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Analysis on the Launch of a Tactical, Nuclear-armed Submarine

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On September 6, *Rodong Sinmun* released an article on the launch of a tactical, nuclear-armed submarine called “Hero Kim Gun-ok” and a transfer of the East Sea Fleet of North Korea’s navy. According to the report, a submarine-launching ceremony was held on September 6 and a shakedown cruise of the submarine took place on September 7. This paper will explore North Korea’s development plan on submarines, military technology assessment of the recently released tactical nuclear attack submarine, as well as background and strategic intention behind the release of the launch.

Release of Two-tracks: Development Plans on Nuclear Submarines

According to Kim Jong-un’s speech during the submarine-launching ceremony, North Korea’s development plan has two tracks: tactical, nuclear-armed submarine and nuclear-powered submarine. The North Korean leader already hinted at the development plan on submarines through a general report of state affairs at the 8th Party Congress of the Workers’ Party of Korea (WPK) held in January 2021. During his remarks, Kim said that “we have already set clear standards for modernizing **the armament of mid-size submarines** and opened a possibility of dramatically improving the existing submarine operation capabilities through remodeling tests on our military assets, meaning a design research on **new nuclear-armed submarines** is completed and it is under the final review stage.

The first track is a project designed to remodel and field tactical, nuclear-armed submarines with an aim of modernizing the armament of the existing mid-size submarines. To be specific,

North Korea intends to remodel its 20 Romeo-class submarines powered by diesel-electric engines and mount vertical launching tubes so that those submarines can operate tactical nuclear warheaded weapons such as Submarine-launched Ballistic Missile (SLBM), Submarine-launched Cruise Missile (SLCM), and nuclear torpedo. The latest launch took place in four years when a submarine, being constructed, was released during the on-spot instruction by Kim Jong-un on July 23, 2019, and in two years when the development plan on submarines was released during the 8th Party Congress of the WPK. The submarine made public in September 2023 is the first outcome of the first track under the leadership of Kim Jong-un.

The second track includes a development plan on nuclear-powered submarines. When it comes to nuclear-powered submarines, there are Submersible Ship Nuclear (SSN), a general attack submarine, Submersible Ship Ballistic Missile Nuclear (SSBN), a SLBM-mounted submarine, and Submersible Ship-Guided Missile (SSGN), a SLCM-mounted submarine. When SLBM or SLCM is equipped with nuclear warheads, a submarine can be elevated to a nuclear-capable strategic submarine. The North Korean leader's mention of "nuclear armament of the navy" during the latest submarine-launching ceremony suggests that the ultimate goal of developing submarines is to give birth to SSBN and SSGN. According to his remarks during the 8th Party Congress of the WPK, a design for nuclear-powered submarines is under the final review stage following the design research. Meanwhile, during the submarine-launching ceremony, he talked about a prospective development and building plan on nuclear submarines, which indicates such initiative is in its infancy.

The remarks by Kim during the 8th Party Congress of the WPK shows the ultimate goal of the two-tracked submarine capability build-up plan: developing and rolling out SSBN and SSGN. However, given developing nuclear-powered submarines needs a long-term plan, North Korea has decided to have one track of short-term mission as a complementary approach to a long process of developing nuclear-powered submarines where the existing assets within available resources are remodeled, while continuing to evolve submarines that need a longer timeframe.

At first, North Korea's submarine plan appears to be a two-tracked approach, but deep down, it is rather a last-resort effort since such development process on nuclear-powered submarines is easier said than done. It is difficult for North Korea to develop nuclear-powered submarines without technical support from other countries which have developed such assets. That does not mean that North Korea is not willing to receive help from other countries: it is just that getting such outside technical guidance is not easy, thus making it difficult for them to make progress on developing nuclear-powered submarines. On top of receiving professional support, this development requires a huge amount of investment for a long time. All of this point to an up-in-the-air reality that amid technological impasse, enormous amount of time and finance, North Korea is likely to just focus on remodeling low-cost submarines and equipping them with tactical nuclear warheads.

Technical Issues and Impracticability of Remodeling Plan on Tactical, Nuclear-armed Submarines

However, there are reservations in many aspects about technical operation and practicability of the remodeling plan on tactical, nuclear-armed submarines. When it comes to technical operation, based on Romeo-class submarine type, which was first built by Russia in 1957, 18 mid-size submarines of North Korea first started to be built at the Mayang-do Navy Shipyard in the city of Sin-po with technical support from China after introducing four Chinese submarines (Type 033) in the late 1960. Romeo-class submarine is a submarine for coast defense with torpedo, mine, and antiship missiles installed. This type of submarine may not be appropriate for long-term operations because they have aged for a long time.

Kim Jong-un laid out tasks in submarine remodeling, including (1) introducing upgraded electric-power system, (2) improving submerged operation capabilities, and (3) mounting tactical nuclear weapons.¹⁾ The sub-tasks are as follows: in terms of power, improving engine, turbine, and electric condenser is needed; in terms of submerge capabilities, improving snorkeling is needed²⁾; in terms of mounting tactical nuclear weapons, installing launching tubes by remodeling bridge is needed. However, this kind of remodeling may create a considerable structural problem due to an impractical improvement where displacement increases and a vertical launching tube is patched on the backside of a bridge to mount tactical nuclear weapons. Due to structural design, a section of the body of a ship should be molded in a circular shape with small margins of error. If the ship loses its balance, its resistance to pressure will fall dramatically. A too-radical structural change to the bridge of a ship may have negative impacts on its balance, resistance to pressure, and adjusting ability, a condition which can cause a

¹⁾ In the lead up to the submarine-launching ceremony, North Korea media reported about Kim Jong-un's on-site instruction on China-North Korea Machine Complex, the largest marine diesel engine manufacturer in North Korea. On the day Kim visited the plant, he said, "the machine complex has a critical role in enhancing military power, a task that cannot be replaced by any other organization or institution." Photos from an article featuring Kim's visit have large engines and turbines, all of which are blurred out. Diesel submarine is a submarine that generates power by creating high pressure steam with diesel as a fuel and operating turbine with the steam.

²⁾ Snorkeling conventional submarine absorb oxygen by surfacing itself on a regular basis, which enables a diesel engine to operate and charge a storage battery. However, in the middle of this process, a submarine is highly likely to be exposed to an adversary. Korea has become the third country in the world that has successfully generated power using Air Independent Propulsion without a diesel engine. Korea's Recently-built submarines, including the submarine Dosan Ahn Chang-ho, are good examples of this type of submarines.

critical problem to the ship's operational mobility. North Korea initially intended to add a missile-armed function to submarines through remodeling of expansion on the bridges, this upgraded feature is likely to limit missile use and military operation because of instability arising from the remodeled submarine structure.

This kind of technical issue also makes us doubtful about whether or not the entire development plan on submarines is viable. The missile submarine "Hero Kim Gun-ok," which was launched during the September ceremony, is a case in point: it is believed to have taken quite a time when it was built on the back of a series of technical issues. Judging from the release of building the submarine in July 2019, it is fair to say that it took more than four years to complete the construction ranging from design, remodeling, and launch. A remarkable change in the structure of the bridge this time is in a contrast to the change in the same submarine publicly released in 2019, meaning that during the period, there has been many modifications to the asset in terms of design. During his speech at the submarine-launching ceremony, Kim Jong-un said that using the upgraded submarine, which has just been released, as a standard type, the subsequent remodeling work on submarines will not take long going forward. However, what we do know is that building a submarine requires at least three to four years from design to breaking ground to launch on the premise that abundant budget and technical support are secured, a condition that may not be realistic in North Korea's case.

Even after the launch of a submarine, it takes another several years: it should go through test-sailing and the navy will perform fielding and operational exercises once it takes over the submarine. In this sense, it is unrealistic to remodel all Romeo-class submarines at a single stroke. An impractical structural change to a submarine, which can happen at any stage from building to fielding a ship, may cause several issues regarding submarine adjustment and operation. Even if North Korea can deal with and complement such glitches, it will take a considerable amount of time, not to mention a possibility of having to scrap the entire plan altogether. North Korea said it transferred the submarine to the navy right after its launch. However, the launch of a submarine is just the tip of the iceberg: it usually takes years to test-sail and correct technical issues before finally being transferred to the navy. Then they will be able to perform fielding and operational exercises, followed by commission and combat deployment. It seems that all of this adds up to the impatience felt by North Korea. As such, the latest launch itself may not translate into an automatic fielding.

Rush to Release: Practical Operation of Submarine-based Tactical Nuclear Weapons Remains to be seen

North Korea's submarine Hero Kim Gun-ok has been remodeled to Vertical Launching System (VLS), which consists of four large launching tubes and six small-to mid-sized launching tubes. During his remarks, Kim Jong-un emphasized that "the submarine is mounted with multiple nuclear projectile means that come with different levels of power," probably having small SLBM, SLCM, and nuclear torpedo in mind. The small SLBM can fly 600km and reach an altitude of 60km, meaning the Korean Peninsula is in its firing range. The submarine 8.24 Yongung (2,000-ton class, or Whale-class), as a missile experiment submarine, carried out launch experiments off Sin-po costal area in May 2022 and around a reservoir in October 2022. KN-23, a North Korean ballistic missile, similar to the Russian Iskander, has been remodeled for marine use and it is assumed that the upgraded model is available for an evasive maneuver. This move can be interpreted as a way to mount a series of missiles in a submarine by miniaturizing them.

There is a possibility that SLCM, which will be installed in a submarine, is a strategic cruise missile. It appears that North Korea's strategic cruise missile has two tracks of ground launch and submarine launch. In terms of strategic cruise missile launch by a submarine, the 8.24 Yongung Submarine carried out two firing missile drills at Sin-po costal area, South Hamgyong Province on February 12, 2023.³⁾ It appears that the firing drill was a part of preparation for the latest launch of the nuclear-powered submarine. Haeil, which was released as a nuclear torpedo, could be operated at the front part of a torpedo launching tube. North Korea's media showed the front part but it was covered by a flag. The possibility of hiding launching tubes in that particular area should not be ruled out. Whether or not launching tubes, which were unreasonably elongated through an abnormal expansion of the overall structure of the bride, will be able to operate various kinds of missiles in a real combat setting is unclear.

The latest release of the launch of the tactical, nuclear-armed submarine by North Korea appears to be proceeded hastily in both technical and development process aspects. The impatience can be construed on two fronts. First, North Korea's intention can be found in the expressions used by its leader. Kim Jong-un stressed "nuclear submarine" and "low-cost and advancement strategy" at the submarine-launching ceremony. He has

³⁾ Korea Central News Agency (KCNA) reported that "underwater launch exercise with strategic cruise missiles was carried out on 12th at dawn," and that "the submarine 8.24 Yongung fired two strategic missiles toward the East Sea near Kyung-po area."

presented his view on nuclear submarine, not considering it as a nuclear power system, but rather acknowledging nuclear-armed status as long as a submarine has been installed with nuclear weapons. This unreasonable endeavor to reshape the concept of nuclear submarine indicates the fact that North Korea is aware of difficulties in developing nuclear-powered submarines and that acknowledges its absolute inferiority in marine power. In addition, The notion that North Korea applies “low-cost advancement strategy” to the development of tactical, nuclear-armed submarines is contradictory because pursuing “low cost” and “advancement” at the same time is not viable in submarine development process. Such irony signifies that North Korea seeks to use a substitute to a high-tech submarine as a stopgap measure amid financial and technological burdens. Using the phrase “tactical nuclear attack” may be seen as an attempt to exaggerate North Korea’s submarine capabilities by unreasonably applying ground-based tactical nuclear operation to marine operation.

Background of the Release: Boasting North Korea’s Achievement to Commemorate the 75th Anniversary of Its Regime While Responding to the ROK-U.S.-Japan Partnership and Pursuing Military Cooperation with Russia

What made North Korea rush to launch tactical, nuclear-armed submarine despite several technical issues that can possibly be raised? First and foremost, the authoritarian regime was eager to boast what it has recently achieved in the lead up to the 75th anniversary of the regime establishment. Regarding the launch of the submarine, *Rodong Sinmun* assigns the meaning of the event by saying that the launch means “offering a gift to the Motherland in commemoration of the 75th anniversary of the regime establishment,” and “glorifying 75 national icons.”⁴⁾ It is likely that the two failed attempts of launching spy satellites back in May and August have served as an impetus for North Korea to rapidly launch the tactical, nuclear attack submarine.

Second, North Korea hopes to show off its military power in response to a mounting pressure from the strengthened ROK-U.S.-Japan security cooperation as well as the upgraded joint military exercise by the three countries. In his speech during the submarine-launching ceremony, Kim Jong-un pointed out that given invasive intentions and military positions by adversaries, “nuclear armament of the navy is a top priority in

⁴⁾ An article said, “an era of proactive enhancement in marine power, signaling a transitional period with the beloved Kim Jong-un at this great event of the submarine-launching ceremony,” *Rodong Sinmun* (accessed Sep 8, 2023)

national defense, a task we cannot no longer deter,” and “a desparate mission of our time that we cannot put off,” and a “destined national task for national right to self-defend its marine areas.” Following the Washington Declaration made by the ROK and U.S., Ohio-class nuclear ballistic missile submarine USS Kentucky (SSBN-737) arrived in Busan, South Korea on July 18 while the ROK-U.S.-Japan combined military exercise, which has recently been strengthened, came on the heels of the trilateral summit at Camp David. It is likely that the recent development may have revealed North Korea’s absolute inferiority in marine military power around the East Sea of Korea. The fact that Kim Jong-un’s mention of tactical nuclear submarine serving as “a pressure to its adversaries” shows the latest launch of North Korea’s submarine is a response to the newly strengthened stance among the ROK, U.S., Japan with North Korea.

Third, the launch of the submarine is to show the world that North Korea is not only diversifying but expanding its tactical nuclear weapon operating platforms from an actual battle preparation perspective. The reason behind highlighting certain aspects, such as “tactical nuclear” and “attack,” from the “tactical nuclear attack submarine” is that North Korea hopes to boast its claimed reality that its ground tactical nuclear operation is now being applied to marine tactical nuclear platforms. By reflecting its confidence in short ballistic missile and tactical nuclear development and operation into marine power, North Korea intends to deal with its psychological pressure and make up for its absolute inferiority in overall and marine military power.

Last but not least, North Korea aims to increase it response to the ROK-U.S.-Japan partnership by modernizing its marine power and seeking military cooperation with Russia. While it has a 5-10 year plan on nuclear armament of the navy with mid-to-long term goal in mind, North Korea rushes to enhance its strategy against the trilateral cooperation for a short term. It is likely that North Korea has its own marine power modernization plan in three aspects: (1) remodeling a tactical nuclear submarine and building up ship-to-ship and ship-to-ground strategic cruise missiles for a short term; (2) expanding exercise area by carrying out Russia-North Korea joint maritime exercise in the East Sea and forming a response line against the trilateral partnership; and (3) developing nuclear-powered submarines with technical help from Russia for a long term. At the same time, North Korea is showing its willingness to strengthen its military power through joint maritime exercise and military cooperation with Russia. ©KINU 2023

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