

Coming to Terms with North Korea's Nuclear Strength

By Jungsup Kim & Chung-in Moon

While efforts to bring North Korea back into negotiations on denuclearization have been stalled for years, Pyongyang's nuclear and missile programs have developed with alarming determination and rapidity. This has only fueled growing calls in South Korea to consider a stronger response, including even going nuclear itself.

The risks of miscalculation and possible catastrophe have never been greater. A level-headed, realistic approach, even one that may acknowledge North Korea as a nuclear-weapons state, is needed to redefine approaches to the threat, write Jungsup Kim and Chung-in Moon.

THE SECURITY SITUATION on the Korean Peninsula is going from bad to worse. The spiral of hostile actions and reactions, disguised under the logic of self-defense, is heightening tensions and jeopardizing peace and stability. Pyongyang's assertive behavior was predicted when it announced the cancellation of a unilateral moratorium on nuclear and missile activities in January 2022 that had been in effect since April 2018. In 2022 alone, North Korea test-launched 42 ballistic and cruise missiles of varying ranges; of these, 30 were fired after the inauguration of the Yoon Suk-yeol government on May 8. Worse is to come. Close observers of North Korea speculate that it could undertake a seventh nuclear test and soon test-launch additional intercontinental ballistic missiles (ICBMs). Such developments could precipitate a catastrophic crisis on the Korean Peninsula.

CAPABLE, VARIED AND GROWING

North Korea formally legalized its nuclear weapons status on Sept. 8, 2022. Do its nuclear-weapons capabilities justify the move? There are several indicators to assess such capabilities, including nuclear facilities and materials, nuclear warheads, delivery vehicles, nuclear testing, and the upgrading of nuclear weapons through miniaturization and diversification. Although the Treaty on the Non-Proliferation of Nuclear Weapons (NPT) regime does not recognize North Korea as a nuclear-weapons state, by the indicators above it has, indeed, completed the process of nuclear weaponization. But it should be kept in mind that figuring out North Korea's

¹ Siegfried S. Hecker, "The North Korean Nuclear Question Revisited: Facts, Myths and Uncertainties," *Global Asia*, Vol. 16 No. 3, September 2021, www.globalasia.org/v16no3/cover/the-north-korean-nuclear-question-revisited-facts-myths-and-uncertainties_siegfried-s-hecker
² Hans M. Kristensen and Matt Korda, "Nuclear Notebook: How many nuclear weapons does North Korea have in 2022?" *Bulletin of the Atomic Scientists*, Sept. 8, 2022, thebulletin.org/

premium/2022-09/nuclear-notebook-how-many-nuclear-weapons-does-north-korea-have-in-2022/

³ Bruce W. Bennett et. al., "Countering the Risks of North Korean Nuclear Weapons," RAND Corporation, April 2021, www.rand.org/pubs/perspectives/PEA1015-1.html

⁴ Kristensen and Korda, *op. cit.*

⁵ Hecker, *Global Asia*, *op. cit.*

nuclear-weapons capabilities is like the tale of the blind men touching an elephant — each one describes a different beast. Lack of transparency and extreme secrecy make it virtually impossible to access data on the country's nuclear and missile capabilities. As Siegfried Hecker warned: "Facts are difficult to come by, myths are deeply ingrained, and uncertainties lurk everywhere — that, in short, is the nature of North Korea's nuclear program."¹

North Korea has the complete fuel cycle that includes indigenous uranium ore, mining facilities and production capacity for plutonium and highly enriched uranium (HEU). It also has qualified human resources. Apart from uranium mining facilities in Pyongsan that by some estimates can produce up to 360,000 tons of ore, Yongbyon has a 5 Megawatt-electric graphite-moderated nuclear reactor, an HEU facility with more than 4,000 centrifuges, a fuel fabrication plant, a radiochemical reprocessing plant for the separation of plutonium, new tritium separation facilities and a new facility to make uranium hexafluoride needed for enrichment operations. North Korea is also known to have been building a new, 50 Mwe experimental light-water reactor in Yongbyon. American intelligence sources have alluded to the possibility that it has two or more hidden HEU-related facilities in Kangsun and elsewhere, but such allegations have not yet been verified.

In sum, North Korea has the facilities needed to produce nuclear bombs. As for production rates of plutonium and HEU materials, there has been widespread speculation. According to Hecker's estimate, by the end of 2020, it had 25kg to 48kg of plutonium and 650kg to 900kg of HEU. Most observers tend to agree with his estimate of the plutonium inventory, but estimates of HEU vary. The Stockholm International Peace Research Institute (SIPRI) estimated that North Korea had acquired between 230kg and

1,180 kg of HEU by the beginning of 2021; the International Panel on Fissile Materials gives an estimate of 400kg to 1,000kg.² The estimate of its tritium and other nuclear materials is even more uncertain. Nevertheless, there is little doubt that North Korea has acquired a significant amount of the fissile materials needed.

As with the amount of nuclear materials, the actual size of North Korea's nuclear arsenal is unclear. It is generally known that the amount of fissile materials varies by the nature of the bomb under production (e.g. yield scale and level of bomb-making technology), a plutonium bomb requires 6kg to 8kg and an HEU bomb 12kg. The RAND Corporation and an Asan Institute report estimated that as of 2021, North Korea had 67 to 116 nuclear weapons and projects that it will have 151 to 242 by 2027.³ Kristensen and Korda estimate a minimum of 20 to 30 warheads and maximum of 44 to 55 as of 2022.⁴ Hecker estimates that North Korea's nuclear arsenal grew from four to six in 2008 to 25 in 2016 and to 45 by 2021, and that this is expected to grow to around 70 by 2027.⁵ In view of this, we can conclude that North Korea now possesses a formidable number of nuclear weapons.

Nuclear weapons, however, are not credible unless they are tested. North Korea has undertaken six rounds of nuclear testing, starting in October 2006. The first test was conducted on Oct. 9, 2006, and was considered a failure, with a yield of less than 1 kiloton despite its designed yield of 4 kilotons. The second, on May 25, 2009, is known to have yielded 2-6 kilotons, a higher level of explosive power and technology. The third (Feb. 12, 2013), fourth (Jan. 6, 2016) and fifth (Sept. 9, 2016) yielded 6-7 kilotons, 6 kilotons and 10 kilotons respectively. The sixth, on Sept. 3, 2017, is seen as the most significant, not only because of its explosive power (50-60 kilotons by a South Korean estimate, 108.3 kilotons

⁶ Tianran Xu, "Backgrounder: Previous DPRK Nuclear Tests, Open Nuclear Network, June 17, 2022, opennuclear.org/publication/backgrounder-previous-dprk-nuclear-tests?language_content_entity=en

⁷ Vann H. Van Diepen, "North Korea Launches Four "Hwasal-2" LACMs to Show Strong Deterrence and Rapid Response," 38 NORTH, March 1, 2023, www.38north.org/2023/03/north-korea-launches-four-hwasal-2-lacms-to-show-strong-deterrence-and-rapid-response/

plus-or-minus 48.1 by a Chinese estimate, and 160 kilotons by a Japanese estimate), but also because of its design characteristics, such as fission detonation and high temperature fusion ignition and the ensuing rapidly boosting fission-fusion reactions.⁶ Put simply, it was a thermonuclear device for an ICBM. The history of North Korea's nuclear testing shows continuous evolution in terms of explosive power and technological sophistication.

Can North Korea deliver its nuclear weapons to targets? Yes, it has developed considerable delivery capability and now possesses 20 types of ballistic missile, of short range (300km-1,000km) such as Scud-B and C, KN-23 (resembling Russian Iskander) and KN-24 (resembling US ATACMS), mid-range (1,000km-3,000km) such as Scud-ER and Nodong, and intermediate range (3,000km-5,500km) such as Musudan and Hwasung-12. It has also developed ICBMs that can fly 5,500km to 15,000km (Hwasong-13, 14, 15 and 17). In addition, it has recently test-fired submarine-launched ballistic missiles (SLBMs), known as the Bukguk-song series, with a range of 2,000km to 3,000km, mega-caliber multiple rocket launchers; and new cruise missiles, such as the Hwasal-2, that can carry tactical nuclear warheads.⁷ Kim Jong Un is also committed to developing hypersonic gliding vehicles, military reconnaissance satellites and nuclear-powered submarines. It is not clear whether North Korea has developed and tested any of these items on Kim's wish list.

WHAT PYONGYANG SAYS

North Korea's recent statements and activities reveal four interesting trends. First, it has ballistic missiles that can target South Korea, Japan and Guam, as well as the US mainland. Second, it claims that it has an operationally deployed, reliable and varied delivery capability for "tactical" nuclear weapons including short-range



Just what I ordered: Kim Jong Un oversees military drills in October 2022 to assess North Korea's deterrence capability and react to joint US and South Korean military exercises. The drills included several ballistic missile launches to test tactical nuclear warfare capabilities.

Photo: North Korean Central News Agency

ballistic missiles. Third, it has adopted diverse basing modes to cope with Seoul's pre-emption doctrine. Apart from using transportable launch vehicles, it has introduced diverse launch platforms such as train cars, submarines and even, most recently, underwater silos.⁸ Finally, North Korea has revealed remarkable technological improvements such as an increasing use of solid propellant for short-range ballistic missiles and a "pull up" maneuver in the terminal phase of flight by the KN-23 to avoid interception.

At the Eighth Party Congress of the Korea Workers' Party (KWP) on Jan. 12, 2021, Kim Jong Un said the country had successfully developed tactical nuclear weapons by mastering miniaturization and standardization. He also said it had acquired large hydrogen bombs. Miniaturization to make nuclear warheads smaller and

lighter is not easy, but it can be prudently concluded that Pyongyang is approaching this goal as part of its growing arsenal.

There are elements of uncertainty in assessing these capabilities, of course, but generally speaking, North Korea has nuclear facilities and materials, nuclear devices proven through six rounds of testing and a vast inventory of delivery vehicles, while it is constantly upgrading its technology. In accordance with the NPT, we cannot recognize North Korea as a nuclear-weapons state, but we cannot deny that its nuclear weapons are an objective reality.

INTENTIONS AND MOTIVES

What is really behind North Korea's pursuit of nuclear weapons? Pyongyang has traditionally claimed that nuclear weapons are strictly for

deterrence as a result of American military hostility. However, analysts of North Korea have given a wide range of rationales other than deterrence. They include acquiring a position of strength for the reunification of the Korean Peninsula by force; a tool for the united front strategy; counterbalancing inferiority in the conventional arms race with the South in an economic way; enhancing regime security through legitimacy building, cooptation of the military, and improved international status; using nuclear weapons as tools for greater bargaining strength. Some even accuse Pyongyang of attempting to acquire nuclear weapons for hard currency through proliferation. Our conclusion is that its primary motive is security through deterrence rather than changing the status quo, because it lacks the conventional forces to do so.

8 Vann H. Van Diepen, "A Strong Military Warning: Four Key Implications of North Korea's October 10 Missile Statement," 38 NORTH, Oct. 14, 2022, www.38north.org/2022/10/a-strong-military-warning-four-key-implications-of-north-koreas-october-10-missile-statement/

9 "Kim Jong Un threatens with five conditions for pre-emptive nuclear strike," *Chosun Ilbo*, Sept. 12, 2022.

The North Korean Nuclear Forces Law, enacted on Sept. 8 last year, clarifies its nuclear doctrine. Article 1 stipulates that North Korea's nuclear force is based on "deterrence of war," but it will carry out its "operational mission" for a decisive victory in the case that deterrence fails. This means that North Korea is pursuing two missions simultaneously — one is "assured retaliation," and the other is "asymmetric escalation."

North Korea has long focused on its ability to retaliate against the US mainland through the development of ICBMs. The Hwasong-15 and Hwasong-17 ICBMs, and the Pukguksong SLBM, which is not yet fully developed, show that its nuclear doctrine includes "deterrence by punishment" against the US. On the other hand, it has recently been focusing on "nuclear war-fighting capability" in the form of tactical nuclear weapons on the battlefield. New tactical guided weapons (KN-23, 24, 25, etc.) that have frequently appeared since the breakdown of the Hanoi summit between the US and North Korea testify to this. North Korea's nuclear posture does not stop at securing retaliation against the US but also demonstrates that it is pursuing an asymmetric escalation in which it appears willing to use tactical nuclear weapons in real combat.

Judged on the operational capabilities of tactical nuclear weapons, North Korea's nuclear doctrine is evolving into a "war-fighting" strategy. There is also a growing belief that North Korea is "the most aggressive and radical" among nuclear powers, pointing to the provision of Article 6 of the law, which allows it to pre-emptively use nuclear weapons against non-nuclear attacks.⁹ However, it is reasonable to interpret the doctrine of pre-emptive nuclear use as part of deterrence in a broad sense. Showing off nuclear war-fighting capability at the tactical level is part of "deterrence by denial," which makes it difficult for the US to deploy reinforcements on the Korean Pen-

insula in case of emergency. Thus, Pyongyang's threat of pre-emptive use of nuclear weapons in a non-nuclear conflict can be seen as a deterrence strategy to offset its inferiority in conventional forces in relation to the US-South Korea alliance.

Pakistan's nuclear posture since 1998, NATO's nuclear doctrine during the Cold War and Russia's nuclear strategy after the Cold War are all in the same context. Also, North Korea's doctrine that nuclear weapons can be used when an attack is imminent is not new and has been a concern of all nuclear states since the Cold War era. This is where the "launch on warning" posture comes in. The provision that a nuclear strike is automatically carried out when the command-and-control system is attacked also reflects North Korea's fear of decapitation in line with "Dead Hand," a system devised by the Soviet Union during the Cold War. Therefore, it is necessary to understand North Korea's nuclear posture in light of the universal logic of nuclear deterrence, rather than being immersed in its threatening remarks or actions.

Although North Korea's nuclear doctrine is based on deterrence, it poses a threat because it lowers the nuclear threshold and opens the possibility of crisis instability. The emphasis on the operational mission of nuclear forces means that options for using nuclear weapons at each stage of a crisis are more diverse and the threshold of use is lowered. As shown in the nuclear automatic strike, the nuclear command-and-control system can be under pressure of delegation. As such, there is an increased risk of an inadvertent nuclear war. If South Korea and the US move offensively against North Korea's nuclear war-fighting capability, the crisis instability problem is exacerbated. This is because the chain effect of mutual fear can work if both North and South Korea launch a pre-emptive strike when the opponent shows signs of an attack.

In addition, North Korea will continue to advance its nuclear and missile capabilities with the final goal seeming to be operational ballistic-missile submarines, known as SSBNs, to ensure second-strike capability. It is also expected to focus on operational tactical nuclear capabilities. North Korea's pursuit of a nuclear strike capability on the US mainland and its ability to deter military intervention on the Korean Peninsula could cast severe doubt on the credibility of extended deterrence.

MANAGING NORTH KOREA'S NEW NUCLEAR POSTURE

How should South Korea and the US respond to North Korea's new nuclear posture?

First, the effectiveness of extended deterrence should be enhanced. If the question of whether to sacrifice Washington for the sake of Seoul is not resolved, anxiety about the North Korean nuclear threat will deepen, and popular voices for the redeployment of US tactical nuclear weapons to the Korean Peninsula and the development of South Korea's own nuclear arms will grow. Questions about the credibility of extended deterrence against the North Korean nuclear threat can undermine the South Korea-US alliance. The Extended Deterrence Strategies and Consultation Group (EDSCG), which was held in Washington on Sept. 16, 2022, reaffirmed that any nuclear attack by North Korea would be met by an overwhelming and decisive response. Despite the rhetorical commitment, there are some concerns. Although Washington has committed to timely deployment of strategic assets, no details have so far been revealed. How to consolidate the "tailored deterrence" posture on the Korean Peninsula within the framework of extended deterrence also needs to be specified through mutual consultation.

For a credible extended deterrence, it is vital

to expand information sharing and strengthen joint planning. The level of bilateral consultation should be upgraded regarding when, under what circumstances, and in what manner nuclear and non-nuclear options would be pursued. To this end, in-depth information-sharing on US nuclear capabilities and planning procedures should be arranged. It is also necessary to find a way for the South Korean military to participate in nuclear planning with the US Strategic Command during peacetime as well as in times of crisis. The decision about the use of nuclear weapons belongs exclusively to the US president, and it may not be easy for allies to participate at the operational level. Nevertheless, it is equally important to review the issues related to the implementation of extended deterrence in depth beyond the level of sending messages. There must be a system in place that can reflect South Korea's position. In this regard, the eighth Deterrence Strategy Committee Table-Top Exercise, which was held in Washington, DC, on Feb. 23, is a positive development because it dealt with information sharing and joint planning.

The Yoon administration tends to focus too much on the deployment of US strategic assets and joint military training. While these are an important way to demonstrate the firm resolve of South Korea and the US, they should not be treated as the foundation for extended deterrence. Frequent armed demonstrations can easily be subject to the law of diminishing returns while unnecessarily heightening military tensions if not properly implemented in times of crisis. Deepening and institutionalizing extended deterrence that goes beyond symptomatic treatment can be a more reliable way to deal with North Korea's nuclear threat.

Crisis stability is just as important as strengthening deterrence. Blind preoccupation with extended deterrence may paradoxically increase

10 Richard Haass, "The New Nuclear Era," Project Syndicate, Oct. 19, 2022, www.project-syndicate.org/commentary/new-nuclear-era-wider-proliferation-risks-catastrophe-by-richard-haass-2022-10?barrier=accesspaylog

the possibility of nuclear war. While maintaining a deterrence posture that is decisive enough to prevent North Korea from using nuclear weapons, every effort is needed not to raise unnecessary fears, misperceptions or miscalculation on its part. Thus, it is necessary to refrain from using such terms as pre-emptive strikes and decapitation operations that may unnecessarily provoke North Korea. In the case of the deployment of US strategic assets or the transmission of deterrence messages in times of crisis, these should be carefully calibrated with crisis management. Otherwise, a minor conventional armed conflict could quickly escalate into a full-blown nuclear war. Thus, crisis stability through "intra-war deterrence" and "escalation control" is critical. There must be a prudent balance between the two.

FACING REALITY

Deterrence and crisis stability are useful but are still a second-best solution to the North Korean nuclear problem since they are predicated on a perpetual security dilemma. The ideal way forward is to restore diplomacy and resolve the conflict peacefully. We all know this is not easy. But a paradigmatic change in our way of thinking can open a new horizon.

In this regard, genuine realism is desperately needed. We should admit, if not formally recognize, North Korea as a nuclear-weapons state. We cannot make "complete, verifiable irreversible denuclearization" a precondition for any dialogue. The recent remark by Park Jin, South Korea's Foreign Minister, that "peace without North Korea's denuclearization is a false peace" is misleading and unhelpful. While full denuclearization should remain the ultimate goal, a more realistic approach should be sought in which some form of nuclear-arms control limits North Korea's nuclear capabilities in exchange for the removal of hostile policies and a reduction of sanctions.¹⁰

As noted, crisis stability is urgent. Seoul and Washington need to show more restraint, with behavior such as downsizing or temporarily suspending South Korea-US joint military exercises, and the deployment of strategic assets to the Korean Peninsula. These measures could reduce tensions and build confidence that could bring the North back to dialogue and negotiation. "Denuclearization first, peace later" is not likely to work. Denuclearization and peace-making on the Korean Peninsula should be pursued simultaneously. That seems a more realistic approach.

Strategic empathy should also be employed. Demonizing North Korea, adhering to the old habit of crime and punishment, and advocating unilateral attitudes could just worsen the situation. It is essential to understand North Korea as it is, not as we think it is or hope it might become.

Finally, neither the US alone nor South Korea-US and US-South Korea-Japan trilateral co-operation can resolve the problem. Their co-operation and co-ordination can be useful for deterrence and sanctions, but not for a diplomatic resolution. North Korea, China and Russia will need to be part of any dialogue and negotiation. Further, the North Korean nuclear issue cannot be separated from the overall security dynamics of Northeast Asia. A new institutional arrangement such as a Northeast Asia Security Summit should be devised to address and resolve the North Korean security problem.

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