Maritime Nuclear Dynamics in the Korean Peninsula

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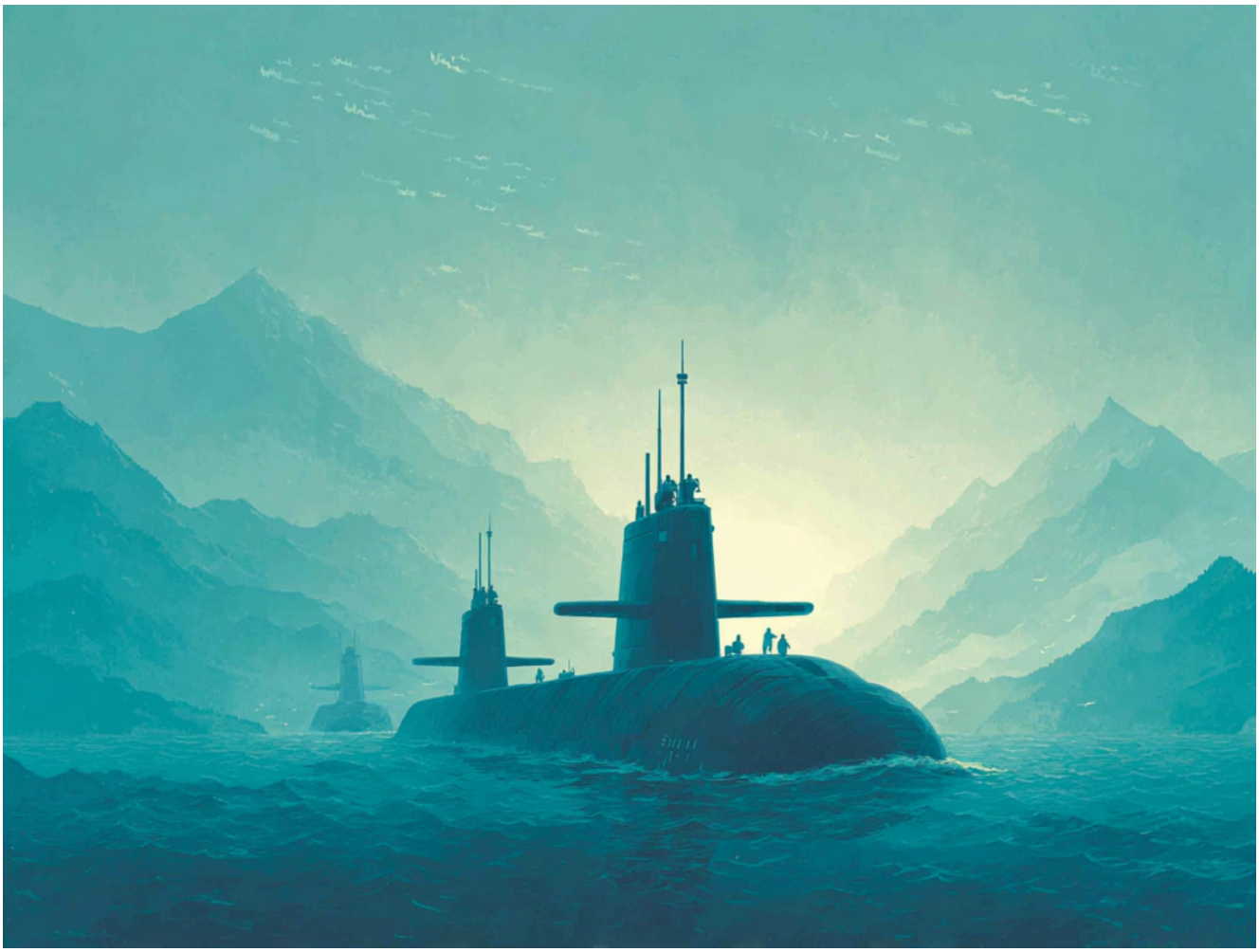

The Korean Peninsula is experiencing a major transformation in the traditional understanding of the inter-Korean security dynamics. Along with conventional land and air-based spheres, the underwater domain has emerged as the new arena of contestation. Seoul is pushing for nuclear-powered submarines, whereas Pyongyang is accelerating its ongoing sea-based nuclear capabilities. For a long time, both Koreas have operated diesel-electric submarines, which require resurfacing for battery charging, thereby increasing the risk of detection.

The turn toward underwater confrontation accelerated after South Korea received US approval to build conventionally

armed, nuclear-powered submarines (SSNs). For Seoul, it became an opportunity to enhance security flexibility and defense autonomy. However, for Pyongyang, SSNs represent a way to secure deterrence at sea, an ambition Kim Jong-un has championed since 2021.

On 25 December 2025, North Korea's state media released photos showing off "the construction of an 8,700-ton-class nuclear-propelled submarine," which Kim has previously described as a "strategic guided missile submarine" or a "strategic nuclear attack submarine." Whereas South Korea's SSN programme is widely estimated to require a decade or more to mature, North Korea has portrayed its project as far advanced. As per submarine expert Moon Keun-sik, the release of an apparently largely completed hull "suggest that many core components", potentially the engine and the reactor, may already be in place. This asymmetric perception of readiness fuels a naval arms race between the two Koreas, jeopardizing Seoul's efforts to revive talks with Pyongyang.

On the other hand, the Trump administration released the National Security Strategy (NSS) earlier in December 2025, which omitted "North Korea" and the "denuclearization of the Korean Peninsula." Whereas, the NSS released during the first Trump administration in 2017 mentioned North Korea "17 times." This shift in the US policy underscores the receding importance of the North Korean nuclear issue. Analysts have argued that by omitting North Korea, the US may want to revive negotiations and reset the US-DPRK relations. North Korea earlier suggested that talks with the US would be possible if the US engages with North Korea as a nuclear power. From South Korea's point of view, omission of denuclearization from the NSS hints at implicitacceptance of North Korea as a nuclear state.

The 2025 NSS also urged its allies, like South Korea and Japan, to increase defense spending. Focusing on the "America First" policy and insisting on burden-sharing, the document

stated that “allies must increase spending and take concrete actions for collective defense.”

The US’s deprioritizing North Korea soon alarmed South Korea. As Pyongyang’s nuclear weapons are not considered as direct threat to the US, Seoul came to understand that the responsibility for keeping the North Korean issue on radar would increasingly fall on its shoulders. As a result, South Korea intensified discussions on SSNs and accelerated high-level delegations to the US, further fuelling regional naval competition.

South Korea

On 17 December, South Korea’s National Security Advisor Wi Sung-lac met with US Secretary of Energy Chris Wright to discuss“Korea’s push for civil uranium enrichment and spent fuel reprocessing.” Within the constraints of the nuclear energy framework (Section 91 of the US Atomic Energy Act), South Korea raised the possibility of seeking a special legal arrangement to enable nuclear-powered submarines, drawing implicit parallels with the precedent established under the AUKUS agreement. Under the bilateral 123 agreement, Korea is permitted to enrich uranium to “levels of up to 20% and to reprocess spent fuel, but only with the US consent.” After the meeting, both agreed to pursue “a stand-alone agreement on cooperation for SSNs, with working level-talks” expected to begin in January 2026.

These developments are a result of a “security bargaining chip” during the ROK-US tariff negotiations. As per the agreement, the US decided to cut import duties on South Korean products from 25% to 15%, in return for $150 billion of Korean investment in the American shipbuilding sectors and an additional $200 billion in industrial sectors. The US also approved South Korea’s plan to build nuclear-powered submarines.

The SSNs will provide South Korea with advantages that were not possible with diesel submarines. Along with deterring North Korea's nuclear and missile threats, nuclear-powered submarines will allow South Korea to remain underwater for months without having to refuel frequently. This will let South Korea expand its nuclear submarine operations to China, hence sharing the US' burden.

Most importantly, nuclear-power submarines do not require weapons-grade fuel, but they significantly reduce the distance to it. Operating SSNs would require Seoul to expand its capabilities in uranium enrichment, fuel fabrication, and spent fuel handling, all of which are core components of a nuclear weapons program. Given South Korea's advanced civilian nuclear industry and skilled technical workforce, mastering enrichment levels of around 20% would strengthen its nuclear latency by lowering technical, institutional, and political barriers to further enrichment. While this does not imply an intention to build nuclear weapons, it would accelerate South Korea's breakout potential by placing it closer to the threshold at which rapid weaponization becomes feasible.

To fasten its nuclear-powered ship ambitions, the government convened an interagency task force in mid-December. The team brought together "director-general-level officials from the Defense Ministry, the Ministry of Economy and Finance, the Ministry of Climate, Energy and Environment, the Ministry of Science and ICT, the Ministry of Trade, Industry and Resources, the Defense Acquisition Program Administration, the Nuclear Safety and Security Commission, the Joint Chiefs of Staff, and the Navy Headquarters."

North Korea

North Korea's revealing of the hull of the submarine was in response to South Korea's SSN diplomacy with the US. The North Korean leader Kim criticized "South Korea's plan "as offensive act…that must be countered." Kim also accused Seoul's

exploration of SSNs capabilities "of worsening instability and vowed to accelerate naval nuclear weaponization in return." As per the analysts, the vessel "is significantly larger than the Sinpo-class diesel-electric boats, representing a major leap in the North's naval architecture." The platform is able to carry a "mix of ICBMs and cruise missiles, which could provide a survivable second-strike capability." It is to be noted that while South Korea is preparing for a conventionally-armed nuclear-powered submarine, North Korea is building a nuclear-powered ballistic missile submarine (SSBN).

North Korea's advances with nuclear submarines reject any notion of denuclearization of the Korean Peninsula. Many analysts believe that it is too late to denuclearize North Korea, as it has already developed nuclear deterrence. North Korea possessesapproximately 50 nuclear warheads, fissile materials to build 70-90 nuclear weapons, and an advanced chemical and biological weapons program. Pyongyang has also learned from the experiences of Ukraine (which surrendered its nuclear weapons), and from the bombing of nuclear facilities in Iran and the capture of the leader of Venezuela. Such incidents further reinforced North Korea's vision of strengthening its nuclear capabilities, implying that any country without nuclear weapons can become a target of attack.

For North Korea, nuclear weapons and ballistic missiles have become a key to its existence and a means of expressing fury over global developments. For instance, only a day after the capture of Maduro, Pyongyang conducted a hypersonic missile launch drill for a "very important strategic task." Such demonstrations reflect North Korea's evolving nuclear doctrine. As per the 2022 DPRK's state policy, North Korea would launch a nuclear retaliation "automatically and immediately" if the leader is incapacitatedin an attack.

Moreover, North Korea's ambitions are backed up by Russia and

China to a greater extent than ever before. In June 2024, North Korea and Russia signed a Treaty on Comprehensive Strategic Partnership. As per Article 4 of the treaty, "if either party is subjected to an armed attack, the other will immediately provide military and other assistance using all available means." This led to North Korea sending nearly 12,000 troops to Ukraine. In return, Russia has provided military technology and supported the advancement of nuclear technology in North Korea. Although "Moscow is not in a position to openly back Pyongyang's construction of a ballistic missile submarine," its limited involvement cannot be ruled out. Excluding the reactor, Russia may have offered technical know-how and expertise.

Also, like the US, China omitted the phrase "denuclearization of the Korean Peninsula" from its defense white paper for the first time in 19 years. China not using the term signals a "tacit acceptance of a nuclear-armed North Korea." This development occurred after Kim attended the military parade marking the 80th anniversary of China's victory in World War II in September 2025, during which he met with Chinese President Xi Jinping.

Ripple Effects

Experts say that while South Korea may take time to build SSNs, it still enjoys superior technology to North Korea. North Korea may realize the tech gap in the event of an accident or if Russia or China decides to stop supporting Pyongyang's naval ambitions. Also, unveiling new submarines helps the North in sustaining the regime through visual propaganda, while sending psychological messages to the US and the ROK.

Whether or not both Koreas achieve their naval nuclear dreams, it has surely sent ripple effects in the Indo-Pacific. Japan is already considering acquiring SSNs to strengthen its maritime security.

In a TV program, Defense Minister Shinjiro Koizumi said that "the environment surrounding Japan has become so severe that Japan needs to discuss whether to continue using diesel power for submarines as before, or to switch to nuclear power." In September 2025, Japan's Defense Ministry "recommended studying the use of next-generation power source (nuclear technology) for submarines with vertical launch systems for counterstrike abilities." In response, the Japanese government accepted the recommendation and decided to promote the idea.

Even AUKUS has President Trump's support, after Australia and the UK feared the US might walk away from the agreement. China has also initiated construction of its first nuclear-powered aircraft carrier, which is believed to "project power beyond the island chains." After US-ROK negotiations on nuclear subs, Chinese officials also warned Seoul and Washington against expanding their alliance into a broader anti-China framework, framing the move as destabilizing regional security.

The naval arms race among the US allies are further reinforced by the burden-sharing, where Washington is trying to lessen its role for other countries' security. Japan's conservatives are arguing that Japan (a pacifist nation along with being a victim of atomic bombing) should at least debate a nuclear option. In August 2025, a survey conducted in Hiroshima found that "53% of respondents believe that the US nuclear umbrella is necessary for now."

Recent developments on the Korean Peninsula have complicated the dynamics. A new area of confrontation is about to be added, involving multiple stakeholders and leading to insecurity among other states in the region. To mitigate this, more confidence-building measures are required, which look bleak at this point.