

China's nuclear strategy and capabilities: An introduction

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China is pursuing a transformation of its nuclear arsenal. The intensifying strategic rivalry and deep mistrust between the US and China increase the risk that a crisis or military conflict between the two countries could escalate to the use of nuclear weapons, whether deliberate or inadvertent. Within NATO, allies are debating China's expanding global influence and military modernisation with growing intensity. NATO allies must contend with China's military build-up, including its nuclear forces.

THIS MEMO PROVIDES a foundational overview of China's nuclear strategy, capabilities, and organisation. The body of research and analysis on China and nuclear weapons is growing and spans a range of questions, perspectives, and interpretations. The memo concludes with a short selection of relevant literature for readers who wish to explore the subject further.

A particular challenge concerns China's lack of transparency and the high sensitivity surrounding nuclear issues. For example, China publishes little official information about its existing nuclear arsenal. Open-source information on weapon-system development and on China's operational plans for the use of nuclear weapons, in both peacetime and wartime, is limited. Added to this is the closed nature of China's political system, not least within the People's Liberation Army (PLA),

which hampers understanding of, for example, decision-making processes and command-and-control systems.

This memo relies primarily on existing secondary literature. This applies to information on China's nuclear forces, as well as to its nuclear strategy and domestic thinking on nuclear weapons.¹ It is important to emphasise that there is considerable uncertainty about China's nuclear arsenal, not least its future development. Readers should therefore treat the memo as an overview of China's nuclear capabilities, how they are intended to be employed, and for what purposes.²

The memo opens with a description of China's nuclear programme and strategy. This is followed by an outline of China's nuclear arsenal, and of the organisation and operational planning of its nuclear forces. The conclusion offers several brief reflections.

1 Much of the available open-source information on China's nuclear arsenal is published by the US Department of Defense (DoD) in its annual report; see US Department of Defense, *Military and Security Developments Involving the People's Republic of China*. Other leading assessors, such as the Federation of American Scientists (FAS) and the Stockholm International Peace Research Institute (SIPRI), largely draw on the DoD report but also make their own judgements of that material, supplemented by their own collected material. This, in turn, produces a somewhat different analysis of China's nuclear arsenal and its development. This memo relies to a large extent on these three sources for information on China's existing nuclear forces.

2 FOI has previously issued a number of publications on China and nuclear weapons, as well as related topics. See, for example, Anders Axelsson, Martin Goliath, Mattias Waldenvik, and Jens Wirstam, *Teknikutveckling och rustningskontroll (Technology development and arms control)*, FOI-R--5122--SE, March 2021; Magnus Evestedt and David Yang, *Kinas ballistiska robotar och kryssningsrobotar (China's ballistic missiles and cruise missiles)*, FOI Memo 7423, 2020; Mårten Stenmark, *Asien ur ett icke-spridningsperspektiv (Asia from a non-proliferation perspective)*, FOI-R--3379--SE, December 2011.

CHINA'S NUCLEAR ARMS PROGRAMME

China began its nuclear programme in the 1950s with substantial technical assistance and expertise from the Soviet Union. However, the Sino-Soviet split in the 1960s led Moscow to withdraw all support, leaving China to continue developing its programme independently. A major reason for China's decision to acquire nuclear weapons was its escalating confrontation with the US, clearly reflected in the Korean War (1950–1953) and the Taiwan crisis of 1955; in that context, Mao Zedong argued that possessing nuclear weapons would deter other states from threatening China's national security and independence.³

China conducted its first nuclear test in October 1964 at Lop Nur in the Gobi Desert, located in the southeastern part of Xinjiang province. In 1967 it detonated its first hydrogen bomb. From 1964 to 1996, when China signed the Comprehensive Nuclear-Test-Ban Treaty (CTBT), it carried out 45 nuclear tests.⁴ The US has alleged that China has conducted a secret critical nuclear explosive test in 2020 in violation of the treaty and also preparing for nuclear tests with yields in the range of hundreds of tons.⁵ However, it remains unclear if China did conduct a nuclear test, and if it did, for what purpose.⁶ In 1992 China signed the Treaty on the Non-Proliferation of Nuclear Weapons (NPT). China has officially declared that it supports the complete disarmament of all nuclear weapons worldwide, but it has not signed the United Nations Treaty on the Prohibition of Nuclear Weapons (TPNW).⁷ China is a member of the Nuclear Suppliers Group (NSG), but not a full member of the Missile Technology Control Regime (MTCR), although it claims to follow that regime's guidelines and practice.⁸

Initially, China employed strategic bombers as nuclear delivery systems with the H-6 (based on the Soviet Tu-16) armed with free-fall gravity bombs. The bombers' range was limited, however. China therefore

developed increasingly capable delivery systems, chiefly land-based ballistic missiles. Its first ballistic missile was the DF-1, based on the Soviet R-2, with a range of 600 km. The first test launch of a ballistic missile was conducted in 1960. In 1966, China conducted its first nuclear test using a ballistic missile as delivery system (the DF-2), capable of reaching parts of Japan when launched from northeast China.⁹ In 1980, China developed its first land-based intercontinental ballistic missile (ICBM), the DF-5, capable of carrying a nuclear warhead and able to reach the continental US.

Until the early 1990s, China's nuclear forces consisted largely of land-based, relatively inaccurate, liquid-fuelled missiles, armed with high-yield warheads intended to strike large targets such as cities, and deployed in tunnel complexes and silos deep within Chinese territory. In the mid-1980s, China developed its first strategic submarines (ballistic missile submarines, SSBNs), the Xia class (Type 092), equipped with JL-1 submarine-launched ballistic missiles (SLBMs) with a range of around 1,700 km. However, most assessments hold that the Xia boats never conducted operational patrols carrying nuclear weapons.¹⁰

CHINA'S NUCLEAR WEAPONS STRATEGY AND POLICY

For many years, China had no officially declared nuclear-weapons policy. Instead, the role of nuclear weapons in China's military strategy and national security has been identified from various statements by the country's senior political and military leaders.¹¹ China first promulgated a codified official policy in its 2006 defence white paper. Since then, it has reiterated this declared nuclear-weapons policy in subsequent white papers on defence and military development and in other official statements. The most recent defence white paper, published in 2019, stipulates that the policy is one of "self-defence" and intends to develop "nuclear capabilities at

3 John Wilson Lewis and Xue Litai, *China Builds the Bomb*, Stanford University Press, 1991.

4 The US conducted about 1,054 nuclear tests between 1945 and 1992, and the Soviet Union conducted 715 nuclear tests between 1949 and 1990. Like China, the US has signed the Comprehensive Nuclear-Test-Ban Treaty (CTBT) but has not yet ratified it.

5 Thomas G. Dinanno, *Statement to the Conference on Disarmament*. U.S. Department of State, February 6, 2025. <https://www.state.gov/releases/under-secretary-for-arms-control-and-international-security-affairs/2026/02/statement-to-the-conference-on-disarmament>

6 Joseph Rodgers and Joseph S. Bermudez Jr. "Satellite Imagery Analysis of China's Alleged 2020 Nuclear Test at Lop Nur", February 13, 2026. Center for Strategic and International Studies (CSIS). <https://www.csis.org/analysis/satellite-imagery-analysis-chinas-alleged-2020-nuclear-test-lop-nur>

7 Nor has any other nuclear-armed state signed the United Nations Treaty on the Prohibition of Nuclear Weapons (TPNW).

8 US Congressional Research Service (CRS), "Chinese Nuclear and Missile Proliferation," (updated February 2023).

9 Evestedt and Yang, *Kinas ballistiska robotar och kryssningsrobotar*, p. 3.

10 Wu Riqiang, "Certainty of Uncertainty: Nuclear Strategy with Chinese Characteristics," *Journal of Strategic Studies*, 36:4 (2013), pp. 593–598.

11 For a systematic description, see, for example, Fravel, M. Taylor and Evan S. Medeiros, "China's Search for Assured Retaliation: The Evolution of Chinese Nuclear Strategy and Force Structure," *International Security*, 35.2 (2011): 48–87.

the minimum level required for national security.”¹² This policy was reaffirmed in China’s latest white paper from 2025 on arms control, disarmament and non-proliferation.¹³ In practical terms, this implies that China wants to possess a credible second-strike capability: an arsenal robust enough to survive a first nuclear attack by an adversary and to retaliate with nuclear weapons.

China’s nuclear strategy is often described as “assured retaliation” and forms the core of the country’s deterrence strategy. This rests on the conviction that the use of nuclear weapons entails such destructive power that no state would use them against another nuclear-armed state, since that would result in mutual annihilation.¹⁴ China’s position is that escalation is very difficult to control in a nuclear crisis or conflict, because even the use of so-called “tactical nuclear weapons” against limited targets risks spiralling into full-scale nuclear war.¹⁵ It therefore judges that nuclear weapons have limited utility as battlefield weapons and should ultimately be regarded as instruments of deterrence against other states’ nuclear attacks or as tools to avert external threats and coercion.¹⁶

This posture has also meant that, for many years, China maintained a relatively small nuclear arsenal and comparatively unsophisticated delivery systems. In the 1970s, China was assessed to possess just over 70 nuclear warheads. In 1984, US intelligence estimated China’s arsenal at between 150 and 160 warheads. By comparison, in that year the US arsenal exceeded 23,000 warheads, and the Soviet Union’s stood at about 37,000.¹⁷ As late as 2005, China was assessed to be the world’s

fifth-largest nuclear-armed state, after the US, Russia, France, and the United Kingdom.

China has also officially declared a *no-first-use* (NFU) policy. Under the policy, China will not be the first to use nuclear weapons in a conflict, but will retaliate with nuclear weapons if attacked with them. China adopted the policy shortly after conducting its first nuclear test in 1964. China has also declared that it will not use nuclear weapons against non-nuclear-weapon states or in nuclear-weapon-free zones (so-called *negative security assurances*).¹⁸ China and India are the only nuclear-armed states with an official, publicly declared NFU policy.¹⁹

In line with its NFU policy, China keeps most of its nuclear forces at a low alert status. This means that, in practice, warheads and delivery systems are generally kept separated and unmated in peacetime, which sets China apart from, for example, the US and Russia. At the same time, the US Department of Defense (DoD) argues that there is now greater uncertainty about this than before. For example, China conducts regular readiness exercises and rotates missile battalions from low-alert *standby* status to ready-to-launch positions. Such exercises are deemed to have increased in frequency and to indicate that China may be moving towards a posture in which warheads are mated to delivery systems, a *launch-on-warning* (LOW) posture policy (in China, this is known as a “early warning counterstrike”), which could also imply a departure from its declared NFU.²⁰ According to US DoD’s assessments, China aims to keep at least some portions of its units on a heightened

12 The State Council Information Office of the People’s Republic of China, *China’s National Defense in the New Era*, 2019.

13 The State Council Information Office of the People’s Republic of China, *China’s Arms Control, Disarmament, and Non-proliferation in the New Era*, 2025.

14 Fiona S. Cunningham and M. Taylor Fravel, “Assuring Assured Retaliation: China’s Nuclear Posture and US–China Strategic Stability,” *International Security*, vol. 40, no. 2, (Fall 2015). More generally, this reflects a strand of the nuclear-weapons and deterrence literature, often referred to as the “nuclear revolution” or “mutually assured destruction” (MAD). See, for example, Robert Jervis, *The Meaning of the Nuclear Revolution: Statecraft and the Prospect of Armageddon*, Ithaca, NY: Cornell University Press, 1985.

15 There is some disagreement over the term “tactical nuclear weapons.” In brief, tactical, or sub-strategic, nuclear weapons refer to shorter-range systems with lower yields than strategic nuclear weapons. Tactical nuclear weapons are intended to strike local or regional military targets and assets, or targets with military support functions. Strategic nuclear weapons are directed against an adversary’s society and population.

16 Fiona S. Cunningham and M. Taylor Fravel, “Dangerous Confidence? Chinese Views on Nuclear Escalation,” *International Security* 44, no. 2 (Fall 2019): 61–109.

17 Ashely J. Tellis, *Striking Asymmetries: Nuclear Transitions in Southern Asia*, Washington D.C. Carnegie Endowment for International Peace, 2022, p. 20

18 The State Council Information Office of the People’s Republic of China, *China’s National Defense in 2006*, 2006.

19 India adopted its NFU policy in 1998.

20 US Department of Defense, *Military and Security Developments involving the People’s Republic of China 2022*, p. 99.

state level of readiness.²¹ China is also developing early-warning systems, a prerequisite for a viable LOW posture.²² Ground-based radars and satellites are used for such a development.²³ Russia has pledged to help China develop such a system, although the details of this cooperation remain unclear.²⁴

There is also debate over whether China might circumvent its NFU policy if its nuclear forces were attacked with non-nuclear means, for example with conventional weapons, and thus mount a retaliatory nuclear strike.²⁵ In China, expert discussions have periodically considered whether the country should adjust its nuclear strategy in light of such scenarios.²⁶ For example, some PLA experts argue that a LOW posture need not necessarily constitute a breach of the country's NFU policy.²⁷ At the same time, there are currently few clear open-source indications that China intends to revise the fundamental elements of its nuclear strategy, including the NFU policy. Official documents, statements by political and military leaders, and military publications and other texts reaffirm continuity and prior commitments to maintain the current strategy.²⁸

NUCLEAR ARSENAL

Over the past decade, China has embarked on a concerted transformation of its nuclear forces. In particular since about 2019, China has markedly expanded its

nuclear arsenal and developed increasingly advanced, technologically sophisticated delivery systems and supporting infrastructure. China is now judged having a fully capable nuclear triad fielding operational delivery systems from land, air, and sea.²⁹ In addition, the PLA has undergone extensive reforms that have also affected the organisation and operational planning of China's nuclear forces.

According to the latest estimate from the DoD, as of December 2025 China possessed around 600 operational nuclear warheads,³⁰ up from the 400 estimated in 2022.³¹ It should be noted that China's total nuclear arsenal still remains far below those of the US and Russia, at roughly one third the size of either.³²

Assessments differ, however, on projections of China's future arsenal. In a 2022 report, the DoD assessed that, if current trends persist, China could field around 1,000 operational nuclear warheads by 2030 and likely around 1,500 by 2035.³³ The latest US DoD report acknowledges that the rate of production has somewhat slowed recently, but that China nonetheless is on track to possess over 1,000 warheads by 2030. In earlier reports, FAS estimated just under 600 by 2030 and about 750 by 2035, almost half the DoD figures. In its latest assessment from 2025 FAS has estimated around 600 warheads.³⁴ It should however be noted that earlier estimates of China's nuclear arsenal have often

21 US Department of Defense, *Military and Security Developments involving the People's Republic of China 2024*, p. 106.

22 A launch-on-warning (LOW) posture means that orders to launch nuclear weapons can be issued as soon as satellites or other early-warning sensors detect incoming missiles, before any impact has occurred. Such a posture requires nuclear warheads to be mated to missiles and other delivery systems and kept at immediate readiness. Early-warning systems make this technically possible. These systems are highly sophisticated, and only the US and Russia can be said to possess reliable, well-functioning versions.

23 U.S. Department of Defense, *Military and Security Developments involving the People's Republic of China 2025*, p. 29-30.

24 Christopher Weidacher Hsiung, "Missile defense and early warning missile attack system cooperation: Enhancing the Sino-Russian defense partnership," *IFS Insight*, January 1, 2020, 1–8.

25 Caitlin Talmadge, "Would China Go Nuclear? Assessing the Risk of Chinese Nuclear Escalation in a Conventional War with the United States" *International Security*, vol. 41, no. 4 (Spring 2017): 50–92.

26 Liping Xia, "China's Nuclear Doctrine: Debates and Evolution," *Regional Voices on the Challenges of Nuclear Deterrence Stability in Southern Asia*, Carnegie Endowment for International Peace, June 30, 2016, <https://carnegieendowment.org/2016/06/30/china-s-nuclear-doctrine-debates-and-evolution-pub-63967>.

27 Henrik Stålhane Hiim, M. Taylor Fravel, and Magnus Langset Trøan, "The Dynamics of an Entangled Security Dilemma: China's Changing Nuclear Posture," *International Security*, vol. 47, no. 4 (Spring 2023), p. 170.

28 David C. Logan, "China's Nuclear Forces," *Testimony before U.S.-China Economic and Security Review Commission*, June 10, 2021, <https://www.uscc.gov/hearings/chinas-nuclear-forces>. Also, see Hiim, Fravel, and Trøan, "The Dynamics."

29 U.S. Department of Defense, *Military and Security Developments 2025*. Russia and India also possess a mature nuclear triad. France has only bombers and submarines, and the UK only submarines.

30 *Ibid.*, p. 22.

31 U.S. Department of Defense, *Military and Security Developments involving the People's Republic of China 2025*, pp. 97-98.

32 This also depends on how one calculates it. Including both operational and stored warheads, and both strategic and tactical types, the US possesses 5,244 nuclear warheads and Russia 5,889. See Hans Kristensen, Matt Korda, Eliana Johns, and Kate Kohn, "Status Of World Nuclear Forces," *Federation of American Scientists* (FAS), 31 March, 2023, <https://fas.org/initiative/status-world-nuclear-forces/>.

33 US DoD, *Military and Security Developments 2022*, p. 97–98.

34 Hans M. Kristensen, Matt Korda, Eliana Johns and Mackenzie Knight-Boyle, "Chinese nuclear weapons, 2025", *Bulletin of the Atomic Scientist*, Vol 81, No 2 (2025): 135-160.

been imprecise and, not infrequently, overstated.³⁵ This underscores how difficult it is to assess precisely the true size of China's nuclear arsenal. At the same time, it is clear that China has substantially increased the number of warheads: since 2010, the total has more than tripled after remaining roughly constant at around 200 for several decades.

The pace and scale of China's continued growth in warhead numbers depend on its stocks of plutonium, uranium enrichment, and tritium, and on the broader state of its nuclear-technology infrastructure. China has not publicly declared that it has ceased producing fissile material for military purposes, but it is generally assessed to have ended production in the late 1980s and to hold a relatively small stock today.³⁶ According to FAS, there is currently sufficient fissile material to increase the number of warheads; however, exceeding 1,000 would require additional production.³⁷ According to the US DoD, China is expanding its civilian nuclear-power industry, including through increased cooperation with Russia, and that these developments could contribute to China's nuclear-weapons development.³⁸

China can launch nuclear weapons from land-, air-, and sea-based platforms. The following provides a brief overview of the principal delivery systems.

LAND-BASED MISSILE ARSENAL

China's land-based missile arsenal largely consists of ICBMs. In broad terms, there are four types: DF-4, DF-5, DF-31, and DF-41, each fielded in several variants.³⁹ Most of these systems carry a single nuclear warhead, but a small, and growing, subset can carry multiple warheads in a single payload; many are MIRV-capable

(multiple independently targetable re-entry vehicles, MIRVs), enabling individual warheads to strike different targets within the same area.⁴⁰

It should be emphasised that the bulk of China's overall missile arsenal consists of medium- and short-range systems intended for regional missions; most of which are assessed as not carrying nuclear warheads.⁴¹ Roughly one third of China's nuclear-capable ballistic missiles have the range to reach the continental US.⁴²

China fields both silo-based, liquid-fuelled ICBMs and a growing number of road-mobile launchers with solid-fuel missiles.⁴³ DF-5 variants are assessed to have the longest range, at about 13,000 km; two variants, the DF-5A and DF-5B, are operational, and the latter is judged to be MIRV-capable. China's oldest ICBM, the DF-4, is no longer considered to have an operational role.⁴⁴ In 2024, US DoD assesses that China possesses roughly 400 ICBMs in total.⁴⁵

DF-31 missiles are China's first mobile, land-based, solid-fuel ICBMs. The original DF-31, which entered service in 2006, has been modernised; newer variants include the DF-31A, with a range of about 11,200 km (the DF-31, at around 7,200 km, could not reach the continental US and is thought to have been intended for regional missions—Russia, India, and Guam), and the DF-31AG, understood to offer improved mobility.⁴⁶ The DF-41 is also considered road-mobile, and available information indicates that China plans to deploy it in rail-mobile configuration or in silos. The DF-41 is credited with greater range and accuracy than the DF-31 family and can carry up to three nuclear warheads.⁴⁷ According to the DoD, China is also developing a DF-27 variant with a 5,000–8,000 km range, which

35 For an overview of different historical assessments, see Kristensen, Korda, and Reynolds, "Chinese Nuclear Weapons, 2023," p. 110.

36 International Panel on Fissile Materials (IPFM), "Countries: China" (updated, April 29, 2023), <https://fissilematerials.org/countries/china.html>.

37 Kristensen, Korda, and Reynolds, "Chinese nuclear weapons, 2023," p. 108.

38 US DoD, *Military and Security Developments 2023*, p. 109–110.

39 China's land-based ballistic missiles all carry the designation DF, an abbreviation of Dongfeng ("East Wind" in Chinese), followed by a number and sometimes a letter. NATO uses an alternative designation, CSS (Chinese Surface-to-surface missile), followed by a number; for example, it designates the DF-4 as CSS-3.

40 SIPRI, *SIPRI Yearbook 2023*, p. 290.

41 To qualify as an intercontinental ballistic missile (ICBM), a missile must have a range of at least 5,500 km. Two categories of medium-range ballistic missile are commonly distinguished: medium-range ballistic missiles (MRBMs) and intermediate-range ballistic missiles (IRBMs). An MRBM typically has a range of 1,000–3,000 km; an IRBM falls between an MRBM and an ICBM, at 3,000–5,500 km.

42 Kristensen, Korda, and Reynolds, "Chinese nuclear weapons, 2023," p. 115.

43 A key difference between propellant types is that liquid propellant requires longer fuelling times and therefore entails greater vulnerability. Land-mobile denotes transport by road or rail.

44 SIPRI, *SIPRI Yearbook 2023*, p. 287.

45 U.S. Department of Defense, *Military and Security Developments Involving the People's Republic of China, 2024*, p. 65.

46 Kristensen, Korda, and Reynolds, "Chinese nuclear weapons, 2023," p. 121–122.

47 US DoD, *Military and Security Developments 2022*, p. 94.

would make it usable as an ICBM.⁴⁸ FAS, however, assesses that the DF-27 is likely to be used for conventional strikes.⁴⁹ At the military parade in Beijing 2025 to commemorate the Chinese Communist Party's victory over Japan, China revealed the DF-61, likely MIRV-capable and the next generation of China's ICBMs.⁵⁰

In addition, according to reports, in July 2021 China for the first time conducted a fractional-orbit launch of a hypersonic boost-glide vehicle (HGV) using an ICBM. The glide vehicle flew more than 40,000 km and for over 10 minutes, the longest distance and flight time ever achieved by Chinese land-attack systems. It circled the globe and although it did not strike its target in China, it came close.⁵¹ The development of hypersonic glide vehicles can be viewed in light of broader and deepening Chinese concerns, particularly regarding US missile-defence systems and increasingly advanced US conventional capabilities, which, in China's view, undermine its second-strike capability. In addition to HGVs, China is therefore developing a range of advanced conventional capabilities, including anti-satellite weapons (ASAT), electronic warfare, cyber capabilities, and more advanced ballistic and cruise missiles that can disable satellites and ground-based radar systems, with the aim of degrading US missile-defence systems.⁵²

In 2021, it was discovered that China had begun constructing more than 300 new silos in three geographic areas ("silo fields") in central and western China.⁵³ According to DoD's assessments, construction of the three silo fields is largely complete, with at least some ICBM silos across the three fields.⁵⁴ These fields are located deeper within Chinese territory than earlier sites and are therefore less vulnerable to an adversary's conventional long-range strikes. Estimates suggest that, if China fills all of the silos, it could arm its ICBMs with around 500 nuclear warheads within the next ten

years. If the ICBMs are also equipped for MIRVs, the total could reach about 1,200 warheads once all the silo fields are finished. Considerable uncertainty nevertheless remains about how China intends to use the new silos. Outstanding questions include how many silos will be filled, how many nuclear warheads each missile will carry, and whether the silos will be populated with ballistic missiles assigned to more conventional (non-nuclear) roles.⁵⁵

China's DF-21 family is its principal system for regional missions. The DF-21 is a, two-stage, solid-fuelled, medium-range ballistic missile, with a range of roughly 2,150 km. Since 2016, however, it has been gradually replaced by the DF-26, which has a range of over 3,000 km and can reach targets in India, the South China Sea, and Guam. The DF-26 is considered *dual-use*, making it technically possible to switch between conventional and nuclear-armed configurations. According to the DoD, the DF-26 is China's first nuclear-capable missile able to conduct high-precision strikes and is therefore likely to be fitted with nuclear payloads in the near term.⁵⁶ The dual-use nature of the DF-26 increases the risk of misinterpretation, since it may be difficult to distinguish whether an incoming DF-26 is conventionally or nuclear-armed. Uncertainty remains, however, over how many DF-26s may be nuclear-armed and, according to FAS, most missiles are likely intended for conventional roles. China's short-range ballistic missiles (SRBMs) are generally recognised to be exclusively configured for conventional missions and not nuclear-armed.⁵⁷

China does not field sub-strategic ("tactical") nuclear weapons in the way that, for example, Russia does. As noted above, the DoD claims that China may develop such weapons (what it terms "lower-yield nuclear weapons") to strengthen deterrence, primarily

48 Ibid., p. 65.

49 Kristensen, Korda, and Reynolds, "Chinese nuclear weapons, 2023," p. 123.

50 Per Olsson and Christopher Weidacher Hsiung, *Kinas militära modernisering – några observationer efter militärparaden (China's military modernisation – some observations from the military parade)*, FOI Memo 8949, 2025.

51 US DoD, *Military and Security Developments 2022*, p. 65.

52 Tong Zhao, "Managing the Impact of Missile Defense on U.S.–China Strategic Stability," Carnegie Endowment for International Peace, April 30, 2023, <https://carnegieendowment.org/carnegiechina/?maxrow=20&tabName=&channel=&ftr=&lang=en&pageOn=2>.

53 These are the Yumen, Hami, and Yulin silo fields.

54 US DoD, *Military and Security Developments 2023*, p. 104; US DoD, *Military and Security Developments 2024*, p. 103.

55 Kristensen, Korda, and Reynolds, "Chinese nuclear weapons, 2023," p. 115–123.

56 US DoD, *Military and Security Developments 2022*, p. 98.

57 Kristensen, Korda, and Reynolds, "Chinese nuclear weapons, 2023," p.124.

via the DF-26, or perhaps even conduct limited counter-strike operations and control nuclear escalation.⁵⁸ However, other analyses indicate that few voices in China's internal expert debate advocate such a course.⁵⁹ At the same time, it remains unclear how China intends to employ its regional nuclear forces. One scenario sometimes discussed is that China might threaten nuclear use in a regional setting to signal deterrence, for example, against the US or other regional states, in a potential Taiwan crisis.⁶⁰

Strategic bombers

The People's Liberation Army Air Force (PLAAF) operates a number of H-6 (Hong-6) bombers.⁶¹ During the 1960s and 1970s, China air-dropped and detonated at least 12 nuclear devices using these aircraft as part of its nuclear programme. FAS assesses that China has long maintained a small arsenal of gravity bombs, potentially up to 20.⁶² Until 2018, however, these bombs were not fully operational and probably served a reserve role.⁶³

The DoD states that the PLAAF has regained a "nuclear role."⁶⁴ A variant of the H-6, the H-6N, is China's first bomber capable of aerial refuelling, allowing longer-range missions. China is also developing two air-launched ballistic missiles (ALBMs), one of which is potentially nuclear-capable.⁶⁵ According to the DoD, these missiles appear to be MARV-capable (maneuverable reentry vehicle), enabling high-precision strikes against targets in the Indo-Pacific region.⁶⁶ During the Military Parade in 2025, China showcased for the first time officially one such an ALMB, the JingLei-1 (JL-1).⁶⁷ China is also developing a new strategic stealth bomber, the H-20, which is expected to become operational within the next decade, and is likely to undertake both

conventional and nuclear roles. The H-20 is thought to have a range of more than 10,000 km, enabling deep penetration into the western Pacific; with aerial refuelling it could achieve global reach.⁶⁸ This would make the H-20 comparable to the US B-2 strategic bomber. At the same time, China's strategic bombers are highly vulnerable on long-range missions, not least because China lacks a developed global network of air bases, like the US's.

Submarine-based nuclear weapons

China's sea-based nuclear ballistic-missile force comprises six Jin-class (Type 094) SSBNs.⁶⁹ The first four boats were delivered to the People's Liberation Army Navy (PLAN) in 2016. The remaining two, designated Type 094A, are variants of the earlier boats and appear to have been operational since 2021. The Jin boats are based at Longpo on Hainan Island in the South China Sea.⁷⁰ They replaced the earlier Xia class.

The Jin boats were previously equipped with JL-2 ballistic missiles with a range of about 7,200 km. When launched from waters near China, these missiles can strike Alaska, Guam, Hawaii, Russia, and India. The missiles can reach the continental US only if the submarines patrol deep into the Pacific. Reporting had indicated that the JL-2 has been replaced by the newer JL-3, which was also publicly revealed at the Military Parade in 2025. The JL-3 has a range of about 10,000 km. From Chinese waters, the JL-3 can therefore reach the continental US, though not Washington, DC.⁷¹ According to the DoD, the JL-3 could enable a "bastion defence," likely in the South China Sea and the Bohai Gulf, intended to enhance the survivability of China's sea-based nuclear arsenal.⁷²

58 US DoD, *Military and Security Developments 2022*, p. 98. See also US DoD, *Military and Security Developments 2025*, p. 24, which states: "The PLA is probably pursuing nuclear weapons with yields below 10 kilotons. Such weapons address long-held PLA desires to be able to conduct limited nuclear counter-strikes against military targets and control nuclear escalation."

59 Hiim, Fravel, and Trøan, "The Dynamics," p. 172.

60 David C. Logan and Philip C. Saunders, "Discerning the Drivers of China's Nuclear Force Development: Models, Indicators, and Data," p. 13.

61 The Chinese designation is Hong-6, and the US designation is H-6.

62 Kristensen, Korda, and Reynolds, "Chinese nuclear weapons, 2023," p.127.

63 SIPRI, *SIPRI Yearbook 2023*, p. 288.

64 US DoD, *Military and Security Developments 2022*, p. 60.

65 Kristensen, Korda, and Reynolds, "Chinese nuclear weapons, 2023," p.127.

66 US DoD, *Military and Security Developments 2023*, p. 108–109.

67 Per Olsson and Christopher Weidacher Hsiung, *Kinas militära modernisering – några observationer efter militärparaden*.

68 US DoD, *Military and Security Developments 2022*, p. 83.

69 "Type 094" is the US designation.

70 SIPRI, *SIPRI Yearbook 2023*, p. 125.

71 Ibid.

72 US DoD, *Military and Security Developments 2023*, p. 108.

The Jin class is an improvement on the Xia but remains considerably noisier and less advanced than its US and Russian counterparts. China is therefore unlikely to build further Jin-class submarines; instead it is developing quieter, larger SSBNs known as Type 096. Production has begun. Uncertainty remains as to whether the new class consists of new nuclear-powered attack submarines (SSNs) or larger SSBNs.⁷³

According to the DoD, China now largely keeps Jin-class submarines on patrol, a pattern it describes as “near-continuous at-sea deterrence patrols.”⁷⁴ However, this development remains uncertain and likely does not mean that the whole SSBN fleet is on patrol but rather one boat deployed at a time; SIPRI reports that it cannot be confirmed with confidence.⁷⁵

ORGANISATION AND OPERATIONAL PLANNING

China has historically maintained a relatively restrictive approach to the intended use of nuclear weapons. Control of, and decisions over, nuclear weapons are highly centralised and rest with the Politburo Standing Committee and the Central Military Commission (CMC). Only the political leadership can authorise a nuclear strike; in practice, this means the top leader, currently President Xi Jinping.

As noted above, China keeps most nuclear warheads unmated from their delivery systems and at low alert, although the DoD assesses that China is moving towards a partial LOW posture. A key reason is the need to avoid unauthorised or accidental use of nuclear weapons, which analysts take to indicate that China has traditionally prioritised strict control of its nuclear weapons over the survivability of the arsenal.⁷⁶

The PLA Rocket Force (PLARF) is operationally responsible for organising, equipping, training, and

operating China’s land-based nuclear forces, as well as the country’s conventional missile arsenal.⁷⁷ PLARF reports directly to the Central Military Commission (CMC), whereas the army, navy, and air force fall under China’s regional *theatre commands*.⁷⁸ Following the major military reforms launched in 2015, efforts have been made to separate operational command arrangements between the conventional and strategic forces, with the conventional missile arsenal increasingly integrated into the theatre commands. The long-standing view has been that PLARF also controls the nuclear warheads carried by China’s submarines and strategic bombers, although how this works in practice today is uncertain.⁷⁹ A more diversified deterrence posture, in which the PLAN and PLARF have greater scope to manage nuclear weapons themselves, could pose new challenges for China’s command-and-control, as more actors become directly involved in handling and launching nuclear weapons—closer to the presumed US and Russian practice.

PLARF has its headquarters in north-eastern Beijing. China’s land-based missile forces are organised into six missile bases located in Liaoning, Anhui, Yunnan, Henan, Hunan, and Gansu provinces.⁸⁰ The central depot for nuclear warheads is in central China, in Shaanxi Province. Each missile base oversees around six to eight missile brigades, comprising both conventional and strategic brigades deployed at various sites. In total, China has 41 missile brigades, each believed to be assigned a single missile type.⁸¹ Each brigade, in turn, is subdivided into subordinate battalions, launch companies, and launch platoons.⁸² The brigades function largely as self-contained bases with their own communications and operational and logistic support.⁸³ As China expands its missile arsenal, the number of brigades is likely to increase. In general, each brigade operates

73 SIPRI, *SIPRI Yearbook 2023*, p. 126.

74 US DoD, *Military and Security Developments 2022*, p. 96.

75 SIPRI, *SIPRI Yearbook 2023*, p. 293.

76 Fiona Cunningham, “Nuclear Command, Control, and Communications Systems of the People’s Republic of China,” *NAPSNet Special Reports*, July 18, 2019, p. 7.

77 In 2016, the PLARF replaced the “Second Artillery” (founded in 1966), which had previously managed China’s land-based missile force. Since then, the PLARF has been a separate service branch, on a par with the army, navy, and air force.

78 David C. Logan, “Are They Reading Shelling in Beijing? The Dimensions, Drivers, and Risks of Nuclear-Conventional Entanglement in China,” *Journal of Strategic Studies*, 46:1 (2023), p. 30–31.

79 Mark A. Stokes, “China’s Nuclear Warhead Storage and Handling System,” March 12, 2010, *Project 2049 Institute*, p. 2.

80 In China, the bases are numbered 61, 62, 63, 64, 65, and 66. There is also a central base located in Shaanxi, Base 67. In addition, there are two further bases. Base 68 consists of a number of engineering brigades responsible for the construction and maintenance of installations, equipment, and infrastructure. Base 69 is responsible for PLARF training and testing.

81 Decker Eveleth, “People’s Liberation Army Rocket Force Order of Battle 2023,” *CNS*, July 2023, James Martin Center of Nonproliferation Studies, Middlebury Institute of International Studies at Monterey, July 2023, p. 28.

82 Cunningham, “Nuclear Command, Control, and Communications,” p. 7.

83 Ma Xiu, *PLA Rocket Force Organisation*, China Aerospace Studies Institute, 2022, p. 5.

within its geographic area; however, China's transport network for both conventional and strategic missiles enables redeployment to bases in other regions.⁸⁴ It is estimated that PLARF has approximately 45 brigades with ballistic or cruise missile launchers. Roughly 30 of those operate either ballistic missile launchers with nuclear capability or they are undergoing upgrades to for that purpose.⁸⁵

There is limited open-source information on the operational routines and procedures that would apply if China raised its launch readiness for nuclear weapons. The only "concrete" campaign concept involving the PLARF's nuclear use concerns a nuclear counter-strike, in line with China's "assured retaliation" strategy and the NFU policy described above.⁸⁶ Chinese open-source materials refer exclusively to PLARF training under conditions in which China has already suffered a nuclear attack. There is virtually no open-source information on nuclear training for China's strategic submarines and bombers.⁸⁷

Some analysts argue that PLARF's remit contains a degree of ambiguity, and that China might employ nuclear weapons as threats or in circumstances other than a counter-strike after a nuclear attack on China. One case sometimes cited is a conventional attack that Beijing judges to threaten its nuclear forces or their command-and-control.⁸⁸ Others, however, contend that this ambiguity should be clarified. PLARF reports directly to the CMC and, ultimately, to the political leadership. China's NFU policy, and its nuclear strategy more broadly, are therefore matters for the political leadership, not for PLARF.⁸⁹ Beyond this, there are few military texts or expert publications indicating that China seeks to use nuclear weapons other than in a retaliatory scenario.⁹⁰ That said, PLA writings refer to

various forms of nuclear signalling for deterrence: escalating official rhetoric, raising the readiness of strategic forces, demonstrating and testing missile launches, and fitting ICBMs with conventional payloads and firing them to land near a potential adversary's territory.⁹¹ Chinese military publications have also increasingly discussed more proactive use of offensive capabilities in the cyber and space domains to raise the costs in the event of a nuclear attack.⁹²

The general assumption is that in a crisis or period of strategic warning that requires activating the nuclear arsenal, nuclear warheads would be moved by rail or road (very rarely by air) from the central warhead depot in Shaanxi Province to the six regional missile bases. Once there, the warheads would be inspected and assembled, then mated to delivery systems within a missile brigade, where they would await launch orders.⁹³ A major challenge with this system is that it requires China to survive a nuclear attack long enough to ready its arsenal for launch.

CONCLUDING REFLECTIONS

It is clear that China has far-reaching ambitions to expand its nuclear arsenal. This creates a widening disconnect between the rapid transformation of China's nuclear forces and its declared nuclear policy. At the same time, significant uncertainty and debate persist over China's long-term intentions and what nuclear transformation means for the country's overall nuclear strategy. China's lack of transparency further exacerbates this uncertainty.

Some analysts conclude that China's nuclear transformation could make it a nuclear peer of the US within the next ten years. This would place entirely new demands on US defence planning, as the US would

84 Logan, "Are They Reading Shelling in Beijing?" p. 24.

85 Hans M. Kristensen, Matt Korda, Eliana Johns and Mackenzie Knight, "Chinese nuclear weapons 2025", p. 144.

86 This is described in a military publication entitled *The Science of Second Artillery Campaigns* (PLA Press, 2004).

87 David C. Logan, "China's nuclear forces," *Testimony before the U.S.–China Economic and Security Review Commission*, June 10, 2021, p.10–11.

88 Thomas J. Christensen, "The Meaning of the Nuclear Evolution: China's Strategic Modernisation and U.S. China Security Relations," *Journal of Strategic Studies*, 35:4 (2012), 447–487.

89 Tong Zhao, "China and the International Debate on the No First Use of Nuclear Weapons," *Asian Security*, 18:3 (2022), 2015–213.

90 Cunningham and Fravel, "Dangerous Confidence?"

91 Nathan Beauchamp-Mustafaga, Derek Grossman, Kristen Gunness, Michael S. Chase, Marigold Black, and Natalia D. Simmons-Thomas, *Deciphering Chinese Deterrence Signalling in the New Era: An Analytic Framework and Seven Case Studies*. RAND Corporation, 2021, p. 25–32.

92 Lora Saalman, "Multidomain Deterrence and Strategic Stability in China," *SIPRI Insights on Peace and Security*, No. 2/2022.

93 Ashely J. Tellis, *Striking Assymetries: Nuclear Transitions in Southern Asia*, p. 59–60.

have to manage two nuclear-armed adversaries, Russia and China, simultaneously.⁹⁴ Greater balance in nuclear capabilities could also increase China's willingness to fight a conventional war against the US, since Chinese leaders appear to believe that escalation from conventional conflict to the nuclear level can be controlled.⁹⁵ China's improved capabilities could expand its scope to employ nuclear threats in regional conflicts, not least over Taiwan, to deter the US and its allies from intervening. Russia's repeated nuclear threats in its war of aggression against Ukraine, intended to deter further Western support, are likely being studied closely in China and may shape how the Chinese leadership views nuclear deterrence and signalling in the Taiwan context.⁹⁶

It remains an open question whether China's current political leadership favours a less restrictive nuclear posture. This can be understood within the broader context of China's ambition to become a modern great power in military terms. Xi Jinping has spoken of the PLA establishing a "strong system of strategic deterrence," and some Chinese analysts point to his direct involvement in China's ongoing nuclear transformation.⁹⁷ Even so, it is difficult to determine whether the underlying convictions that have shaped the leadership's restrictive view of nuclear weapons have changed. Some claim China's nuclear build-up is best understood primarily as an effort to reduce the vulnerability of the existing arsenal. US capability development—above all increasingly advanced conventional precision-strike weapons and space- and cyber-domain capabilities—is seen in China as a direct threat to the survivability of its nuclear forces. China does not seek nuclear parity with the US, but to preserve "mutual vulnerability" between the two countries.⁹⁸ For its part, the US views China's build-up

as increasingly ambitious and threatening. The build-up of nuclear forces together with ever more advanced conventional systems risks greater "entanglement" of nuclear and non-nuclear capabilities, increasing the danger of miscalculation and inadvertent escalation in a crisis or conflict.⁹⁹ At root, intensifying strategic rivalry and deep mistrust between the US and China also shape the nuclear relationship between them.¹⁰⁰

Others argue that the issue of maintaining a modern, capable nuclear arsenal is closely tied to China's drive for greater status and prestige as a global great power.¹⁰¹ Xi Jinping has described the PLARF as "the strategic pillar of China's great-power status," and technological advances such as MIRV capabilities and the development of a strategic submarine force demonstrate China's high-technology achievements to domestic and foreign audiences.¹⁰²

It cannot be ruled out that within China's political system there may be domestic dynamics among PLA actors, such as the PLARF, who are driven by institutional self-interest and aim to further elevate the importance and role of nuclear weapons in China's military organisation. The development of new air-launched ballistic missiles (ALBMs) from bombers is better seen as the outcome of bureaucratic interests within the Chinese air force than as a strategically motivated initiative.¹⁰³

China's future nuclear development remains uncertain. Based on this memo, a number of problem areas and questions, addressed directly or indirectly, may warrant deeper examination.

- *Nuclear-technology infrastructure.* A major expansion in the number of nuclear warheads requires adequate nuclear-technology infrastructure and

94 Study Group at the Center for Global Security Research at Lawrence Livermore National Laboratory, *China's Emergence as a Second Nuclear Peer. Implications for U.S. Nuclear Deterrence Strategy*, Center for Global Security Research at Lawrence Livermore National Laboratory (LLNL), Spring 2023.

95 Evan Braden Montgomery and Toshi Yoshihara, "The real challenge of China's Nuclear Modernisation," *The Washington Quarterly*, 45/4 (2020), 45–60. Such a circumstance can in part be attributed to what is referred to as the "stability–instability paradox"; see, for example, Glenn H. Snyder, "The Balance of Power and the Balance of Terror," in Paul Seabury (ed.) *Balance of Power*, San Francisco, CA: Chandler Publishing Company, 1965, p. 184–201.

96 Lyle Goldstein and Nathan Waechter, "What Lessons Does Russia's Nuclear Signaling Hold for a Prospective Chinese War to Force Unification With Taiwan?" *The Diplomat*, July 21, 2023, <https://thediplomat.com/2023/07/china-studies-nuclear-risk-in-the-context-of-the-ukraine-war/>.

97 Fiona S. Cunningham, "The Unknowns About China's Nuclear Modernization Program," *Arms Control Today*, June 2023, <https://www.armscontrol.org/act/2023-06/features/unknowns-about-chinas-nuclear-modernization-program>.

98 Alison A. Kaufman and Brain Waidelich, "PRC Writings on Strategic Deterrence: Technological Disruption and the Search for Strategic Stability," *CNA Occasional Paper*, February 2023.

99 Hiim, Fravel, and Trøan, "The Dynamics," p. 147–187.

100 Logan and Saunders, "Discerning the Drivers."

101 See, for example, Susan Turner Haynes, "The Power of Prestige: Explaining China's Nuclear Decisions," *Asian Security*, 16/1 (January, 2020), 35–52.

102 Logan, "China's Nuclear Forces," p. 9.

103 Ibid.

access to critical materials. How, for example, does China intend to meet its needs for critical materials such as plutonium? To expand beyond 1,000 warheads, China would likely need to draw on its civilian nuclear-power industry or restart domestic plutonium production.

- *Command-and-control and operational procedures.* How far does China intend to implement a launch-on-warning (LOW) posture? Such a development would almost certainly require new decision-making processes. For example, will China's strategic submarines patrol continuously with nuclear-armed ballistic missiles, and will they be delegated some authority to launch nuclear weapons themselves? No longer keeping nuclear warheads separated from delivery systems in peacetime, together with delegating decision authority downward, could also represent a departure from China's NFU policy and a potential shift in China's current deterrence strategy.
- *Cyber and space capabilities and artificial intelligence (AI).* China is increasingly integrating advanced conventional cyber and space capabilities with traditional nuclear deterrence. China also seeks to
- *Deterrence and escalation.* Russia's nuclear threats and the escalation dynamics of the war in Ukraine are likely being studied closely in China. The question is whether this affects the country's own thinking about the role of nuclear weapons with regard to, for example, Taiwan, and, more generally, its views on crises, deterrence, and escalation.
- *Arms control.* China has long maintained that the major nuclear powers, the US and Russia, must reduce their overall arsenals before China can enter formal arms-control negotiations, and that the US in particular uses various arms-control regimes to constrain China's nuclear capabilities. What perspectives and positions does China now take, given the ongoing expansion? How can China be engaged more directly in multilateral arms-control talks and negotiations?

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