Chapter 5

China's Nuclear Triad: Delivery Capabilities of New-Generation Strategic Nuclear Forces

Tzu-Yun Su*

I. Introduction

It is clear from China's rapid increase in military budgets that Beijing seeks to compete globally in navy power and nuclear balance. Based on public information, China's military spending totaled USD 203 billion in 2021, twice the 2012 national defense budget of USD 100.3 billion when Xi Jinping took power. As far as the navy capabilities are concerned, publicly available pictures show that the PLA Navy added 106 large surface vessels since 2012 during Xi Jinping's term. During the past two years, the focus was on aircraft carriers and Type 075 landing helicopter docks, not only to target Taiwan but also to control the oceans.

Meanwhile, China's North Pole policy, disguised as a commercial policy, is aimed at deploying the new strategic submarine ballistic nuclear (SSBN). The submarine-launched ballistic missiles launched from the North Pole can hit the conterminous United States. Similar to the South China Sea, attacks can be initiated against the West Coast of the United States with SSBN entering the Philippine Sea, to the east of Taiwan, from the Bashi Channel.

Therefore, the Taiwan Strait problem is essentially due to China's military expansion. Taiwan's safety matters not only to its own survival but also to

* Associate Research Fellow, Division of Defense Strategy and Resources, Institute for National Defense and Security Research. Also served as a Research Fellow of National Security Council, Confidential Commissioner of the Ministry of National Defense, and visiting scholar of the U.S. Department of State.

Japan's and Korea's maritime, marine lifelines and the U.S.'s missile defense for its mainland. Hence, why the U.S.-Japan Joint Leaders' Statement, U.S.-ROK Leaders' Joint Statement, and G7 Summit Communique all emphasized the importance of security and peace of the Taiwan Strait.

The nuclear triad of China's strategic nuclear weapons consists of nuclear warheads, new missiles (e.g., DF-41, DF-26, and JL-3), and launch capabilities (e.g., Type 094A tactical nuclear submarines and H-20 bombers). This nuclear balance may seem unrelated to Taiwan, but it can change the world and influence the power structure of international politics.

This article analyzes the center point of China's strategic nuclear weapons—the DF-41 missiles, Type 094 tactical nuclear submarines, and H-20 stealth bombers under development.

II. Ground-based Nuclear Force — DF-41

The main elements of China's intercontinental ballistic missiles (ICBM) are the DF-5 Series and DF-41 intercontinental missiles. The DF-5 is powered by liquid fuels, injected before launch, which takes a while to spot its presence and take countermeasures. The DF-41 is solid-fueled, capable of prompt launches. It can be deployed on missile launch facilities and from launch vehicles for mobility. With its high survivability, it is considered China's newest ground-based missiles. Based on the geophysical survey of latitude and longitude and the atmosphere, DF-41's range can cover the Lower 48 of the United States from an appropriate location. Hence, also the backbone of China's new generation of nuclear strike capabilities. Its equipment with multiple independently targetable re-entry vehicles (MIRVs) is seen as a capability to initiate the first strike. Although the actual performance is unknown to the outside world, it is possible to reasonably estimate its likely functionality according to the assessment of its core elements.

Based on the publicly available data, the DF-41 is estimated to have a weight of c. 63.5 tons, a body length of 16.5 meters, and a caliber of 2.78 meters. With

the adoption of third-stage solid propellant rocket engines, the maximum range is as long as 13,000-14,000 kilometers. It can also carry ten nuclear warheads of over 100,000 tons TNT equivalent. Its circular error probable (CEP) is about 100 meters.[1]

Figure 5-1 Possible Firing Data on DF-41 Intercontinental Missiles
Source: *China Central Television (CCTV)*, cited from: https://www.sohu.com/a/475570671_260616.

1. Range

The key to the effective range of a ballistic missile lies in the fuel capacity and the engine design. However, these two are inherently conflicting with each other. Large size comes with a greater aerodynamic drag and demands more energy from the engine, limiting the range. Therefore, all the countries are focusing on improving fuels (i.e., the increase in the energy density of solid propellants). It is estimated that each 5% increase in the impulse of propellants can boost the range by 45%.[2]

In the context of the history of missile technology development, the current mainstream solid propellants can be divided into two groups: HTPB (hydroxyl-terminated polybutadiene) and NEPE (nitrate ester plasticized polyether). The

[1] "DF-41 Key Data Exposed! Range of 14,000 Kilometers, 10 Warheads. Who Is the Strongest vs. US and Russia," *Tencent*, November 24, 2020, https://new.qq.com/omn/20201124/20201124A00OXN00.html.

[2] Cheng, Tianze, "Review of Novel Energetic Polymers and Binders - High Energy Propellant Ingredients for the New Space Race," *Designed monomers and polymers*, Vol. 22, pp. 54-65, March 2019, doi: 10.1080/15685551.2019.1575652.

NEPE's specific impulse of 2,685N.s/kg and the density of 1.86g/cm3[3] are both superior to those of the HTPB propellants.

It is generally believed that the DF-41 missiles are powered by N15/N16 Series solid propellants newly developed in China—possibly by Academy No. 42 of the China Aerospace Science and Technology (CASC) Academy No. 4,[4] dedicated to the R&D of solid propellants produced by China Aerospace Science and Technology's Jianghe Factory and responsible for the manufacturing of high-energy propellants.[5] While there are questions about the statement of Chinese media regarding the formula and performance of the propellants surpassing the U.S. and Russia, it is less likely different from world-leading NEPE propellants. The reasonable range should be around 13,000 kilometers.

2. Precision

According to the open data from the Chinese official media, a DF-41 can carry ten nuclear warheads of over 100,000 tons TNT equivalent. The circular error probable (CEP) is approximately 100 meters.[6] This precision level is adequate for nuclear warheads to hit area targets such as cities. However, it may fall short of aiming for point targets such as the enemy's underground missile launch facility. Given the lack of guarantee in destroying reinforced underground bunkers, its ability to strike the opponent's nuclear power is undermined.

According to the technological evolution of ballistic missiles, its navigation system is probably based on laser gyroscope as inertial navigation for the climb

---

[3] Fang C, Li S-f. 2001. Experimental Studies on Effects of AP Content and Particle Size in NEPE Propellant. J. Journal of Solid Rocket Technology. 24 (3). Cited in Xiao-ting YAN, Zhi-xun XIA, Li-ya HUANG, Yun-chao FENG, Xu-dong NA, "Experimental Study on Combustion Process of NEPE Propellant," 7 TH EUROPEAN CONFERENCE FOR AERONAUTICS AND SPACE SCIENCES (EUCASS), DOI: 10.13009/EUCASS2017-324.

[4] *Xinhua News Agency*, "Revealed for the First Time: Confidential R&D of Solid Propellants for Strategic Guided Missiles," *Xinhua Net*, December 7, 2016, http://xinhua-rss.zhongguowangshi.com/425/4660762653476101656/1370657.html.

[5] Ai-min Wang, "Towards High Energy: the Development of High-energy Solid Propellant in Jianghe Factory," *China Aerospace Science and Technology Corp. (CASC)*, December 8, 2006, http://www.spacechina.com/n25../n2014789/n2014809/c76748/content.html.

[6] "Official Disclosure: How Far and How Accurate Is DF-41's Range?," *Sina Military Section*, July 9, 2021, https://mil.news.sina.com.cn/blog/2021-07-09/doc-ikqcfnca5935434.shtml.

and flight stages to control the missile's position and direction.

Furthermore, the warhead re-entry vehicle can be combined with the BeiDou Navigation Satellite System for precise positioning and terminal guidance, with directions modified by the vector nozzle. However, this will depends on whether the wireless communications of the re-entry vehicle can break through the ionosphere shielding of the blackout zone when entering the atmosphere. A possible solution is to reduce the speed of the re-entry vehicle below 8 Mach or receive signals at the vehicle tail from the BeiDou Navigation Satellite System in order to maintain the controllability of the re-entry vehicle. Meanwhile, judging from China's current deployment of the BeiDou Navigation Satellite Constellation, the designs from military companies, and the production of 28nm TianQin II satellite-based augmentation processors for BeiDou Navigation Satellites and various vehicles,[7] the installation of a satellite signal receiver model at the tail of the re-entry vehicle is the most likely solution. This solution will greatly enhance the warhead position and establish its role as a counterforce, capable of hitting cities or striking the enemy's nuclear missile launch facility, thereby significantly boosting nuclear deterrence.

III. Naval-based Nuclear Force — Type 094 submarine

Strategic submarines are considered the main tool for tactical deterrence because they can carry submarine-launched ballistic missiles (SLBMs) and boast their launch capability with mobility and stealth. Mobility and stealth are important indicators of well-performing nuclear weapons because they imply the ability to initiate nuclear assaults—the most important component of the tactical nuclear triad.

In addition to the first-generation Type 092 submarines launched in 1981, Type 094 submarines are currently the main force of China's tactical nuclear submarines.

---

[7] "Ramp-up of 100% China-Made 28nm Chips for BeiDou-3 Satellite Core Components," *Electronic Engineering Times*, August 8, 2020, https://www.eet-china.com/news/202008040957.html.

The publicly available pictures show that Type 094 submarines have three remodels.[8] According to the estimates by the U.S., China needs to have at least five tactical nuclear submarines to maintain the minimum nuclear deterrence and the second-strike capability.[9] This estimate was primarily based on maintenance, training, and strategic cruise flow routes.

The most important performance indicators of tactical nuclear submarines are nuclear reactors and submarine-launched ballistic missiles, as they determine the acoustic quieting performance of the submarines and the strike range of the missile.

1. Evaluation on the Propulsion of Nuclear Submarines

Nuclear reactors determine the underwater speed and—most importantly—the acoustic quieting of submarines. China's fleet of nuclear submarines mainly includes Type 093 nuclear attack submarines and Type 094 nuclear tactical submarines. These two submarine types are similar in design, with Type 094 as a larger version of Type 093 and both adopting pressurized water reactors. The underwater noise level is generally estimated to be about 120 decibels.[10] While the actual power is not openly announced, the publicly available information regarding the ACP100 "Advanced Pressurized Water Reactor 100 MW"—the commercial version transferred from the military[11]—sheds light on the possible design architecture and the 100 MW power range of the submarine nuclear reactor.

As the shaft horsepower is approximately 20% of the reactor's power,[12] it can be estimated that China's nuclear submarines have a shaft horsepower of 27,192.[13]

---

8 The difference in the appearance of Type 094 submarines is primarily with the shape of its sails, scuppers and sonar on the side, and turtle backs.

9 Defense Intelligence Agency, *China Military Power: Modernizing A Force to Fight and Win*, (Washington, D. C.: DIA, 2019), p. 73.

10 "Type 094 Jin-class Design," *Global Security*, https://www.globalsecurity.org/wmd/world/china/type_94-design.htm

11 "SMR (Small and Medium-Sized Reactors) May Flourish at Multiple Locations. Purposes Determine Site Selection," *China Energy News*, November 30, 2011, http://www.nea.gov.cn/2011-11/30/c_131278758.htm.

12 U.S. Ohio-class tactical submarine uses S8G reactors, thermal power at 220MW, shaft horsepower at 45MW, about 20% of thermal power. See "Nuclear-Powered Ships," World Nuclear Association, in September 2021, https://world-nuclear.org/information-library/non-power-nuclear-applications/transport/nuclear-powered-ships.aspx.

13 The thermal power of a reactor at 100 MW is equal to 100,000 KW, or 135,962 in metric horsepower. However, the conversion for shaft output is usually 20% of thermal power. Hence, it is 27,192 shaft horsepower.

In 2016, the QL-1 Lead-cooled Fast Reactor (LFR) prototype developed by the FDS Team of the Chinese Academy of Sciences Nuclear Safety Technology Research Institute successfully completed the trial run,[14] indicating the readiness of the technological groundwork in the new generation of high power reactors. It is worth noting that the disclosed information about the development team included China Shipbuilding Industry Group Co., Ltd. It also mentioned that the same technology is used in Russian submarines and has obtained the numerology security certification of the Chinese Academy of Sciences.[15] Therefore, it can be determined that this is the reactor for China's new nuclear submarines.

Figure 5-2 PLA's Early Configuration of Submarine Nuclear Reactors
Explanation: PLA's early configuration of submarine nuclear reactors. Based on the diameter, this should be for submarines, possibly during the late 1960s.
Source: China Nuclear Information Site: https://reurl.cc/L7MxE9.

These new-generation nuclear reactors are called the "ADS Lead-Bismuth Eutectic Project" (or CLEAR-I, "Qilin-1"). It was initiated by the 863 Plan and included in the Seventh Five-Year Plan in 1986 and the 973 Plan under the Ninth

[14] "China Achieves Major Breakthrough in Coolant for Lead-cooled Fast Reactors," *Hefei Regional Center of Strategy Energy and Physical Science Instrument of Chinese Academy of Sciences*, September 8, 2016, http://sepsc.kjtj.cas.cn/xwdt/zxdt/201609/t20160920_348648.html.

[15] "China Achieves Major Breakthrough in Coolant for Lead-cooled Fast Reactors," the same as the previous note.

Five-Year Plan as the focus of the R&D project for new energy.[16] This project lasted thirty years and was completed in 2016. The critical operation of the first reactor finally started in 2019.[17]

This type of reactor, known for its high thermal efficiency, was first adopted by Russian submarines. However, Russia experienced nuclear submarine safety accidents due to materials and technological limitations in the 1970s. Subsequently, pressurized water reactors were used in Russian submarines for better safety. As technology progressed, liquid-metal-cooled nuclear reactors became one of the options for the fourth generation nuclear reactors listed in China's 863 Plan and 973 Plan, which achieved preliminary success in operation. If the subsequent commercialization went well, it would likely be transferred for military use in the next-generation submarines for larger tonnage, higher underwater speeds, and greater strategic benefit in nuclear deterrence.

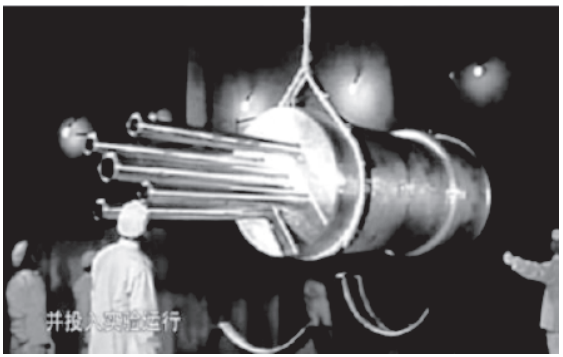

Figure 5-3 PLA's Early Configuration of Control Rods for Submarine Nuclear Reactors

Explanation: PLA early configuration of control rods for submarine nuclear reactors, likely during the late 1960s.

Source: *China Nuclear Information*, https://reurl.cc/L7MxE9.

---

[16] The full name of the 973 Plan is "National Key Research and Development Program Based on the Former National Key Fundamental Research and Development Program," The full name of the 863 Plan is "National High-tech R&D Program".

[17] "Ccongratulations! China's Lead Bismuth Eutectic (LBE) Zero Power Reactor Achieves First Critical. Electricity from Mobile Small-Sized Reactors Within Sight," *Sina News*, October 12, 2019, https://news.sina.com.tw/article/20191012/32923338.html.

2. Submarine Launch and Strike Capability

Type 094 tactical submarine, which adopts the turtle back design, can carry 12 JL submarine-launched ballistic missiles (SLBM). This type of submarine is equipped with JL-2 SLBMs which have the third stage solid rocket design in the length of 13-14 meters and a caliber of 2 meters.[18] The range is generally estimated to be 8,000 kilometers.[19]

The JL-2 missile is equipped with a composite guidance system consisting of the strap-down inertial navigation system, ballistic computers, laser gyroscopes, and celestial navigation. Its guidance precision is 90 meters.[20] Some data suggests that it has the direct strike capability against intercontinental missile launch facilities,[21] which means the strike precision should be in the 10-meter range in order to destroy reinforced underground shelters.

That said, based on the production years and the range and primary design requirements of second strikes for tactical nuclear submarines (i.e., to hit the enemy's cities and not missile launch facilities), the precision is probably in the 100-meter range.

The possible deployment of JL-3 submarine-launched ballistic missiles is worth mentioning. Based on the publicly available information, its deployment is surely a go-ahead. Firstly, according to its technological development of submarine-launched ballistic missiles, China seeks a full replacement for the next generation to meet the requirements for the next 30 years. Secondly, the deployment is aimed at meeting China's pursuit of a new nuclear weapon strategy (i.e., the ownership of projection power with greater deterrence effects).

Hence, JL-3 is likely to be powered with the new N-15/16 solid propellants in

---

[18] "With a Range of Mere 8000 kilometers, JL-2 Guided Missile Debut at Military Parade a Leader or a Lagger," *Tencent*, December 27, 2019, https://new.qq.com/omn/20191227/20191227A0F9V300.html?pc.

[19] Hsiao Han, Dong Cui, "Expert: JL-3 Guided Missile Equipped with Many Advanced Technologies for Advanced Performances," *Science and Technology Daily*, August 17, 2017, http://military.people.com.cn/BIG5/n1/2017/0817/c1011-29476356.html.

[20] "China's Ballistic Missiles," *China Laobingwang*, September 21, 2021. http://www.laobing.com/jsht/jbz/erp/jsht-zldd-22.htm.

[21] "What does JL-2 Missile Has "First Strike Potential" Mean?," *SciMall*, November 17, 2020, https://www.scimall.org.cn/article/detail?id=4785007.

order to achieve a farther range. The possible ranges are estimated below:

(1) Basic model: If the JL sizes stay the same, the new fuel with high-energy density can extend the range by 15-20%; that is, up to 10,000 kilometers.
(2) Completely new configuration: In general, the pressure shell of a submarine reactor comes with a diameter of 12 meters or so. Hence, the Type 094 submarine adopts the turtle back design to accommodate longer ballistic missiles. Judging from the technical limitation of shipbuilding engineering, maintaining a 14-meter length can increase the caliber of JL-3 to accommodate more propellants and adopt more composite materials and carbon fiber engines. The combination of a fuel increase, weight reduction, and engine efficiency enhancement may extend the range up to 14,000 kilometers.

In this way, the Type 094 submarine in the future or the subsequent Type 096 submarine may attack the contiguous United States from China South Sea. This is strategically significant because such an attack is only possible now from the Philippine Sea in the east of Taiwan, the Kuril Islands in the northern Sea of Japan, or even the Aleutian Islands.

IV. Air-launched Nuclear Force — H-20 Bomber

China's aviation industry received some assistance from the U.S.S.R. However, the transfer of technology was stopped after China and the U.S.S.R. went separate ways. Nevertheless, China conducted research and reforms with reverse engineering and gradually achieved the localization of all fighters. It is worth noting that research and improvement through imitation is an R&D route often adopted by countries with less advanced military technology, which does not warrant over-stigmatizing. In addition to the learning curve, there is also substitute research in fundamental sciences such as material science.

After the reforms and opening up and the ensuing economic development, the progress in civil aerospace and electronic technology has made achievements in engine design, materials science, and avionics.

1. Indirect Official Confirmation for H-20 Bombers

Although China's current main bombers are an imitation of the former U.S.S.R.'s Tu-16 H-6 bombers, their survivability is rather low in today's air defense system. In addition, it has reached the engineering limitation in terms of performance enhancement. Therefore, the H-20 bombers under development by the Xi An Aircraft Industry Group Co. are expected to become the mainstay of China's next-generation strategic air force, given its stealth characteristics.

Assessment on the reasonability of the technology roadmap: after the successful development of the J-20 stealth fighters and the improvement of the domestic engines, China's subsequent launch of the H-20 has a credible technological basis. Obviously, China also adopted generation-hopping as its development strategy for strategic bombers. Unlike the roadmap of the U.S.'s or Russia's strategic air forces—from B-52 and Tu-95 subsonic bombers to B-1 and Tu-22 supersonic bombers, respectively—China directly jumps to the forefront of the new-generation stealth platform.

This can be proven by the open comment in 2016 from Ma Xiao-tian, the former Air Force Commander, that "China's air force is developing the next generation long-range bombers".[22] On the other hand, the PLA Air Force spokesperson, Colonel Shen Jin-ke, announced in August 2021 that "the PLA Air Force has entered the historical threshold of the strategic air force".[23] These statements explain the possibility of the H-20.

2. Stealth Capability

When flying in the atmosphere, aircraft avoid radar waves by staying low along with the earth's curvature. Due to the natural conditions for stealth, it is necessary to reduce signals, such as electromagnetic waves and infrared thermal with means of body configurations and radar-absorbent coatings to avoid being detected. The

---

[22] "Air Force Commander Ma Xiaotian: "China's Air Force Is Developing the Next Generation Long-Range Bombers," *people.cn*, September 2, 2016, http://military.people.com.cn/BIG5/n1/2016/0902/c1011-28686929.html.

[23] "Debut of H -20 on National Day? China Air Force Declares: Stepping into Threshold of Strategic Air Force," *Douwei News*, September 2, 2021, https://blog.dwnews.com/post-1462249.html.

radar cross-section (RCS) control decreases radar-reflected signals.

Although China has not formally published the look of its H-20, the publicly available information shows a blended wing body (BWB) design, basically in the flying-wing configuration,[24] which effectively reduces the area of laser reflection. The possible stealth capability may be benchmarked against the roadmap of the U.S. Armed Forces bombers. The possible RCS values for the U.S. Armed Forces' backbone strategic bombers are 100 m2 for B-52, 0.75 m2 for B-1, and below 0.1 m2 for B-2.[25]

In summary, based on the overall consideration of the experience from the U.S. Armed Forces and the technological levels in China, it is possible to control the H-20's area of laser reflection to below 0.5 m2, compared to the RCS of 16 m2 for the current mainstay model, H-6 bomber.[26]

Figure 5-4 One of H-20's Possible Configurations
Source: China Central Television (CCTV), from Business Insider.

[24] Yun Chen, "H-20 Coming Up Soon? Picture of Imagination Published by Weapon Magazine Triggers Heated Discussions," *Voice of America*, May 29, 2021, https://www.voacantonese.com/a/is-bomber-h20-going-to-show-up-china-weapon-magazine-s-blueprint-for-h20-s-appearance-draws-hot-discussion-20210529/5909149.html.

[25] Radar Cross Section, *Global Security Org*., https://www.globalsecurity.org/military/world/stealth-aircraft-rcs.htm.

[26] Global Investment Center, *Indonesia Air Force Handbook Volume 1 Strategic Information and Weapon Systems* (Washington, D.C.: International Business Publication, 2013), p. 86.

3. Overall Performance

The U.S. Department of Defense estimates that the H-20 may have a flying range of 8,500 kilometers and a payload of 10 metric tons.[27] With in-flight refueling capability, it will be able to strike across states. Further, there is greater survivability through the opponent's air defense system, given its stealth features.

Meanwhile, the strategic thinking of the PLA Air Force for "airland battles, both offensive and defensive operations" will be integrated into the pillar of the "integrated information–firepower warfare". In particular, the BeiDou Navigation Satellite System and the Gaofen and Fengyun Series Satellite Systems can provide China with a complete picture of battlefield weathers, images, and positioning information, which will help the schedule planning and precise projection of the strategic air force and strengthen the capability of nuclear strikes. In this way, Beijing will have a nuclear triad of more credible deterrence.

V. Conclusion

Despite China's keen pursuit of a rapid boost to its nuclear strike capabilities, the nuclear projection in the 2020s will remain dependent on ground-based intercontinental missiles due to technological limitations and overall deployment experience. The up-and-coming stealth bombers and tactical nuclear submarines will gradually grow in numbers, thereby constructing a comprehensive nuclear deterrent power. Possible developments, in general, are described below:

1. Intercontinental Strike

The more mature ballistic missile DF-5 is equipped with liquid fuels; hence, not set up for quick responses. However, it has a range of 15,000 kilometers[28] and can cover entire North America. This strategic implication will keep it in service for

---

[27] Office of the Secretary of Defense, *Military and Security Developments Involving the PRC 2018* (Washington, D. C., Department of Defense, 2018), p. 70.

[28] Hsiao Ke,"DF-5 as Bright Spot of the Military Parade, with a Range of Over 15,000 Kilometers and Multiple Warheads," *Sina Military Section*, September 2, 2015, http://mil.news.sina.com.cn/2015-09-02/1220838272.html.

another while. The DF-41 has a slightly short range, but it can be launched quickly and deployed on roads or railways. Its better survivability is complementary to the DF-5—together, they constitute China's main power of nuclear deterrence. With at least three naval-based JL-2 and Type 094 submarines or subsequent Type 096 submarines, China will be able to conduct military cruises regularly in the Philippine Sea, to the east of Taiwan, enhancing the deterrence and credibility for second strikes.

2. Regional Strike

In targeting the countries in the Indo-Pacific, China also relies on the mainstay force, such as DF-21, 26, and 31 Series medium-range ballistic missiles. The H-6 bomber troops also play a role, although its survivability in today's air defense system is not high due to flight performance. Hence, H-6 serves as an aerial and mobile platform, working in conjunction with CJ Series cruise missiles for attacks. The H-6's operating radius is about 2,800 kilometers based on the publicly available data. When combined with the CJ missile's range of 2,500 kilometers, it is possible to cover a strike range of 5,000 kilometers. Hence, the ground-based and air-launched regional deterrence capability can be established with medium-range missiles.

3. Theatre Strike

China's third level of a nuclear strike is its theater and tactical nuclear projection capabilities. The main force at this level is the DF-15 and DF-16, consisting of medium- and short-range ballistic missiles at a range of 1,500 kilometers. Meanwhile, the JH-7, J-15, and J-16 fighter planes also have the capability to project tactical nuclear warheads, which can initiate tactical nuclear attacks on ground targets and submarines in the sea and serve as a nuclear delivery vehicle in warzones.

4. Overseas Bases

This section is related to the first point mentioned above about China's

dependence on ground-based ballistic missiles. The projection capability of the PLA Navy and Air Force is constrained by the lack of overseas bases. If there are sufficient overseas bases, China's bombers and tactical submarines will be able to operate in a wider area with the support of logistics resupply points, which will boost its survivability and credibility. For example, China currently has a base in Djibouti for the Red Sea coastal area in Africa. Although it is located at the northeast corner of Africa, China can still directly strike at the North Atlantic Treaty Organization (NATO) with H-20 bombers and threaten India by moving eastward. Similarly, after taking over Kiribati, an island country with diplomatic ties with Taiwan, about 3,000 kilometers from Hawaii and 8,000 kilometers from the mainland United States, China plans to invest and repair Kanton Airport used by the U.S. Armed Forces during the Second World War.[29] If this plan comes true for Beijing, the deployment of H-20 will pose a direct nuclear threat to the west coast of the United States.

In conclusion, China has been increasing its nuclear force rapidly in recent years by strengthening its coercion and enhancing strike capabilities, which implies that China has substantial abilities to initiate nuclear strikes. It is also necessary to note that, apart from nuclear military and delivery vehicles, Beijing also integrates in-depth a geostrategic strategy, including scientific research in the North Pole, which is often overlooked by outside parties. The collection of information about ice sheets, water temperatures, and currents helps the deployment of tactical nuclear submarines. The launch of submarine-launched ballistic missiles (SLBMs) in the Arctic Ocean can quickly arrive at the Lower 48 of the United States and shorten the response time to the U.S.'s missile defense system. This may affect both the United States and Russia, change the global nuclear balance, and influence international politics. Furthermore, while Beijing may obtain power, it risks the countermeasures from all countries—a military and strategic dilemma China is putting itself into.

[29] "China Plans to Modernize 2km Airstrip in Centre of Pacific Ocean," *Global Construction Review*, May 7, 2021, https://www.globalconstructionreview.com/news/china-plans-modernise-2km-airstrip-centre-pacific-/.