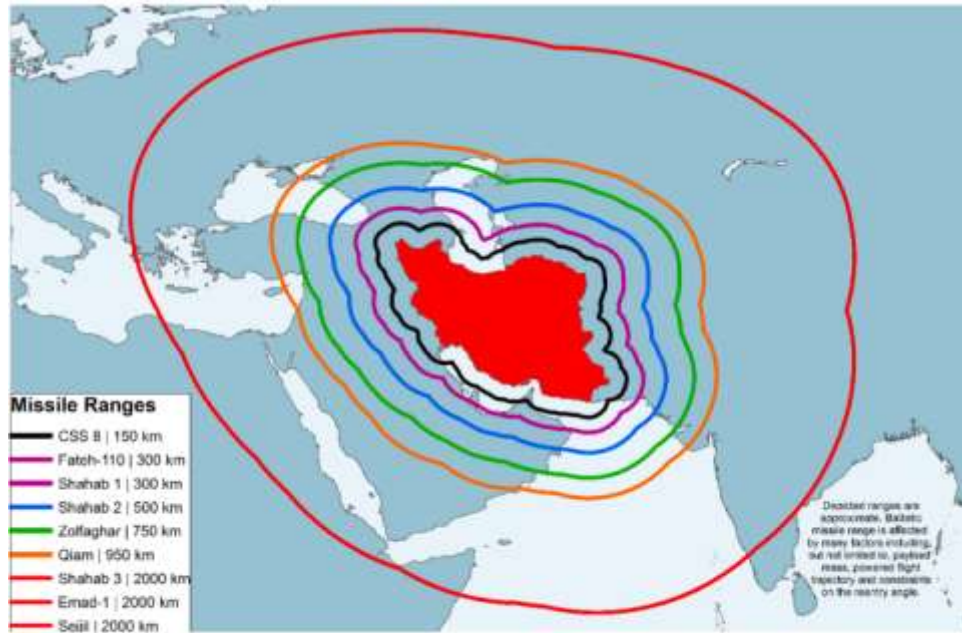


Figure 22. Iranian Offensive Missile Range Rings. Provided by the National Air and Space Intelligence Center.

IRAN

DPRK

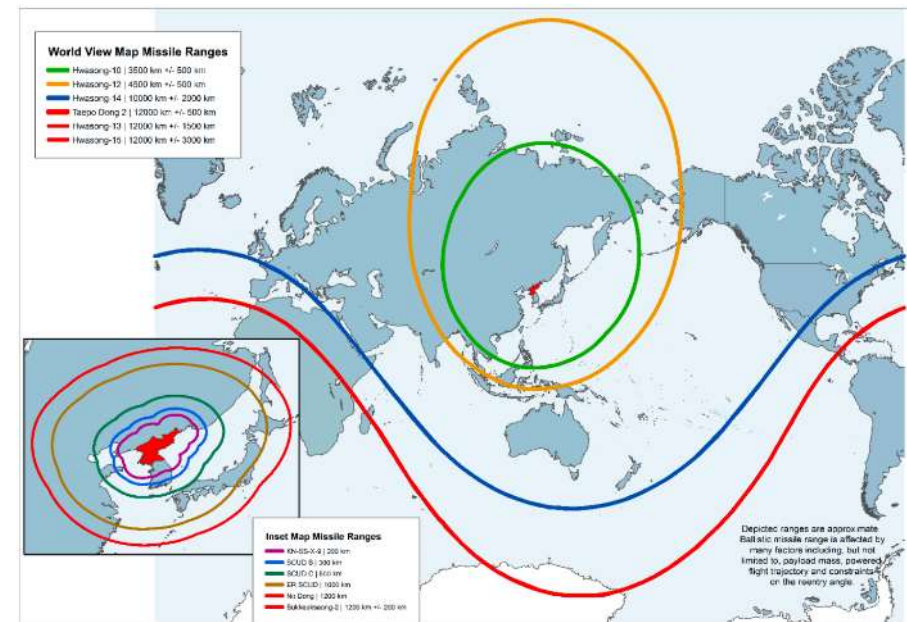


Figure 20. North Korean Offensive Missile Range Rings. Provided by the National Air and Space Intelligence Center.

**Advanced Modernization and
Preparation for War:
Informatized Warfare, New
Force Elements, Cyber, Space,
Logistics**

Chinese 2019 Defense White Paper: Cyber and Space Warfare

Promoting innovation in defense S&T and military theory. China's armed forces are accelerating the implementation of the strategy to develop the military through S&T in a bid to maintain and enhance the strength of the areas where they lead, and intensify innovation in emerging areas. They have made great progress in independent innovation in some strategic, cutting-edge and disruptive technologies, and succeeded in developing strategic hi-tech products such as the Tianhe-2 supercomputer. Focusing on war and fighting wars, China's armed forces have innovated in military doctrines and delivered outcomes in military strategy, joint operations and informationization, which have provided a theoretical support to defense and military development.

Outer space is a critical domain in international strategic competition. Outer space security provides strategic assurance for national and social development. In the interest of the peaceful use of outer space, China actively participates in international space cooperation, develops relevant technologies and capabilities, advances holistic management of space-based information resources, strengthens space situation awareness, safeguards space assets, and enhances the capacity to safely enter, exit and openly use outer space.

Cyberspace is a key area for national security, economic growth and social development. Cyber security remains a global challenge and poses a severe threat to China. China's armed forces accelerate the building of their cyberspace capabilities, develop cyber security and defense means, and build cyber defense capabilities consistent with China's international standing and its status as a major cyber country. They reinforce national cyber border defense, and promptly detect and counter network intrusions. They safeguard information and cyber security, and resolutely maintain national cyber sovereignty, information security and social stability.

...The US has adjusted its national security and defense strategies, and adopted unilateral policies. It has provoked and intensified competition among major countries, significantly increased its defense expenditure, pushed for additional capacity in nuclear, outer space, cyber and missile defense, and undermined global strategic stability....The international non-proliferation regime is compromised by pragmatism and double standards, and hence faces new challenges. Extremism and terrorism keep spreading. Non-traditional security threats involving cyber security, bio-security and piracy are becoming more pronounced....Threats to outer space and cyber security loom large and the threat of non-traditional security issues posed by natural disasters and major epidemics is on the rise.

...China's armed forces will...make concerted efforts to respond to global challenges such as terrorism, cyber security and major natural disasters, thus making a positive contribution to building a community with a shared future for mankind.

...The PLA Strategic Support Force (PLASSF) is a new type of combat force for safeguarding national security and an important driver for the growth of new combat capabilities. It comprises supporting forces for battlefield environment, information, communications, information security, and new technology testing. In line with the strategic requirements of integrating existing systems and aligning civil and military endeavors, the PLASSF is seeking to achieve big development strides in key areas and accelerate the integrated development of new-type combat forces, so as to build a strong and modernized strategic support force.

...China has actively participated in multilateral dialogues and negotiations on cyberspace and outer space, and pushed for the formulation of widely accepted international rules that are fair and equitable.

Advanced Modernization and Preparation for War

It is tempting to focus on the most advanced areas of Chinese modernization in technological terms – space and cyberwarfare. As the previous sections and the summary the analysis in this section show, however, these are only two elements of a far broader Chinese effort to modernize its forces and warfighting capabilities that include a far broader effort in electronic warfare, command and control, intelligence, informatized warfare, logistics and paramilitary forces.

China has emphasized a broad series of efforts in its military white papers, and the work by OSD and DIA in this section show that the U.S. military fully recognizes the importance of linking all of these reforms and innovations – as well as the changes being made in nuclear and missile capabilities described earlier, and in each military service described in the sections that follow.

Unlike some countries, China does not emphasize limited areas of military technology or reform, or focus on deterrence without placing an equal emphasis on sustainable warfighting. It will take a decade or more to determine how successful China is in fully implementing the reforms and changes outlined in this section, and some goals may well prove to be too demanding or only achieve partial success – particularly relative to the competing advances being made in U.S. forces.

China's goals should make it significantly more competitive with the U.S., while some Russian efforts are so narrowly focused or underfunded that they may create the image or shell of new capabilities instead of the reality. It is also striking that only three other Asia powers are attempting such a range of innovation – Australia, Japan, and South Korea (although Taiwan may be approaching such goals). All three also have far more limited forces and less ambitious efforts. No European power is attempting such modernization levels, and India and Pakistan lag far behind China as well.

These are key points for U.S. analysts, planners, and policymakers who tend to focus on technology rather than the full spectrum of deterrence and warfighting capabilities. Space and Cyber are critically important, but so is every other aspect of military capability.

China's View of Preparations for War: 2015 Defense White Paper

Preparation for military struggle (PMS) is a basic military practice and an important guarantee for safeguarding peace, containing crises and winning wars. To expand and intensify PMS, China's armed forces must meet the requirement of being capable of fighting and winning, focus on solving major problems and difficulties, and do solid work and make relentless efforts in practical preparations, in order to enhance their overall capabilities for deterrence and warfighting.

Enhancing capabilities for system-vs-system operations based on information systems. China's armed forces will quicken their steps to transform the generating mode of combat effectiveness, work to use information systems to integrate a wide range of operational forces, modules and elements into overall operational capacity, and gradually establish an integrated joint operational system in which all elements are seamlessly linked and various operational platforms perform independently and in coordination.

China's armed forces will endeavor to address the pressing problems constraining the capabilities for system-vs-system operations. They will make further exploration and more efficient utilization of information resources, strengthen the building of the systems of reconnaissance, early-warning and command and control, develop medium- and long-range precision strike capabilities, and improve the comprehensive support systems. In accordance with the requirement of being authoritative, streamlined, agile and efficient, they will strive to establish and improve the CMC command organ and theater-level command systems for joint operations.

Pushing ahead with PMS in all directions and domains. Due to its complex geostrategic environment, China faces various threats and challenges in all its strategic directions and security domains. Therefore, PMS must be carried out in a well-planned, prioritized, comprehensive and coordinated way, so as to maintain the balance and stability of the overall strategic situation. China's armed forces will make overall planning for PMS in both traditional and new security domains, and get ready to safeguard national sovereignty and security, protect the country's maritime rights and interests, and deal with armed conflicts and emergencies. To adapt to the upgrading of weaponry and equipment as well as changes of operational patterns, China's armed forces will further optimize battlefield disposition and strengthen strategic prepositioning.

China's View of Critical New Strategic Domains: 2015 Defense White Paper

The **seas and oceans** bear on the enduring peace, lasting stability and sustainable development of China. The traditional mentality that land outweighs sea must be abandoned, and great importance has to be attached to managing the seas and oceans and protecting maritime rights and interests. It is necessary for China to develop a modern maritime military force structure commensurate with its national security and development interests, safeguard its national sovereignty and maritime rights and interests, protect the security of strategic SLOCs and overseas interests, and participate in international maritime cooperation, so as to provide strategic support for building itself into a maritime power.

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.

OSD on Military Reform and Changing Contingency Capability: 2018

KEY TAKEAWAYS

- ✓ The PLA aims to increase its ability to conduct complex joint operations.
- ✓ Although ongoing reforms may decrease near-term readiness, in the long-term they should enable better planning and preparation for joint military operations across the Taiwan Strait.

One of the overarching goals of the structural reforms now reshaping the PLA is to construct a military capable of conducting complex joint operations, including those that would be involved in a Taiwan contingency. PLA reforms are aimed at clarifying command authorities, improving joint integration, and facilitating the transition from peace to war. The abolishment of military regions in favor of military theaters – in this case, the PLA's Eastern Theater – has also likely streamlined and improved the PLA's ability to conduct yearlong planning and preparation for joint military operations across the Taiwan Strait. In the near term, PLA combat units may experience decreased readiness and proficiency to conduct large-scale joint operations as they reorganize units, integrate new capabilities, and adjust to new command structures.

A significant addition to the overall structure of the PLA under current reforms is the establishment of the SSF and JLSF. During a Taiwan contingency, the JLSF, in conjunction with subordinate joint logistics support centers, would coordinate joint logistics and the delivery of materiel as well as oversee various civil-military support systems to sustain the campaign. The creation of the SSF probably improves the PLA's ability to execute and coordinate IO (especially cyber, EW, and counterspace) in a Taiwan contingency. It may also improve the PLA's ability to manage and provide space-based reconnaissance to the CMC and Eastern Theater, improving PLA command staffs' situational awareness of Taiwan military units and facilities. The PLA is likely still exploring how to reform its joint command processes to integrate IO and ISR capabilities more fully at the theater-level, but structural reforms have removed the biggest barriers to integrating these strategic capabilities at the theater-level.

Structural reforms within the military services also have implications on resources and operational capabilities available to the PLA for a future Taiwan contingency.

- > In 2017, the PLAN established a PLANMC headquarters and began expanding the PLANMC. However, the extent of PLANMC expansion and the roles that the PLANMC will be assigned remain unclear – the PLANMC may be assigned roles pertaining to overseas base defense or small island seizure, leaving large-scale amphibious operations under the purview of the PLAA's amphibious units.
- > The PLA Airborne Corps (formerly the PLAAF 15th Airborne Corps) also underwent major changes in 2017, reorganizing its previous units into airborne infantry brigades, a special operations brigade, an aviation brigade, and a support brigade. The goal of reorganization was to create a responsive and streamlined airborne corps capable of air-delivering modular combat units – including aerial drop of mechanized infantry forces.
- > The PLAA continues the expansion and transformation of rotary-wing aviation into its own combat arm capable of maneuver, precision strike, and three-dimensional transportation of forces. The PLAA intends to field at least one army aviation brigade per group army and military district as part of its on-going restructure and modernization. Furthermore, in 2017, the PLAA established its first two helicopter-based air assault infantry brigades, with subsequent plans to equip these brigades with both transport and assault helicopters.

China and “Informatized Warfare”: 2019

- President Xi’s strategic vision calls for the PLA to create a highly informatized force capable of dominating all networks and expanding the country’s security and development interests.
- The PLA considers information operations (IO) as a means of achieving information dominance early in a conflict, and continues to expand the scope and regularity of IO in military exercises.

President Xi’s strategic vision calls for the PLA to create a highly informatized force capable of dominating all networks and expanding the country’s security and development interests. Chinese military writings describe informatized warfare as the use of information technology to create an operational system-of-systems, which would enable the PLA to acquire, transmit, process, and use information during a conflict to conduct joint military operations across the ground, maritime, air, space, cyberspace, and electromagnetic spectrum domains. Ongoing military reforms are accelerating the incorporation of command information systems enabling forces and commanders to carry out missions and tasks more effectively to win informatized local wars. The PLA continues to expand the scope and regularity of military exercises simulating informatized operations and likely views conventional and cyberspace operations as a means of achieving information dominance early in a contingency or conflict.

Command, Control, Communications, Computers, and Intelligence Modernization (C4I). China continues to prioritize C4I modernization as a response to trends in modern warfare that emphasize the importance of rapid information sharing, processing, and decision-making. The PLA seeks to modernize itself, both technologically and organizationally, to command complex, joint operations in near and distant battlefields with increasingly advanced C4ISR systems and sophisticated weapons.

The PLA sees networked, technologically advanced C4I systems as essential to provide reliable, secure communications to fixed and mobile command posts, thereby enabling rapid, effective, multi-echelon decision-making. These systems were designed to distribute data including intelligence, battlefield information, logistical information, and weather reports via redundant, resilient communications networks to improve commanders’ situational awareness. The PLA views making near-real-time ISR data available to field commanders as especially valuable in streamlining their decision processes. China is fielding the Integrated Command Platform (ICP) to units at multiple levels across the force to enable lateral and cross-service communications required for joint operations. Using digital databases and command automation tools allows commanders to simultaneously issue orders to multiple units while on the move and they allow units to quickly adapt their actions to shifting conditions in the battlespace.

These technical improvements are notably boosting PLA operational flexibility and responsiveness. As the PLA continues to focus on its ability to fight and win informatized wars, future information systems will likely implement emerging technologies such as big- data, the internet of things, artificial intelligence (AI), and cloud computing to provide reliable, automated platforms yielding further process efficiencies. The PLA has already begun this process by embracing big- data analytics that fuse together a variety of data to improve automation and to create a comprehensive, real-time picture.

Information Operations (IO). China assesses that controlling the information spectrum in the modern battlespace is a critical enabler, if not a fundamental prerequisite, of its ability to counter third-party intervention in a conflict. PLA authors often cite this capability – sometimes termed “information blockade” or “information dominance” – as necessary to seize the initiative and set the conditions necessary to gain air and sea superiority. This “information blockade” concept likely envisions combining military capabilities across space and cyber domains with non- military instruments of state power. China’s investment in advanced electronic warfare (EW) systems, counterspace capabilities, and cyber operations – combined with more traditional forms of information control, such as propaganda and denial via opacity – reflect the priority the PLA places on information advantage.

Electronic Warfare. The PLA considers electronic warfare (EW) an integral component of modern warfare. Its EW strategy emphasizes suppressing, degrading, disrupting, or deceiving enemy electronic equipment. Potential EW victims include adversary systems operating in radio, radar, microwave, infrared, and optical frequency ranges, as well as adversary computer and information systems. China fielded several types of UAVs with EW payloads and displayed several of these during the PLA 90th anniversary parade in July 2017. PLA EW units routinely train to conduct jamming and anti-jamming operations against multiple communication and radar systems or GPS satellite systems in force-on- force exercises. These exercises test operational units’ understanding of EW weapons, equipment, and performance but they also enable operators to improve confidence in their ability to operate effectively in a complex electromagnetic environment. In addition, the PLA reportedly tests and validates advances in EW weapons research and development during these exercises.

Modernizing Joint Command and Control: 2019

In the implementation of the military strategic guideline in the new situation, China's armed forces must closely center around the CPC's [Communist Party's] goal of building a strong military, respond to the state's core security needs, aim at building an informatized military and winning informatized wars, deepen the reform of national defense and the armed forces in an all-round way, build a modern system of military forces with Chinese characteristics, and constantly enhance their capabilities for addressing various security threats and accomplishing diversified military tasks.

—Excerpt from China's Military Strategy, May 2015

China continues to place a high priority on modernizing the PLA's command, control, communications, computers, intelligence, surveillance, and reconnaissance (C4ISR) system as a response to trends in modern warfare that emphasize the importance of rapid decision making and information sharing and processing. The PLA is seeking to improve its technological capabilities and organizational structure to command complex joint operations in near and distant battlefields with increasingly sophisticated weapons.

Supporting the reforms with technological improvements to C4ISR systems is essential to improving the speed and effectiveness of decision making while providing secure, reliable communications to fixed and mobile command posts. The PLA is fielding advanced automated command systems, such as its Integrated Command Platform, with units at lower echelons across the force. The adoption of the Integrated Command Platform enables multiservice communications necessary for joint operations.

New technologies which are being introduced into the PLA enable sharing of information— intelligence, battlefield information, logistic information, and weather reports—on robust, redundant communication networks to improve commanders' situational awareness. In particular, the transmission of intelligence, surveillance, and reconnaissance (ISR) data in near-real time to commanders in the field could facilitate the commanders' decision making processes and make operations more efficient.

As these technical improvements are brought on line, they greatly enhance the PLA's flexibility and responsiveness. Informatized operations no longer require in-person meetings for command decision making or labor-intensive processes for execution. Commanders can issue orders to multiple units at the same time while on the move, and units can rapidly adjust their actions through the use of digital databases and command automation tools.

The nature of these reform and modernization efforts in part resembles a Western-style joint C2 structure in which operational commanders develop force packages from units that are trained and equipped by the services. The creation of a permanent joint C2 structure that places more emphasis on naval and aerospace forces, along with a dedicated Strategic Support Force responsible for electronic warfare and operations in the space and cyberspace domains, reflects an emerging PLA capacity to more effectively execute joint operations.

Chinese Intelligence Services in 2019

In June 2017, China passed a National Intelligence Law specifying that “state intelligence work” would fall under the “central national security leadership body,” and military intelligence work would fall under the Central Military Commission. The central national security leadership body may refer to an intelligence committee structure subordinate to China’s Central National Security Commission. The PLA’s national-level intelligence system is still undergoing changes as part of broader military reform efforts.

Civilian Intelligence. The Ministry of State Security (MSS) is China’s main civilian intelligence and counterintelligence service.²⁶⁴ MSS missions include protecting China’s national security, securing political and social stability, implementing the updated State Security Law and related laws and regulations, protecting state secrets, and conducting counterintelligence.

Domestic Security. The Ministry of Public Security (MPS) is China’s principal domestic security agency and is responsible for overseeing the country’s domestic policing and public security activities. Although the MPS is not directly involved in domestic intelligence gathering, it has domestic intelligence functions, including investigating corruption cases, countering threats to political and social stability, countering terrorism, and policing the Internet.

Political Work. The General Political Department Liaison Department, which probably was renamed the Political Work Department Liaison Bureau (PWD/LB) during recent reforms, is the PLA’s principal organization responsible for political warfare and for collecting and analyzing intelligence information regarding senior-level officers from the United States, Taiwan, Japan, and other defense establishments of interest. The PWD/LB functions as an interlocking directorate that operates at the nexus of politics, finance, military operations, and intelligence. The PWD/LB has few analogous counterparts in modern democratic societies.

Military Intelligence. The former PLA Second Department (2PLA) was a subdepartment of the GSD. Postreform, the 2PLA has been identified as the Intelligence Bureau of the Joint Staff Department under the Central Military Commission. This bureau carries out the military’s overt reporting and clandestine human intelligence collection operations, provides indications and warning and other analysis to the CMC leadership, runs the defense attaches network, and manages intelligence produced by dedicated PLA reconnaissance assets.

Signals Intelligence. The former PLA Third Department (3PLA) was one of the GSD’s subdepartments but post reform has probably been renamed and subordinated under the SSF. This element controls a vast signals intelligence (SIGINT) and computer network operations infrastructure. The PLA’s SIGINT and cyber assets target foreign satellite, line of sight, and over-the-horizon communications, as well as computer networks.

Electronic Intelligence. The former PLA Fourth Department (4PLA) was a subdepartment of the GSD, but post reform has probably been renamed and subordinated to the SSF. This element is primarily responsible for offensive electronic warfare, but it is generally believed to maintain electronic intelligence capabilities

Chinese Joint Logistics Support Force (JLSF): 2019

Key Takeaways

- China's military leaders established the JLSF to streamline logistics support for the PLA.
- In 2018, the PLA elevated the JLSF's status to a theater-level organization.
- The PLA is integrating civilian-controlled support equipment, including ships and trucks, into military operations and exercises.

In 2018, the PLA elevated the JLSF's status to a theater-level organization, which gives the JLSF additional authority to deconflict support requirements with the services. In September 2016, as a part of the overall military structure reorganization, the PLA established the JLSF and five subordinate Joint Logistics Service Centers (JLSCs) under the CMC to streamline logistics support for the PLA.

Headquartered at the Wuhan Joint Logistics Support Base, the JLSF controls the peacetime activities of the JLSCs; in wartime, the theater commands assume control of the JLSC located within its respective geographic area. Since the establishment of the JLSF, the PLA has continued to adjust this organization to ensure greater integration with joint operations. The JLSF has assigned a representative to each of the theater joint command centers, thereby allowing support forces to operate in the same command network as combat forces during an exercise, which results in better coordination of various support missions. Allowing logistic units to deploy and maneuver directly with combat units during conflict has been a focus of annual exercises since the JLSF's inception in 2016.

The PLA is integrating civilian-controlled support equipment and components, including ships and trucks, into its military operations and exercises, and the military plans to increase this type of support during the next several years. In February 2018, the Wuxi JLSC practiced transporting ammunition on a civilian roll-on/roll-off ship that met military transportation standards, according to post-exercise press reporting.

Two recent logistics-focused exercises include JIDI BAOZHANG (Base Security) 2018 and JOINT LOGISTICS MISSION 2018B. The PLA Tibet Military District hosted JIDI BAOZHANG 2018 in June, during which its logistic support department worked closely with local civilian entities to construct temporary bridges, transport fuel, and deliver food to troops in the field. The PLA highlighted civil-military integration as a key component of the exercise. In August 2018, participants in JOINT LOGISTICS MISSION 2018B included logistic forces from the JLSF, Army units from the Western Theater Command, Air Force logistic forces, and civilian national defense mobilization forces from Gansu, Qinghai, and Sichuan Provinces.

OSD - The Strategic Support Force (SSF) in 2019

- The SSF centralizes strategic space, cyber, electronic, and psychological warfare missions.
- In 2018, the SSF conducted joint communications and reconnaissance training with the PLAA and the PLAAF to improve operational support capabilities and joint operations in advanced electromagnetic environments.
- In 2018, China marked its largest space launch year to-date, successfully launching 38 of 39 space launch vehicles (SLVs) and orbiting approximately 100 spacecraft.

The PLA created the SSF in 2016 as a theater command-level organization to centralize strategic space, cyber, electronic, and psychological warfare missions. The creation of the SSF highlights China's understanding of information as a strategic resource in modern warfare. China's leadership believes that achieving information dominance in the electromagnetic spectrum and denying its use to adversaries is necessary to seize and maintain the strategic initiative in a conflict. The SSF was formed from organizations formerly subordinate to the PLA services and General Staff Departments (GSD) with the goal of creating operational synergies between formerly disparate information warfare capabilities to enable the information dominance that China believes will be decisive in future wars.

The SSF oversees two deputy theater command-level departments: the Space Systems Department responsible for military space operations, and the Network Systems Department responsible for information operations (IO). At the headquarters level, the SSF has a four-department administrative structure that includes the Staff, Equipment, Political Work, and Logistics Departments. As a strategic organization, the SSF reports directly to the Central Military Commission (CMC) and not to the Theater Commands.

The SSF Network Systems Department is responsible for information warfare with a mission set that includes cyberwarfare, technical reconnaissance, electronic warfare, and psychological warfare. By placing these missions under the same organizational umbrella, China seeks to remedy the operational coordination challenges that hindered information sharing under the pre-reform organizational structure.

The SSF's psychological warfare mission is performed by the former General Political Department's 311 Base. This base is the only organization in the PLA that is publicly known to perform psychological warfare operations.

In 2018, the Strategic Support Force increased joint communications and reconnaissance training with the PLAA and the PLAAF to improve operational support capabilities and joint operations in advanced electromagnetic environments. Included in this training was the LUOYANG-2018 series of force-on-force exercises in which an SSF base challenged a PLA group army brigade's communications with hostile jamming and interruptions to their operational electromagnetic environment.

The SSF Space Systems Department is responsible for nearly all PLA space operations, including space launch and support, space information support, space telemetry, tracking, and space warfare. The formation of the Space Systems Department seeks to resolve the bureaucratic power struggles that existed over the PLA space mission, as elements of the mission had been dispersed across several national and service-subordinate organizations. China officially designated space as a new domain of warfare in its 2015 defense white paper, highlighting the importance of the space domain in strategic military competition. Notably, China expects space to play an important role in enabling long-range precision strikes and in denying other militaries the use of overhead C4ISR systems. Among the Space System Department's core missions is the launch and operation of the satellites that are vital to China's overhead C4ISR architecture.

DIA -The Strategic Support Force (SSF) in 2019

In December 2015, Beijing established the Strategic Support Force (SSF) to provide the PLA with cyber, aerospace, and electronic warfare capabilities.²⁵⁹ The SSF forms the core of China's information warfare force, supports the entire PLA, and reports directly to the CMC. The force's formation appears to be the outcome of debate in the PLA since the 1980s regarding PLA needs in a potential conflict with peer nations. According to a Ministry of National Defense spokesman, "The SSF will integrate reconnaissance, early warning, communications, command, control, [and] navigation ... and will provide strong support for joint operations for each military service branch."

A key aspect of the SSF is that the new body unites previously dispersed elements, providing more centralized command and control of China's cyber, space, and electronic warfare capabilities. Before the 2015 structural reforms, for example, responsibility for space, cyber, and electronic warfare missions rested with offices across the former General Armaments Department and the General Staff Department (GSD), including the GSD Technical Department and GSD Electronic Countermeasures and Radar Department.

The SSF constitutes the first steps in the development of a cyberforce by combining cyber reconnaissance, cyberattack, and cyberdefense capabilities into one organization to reduce bureaucratic hurdles and centralize command and control. The SSF also appears to be in line with PLA efforts to support and execute modern informatized warfare.

The PLA's 90th anniversary parade in July 2017 included the participation of an SSF electronic reconnaissance formation, which reportedly provides highly mobile, integrated, flexible, multidomain information warfare capabilities. The unit's mission reportedly is seizing and maintaining battlefield information control. This focus on the SSF and one of its premier units suggests that the PLA is increasing the priority and prominence of the SSF and its assigned missions to tackle the military's deficiencies in controlling complex electromagnetic environments.

China's Joint Strategic Support Force (Est. 2015)

Space and Counterspace. PLA strategists regard the ability to use space-based systems—and to deny them to adversaries—as central to enabling modern informatized warfare. As a result, the PLA continues to strengthen its military space capabilities despite its public stance against the militarization of space. 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 serve a key role in enabling actions that counter third-party intervention. 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. These advancements include the Beidou navigation satellite system and space surveillance capabilities that can monitor objects across the globe and in space.

Information Operations (IO). China assesses that an essential element, if not a fundamental prerequisite, of its ability to counter third-party intervention is the ability to control the information spectrum in the modern battlespace. PLA authors often cite this capability—sometimes termed “information blockade” or “information dominance”—as necessary to seize the initiative and set the conditions needed to achieve air and sea superiority. China’s “information blockade” concept 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 cyber operations—combined with more traditional forms of control such as propaganda and denial through opacity—reflect the priority the PLA places on information advantage.

Cyberoperations. Chinese cyberattack operations could support A2/AD by targeting critical nodes to disrupt adversary networks throughout the region. China believes its cyber capabilities and personnel lag behind the United States. To deal with these perceived deficiencies, China is improving training and domestic innovation to achieve its cyber capability development goals. PLA researchers advocate seizing “cyberspace superiority” by using offensive cyber operations to deter or degrade an adversary’s ability to conduct military operations against China.

China and Cyberwarfare: 2019

Cyberwarfare. The development of cyberwarfare capabilities is consistent with PLA writings, which identify IO – comprising cyber, electronic, and psychological warfare – as integral to achieving information superiority and as an effective means for countering a stronger foe. China has publicly identified cyberspace as a critical domain for national security and declared its intent to expedite the development of its cyber forces.

PLA writings note the effectiveness of IO and cyberwarfare in recent conflicts and advocate targeting an adversary's C2 and logistics networks to affect its ability to operate during the early stages of conflict. They credit cyberattacks on an enemy's C2 system with the potential to “completely disrupt” these systems, paralyzing the victim and thus gaining battlefield superiority for the attacker. Accordingly, the PLA may seek to use its cyberwarfare capabilities to collect data for intelligence and cyberattack purposes; to constrain an adversary's actions by targeting network-based logistics, communications, and commercial activities; or to serve as a force- multiplier when coupled with kinetic attacks during armed conflict.

The PLA's ongoing structural reforms may further change how the PLA organizes and commands IO, particularly as the SSF evolves over time. In consolidating cyber and other level cyber reconnaissance, attack, and defense IO-related elements, the SSF is likely generating synergies by combining national- capabilities in its organization.

Cyber Operations. PLA researchers believe that building strong cyber capabilities are necessary to protect Chinese networks and advocate seizing “cyberspace superiority” by using offensive cyber operations to deter or degrade an adversary's ability to conduct military operations against China. Chinese writings suggest cyber operations allow China to manage the escalation of a conflict because cyber attacks are a low-cost deterrent. The writings also suggest that cyber attacks demonstrate capabilities and resolve to an adversary. To support A2/AD, Chinese cyber attack operations aim to target critical military and civilian nodes to deter or disrupt adversary intervention, and to retain the option to scale these attacks to achieve desired conditions with minimal strategic cost. China believes its cyber capabilities and cyber personnel lag behind the United States, and it is working to improve training and bolster domestic innovation to overcome these perceived deficiencies and advance cyberspace operations.

Cyber Activities Directed Against the Department of Defense

Computer systems around the world, including those owned by the U.S. Government, continued to be targeted by China-based intrusions through 2018. These and past intrusions focus on accessing networks and extracting information. China uses its cyber capabilities to not only support intelligence collection against U.S. diplomatic, economic, academic, and defense industrial base (DIB) sectors, but also to exfiltrate sensitive information from the DIB to gain military advantage. The information targeted can benefit China's defense high-technology industries, support China's military modernization, provide the CCP insights into U.S. leadership perspectives, and enable diplomatic negotiations, such as those supporting OBOR. Additionally, targeted information could enable PLA cyber forces to build an operational picture of U.S. defense networks, military disposition, logistics, and related military capabilities that could be exploited prior to or during a crisis. The accesses and skills required for these intrusions are similar to those necessary to conduct cyber operations in an attempt to deter, delay, disrupt, and degrade DoD operations prior to or during a conflict. In aggregate, these cyber-enabled campaigns threaten to erode U.S. military advantages and imperil the infrastructure and prosperity on which those advantages rely.

DIA on China's Role in Cyberspace in 2019

Authoritative PLA writings identify controlling the “information domain”—sometimes referred to as “information dominance”—as a prerequisite for achieving victory in a modern war and as essential for countering outside intervention in a conflict. The PLA's broader concept of the information domain and of information operations encompasses the network, electromagnetic, psychological, and intelligence domains, with the “network domain” and corresponding “network warfare” roughly analogous to the current U.S. concept of the cyber domain and cyberwarfare.

The PLA Strategic Support Force (SSF) may be the first step in the development of a cyberforce by combining cyber reconnaissance, cyberattack, and cyberdefense capabilities into one organization to reduce bureaucratic hurdles and centralize command and control of PLA cyber units. Official pronouncements offer limited details on the organization's makeup or mission.

President Xi simply said during the SSF founding ceremony on 31 December 2015 that the SSF is a “new-type combat force to maintain national security and [is] an important growth point for the PLA's combat capabilities.” The SSF probably was formed to consolidate cyber elements of the former PLA General Staff Third (Technical Reconnaissance) and Fourth (Electronic Countermeasures and Radar) Departments and Informatization Department.

OSD – China in Space in 2019 - I

Space and Counterspace. PLA strategists regard the ability to use space-based systems – and to deny them to adversaries – as central to modern warfare. The PLA continues to strengthen its military space capabilities, despite its public stance against the militarization of space. The PLA views space operations as a key enabler of PLA campaigns aimed at countering third-party intervention, although many PLA writings have not elevated these operations to the level of a separate “campaign.” China seeks to enhance C2 in joint operations and establish a real-time surveillance, reconnaissance, and warning system, and it is increasing the number and capabilities of its space systems, including various communications and intelligence satellites as well as the Beidou navigation satellite system. China also continues to develop counterspace capabilities and related technologies, including kinetic-kill missiles, ground-based lasers, and orbiting space robots, as well as expanding space surveillance capabilities, which can monitor objects across the globe and in space and enable counterspace actions.

Space and Counterspace Capabilities.

China’s space program continues to mature rapidly. The PLA, which has historically managed the effort, continues to invest in improving its capabilities in space-based ISR, satellite communication, satellite navigation, and meteorology, as well as human spaceflight and robotic space exploration. China has built an expansive ground support infrastructure to support its growing on-orbit fleet and related functions including spacecraft and space launch vehicle (SLV) manufacture, launch, C2, and data downlink. Additionally, China continues development of multiple counterspace capabilities designed to degrade and deny adversary use of space-based assets during a crisis or conflict. Furthermore, China may seek to expand its overseas satellite tracking stations to support its space program analogous to the Neuquén Deep Space Facility in Argentina. The Neuquén Deep Space Facility, built and operated by China to support lunar exploration missions, is operated by China’s national space program, which is administered by the PLA.

In 2018, China launched 39 SLVs, of which 38 were successful, orbiting approximately 100 spacecraft that include navigation, ISR, and test/engineering satellites. Other activities in 2018 included:

- *Beidou Navigation Satellite Constellation:* Since the beginning of 2017, China has launched 19 new Beidou satellites for its worldwide satellite navigation constellation, bringing Beidou to initial operating capability in December 2018, with plans to reach full operating capability by the end of 2020. The new Beidou satellites are equipped with radiofrequency and laser inter-satellite links, new atomic clocks, and other new advanced technologies. Additionally, China plans to offer satellite-based augmentation services, a worldwide short-message service, and internationally recognized search and rescue capabilities.
- *Lunar Exploration Program:* In December 2018, China launched the Chang’e-4 lunar rover and lander, which will be the first- ever probe to soft land on the far side of the Moon. In May 2018, China launched the Queqiao lunar relay satellite as the first part of the mission to facilitate communications between China’s ground stations on Earth and the Chang’e-4 lander and rover while on the lunar far side. Building on the enabling capabilities such as lunar orbiting, soft landing, and sample return mastered through the legacy Chang’e program, China plans to assemble a lunar research station on the Moon around 2025 and a lunar research and development base around 2050.

OSD – China in Space in 2019 - II

- *Commercial Space Launch:* China's Expace Technology, a commercial subsidiary of China Aerospace Science and Industry Corporation (CASIC), continued to launch its Kuaizhou-1A (KZ-1A) commercial SLV in 2018 with two additional launches, following its debut in January 2017. In 2018, nine Chinese state-backed launch companies indicated they were developing launch vehicles. At least five of these companies completed engine testing in 2018, while two companies achieved suborbital testing and one attempted an orbital launch. The presence of commercial launch companies and their progress grew substantially in 2018.

The PLA is acquiring a range of technologies to improve China's counterspace capabilities. In addition to the development of directed- energy weapons and satellite jammers, China is also developing anti-satellite capabilities and has probably made progress on the anti- satellite missile system it tested in July 2014.

China is employing more sophisticated satellite operations and is probably testing dual-use technologies in space that could be applied to counterspace missions.

Although China has not publicly acknowledged the existence of any new programs since it confirmed it used an anti-satellite missile to destroy a weather satellite in 2007, Chinese defense academics often publish on counterspace threat technologies. These scholars stress 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."

Chinese Space Launch Sites 2019

China operates four space launch sites: Jiuquan, Taiyuan, Xichang, and Wenchang.

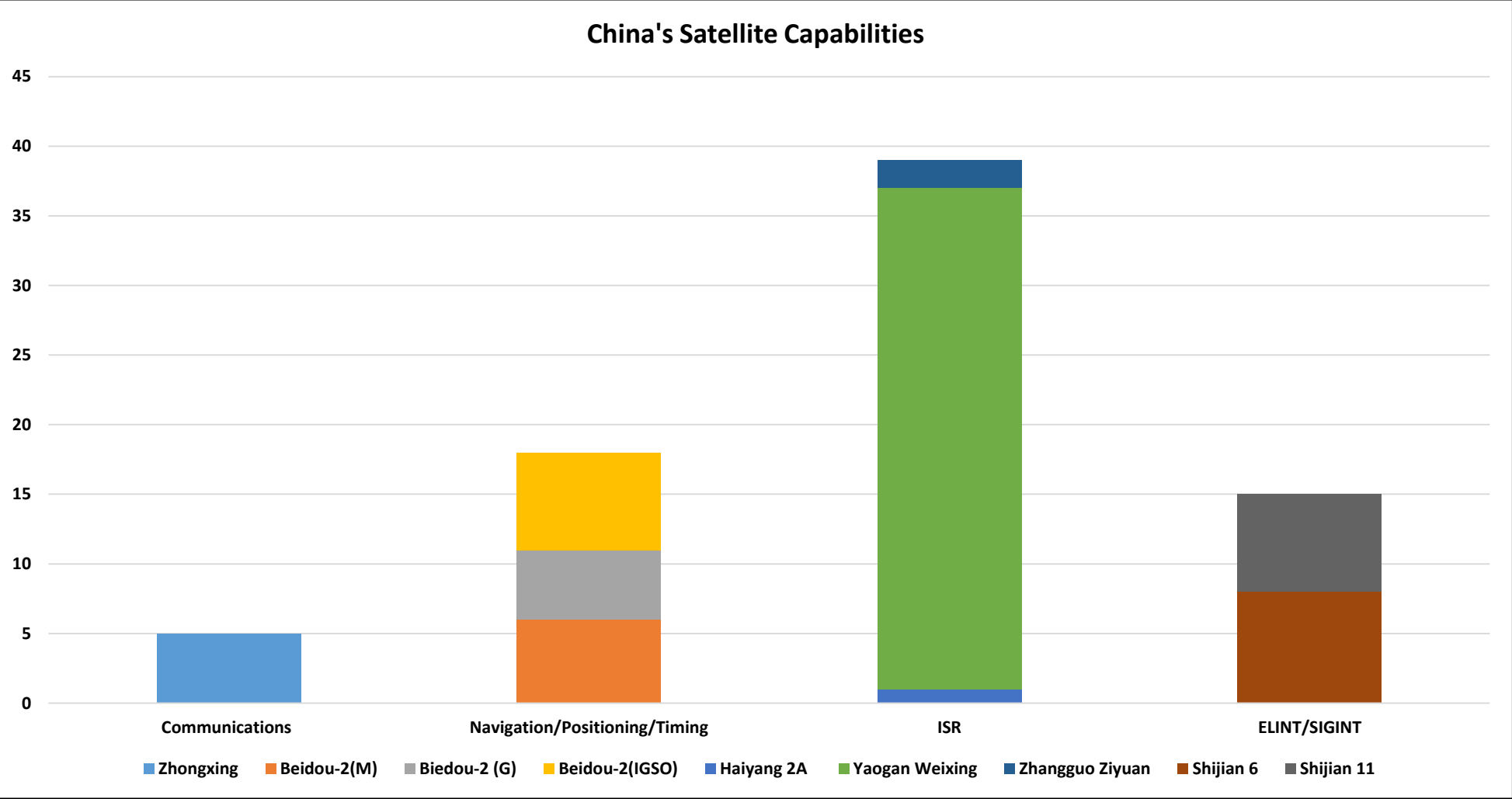


Chinese Space Launch Fleet 2019

System	Propellant	Generation	Outlook
LM-2, LM-3, LM-4 series	Liquid	Legacy	Phase out by 2025
LM-5 series	Liquid	Next	Heavy-lift for the proposed space station and other payloads
LM-6	Liquid	Next	Light-lift for low Earth and sun-synchronous orbit
LM-7	Liquid	Next	Medium-lift for human spaceflight and resupply to the future space station
LM-11 and Kuaizhou series	Solid	Next	Lift for emergency response

Source: Office of the Secretary of Defense, Military and Security Developments Involving the Republic of China, Annual Report to Congress, May 16, 2018, Department of Defense. China Military Power 2018, p. 45.

China's Active Satellites



Source: IISS *Military Balance*, 2016. Adapted by Anthony H. Cordesman and Joseph Kendall at the Center for Strategic and International Studies

China: New Satellites Launched Per Year 2010-2014

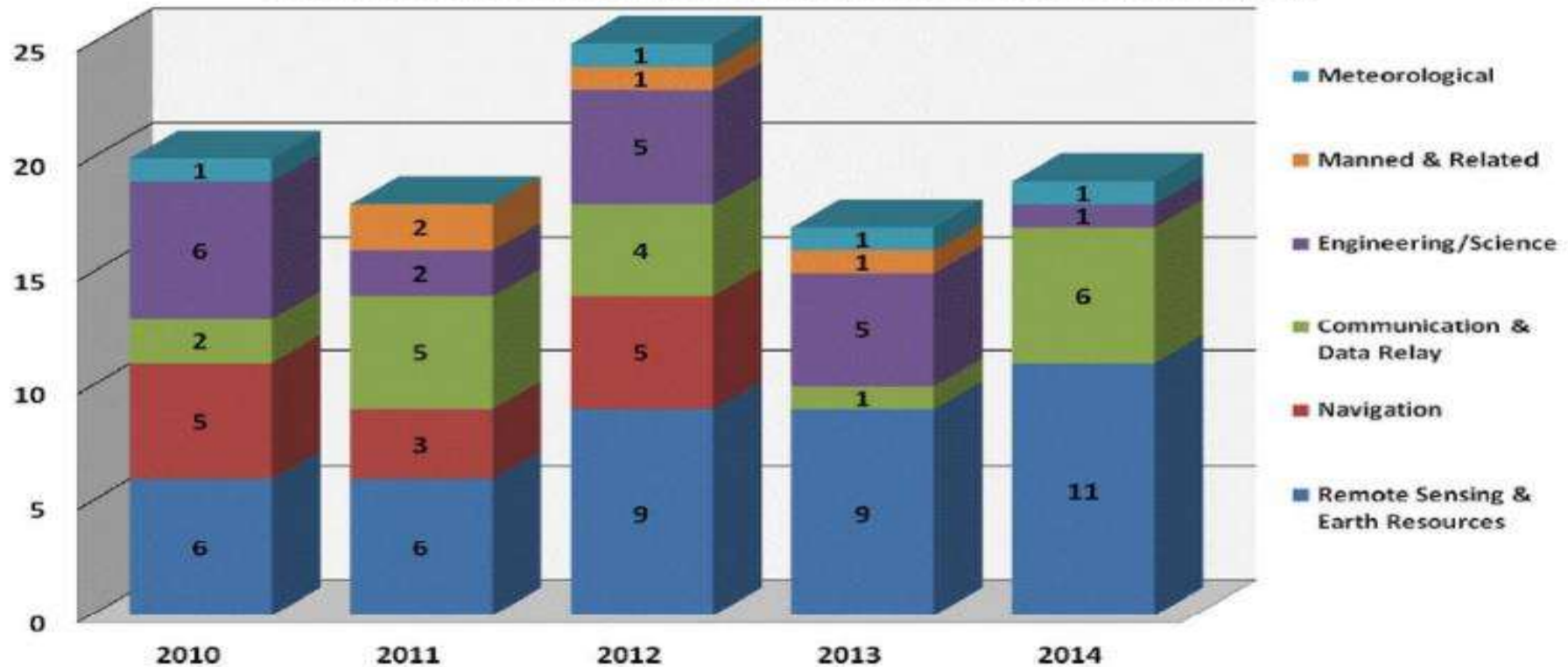


Table 2: Chinese versus U.S. Space Launches, 2010–2014

	<i>2010</i>	<i>2011</i>	<i>2012</i>	<i>2013</i>	<i>2014</i>
Chinese Launches (Satellites Deployed)	15 (20)	19 (18)	19 (25)	14 (17)	16 (19)
U.S. Launches (Satellites Deployed)	15 (41)	19 (39)	16 (35)	20 (85)	23 (110)

Source: DoD Annual Report to Congress: Military and Security Developments Involving the People's Republic of China, April 2015; Source: "China's Space and Counterspace Programs", 2015 Report to Congress, US-China Economic and Security Review Commission, November 2015, p. 294, http://origin.www.uscc.gov/sites/default/files/annual_reports/2015%20Annual%20Report%20to%20Congress.PDF.

China's Direct-Ascent ASAT Tests

Date	Orbital Debris	Missile	Notes
July 2005	No	SC-19	Rocket test
February 2006	No	SC-19	Failed intercept and destruction of an orbital target
January 2007	Yes	SC-19	Successful intercept and destruction of an orbital target
January 2010	No	SC-19	Successful intercept and destruction of a suborbital target
January 2013	No	SC-19	Successful intercept and destruction of a suborbital target
May 2013	No	DN-2	Rocket test
July 2014	No	SC-19	Successful intercept and destruction of a suborbital target

Source: "China's Space and Counterspace Programs", 2015 Report to Congress, US-China Economic and Security Review Commission, November 2015, p. 294, http://origin.www.uscc.gov/sites/default/files/annual_reports/2015%20Annual%20Report%20to%20Congress.PDF

China's Changing Land Power

China Developing Ground Forces: 2015 Defense White Paper

In the implementation of the military strategic guideline in the new situation, China's armed forces must closely center around the CPC's goal of building a strong military, respond to the state's core security needs, aim at building an informationized military and winning informationized wars, deepen the reform of national defense and the armed forces in an all-round way, build a modern system of military forces with Chinese characteristics, and constantly enhance their capabilities for addressing various security threats and accomplishing diversified military tasks.

Development of the Services and Arms of the People's Liberation Army (PLA) and the People's Armed Police Force (PAPF): 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.

Chinese 2019 Defense White Paper: PLA

Great progress has been made in the Revolution in Military Affairs (RMA) with Chinese characteristics. However, the People's Liberation Army (PLA) has yet to complete the task of mechanization, and is in urgent need of improving its informationization. China's military security is confronted by risks from technology surprise and growing technological generation gap. Greater efforts have to be invested in military modernization to meet national security demands. The PLA still lags far behind the world's leading militaries.

...Since the introduction of reform and opening-up, China has been committed to promoting world peace, and has voluntarily downsized the PLA by over 4 million troops.

...*Adjusting scale and proportion, and restructuring force composition.* 300,000 personnel have been cut to keep the total active force at 2 million. Reform measures have been taken to transfer more officer positions to non-commissioned officers and civilian staff, downsize the leading organs at all levels by reducing their subordinate sections, leadership hierarchies and staff, and streamline the institutions and personnel in arts, sports, press, publication, logistical support, medical facilities, depots, and educational and research institutes. Thus, the number of personnel in the leading organs at and above regiment level has been cut by about 25%, and that of non-combat units by almost 50%.

...The PLA and the People's Armed Police Force (PAP) give greater priority to combat readiness. Efforts are made to strictly act on relevant regulations and procedures, fulfill readiness duties, conduct targeted exercises and training, and maintain standardized order, with a view to staying ready to act when required and effectively carrying out readiness (combat) duties.

The PLA supports the civil authorities in maintaining social stability, provides security for major events, and responds to emergencies in accordance with the law. It is mainly tasked with missions such as counter-terrorism, NBCE detection and test, medical relief, and transport support. It disposes of potential safety hazards in the waters and protects security in the air over and around major event venues.

...Since 2012, the PLA and the PAP have deployed 950,000 soldiers, 1.41 million militia, 190,000 vehicles and items of equipment, and sortied 26,000 vessels and 820 aircraft in emergency response and disaster relief. They have participated in rescue and relief efforts such as the earthquake in Ludian County of Yunnan Province, the rainstorm and flood in the middle and lower reaches of the Yangtze River, and the removal of the barrier lake in the Yarlung Zangbo River. They have assisted local governments to rescue and transfer over 5 million people, treated over 210,000 patients, transported over 360,000 tons of goods, and reinforced over 3,600 km of levees. In 2017, the PLA Macao Garrison sent 2,631 soldiers and over 160 vehicles to assist the government of Macao Special Administrative Region in its relief efforts in the wake of Typhoon Hato.

.. the PLA has established a lean and efficient joint operations command system composed of permanent and specialized commanding establishments for both peacetime and wartime operations. The former Shenyang, Beijing, Lanzhou, Jinan, Nanjing, Guangzhou and Chengdu MACs have been reorganized into 5 TCs: Eastern Theater Command (ETC), Southern Theater Command (STC), Western Theater Command (WTC), Northern Theater Command (NTC), and Central Theater Command (CTC). Thus, a CMC-TCs-Troops operations command system has been established.

...the PLA is striving to transform from a quantity-and-scale model to that of quality and efficiency, as well as from being personnel-intensive to one that is S&T-intensive.

Chinese 2019 Defense White Paper: PLA Army (PLAA)

...The PLAA plays an irreplaceable role in maintaining China's national sovereignty, security and development interests. It comprises maneuver operation, border and coastal defense, and garrison forces.

Under the PLAA, there are 5 TC army commands, the Xinjiang military command, and the Tibet military command. The ETC Army has under it the 71st, 72nd, and 73rd group armies; the STC Army has the 74th and 75th group armies; the WTC Army has the 76th and 77th group armies; the NTC Army has the 78th, 79th and 80th group armies; and the CTC Army has the 81st, 82nd and 83rd group armies.

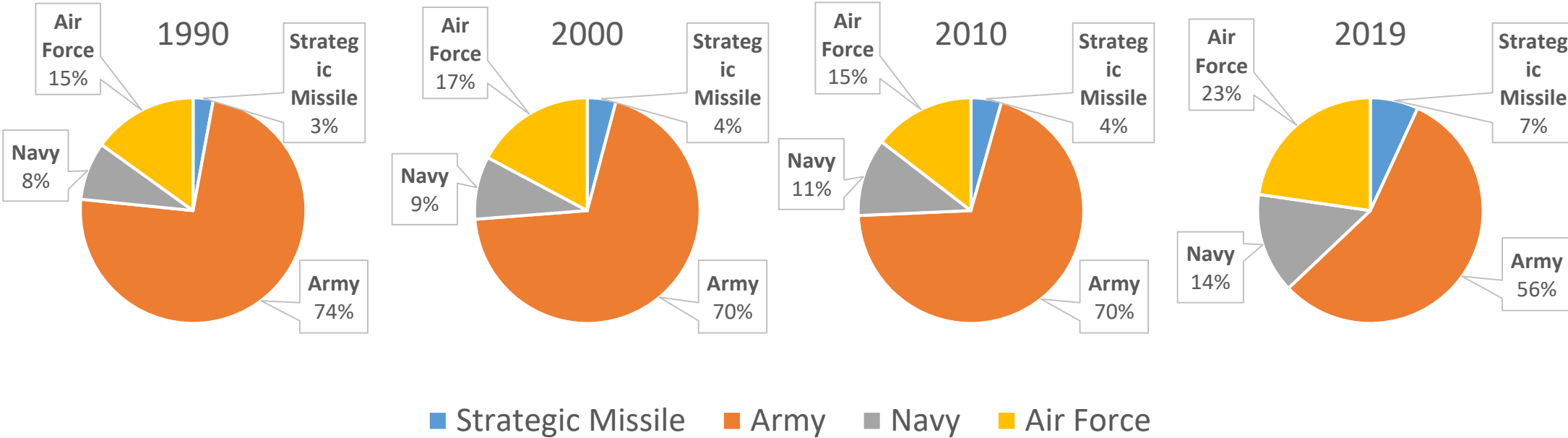
In line with the strategic requirements of maneuver operations as well as multi-dimensional offense and defense, the PLAA is speeding up the transition of its tasks from regional defense to trans-theater operations, and improving the capabilities for precise, multi-dimensional, trans-theater, multi-functional and sustained operations, so as to build a new type of strong and modernized land force.

*...Adjusting scale and proportion, and restructuring force composition....*The PLA has significantly downsized the active force of the PLAA, maintained that of the PLAAF at a steady number, moderately increased that of the PLAN and PLARF, and optimized the force structures of all services and arms. The PLA has restructured the defense reserves. The deployment of combat forces has been adjusted for a strategic configuration that meets the demands of safeguarding China's national security in the new era.

Reorganizing the troops and rebuilding new-type combat forces. The previous 18 group armies have been reorganized into 13 new ones. All major combat units of the PLA follow a group army-brigade-battalion system. Reform measures have been taken to reinforce the combat capacity of the arms, reduce the command hierarchies and combine the troops at lower levels. New types of combat forces have been enhanced to conduct special operations, all-dimensional offense and defense, amphibious operations, far seas protection and strategic projection, aiming to make the force composition complete, combined, functional and flexible.

.. The PLA Army (PLAA) has organized training competitions and conducted live exercises codenamed *Stride* and *Firepower*.

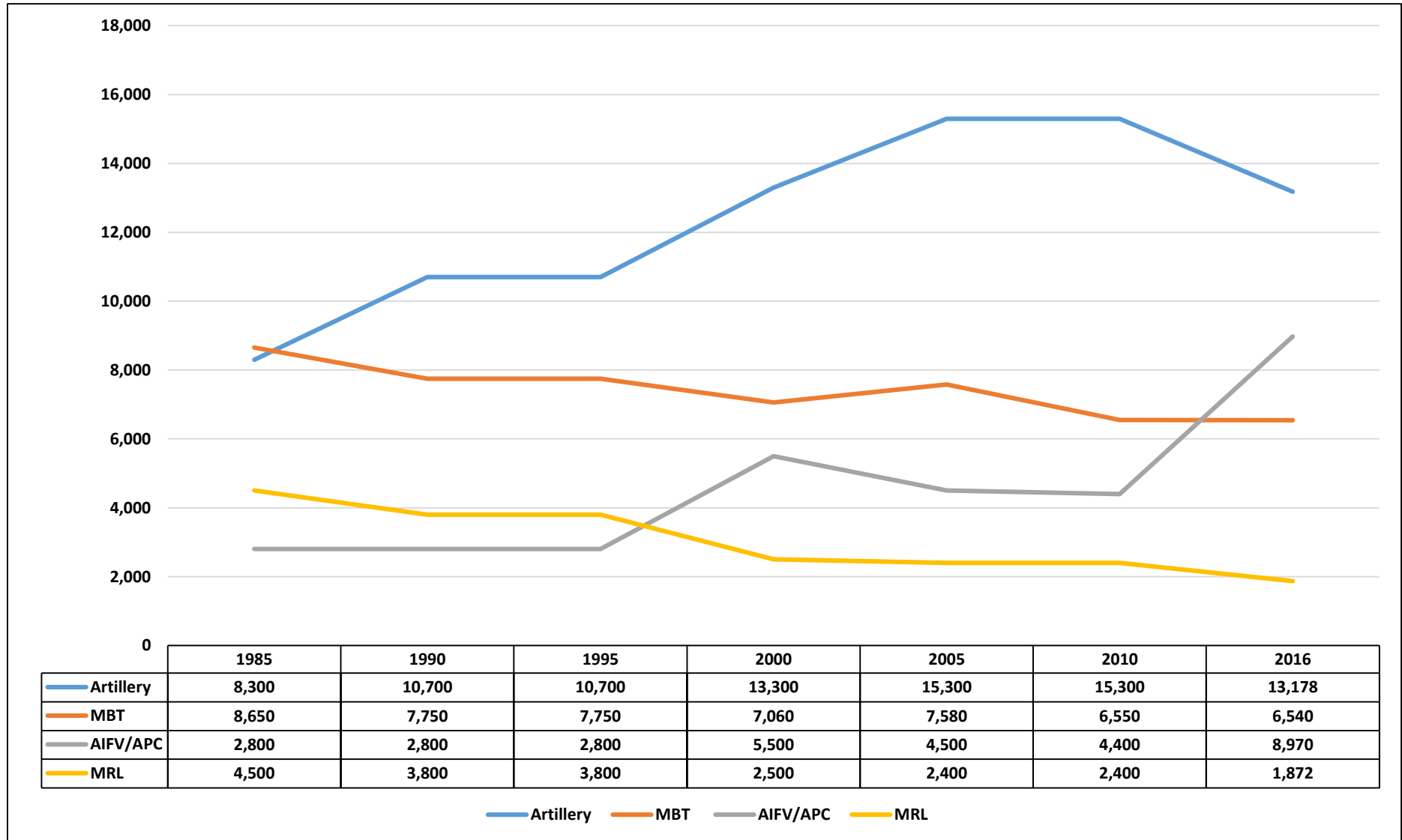
China's Changing Military Personnel: 1990-2019



Category	Total	Strategic Missile	% of Total	Army	% of Total	Navy	% of Total	Air Force	% of Total	Paramilitary
1980	4,450,000	ND	ND	3,600,000	(80.9%)	360,000	(8.1%)	490,000	(11.0%)	ND
1990	3,030,000	90,000	(3.0%)	2,300,000	(75.9%)	260,000	(8.6%)	470,000	(15.5%)	12,000,000
2000	2,470,000	100,000	(4.0%)	1,700,000	(68.8%)	220,000	(8.9%)	420,000	(17.0%)	1,000,000
2010	2,285,000	100,000	(4.4%)	1,600,000	(70.0%)	255,000	(11.2%)	333,000	(14.6%)	660,000
2019	2,035,000	120,000	(5.9%)	975,000	(47.9%)	250,000	(12.3%)	395,000	(19.4%)	660,000

Source: World Bank, <https://data.worldbank.org/indicator/MS.MIL.TOTL.P1?end=2017&locations=CN&start=1985&view=chart>, and IISS, Military Balance.

China's Changing Army: 1985-2016



China's Mechanization Progress

...By 2020, the PLA is meant to have met the goals of achieving basic mechanization ... and making significant progress towards informationization ... This timeline was publicly laid out in the 2008 Defence White Paper, and was recently reiterated in Xi's speech at the 19th Party Congress in 2017.

...The PLA Army proper (i.e. the ground forces) remains the most likely point of failure for the 2020 objectives. Although the most recent reorganisation has reduced the army's overall size below 1,000,000 personnel, it still retains roughly twice as many active duty personnel as the US Army. Equipping such a force exclusively with modern equipment is an enormous undertaking. It is an even greater challenge given that the navy, air force and rocket forces are receiving priority over the army for their own ambitious programs.

While the army has ambitions to standardize its equipment across its newly restructured combined arms brigades, with heavy, medium and light roles redolent of the US brigade combat team structure, for now a significant number of formations are still dependent on legacy platforms and systems. This 'partial mechanization' of the army has long been seen as a major complicating factor in the PLA's pursuit of effective informationization.

- Of the 5,800 main battle tanks listed in service in the IISS Military Balance+ database, only about 60% could be classified as modern; around 2,000 are still based on the obsolescent ZTZ-59 (a licence-built version of the Soviet T-54).
- The Type-15 (ZTQ-15) light tank referenced by the white paper has indeed now entered service, but only with one, or maybe two, brigades so far.
- For other armoured vehicles, the picture is worse: of the approximately 50 heavy and medium combined arms brigades in the PLA (excluding amphibious formations), only around 20 are currently equipped with the latest tracked (ZBD-04/-04A) or wheeled (ZBL-08) infantry fighting vehicles.

In short, completely replacing the PLA Army's legacy platform inventory – presumably a key component of true mechanisation – would require the addition of thousands of new armored vehicles and artillery pieces over the next two years. This is highly unlikely to occur, even if army modernisation was to receive a higher prioritization than it has had in the past.

A more realistic outcome might be to expect at least 50% of all PLA Army armoured vehicles, artillery and air-defense systems to be modern by 2020.

Ground Forces in End-2016

Taiwan Strait Military Balance, Ground Forces			
	China		Taiwan
	Total	Taiwan Strait Area	Total
Personnel (Active in Combat Units)	850,000	190,000	130,000
Group Armies/Army Corps	18	6	3
<i>Infantry Divisions</i>	12	3	0
<i>Infantry Brigades</i>	23	6	7
<i>Mechanized Infantry Divisions</i>	7	1	0
<i>Mechanized Infantry Brigades</i>	25	6	3
<i>Armor Divisions</i>	1	0	0
<i>Armor Brigades</i>	17	6	4
<i>Army Aviation Brigades and Regiments</i>	11	5	3
<i>Artillery Brigades</i>	22	8	5
Airborne Corps	1	1	0
Amphibious Divisions	2	2	0
Amphibious Brigades	3	3	2
Tanks	7,000	2,000	1,100
Artillery Pieces	8,000	2,600	1,600
<p>Note: The 2016 chart focuses on PLA combat units and applies a changed methodology, resulting in significantly lower personnel numbers than shown in previous reports. This does not reflect a sudden drop in capability. This presentation is likely to change further as the PLA carries out its announced demobilization of 300,000 troops by 2017. This chart also changes how it presents amphibious units, which in the PLA are in both the PLAA and PLAN Marine Corps. The "Taiwan Strait Area" includes select national-level assets and units in the PLA's Eastern and Southern Theaters. The numbers of personnel and systems are approximate.</p>			

China's Army Modernization in 2017

Theater commands appear to have assumed more operational control from the services, and probably commanded the PLA's responses to North Korea, India, and activities in the South China Sea.

After unveiling the PLA's newly established CMC Joint Operations Command Center (JOCC) in 2016, the PLA established theater JOCCs. Like the CMC JOCC, each theater JOCC is probably staffed by the Army, Navy, Air Force, and Rocket Force and equipped with a joint command system

In April 2017, the PLA began restructuring its corps-level and below units, renaming and restructuring many units across the PLA.

Most notably, the PLAA's 18 group armies were reorganized into 13 renamed group armies, dissolving 5 group armies and transitioning most of the units subordinate to the group armies into brigades.

The PLAAF is also converting its fighter and ground attack divisions into brigades subordinate to air bases, and the PLAN is creating brigade-level frigate flotillas. The PLA probably expects that a more consistent brigade structure across the force will improve joint combat capabilities.

Demobilizing Personnel. In 2017, the PLA largely completed cuts to reduce its force by 300,000 personnel. These cuts probably focused on non-combat personnel, such as those in arts and culture, administrative duties, or academic work, rather than the demobilization of combat personnel from dissolved group armies.

China's official media also reported the cuts are rebalancing the proportion of forces among the services, increasing the relative size of the PLAN and PLAAF and reducing PLAA personnel to less than half of the PLA. The number of active-duty personnel in non-combat units was likely cut in half, and almost one-third of officers were also cut.

The PLA continues to build towards an expeditionary capability by increasing the number of army aviation and marine units.

These changes will require significant revisions to PLA doctrine in the coming years to meet the PLA's modernization goals for 2020.

The PLA trained to execute large-scale, complex joint operations by increasing realism and including dedicated opposition force training, maneuver, and mobility

...Theater command exercises focused on multi-service command and control, while exercises tested brigade-level capabilities and readiness. The PLAA continued its two major \ exercise series in 2017 and introduced new, force multiplying systems that improve combat power.

The PLAA also continued to modernize in 2017, emphasizing systems that act as force multipliers and improve combat power. The year saw increases and improvements in air defense, artillery, sustainment support, engineers, and chemical defense systems at all echelon levels.

This selective modernization enables the shift to the brigade and battalion as the main operational echelons by giving their commanders critical organic force protection, firepower strike, reconnaissance, and sustainment capabilities

Select Army Systems Entering Service and Under Development

Equipment	Mission Area	Estimated Service Entry	Implications
Z-20 medium-lift helicopter	Transport	2018–2019	The Z-20 will provide the PLA Army and PLA Navy aviation added flexibility in conducting missions at a greater range, and will increase the PLA's expeditionary capabilities.
ZTQ-15 light battle tank	Homeland and border defense; amphibious warfare	2017	This tank is designed to operate in mountainous and high-altitude environments, which would help support PLA operations in China's western border region. <i>IHS Jane's</i> reported that an image appeared on the Chinese internet in July 2018 showing the tank painted in PLA Marine Corps camouflage, suggesting it could support amphibious operations.
Heavy-lift helicopter (joint China-Russia production)	Transport	2023	When this helicopter enters service, it will provide the PLA with a heavy-lift capability with a longer range and more lift capacity than current helicopters.

Major Ground Units - 2018



Source: Office of the Secretary of Defense, *Military and Security Developments Involving the Republic of China*, Annual Report to Congress, May 16, 2018, Department of Defense. China Military Power 2018, p.27.

Chinese Major Land Units in 2019

The PLA Army (PLAA) is the world's largest standing ground force, with approximately 915,000 active-duty personnel in combat units. 177 China's military reforms since 2015 have included creating a separate PLAA headquarters for the first time in the PLA's history.

In April 2017, the PLA announced the reduction of 5 of the PLAA's 18 group armies (corps-sized units), and the restructuring to a corps-brigade-battalion force structure. This new design implemented more mobile, modular units and integrated maneuver elements into combined-arms brigades. The PLAA is also modernizing C4I systems to enhance its forces' interoperability.

Source: DIA, *China Military Power: Modernizing a Force to Fight and Win*, 2019, DIA-02-1706-085, 2019, p. 56



China's Changing Naval Power

China Developing Naval Forces: 2015 Defense White Paper

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.

Chinese 2019 Defense White Paper: PLAN (PLA Navy)

...The PLA Navy (PLAN) has extended training to the far seas and deployed the aircraft carrier task group for its first far seas combat exercise in the West Pacific. It has organized naval parades in the South China Sea and the waters and airspace near Qingdao, and conducted a series of live force-on-force exercises codenamed *Mobility* and systematic all-elements exercises.

...When the security situation in Yemen deteriorated in March 2015, a PLAN escort task group sailed to the Gulf of Aden, berthed for the first time directly in an engagement area, and evacuated 621 Chinese citizens and 279 foreign citizens from 15 countries including Pakistan, Ethiopia, Singapore, Italy, Poland, Germany, Canada, the UK, India and Japan.

...The PLA has significantly downsized the active force of the PLAA, maintained that of the PLAAF at a steady number, moderately increased that of the PLAN and PLARF, and optimized the force structures of all services and arms.

The PLAN has a very important standing in the overall configuration of China's national security and development. It comprises submarine, surface ship, aviation, marine, and coastal defense forces. Under the PLAN, there are the ETC Navy (Donghai Fleet), the STC Navy (Nanhai Fleet), the NTC Navy (Beihai Fleet), and the PLAN Marine Corps. Under the TC navies there are naval bases, submarine flotillas, surface ship flotillas and aviation brigades. In line with the strategic requirements of near seas defense and far seas protection, the PLAN is speeding up the transition of its tasks from defense on the near seas to protection missions on the far seas, and improving its capabilities for strategic deterrence and counterattack, maritime maneuver operations, maritime joint operations, comprehensive defense, and integrated support, so as to build a strong and modernized naval force.

In line with relevant UNSC resolutions, since December 2008, the Chinese government has dispatched naval ships to carry out regular vessel protection operations in the Gulf of Aden and the waters off the coast of Somalia. Chinese PLAN task groups cooperate with multiple naval forces in the area to safeguard international SLOCs. In the past decade, over 100 vessels and 26,000 officers and sailors have been regularly deployed in 31 convoys, each consisting of three to four ships, in vessel protection operations. They have provided security protection for over 6,600 Chinese and foreign ships, and rescued, protected or assisted over 70 ships in distress.

Chinese Naval Build-Up - I

(Figures include both less-capable older units and more-capable newer units)

Year of DOD report	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2019 change from 2005
Ballistic missile submarines	1	1	1	1	2	2	2	2	3	3	4	4	4	4	4	+3
Nuclear-powered attack submarines	6	5	5	5	6	6	5	5	5	5	5	5	5	5	6	0
Diesel attack submarines	51	50	53	54	54	54	49	48	49	51	53	57	54	47	50	-1
Aircraft carriers	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	+1
Destroyers	21	25	25	29	27	25	26	26	23	24	21	23	31	28	33	+12
Frigates	43	45	47	45	48	49	53	53	52	49	52	52	56	51	54	+11
Corvettes	0	0	0	0	0	0	0	0	0	8	15	23	23	28	42	+42
Missile-armed coastal patrol craft	51	45	41	45	70	85	86	86	85	85	86	86	88	86	86	+35
Amphibious ships: LSTs and LPDs	20	25	25	26	27	27	27	28	29	29	29	30	34	33	37	+17
Amphibious ships: LSMs	23	25	25	28	28	28	28	23	26	28	28	22	21	23	22	-1
Total of types above (does not include other types, such as auxiliary and support ships)	216	221	222	233	262	276	276	271	273	283	294	303	317	306	335	+119
<i>China Coast Guard ships</i>	<i>n/a</i>	<i>n/a</i>	<i>n/a</i>	<i>n/a</i>	<i>n/a</i>	<i>n/a</i>	<i>n/a</i>	<i>n/a</i>	<i>n/a</i>	<i>n/a</i>	<i>n/a</i>	<i>n/a</i>	<i>185</i>	<i>240</i>	<i>248</i>	<i>n/a</i>
Total U.S. Navy battle force ships (which includes auxiliary and support ships but excludes patrol craft)	291	282	281	279	282	285	288	284	287	285	289	271	275	279	286	-5
U.S. Navy figure compared to above total for certain Chinese ship types	+75	+61	+59	+46	+20	+9	+12	+13	+14	+2	-5	-32	-42	-27	-49	-124

Source: Table prepared by CRS based on 2005-2019 editions of annual DOD report to Congress on military and security developments involving China (known for 2009 and prior editions as the report on China military power), and (for U.S. Navy ships) U.S. Navy data as presented in CRS Report RL32665, *Navy Force Structure and Shipbuilding Plans: Background and Issues for Congress*, by Ronald O'Rourke.

Notes: *n/a* means data not available in report. **LST** means tank landing ship; **LPD** means transport dock ship; **LSM** means medium landing ship. The DOD report generally covers events of the prior calendar year. Thus, the 2019 edition covers events during 2018, and so on for earlier years. Similarly, for the U.S. Navy figures, the 2019 column shows the figure for the end of FY2018, and so on for earlier years.

Chinese Naval Build-Up - II

(Numbers of PLA Navy Ships Presented in Annual DOD Reports to Congress)

(Figures include both older and less capable units—including some of questionable operational status—and newer and more capable units)

Year of DOD report	2000	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Ballistic missile submarines	1	1	1	n/a	1	1	1	1	2	2	2	2	3	3	4	4	4
Nuclear-powered attack submarines	5	5	~60	n/a	6	5	5	5	6	6	5	5	5	5	5	5	5
Diesel attack submarines	~60	~ 50		n/a	51	50	53	54	54	54	49	48	49	51	53	57	54
Aircraft carriers	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1
Destroyers	~20	~ 60	> 60	n/a	21	25	25	29	27	25	26	26	23	24	21	23	31
Frigates	~40			n/a	43	45	47	45	48	49	53	53	52	49	52	52	56
Corvettes	0	0	0	0	0	0	0	0	0	0	0	0	0	8	15	23	23
Missile-armed coastal patrol craft	n/a	~ 50	~ 50	n/a	51	45	41	45	70	85	86	86	85	85	86	86	88
Amphibious ships: LSTs and LPDs	almost 50	~ 40	> 40	n/a	20	25	25	26	27	27	27	28	29	29	29	30	34
Amphibious ships: LSMs				n/a	23	25	25	28	28	28	28	23	26	28	28	22	21

Source: Table prepared by CRS based on 2000-2016 editions of annual DOD report to Congress on military and security developments involving China (known for 2009 and prior editions as the report on China military power).

Notes: n/a means data not available in report. LST means tank landing ship; LPD means transport dock ship; LSM means medium landing ship. The DOD report generally covers events of the prior calendar year. Thus, the 2016 edition of the report covers events during 2015.

Chinese Naval Build-Up – III

(Numbers of PLA Navy Ships and
Aircraft Provided by ONI in 2009)

(Figures include both older and less capable units—including some of questionable operational status—
and newer and more capable units)

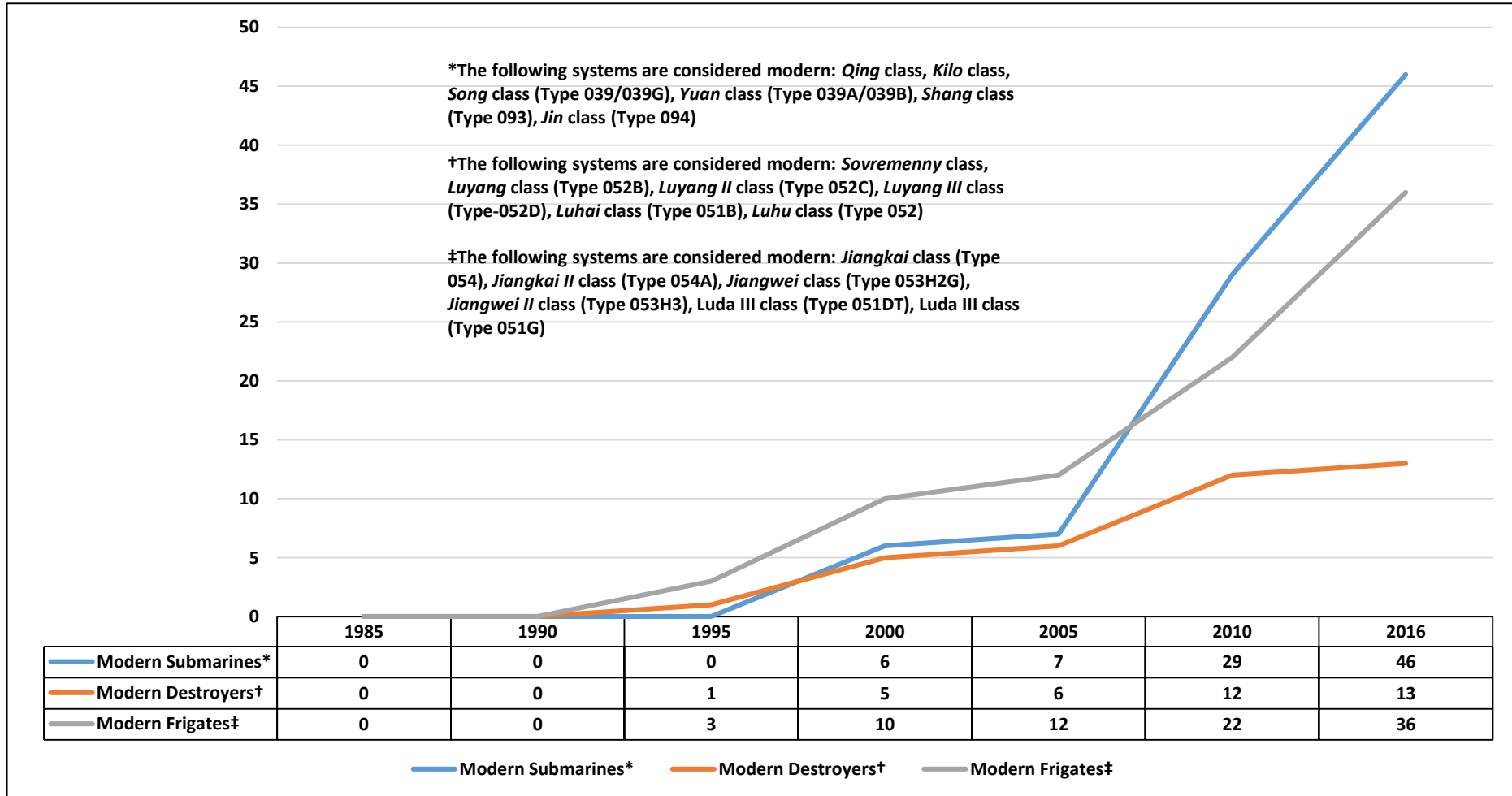
	1990	1995	2000	2005	2009	Projection for 2015	Projection for 2020
<i>Ships</i>							
Ballistic missile submarines	1	1	1	2	3	4 or 5?	4 or 5?
Attack submarines (SSNs and SSs)	80	82	65	58	59	~70	~72
SSNs	5	5	5	6	6	n/a	n/a
SSs	75	77	60	52	53	n/a	n/a
Aircraft carriers	0	0	0	0	0	1?	2?
Destroyers	14	18	21	25	26	~26	~26
Frigates	35	35	37	42	48	~45	~42
<i>Subtotal above ships</i>	<i>130</i>	<i>136</i>	<i>124</i>	<i>127</i>	<i>136</i>	<i>~146 or ~147?</i>	<i>~146 or ~147?</i>
Missile-armed attack craft	200	165	100	75	80+	n/a	n/a
Amphibious ships	65	70	60	56	58	n/a	n/a
Large ships (LPDs/LHDs)	0	0	0	0	1	~6?	~6?
Smaller ships	65	70	60	56	57	n/a	n/a
Mine warfare ships	n/a	n/a	n/a	n/a	40	n/a	n/a
Major auxiliary ships	n/a	n/a	n/a	n/a	50	n/a	n/a
Minor auxiliary ships and support craft	n/a	n/a	n/a	n/a	250+	n/a	n/a
<i>Aircraft</i>							
Land-based maritime strike aircraft	n/a	n/a	n/a	n/a	~145	~255	~258
Carrier-based fighters	0	0	0	0	0	~60	~90
Helicopters	n/a	n/a	n/a	n/a	~34	~153	~157
<i>Subtotal above aircraft</i>	<i>n/a</i>	<i>n/a</i>	<i>n/a</i>	<i>n/a</i>	<i>~179</i>	<i>~468</i>	<i>~505</i>

Source: Prepared by CRS. Source for 2009, 2015, and 2020: 2009 ONI report, page 18 (text and table), page 21 (text), and (for figures not available on pages 18 or 21), page 45 (CRS estimates based on visual inspection of ONI graph entitled “Estimated PLA[N] Force Levels”). Source for 1990, 1995, 2000, and 2005: Navy data provided to CRS by Navy Office of Legislative Affairs, July 9, 2010.

Notes: n/a is not available. The use of question marks for the projected figures for ballistic missile submarines, aircraft, carriers, and major amphibious ships (LPDs and LHDs) for 2015 and 2020 reflects the difficulty of resolving these numbers visually from the graph on page 45 of the ONI report. The graph shows more major amphibious ships than ballistic missile submarines, and more ballistic missile submarines than aircraft carriers. Figures in this table for aircraft carriers include the *Liaoning*. The ONI report states on page 19 that China “will

Source: Ronald O'Rourke, China Naval
Modernization: Implications for U.S. Navy
Capabilities—Background and Issues for
Congress, CRS RL33153, August 1, 2018, p.71.

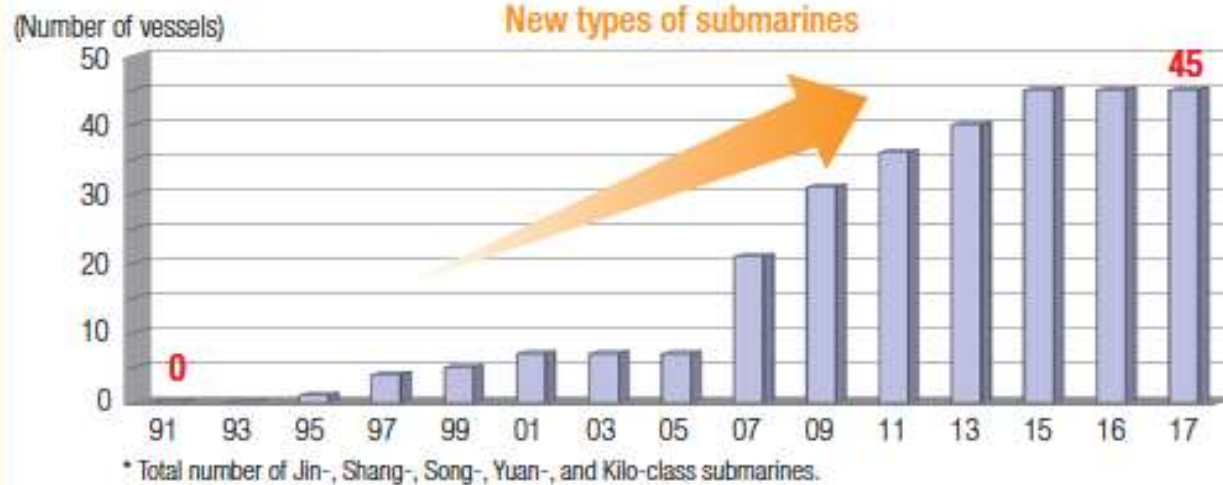
China's Naval Modernization: Increase in Modern Major Combat Ships: 1985-2016



Source: Source: IISS, *Military Balance* 1985-2016. Adapted by Anthony H. Cordesman and Joseph Kendall at the Center for Strategic and International Studies

Japanese Estimate of Chinese Naval Modernization

Naval Force



Jin-class SSBN



Yuan-class submarine

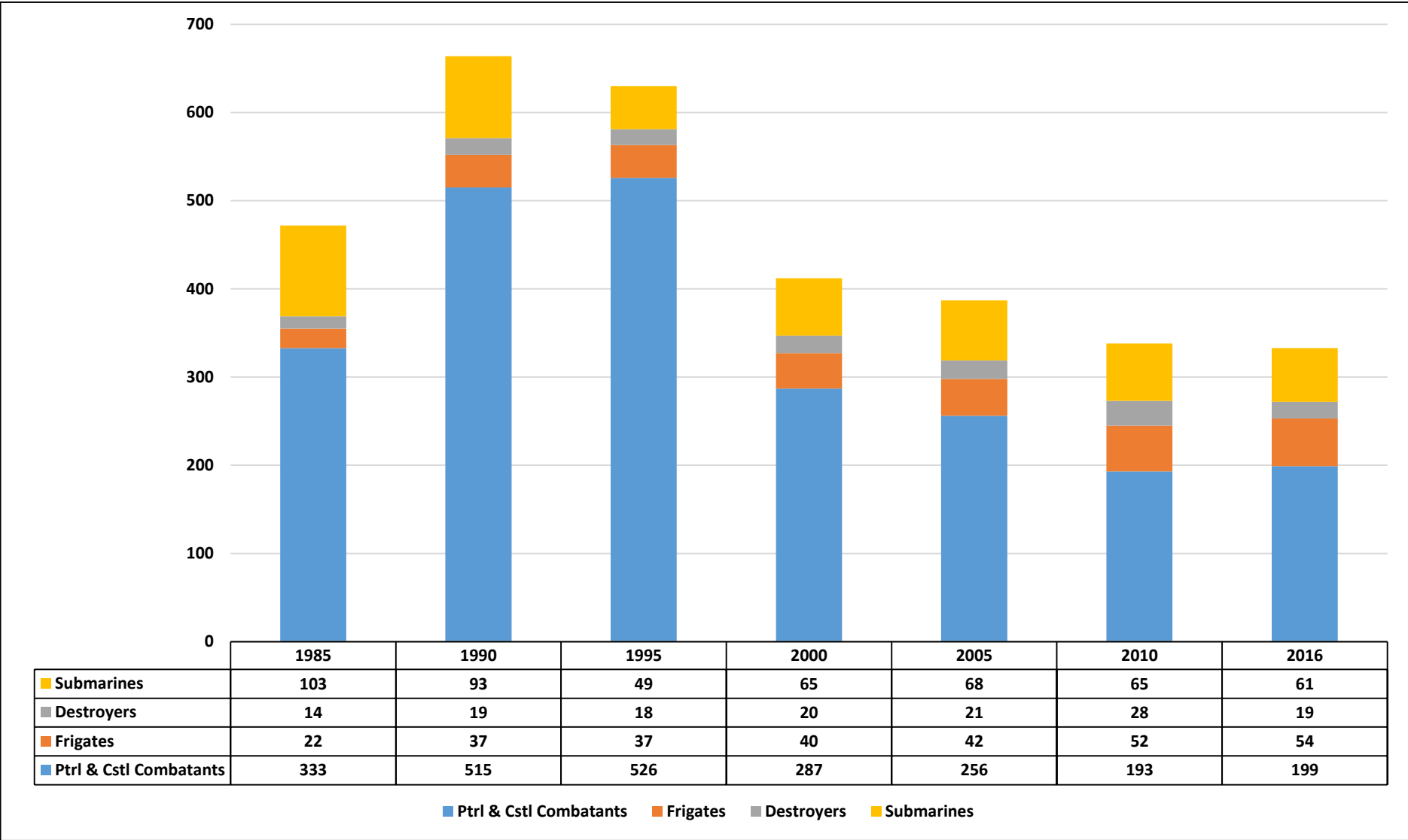


Luyang III-class destroyer



Jiangkai II-class frigate
[Jane's by IHS Markit]

China's Naval Modernization: Quality versus Quantity



Source: IISS, *Military Balance* 1985-2016. Adapted by Anthony H. Cordesman and Joseph Kendall at the Center for Strategic and International Studies.

Naval Forces in End-2016

Taiwan Strait Military Balance, Naval Forces			
	China		Taiwan
	Total	Eastern and Southern Theater Navies	Total
<i>Aircraft Carriers</i>	1	0	0
<i>Destroyers</i>	31	24	4
<i>Frigates</i>	56	42	22
<i>Corvettes</i>	23	14	1
<i>Tank Landing Ships/ Amphibious Transport Dock</i>	34	32	12
<i>Medium Landing Ships</i>	21	15	4
<i>Diesel Attack Submarines</i>	54	34	4
<i>Nuclear Attack Submarines</i>	5	2	0
<i>Ballistic Missile Submarines</i>	4	4	0
<i>Coastal Patrol (Missile)</i>	88	70	45
<i>Coast Guard Ships</i>	185	N / A	25
Note: The PLAN has the largest force of principal combatants, submarines, and amphibious warfare ships in Asia. In the event of a major Taiwan conflict, the Eastern and Southern Theater Navies would participate in direct action against the Taiwan Navy. The Northern Theater Navy (not shown) would be responsible primarily for protecting the sea approaches to China, but could provide mission-critical assets to support other fleets. In conflict, China may also employ CCG ships to support military operations.			

Major Naval Units -2018



Source: Office of the Secretary of Defense, *Military and Security Developments Involving the Republic of China, Annual Report to Congress*, May 16, 2018, Department of Defense. China Military Power 2018, p.32.

Chinese Major Naval Units in 2019

The PLA Navy (PLAN) is Asia's largest navy, with an inventory of more than 300 surface combatants, submarines, amphibious ships, patrol craft, and specialized units. The PLAN is rapidly replacing obsolescent, generally single-purpose ships in favor of larger, multirole combatants with advanced antiship, anti-air, and antisubmarine weapons and sensors. This modernization aligns with China's growing emphasis on the maritime domain, with increasing demands on the PLAN to conduct operational tasks at increasing distances from the Chinese mainland using multimission, long-range, sustainable naval platforms with robust self-defense.

By 1987, PLAN Commander Adm Liu Huaqing had established a strategy referred to as "offshore defense." ...Although Liu characterized offshore areas as east of Taiwan and the northern part of the Pacific Ocean, stretching beyond the first island chain, offshore defense was often associated with operations in the Yellow Sea, East China Sea, and South China Sea—China's "near seas." Development of offshore defense paralleled the CMC's adoption of a new military strategy that focused on local wars on China's periphery rather than a major confrontation with the Soviet Union, and it focused on achieving regional goals and deterring a modern adversary from intervening in a regional conflict.

Source: DIA, *China Military Power: Modernizing a Force to Fight and Win*, 2019, DIA-02-1706-085, 2019, p. 63.

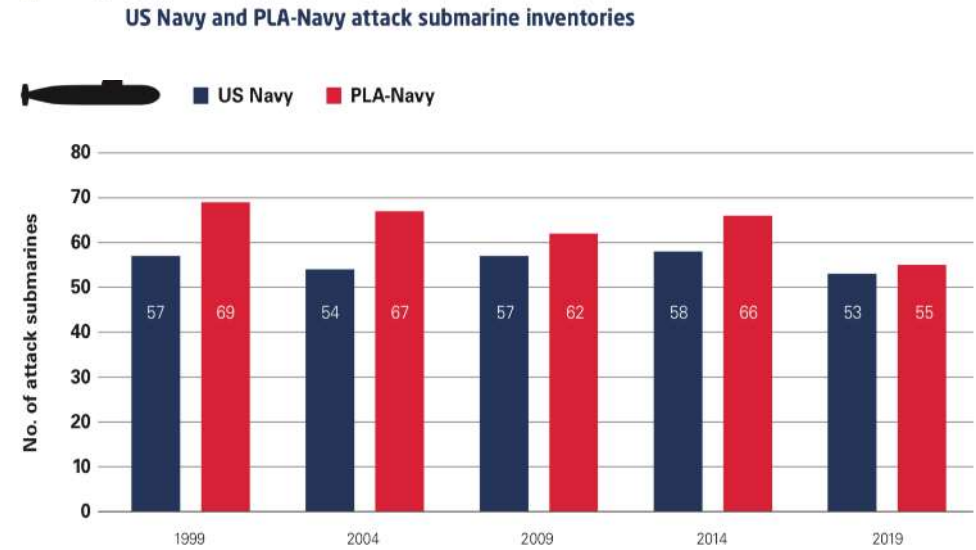
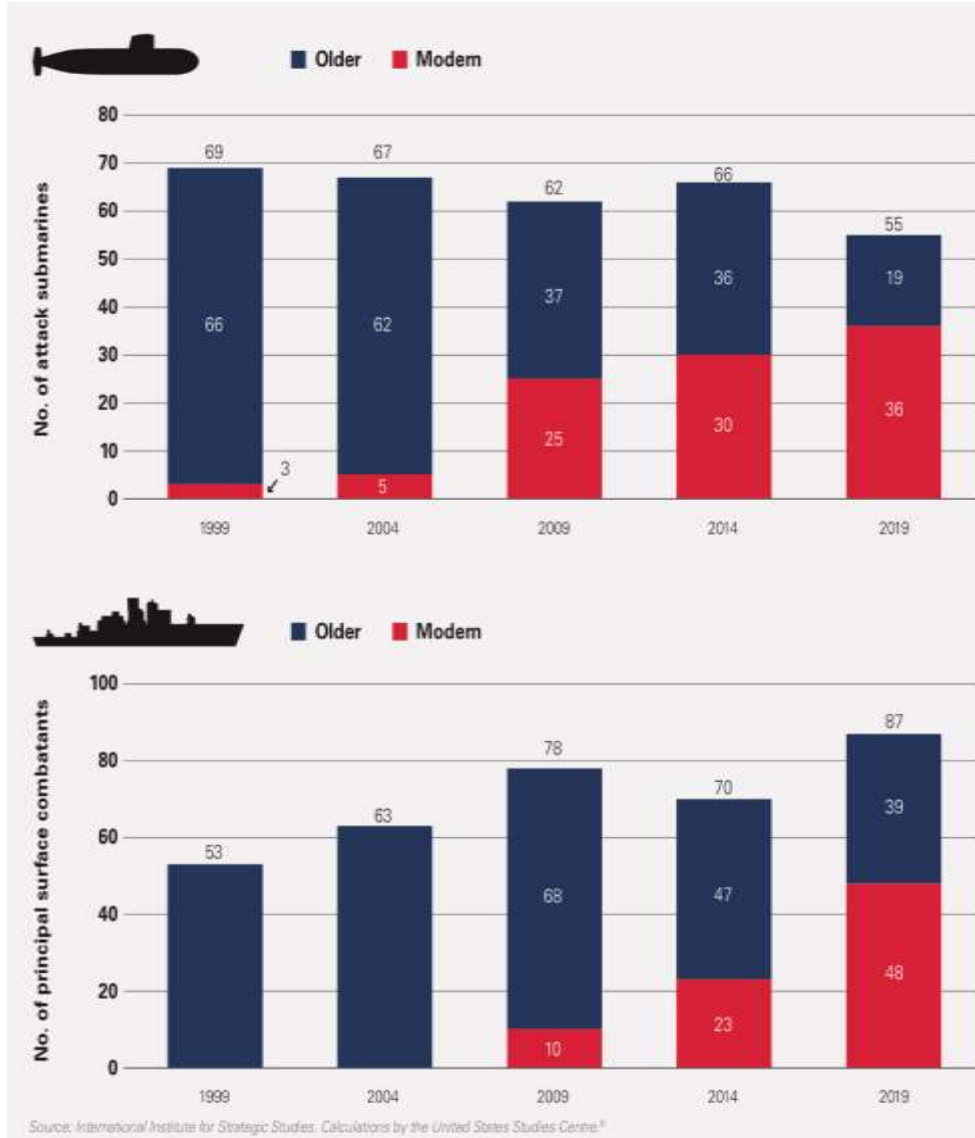


Select Advanced PLN Naval Systems Entering Service and under Development

Equipment	Mission Area	Estimated Service Entry	Implications
Type 055 REN-HAI-class cruiser	Anti-Air Warfare (AAW); Anti-Surface Warfare (ASUW); Anti-Submarine Warfare (ASW)	2018–2019	China has produced four Type 055 cruisers that are undergoing sea trials. The cruisers reportedly will be equipped with phased-array radars and a multipurpose vertical launch system for surface-to-air antiship cruise missiles and anti-submarine missiles. They will increase China's anti-surface, force projection, and expeditionary capabilities.
CV-17, Type 001A aircraft carrier	AAW; ASW	2019–2020	Slightly larger than its first aircraft carrier, <i>Liaoning</i> , and expected to accommodate up to eight more aircraft than <i>Liaoning</i> 's 36, CV-17 will boost China's ability to project force.
Railgun mounted on Type 072 III-class tank landing ship	ASUW	Unknown	In January 2018, images appeared on Chinese social media appearing to show a prototype electromagnetic railgun mounted on a Type 072 tank landing ship. When a railgun is in service on Chinese ships, it will increase the PLA's anti-surface warfare capabilities with the ability to fire projectiles at high speeds and low costs compared to missiles.

Equipment	Mission Area	Estimated Service Entry	Implications
J-31 (FC-31) fifth-generation stealth fighter	Air Superiority	2022	The J-31 (and its export variant, the FC-31) will be equipped with modern systems and stealth features that could rival the U.S. F-35 fighter and challenge U.S. aircraft in the Western Pacific. Some Chinese commentators have speculated that China could use the fighters for carrier operations.
Type 075 landing helicopter dock	Transport; Amphibious Assault; Humanitarian Assistance and Disaster Relief (HA/DR)	2020	The Type 075 will reportedly be larger than China's YUZHAO-class amphibious transport dock and have a greater capacity to carry helicopters, providing the PLA increased expeditionary capability.
Heavy-lift helicopter (joint China-Russia production)	Transport; HA/DR; ASW	2023	When this helicopter enters service, it will provide the PLA with a heavy-lift capability with a longer range and more lift capacity than current helicopters. For the PLA Navy, it could eventually operate from the Type 075 helicopter landing dock, Type 055 destroyer, and aircraft carriers.
AG-600 seaplane	Transport; HA/DR; Search and Rescue; ASW; Maritime Surveillance	2022	With a reported maximum payload of 60 tons, the AG-600 is the world's largest seaplane. It will increase China's ability to resupply the land features it controls in the South China Sea and boost its ability to conduct military operations other than war.

University of Sydney Estimate of Key Elements of Chinese Military Modernization

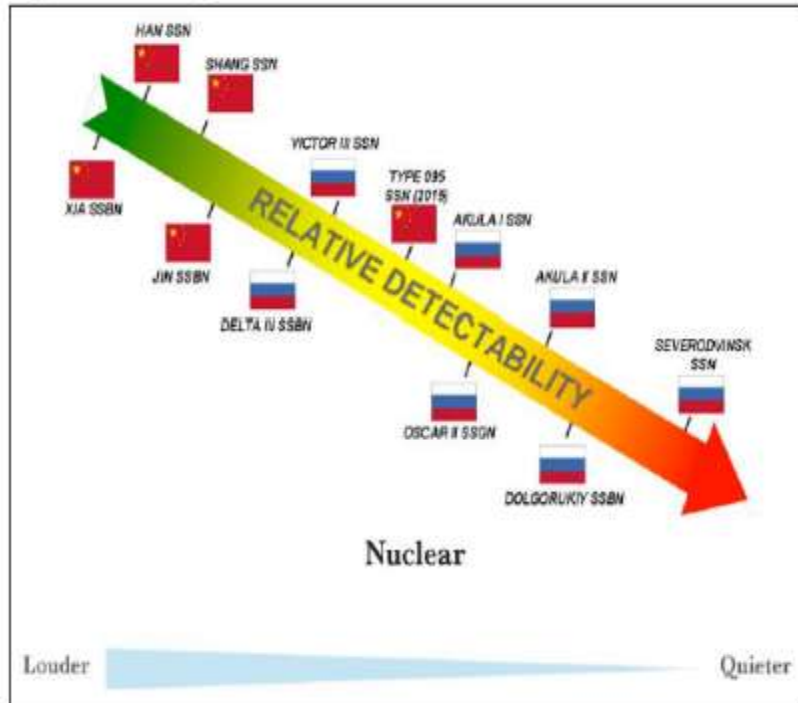


Source: International Institute for Strategic Studies. Calculations by the United States Studies Centre.⁵²

Chinese and Russian Submarine Silencing

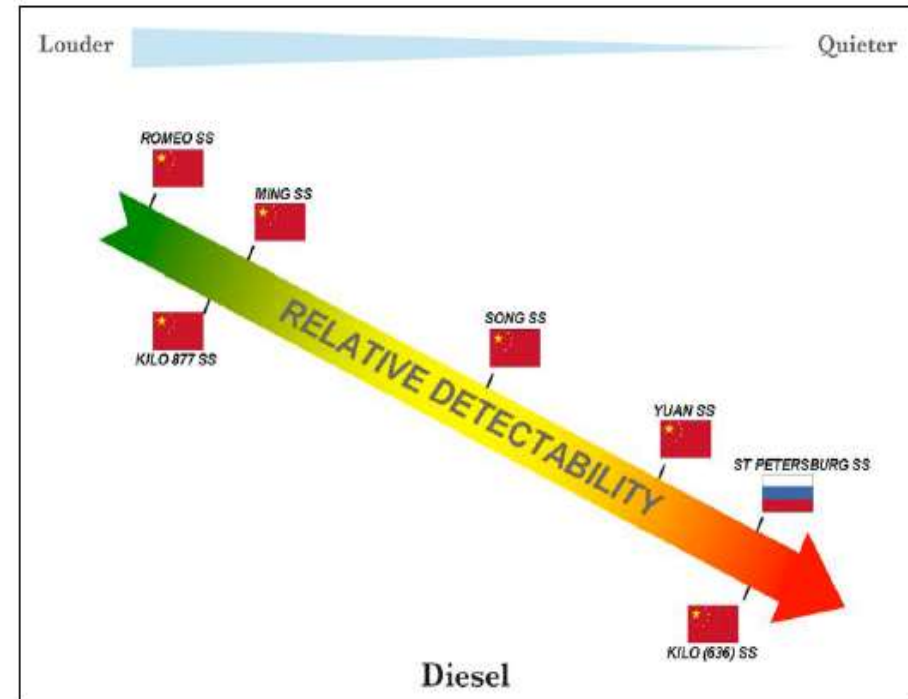
(Numbers of PLA Navy Ships and Aircraft Provided by ONI in 2009)

Figure 3. Acoustic Quietness of Chinese and Russian Nuclear-Powered Submarines



Source: 2009 ONI Report, p. 22.

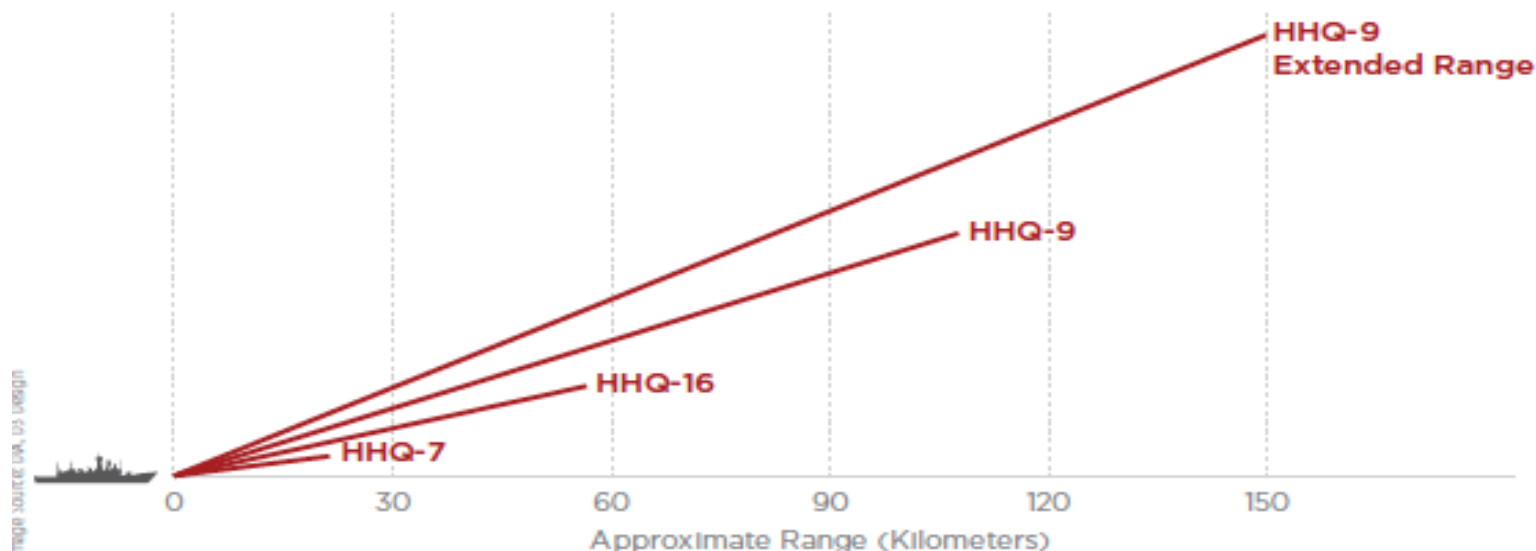
(Non-nuclear-powered submarines are commonly referred to as diesel or diesel-electric submarines)



Source: 2009 ONI Report, p. 22.

Chinese Naval Emphasis on Air Defense

The PLA Navy: Naval SAM Ranges



Shipboard air defense and antisurface warfare capabilities are arguably the most notable areas of improvement on PLAN surface ships. China has retired several older destroyers and frigates that had at most a point air defense capability and a range of just several nautical miles. Newer ships entering the force are equipped with medium- to long-range area air defense missiles, including the Renhai, which has 112 vertical-launch cells for mixed munitions.

The PLAN received a total of six Luyang II (Type 052C) class guided-missile destroyers with the HHQ-9 SAM (55-NM range) and YJ-62 antiship cruise missiles (ASCMs) (150-NM range), and six Luyang III (Type 052D) class guided-missile destroyers are now operational, with several more under construction. The Luyang III carries an extended-range variant of the HHQ-9 SAM and YJ-18 ASCM (290-NM range). In addition, more than 25 Jiangkai II (Type 054A) class guided-missile frigates are now operational, with the vertically launched HHQ-16 (20- to 40-NM range), and more are under construction.

These newer ships use modern combat management systems and air surveillance sensors, such as the Sea Eagle and Dragon Eye phased-array radars. These new units allow the PLAN surface force to operate outside shore-based air defense systems because one or two ships are equipped to provide air defense for the entire task group.



Length	304.5 meters (999.0 ft)
Beam	70 meters (229.7 ft)
Draft	10.5 meters (34.4 ft)
Flight deck length	304.5 meters (999.0 ft)
Flight deck width	70 meters (229.7 ft)
Flight deck angle	7 degrees
Aircraft launch mechanism	Ski jump
Ski jump angle	14 degrees
Top speed	30 kn (55.6 km/h) (34.5 mph)
Range	3,850 NM (7,130.2 km) (4,430.5 miles) at 29 kn (53.7 km/h) (33.4 mph) 8,500 NM (15,742.0 km) (9,781.6 miles) at 18 kn (33.3 km/h) (20.7 mph)
Crew	1,960
Machinery	8 boilers; 4 turbines; 200,000 shp; 4 shafts
Aircraft	Up to 24 J-15 fighters 6 Z-8 helicopters and 4 Ka-31 helicopters

Chinese Development of Carriers

In September 2012, China commissioned the *Liaoning*, joining the small group of countries that have an aircraft carrier. Beijing acquired the Soviet ship, formerly the *Varyag*, from Ukraine in 2002. Since that time, the PLAN has followed the long and difficult path of learning to operate fixed-wing aircraft from a carrier. The first launches and recoveries of J-15 fighter aircraft occurred in November 2012, with additional testing and training in early July 2013. With the first landing complete, China became only the fifth country in the world to have conventional takeoff and landing fighters aboard an aircraft carrier.

China’s first carrier air regiment will comprise the Shenyang J-15 Flying Shark. The J-15 is externally similar to the Russian Su-33 Flanker D but has many of the domestic avionics and armament capabilities of the Chinese J-11B Flanker. The J-15 has folding wings, strengthened landing gear, a tailhook under a shortened tail stinger, two-piece slotted flaps, canards, and a retractable inflight-refueling probe on the left side of the nose.

In 2017, China launched its first domestic aircraft carrier, which was a modified version of the *Liaoning* and is expected to enter into service by 2019. Like the *Liaoning*, the ship lacks catapult capabilities and has a smaller flight deck than U.S. carriers. The PLAN is expected to begin construction in 2018 on its first catapult-capable carrier, which will enable additional fighter aircraft, fixed-wing early warning aircraft, and more rapid flight operations.

Source: Office of the Secretary of Defense, Military and Security Developments Involving the Republic of China, Annual Report to Congress, May 16, 2018, Department of Defense. China Military Power 2018, p. 63.

Carriers

vs.

Islands?

001A Test

Bed vs.

Gerald R.

Ford

Source: China,
Global Times,
2018/5/13 8:35,,
<http://www.globaltimes.cn/content/1101935.shtml>.



Expected to be:
315 meters long, 75 meters wide

50,000 tonnes level

Expected to be:
31 knots

Conventional power

Expected to have:
**32 to 36 J-15 fighter jets
and a number of other planes**

About 60 meters long



SIZE



DISPLACEMENT



SPEED



PROPELLER



AIRCRAFT



ISLAND

304 meters long, 70 meters wide

50,000 tonnes level

29 knots

Conventional power

**Currently 24 J-15 fighter jets
and 12 other planes**

Over 70 meters long

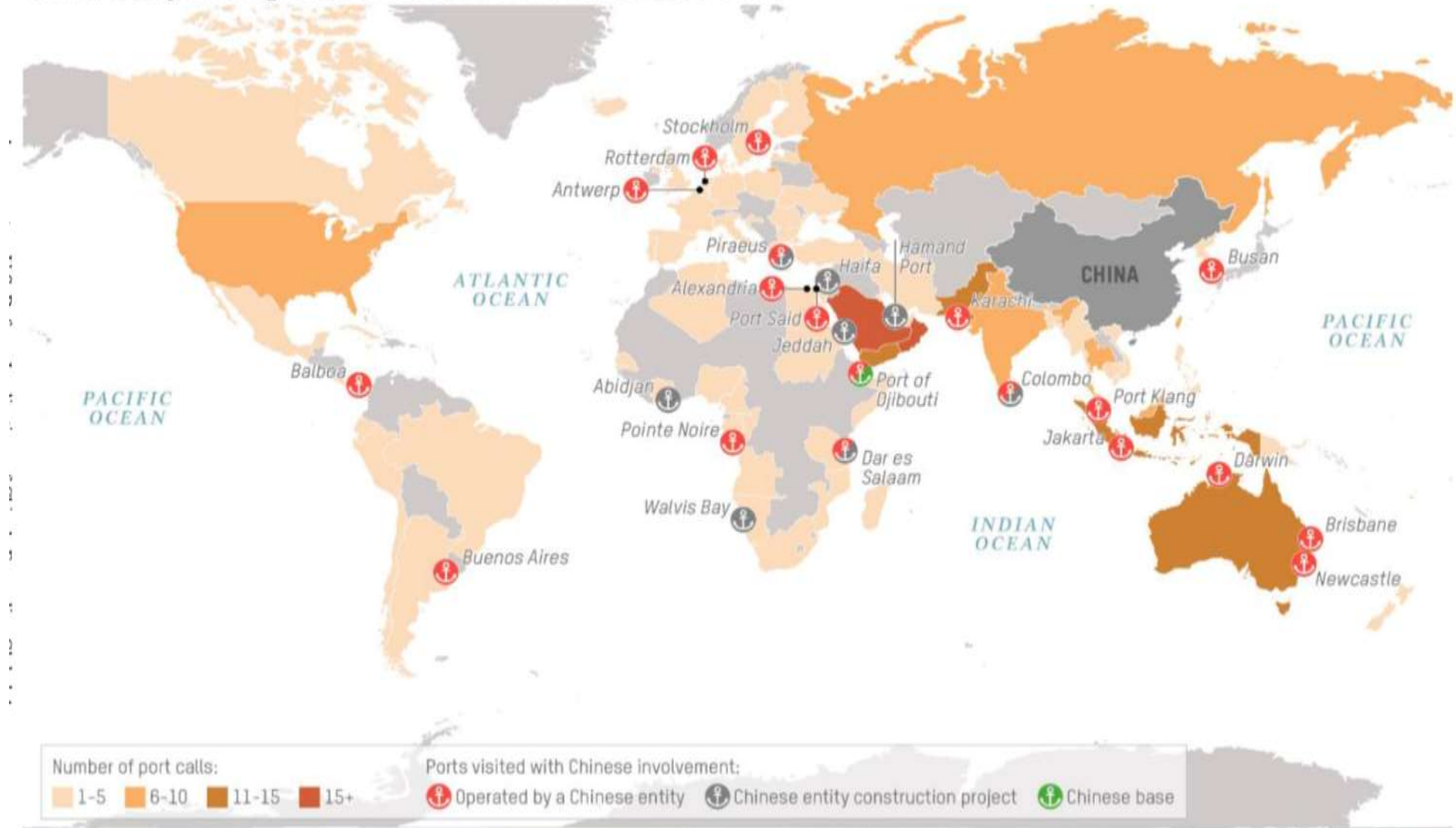
Gerald R. Ford

- Nuclear Power (new nuclear reactor design (2 X [A1B reactor](#)) for greater power generation.)
- 337 meters long
- 100,000 tons
- 75 vs. 36 aircraft
- 40+ Knots
- Advanced [arresting gear](#).
- updated [RIM-162 Evolved Sea Sparrow](#) missile.
- [AN/SPY-3 X Band](#) multifunction radar and an AN/SPY-4 [S Band](#) volume search radar.
- [Electromagnetic Aircraft Launch System](#)
- [Stealth features](#) to reduce [radar cross-section](#).
- Ability to carry up to 90 aircraft + drones

Trends in Naval Port Calls: 2008-2017

(In \$US Billions)

China's Expanding Global Access: Port Calls 2008-2017

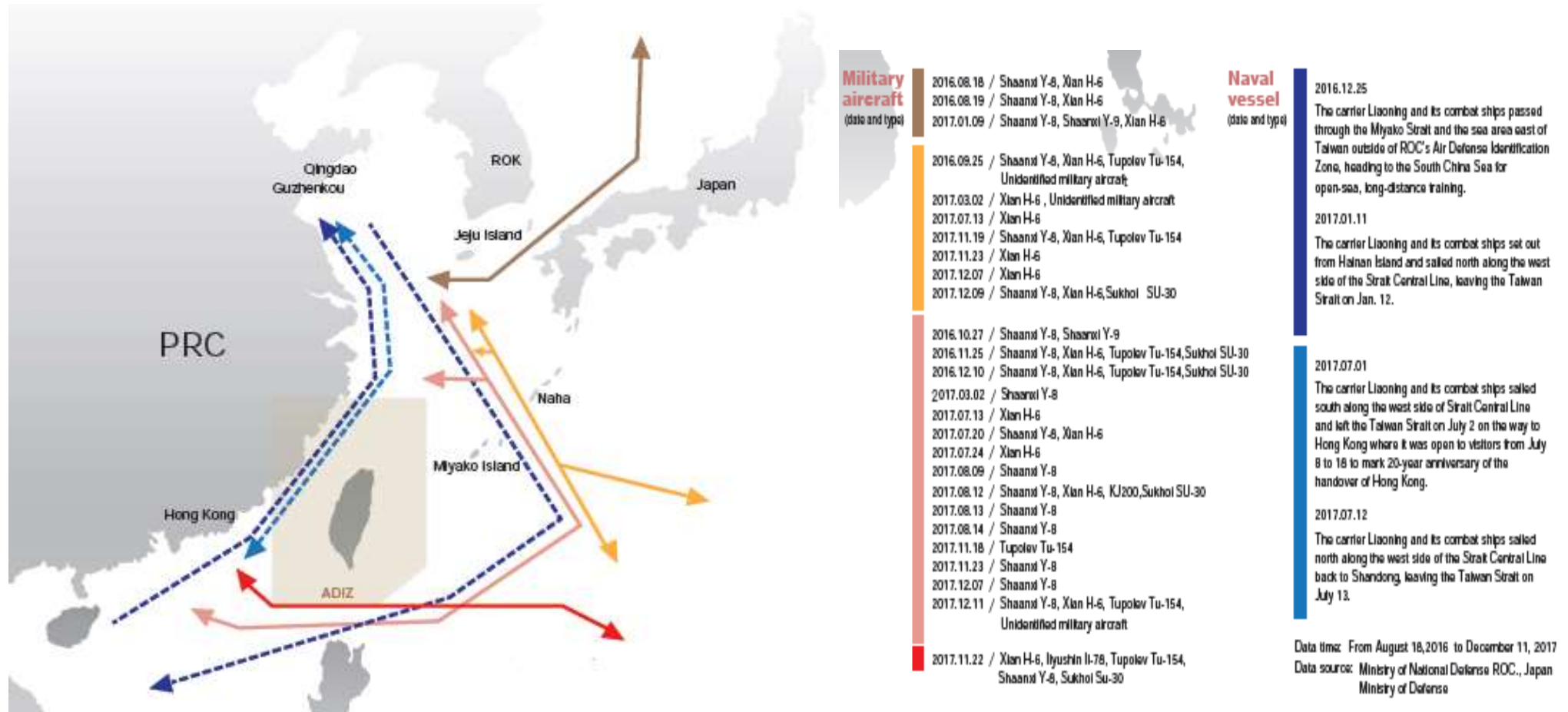


Liaoning Carrier Deployments 2014-2017

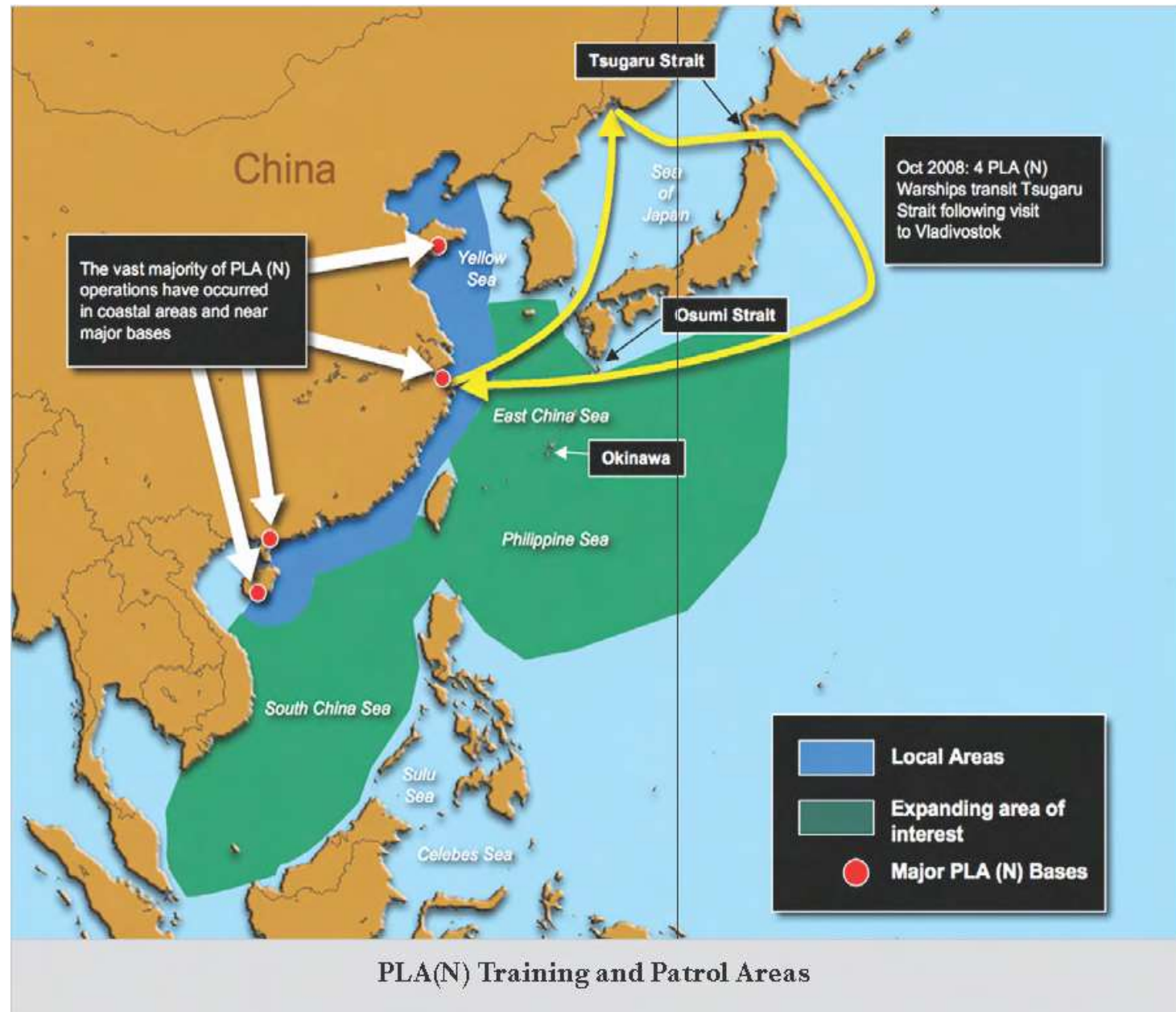


Source: Office of the Secretary of Defense, *Military and Security Developments Involving the Republic of China, Annual Report to Congress*, May 16, 2018, Department of Defense. China Military Power 2018, p.31.

Taiwan Diagram of Chinese Cross Region Naval and Air Training Routes



China's Naval Modernization: Expanding in PLAN Exercise Locations



Source: Office of Naval Intelligence, *People's Liberation Army Navy: A Modern Navy with Chinese Characteristics*, 38.

China's Amphibious Capabilities

Source: Office of the Secretary of Defense, *Military and Security Developments Involving the Republic of China, Annual Report to Congress*, May 16, 2018, Department of Defense. China Military Power 2018, p. 103.

KEY TAKEAWAYS

- ✓ The PLAA and PLANMC continue to equip, plan, and train for sustained amphibious operations.
- ✓ The PLAN did not make significant additions to its amphibious fleet in 2017 but launched a YUZHAO LPD that could enter service in 2018.

The PLA continues to make modest gains in amphibious warfare by developing additional capabilities to conduct amphibious landings and seize and defend small islands. The PLA has 12 units organized and equipped to conduct amphibious operations. Over the last five years, the PLAA and the PLANMC have fielded new equipment designed specifically for amphibious operations such as the ZBD-05 amphibious infantry fighting vehicle and the PLZ-07B amphibious self-propelled howitzer. Both PLAA and PLANMC units equipped for amphibious operations conduct regular company- to battalion-level amphibious training exercises. However, the PLA rarely conducts amphibious exercises involving echelons above a battalion, though both PLAA and PLANMC units have emphasized the development of combined arms battalion formations since 2012.

In 2017, the PLA reorganized amphibious infantry divisions of the former 1st Group Army and 42nd Group Army as well as the former 31st Group Army amphibious armor brigade, into a total of five amphibious combined arms brigades now under the new 72nd Group Army and 74th Group Army. Amphibious training throughout 2017 continued to focus upon the ability to conduct and sustain amphibious operations while incorporating real-time ISR, precision targeting for close air support assets, integrated command and control, and nighttime reconnaissance and attack training.

The PLANMC continues to make modest gains in its proficiency to conduct amphibious operations. Despite the tripling of the number of PLANMC brigades, there are no indications that any of the new units are conducting – or are even equipped to conduct – amphibious warfare training. In 2017, the PLANMC may have reduced some of its annual training due to restructuring from PLA reforms. At least one squad of operational PLAN marines from the South Sea Fleet conducted coral reef/small island seizure training in the Paracel Islands in March 2017.

The PLAN did not make significant additions to its amphibious fleet in 2017, but launched a YUZHAO LPD that could enter service in 2018.

Civilian and Paramilitary Maritime Forces

CHINA'S GROWING CIVILIAN AND PARAMILITARY MARITIME CAPABILITY

KEY TAKEAWAYS

- ✓ The CCG is the world's largest; the PAFMM is the only government-sanctioned maritime militia in the world.
- ✓ The PAFMM has organizational ties to, and is sometimes directed by, China's armed forces, and is active in the South and East China Seas.
- ✓ PAFMM units enable low-intensity coercion activities to advance territorial and maritime claims, including a patrol with the PLAN and CCG in August 2017.

China Coast Guard (CCG). The CCG is responsible for a wide range of missions, including enforcement of China's sovereignty claims, surveillance, protection of fisheries, anti-smuggling, and general law enforcement. China primarily uses civilian maritime law enforcement agencies in maritime disputes, selectively using the PLAN to provide overwatch in case of escalation.

The CCG's rapid expansion and modernization has improved China's ability to enforce its maritime claims. Since 2010, the CCG's fleet of large patrol ships (more than 1,000 tons) has more than doubled from approximately 60 to more than 130 ships, making it by far the largest coast guard force in the world and increasing its capacity to conduct simultaneous, extended offshore operations in multiple disputed areas. Furthermore, the newer ships are substantially larger and more capable than the older ships, and the majority are equipped with helicopter facilities, high-capacity water cannons, and guns ranging from 30mm to 76mm. A number of these ships are capable of long-endurance out-of-area

In addition, the CCG operates more than 70 fast patrol combatants (more than 500 tons), which can be used for limited offshore operations, more than 400 coastal patrol craft, and approximately 1000 inshore and riverine patrol boats. The CCG is likely to add another 25-30 patrol ships and patrol combatants by the end of the decade before the construction program levels off.

People's Armed Forces Maritime Militia (PAFMM). The PAFMM is a subset of China's national militia, an armed reserve force of civilians available for mobilization. The PAFMM is the only government-sanctioned maritime militia in the world. Militia units organize around towns, villages, urban sub-districts, and enterprises, and vary widely in composition and mission. In the South China Sea, the PAFMM plays a major role in coercive activities to achieve China's political goals without fighting, part of broader PRC military doctrine stating confrontational operations short of war can be an effective means of accomplishing political objectives. The militia has played significant roles in a number of military campaigns and coercive incidents over the years, including the 2009 harassment of the USNS IMPECCABLE conducting normal operations, the 2012 Scarborough Reef standoff, the 2014 *Haiyang Shiyun*-981 oil rig standoff, and a large surge of ships in waters near the Senkakus in 2016.

A large number of PAFMM vessels train with and assist the PLAN and CCG in tasks such as safeguarding maritime claims, surveillance and reconnaissance, fishery protection, logistics support, and search and rescue. The government subsidizes various local and provincial commercial organizations to operate militia vessels to perform "official" missions on an ad hoc basis outside of their regular civilian commercial activities. In August 2017, China used PLAN, CCG, and PAFMM ships to patrol around Thitu Island and planted a flag on Sandy Cay, a sandbar within 12 nm of Subi Reef and Thitu Island, possibly in response to the Philippines' reported plans to upgrade the runway on Thitu Island.

In the past, the PAFMM rented fishing vessels from companies or individual fishermen, but China has built a state-owned fishing fleet for at least part of its maritime militia force in the South China Sea. The Hainan provincial government, adjacent to the South China Sea, ordered the building of 84 large militia fishing vessels with reinforced hulls and ammunition storage, which the militia received by the end of 2016, along with extensive subsidies to encourage frequent operations in the Spratly Islands. This particular PAFMM unit is also China's most professional, paid salaries independent of any clear commercial fishing responsibilities, and recruited from recently separated veterans.

China's Changing Airpower

China Developing Air Forces: 2015 Defense White Paper

In line with the strategic requirement of building air-space capabilities and conducting offensive and defensive operations, the PLA Air Force (PLAAF) will endeavor to shift its focus from territorial air defense to both defense and offense, and build an air-space defense force structure that can meet the requirements of informationized operations.

The PLAAF will boost its capabilities for strategic early warning, air strike, air and missile defense, information countermeasures, airborne operations, strategic projection and comprehensive support.

Chinese 2019 Defense White Paper: PLAAF (PLA Air Force)

...The PLA Air Force (PLAAF) has strengthened systematic and all-airspace training based on operational plans. It has conducted combat patrols in the South China Sea and security patrols in the East China Sea, and operated in the West Pacific. It has completed a series of regular system-vs.-system exercises such as *Red Sword*.

The PLA has significantly downsized the active force of the PLAA, maintained that of the PLAAF at a steady number, moderately increased that of the PLAN and PLARF, and optimized the force structures of all services and arms. The PLA has restructured the defense reserves. The deployment of combat forces has been adjusted for a strategic configuration that meets the demands of safeguarding China's national security in the new era.

The PLAAF plays a crucial role in overall national security and military strategy. It comprises aviation, airborne, ground-to-air missile, radar, ECM, and communications forces. Under the PLAAF, there are 5 TC air force commands and one airborne corps. Under the TC air forces, there are air bases, aviation brigades (divisions), ground-to-air missile brigades (divisions) and radar brigades. In line with the strategic requirements of integrating air and space capabilities as well as coordinating offensive and defensive operations, the PLAAF is accelerating the transition of its tasks from territorial air defense to both offensive and defensive operations, and improving its capabilities for strategic early warning, air strikes, air and missile defense, information countermeasures, airborne operations, strategic projection, and integrated support, so as to build a strong and modernized air force.

Chinese Air Forces in End-2016

Taiwan Strait Military Balance, Air Forces			
	China		Taiwan
	Total	Within range of Taiwan	Total
Fighters	1,700	130	384
Bombers/Attack	400	200	0
Transport	475	150	19
Special Mission Aircraft	115	75	25
<p>Note: The chart displays military aircraft only, but the PLAAF may supplement its military transports with civilian aircraft in a combat scenario. The chart categorizes aircraft as "within range of Taiwan" if they are able to conduct combat operations against Taiwan without refueling from their current location; however, the number of aircraft "within range" may be significantly increased through any combination of aircraft forward deployment, decreased ordnance loads, or altered mission profiles.</p>			

Chinese Major Air Units - 2018



Source: Office of the Secretary of Defense, *Military and Security Developments Involving the Republic of China*, Annual Report to Congress, May 16, 2018, Department of Defense. China Military Power 2018, p.35.

Chinese Major Air Units in 2019

The PLAAF is the largest air force in the region and the third largest in the world, with more than 2,500 total aircraft (not including UAVs or trainers) and 1,700 combat aircraft (including fighters, strategic bombers, tactical bombers, and multimission tactical and attack aircraft). The PLAAF is closing the gap with Western air forces across a broad spectrum of capabilities, such as aircraft performance, C2, and electronic warfare.

In 2017, the PLAAF reorganized its force structure as part of broader PLA reforms. Changes included establishing at least six new airbases and restructuring the force's previously subordinate regiments into brigades under these newly established bases by disbanding fighter and fighter-bomber divisions. The PLAAF also relocated or resubordinated some units to different theater commands and redesignated the 15th Airborne Corps as the PLA Airborne Corps.

"In line with the strategic requirement of building air-space capabilities and conducting offensive and defensive operations, the PLA Air Force (PLAAF) will endeavor to shift its focus from territorial air defense to both defense and offense and build an air-space defense force structure that can meet the requirements of informatized operations. The PLAAF will boost its capabilities for strategic early warning, air strike, air and missile defense, information countermeasures, airborne operations, strategic projection, and comprehensive support."

—Excerpt from *China's Military Strategy*, May 2015



Select Air Force Tactical and Strategic Systems Entering Service and under Development

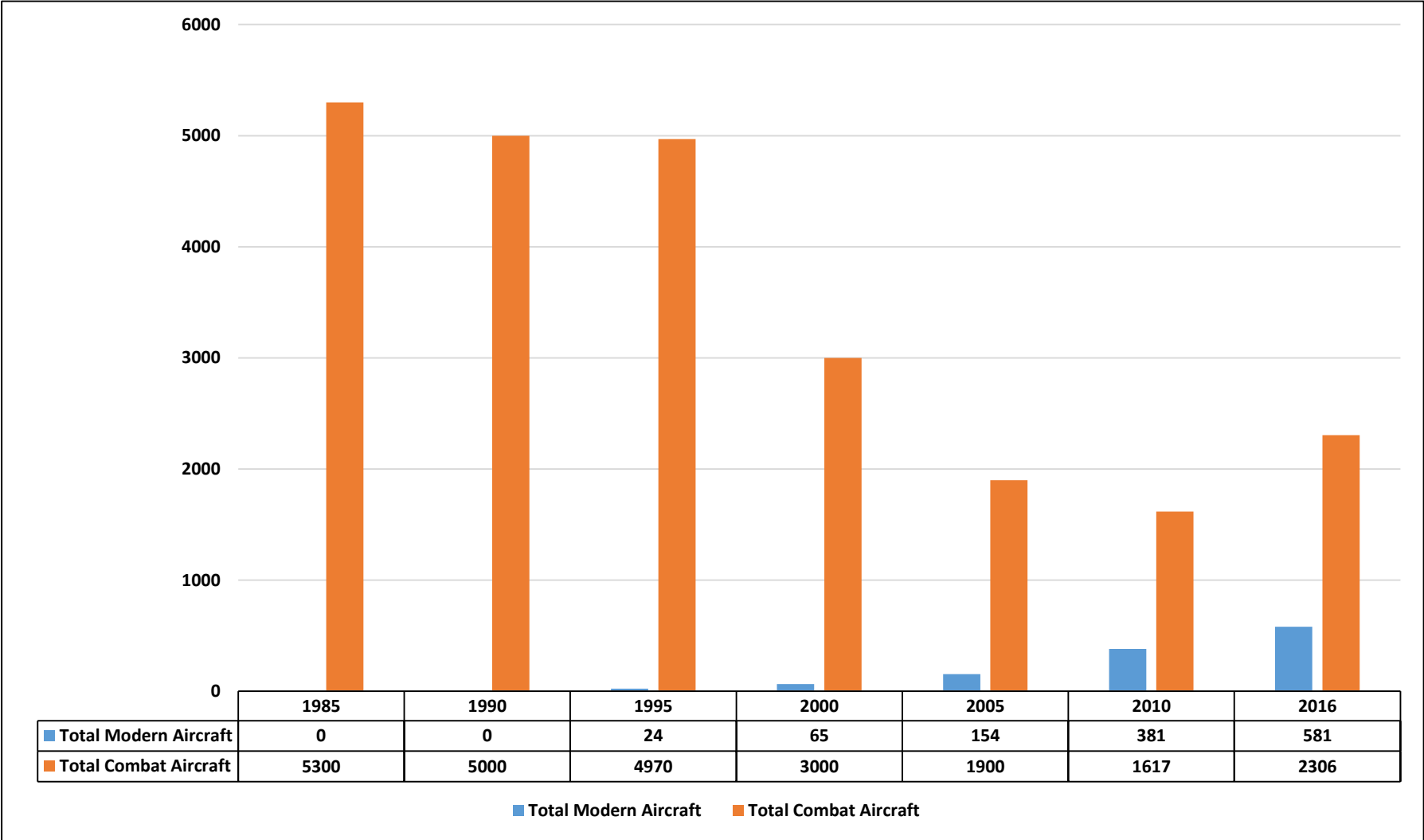
Equipment	Mission Area	Estimated Service Entry	Implications
J-20 fifth-generation fighter	Air Superiority	2017	Having officially entered service in September 2017, the J-20 is China's most advanced indigenously produced fighter, with similar capabilities as the J-31 in terms of stealth features and advanced radar. The J-20 will pose challenges to U.S. aircraft in the Western Pacific.
Su-35 4.5-generation fighter	Air Superiority	2017–2018	Purchased from Russia (24 in total, receiving the last batch of 10 by the end of 2018), the Su-35 provides the PLA improved counter-air and strike capabilities with its advanced avionics and radar. It will boost the PLA's ability to conduct air operations in the Western Pacific.
J-31 (FC-31) fifth-generation stealth fighter	Air Superiority	2022	The J-31 (and its export variant, the FC-31) will be equipped with modern systems and stealth features that could rival the U.S. F-35 fighter and challenge U.S. aircraft in the Western Pacific. Some Chinese commentators have speculated that China could use the fighters for carrier operations.

Equipment	Mission Area	Estimated Service Entry	Implications
H-20 long-range stealth bomber	Strike; Nuclear Deterrence; A2/AD	2025	China's next-generation bomber will integrate fifth-generation technologies and be capable of carrying nuclear weapons, according to DOD. Replacing the H-6, the H-20 will have an increased range of at least 5,000 miles (mi), boosting China's ability to operate farther from its shores and putting Hawaii at risk.
Y-20 strategic heavy-lift aircraft	Transport	2016	The Y-20 reportedly has a maximum payload of 66 tons, and is in the same category as the Russian IL-76 and U.S. C-17. As China produces more of these aircraft, they will extend the PLA's expeditionary capabilities.
AN-225 strategic heavy-lift aircraft	Transport	2019–2020	As part of a China-Ukraine agreement, a Ukrainian aircraft firm is restarting production on the AN-225 and transferring the technology to China. As the largest transport aircraft in the world, the AN-225 has a maximum payload of 280 tons. It will be the PLA's largest strategic lift aircraft, increasing its expeditionary capabilities.

Select Air Force Missile Defense Systems Entering Service and Under Development—November 2018

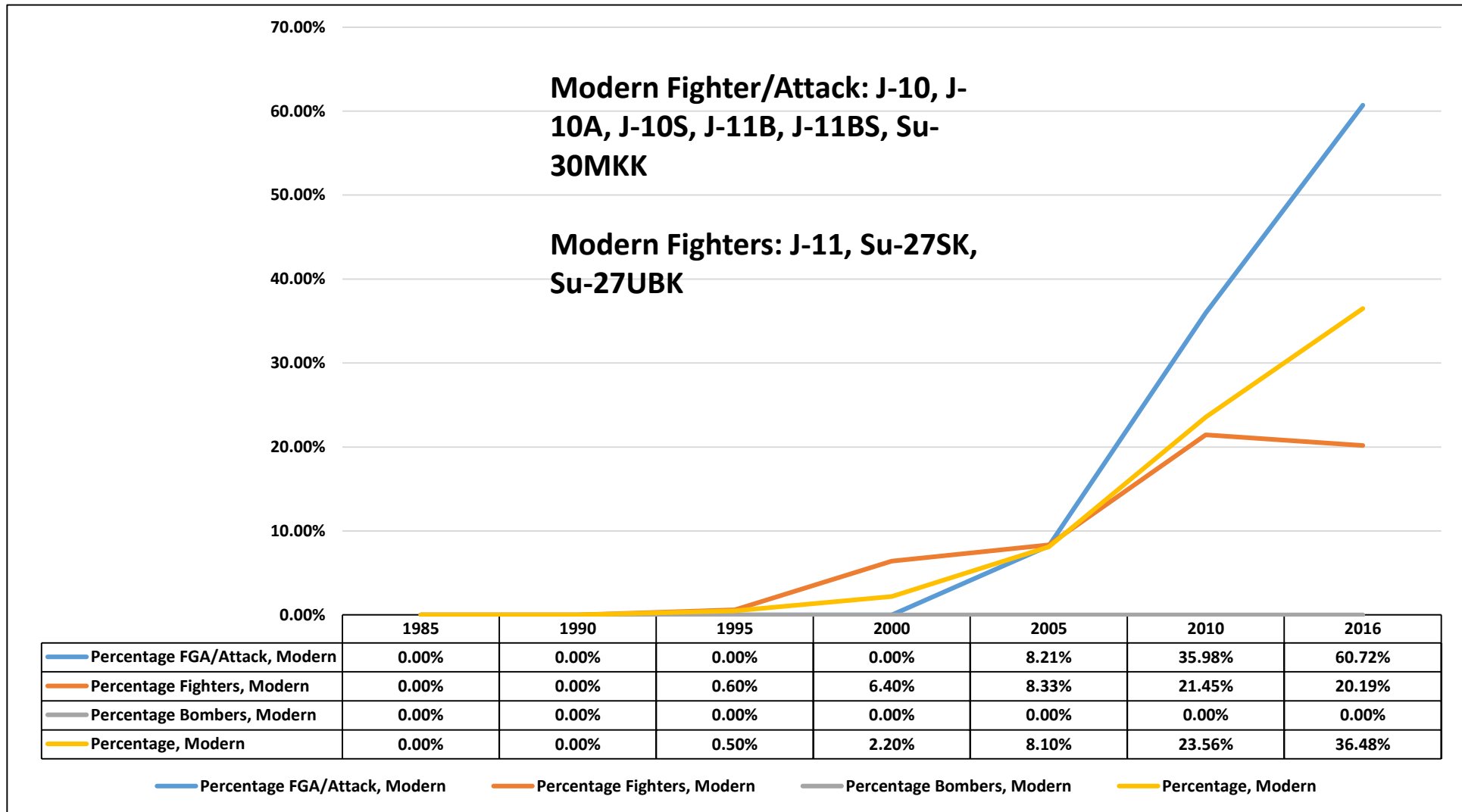
Equipment	Mission Area	Estimated Service Entry	Implications
S-400 surface-to-air missile (SAM) system	Air Defense; A2/AD	2018	Receiving its first regiment of S-400 SAM systems in April 2018 from Russia, China reportedly will receive four to six battalions as part of a 2014 deal. The S-400's 250-mi range expands China's air coverage over the South China Sea and Taiwan if deployed near either area.
HQ-19 SAM system	Air Defense; A2/AD; Ballistic Missile Defense	Unknown	DOD assesses the HQ-19 "may fill the mid-tier of China's [ballistic missile defense] network," and testing so far has focused on intercepting 3,000 km-ranged ballistic missiles. This system will increase China's ability to challenge an adversary's attempt to control airspace or conduct strike operations in China's periphery.

China’s Air Modernization: Total versus Modern Combat Aircraft, 1985-2016



*The following systems are considered modern: J-10, J-10A, J-10B, J-10S, J-11, J-11B, J-11BS, Su-27SK, Su-27UBK, Su-30MKK
Source: IISS, *Military Balance* 1985-2016.

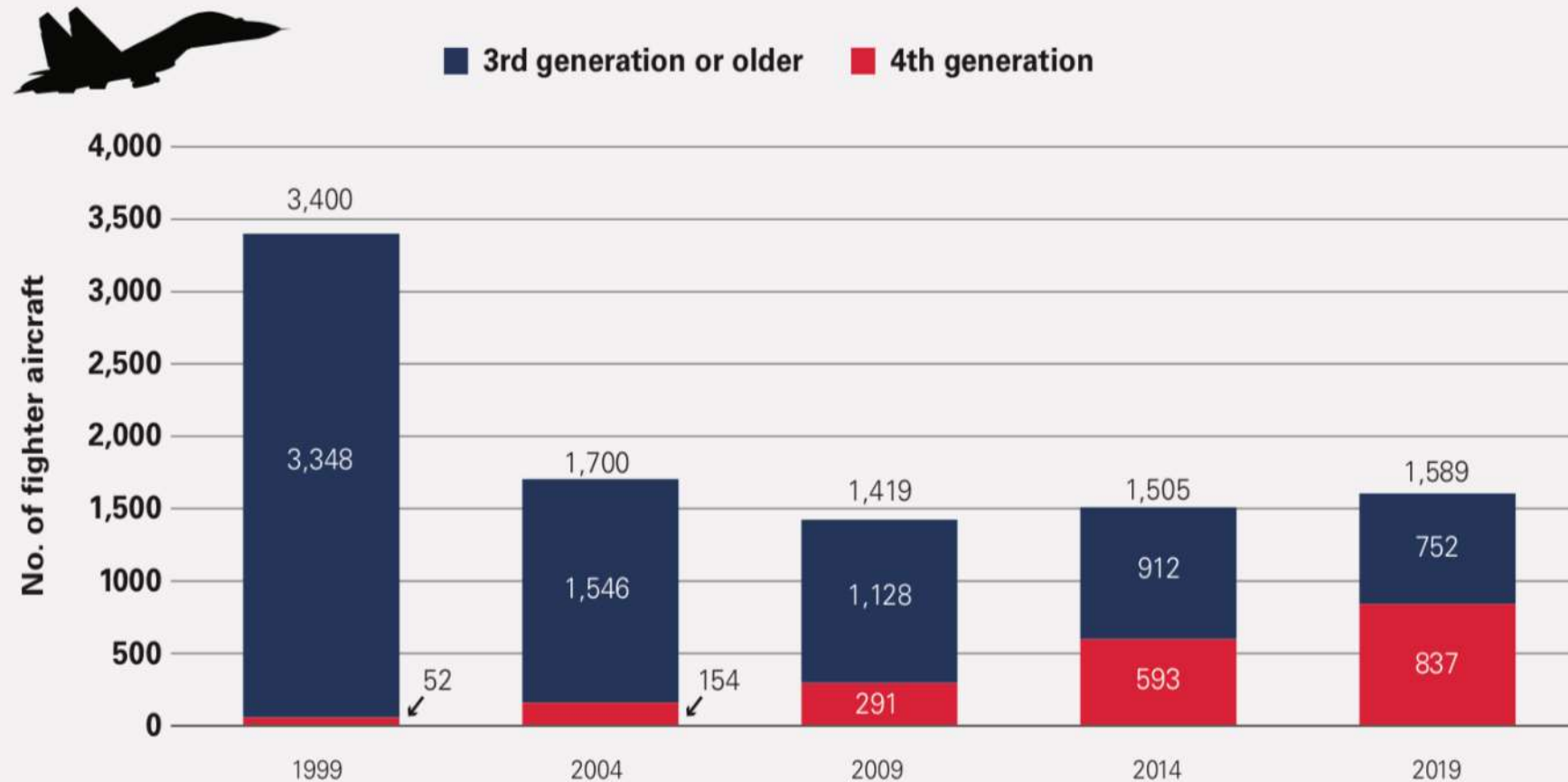
China's Air Modernization: Percent of Modern Combat Aircraft, 1985-2016



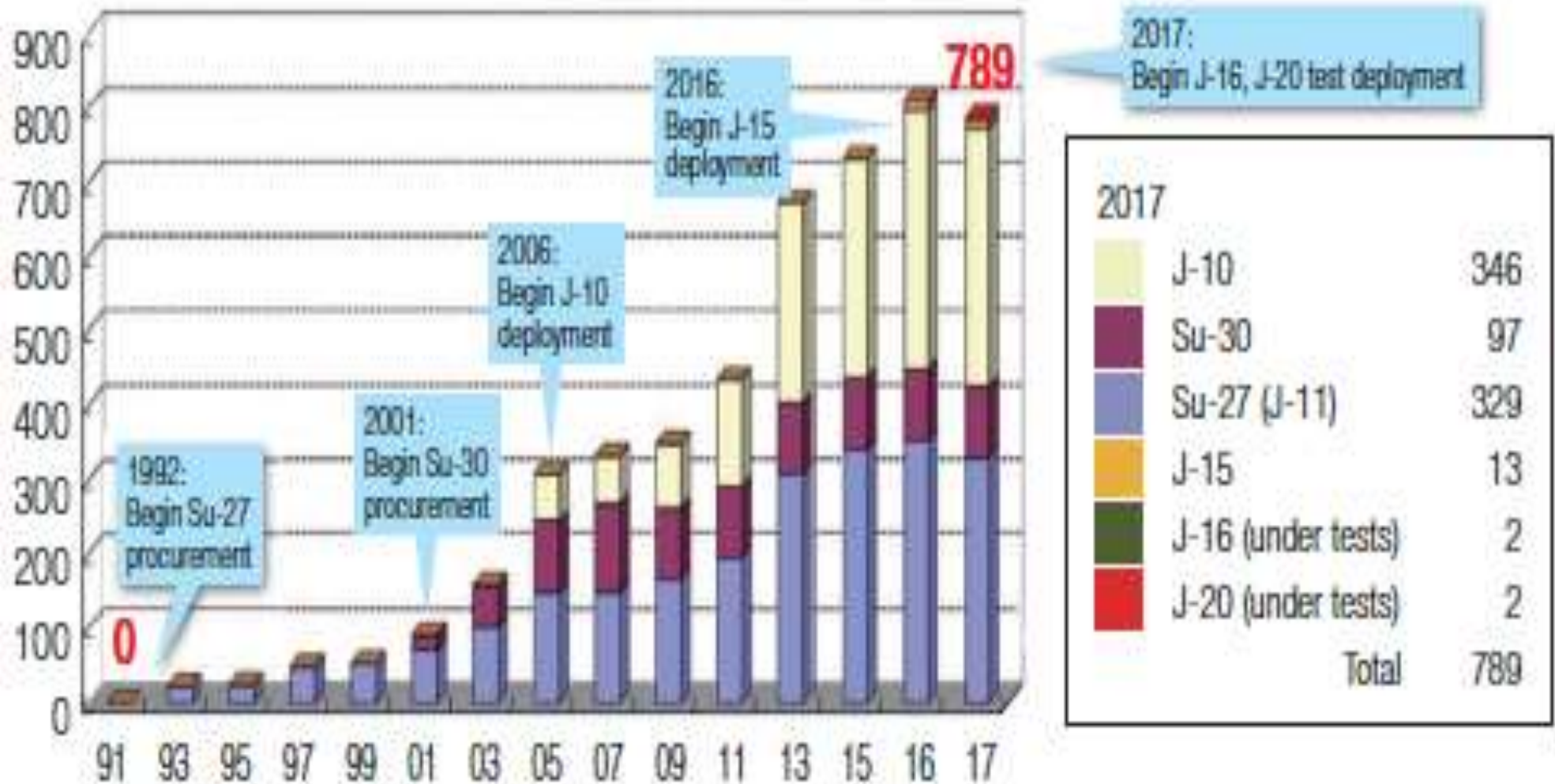
Note: "Percentage Modern" assesses only combat capable aircraft.

Source: IISS, *Military Balance* 1985-2015. Adapted by Anthony H. Cordesman and Joseph Kendall at the Center for Strategic and International Studies.

University of Sydney Estimate of Key Elements of Chinese Air Modernization: 1999-2019



Japanese Estimate of Chinese 4th and 5th Generation Fighters: 1991-2017



Japanese Estimate of Key Chinese 4th and 5th Generation Aircraft

J-10 fighter



[Jane's By IHS Markit]

<Specifications, performance>

Maximum speed: Mach 1.8

Main armament: Air-to-air missiles (maximum firing range 70 km), air-to-ship missiles (maximum firing range 120 km)

<Description>

China's first main fighter produced domestically. First deployed in 2003, it is reportedly in mass production.

J-20 fighter



[Jane's By IHS Markit]

<Specifications, performance>

Details unknown

<Description>

Fifth-generation fighter with stealth capabilities. First demonstration flight of two J-20 fighters at air show in 2016. Its test deployment has reportedly been started already.

KJ-2000 AWACS



[Jane's By IHS Markit]

<Specifications, performance>

Details unknown

<Description>

Airborne early warning and control (AWAC) aircraft. A Russian IL-76 strategic airlifter mounted with a radar dome.

Y-20 large cargo aircraft



[Jane's By IHS Markit]

<Specifications, performance>

Maximum cruising speed: 796 km/h

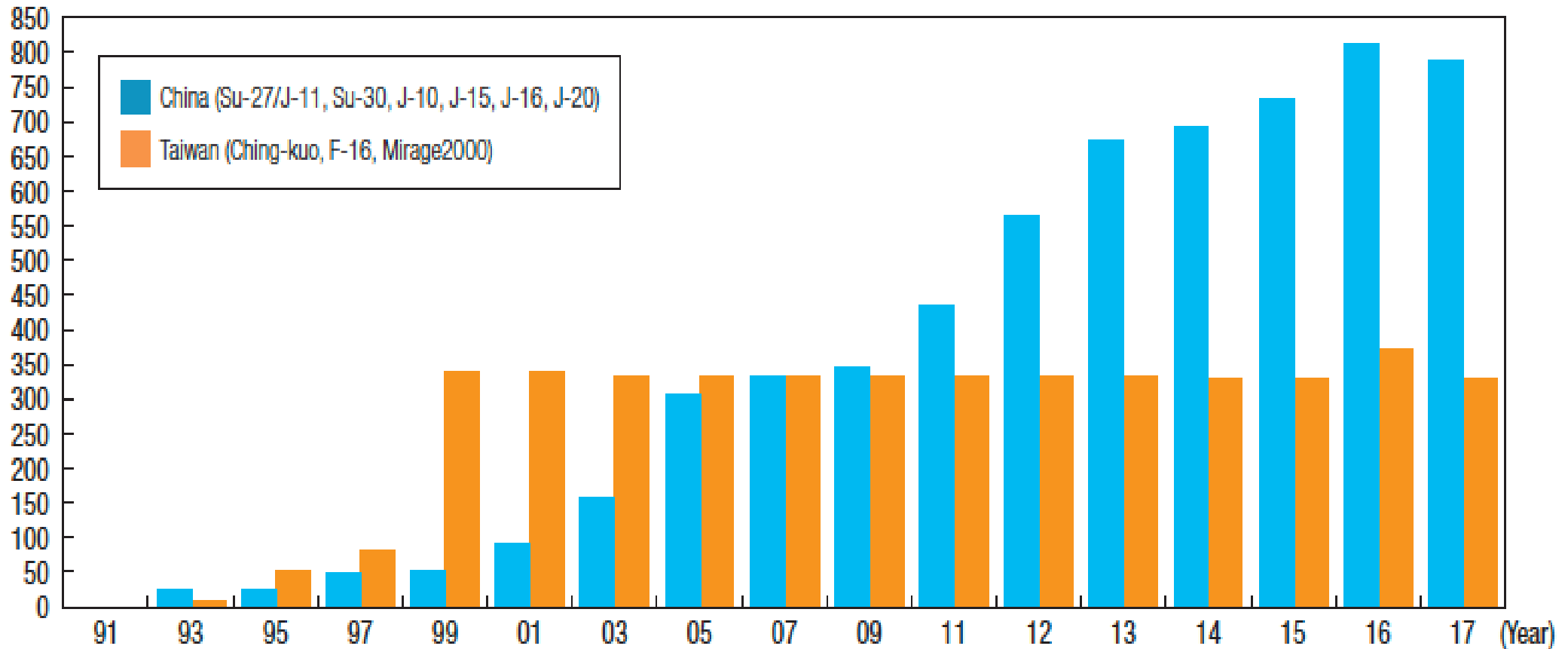
Maximum payload: 66,000 kg (estimate)

<Description>

Large multipurpose cargo aircraft independently developed by China. Deployed to military units in July 2016.

Japanese Estimate of Chinese vs. Taiwan Air Modernization: 1991-2017

(Number of Aircraft)



Source: "The Military Balance" (of respective years)

U.S. - Defined Fourth and Fifth Generation Fighter Aircraft in China

DIA in 2019

Fourth-generation fighter aircraft*—which include the Chinese J-10B/C, J-11B, and J-16—are generally characterized by the following:

- Electronically or mechanically scanned multimode radars, passive infrared search and track systems.
- “Glass” cockpits with multifunction displays (MFDs), improved heads-up display (HUD), and helmet-mounted sight (HMS).
- High-bandwidth communications and datalinks and identification, friend or foe (IFF).
- Advanced electronic warfare (EW) avionics, including digital jamming system, radar warning receiver, chaff/flare dispensers, and adaptive countermeasures.
- Engines with increased thrust and service life; advanced weapons, including long-range air-to-air missiles (AAMs), off-boresight short-range AAMs, LACMs, ASCMs, and precision-guided munitions (PGMs).
- Passive electronically scanned array or active electronically scanned array (AESA) radars. These radars provide long-range radar detection and electronically scanned radar beams that enable automatic target acquisition, tracking of multiple targets, and highly accurate targeting data for air-to-air and precision air-to-ground engagements.
- Digital radiofrequency memory (DRFM) jammers enabling instantaneous smart jamming responses by automatically selecting jamming waveforms to counter a specific radar threat—significantly improving fighter aircraft survivability.

Fifth-generation fighter aircraft*, including the developmental Chinese J-20 and FC-31/J-31, are commonly defined by the following state-of-the-art technologies:

- Stealthy aircraft designs with significantly reduced radar and infrared signatures.
- AESA radars.
- Long-range, multiband EO targeting systems.
- Sensor fusion.
- Advanced glass cockpits with large MFDs and HMSs.
- Advanced datalinks fusing data from air and ground networks.
- Internal carriage of off-boresight and long-range AAMs, LACMs, ASCMs, and PGMs.
- Sophisticated EW suites with advanced DRFM jammers and EO defensive systems.
- Super maneuverability and/or super cruise capability (ability to fly above Mach 1 without use of afterburner).
- Designed with network-centric warfare technology; will have potent air-to-air lethality and standoff attack capabilities in sensor-to-shooter operations.

China's Over-Water Bomber Operations

The PLA has long been developing air strike capabilities to engage targets as far away from China as possible. Over the last three years, the PLA has rapidly expanded its overwater bomber operating areas, gaining experience in critical maritime regions and likely training for strikes against U.S. and allied targets. The PLA may continue to extend its operations beyond the first island chain, demonstrating the capability to strike U.S. and allied forces and military bases in the western Pacific Ocean, including Guam. Such flights could potentially be used as a strategic signal to regional states, although the PLA has thus far has not been clear what messages such flights communicate beyond a demonstration of improved capabilities.

Western Pacific. PLA aircraft first operated beyond the first island chain in 2013, when a PLAN ASCM-capable H-6G bomber transited through the Bashi Channel; however, the H-6G bomber lacks the range and endurance to patrol the western Pacific Ocean effectively and strike key U.S. and allied facilities. China began to field the longer-range H-6K bomber in 2013, incorporating cruise missile pylons to turn the bomber into a stand-off strike platform. The H-6K's capabilities provided the PLAAF an offensive strike capability against Guam with LACMs.

The PLAAF began flying the H-6K past the First Island Chain into the western Pacific Ocean in 2015, alternating transits through the Miyako Strait and the Bashi Channel and flying within LACM range of Guam. In 2016, the PLAAF improved its capabilities by adding AWACS and fighter aircraft to its bomber flight packages to provide defensive counter-air protection of the bombers beyond the first island chain.

In 2016, the PLAAF also circumnavigated Taiwan for the first time by passing through both the Miyako Strait and Bashi Channel in the same mission, and significantly increased the number of circumnavigation missions in 2017. In addition to long-range flight plans, future H-6 missions may also target Taiwan. Depending on the weapons load, potential future H-6 missions could include anti-ship or shorter-range strikes targeting eastern Taiwan from all directions or supporting a blockade. Currently, such missions are vulnerable without defense counter-air support provided by fighters traveling along the route with the bombers.

South China Sea. In 2016, China began flying H-6K missions in the South China Sea, probably as far as Scarborough Reef, conducting maritime patrols and ISR. H-6s could, if deployed to airfields in the Spratly Islands, extend their range through the Balabac Strait into the Celebes Sea or through the Sunda or Malacca Strait to fly into the Indian Ocean.

Sea of Japan. In August 2016, two PLAN H-6 bombers accompanied by a Y-8 AEW&C aircraft conducted the first PLA flights into the Sea of Japan. In January 2017, they flew the same route, this time with six bombers supported by two reconnaissance aircraft. In August 2017, the PLAAF further expanded the PLA's operating area by sending six PLAAF H-6K bombers through the Miyako Strait, and for the first time, turned north to fly east of Okinawa and as far north as the Kii Peninsula. These

Date	Service	Operating Area	Notes
Sep 2013	PLAN	Western Pacific	1st PLA flight ever beyond first island chain; occurred on anniversary of Japan nationalizing Senkakus
Dec 2014	PLAN	Western Pacific	1st ever PLAAF flight beyond first island chain
Mar 2015	PLAAF	Western Pacific	
May 2015	PLAAF	Western Pacific	
Aug 2015	PLAAF	Western Pacific	
Nov 2015	PLAAF	Western Pacific	
Aug 2016	PLAN	Sea of Japan	1st PLA flight into Sea of Japan
Sep 2016	PLAAF	Western Pacific	Probably 1st flight to include fighters and AWACS with the bombers beyond the first island chain
Nov 2016	PLAAF	Western Pacific	1st circumnavigation of Taiwan
Dec 2016	PLAAF	Western Pacific	2nd circumnavigation of Taiwan
Jan 2017	PLAN	Sea of Japan	2nd mission to Sea of Japan, this time with six H-6G bombers
Jul 2017	PLAAF	Western Pacific	Circumnavigation of Taiwan, concurrent missions in each direction
Aug 2017	PLAAF	Western Pacific	Circumnavigation of Taiwan
Aug 2017	PLAAF	Western Pacific, east of Japan north of the Miyako Strait	First flights along eastern Japan
Nov 2017	PLAAF	Western Pacific	
Nov 2017	PLAAF	Western Pacific	Notably included EW and tanker aircraft in addition to fighters
Nov 2017	PLAAF	Western Pacific	Separate missions through both Miyako and Luzon Straits in one day
Dec 2017	PLAN	Western Pacific	Separate missions through both Miyako and Luzon Straits
Dec 2017	PLAAF	Western Pacific	
Dec 2017	PLAAF	Western Pacific	Circumnavigation of Taiwan; PLAAF spokesman described as a "circling-the-island patrol"
Dec 2017	PLAAF	Sea of Japan	1st PLAAF flight into Sea of Japan and entered the Korean ADIZ
Dec 2017	PLAAF	Western Pacific	Supported by a Y-8 that continued on to circumnavigate Taiwan

flights demonstrated a maturing capability for H-6K bombers to conduct off-axis strikes against U.S. and allied facilities. Previously demonstrated flight endurance of the PLAAF H-6K suggest future missions could fly around Japan, along the Philippines' coast, and use a wider area of operations throughout the Philippine Sea than current operations by Chinese aircraft.

China's Over-Water Bomber Capabilities

Office of the Secretary of Defense,
*Military and Security Developments
 Involving the Republic of China, Annual
 Report to Congress*, May 16, 2018,
 Department of Defense. China Military
 Power 2018, p. 118.



China's Paramilitary Forces and Counterterrorism

Chinese 2019 Defense White Paper: Peoples Army Police and Paramilitary Forces

The PAP fulfills missions such as guarding key targets, on-site security protection, setting check points on key passages, and armed urban patrols. In accordance with the law, the PAP supports civil authorities in law enforcement operations to combat criminal gangs and terrorist activities, actively participates in the maintenance of public order, and prevents and responds to potential threats to China's political security and social order, thus making a significant contribution to the Peaceful China initiative. Since 2012, the PAP has deployed large numbers of troops annually in security duties, counter-terrorism, emergency response, and maritime rights protection and law enforcement. It has completed around 10,000 security assignments during major events such as the G20 Summit, the APEC Economic Leaders' Meeting, the Belt and Road Forum for International Cooperation, the BRICS Leaders Meeting, and the SCO Qingdao Summit, and participated in the response to 671 hostage situations, incidents of severe violence, and terrorist attacks. Since 2014, the PAP has assisted the government of Xinjiang Uygur Autonomous Region in taking out 1,588 violent terrorist gangs and capturing 12,995 terrorists.

...Since 2012, the PLA and the PAP have deployed 950,000 soldiers, 1.41 million militia, 190,000 vehicles and items of equipment, and sortied 26,000 vessels and 820 aircraft in emergency response and disaster relief. They have participated in rescue and relief efforts such as the earthquake in Ludian County of Yunnan Province, the rainstorm and flood in the middle and lower reaches of the Yangtze River, and the removal of the barrier lake in the Yarlung Zangbo River. They have assisted local governments to rescue and transfer over 5 million people, treated over 210,000 patients, transported over 360,000 tons of goods, and reinforced over 3,600 km of levees

...The PAP shoulders important responsibilities in safeguarding national security, social stability and public wellbeing. China has adopted a CMC-PAP-Troops leadership and command system with the basic duties and nature of the PAP unchanged. The PAP is not in the force structure of the PLA. The PAP border defense, firefighting and security guard forces have been decommissioned. The coast guard under the leadership of State Oceanic Administration has been transferred to the PAP. PAP goldmine, forest and hydroelectricity forces have been reorganized into specialized forces of non-active service under corresponding state authorities. Meanwhile, the PAP customs guard forces have been withdrawn. In this way, the leadership, management, command and employment of the PAP has become more coherent. Following adjustment and reorganization, the PAP is mainly composed of the internal security corps, the mobile corps, and the coast guard. In line with the strategic requirements of performing multiple functions and effectively maintaining social stability, the PAP is enhancing capacity in guard duties, emergency response, counter-terrorism, maritime rights protection, administrative enforcement and disaster relief, so as to build a strong and modernized armed police force.

...The PLA and the People's Armed Police Force (PAP) give greater priority to combat readiness. Efforts are made to strictly act on relevant regulations and procedures, fulfill readiness duties, conduct targeted exercises and training, and maintain standardized order, with a view to staying ready to act when required and effectively carrying out readiness (combat) duties.

...The PAP has developed to meet the requirements of nationwide coverage, effective connectivity, all-area response and integrated functions, and conducted a series of exercises including *Guard*.

Chinese 2019 Defense White Paper: Terrorism

Extremism and terrorism keep spreading. Non-traditional security threats involving cyber security, bio-security and piracy are becoming more pronounced.

...China firmly opposes all forms of terrorism and extremism. As mandated by law, China's armed forces participate in operations for maintaining social order, prevent and combat violence and terrorism, safeguard political security and social stability, and secure the public's right to live and work in peace.

..China is active in international and regional counter-terrorism cooperation. It has strengthened such cooperation within the framework of the SCO. China hosts and participates in joint counter-terrorism exercises, cracks down on illegal trafficking of weapons, ammunition and explosives, cooperates with SCO members to identify and cut off channels for terrorist infiltration, and promotes international counter-terrorism intelligence exchange and information sharing. It hosts the Great Wall International Forum on Counter-Terrorism, and actively participates in multilateral counter-terrorism mechanisms such as the APEC Counter-Terrorism Working Group and the Global Counter-Terrorism Forum. Bilateral counter-terrorism consultations have been held with certain countries. China initiated the establishment of the Quadrilateral Cooperation and Coordination Mechanism (QCCM), a counter-terrorism cooperation and coordination mechanism by the militaries of Afghanistan, China, Pakistan and Tajikistan. The QCCM has convened two military leaders' meetings and conducted counter-terrorism exchange and cooperation, actively safeguarding regional security.

...Meeting and the ASEAN Defense Ministers' Meeting Plus (ADMM-Plus) play positive roles in enhancing trust among regional countries through military exchanges and cooperation. ...Steady progress has been made in building a coordinated counter-terrorism mechanism among the militaries of the regional countries.

...China's armed forces...make concerted efforts to respond to global challenges such as terrorism, cyber security and major natural disasters, thus making a positive contribution to building a community with a shared future for mankind....the PAP is enhancing capacity in guard duties, emergency response, counter-terrorism, maritime rights protection, administrative enforcement and disaster relief, so as to build a strong and modernized armed police force.

China has regularly held serial joint exercises and training on counter-terrorism, peacekeeping, search and rescue, and tactical skills with its neighboring countries, and carried out extensive exchanges and practical cooperation on border and coastal defense .

...The PAP fulfills missions such as guarding key targets, on-site security protection, setting check points on key passages, and armed urban patrols It has completed around 10,000 security assignments during major events such as the G20 Summit, the APEC Economic Leaders' Meeting, the Belt and Road Forum for International Cooperation, the BRICS Leaders Meeting, and the SCO Qingdao Summit, and participated in the response to 671 hostage situations, incidents of severe violence, and terrorist attacks. Since 2014, the PAP has assisted the government of Xinjiang Uygur Autonomous Region in taking out 1,588 violent terrorist gangs and capturing 12,995 terrorists.

...The PLA supports the civil authorities in maintaining social stability, provides security for major events, and responds to emergencies in accordance with the law. It is mainly tasked with missions such as counter-terrorism, NBCE detection and test, medical relief, and transport support. It disposes of potential safety hazards in the waters and protects security in the air over and around major event venues.

U.S. State Department Country Report on China and Terrorism: 2018 - I

CHINA (HONG KONG AND MACAU) Overview: Referring to “terrorism, separatism, and extremism” as “three evil forces” that threaten domestic stability, China continued enhancing domestic counterterrorism efforts and called for greater regional cooperation to combat terrorism. During March-April, China initiated a major security campaign in the Xinjiang Uighur Autonomous Region (XUAR) that targeted Uighur and other Muslim ethnic groups and was reportedly aimed at rooting out what officials describe as “separatist, extremist, and terrorist activity.” The campaign included detentions widely reported to number in the thousands, along with intensified use of traditional policing measures, the deployment of high-tech surveillance and monitoring systems, the involuntary collection of DNA and other biometric data, and the closure of mosques.

China’s primary counterterrorism focus remained on ethnic Uighur extremists Beijing ascribes to the East Turkistan Islamic Movement (ETIM). China maintains that ETIM is responsible for much of the violence in the XUAR, despite a lack of independent information that ETIM is active in China. China’s response to the threat of terrorism remained difficult to distinguish from its suppression of activities its leadership deems separatist in nature or politically subversive to the Chinese Communist Party. In response to alleged separatist or subversive concerns, China intensified its security and surveillance in the XUAR, including the implementation of stricter security controls, restrictions on travel, and curbs on religious practice.

There were signs that ISIS posed a threat to China and its interests abroad, and the Chinese government reported that some Chinese citizens have joined ISIS and other terrorist organizations in the Middle East. China also issued public statements warning of growing threats to Chinese nationals abroad. In March, ISIS released a half-hour video in which it pledged to attack unspecified Chinese targets.

...Legislation, Law Enforcement, and Border Security: China continued to enhance surveillance and security throughout the country, sometimes citing the Counterterrorism, National Security, Counter-Espionage, and Cyber-Security laws. The 2017 Supreme People’s Court report departed from past practice by not reporting the number of individuals convicted in 2016 on terrorism-related charges. Nevertheless, publicly available verdicts related to terrorism prosecutions in 2016 indicate that efforts to implement the Counterterrorism Law have focused on punishing the possession or distribution of materials that authorities deemed “fake terrorism information” or “terrorist” or “extremist” in nature. Specifically, the individuals in these cases were convicted of possessing, accessing, and distributing terrorism-related video or audio material. The implementation of the Counterterrorism Law has also focused on punishing hotels and courier services for failing to comply with “real name registration” requirements.

Lawmakers in XUAR passed a regional Anti-Religious Extremism Law in March. The law prohibits advocating or propagating what it considers “extremist” thoughts and publishing, downloading, sharing, or reading articles and audio-video material containing “extremist” content. The law also criminalizes the wearing of long beards and other practices. There were also reports that authorities compelled Uighurs and other

U.S. State Department Country Report on China and Terrorism: 2018 - II

minorities to return to the locality listed on their identification documents and that authorities confiscated the passports of members of ethnic minorities and restricted them from leaving the country. Citing terrorism concerns, authorities required some vehicles in the XUAR to install mandatory satellite tracking and required all residents there to install a surveillance “app” that automatically detects “terrorist and illegal” religious videos, images, e-books, and electronic documents on smart phones. The app reportedly has the capability to remotely delete this content. The government’s broad definitions of “terrorism” and “extremism” and its unclear definition of “fake terrorism information” continued to raise human rights concerns. We refer you to the State Department’s Country Reports on Human Rights Practices for further information.

Beyond China’s borders, China pursued security and counterterrorism cooperation with countries that drew a similarly broad definition of “extremism” and raised human rights concerns. For example, Egyptian authorities arrested and deported at least 34 Chinese-nationality Uighurs in July, reportedly following a Chinese government order that Uighur students in Egypt return to China. Those Uighurs who returned were reportedly sent to re-education camps, where at least two have died. Also, Chinese authorities confirmed in December they were monitoring some international Twitter accounts allegedly linked to ETIM. In another incident, Italian authorities detained a Uighur activist with German citizenship, preventing him from delivering a scheduled speech about human rights in the XUAR. This detention was allegedly responding to an INTERPOL Red Notice.

Countering the Financing of Terrorism: China is a member of the Financial Action Task Force, the Asia/Pacific Group on Money Laundering, and the Eurasian Group on Combating Money Laundering and Terrorist Financing. Based on current law enforcement investigations, the United States is concerned that China does not adequately control terrorist financing. Chinese law enforcement claims to have limited ability to freeze funds and investigate banking transactions. Additional concerns include a lack of guidance for designated non-financial businesses and professions, underdeveloped procedures for individuals and groups who seek to be delisted from domestic sanctions, and inadequate regulations defining the rights of bona fide third parties in seizure and confiscation actions. For further information on money laundering and financial crimes, see the 2018 International Narcotics Control Strategy Report (INCSR), Volume II, Money Laundering and Financial Crimes

Countering Violent Extremism (CVE): China continued to implement broad campaigns in the XUAR under the rubric of countering what the Chinese government considered “extremism.” The XUAR government also mandated “re-education” programs for members of ethnic minority communities and students who study overseas. The government implemented a number of other programs aimed at “stability maintenance,” many of which promote cultural assimilation in the XUAR and place restrictions on the practice of Islam. For further information, please see the Department of State’s Report on International Religious Freedom for 2017.

U.S. State Department Country Report on China and Terrorism: 2018 - III

Regional and International Cooperation: China continued to promote the United Nations as the primary international fora for counterterrorism while increasing its engagement in other multilateral, regional, and bilateral fora. In June, China and other members of the Shanghai Cooperation Organization (SCO) signed the SCO Convention on Combating Extremism. In August, China participated in the 2nd High-level Military Leaders' Meeting on Quadrilateral Cooperation and Coordination Mechanism in Counterterrorism with Afghanistan, Pakistan, and Tajikistan in Dushanbe, and the four parties signed agreements to coordinate counterterrorism efforts. More than 80 countries sent representatives to attend China's Forum on International Cooperation in Countering the Use of Cyberspace for Criminal and Terrorist Purposes in December. Beijing pursued the return of ethnic Uighurs and others in Malaysia and other countries to China in the name of counterterrorism cooperation, although evidence of these individuals' connection to terrorism was not made public.

...**Hong Kong** continued its effective security and law enforcement partnership with the United States through the Hong Kong Customs and Excise Department's joint implementation of the Container Security Initiative and participation in U.S.-sponsored training in port and border security. Counterterrorism remained an operational priority for the Hong Kong Police Force. The Police Security Wing coordinates potential terrorist threat information with relevant counterterrorism units. The Police Counterterrorism Response Unit provides a strong deterrent presence. It assists police districts with counterterrorism strategy implementation and complements the tactical and professional support of existing police specialist units, such as the Explosive Ordnance Disposal Bureau, the Special Duties Unit, the Airport Security Unit, and the VIP Protection Unit.

Hong Kong is a member of the Financial Action Task Force (FATF) and the Asia/Pacific Group on Money Laundering, a FATF-style regional body. Hong Kong's Joint Financial Intelligence Unit is a member of the Egmont Group. Terrorist financing is a criminal offense in Hong Kong, and financial institutions are required to search continuously for terrorist financing networks. They must also screen accounts using designations lists provided by the United States under relevant authorities, as well as the UNSC ISIL (Da'esh) and al-Qa'ida and 1988 (Afghanistan/Taliban) Sanctions Committees' lists. .

...**Macau's** counterterrorism cooperation with the United States included information sharing. The Police Intervention Tactical Unit (UTIP), which falls under the Macau Public Security Police Force, is responsible for protecting important installations and dignitaries and conducting high-risk missions, such as improvised explosive device deactivation. UTIP's Special Operations Group's mission is counterterrorism operations. Macau cooperated internationally on counterterrorism efforts through INTERPOL and other security-focused organizations. Macau law enforcement officers attended U.S. government-sponsored capacity-building training at the International Law Enforcement Academy on personnel and facility security, financial and crime scene investigations, computer investigations, and evidence protection.

Macau is a member of the Asia/Pacific Group on Money Laundering, a FATF-style regional body. Macau's Financial Intelligence Office is a member of the Egmont Group...

Major Multilateral Counter-Terrorism Treaties Signed by China

Treaty	Date of Signature	Effective Date	Participation or Statement by China
Agreement on Quadrilateral Cooperation and Coordination Mechanism in Counter Terrorism by the Ministry of Defense/ Armed Forces/ Military of Afghanistan, China, Pakistan, and	Aug. 2017	Aug. 2017	Signed in Aug. 2017, effective in China
Tajikistan			
Convention of the Shanghai Cooperation Organization Against Terrorism	Jun. 2009	Jan. 2012	Signed in Jun. 2009, ratified in Dec. 2014
Agreement on Cooperation in Combating Illicit Trafficking in Arms, Ammunition and Explosives between the Governments of the Member States of the Shanghai Cooperation Organization	Aug. 2008	May 2010	Approved by the State Council in May 2012, instrument of approval deposited in Jul. 2012, effective in China
Agreement on the Procedure for Organizing and Conducting Joint Anti-Terrorism Exercise within Territories of Member States of the Shanghai Cooperation Organization	Aug. 2008	Nov. 2013	Approved in Jun. 2013, effective in China since Nov. 2013
Cooperation Agreement in the Sphere of Identifying and Cutting off the Channels Used by the Individuals Involved in Terrorist, Separatist and Extremist Activities to Enter the Shanghai Cooperation Organization Member States	Jun. 2006	Nov. 2008	Approved by the State Council in May 2012, instrument of approval deposited in Jul. 2012, effective in China

Chinese Internal Security Forces - 2019

China's internal security forces consist primarily of the Ministry of Public Security (MPS), the Ministry of State Security (MSS), the People's Armed Police (PAP), and the PLA. In 2018, the Central Military Commission (CMC) assumed direct control of the PAP after the Party ended the PAP's previous CMC-State Council dual-command system, and the China Coast Guard (CCG) was subordinated to the PAP, codifying the PLA's enduring role in internal security and possibly increasing the PLA's oversight and interoperability with the paramilitary forces. China's leaders rely on these forces to address challenges ranging from protests over political, social, environmental, or economic problems to suspected terrorist attacks. In recent years, China has focused increasingly on protests perceived as being linked to foreign influences and, separately, the Turkestan Islamic Party, which China's leaders characterize as a terrorist group connected to ethnic Uighur nationalists in the Xinjiang Uighur Autonomous Region. China blames Uighur "separatists" for terrorist attacks in China, and has imposed strict security in Xinjiang, ostensibly to curb potential attacks.

Ministry of Public Security (MPS). The MPS leads China's civilian national police, which serves as the first-line force for public order. The key mission of the MPS is domestic law enforcement and the "maintenance of social security and order" with duties including anti-rioting and anti-terrorism.

Ministry of State Security (MSS). The MSS is China's main civilian intelligence/counterintelligence service. The missions of the MSS are: to protect China's national security; to secure political and social stability; to implement the recently updated *State Security Law* and related laws and regulations; to protect state secrets; to conduct counterintelligence; and to investigate organizations or people inside China who carry out or direct, support, or aid other people whom China perceives harm its national security.

People's Armed Police (PAP). The PAP is a paramilitary component of China's armed forces whose primary mission is internal security and domestic stability. As of 2018, the PAP now falls solely under the authority of the CMC and has authority over the CCG. The PAP is the primary force responsible for internal security.

People's Liberation Army (PLA). As the armed wing of the CCP, the PLA is the ultimate guarantor of the CCP's rule, giving it a role in domestic security in addition to its national defense mission. For example, the PLA may provide transportation, logistics, and intelligence to assist local public security forces with internal security, and is authorized under the 1997 *National Defense Law* to directly "assist in maintaining public order" when CCP leaders consider it necessary.

Chinese Increasing Interoperability with Paramilitary Forces: 2019 - I

Key Takeaways

- As of 2018, the CMC assumed direct control of the PAP. As part of this reform, the PAP also assumed control of the China Coast Guard (CCG) from China's State Oceanic Administration.
- Paramilitary reforms could improve paramilitary forces' ability to provide support to PLA operations under the command of the joint theater commands.
- In 2018, examples of interoperability between the PLA and paramilitary forces included coordination between the PLAN, the CCG, and the People's Armed Forces Maritime Militia (PAFMM).

People's Armed Police (PAP). The PAP is a paramilitary component of China's armed forces whose primary mission is internal security and domestic stability. In early 2018, the CMC assumed direct control of the PAP after the CCP ended the previous CMC-State Council dual-command system. As part of this reform, the PAP also assumed control of the CCG in July 2018 from China's State Oceanic Administration. Although the PAP has specialized units for a variety of functions, the most numerous are for internal security. Additionally, the PAP is undergoing its most extensive organizational transformation to date as part of broader military reforms. Previously, PAP internal security units were organized into contingents for each province, autonomous region, and centrally administered city, as well as a smaller number of mobile divisions available to deploy anywhere in the country in response to escalating internal crises. In 2018, the mobile divisions were disbanded. Some units went to the 31 provincial contingents, and other units were assigned to two new mobile contingents which do not have a fixed geographic area of responsibility. PAP reform could lead to further interoperability between the PLA and the PAP, but in 2018, examples of interoperability were more apparent in coordination between the PLAN, the CCG, and the PAFMM than between the PAP and the PLA.

China Coast Guard (CCG). The CCG is responsible for a wide range of missions under the umbrella of maritime rights protection, including enforcement of China's sovereignty claims, surveillance, protection of fisheries' resources, anti-smuggling, and general law enforcement. As of July 2018, the CCG completed its merger into the military command structure through its subordination to the PAP, which could facilitate closer coordination between the CCG and the PLAN. China primarily uses paramilitary maritime law enforcement agencies in maritime disputes, selectively using the PLAN to provide overwatch in case of escalation. Days after the administrative transfer of the CCG to the PAP, the CCG conducted a patrol mission near the contested Senkaku Islands in the East China Sea.

The CCG's rapid expansion and modernization has improved China's ability to enforce its maritime claims. Since 2010, the CCG's fleet of large patrol ships (more than 1,000 tons) has more than doubled from approximately 60 to more than 130 ships, making it by far the largest coast guard force in the world and increasing its capacity to conduct simultaneous, extended offshore operations in multiple disputed areas.

Chinese Increasing Interoperability with Paramilitary Forces: 2019 - II

Furthermore, the newer ships are substantially larger and more capable than the older ships, and the majority are equipped with helicopter facilities, high-capacity water cannons, and guns ranging from 30 mm to 76 mm. A number of these ships are capable of long-endurance out-of-area operations. These characteristics give CCG vessels the ability to intimidate local, non-Chinese fishing boats, as occurred in an October 2016 incident near Scarborough Reef.

In addition, the CCG operates more than 70 fast patrol combatants (more than 500 tons), which can be used for limited offshore operations, more than 400 coastal patrol craft, and approximately 1,000 inshore and riverine patrol boats. The CCG is likely to add another 25-30 patrol ships and patrol combatants by the end of the decade before the construction program levels off.

People's Armed Forces Maritime Militia (PAFMM). The PAFMM is a subset of China's national militia, an armed reserve force of civilians available for mobilization. Militia units organize around towns, villages, urban sub-districts, and enterprises and vary widely in composition and mission. In the South China Sea, the PAFMM plays a major role in coercive activities to achieve China's political goals without fighting, part of broader Chinese military theory that sees confrontational operations short of war as an effective means of accomplishing political objectives. The militia has played significant roles in a number of military campaigns and coercive incidents over the years, including the 2009 harassment of the *USNS Impeccable* conducting normal operations, the 2012 Scarborough Reef standoff, the 2014 Haiyang Shiyu-981 oil rig standoff, and a large incursion in waters near the Senkakus in 2016.

A large number of PAFMM vessels train with and assist the PLAN and CCG in tasks such as safeguarding maritime claims, surveillance and reconnaissance, fisheries protection, logistic support, and search and rescue. The government subsidizes various local and provincial commercial organizations to operate militia vessels to perform "official" missions on an ad hoc basis outside of their regular civilian commercial activities.

In the past, the PAFMM rented fishing vessels from companies or individual fishermen, but China has built a state-owned fishing fleet for at least part of its maritime militia force in the South China Sea. The Hainan provincial government, adjacent to the South China Sea, ordered the building of 84 large militia fishing vessels with reinforced hulls and ammunition storage, which the militia received by the end of 2016, along with extensive subsidies to encourage frequent operations in the Spratly Islands. This particular PAFMM unit is also China's most professional. Its forces are paid salaries independent of any clear commercial fishing responsibilities and recruited from recently separated veterans.