CENTRE FOR AIR POWER STUDIES

In Focus

New Delhi

CAPS InFocus: 06/2025

21 March 2025

North Korea's Nuclear Submarine Programme: An Overview of the Recent Developments

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Source: https://www.france24.com/en/live-news/20250308-north-korea-s-kim-inspects-nuclear-powered-submarine-project

Keywords: North Korea, Nuclear-powered Submarine, Korean Peninsula

The current global nuclear order is witnessing a significant transition. All nuclear weapons states are now in the process of modernising their weapon inventories and the associated systems. Amongst the modernisation, all nuclear weapon states are ensuring that their sea leg of nuclear deterrence should be prioritised. So, while the N5[1] is investing in the sea leg of nuclear deterrence, the same is now being witnessed within the states that are not party to the Non-Proliferation Treaty (NPT). In this course of development, North Korea, which has harboured its ambition to develop advanced nuclear submarines, is finally showing the world its progress.

On March 08, 2025, Kim Jong-un visited some unidentified shipyards and made sure to be photographed with a large vessel, which North Korea has termed a nuclear-powered strategic guided missile submarine.[2] This was the first such occurrence when North Korea had exposed an indication of its first nuclear-powered submarine. The visit and the subsequent statement require further analysis in the context of the geo-strategic environment of the Korean Peninsula.

The Ambition

The Democratic People's Republic of Korea (DPRK) has been working on its nuclear submarine ambition for some time now. The goal to have a nuclear-powered submarine was first announced in January 2021. However, the seventh Congress of the Workers' Party of Korea (WPK) was held on May 08, 2016, which first referred to building a "powerful nuclear deterrence."[3] In January 2021, Kim Jong-un referred to a five-year weapons development plan at the eighth Congress of the WPK, which established ambitious national defence goals for 2021-2025. While announcing the National Defence Policy at the eighth Congress of the WPK, Kim Jong-un referred to the "strengthening of strategic nuclear deterrence and war-fighting capabilities, including the development of new strategic and tactical nuclear weapons."[4] In the same vein, Kim Jong-un hinted towards the completion of modernisation and remodelling of a medium-sized submarine and the continuous research on the design of a new nuclear-powered submarine, which was in the final stage.[5] Kim also mentioned that while the research and development will continue on a nuclear-powered submarine, "an underwater-launch nuclear strategic weapon"[6] would also be developed to enhance nuclear long-range strike capabilities.[7] Keeping in mind the modernisation and remodelling of a medium-sized submarine, North Korea on September 06, 2023, launched its new ballistic missile submarine, the Hero Kim Kun Ok. The submarine numbered 842, is diesel-powered and capable of carrying nuclear-armed missiles.[8] More importantly, in January 2024, North Korea test-fired its submarine-launched cruise missiles and once again reiterated the desire for the nuclear submarine.[9]

The Rationale

Over the years, North Korea has made sure to invest in its land-based nuclear forces. In doing so, North Korea has made sure to develop all kinds of ballistic missiles. As recently as October 2024, North Korea has demonstrated its ICBM capabilities. In October 2024, North Korea tested its Hwasong-18 ICBM, which can fly as far as 15,000 km when fired in a non-lofted trajectory.[10] More importantly, unlike other ICBMs such as Hwasong-17which is a liquid-fuelled missile, the Hwasong-18 is a solid-fuelled missile, which is safer and easier to launch as it does not require on the spot fuelling, thus also reducing extra logistical support. The Hwasong-18, with solid-fuelled propellants, can help North Korea field more survivable ICMBs during heightened periods of crisis. Another critical dimension of North Korea's ICBM development is that all its current inventories of such a range of missiles are based on road-mobile platforms. The following table provides further information about North Korea's ICBMs;

Missile	Range	Basing
Hwasong-14	**10,000+ km**	**Road-mobile**
Hwasong-15	**13,000 km**	**Road-mobile**
Hwasong-17	**15,000 km**	**Road-mobile**
Hwasong-18	**15,000 km**	**Road-mobile**

Source: "Missiles of North Korea," Missile Threat, November 22, 2022, https://missilethreat.csis.org/country/dprk/, Accessed on March 13, 2025.

Erin Hale, "What we know about North Korea's ICBM programme," *Al Jazeera*, October 31, 2024, https://www.aljazeera.com/news/2024/10/31/what-we-know-about-north-koreas-icbm-programme, Accessed on March 13, 2025.

Road mobility essentially provides a hedge against constraints placed on silo-based missile systems. The dispersion through road-mobile basing provides more strategic depth and complicates the adversaries' targeting and planning process. However, road-mobile platforms also carry certain disadvantages. The road-mobile ICBM needs heavy launchers for longer-range missiles, which could limit movements in off-road terrains. North Korea in the past have sourced its launchers from Russia, Belarus, and China. However, most recently, North Korea has shown significant success in its indigenous production of heavy launchers.[11]

The ambition to develop nuclear-powered submarines also refers to the changes made by the DPRK in its nuclear doctrine. North Korea maintains a nuclear doctrine of first-strike ambiguity. While the 2013 Law focused more on the retaliatory nuclear strike, the conditions for a first nuclear strike have expanded over the years. The 2022 Law, while keeping uncertainty to its core, maintained an expanded list of conditions under which the DPRK may go ahead with a first strike. The conditions are as follows:

1. In case an attack by nuclear weapons or other weapons of mass destruction was launched or drew near is judged;

2. In case a nuclear or non-nuclear attack by hostile forces on the state leadership and the command organisation of the state's nuclear forces was launched, or drew near is judged;

3. In case a fatal military attack against important strategic objects of the state was launched or drew near is judged;

4. In case the need for an operation for preventing the expansion and protraction of war and taking the initiative in the war in contingency is inevitably raised;

5. In another case, an inevitable situation in which it is compelled to correspond with a catastrophic crisis to the existence of the state and safety of the people by only nuclear weapons is created.[12]

Within these broad parameters, North Korea also separately inserted the provision which stated that “the DPRK shall be regularly ready for action so that if an order to use nuclear weapons is issued, it can immediately execute it in any conditions and circumstances.”[13] Given the fact that North Korea is by number a smaller nuclear power, the choice to have a first-strike seems logical. Currently, North Korea possesses around 50 nuclear warheads and fissile material, which can be used to build up to 90 nuclear weapons.[14] Compared to its primary adversary, the USA, which has 5,177 warheads.[15] However, a first strike can only make sense when it helps deprive the enemy of the ability to retaliate, in this, the US. North Korea by no means can deprive the US of not retaliating after exercising its first strike option. The case of building a nuclear-capable submarine arose from the fact that North Korea seeks an assured second-strike capability in the near future.

Regional Naval Competition

The Korean Peninsula is also undergoing a major transformation in offensive naval capabilities. The DPRK in 2023 tested Haeil-1 and Haeil-2 underwater unmanned attack vehicles, which the DPRK termed as “underwater nuclear strategic weapons” capable of making “radioactive tsunami through

underwater explosion to destroy naval striker groups and major operational ports of enemy."[16] The Hero Kim Kun Ok diesel-powered submarine has the capacity to carry 10 missiles of the Pukguksong series SLBMs, Pukguksong-1 and Pukguksong-3, with ranges of 1,200 km and 2,000 km respectively, and the Hwasal cruise missiles. South Korea, on the other hand, in September 2021 revealed a new supersonic anti-ship cruise missile.[17] Besides this, South Korea, in September 2021, became the first non-nuclear weapon state to develop and test a submarine-launched ballistic missile, the Hyunmoo-4-4.[18] Japan has also made sure to enhance its naval capabilities. It is now looking forward to the emplacement of long-range cruise missiles on its diesel-powered submarines.

Conclusion

The DPRK's nuclear-powered submarine ambition is still in its nascent stage and will take some more time to be fully functional. However, it seems that the DPRK is now moving on a path where its status as a nuclear-weapon state becomes more and more irreversible. More importantly, a nuclear-powered submarine will help the DPRK to have a credible nuclear retaliatory posture, at least in the regional context. This development might also help North Korea to have some strategic leverage if and when the dialogue resumes between the US, North Korea, and South Korea. The nuclear-powered submarine development also brings forth the problem of advanced technology transfer to North Korea by Russia. It has been alleged by the US in its annual threat assessment that Russia "potentially could be dropping its long-held nonproliferation norms in its interaction with North Korea."[19] The Russia-DPRK strategic cooperation will only provide the latter more incentives while keeping the US and the regional context at less consideration.

NOTES:

[1] Nuclear 5 refers to the five countries officially recognised as possessing nuclear weapons by the Treaty on the Non-Proliferation of Nuclear Weapons (NPT): China, France, Russia, the United Kingdom, and the United States.

[2] Colin Zwirko, "North Korea releases first photos of new nuclear-powered missile," *NK News*, March 08, 2025, https://www.nknews.org/2025/03/north-korea-releases-first-photos-of-new-nuclear-powered-missile-submarine/. Accessed on March 11, 2025.

[3] "Decision of Seventh Congress of WPK Adopted," *KCNA,* May 8, 2016, http://www.kcna.co.jp/item/2016/201605/news08/20160508-14ee.html. Accessed on March 11, 2025.

[4] Katsuhisa Furukawa, "The 8th Congress of the Workers' Party of Korea (1)," *Open Nuclear Network*, p. 5, February 09, 2025, https://opennuclear.org/open-nuclear-network/publication/8th-congress-workers-party-korea-1. Accessed on March 11, 2025.

[5] Ibid, p. 11.

[6] Ibid.

[7] Ibid.

[8] Joseph S. Bermudez Jr., Victor Cha and Jennifer Jun, "North Korea Launches New Ballistic Missile Submarine," *Beyond Parallel: CSIS,* September 11, 2023, https://beyondparallel.csis.org/north-korea-launches-new-ballistic-missile-submarine/. Accessed on March 12, 2025.

[9] Jack Kim, "North Korea tests submarine-launched cruise missiles, KCNA says," *Reuters,* January 29, 2024, https://www.reuters.com/world/asia-pacific/north-korea-tests-submarine-launched-cruise-missile-kcna-says-2024-01-28/. Accessed on March 12, 2025.

[10] Erin Hale, "What we know about North Korea's ICBM programme," *Al Jazeera*, October 31, 2024, https://www.aljazeera.com/news/2024/10/31/what-we-know-about-north-koreas-icbm-programme. Accessed on March 12, 2025.

[11] Hans M. Kristensen, Matt Korda, Eliana Johns, and Mackenzie Knight, "North Korean nuclear weapons, 2024," *Bulletin of Atomic Scientists* , Vol. 80, Iss. 4, July 14, 2024, https://www.tandfonline.com/doi/full/10.1080/00963402.2024.2365013#abstract. Accessed on March 13, 2025.

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[13] Ibid.

[14] Hans M. Kristensen, Matt Korda, Eliana Johns, and Mackenzie Knight, "North Korean nuclear weapons, 2024," *Bulletin of Atomic Scientists* 80, no.4, p.251, July 14, 2024, https://www.tandfonline.com/doi/full/10.1080/00963402.2024.2365013#abstract. Accessed on March 14, 2025.

[15] Hans M. Kristensen, Matt Korda, Eliana Johns, and Mackenzie Knight, "United States nuclear weapons, 2025," *Bulletin of Atomic Scientists,* 81, no. 1, p. 54, January 13, 2025, https://thebulletin.org/premium/2025-01/united-states-nuclear-weapons-2025/. Accessed on March 14, 2025.

[16] Anastasia Barannikova, "Nuclear Strategy of the DPRK in Modern Conditions," *Journal for Peace and Nuclear Disarmament,* p.7, March 06, 2025, https://www.tandfonline.com/doi/full/10.1080/25751654.2025.2475569?src=#abstract. Accessed on March 13, 2025.

[17] Daehan Lee, "South Korea Unveils New Supersonic Anti-Ship Missile," *Naval News,* September 24, 2021, https://www.navalnews.com/naval-news/2021/09/south-korea-unveils-new-supersonic-anti-ship-missile/. Accessed on March 13, 2025.

[18] Hyonhee Shin, "S.Korea says it successfully tests submarine-launched ballistic missile," *Reuters,* September 15, 2021, https://www.reuters.com/business/aerospace-defense/skorea-successfully-tests-submarine-launched-ballistic-missile-blue-house-2021-09-15/. Accessed on March 14, 2025.

[19] Victor Cha and Ellen Kim, "North Korea Announces Nuclear-Powered Submarine Development," CSIS*,* March 10, 2025, https://www.csis.org/analysis/north-korea-announces-nuclear-powered-submarine-development. Accessed on March 14, 2025.