

CHINA'S SSBN FLEET AND UNINTENDED ESCALATION RISKS IN THE ASIA-PACIFIC UNDERWATER-NUCLEAR NEXUS

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China is currently undertaking the most rapid expansion of its nuclear arsenal among all the world's nuclear armed powers. The drivers of this expansion remain subject to much debate and speculation, as China has never publicly elaborated on its rationale.¹ In tandem with its nuclear expansion, China is also expanding its submarine fleet of conventionally armed nuclear-powered attack submarines (SSNs), and nuclear-powered ballistic submarines (SSBNs). The latter constitutes the emerging sea-leg of China's nuclear triad. As a part of this expansion, China tested a submarine-launched ballistic missile (SLBM) in July 2026, the first such test since 1982.

The presence of Chinese SSBNs in the crowded Asia-Pacific maritime space puts Chinese nuclear delivery systems in close contact with the military assets of the United States and its allies. This proximity could lead to misunderstandings and potential escalation, especially in times of crisis. It is thus crucial to understand how China seeks to manage the risk of unintended nuclear escalation in the maritime domain.

China's official approach to nuclear risk reduction emphasises "crisis prevention over crisis control."² In this formulation, China argues that (implicitly Western) approaches to risk reduction are premised on the creation of crises that in turn justify the implementation of arms control arrangements to manage those manufactured crises. Partly for this reason, China refuses to engage in bilateral arms control arrangements with the United States, arguing instead for multilateral arrangements between all nuclear weapon states, as well as the allies of nuclear weapon states who rely on them for extended nuclear deterrence. In practice, the dearth of multilateral arms control and disarmament initiatives means that China's approach to nuclear risk reduction is almost entirely unilateral. China's 2025 arms control White Paper places heavy emphasis on centralised control, "strict laws and regulations and reliable technical means." These, the White Paper argues, "effectively prevent any risk of an unauthorized or accidental launch of nuclear missiles, and ensure that the nuclear force is kept absolutely safe and reliable."³

¹ Tong Zhao, *Political Drivers of China's Changing Nuclear Policy: Implications for U.S.-China Nuclear Relations and International Security* (Carnegie Endowment for International Peace, 2024), 114, https://assets.carnegieendowment.org/static/files/Zhao_Political%20Drivers_final-2024.pdf.

² People's Republic of China, "Nuclear Risk Reduction: Working Paper Submitted by China," NPT/CONF.2026/PC.I/WP.30, August 2, 2023, <https://documents.un.org/doc/undoc/gen/n23/229/29/pdf/n2322929.pdf>.

³ Xinhua, "Full Text: China's Arms Control, Disarmament, and Nonproliferation in the New Era," The State Council Information Office of the People's Republic of China, November 27, 2025, http://english.scio.gov.cn/whitepapers/2025-11/27/content_118198082_5.html.

This paper explores how these principles have been implemented in practice in the operation of China's SSBN fleet and assesses the impact on crisis stability in the Asia-Pacific. Overall, China's emphasis on centralised control constitutes a significant risk reduction measure, but operational realities in the Asia-Pacific underwater domain still serve to increase the risk of unintended escalation in the future and underline the need for China and regional states to urgently implement a code of conduct for the regional underwater domain.

No first use and SSBNs

Any nuclear state must configure its nuclear command, control, and communications (NC3) in such a way that a nuclear weapon can always be used when political decisionmakers decide to do so, but never under any other circumstance. This consideration – known as the “always-never” dilemma – means that any given measure taken to increase a decisionmakers confidence that their nuclear weapons will be launched on command, might simultaneously increase the risk of unintended nuclear use, whether by accident or unauthorised action. The reverse is also true: any action to prevent accidental or unauthorised launch might impair the decisionmaker's ability to use nuclear weapons when they so desire.

China's approach to the “always-never” dilemma has been to emphasise the “never” side of the equation. Broadly, three measures have contributed to ensuring a low risk of unintended nuclear use: (1) strict political and centralised control of nuclear decision-making, (2) separation of warheads from boosters, and (3) a doctrine of No First Use (NFU). The first two measures serve to reduce the risk of unauthorised access or launch, while the NFU doctrine increases decision-making time in a crisis, giving decisionmakers sufficient time to assess and plan their response.

China consistently promotes NFU as its primary nuclear risk reduction measure, arguing that it constitutes a resolution never to use nuclear weapons first in a conflict. Rather, China expects that its leadership and NC3 system will be able to survive and adversary's first nuclear strike and still retain sufficient capability to retaliate afterwards (this constitutes the “always” side of the dilemma). In other words, China claims that it will never use nuclear weapons first but will always use them in response to a nuclear attack. This has been known as “assured retaliation.”⁴

In theory, China's maturing SSBN capability raises concerns about the degree to which it will continue to adhere to its NFU doctrine. China can only realistically adhere to its NFU if its NC3 systems can survive an adversary's first strike. But China appears to use the same communication systems for its SSNs and SSBNs, greatly increasing the risk that an adversary's intent to disable China's conventional communication capabilities is misread as an attempt to compromise its nuclear deterrent.⁵

⁴ Fiona S. Cunningham and M. Taylor Fravel, “Assuring Assured Retaliation: China's Nuclear Posture and U.S.-China Strategic Stability,” *International Security* 40, no. 2 (2015): 7–50, https://doi.org/10.1162/ISEC_a_00215.

⁵ Tong Zhao, *Tides of Change: China's Nuclear Ballistic Missile Submarines and Strategic Stability* (2018), 83, https://assets.carnegieendowment.org/static/files/files_Zhao_SSBN_final.pdf.

Furthermore, it is not feasible to store warheads and missiles separate on submarines: missiles and warheads must be mated and ready to fire from their launch tubes, which undermines this central principle of risk reduction in the Chinese nuclear arsenal. Moreover, some scholars have reported that discussions in China have taken place regarding the need to adopt a launch on warning posture.⁶ The US Department of Defense's China Military Power Report (CMPR) argues that China's policy of "early warning counterstrike" (预警反击) already constitutes a de-facto move towards launch on warning.⁷

Launch authority and AI-integration

On the operational level, two additional factors might affect China's NFU doctrine: the degree to which China decides to delegate launch authority to commanders aboard submarines, and the degree of artificial intelligence (AI) being integrated throughout the Chinese navy.

A launch on warning posture might require the Central Military Commission (CMC) to delegate launch authority to commanders in the field, which in theory could include submarine commanders. The CMPR long argued this possibility.⁸ However, since 2020, the CMPR has continuously stated that China may be moving towards a launch on warning posture but has only ever connected this effort with China's expansion of silo-based missiles, not the expansion of its SSBNs. The 2024 edition of the CMPR notes that "The PRC probably continued to conduct near-continuous at-sea deterrence patrols with its six operational JIN class SSBNs," suggesting that China's SSBN fleet – in the US intelligence community's assessment – has not yet matured to the stage where it can contribute to its launch on warning posture.⁹ Nevertheless, according to Kristensen et. al., US officials believe that Chinese SSBNs on "intermittent patrol" are carrying live warheads.¹⁰ Although Kristensen and colleagues challenge this assessment, the distinction may not matter on the operational level: if US officials and decisionmakers believe that Chinese SSBNs are nuclear-armed, they may act accordingly, and this perception could have negative effects on regional stability in a crisis.

⁶ Cunningham and Fravel, "Assuring Assured Retaliation," 39.

⁷ U.S. Department of Defense, *Military and Security Developments Involving the People's Republic of China 2024* (U.S. Department of Defense, 2024).

⁸ All CMPR from 2011 to 2019 noted (with some variation in language) that "growing numbers of mobile intercontinental ballistic missiles (ICBMs) and future nuclear-powered ballistic missile submarine (SSBN) deterrence patrols *require the PLA to safeguard the integrity of nuclear release authority for a larger, more dispersed force.*" Emphasis added, quoted from Defense Intelligence Agency, *China Military Power: Modernizing a Force to Fight and Win* (Defense Intelligence Agency, 2019), 37, https://www.dia.mil/Portals/110/Images/News/Military_Powers_Publications/China_Military_Power.pdf.

⁹ Interestingly, when China had only four operational Jin-class SSBNs, the 2019 edition of the CMPR assesses that "a minimum of five Jin SSBNs" would be required to maintain a continuous at sea nuclear deterrent. Please see, Defense Intelligence Agency, *China Military Power*, 73.

¹⁰ Hans M. Kristensen et al., "Chinese Nuclear Weapons, 2026," *Bulletin of the Atomic Scientists* 82, no. 4 (2026): 293, <https://doi.org/10.1080/00963402.2026.2691662>.

The Chinese arms control White Paper's claim that a "streamlined and efficient process ... ensures that unit operations are carried out in the strictest and most accurate compliance with the orders of the Central Military Commission" suggests that launch authority has not (yet) been delegated from the People's Liberation Army (PLA) Rocket Force (which reports directly to the CMC) to the PLA Navy (which reports to the CMC indirectly through theatre commands).¹¹ Altogether, the evidence suggests that China maintains tight political control of launch authority which likely has a positive effect on the risk of accidental or unauthorised launches. However, as long as China maintains centralised firing authority, it will not have a truly credible sea-based deterrent force.¹² As Tong Zhao notes: "If China concludes that it must [pre-delegate launch authority], the risk of an accidental and/or unauthorized launch of a sea-based nuclear ballistic missile will be higher."¹³

Given China's focus on centralised control, it is reasonable to assume that permissive action links (PALs) are installed on Chinese nuclear missiles. Such devices provide positive control to Chinese decisionmaker until a launch code is provided to the weapon to unlock it. The United States implemented PALs on its submarines in the late 1990s. It is unclear exactly when China implemented PALs across its arsenal, but historically, China appears to have first developed an interest in them after the political unrest that culminated in the Tiananmen protests and its subsequent crackdown raised concerns about unauthorised access to nuclear weapons. After having unsuccessfully approached the United States for assistance in developing PALs in the late 1990s, China eventually sought Russian assistance.¹⁴ One might reasonably assume that the necessity of deploying ballistic missiles with mated warheads on the *Jin*-class SSBNs means that they were implemented before the first boat was deployed on patrol in 2015, or perhaps as early as 2013, when the first JL-2 sea-launched intercontinental ballistic missile (ICBM) was test-fired for the first time. The precursor to the *Jin*-class, the *Xia*-class – a single submarine that never went on deterrent patrol – had no PALs. In addition to such technical measures, it is reasonable to assume that China operates some form of dual-key system, where launch orders have to be authenticated by two officers.

AI has unclear implications for Chinese NC3 arrangements in the underwater-nuclear nexus. There is no public information on how China has implemented AI on its SSBNs, but in line with its doctrinal focus on positive control, China has publicly endorsed the notion of human-in-the-loop, meaning that it does not intend to put AI in charge of nuclear use decisions.¹⁵ That said, given the

¹¹ Xinhua,, "Full Text."

¹² China Power Team, "Does China Have an Effective Sea-Based Nuclear Deterrent?" China Power, September 21, 2026, <https://chinapower.csis.org/ssbn/>.

¹³ Zhao, *Tides of Change: China's Nuclear Ballistic Missile Submarines and Strategic Stability*, 2.

¹⁴ US nuclear weapons scientist and intelligence analyst Daniel Stillman was involved in back-channel communication between the United States and China in the 1990s, see: Steve Coll, "The Man Inside China's Bomb Labs," *Washington Post*, May 16, 2001, <https://www.washingtonpost.com/archive/politics/2001/05/16/the-man-inside-chinas-bomb-labs/7d5a0209-fe13-4394-9ff5-6bbd16538f2e/>.

¹⁵ However, the 2025 White Paper contains language that suggests that China seeks some flexibility on human control of "relevant weapon systems". See: Lora Saalman, *AI in Chinese, Indian and US Nuclear Postures, Norms and Systems* (Stockholm International Peace Research Institute, 2026), 26, <https://doi.org/10.55163/QZBL7397>.

intense focus on AI-integration across the Chinese armed forces overall, it is reasonable to assume that efforts are being made to integrate AI in various parts of the NC3 system, including submarines.¹⁶ This integration may not extend to the missiles themselves, however: Lora Saalman notes that “China’s Julang-2 (JL-2) and JL-3 submarine-launched ballistic missiles do not feature in its AI-related discussions.”¹⁷ The human “in the loop” is still likely to act on information provided by AI-supported systems, even if the systems themselves are not configured to take autonomous action.¹⁸

Constrained and contested geography

Regional geography also plays a role in increasing the risk of escalation. Chinese SSBNs are based out of two locations: Bohai, by the Yellow Sea, and Hainan, by the South China Sea. Due to the noisy design of Chinese submarines, crossing the first island chain is associated with significant risks of detection by US and allied submarines.¹⁹ Hainan likely acts as the main “bastion,” where the SSBNs are kept protected by other naval elements above and below the surface, as well as on land. This bastion deployment is broadly analogous to Russia’s use of its SSBN base at Murmansk on the Kola Peninsula, but China’s practice of a bastion defence requires it to operate in the constrained maritime space of the South China Sea (and the Bohai Bay to the northeast), which is far more prone to inadvertent escalation than the Arctic Sea into which Russian SSBNs flush out. The South China Sea is one of the world’s most trafficked waterways, and several regional states make overlapping territorial claims on the area. The United States regularly conducts freedom of navigation operations in the South China Sea to contest the Chinese claim. External stakeholders have also increased their activities in the region. Accidents and collisions have happened in the past, but without military escalation.

The basing of the Chinese nuclear deterrent at Hainan is likely one of the drivers of China’s assertiveness in the region. The South China Sea is the only maritime space directly accessible to China from the mainland inside of the first island chain with sufficient depth to hide SSBNs on patrol. While the benefit of depth should not be overstated – basing SSBNs in shallow waters can create more noise for enemy radars to cut through – but Chinese experts worry that the waters along China’s coastline are so shallow that they constrict the operational depth of its SSBNs.²⁰

¹⁶ Jingdong Yuan, *China and AI-Military Integration: Perspectives, Opportunities, and Challenges* (Asia-Pacific Leadership Network, 2026).

¹⁷ Saalman, *AI in Chinese, Indian and US Nuclear Postures, Norms and Systems*, 16.

¹⁸ Enoch Wong, “PLA Navy’s First AI-Aided Magnetic Field Reduction Drill Shows 60% Better Result,” *South China Morning Post*, May 13, 2025, <https://www.scmp.com/news/china/military/article/3310163/pla-navy-drill-uses-ai-trim-warships-magnetic-field-gets-60-more-efficiency>.

¹⁹ Edward Black and Kaushal Sidhart, “Chinese Submarine Warfare – A Natural Evolution or Game Changing Revolution?” RUSI, May 29, 2026, <https://www.rusi.org/explore-our-research/publications/commentary/chinese-submarine-warfare-natural-evolution-or-game-changing-revolution>.

²⁰ Riqiang Wu, “Survivability of China’s Sea-Based Nuclear Forces,” *Science & Global Security* 19, no. 2 (2011): 91–120, <https://doi.org/10.1080/08929882.2011.586312>.

Although the claim to the South China Sea is surely driven by a mix of historical, economic, and political motivations, the crucial role of the South China Sea as the geographical locus of China's second-strike capability must be clearly understood, as it likely influences the extent to which China might be willing to make future compromises relating to historical interpretations, economic utility, or political and legal agreements over the area (such as the long-overdue Code of Conduct in the South China Sea). At the operational level, one important escalation risk of China's SSBNs does not originate from the submarines themselves, but from conventional military assets that seek to protect them, or Chinese maritime militia, coast guard, who guard the area against other regional claimants.²¹ The future potential deployment of Australian, South Korean, and possibly Japanese SSNs and other anti-submarine warfare (ASW) capabilities will crowd the area further. These are discussed in chapters written by Jamie Kwong, Jennifer Parker, and Sanghoe Lee of this volume and not explored further here, other than to note that the increasing presence of advanced adversary ASW capabilities (including SSNs) constitute a main source of pressure on China to delegate launch authority to submarine commanders.

Finally, North Korea's imminent deployment of its first SSBN might also complicate China's nuclear deterrent in at least two ways and increase the risk of inadvertent escalation. First, North Korean SSBNs could be mistaken for Chinese and vice versa, leading to an inadvertent engagement. South Korean ASW (or future SSN), aimed at hunting down a North Korean SSBN might inadvertently give chase to a Chinese SSBN with unpredictable consequences.²² Far worse, US or allied efforts aimed at tracking Chinese submarines might target a North Korean SSBN instead. Whereas the mistaken engagement of a Chinese SSBN is less likely to lead to use-it-or-lose-it pressures due to China's centralised command and control, North Korea is more likely to practice delegation of launch authority, with potentially disastrous outcomes. Finally, Chinese and North Korean submarines might also constitute an accidental threat to each other. In 2009, a French and a UK SSBN collided in the middle of the Atlantic, showing that even close allies with far better coordination between them than China and North Korea are susceptible to such misadventures.

In this constrained geography, China's chief operational risk reduction measure with regards to its SSBNs is its practice of pre-launch notification of missile tests, which reduces the risk that a test is mistaken for an actual launch. China's test of an ICBM in 2025, and its first SLBM launch in June 2026 were both preceded by prior notifications to countries in the region. However, China was criticised on two points: not all countries whose territory the missiles overflew were informed,

²¹ Zhao, *Tides of Change: China's Nuclear Ballistic Missile Submarines and Strategic Stability*.

²² Chinese SSBNs patrolling in the Yellow Sea or the Bohai Bay can reach a larger part of the US mainland, see: Kyle Mizomkami, "China's New Submarine Missile Puts the U.S. Within Striking Distance," *Weapons, Popular Mechanics*, November 28, 2022, <https://www.popularmechanics.com/military/weapons/a42028228/new-chinese-submarine-missile-can-reach-us/>.

and the notifications were given on very short notice.²³ China is not a member of the Hague Code of Conduct, an international arms control instrument (although not legally binding) through which members resolve to follow specific protocols for pre-launch notification. The timing of the 2026 launch, and the splashdown of the missile in the Southern Pacific was also read with suspicion in Australia, as a signal of Chinese disapproval of the mutual defence pact that Australia announced with Fiji the same day.²⁴

Reducing risks in the underwater-nuclear nexus

Overall, China's heavy emphasis on centralised control and many of the technical and operational measures that flow from that doctrine, appear to have a positive impact on crisis stability and the risk of unauthorised or inadvertent escalation within the underwater-nuclear nexus. However, geopolitical, operational, and technical realities all have the potential to push China away from its heavy emphasis on centralised control.

Responsibility for preventing that push lies on both China and its potential adversaries in the region. If China does indeed decide to move towards delegated launch authority to its submarines in the future, it will likely justify that move (officially or unofficially) by the presence of US and allied ASW capabilities in the region. To be sure, this push-effect is a good reason for the United States and its allies to advance such capabilities with prudence, but the final responsibility for China's NC3 and deployment decisions lies with China alone. China's preference for crisis prevention over "crisis control" also sits ill at ease with its expanding blue water capabilities, the presence of which might increase the risk of an inadvertent crisis.

Moreover, China's NFU principle may indeed serve to lower the risk of unintended nuclear use, but it would behove China's policymakers to clearly explain how it will remain compatible with its rapidly expanding nuclear arsenal and SSBN fleet. The expansion of both is slowly but surely hollowing out its political and doctrinal significance and might even enhance US and allied perceptions that China would consider first use in some scenarios (such as a Taiwan invasion). That perception could in turn speed up apparent US plans to deploy tactical nuclear weapons more broadly in the region.

If NFU is ever going to become the multilateral risk reduction instrument that China wants it to be, it must first overcome the basic issue that US (and allied) policy makers simply do not believe in China's commitment to it.²⁵ A part of this effort could consist of a nuclear fail-safe review to

²³ Joseph Rodgers et al., *China's SLBM Test Underscores the Importance of a Ballistic Missile Launch Notification Agreement*, Center for Strategic & International Studies, July 7, 2026, <https://www.csis.org/analysis/chinas-slbm-test-underscores-importance-ballistic-missile-launch-notification-agreement>.

²⁴ A majority of Australian experts connected the test with the Australia-Fiji treaty, in a commentary published by the Australian Strategic Policy Institute Malcolm Davis et al., "China's Pacific Ballistic Missile Test – Views from ASPI Analysts," ASPI Strategist, July 6, 2026, <https://www.aspistrategist.org.au/chinas-pacific-ballistic-missile-test-views-from-aspi-analysts/>.

²⁵ Caitlin Talmadge et al., "When Actions Speak Louder Than Words," *International Security* 48, no. 4 (2024): 219–36, https://doi.org/https://doi.org/10.1162/isec_a_00482. See also: William Alberque, "China and No First Use:

assess the impact of emerging technologies on the risk of unintended nuclear use throughout the entire nuclear enterprise. Given China's rapid integration of AI across its military and the unclear implications of this integration for the command and control of Chinese nuclear weapons, conducting such a review would be a strong risk reduction measure.²⁶

Finally, China's unilateral approach to risk reduction is necessary, but not sufficient to reduce the risk of unintended escalation in the underwater-nuclear nexus. Because some of the most dangerous risks stem from the interaction between the actors of the ongoing underwater arms race in the Asia-Pacific, only bilateral and multilateral arrangements between those actors can address the risks. For example, China has little to lose on formally joining and adhering to the Hague Code of Conduct, which most of its maritime neighbours have subscribed to.²⁷ Furthermore, while negotiations on a Code of Conduct in the South China Sea are ongoing between China and ASEAN, a separate code of conduct that covers the maritime nuclear, ASW, and AI deployments of China, the United States, US allies, as well as North Korea, would lower the risk of escalation in the Asia-Pacific.

Distract, Deny, Delay," *Issues & Insights*, 6, vol. 25 (September 2025), <https://pacforum.org/publications/issues-and-insights-volume-25-sr-6-china-and-no-first-use-distract-deny-delay/>.

²⁶ For more on the potential for nuclear fail-safe reviews to reduce nuclear risks in China and other nuclear-armed states in the Asia-Pacific, see: "Global Nuclear Fail-Safe: Meeting Summaries and Related Documents," Asia-Pacific Leadership Network, August 13, 2025, <https://www.apln.network/projects/advancing-nuclear-fail-safe/global-nuclear-fail-safe-meeting-summaries-and-related-documents>.

²⁷ Among the states with which China shares a maritime border or overlapping territorial claim, no South China Sea claimant (except for the Philippines) has subscribed to the HCoC. Neither has North Korea. See: The Hauge Code of Conduct, "List of HCoC Subscribing States," January 2024, <https://www.hcoc.at/subscribing-states/list-of-hcoc-subscribing-states.html>.