

V. Chinese nuclear forces

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China maintains an estimated stockpile of about 290 nuclear warheads. The size of the stockpile is increasing slowly. Around 250 warheads are assigned to China's land- and sea-based ballistic missiles. The remainder are assigned to non-operational forces, such as new systems in development, operational systems that may increase in number in the future and reserves. China may also have some residual nuclear air-strike capability (see table 6.6). China's nuclear warheads are believed to be 'de-mated' from their delivery vehicles—that is, stored separately and not available for immediate use.¹

China continues to modernize and modestly expand the size of its nuclear arsenal as part of a long-term programme to develop more survivable and robust forces consistent with its nuclear strategy of assured retaliation. The Chinese Government's stated goal is to 'strengthen [China's] capabilities for strategic deterrence and nuclear counterattack' by improving the 'strategic early warning, command and control, rapid reaction, and survivability and protection' capabilities of its nuclear forces.² China has also prioritized the acquisition of new capabilities in response to the ballistic missile defences, space-based weapons and precision-guided conventional strike systems being developed by the United States and other countries.³

The Chinese Government has reorganized the country's nuclear forces as part of a larger move to restructure and modernize the military under a streamlined command system.⁴ At the beginning of 2016 it established a new People's Liberation Army (PLA) Rocket Force (PLARF) as the fourth service in China's military. It has command responsibility for all three legs of China's nuclear triad and maintains custodial and operational control over the country's nuclear warheads.⁵ While remaining the 'core force of strategic deterrence', the PLARF has also been put in charge of conventional missile systems and tasked with strengthening China's medium- and long-range

¹ Stokes, M. A., *China's Nuclear Warhead Storage and Handling System* (Project 2049 Institute: Arlington, VA, 12 Mar. 2010), p. 8; and Bin, L., 'China's potential to contribute to multilateral nuclear disarmament', *Arms Control Today*, vol. 41, no. 2 (Mar. 2011), pp. 17–21.

² Chinese State Council, *China's Military Strategy*, White Paper (Information Office of the State Council: Beijing, May 2015), section 4. See also Reuters, 'Chinese military paper urges increase in nuclear deterrence capabilities', 30 Jan. 2018.

³ Saalman, L., 'China's calculus on hypersonic glide', SIPRI Commentary, 15 Aug. 2017.

⁴ Chinese Ministry of National Defense, 'China establishes Rocket Force and Strategic Support Force', 1 Jan. 2016.

⁵ Gill, B. and Ni, A., 'The People's Liberation Army Rocket Force: Reshaping China's approach to strategic deterrence', *Australian Journal of International Affairs*, vol. 73, no. 2 (Jan. 2019); and Cordesman, A. and Kendall, J., *The PLA Rocket Force: Evolving Beyond the Second Artillery Corps and Nuclear Dimension* (Center for Strategic and International Studies: Washington, DC, 13 Oct. 2016).

strike capabilities in accordance with the requirements of ‘full-area war deterrence’.⁶

Chinese officials have emphasized that the reorganization of the country’s nuclear command structure does not herald changes to its nuclear policies or strategy. China remains committed to its no-first-use policy on nuclear weapons and has pledged to keep its ‘nuclear capability at the minimum level required for safeguarding its national security’.⁷ Nor has the Chinese Government given any indication that it will change its long-standing policy of maintaining nuclear forces at a low level of alert in peacetime. In recent years, there have been internal discussions within the Chinese military about moving towards a more launch-ready posture in order to ensure the credibility of the country’s nuclear retaliatory force.⁸

Land-based ballistic missiles

China’s nuclear-capable land-based ballistic missile arsenal is undergoing gradual modernization as China replaces ageing silo-based, liquid-fuelled missiles with new mobile solid-fuelled models. China’s shift towards more survivable mobile missiles has been motivated by concerns that US advances in intelligence, surveillance and reconnaissance (ISR) capabilities and in precision-guided conventional weapons pose a pre-emptive threat to fixed missile launch sites and supporting infrastructure.⁹

In its most recent annual report on Chinese military developments, the US Department of Defense (DOD) estimated that China deployed 75–100 intercontinental ballistic missiles (ICBMs) in 2018 on 50–75 launchers.¹⁰ The DOD estimate was unchanged from the previous year’s report. The silo-based, liquid-fuelled, two-stage Dong Feng (DF)-5A and the road-mobile, solid-fuelled, three-stage DF-31A are currently China’s longest-range ICBMs and the only operational missiles in its arsenal capable of targeting all of the continental USA.

China is developing a longer-range ICBM: the road-mobile, solid-fuelled, three-stage DF-41, which has an estimated range in excess of 12 000 kilometres; it is also developing rail- and silo-based versions of the

⁶ Chinese Ministry of National Defense (note 4).

⁷ Xinhua, ‘China’s nuclear policy, strategy consistent: Spokesperson’, 1 Jan. 2016. See also Pan, Z., ‘A study of China’s no-first-use policy on nuclear weapons’, *Journal for Peace and Nuclear Disarmament*, vol. 1, no. 1 (2018), pp. 115–36.

⁸ See Heginbotham, E. et al. (eds), *China’s Evolving Nuclear Deterrent: Major Drivers and Issues for the United States* (RAND Corporation: Santa Monica, CA, 2017), pp. 131–33; and Kulacki, G., ‘China’s military calls for putting its nuclear forces on alert’, Union of Concerned Scientists, Jan. 2016.

⁹ O’Connor, S., ‘Sharpened Fengs: China’s ICBM modernisation alters threat profile’, *Jane’s Intelligence Review*, vol. 27, no. 12 (Dec. 2015), pp. 44–49.

¹⁰ US Department of Defense (DOD), *Military and Security Developments Involving the People’s Republic of China 2018*, Annual Report to Congress (DOD: Washington, DC, Aug. 2018), p. 36.

Table 6.6. Chinese nuclear forces, January 2019

Type/Chinese designation (US designation)	Launchers deployed	Year first deployed	Range (km) ^a	Warheads x yield	No. of warheads ^b
<i>Land-based ballistic missiles^c</i>	129 ^d				202
DF-4 (CSS-3)	5	1980	5 500	1 x 3.3 Mt	10
DF-5A (CSS-4 Mod 1)	10	1981	12 000+	1 x 4–5 Mt	10
DF-5B (CSS-4 Mod 2)	10	2015	12 000	3 x 200–300 kt	30
DF-5C (CSS-4 Mod 3)	..	..	..	MIRV	..
DF-15 (CSS-6 Mod 1)	..	1994	600	(1 x 10–50 kt)	.. ^e
DF-21 (CSS-5 Mod 2) ^f	40	1991	2 100 ^f	1 x 200–300 kt	80
DF-21 (CSS-5 Mod 6)	8	2016	2 100	1 x 200–300 kt	16
DF-26 (CSS-. .)	16	(2017)	>4 000	1 x 200–300 kt	16
DF-31 (CSS-10 Mod 1)	8	2006	>7 000	(1 x 200–300 kt)	8
DF-31A (CSS-10 Mod 2)	32	2007	>11 200	(1 x 200–300 kt)	32
DF-31AG (CSS-10 Mod . .)	..	(2018)	..	..	..
DF-41 (CSS-X-20)	..	(2019)	(12 000)	MIRV	..
<i>Sea-based ballistic missiles^g</i>	48				48 ^h
JL-2 (CSS-NX-14)	48	(2016)	>7 000	(1 x 200–300 kt)	48
<i>Aircraftⁱ</i>	(20)				(20)
H-6 (B-6)	(20)	1965	3 100	1 x bomb/ (ALCM) ^j	(20)
H-20 (B-20)	..	(2030)	..	..	..
Attack (. .)	..	1972–..	..	1 x bomb	..
<i>Cruise missiles^k</i>	..				..
(CJ-20 ALCM)	..	(2014)	>1 500	1 x ..	..
(SLCM)	..	..	..	1 x ..	..
Total	197				290^l

.. = not available or not applicable; () = uncertain figure; ALCM = air-launched cruise missile; kt = kiloton; Mt = megaton; MIRV = multiple independently targetable re-entry vehicle; SLCM = sea-launched cruise missile.

^a Aircraft range is for illustrative purposes only; actual mission range will vary according to flight profile and weapon loading.

^b Figures are based on estimates of 1 warhead per nuclear-capable launcher, except the MIRVed DF-5B, which is estimated to have 3 warheads. The warheads are not thought to be deployed on launchers under normal circumstances but kept in storage facilities. All estimates are approximate.

^c China defines missile ranges as short-range, <1000 km; medium-range, 1000–3000 km; long-range, 3000–8000 km; and intercontinental range, >8000 km.

^d The estimate only counts nuclear launchers. Some launchers might have one or more reloads of missiles.

^e The US Central Intelligence Agency concluded in 1993 that China had ‘almost certainly’ developed a warhead for the DF-15, although it is unclear whether the capability was ever fielded.

^f The range of the nuclear DF-21 variants (CSS-5 Mods 2 and 6) is thought to be greater than the 1750 km reported for the original CSS-5 Mod 1, which has been retired.

^g A fifth Type 094 SSBN launched in 2018 is not yet operational.

^h The estimate is based on the assumption that warheads have been produced for the JL-2 submarine-launched ballistic missiles (SLBMs) on China’s 4 Type 094 (Jin class) nuclear-powered ballistic missile submarines (SSBNs). There is no authoritative information that Chinese SLBMs are armed with nuclear warheads under normal circumstances.

ⁱThe US Department of Defense (DOD) reported in 2018 that the People's Liberation Army Air Force has been reassigned a nuclear mission. H-6 bombers were used to deliver nuclear weapons during China's nuclear weapon testing programme (one test used a fighter) and models of nuclear bombs are displayed in military museums. The new H-20 is expected to be nuclear-capable.

^jIn 2018 the US Defense Intelligence Agency reported that China is developing two types of air-launched ballistic missile, one of which may have a nuclear payload.

^kOfficial US Government documents are inconsistent and contradictory about possible Chinese nuclear cruise missiles. US Air Force Global Strike Command in 2013 listed the CJ-20 as nuclear-capable. In 2013 the US Air Force National Air and Space Intelligence Center (NASIC) listed the CJ-10 as 'conventional or nuclear' but in 2017 it listed the CJ-10 as conventional.

^lThe total stockpile is estimated to comprise c. 290 warheads and is slowly increasing. In addition to the c. 270 warheads thought to be assigned to operational forces, a further c. 20 warheads are estimated to be in storage or production to arm additional DF-26s and new DF-41s, which will probably replace some of the older DF-21s and DF-31s.

Sources: US Air Force, National Air and Space Intelligence Center (NASIC), *Ballistic and Cruise Missile Threat*, various years; US Air Force Global Strike Command, various documents; US Central Intelligence Agency, various documents; US Defense Intelligence Agency, various documents; US Department of Defense, *Military and Security Developments Involving the People's Republic of China*, various years; Kristensen, H. M., Norris, R. S. and McKinzie, M. G., *Chinese Nuclear Forces and US Nuclear War Planning* (Federation of American Scientists/Natural Resources Defense Council: Washington, DC, Nov. 2006); 'Nuclear notebook', *Bulletin of the Atomic Scientists*, various issues; Google Earth; and authors' estimates.

missile.¹¹ On 27 May 2018 the PLARF reportedly carried out a flight test of a DF-41 missile that was launched from the Taiyuan Space Launch Center in northern China and flew overland several thousand kilometres to an impact zone in the western Gobi Desert. It was the 10th known flight test of the system since 2012.¹² The apparently successful test led analysts to speculate that the DF-41 was nearing entry into service.¹³

After many years of research and development, China has modified a small number of ICBMs to deliver nuclear warheads in multiple independently targetable re-entry vehicles (MIRVs). China has prioritized the deployment of MIRVs in order to improve its warhead penetration capabilities in response to advances in US and, to a lesser extent, Indian and Russian missile defences.¹⁴ It has modified the liquid-fuelled, silo-based DF-5A ICBM, which first went into service in the early 1980s, to carry multiple warheads.¹⁵ One variant of the missile, the DF-5B, is assessed to carry up to three MIRVed

¹¹ Sun, W., 'China's latest intercontinental ballistic missile expected to be deployed next year', People's Daily Online, 28 Nov. 2017; and O'Halloran, J. (ed.), 'DF-41', *IHS Jane's Weapons: Strategic, 2015–16* (IHS Jane's: Coulsdon, 2015), pp. 21–22.

¹² Gertz, B., 'China flight tests new multi-warhead ICBM', Washington Free Beacon, 6 June 2018.

¹³ Gertz (note 12); and People's Daily Online, 'China's new multi-warhead ICBM among world's most advanced missiles', 8 June 2018.

¹⁴ Lewis, J., 'China's belated embrace of MIRVs', eds M. Krepon, T. Wheeler and S. Mason, *The Lure and Pitfalls of MIRVs: From the First to the Second Nuclear Age* (Stimson Center: Washington, DC, May 2016), pp. 95–99.

¹⁵ US Department of Defense (note 10), p. 36.

warheads.¹⁶ A second variant, the DF-5C, was reportedly flight tested in 2017 carrying 10 dummy warheads.¹⁷ The deployment of MIRVs on the ageing DF-5 missiles might have been an interim arrangement necessitated by delays in the development of the DF-41 mobile ICBM.¹⁸ The DF-41 might be able to carry 6–10 MIRVed warheads, although there is significant uncertainty about the actual capability.¹⁹ Similarly, there are unconfirmed reports that a new variant of the DF-31A ICBM, the DF-31AG, might be capable of carrying MIRVed warheads.²⁰ However, MIRVed warheads would require a significantly modified DF-31A missile, which according to the US Air Force National Air and Space Intelligence Center (NASIC) carries only one warhead.²¹ The DF-31AG might therefore be an improved launcher for the existing DF-31A.

In 2018 the PLARF announced that it had deployed the new DF-26 intermediate-range ballistic missile (IRBM), which is capable of precision conventional or nuclear strikes against ground targets, as well as conventional strikes against naval targets.²² The DF-26 has an estimated maximum range exceeding 4000 km and can reach targets in the western Pacific Ocean, including the US territory of Guam.²³

The PLARF currently deploys one nuclear-capable medium-range ballistic missile. The DF-21 is a two-stage, solid-fuelled mobile missile that was first deployed in 1991. A modified version, the DF-21A, was deployed beginning in 1996.²⁴ According to the US DOD, a new version of the DF-21 was deployed in 2016.²⁵

Ballistic missile submarines

China continues to pursue its long-standing strategic goal of developing and deploying a sea-based nuclear deterrent. According to the US DOD's

¹⁶ O'Halloran, ed. (note 11), pp. 7–8.

¹⁷ Gertz, B., 'China tests missile with 10 warheads', *Washington Free Beacon*, 31 Jan. 2017.

¹⁸ Minnick, W., 'Chinese parade proves Xi in charge', *Defense News*, 6 Sep. 2015.

¹⁹ O'Halloran, ed. (note 11), pp. 21–22; and Gertz, B., 'China flight tests new multiple-warhead missile', *Washington Free Beacon*, 16 Apr. 2016; and Gan, N., 'US within reach: China shows off new and improved advanced missile system', *South China Morning Post*, 24 July 2017.

²⁰ Fisher, R., 'DF-31AG ICBM can carry multiple warheads, claims China's state media', *Jane's Defence Weekly*, 16 Aug. 2017, p. 9.

²¹ US Air Force, National Air and Space Intelligence Center (NASIC), *Ballistic and Cruise Missile Threat* (NASIC: Wright-Patterson Air Force Base, OH, July 2017), p. 29.

²² Deng, X., 'China deploys Dongfeng-26 ballistic missile with PLA Rocket Force', *Global Times*, 26 Apr. 2018.

²³ US Department of Defense (note 10), pp. 31, 49; and Wilson, J., 'China's expanding ability to conduct conventional missile strikes on Guam', US–China Economic and Security Review Commission, Staff Research Report, 10 May 2016, p. 8.

²⁴ O'Halloran, ed. (note 11), pp. 15–17. Two subsequent versions of the missile were designed for conventional anti-ship and anti-access/area-denial (A2/AD) missions.

²⁵ US Department of Defense (DOD), *Military and Security Developments Involving the People's Republic of China 2016*, Annual Report to Congress (DOD: Washington, DC, May 2016), p. 58.

2018 annual report on China's military power, the PLA Navy (PLAN) has commissioned four Type 094 nuclear-powered ballistic missile submarines (SSBNs).²⁶ A fifth submarine with a modified hull structure was launched in 2018 and a sixth may be under construction.²⁷ Given the expected life-spans of both the operational Type 094 and the next-generation Type 096 (see below), the PLAN is likely to operate both types of SSBNs concurrently.²⁸

The Type 094 submarine can carry up to 12 three-stage, solid-fuelled Julang-2 (JL-2) submarine-launched ballistic missiles (SLBMs). The JL-2 is a sea-based variant of the DF-31 ICBM. It has an estimated maximum range in excess of 7000 km and is believed to carry a single nuclear warhead. In its 2018 report on Chinese military developments, the US DOD assessed that the PLAN had deployed the JL-2 SLBM on its four operational Type 094 SSBNs.²⁹ In February 2018 the Director of US National Intelligence, Dan Coats, stated that this gave 'the PLA Navy its first long-range, sea-based nuclear capability'.³⁰

There has been considerable speculation about when a Type 094 SSBN carrying nuclear-armed JL-2 SLBMs will begin deterrence patrols. Although there were media reports in 2016 that China would soon commence patrols, there was no evidence in 2018 that they had begun.³¹ The annual US DOD reports on China's military power have been predicting since 2014 that commencement of submarine deterrence patrols was imminent, but the 2018 report did not refer to the issue. The routine deployment by China of nuclear weapons on its SSBNs would constitute a significant change to the country's long-held practice of keeping nuclear warheads in central storage in peacetime.

The PLAN is developing its next-generation SSBN, the Type 096. In 2018 the US DOD assessed that construction is likely to begin in the early 2020s.³² Reports vary widely on the design parameters, but the new submarine is expected to be larger, quieter and equipped with more missile launch tubes than the Type 094.

The Type 096 will reportedly be armed with a successor to the JL-2, the JL-3 SLBM.³³ The new missile is thought to use technologies from the

²⁶ US Department of Defense (note 10), p. 29. The Type 094 SSBN is designated the Jin class by the United States and the North Atlantic Treaty Organization.

²⁷ Tate, A., 'Satellite imagery shows two Chinese SSBNs in Huludao', *Jane's Defence Weekly*, 5 Dec. 2018, p. 6.

²⁸ US Department of Defense (note 10), p. 76.

²⁹ US Department of Defense (note 10), p. 76.

³⁰ Coats, D., Director, US National Intelligence, Statement for the Record: Worldwide Threat Assessment, Armed Services Committee, US Senate, 13 Feb. 2018, p. 7.

³¹ Borger, J., 'China to send nuclear-armed submarines into Pacific amid tensions with US', *The Guardian*, 26 May 2016.

³² US Department of Defense (note 10), p. 29.

³³ Dempsey, J. and Boyd, H., 'Beyond JL-2: China's development of a successor SLBM continues', Military Balance blog, International Institute for Strategic Studies, 7 Aug. 2017.

land-based DF-41 ICBM and is likely to have a range in excess of 9000 km, according to US intelligence estimates. On 24 November 2018 the PLAN reportedly conducted the first known flight test of the JL-3 SLBM from a modified conventional submarine in the Bohai Sea.³⁴ The Chinese Government did not confirm the test. It has yet to reveal publicly the number of missiles to be carried by the Type 096 or how many submarines will be built.

Aircraft and cruise missiles

According to the US DOD's 2018 annual report on China's military power, the PLA Air Force (PLAAF) has been 're-assigned a nuclear mission'.³⁵ This is an update on the 2017 report, which stated that the PLAAF 'does not currently have a nuclear mission'.³⁶ China is currently building its first long-range strategic bomber.³⁷ The aircraft, known as the H-20, reportedly will have stealth characteristics similar to those of the US B-2 bomber.³⁸ Analysts expect that the H-20 will make its maiden flight in the early 2020s, with production possibly beginning around 2025.³⁹

The PLA currently deploys or is believed to be developing several types of air-, ground- and sea-launched cruise missiles. In its 2017 assessment of ballistic missile and cruise missile threats, NASIC did not list any Chinese cruise missile as being nuclear-capable.⁴⁰ However, in its previous assessment, published in 2013, NASIC listed the ground-launched Donghai-10 (DH-10, also designated Changjian-10, CJ-10) as a 'conventional or nuclear' (dual-capable) system. In its 2018 annual worldwide threat assessment report, the US Defense Intelligence Agency (DIA) noted that China was developing two new types of air-launched ballistic missile, 'one of which may include a nuclear payload'.⁴¹ It was later identified as a likely variant of the DF-21 medium-range ballistic missile and designated by the DIA as the CH-AS-X-13.⁴²

³⁴ Gertz, B., 'China flight tests new submarine-launched missile', Washington Free Beacon, 18 Dec. 2018.

³⁵ US Department of Defense (note 10), p. 77.

³⁶ US Department of Defense (DOD), *Military and Security Developments Involving the People's Republic of China 2017*, Annual Report to Congress (DOD: Washington, DC, May 2017), p. 61.

³⁷ Medium-range combat aircraft were China's earliest means of delivering nuclear weapons and were used to conduct more than 12 atmospheric nuclear tests in the 1960s and 1970s.

³⁸ Tate, A., 'Details emerge about requirement for China's new strategic bomber', *Jane's Defence Weekly*, 4 Jan. 2017, p. 4.

³⁹ US Department of Defense (note 10), pp. 34, 77; and Roblin, S., 'China's H-20 strategic stealth bomber (everything we know right now)', *National Interest*, 16 Dec. 2018.

⁴⁰ US Air Force, National Air and Space Intelligence Center (note 21).

⁴¹ Ashley, R., Director, US Defense Intelligence Agency, Statement for the Record: Worldwide Threat Assessment, Armed Services Committee, US Senate, 6 Mar. 2018, p. 8.

⁴² Panda, A., 'Revealed: China's nuclear-capable air-launched ballistic missile', *The Diplomat*, 10 Apr. 2018.