

DENUCLEARIZATION OF THE KOREAN PENINSULA

An Arms Control Framework

SHARON SQUASSONI

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ABSTRACT

The report develops and proposes strategies for progressive North Korean denuclearization as embedded in a broader arms control context. Rather than a roadmap, it provides a menu of options that may become more or less attractive as the political, economic, and security environments change. The report includes consideration of tension reduction, risk reduction, confidence-building, and arms reduction measures. Given the rise of political tensions, including adoption of a more expansive nuclear doctrine by North Korea, military posturing and continued development of destabilizing military capabilities, the report concludes that measures focused on improving crisis stability and crisis management should be prioritized. It will be necessary to reduce risks before eliminating them. However, the goal of denuclearization should not be abandoned, and the implementation of cooperative measures must avoid in any way assisting or legitimizing North Korea's nuclear weapons or taking the pressure off the need for nuclear disarmament.

EXECUTIVE SUMMARY

North Korea's nuclear weapons pose a growing challenge to security on the Korean peninsula, in the region, and, potentially, worldwide. The prospects for denuclearizing the Korean peninsula have dimmed significantly with each operational improvement in North Korea's nuclear arsenal. What began as a non-proliferation task close to thirty years ago — to cap and rollback the DPRK's nuclear capabilities — can no longer plausibly be treated as such.

Skepticism that North Korea will bargain away its nuclear deterrent has rightly grown, buoyed by the adoption of laws and recent statements by Kim Jong Un. Leaving aside how practical denuclearization or disarmament as an outcome might be, it is still possible to focus on the process of denuclearization. Thus, the goal of denuclearization may remain inviolate (just as disarmament continues to be a global objective, enshrined in Article VI of the Nuclear Nonproliferation Treaty (NPT)), while the process and methods may shift over time. This report assumes that it is no longer appropriate to consider denuclearization as a nonproliferation objective but rather as an arms control/disarmament task. This has significant implications for how policies are formulated and implemented, including key participants. It also means that some of the approaches and methods developed for arms control and disarmament purposes may be valuable.

This report explores ways to reduce the risks from North Korean nuclear weapons within an arms control framework that does not abandon the ultimate goal of denuclearization. It makes the case for why nonproliferation tools and policies are no longer adequate to contain the risks, but must be complemented, if not supplanted, by measures that traditionally have belonged to the genre of arms control.

While it is common to narrowly define arms control measures as arms reduction treaties, a wider definition would encompass those measures that depend on cooperation to reduce the likelihood of war occurring, as well as its impacts. Cooperation is the key distinction between measures that belong in the category of arms control and those that might be deemed counterproliferation or nonproliferation. Counterproliferation measures are conducted against a proliferant state assuming there will be no cooperation. These can include sanctions, export interdictions, and a variety of intelligence, diplomatic and military tools to halt the spread of nuclear weapons. Policy tools vis-à-vis North Korea's nuclear weapons fall squarely in this category at this moment in time. Nonproliferation measures, on the other hand, require a modicum of cooperation and are based in obligations incurred under the Nuclear Nonproliferation Treaty (NPT). Provision of information and access to inspections are key to the success

of nonproliferation measures, but nonproliferation measures mainly apply to activities prior to acquisition of a nuclear weapon. North Korea occupies its own category as a state that previously accepted NPT obligations and then withdrew from the treaty and developed nuclear weapons. As such, it has come to present a policy conundrum.

Continuing to view North Korea's nuclear threat through the lens of nonproliferation has policy implications that may limit freedom of action. As long as North Korea's nuclear weapons program is regarded as violating its nonproliferation commitments (even though it withdrew from the NPT in 2003), the international community must punish North Korea for its actions. Anything less would undermine the rule of law and eventually erode the global nonproliferation regime (Lewis 2022). One byproduct of this perspective is regarding North Korea's nuclear weapons as "illegal," a term not conducive to negotiated solutions. Second, it is difficult within a nonproliferation context to acknowledge security motivations for the development of nuclear weapons. Under the NPT, nuclear weapon states argue that non-nuclear-weapon states achieve greater security benefits by foregoing nuclear weapons, despite their own continued reliance on nuclear weapons for security. Although many understand that a solution to peace on the Korean peninsula will require security guarantees and assurances, these must be separated from denuclearization as a nonproliferation task. These have all contributed to the focus on denuclearization first before other steps, a process that North Korea has rejected.

An arms control framework could facilitate a wider range of measures aimed at reducing risks from North Korea's nuclear weapons, while retaining the ultimate goal of denuclearization. It would need to avoid legitimizing North Korea's nuclear weapons, particularly the perception that anything that not covered by arms control agreements would be fair game for competition – that "anything not forbidden is permitted" (Krass 1985). It would absolutely have to avoid aiding North Korea's WMD programs in any way and it must not spur proliferation by North Korea's neighbors, based on the perception of acceptance of the North's arsenal. Denuclearization of the Peninsula cannot be discarded and should be reaffirmed by all parties as the ultimate objective. Avoiding some of the language reserved for peer competitors, including "strategic stability," by describing the process as risk reduction or crisis stability more broadly could be helpful.

The classic Schelling-Halperin definition of arms control is "all forms of military cooperation between potential enemies in the interest of reducing the likelihood of war, its scope and violence if it occurs, and the political and economic costs of being prepared for it" (Schelling and Halperin, 2). Essential prerequisites include a recognized common interest and the possibility of reciprocation and cooperation. In the Schelling-Halperin context, military forces would deter aggression "while avoiding the kind of threat that may provoke desperate, preventive, or irrational military action on the part of other countries."

The United States acknowledges the need to deter North Korean WMD, but it does not view North Korea as a competitor. That language is typically reserved for Russia and, now, China. The United States may view a costly arms race as potentially inevitable with China and a possibility with Russia, but almost certainly dismisses the possibility of North Korea competing on that scale, not least of all because of its size and relative poverty. However, reducing the likelihood of miscalculation by both North and South Korea is essential to avoiding a war on the peninsula that the United States clearly seeks to avoid not just because of the potential for escalation on the peninsula but also regionally. There is therefore room for measures, however they are categorized, that enhance predictability, balance force postures and complement deterrence.

Rising tension on the Korean peninsula, competition between the United States and China, and growing conventional deterrence capabilities by Japan and South Korea suggest a need for mechanisms to relieve pressure to act. Crisis stability measures, especially communication channels, notifications, and Track II talks should be a first order of business. There is a long history of measures within the US-Soviet-European context that is now beginning to be considered by some Asian partners.

Bilateral and Multilateral Measures for Crisis Communication, Management and Stability

MEASURE	PARTIES	CRISIS COMMUNICATION	CRISIS MANAGEMENT	CRISIS STABILITY
1963 Hotline Agreement	US-Soviet	•		
1971 Agreement to Reduce Risks of Nuclear War	US-Soviet	•		•
1972 Incidents at Sea Agreement	US-Soviet		•	•
1973 US-Soviet Agreement on the Prevention of Nuclear War	US-Soviet	•	•	•
1975 Helsinki Final Act	Multilateral		•	•
1986 Stockholm Agreement	Multilateral		•	•
1987 Nuclear Risk Reduction Centers (NRRC)	US-Soviet	•		
1988 US-Soviet Ballistic Missile Launch Notification Agreement	US-Soviet		•	•
1989 Agreement on Prevention of Dangerous Military Incidents	US-Soviet		•	•
1989 Agreement on Notification of Major Strategic Exercises	US-Soviet		•	•
1990 Vienna Document	Multilateral		•	•
1990 CFE Treaty	Multilateral			•
1994 US-Russia Presidential Declaration on Mutual De-Targeting	US-Russia			•
1998 US-PRC Agreement Establishing a Direct Telephone Link	US-China	•		
2002 Hague Code of Conduct	Multilateral		•	•
2007 Maritime & Aerial Communication System	Japan-China	•		
2014 U.S.-PRC Memorandum of Understanding on Rules of Behavior for the Safety of Air and Maritime Encounters	US-PRC			•
2018 Leadership Hotline	ROK-DPRK	•		

Sources: Adapted from Michael Krepon, Dominique M. McCoy and Matthew C.J. Rudolph, eds, *A Handbook of Confidence-Building Measures for Regional Security* (Washington, DC: The Henry L. Stimson Center, September 1993); NPT_Conf_2020_e_wp.55.pdf ; and author's additions.

FROM TENSION REDUCTION TO ARMS CONTROL

Starting with a group of measures to reduce tensions in Northeast Asia, the analysis explored the potential for collaborative search and rescue missions and environmental remediation collaboration in the West and East Seas; climate change data exchange; limited cooperation on nuclear safety, as well as sharing experiences with accident mitigation; and dialogue on the humanitarian impact of nuclear weapons, perhaps including environmental impact of nuclear testing. Risk reduction measures for consideration included hotlines, codes of conduct (particularly in the maritime environment) and a risk reduction center. Confidence-building measures should be considered to introduce greater predictability about force levels, operations, and capabilities. This might include information exchange; although it may seem that the ubiquity of information on the internet makes this unnecessary, there is a significant need for authoritative information. Government provision of information also would allow follow-up requests for clarification or elaboration. While the Vienna Document provides a comprehensive template, parties are likely to choose to start smaller. At a minimum, it would be useful to include in those declarations information about naval forces and missiles.

Talks on doctrine and crisis/strategic stability will be increasingly necessary as North Korea operationalizes its nuclear weapons capability. These could be orchestrated on different levels –Track 1.5 (civilians on US side; DPRK officials) and/or Track 1 (government officials for both). Such talks would have been unthinkable twenty years ago, but would now be useful in light of destabilizing doctrines espousing limited uses of nuclear weapons. In particular, talks could address difficulties (risk of accidental launches, deterioration of chain of command) inherent in relegating control of nuclear weapons to battlefield commanders. In light of recent Russian activities in Ukraine, a no-attack pledge applicable to nuclear facilities could be useful between North and South Korea. The analysis explored the utility of arms control measures designed to improve crisis stability, establish arms race stability and/or decrease the costs/impact of war. A small range of options included those related to nuclear testing, fissile material production and missile limits.

All of the measures were roughly ranked according to their contribution to crisis stability; contribution to arms race stability; ease of implementation (including whether it needs new structure or organization); scope (narrow or wide; single domain or cross-domain); need for monitoring or verification; and urgency/timeliness.

In seeking to differentiate between ideal and pragmatic approaches, the analysis explored the potential to use existing arms control treaties, arrangements and agreements first. Although rejoining the NPT has always been a staple of arrangements to denuclearize North Korea, this is highly unlikely to happen. The prospect of North Korea joining the TPNW, despite statements supporting global denuclearization, should also be ruled out. However, specific outreach or dialogue in connection with these treaties could serve some common interests. More importantly, efforts to halt North Korea's nuclear testing should consider approaches to get North Korea to join the Comprehensive Test Ban Treaty (CTBT) and Partial Test Ban Treaty (PTBT). Neither China nor North Korea is party to the PTBT, which prohibits testing in the atmosphere, but China could reap environmental benefits from North Korea acceding to the treaty while not incurring any costs, since it has already signed the CTBT. While North Korea is unlikely to join the CTBT on its own, a trilateral approach by the United States, China and North Korea to join together could be appealing. To North Korea, it could convey some status; to the United States, it would limit both North Korean and Chinese modernization, and the value to China would lie in capping North Korea's capabilities and limiting environmental damage from further testing. Ultimately, even a trilateral effort by the US, China, and North Korea to join would not in itself bring the treaty into force, but engagement with North Korea there could be a springboard for confidence-building. Another idea would be to invite North Korea to participate in international guidelines on plutonium management. Providing voluntary declarations about fissile material holdings with the objective of providing greater accountability among states with such fissile material would be a step toward more responsible nuclear behavior, although provide little tangible risk reduction. This kind of measure would not merit any sanctions relief, although one could envision sanctions relief for joining the CTBT or other treaties meant to limit capabilities.

Finding common ground in arms control is an important prerequisite for engaging in talks with North Korea. There is obviously no magic formula for getting North Korea to the negotiating table, but a shift from “denuclearization first” to avoiding nuclear war and enhancing crisis stability is clearly in all parties' interests. Despite intensified rhetoric about nuclear-war-fighting, it is likely that North Korea prefers not to fight a nuclear war and this should be the focus of dialogue in the short term.

The report highlights four different scenarios for engaging with North Korea on arms control measures, each with a slightly different focus. For all of them, however, the following messages would be critical to stress in any approach to North Korea:

- All partners have a mutual interest in avoiding nuclear war
- The humanitarian, environmental, and financial costs of nuclear weapons are enormous
- Some nuclear capabilities increase the risk of use, including accidental or unauthorized launch
- Cooperative approaches that include transparency can enhance stability
- Arms control includes all forms of military cooperation in the interest of reducing the likelihood of war, the costs, and effects.

Framing an arms control approach in this way is important to avoid the perception that North Korea is “off the hook” for eventual denuclearization, that North Korea is a peer of the United States, or that North Korea is a “responsible” nuclear state.

SCENARIOS FOR ARMS CONTROL APPROACHES

The first scenario focused on the basic objectives of preventing nuclear war and reducing risks. This scenario starts from a minimal baseline. The United States and ROK would approach the DPRK as a partner to declare their intentions to not stumble accidentally into nuclear war, and their intention to prevent nuclear war, using the 1971 and 1974 agreements as templates. Bilateral declarations with regard to other pledges (not to attack nuclear facilities and/or not to use biological/chemical weapons) could be added to this.

The first two steps of this scenario are not terribly difficult if both sides agree this can be accomplished at a fairly senior (but not summit) level. North Korea may see such declarations as tacit acceptance of its nuclear weapons status and may attempt to engineer them for maximum exploitation, which should be avoided as much as possible. Foreign Ministers could sign the declarations in person or this could be done at the head-of-state level without a summit. The risk reduction center could be trilateral or even quadrilateral (DPRK, ROK, Japan, US), perhaps funded with private money.

Establishing a regional Helsinki-like dialogue designed to produce political and military agreements is, obviously, ambitious and difficult. Yet many of the elements of the Comprehensive Military Agreement were drawn from experience in the Helsinki process. The overall point is to connect nuclear risk reduction with conventional forces risk reduction. North Korea may take a narrow view of risk reduction simply as an issue of the US and ROK giving up exercises, so it will be important to persuade North Korea of the need for a regional approach. China could be a major stumbling block here, given its desire for freedom of action overall in the Pacific. However, there may be tradeoffs (for example, discussions on missile defenses) that could enhance the attractiveness of a Helsinki-type dialogue for the Chinese.

The second scenario sought to improve crisis stability for conventional and nuclear forces, beginning with tension reduction measures to probe North Korea for its capacity for cooperation in non-security-related areas. It would seek to enhance cooperation in the maritime environment first, through collaboration on climate change and environmental remediation in the West and East Seas. A no-attack pledge regarding nuclear facilities, prompted by actions in Ukraine in and around nuclear power plants, could diminish risks even in a potential conventional war. Enhancing North Korea’s understanding of nuclear safety regarding nuclear power plant accident mitigation was another element of this scenario, through either Track 1.5 talks with Japanese or Ukrainian officials or through regulators. Expanding the safety discussion to the environmental impact of underground nuclear testing would be a first turn toward security-related issues. Another essential component here would be nuclear doctrine talks. All of these measures become more feasible if North Korea refrains from provocative tests, missile and artillery firings, and uses existing communications channels on a more regular basis.

A third scenario would seek to chip away at North Korean capabilities via treaties. In this scenario, promoting arms control approaches to North Korea would first focus on seeking adherence to the CTBT and CWC. Outreach from the CTBTO would be useful, supported by either nuclear test site safety talks or environmental remediation through NGOs. Cooperative sealing of sites focused on safety could provide a foothold for further cooperation. The most ambitious element of this scenario would be a trilateral talks by the US, DPRK and China on the CTBT. While North Korea is unlikely to join the CTBT on its own, a trilateral approach by the United States, China and North Korea to join together could be appealing. To North Korea, it could convey some status; to the United States, it would limit both North Korean and Chinese modernization, and the value to China would lie in capping North Korea’s capabilities and limiting environmental damage from further testing. While this in and of itself would not bring the CTBT into force, it would set the DPRK on a more solid path toward maintaining a moratorium. Of course, such an approach would have to be handled extremely carefully in the United States to avoid political backlash.

With respect to chemical weapons, a first step might be a bilateral pledge by ROK and DPRK not to use biological or chemical weapons on the peninsula. The scenario also suggests a regional dialogue on transparency regarding plutonium production as a starting point for engaging North Korea on fissile material issues. Either as a bilateral effort with ROK or as a regional effort to build transparency on nuclear energy and fissile material, partner states adhering to the guidelines could open talks with North Korea to assess common interests. The feasibility of this option would be enhanced by South Korean interest.

Finally, a fourth scenario would seek to limit or eliminate the most destabilizing elements of North Korean arsenal. In this scenario, the focus would be to dissuade further development by North Korea of tactical nuclear weapons capabilities and nuclear-armed cruise missiles and seek limits and/or elimination. In the area of missiles, there may be tradeoffs between ROK and the DPRK that could be considered. For example, the ROK and DPRK could have an inter-Korean agreement not to MIRV any ballistic missiles – conventional on the ROK side and dual-capable on the DPRK side. Or, the ROK might consider dropping some of the capabilities it has been developing and fielding under its program to preemptively strike DPRK leadership (the so-called “Kill Chain” program) in exchange for an agreement from North Korea not to MIRV its missiles. The ROK would be able to monitor whether the DPRK was testing MIRVed warheads.

In parallel, the DPRK, ROK, and US, should open talks on doctrine, deterrence and crisis stability, involving China, Japan and/or Russia as warranted. Talks to determine the kinds of capabilities both sides would like to limit in the future might address drones, hypersonics and cruise missiles, all designed to circumvent missile and air defenses. Looking ahead, North Korea may be especially concerned about the threat posed by future U.S. air-launched nuclear-tipped cruise missiles (LRSO), planned to enter the inventory in 2030.

Tension reduction measures may be useful (per Scenario II) to get North Korea to the table, but should be focused on those that improve crisis stability (vice, for example, measures to improve nuclear safety). As a first step, North Korea could be urged to issue prelaunch NOTAMs (notice to air missions) that would provide rough information to airmen and mariners in the vicinity of missile tests. (The DPRK is a member of both ICAO and IMO but has barely engaged in issuing NOTAMs of any sort over the years.) As in the nuclear area, where some safety topics can be addressed without unduly revealing information, providing advance notification of events would enhance safety for civilians who may be affected by North Korean missile tests. This could be conducted bilaterally between ROK and DPRK or within a multilateral context. Finally, re-establishing adherence to some elements of the CMA would be the major task for the ROK and could require financial inducements for North Korea. The scenarios are summarized in the table below.

Four Scenarios with Combinations of Measures

SCENARIO	OBJECTIVE	TENSION-REDUCTION	RISK REDUCTION	CBM	ARMS CONTROL
I	Prevent nuclear war	Declarations re: accidental war prevention of nuclear war (a la US-Soviets)	Establish Risk-Reduction Centers	Engage DPRK on regional Helsinki-like dialogue with political/military tracks	
II	Improve crisis stability for conventional/nuclear forces	Monitoring for climate change, environmental remediation in W/E Seas; Joint fishing area	Invite DPRK to join CUES; Nuclear doctrinal talks (risks of non-strategic nuclear weapons; Nuclear safety talk	No-attack pledges on peaceful nuclear facilities in wartime (ROK, DPRK)	Renew adherence to Comprehensive Military Agreement
III	Greater Arms Control Treaty Adherence		Nuclear test site safety talks; environmental remediation	Talks on humanitarian impact of nuclear weapons, especially testing; No first-use-pledge on BW/CW (DPRK, ROK) Regional dialogue on plutonium	Outreach from CTBTO on joining CTBT; US-China-DPRK talks on CTBT; Outreach re: CWC
IV	Limit/eliminate most destabilizing North Korean capabilities	Tension reduction measures for maritime environment (including NOTAM)	Crisis stability talks		Missile code of conduct or limitations agreement; Renew adherence to Comprehensive Military Agreement

RECOMMENDATIONS

North Korean nuclear and missile capabilities have been growing unchecked by negotiated constraints for several years. Sanctions and export controls continue to slow those programs, but Kim Jong Un continues to institutionalize nuclear weapons development, planning, and doctrine, expanding the scenarios for possible nuclear weapons use. The greater attention to nuclear weapons as a coercive tool in Russia's war against Ukraine in 2022 likely has contributed to increasing emphasis by the Pyongyang regime on the utility of nuclear weapons.

North Korea first needs to be dissuaded from further entrenchment in its nuclear weapons as a coercive, usable military instrument. This will require candid dialogue perhaps with more than one nuclear-armed state. Second, it needs to take steps along the path toward disarmament. This will be much slower than immediate denuclearization. Although immediate denuclearization is desired by South Korea and the United States to enhance their security, North Korea likely views this as inherently destabilizing. How security can be assured for both North and South Korea without nuclear weapons needs to be discussed.

Given all this, continuing to insist on North Korean denuclearization as a prerequisite for other integrative steps is not a path for progress. Nor should it be treated as the final outcome in resolving a proliferation dilemma. Instead, promoting a menu of practical mechanisms that contribute, ultimately, toward North Korean denuclearization within a broader security architecture, may open up avenues for discussion among key countries in the region that reduce some nuclear risks.

An initiative that encompasses tension and risk reduction, confidence-building, and modest arms control could set a foundation for progress toward denuclearization. Some may view any policy that stops short of denuclearization as adding further legitimacy to North Korea's nuclear arsenal, but in the absence of any negotiated restraints, the only brakes on the North's program are sanctions and export controls. These slow but do not completely stop its program. Furthermore, the nonproliferation regime that has slowed down the advance of North Korea's nuclear program is unlikely to function better in the future than it has in the past, given worsening prospects for cooper-

ation from Russia and China. The task going forward will be to prevent a collapse of the sanctions regime, while calibrating any adjustments to a functioning arms control process.

In terms of North Korea's nuclear capabilities, the most important capabilities to capture are nuclear testing, missile testing, and fissile material production. Nuclear testing and missile testing will contribute to both North Korea's ability to threaten the U.S. homeland with a nuclear-tipped ICBM and to make smaller warheads usable for battlefield use. It may be harder for an arms control framework to capture missile testing and fissile material production, which historically have not been objectives of arms control. Restraining conventional capabilities and postures that increase risks will be key.

CRAFTING A NARRATIVE

Characterizing a different approach towards North Korea should avoid acceptance of North Korea's nuclear weapons, damage to the nonproliferation regime or delegitimizing the current sanctions regime. Therefore, initiatives might use general labels like risk reduction or crisis stability rather than arms control. "Risk reduction" may be easier to accept as a label than arms control, which at least in the U.S. context can evoke negative reactions because of the constraints it places on decision-making and flexibility. A focus on arms control could also connote symmetrical reductions in forces which are not feasible or desirable in this case. However, South Korea and its allies will have to make this attractive to North Korea in some way.

A narrative designed to emphasize top priorities and minimize damaging effects could emphasize the following:

- Avoiding nuclear war is paramount. Dialogue is essential to reduce the risks of intended and unintended use, but particularly escalation from conventional conflicts.
- High priorities are crisis stability and management.
- Arms control is not a substitute for denuclearization but essential to it.
- The purpose of sanctions is not denuclearization but reduction of nuclear and missile risks. Negotiated solutions could ultimately render sanctions unnecessary.

North Korea obviously will attempt to seize the narrative to suggest that arms control talks are a pivot away from denuclearization, making it important to secure commitments to a Korean peninsula free of nuclear weapons and threats in the future. (See Section III of the full report for more specific suggestions).

An important element to control in any dialogue with North Korea is the linkage between sanctions and progress in risk reduction. South Korean statements to the effect that sanctions are purely aimed at denuclearization and nothing more undercut the continued imposition of sanctions within an arms control framework. It would be important to stress that arms control is a process leading towards denuclearization rather than a substitute for it. The implication is that other participants in arms control are also moving toward denuclearization, which is hard for defense establishments to remember and support, despite their obligation under Article VI of the NPT. Although North Korea clearly would prefer lifting all sanctions immediately while slow-rolling denuclearization, some balance between the two will need to be reached. In addition, although North Korea may chafe at use of the term denuclearization, it will be important to preserve this in some fashion.

LOOKING FORWARD

The outcome of the war in Ukraine could have a bearing on issues of nuclear risk reduction in Northeast Asia in a few ways. First, the strong alliance between Russia and China may founder or grow stronger, depending on the outcome. Second, arms control between the US and Russia could collapse. Third, lessons about the utility of nuclear weapons may be drawn from the conflict, potentially to the detriment of crisis stability on the Korean Peninsula.

A poor result for Russia in its war against Ukraine (or Russian nuclear weapons use) could further isolate Russia. Should China withdraw support for Russia, Russia might see value in propping up North Korea and aiding its nuclear

program to complicate the security calculations of both the US and China, paving the way for a doubling/tripling of the North Korean arsenal in the medium term (beyond 10 years).

Although Putin and Biden managed to extend New START for another five years in the beginning of 2021, it is completely possible for US-Russian strategic arms control to collapse completely. While Russia is unlikely to seize the opportunity to build up its nuclear forces as it conducts a war on its border, the collapse of strategic nuclear arms control would free the United States from all restraints. Although it is highly unlikely the United States would build up its nuclear weapons, the ability to do so could potentially give the United States potentially greater leverage in dealing with China, if not North Korea. Whether this would exacerbate or calm current tensions is debatable. On the one hand, the United States already has a significant margin of nuclear capability beyond China's so it is unclear whether growth would further threaten China. On the other hand, China may find U.S. threats to escalate Taiwan to a strategic nuclear conflict incredible, and seek to test the proposition.

Lastly, lessons about the utility of nuclear weapons and a doctrine of escalating to deescalate depend somewhat on whether Russia issues additional nuclear threats or uses nuclear weapons in the context of the Ukraine war. Additional, credible nuclear threats by Russia that cause the United States and/or NATO allies to withhold or withdraw assistance resulting in Ukraine's defeat would be a victory for nuclear coercion as a strategy. North Korea could be emboldened in that case. Russia's use of a nuclear weapon causing Ukraine's capitulation would break the nuclear use taboo and likely spur proliferation by other states, including perhaps South Korea. Russia's use of a nuclear weapon that prompts greater conventional assistance by other states would break the nuclear use taboo but possibly disprove that nuclear escalation is inevitable – a negative consequence perhaps, unless Ukraine prevails. A nuclear response to Russian nuclear use would be devastating but potentially have a sobering effect on other nuclear crisis points around the globe, including the Korean Peninsula. Finally, a resolution of the war that does not result in nuclear use or nuclear proliferation could suggest the fundamental disutility of nuclear weapons for coercion or strategic advantage.

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1. INTRODUCTION

North Korea's nuclear weapons pose a growing challenge to security on the Korean peninsula, in the region, and, potentially, worldwide. The prospects for denuclearizing the Korean peninsula have dimmed significantly with each operational improvement in North Korea's nuclear arsenal. What began as a non-proliferation task close to thirty years ago — to cap and rollback the DPRK's nuclear capabilities — can no longer plausibly be treated as such.

This report explores ways to reduce the risks from North Korean nuclear weapons within an arms control framework that does not abandon the ultimate goal of denuclearization. It makes the case for why nonproliferation tools and policies are no longer adequate to contain the risks, but must be complemented, if not supplanted, by measures that historically have belonged to the genre of arms control. The report develops and proposes strategies for progressive North Korean denuclearization as embedded in a broader arms control context. Rather than a roadmap, it provides a menu of options that may become more or less attractive as the political, economic, and security environments change. The challenge for policymakers is not the development of options but rather putting them together in a way that reduces real and perceived risks for a majority of parties.

North Korea itself will continue to pose a risk of proliferating sensitive technologies useful for nuclear weapons programs (production reactors, missiles, etc.), despite declarations to the contrary. Measures to reduce that risk will still require non- or counter-proliferation approaches such as preventing technology transfers via cooperation, interdiction, or deterrence by denial or punishment. But a new focus on developing negotiated solutions designed to improve both crisis and arms race stability is needed.

HISTORICAL CONTEXT

Thirty years ago, North and South Korea defined denuclearization in the 1992 Joint Declaration on the Denuclearization of the Korean Peninsula. Both sides agreed to not test, manufacture, produce, receive, possess, store, deploy or use nuclear weapons. They also both agreed to use nuclear energy only for peaceful purposes and not to possess uranium enrichment or reprocessing facilities. Both agreed to set up a South-North Joint Nuclear Control Commission (JNCC), which would establish procedures and methods for inspection to verify denuclearization.

The 1992 Joint Declaration was quickly overtaken by events, however. Ten days after signing the joint declaration, North Korea concluded a safeguards agreement with the International Atomic Energy Agency (IAEA), a step that

had been delayed since it signed the Nuclear Nonproliferation Treaty (NPT) in 1985. By March 1992, the two sides established the JNCC, but could not agree on a bilateral inspection effort. Cooperation deteriorated after several developments: North Korea refused access to IAEA inspectors (who then requested a special inspection in February 1993); the US reinstated the Team Spirit exercise scheduled for late summer in 1992; and North Korea threatened to withdraw from the IAEA and the NPT in March 1993. The South-North bilateral denuclearization agreement was replaced, ultimately, by the 1994 Agreed Framework, which froze North Korea's nuclear program until North Korea pulled out of that agreement in 2002.

To many observers, the 1992 Joint Denuclearization agreement was the first of many failures on the path of denuclearization thus far. But it is important in several respects. The obligations recognized a wider range of prohibitions on activities related to nuclear weapons than did the NPT, much more akin to Article I of the 2018 Treaty on the Prohibition of Nuclear Weapons (TPNW). In short, the 1992 Joint Declaration went well beyond the obligations of North and South Korea as non-nuclear weapon state parties to the NPT by including language on not testing, storing, or deploying nuclear weapons. Second, the obligations recognized the importance of limits on civilian nuclear activities like uranium enrichment and spent fuel reprocessing. That obligation also goes well beyond those of state parties to the NPT. Its inclusion recognizes the sensitivity of such fissile material production facilities, and that absence of such capabilities can be important to building confidence in intentions. The Joint Declaration also recognized the need for bilateral verification, as opposed to simply the application of international safeguards pursuant to the NPT.

The Joint Declaration focused on prohibiting activities that could contribute to acquiring nuclear weapons precisely because North Korea's nuclear program had not yet produced nuclear weapons in 1991. It failed to include provisions for negative security assurances. This important omission, which would have benefited North Korea, would have been necessary had negotiators defined denuclearization as the outcome, rather than a process. Other scholars have analyzed the differences between the 1992 declaration and nuclear weapons-free zones, highlighting the April 1999 UN Disarmament Commission's recommendation that nuclear-weapons-free zones include the following:

- Total absence of nuclear weapons: any states should not develop, test, manufacture, produce, acquire, possess, store, transport and deploy nuclear weapons within a Nuclear-Weapon-Free Zone;
- Effective verification of compliance;
- Clearly defined boundaries; and
- Negative Security Assurance: legally binding commitments to the zone by the nuclear weapon states not to use or threaten to use nuclear weapons against the zone parties. (Lee, 2010).

With each improvement to North Korea's nuclear weapons program, denuclearization as a process or outcome recedes further into the background. In the last ten years, North Korea has taken steps to institutionalize its nuclear weapons program, including establishing doctrine, use policy, and research and development institutions. On the South Korean side, prominent South Korean commentators more recently have suggested in fact that a renuclearization would help to deter North Korea from its stated plans to use nuclear weapons early in a conflict. While some use the term "renuclearization" to refer to plans to reinstall U.S. non-strategic nuclear weapons in South Korea, there are also two other options that are popularly discussed: nuclear-sharing between the United States and South Korea, akin to what is done within the NATO alliance, and South Korea's pursuit of its own indigenous nuclear weapons capability. All three options are controversial.

Skepticism that North Korea will bargain away its nuclear deterrent has rightly grown, buoyed by the adoption of laws and recent statements by Kim Jong Un. If North Korea views denuclearization as revisionist or akin to regime change, then the risks of conflict increase. Leaving aside how practical denuclearization or disarmament as an outcome might be, it is still possible to focus on the process of denuclearization. Thus, the goal of denuclearization may remain inviolate (just as disarmament continues to be a global objective, enshrined in Article VI of the Nuclear

Nonproliferation Treaty (NPT)), while the process and methods may shift over time. This report assumes that it is no longer appropriate to consider denuclearization as a nonproliferation objective but rather as a disarmament task. This has significant implications for how policies are formulated and implemented, including key participants. It also means that some of the approaches and methods developed for arms control purposes may be valuable.

NONPROLIFERATION POLICY TOOLS FOR REDUCING RISKS FROM NORTH KOREA

Many analyses have bemoaned the weakness of the nonproliferation regime in dealing with proliferators. To begin with, the Nuclear Nonproliferation Treaty (NPT) is silent on violations and how to handle them. Violations are not tied to the treaty itself, but to safeguards agreements, which contain vague language drawn from the IAEA Statute about settling disputes. The Statute describes a referral procedure, followed in the main but not always. Reported-ly, in the case of Syria's noncompliance, the Board of Governors could not even agree on a definition of safeguards noncompliance (Hibbs 2011). This is because no objective definition exists. None of this is helped by the fact that even if the Board of Governors of the IAEA reports that a state is in noncompliance to the UN Security Council, the UNSC is equally free to ignore the issue or to condemn the state and punish it to the fullest extent.

Past proliferation crises — Iraq, North Korea, Iran, Syria, and Libya — evoked a variety of responses because they evolved differently and carried different security implications. After defeat in the Iraq-Kuwait war in 1991, there were extensive investigations, interviews and destruction of equipment and facilities in Iraq that lasted more than a decade. Iran's proliferation crisis has lasted even longer than Iraq's, with some compromises on sovereignty but much more leverage and negotiation not just with the IAEA but also the P5+1 (US, UK, Russia, China, France and Germany) and the European Union.

In the case of North Korea, the first allegations of a clandestine program arose as IAEA inspectors prepared in 1992 to confirm initial baseline declarations submitted after it joined the treaty in 1985. The solution that resolved the first proliferation crisis almost thirty years ago — the Agreed Framework — sought to bring North Korea into compliance with the NPT, but also used incentives outside of the NPT to persuade North Korea to cooperate, including the creation of the Korean Economic Development Organization (KEDO) to construct two light water reactors for electricity. A second proliferation crisis arose when North Korea abandoned the Agreed Framework in 2002 and withdrew from the NPT in 2003. Subsequent rounds of negotiations under the Six Party Talks ultimately failed. North Korea first tested a nuclear device in 2006 and then five more times, lastly in 2017.

Over time, the challenge of bringing North Korea into compliance with the NPT as a non-nuclear weapon state has grown as its nuclear weapons program has grown. It is now not just a question of fissile material or fissile material production facilities — a reactor (or two), reprocessing plant and uranium enrichment facilities — but also a nuclear test site, missile testing, and actual warheads, missiles and other delivery platforms. Given a political will to disarm, none of these verification challenges is insurmountable. The problem, however, is likely to be that North Korea, even if it decides at some point to give up nuclear weapons, has strong motivation to resist being treated as a proliferator. In fact, of all the noncompliant NPT states, North Korea has been the most successful: it is not, at the moment, subject to any international restrictions on its program, although it is heavily sanctioned. For two decades, North Korea has kept international inspectors more or less at arm's length. Despite myriad UN Security Council resolutions, and at least two agreements to freeze elements of its program, North Korea has managed to produce enough fissile material for some 20-60 weapons, test nuclear devices six times, test short-, medium- and long-range ballistic missiles as well as cruise and hypersonic missiles, and test sea-launched varieties of missiles.

Continuing to view North Korea's nuclear program through the lens of nonproliferation has policy implications that may limit freedom of action. As long as North Korea's nuclear weapons program is regarded as violating its nonproliferation commitments (even though it withdrew from the NPT in 2003), the international community must punish North Korea for its actions. Anything less would undermine the rule of law and eventually erode the global nonproliferation regime (Lewis 2022). One byproduct of this is perspective is regarding North Korea's nuclear weapons as "illegal," a term that is not conducive to negotiated solutions. Second, it is difficult within a nonproliferation context to acknowledge security motivations for the development of nuclear weapons. Under the

NPT, nuclear weapon states argue that non-nuclear-weapon states achieve greater security benefits by foregoing nuclear weapons, despite their own continued reliance on nuclear weapons for security. Although many understand that a solution to peace on the Korean peninsula will require security guarantees and assurances, these must be separated from denuclearization within a nonproliferation context. These have all contributed to the focus on denuclearization first before other steps, a process that North Korea has rejected. To be fair, North Korea's terrible record at compliance, as well as aggressive and provocative behavior, have been motivation enough to get denuclearization gains up front.

AN ALTERNATE APPROACH

An arms control framework could facilitate, perhaps, a wider range of measures aimed at reducing risks from North Korea's nuclear weapons, while keeping the ultimate goal of denuclearization. It would need to avoid legitimizing North Korea's nuclear weapons, particularly the perception that anything that not covered by arms control agreements would be fair game for competition – that “anything not forbidden is permitted” (Krass 1985). It would absolutely have to avoid aiding North Korea's WMD programs in any way and it must not spur proliferation by North Korea's neighbors, based on the perception of acceptance of the North's arsenal. Denuclearization of the Peninsula cannot be discarded and should be reaffirmed by all parties as the ultimate objective. Avoiding some of the language reserved for peer competitors, including “strategic stability,” by describing the process as risk reduction more broadly could be helpful.

On a practical level, arms control is one of several levers to reduce nuclear risks. The unclassified U.S. Nuclear Posture Review, released October 27, 2022, stated:

Deterrence alone will not reduce nuclear dangers. The United States will pursue a comprehensive and balanced approach that places a renewed emphasis on arms control, non-proliferation, and risk reduction to strengthen stability, head off costly arms races, and signal our desire to reduce the salience of nuclear weapons globally. Mutual, verifiable nuclear arms control offers the most effective, durable and responsible path to achieving a key goal: reducing the role of nuclear weapons in U.S. strategy. Despite the challenges in the current security environment, the United States will continue to pursue engagement with other nuclear-armed states where possible to reduce nuclear risks. We will do so with realistic expectations, understanding that progress requires reliable partners prepared to engage responsibly and on the basis of reciprocity, and with whom we can establish a degree of trust.

The classic Schelling-Halperin definition of arms control is “all forms of military cooperation between potential enemies in the interest of reducing the likelihood of war, its scope and violence if it occurs, and the political and economic costs of being prepared for it” (Schelling and Halperin, 2). Essential prerequisites include a recognized common interest and the possibility of reciprocation and cooperation. In the Schelling-Halperin context, military forces would deter aggression “while avoiding the kind of threat that may provoke desperate, preventive, or irrational military action on the part of other countries.”

With respect to North Korea, this is no small task. There must be collaboration to avoid the kinds of crises in which withdrawal is intolerable and provide reassurance that restraint will be matched.

Avoiding war requires dampening unintended and intended escalation. Unintended escalation occurs through miscalculation and accidents. When both sides in a military crisis are secure, they can wait out provocations or even surprise attacks with the confidence that they can respond with a punishing counterattack (Choi 2016). This is not just a question of military capability but relies on perceptions of risk and intention. Measures to improve crisis sta-

bility typically address avoiding misunderstandings through provision of information, through forming habits of communication to build trust, and by lengthening the time required to respond. In short, these measures release or lessen the pressure to act. Without such measures, a country can choose not to respond or choose not to respond in kind, but stability is then wholly reliant on personalities in power. Bilateral or multilateral mechanisms can create a structure to channel and contain actions and reactions. One example is establishing a hotline for crisis communication; another is establishing “rules of the road” for behavior, review, and referral. Multilateral mechanisms through agreements that provide for referral, including automatic referral, to international adjudication can also be created. The Iran nuclear agreement (JCPOA) in 2015 created an elaborate set of procedures designed to avoid precipitous action by any of the parties in the case of disputes. Such procedures may deescalate a crisis situation or simply delay it, but buying time for solutions other than military ones can be valuable. Table I.1 shows examples of bilateral and multilateral mechanisms devoted to crisis communication, management and stability in the last sixty years.

TABLE 1.1
Historical Measures for Crisis Communication, Management and Stability

MEASURE	PARTIES	CRISIS COMMUNICATION	CRISIS MANAGEMENT	CRISIS STABILITY
1963 Hotline Agreement	US-Soviet	•		
1971 Agreement to Reduce Risks of Nuclear War	US-Soviet	•		•
1972 Incidents at Sea Agreement	US-Soviet		•	•
1973 US-Soviet Agreement on the Prevention of Nuclear War	US-Soviet	•	•	•
1975 Helsinki Final Act	Multilateral		•	•
1986 Stockholm Agreement	Multilateral		•	•
1987 Nuclear Risk Reduction Centers (NRRC)	US-Soviet	•		
1988 US-Soviet Ballistic Missile Launch Notification Agreement	US-Soviet		•	•
1989 Agreement on Prevention of Dangerous Military Incidents	US-Soviet		•	•
1989 Agreement on Notification of Major Strategic Exercises	US-Soviet		•	•
1990 Vienna Document	Multilateral		•	•
1990 CFE Treaty	Multilateral			•
1994 US-Russia Presidential Declaration on Mutual De-Targeting	US-Russia			•
1998 US-PRC Agreement Establishing a Direct Telephone Link	US-China	•		
2002 Hague Code of Conduct	Multilateral		•	•
2014 U.S.-PRC Memorandum of Understanding on Rules of Behavior for the Safety of Air and Maritime Encounters	US-PRC			•

Sources: Adapted from Michael Krepon, Dominique M. McCoy and Matthew C.J. Rudolph, eds, *A Handbook of Confidence-Building Measures for Regional Security* (Washington, DC: The Henry L. Stimson Center, September 1993) and NPT_Conf_2020_e_wp.55.pdf

When one side seeks to seize an opportunity for advantage, the escalation is intended. In theory, strategic stability dampens the incentives for intended escalation. In this sense, arms race stability is crucial for strategic stability – when no country has an incentive to use nuclear weapons first. Efforts to enhance predictability, balance force postures, and reduce risks of technological surprise are hallmarks of effective arms control and important to both arms race stability and strategic stability. They have collateral benefits of minimizing the costs and risks of preparing for war and curtailing the scope or violence of the war. The devastation of the bombings of Hiroshima and Nagasaki in 1945 spurred the development of these kinds of proposals long before they were operationalized between the United States and Soviet Union.

This report addresses measures that range from tension and risk reduction, to confidence-building and formal arms control. North and South Korea, as well as the United States are at the core of this analysis, but participation by Japan, China and Russia in some areas will be critical to overall success. The analysis identifies measures that are therefore not only designed to reduce risks from and the capabilities of the DPRK nuclear program, but also those that could contribute to reducing overall risks of war and nuclear war on the Korean peninsula and in Northeast Asia.

Risks to the nonproliferation regime

In addition to the strong allergy to providing any legitimacy whatsoever to North Korea's nuclear weapons, some critics contend that treating North Korea's nuclear weapons as an arms control problem would negatively affect the nonproliferation regime. Because North Korea is the only state to withdraw from the NPT and then develop weapons, it must be treated in the harshest terms possible. In this view, lifting punitive nonproliferation measures (such as sanctions) as a potential tradeoff to get arms reductions rather than complete denuclearization would be seen as a reward for bad behavior. Less extreme views contend that accepting North Korean nuclear weapons for any length of time (despite the fact that the first nuclear weapons test occurred in 2006) could raise doubts in Japan and South Korea, two stalwart members of the nonproliferation regime, about their future security. A defection by Japan and South Korea from the NPT could be a death blow to the nonproliferation regime.

At the time of the Agreed Framework, some critics contended that providing North Korea with two light water reactors was tantamount to rewarding North Korea for bad behavior. Similar criticisms have been leveled at the Joint Comprehensive Plan of Action with Iran for measures that left Iran with some uranium enrichment capabilities. Obviously, there are no perfect solutions because even nonproliferation measures require a state's cooperation. Therefore, there will be tradeoffs. It may be possible, however, to minimize negative impacts on the nuclear nonproliferation regime. Crafting a narrative that sends the right messages to influence perceptions will be important. Such a narrative could emphasize the following:

- Avoiding nuclear war is paramount. Dialogue is essential to reduce the risks of intended and unintended use, but particularly escalation from conventional conflicts.
- An arms control framework should foremost address crisis stability and management.
- Arms control is not a substitute for denuclearization but essential to it.
- The purpose of sanctions is not denuclearization but reduction of nuclear and missile risks. Negotiated solutions could ultimately render sanctions unnecessary.

North Korea obviously will attempt to seize the narrative to suggest that arms control talks are a pivot away from denuclearization, making it important to secure commitments to a Korean peninsula free of nuclear weapons and threats in the future. (See Section III for more specific suggestions).

CHARTING A PATH TOWARD DENUCLEARIZATION ON THE PENINSULA

From a technical perspective, detailing the steps toward denuclearization on the Peninsula is not a complicated charge. One of the best analyses is the 2018 Stanford University report by Siegfried Hecker, Bob Carlin and Elliott Serbin, which advocated a risk management approach to denuclearization (Hecker, Carlin, Serbin 2018). They targeted the most destabilizing North Korean capabilities for at least a freeze, if not elimination, and lesser

destabilizing activities for management. Such an approach acknowledged that a complete denuclearization – that is, elimination of all such nuclear weapons and supporting infrastructure – might not be possible, or if so, would require a phased approach.

The analysis organized activities according to how they affected the size, the sophistication, and the threat North Korea's arsenal posed to the United States and detailed efforts to roll-back activities in each of these areas. To reduce the risk of North Korea's arsenal growing (size), it would be necessary to capture reactors, enrichment, reprocessing, and the production of tritium, deuterium and lithium-deuteride (Li6D). In terms of limiting its sophistication, all of the skills and equipment necessary to weaponize were slated for elimination. In terms of the threat North Korea's nuclear weapons pose to the United States, advances in delivery systems, particularly missiles, were most destabilizing.

The Hecker-Carlin-Serbin template is an excellent checklist for negotiators seeking to reduce risks from North Korea's arsenal, and a blueprint for denuclearization negotiations should they ever be possible. Fitting these ideas into an arms control framework however, requires considering tradeoffs – because it will be a negotiation, not an imposition of denuclearization – and how such measures might contribute to arms control goals. In contrast to earlier negotiations which offered concessions or incentives for North Korea unrelated to weapons systems, arms control negotiations would likely require some degree of reciprocity.

Making the case for nuclear arms control negotiations with North Korea, Toby Dalton and Youngjun Kim in 2021 suggested arms control could perform three functions: to limit or reduce risks of escalation; to build habits of cooperation; and to transform the security landscape so that the role of nuclear weapons does not grow (Dalton and Kim 2021). They conjectured that an arms control framework would change the prioritization, sequencing and types of restraints to seek from North Korea. They grouped potential measures in four stages:

- preliminary de-escalation
- freeze, cap (fissile material, missiles)
- irreversibility – activities harder to reverse, like transparency
- reduction/elimination

Apart from preliminary de-escalation, their proposed sequencing largely reflects previous efforts conducted with North Korea. They posited that engaging in confidence-building to reduce nuclear risks could help get discussions underway with North Korea. Freezing other activities and monitoring them would be the next step. The preliminary de-escalation phase could include declarations (for example, no intention to seek regime change by the US and refraining from issuing nuclear threats by North Korea) followed by practical steps such as no deployments of US nuclear assets and testing moratoria by North Korea. Dalton and Kim suggested that monitored restraints, shared communications and coordination infrastructure, unlike previous denuclearization efforts, could be important.

One aspect of arms control that Dalton and Kim did not consider is the need for reciprocal measures. Reciprocal measures are not the same as incentives but more along the lines of tradeoffs. In the nonproliferation context, and indeed in the history of negotiations with North Korea on its nuclear program, incentives have played a key role in bringing North Korea along. The list is long, from food and oil shipments to lifting the designation of North Korea as a terrorist state and some economic sanctions. Critics of the policy dislike providing incentives because it seems like a bribe or reward for an errant state to refrain from or fix violations that it had already promised not to commit and because North Korea is widely viewed as “selling the same horse” over and over. There was little question of reciprocity in the past because North Korea's violation of the NPT was one-sided and indisputable. A reciprocal measure would have imposed restrictions on other states that were unnecessary and illogical. Many of the measures would have been wholly inappropriate for any of the negotiating partners.

The two potential exceptions to this rule are steps that the US and South Korea separately took in 1991. The US withdrawal of the last of its tactical nuclear weapons from the Korean peninsula may have helped contribute to

creating an environment of reciprocity that was helpful to denuclearization efforts. The impetus for this action, however, was the dissolution of the Soviet Union. In many respects, South Korea was ancillary to this global initiative (Jang 2017). However, the United States and South Korea were able to declare that there were no nuclear weapons on the peninsula (Kristensen and Norris 2017), paving the way for the 1992 Joint Declaration on the Denuclearization of the Korean Peninsula. U.S. officials apparently told New York Times reporters that the decision to withdraw nuclear weapons had been made in part to persuade North Korea to permit international inspections of its nuclear facilities, and in part because the US military no longer thought the bombs were necessary (there were only B-61 bombs left) to defend South Korea. On December 18, 1991, President Roh Tae Woo declared “there do not exist any nuclear weapons anywhere in the Republic of Korea.” On January 20, 1992, Prime Minister Chung Won-Shik and Yon Hyong-muk (Premier of the Administration Council of the DPRK) signed the Joint Denuclearization Agreement. As scholars have noted, North Korea was fully aware at the time that removing tactical nuclear weapons did nothing to alleviate the threat from US strategic weapons, but it is possible that the action motivated them to negotiate.

THE COMPLICATIONS OF THE CURRENT SECURITY ENVIRONMENT

A complicating factor in achieving North Korea’s denuclearization is increased tension more broadly in Northeast Asia. Cooperation between the United States and China is crucial, but insufficient. North Korea may seek to leverage US-China tensions even as it seeks to find a comfortable security arrangement for itself where it is not unduly influenced by either.

The many irritants in the US-China security relationship at present complicate collaboration even in areas where both have convergent security interests, such as denuclearizing North Korea. Tension over Taiwan has risen, particularly since the February 2022 invasion of Ukraine by Russia. It is hard to know which lessons China may ultimately learn from the conflict and how it might apply those lessons in its relationship to Taiwan. At a minimum, China’s early support for Russia has stoked the broader narrative widely embraced in the United States of a great power competition that pits the United States simultaneously against both China and Russia.

The demise of the Intermediate Nuclear Forces (INF) Treaty has undoubtedly increased risk perceptions for both China and North Korea. Although long-standing Russian violations of the INF treaty were the official reason for the U.S. suspension of its obligations under the treaty in 2019, U.S. conservative commentators had long bemoaned the fact that the United States could not “compete” with China in deploying intermediate-range ballistic missiles because of its INF obligations. Although the Trump administration had planned to resuscitate nuclear-armed sea-launched cruise missiles (SLCMs), the Biden administration cancelled the program in 2022. However, the opportunity still exists for a future U.S. administration to revisit the decision or consider ground-based options, both of which would be expensive and in the case of ground-launched cruise missiles, politically sensitive or even destabilizing. The U.S. Army’s development of long-range conventionally armed hypersonic weapons (LRHW) for the IndoPacific theater may also introduce an element of instability for both China (against which they are aimed) and North Korea. Although the Army has suggested they would not be based in foreign countries but rather deployed when needed, this approach could also affect crisis stability (Feickert 2022).

Other considerations that bear watching include how the U.S.’s IndoPacific strategy evolves and the ongoing debate within the US government over the role of nuclear weapons. The IndoPacific strategy, unveiled in February 2022, cites China’s behavior to establish a sphere of influence in the region as harmful and states that China “seeks to become the world’s most influential power” (White House Feb 2022). At the same time, the strategy states that “Our objective is not to change the PRC but to shape the strategic environment in which it operates, building a balance of influence in the world that is maximally favorable to the United States, our allies and partners, and the interests and values we share. We will also seek to manage competition with the PRC responsibly. We will cooperate with our allies and partners while seeking to work with the PRC in areas like climate change and nonproliferation” (White House Feb 2022).

On North Korea, the Indo-Pacific strategy contained nothing new:

As the DPRK continues to develop destabilizing nuclear and missile programs, we will continue to seek serious and sustained dialogue, with the goal of complete denuclearization of the Korean Peninsula and addressing its ongoing human-rights violations and improving the lives and livelihoods of the North Korean people. At the same time, we are strengthening extended deterrence and coordination with the ROK and Japan to respond to DPRK provocations, remaining prepared to deter—and, if necessary, defeat—any aggression to the United States and our allies, while bolstering counter-proliferation efforts throughout the region. While reinforcing extended deterrence against nuclear- and ballistic-missile systems and other emerging threats to strategic stability, the United States will seek to work with a wide set of actors, including our rivals, to prevent and manage crises.

A far more contentious policy initiative revealed in September 2021 was the plan to provide Australia with eight nuclear-powered submarines. This was one element of a broader cooperation package that included undersea technologies, quantum technologies, artificial intelligence, advanced cyber capabilities, hypersonic and counter-hypersonic capabilities, electronic warfare, and information sharing (White House April 2022). The nuclear portion of the deal was controversial first of all because it upset an earlier agreement between Australia and France for the provision of conventionally powered submarines. Second, it was controversial because the US has never shared naval nuclear capabilities with any country other than the United Kingdom. Third, it has elevated Australia as a partner as few other initiatives could. This has clearly drawn the ire of the Chinese, demonstrated in the August 2022 Nuclear Nonproliferation Treaty (NPT) Review Conference, where China has repeatedly criticized the United States for violating the spirit and letter of the NPT in the provision of these nuclear submarines to a non-nuclear-weapon state.

In October 2022, the White House released its National Security Strategy, which declared that “We will seek sustained diplomacy with North Korea to make tangible progress toward the complete denuclearization of the Korean Peninsula, while strengthening extended deterrence in the face of North Korean weapons of mass destruction and missile threats” (White House October 2022). On arms control and nonproliferation, the strategy declared:

The United States will work with allies and partners, civil society, and international organizations to strengthen arms control and nonproliferation mechanisms, especially during times of conflict when escalation risks are greater. We will address the existential threat posed by the proliferation of nuclear weapons through renewed arms control and nonproliferation leadership. We will continue to seek pragmatic engagement with competitors about strategic stability and risk reduction. Our approach will emphasize measures that head off costly arms races, reduce the likelihood of miscalculation, and complement U.S. and allied deterrence strategies.

Prior to the late-October release of the unclassified version of the 2022 Nuclear Posture Review, hints that the United States might not respond to Russian nuclear use with nuclear weapons sparked concerns about U.S. extended deterrence in South Korea. In mid-October, U.S. State Department officials stressed that U.S. support to South Korea in the wake of a barrage of missiles and artillery would span the full range of options to help deter further North Korean aggression, including nuclear, conventional and missile defense capabilities.

On October 27, 2022, the U.S. Department of Defense released its National Defense Strategy, which appended both the Nuclear Posture Review (NPR) and the Missile Defense Review. In the Nuclear Posture Review, language on North Korea was lifted directly from the 2018 NPR:

Any nuclear attack by North Korea against the United States or its Allies and partners is unacceptable and will result in the end of that regime. There is no scenario in which the Kim regime could employ nuclear weapons and survive.

The 2022 NPR added that “Short of nuclear use, North Korea can also conduct rapid strategic attacks in East Asia. U.S. nuclear weapons continue to play a role in deterring such attacks” (U.S. DoD 2022). It reiterated the 2018 declaration that the United States would “hold the regime responsible for any transfers it makes of nuclear weapons technology, material, or expertise to any state or non-state actor.”

On the other hand, the NPR, in its Arms Control, Nuclear Non-Proliferation and Counterterrorism section, stated that U.S. policy toward North Korea “calls for a calibrated diplomatic approach to secure practical progress that increases the security of the United States, our Allies and partners, and deployed forces. At the same time, we will continue to press North Korea to comply with its obligations under various United Nations Security Council resolutions and return to negotiations to verifiably eliminate its nuclear program. With respect to reducing or eliminating the threat from North Korea, our goal remains the complete and verifiable denuclearization of the Korean Peninsula.”

The United States acknowledges the need to deter North Korean WMD, but it does not view North Korea as a competitor. That language is typically reserved for Russia and, now, China. The United States may view a costly arms race as potentially inevitable with China and a possibility with Russia, but almost certainly dismisses the possibility of North Korea competing on that scale, not least of all because of its size and relative poverty. However, reducing the likelihood of miscalculation by both North and South Korea is essential to avoiding a war on the peninsula that the United States clearly seeks to avoid not just because of the potential for escalation on the peninsula but also regionally. There is therefore room for measures, however they are categorized, that enhance predictability, balance force postures and complement deterrence.

STRUCTURE OF THIS REPORT

In the sections that follow, this report summarizes the current arms race as well as the status of risk reduction and confidence-building in Northeast Asia (Section II) and presents a menu of risk reduction and arms control options along with a rough assessment of how they meet criteria that could be important to implementation: ease of implementation, urgency of the threat, scope of the measure, value to crisis stability and/or arms race stability, and verifiability (Section III). The analysis compares ideal and pragmatic approaches (Section IV), suggesting ways in which existing treaties and agreements might be leveraged. The report suggests four scenarios for options with a range of objectives and discusses factors that might affect the feasibility of the approach. Section V concludes with recommendations.

2. ARMS RACING IN NORTHEAST ASIA

There is a significant, new regional arms race underway in Northeast Asia that spans the range of tactical and strategic, conventional and nuclear capabilities. Defense spending continues to climb in Asia, between 3 and 4% higher in 2022 than 2021, fueled by China's growing defense budget (SIPRI 2022 Yearbook). Five of the top-ten-ranked countries in terms of defense spending have forces in Asia – the United States, China, Russia, Japan and South Korea (IISS 2022). While it is beyond the scope of this report to do a comprehensive assessment of the military balance in Northeast Asia, some salient features of the defense landscape are useful as context for later discussion of solutions to nuclear risk reduction.

GLOBAL FORCES WITH REGIONAL EQUITIES

While U.S. and Russian strategic nuclear forces are still bound by the ceilings of New START until 2026, there are no longer any restrictions on conventional or nuclear-tipped intermediate-range forces since the demise of the Intermediate-Range Nuclear Forces (INF) Treaty in 2019. Russia has been deploying intermediate-range nuclear missiles, mostly in southwest Russia but some US experts have noted the imbalance in medium-range nuclear forces between China and the United States and advocated deploying new sea- and ground-based missiles. The 2018 Nuclear Posture Review called for new nuclear-armed sea-launched cruise missiles (SLCMs) and a new low-yield warhead for sea-launched ballistic missiles (SLBMs). The Biden administration revealed in its 2022 Nuclear Posture Review its decision to cancel the SLCM but keep the new low-yield warhead to deter limited use scenarios.

The nuclear modernization programs begun by the United States and Russia quite a while ago have taken different turns. Russia's development of new platforms and capabilities, unveiled by President Putin at a speech in March 2018, signaled the restart of its nuclear competition with the United States, abandoned for two decades after the fall of the Soviet Union. Not all of the programs are new nor are they all successful. Nonetheless, they could, in the future, pose challenges for the United States. Therefore, the United States is keen to continue arms control post-New START. The 2022 Nuclear Posture Review noted that "Expiration of the Treaty without a follow-on agreement would leave Russia free to expand strategic nuclear forces that are now constrained, as well as novel intercontinental-range and regional systems that are not currently limited by the Treaty" (U.S. DoD 2022).

An urgent concern is Russia's "irresponsible saber-rattling, out of cycle nuclear exercises, and false narratives concerning the potential use of weapons of mass destruction (WMD)" (U.S. DoD 2022). A halt to the use of nuclear

threats by Russia to gain advantage in the war in Ukraine is imperative. So far, Russian military activities in Ukraine have not provided a demonstration of their reported “escalate (to nuclear weapons use) to deescalate (a conventional conflict)” doctrine. But the annexation of four areas of Ukraine by Russia in late September 2022, coupled with renewed rhetoric about Russia’s willingness to use nuclear weapons against threats to its territorial integrity, suggest Russia may have removed a few rungs of the metaphorical escalation ladder.

Apparently, the Biden administration is concerned enough about Russian limited use scenarios (and possibly Chinese) to continue the procurement of low-yield warheads (W76-2) for submarine-launched ballistic missiles (SLBMs) precisely for the purpose of having a more “usable” nuclear weapon with which to respond to regional aggression. The 2022 Nuclear Posture Review concluded that it was “an important means to deter limited nuclear use (U.S. DoD 2022 20), yet left the door open for reevaluation pending fielding of the F-35A and the long-range standoff cruise missiles (LRSO). The 2022 NPR cited three reasons for cancelling the SLCM-N, however: redundancy with W76-2, cost, and uncertain value as a bargaining chip against Russian non-strategic nuclear weapons.

IN THE REGION

China and North Korea are currently unconstrained by any arms control limits. The most destabilizing developments include a potential doubling or tripling of China’s strategic nuclear missiles (whether real or perceived), the increasing sophistication of North Korea’s nuclear weapons and acquisition of asymmetric warfare capabilities, and increasingly sophisticated South Korean missile capabilities.

China

China has begun its fourth modernization phase since testing its first nuclear weapon in 1964. The construction of more than 100 new ICBM silos, revealed through satellite images, has led to concerns that China has abandoned its doctrine of minimal credible deterrence and, perhaps, its no-first-use policy. This is, in the words of one expert, China’s “most substantial nuclear weapons modernization effort since it first acquired nuclear weapons in the 1960s” [Kristensen 2020]. One thing is certain: China continues to be motivated by fears of vulnerability in the face of growing US missile defense capabilities. In addition to beefing up its strategic nuclear missiles, China, along with Russia, has tested anti-satellite weapons recently, increasing concerns about rapid escalation in any conventional conflict with the United States. All three countries are racing to field hypersonic missiles, with Russia and China focused on nuclear-tipped missiles. The Bulletin of the Atomic Scientists noted in its 2021 Doomsday Clock statement that “While experts disagree on the both the causes and the consequences of these programs, they clearly mark the start of a new arms competition.”

China has never revealed the size of its nuclear stockpile, but best estimates suggest it has about 350 nuclear weapons, with 280 operationally deployed in land-based missiles; 72 on SSBNs (12 SLBMs on 6 SSBNs) and 20 gravity bombs on long-range bombers (Kristensen & Korda 2021). U.S. Pentagon reports to Congress in 2020 and 2021 estimated that China would double its nuclear stockpile by 2025 (DoD CMP 2020) and potentially increase its stockpile fivefold by 2030 (DoD CMP 2021 page VIII). Such reports were rejected by China’s Director General of Arms Control in the Ministry of Foreign Affairs Fu Cong in January 2022 (Moritsugu 2022). In its 2021 annual report to Congress, the DoD estimated that the “accelerating pace of the PRC’s nuclear expansion may enable the PRC to have up to 700 deliverable nuclear warheads by 2027” and “likely intends to have at least 1000 warheads by 2030”. The Pentagon has cited three new missile fields in western Gansu and Xinjiang provinces. While China deployed a small and mostly land-based arsenal since 1964, China is also building more road-mobile ICBMs and strategic nuclear submarines, in parallel with air-based nuclear capabilities. The Pentagon noted in its 2021 report that “The PRC has possibly already established a nascent ‘nuclear triad’ with the development of a nuclear capable air-launched ballistic missile (ALBM) and improvement of its ground and sea-based nuclear capabilities” and that “New developments in 2020 further suggest that the PRC intends to increase the peacetime readiness of its nuclear forces by moving to a launch-on-warning (LOW) posture with an expanded silo-based force.” Some of these assessments are based on assumptions about China’s fissile material stockpiles, which China has always declared as non-existent, and optimistic assumptions about the production capabilities of fast breeder reactors that produce plutonium for separation.

North Korea

Estimates of Pyongyang’s nuclear arsenal range from 20 to 60 nuclear warheads, with a mid-range of 30-40 (Lee 2022). While there is relatively reliable data on plutonium production, there is greater uncertainty about highly enriched uranium (HEU) production, both in the projected capacity of the Yongbyon facility and the possibility of another, clandestine uranium enrichment plant. There is also uncertainty about warhead designs and whether HEU would be used only in primaries of thermonuclear weapons, in boosted fission devices, in composite cores or in devices solely using HEU (unlikely).

Pyongyang has conducted six nuclear tests since 2006 and declared it had successfully tested a thermonuclear weapon in 2017. Kim Jong Un announced a nuclear test moratorium in April 2018 and invited media to witness the partial destruction of its nuclear test site at Punggye-ri in May 2018. This followed an inter-Korean summit in late April 2018. By December 2019, Kim Jong Un ended his self-imposed moratorium on nuclear and long-range missile testing. Since then, the DPRK has tested scores of long-range missiles, but not yet another nuclear weapon.

Both US and South Korean intelligence agencies have suggested that North Korea will conduct another nuclear test this year. In April 2022, U.S. Ambassador Sung Kim first suggested that North Korea might conduct a nuclear test to celebrate the 110th anniversary of Kim Il Sung’s birthday. Satellite imagery has shown activity since March 2022 to excavate a new portal entrance close to the South Portal (demolished with explosives in 2018, along with the north and west portals; the tunnels accessed through the east portal were abandoned after 2006 because of contamination). South Korea issued warnings of another nuclear test before the Ulchi Freedom Shield exercise in late August and again in September around the time of joint naval exercises.

TABLE 2.1
North Korea’s nuclear tests at Punggye-Ri Nuclear Test Site

TEST DATE	ESTIMATED YIELD (KILOTONS)
October 9, 2006	0.7-2
May 25, 2009	2-5.4
February 12, 2013	6-16
January 6, 2016	7-16.5
September 9, 2016	15-251
September 3, 2017	70-280

Sources: Adapted from Lee Sang-Hyun 2022.

One issue closely related to North Korea’s nuclear tests is progress in developing smaller (tactical) nuclear weapons or so-called miniaturization – making the warhead small enough and robust enough for a ballistic missile nose-cone. Many of the assessments are speculative, although it is clear that North Korea would like to promote the perception that it can reach the United States mainland with nuclear weapons. Regardless, US defense assessments assume that North Korea has made sufficient enough progress in weaponization to threaten the US homeland. Under Kim Jong Un, North Korea’s arsenal has progressed from what may have been a useful bargaining tool into a full-fledged arsenal.

In addition to hardware developments, North Korea opted in 2022 to modernize its nuclear doctrine. In September 2022, the Supreme People’s Assembly passed a law that updated North Korea’s nuclear doctrine and clarified

command and control. Although it reiterated Kim Jong Un's sole authority to order a nuclear strike, the law stated "a nuclear strike shall be launched automatically and immediately" according to an "operation plan decided in advance" if the leader's command and control "is placed in danger owing to an attack by hostile forces." Presumably, this is to shore up the credibility of the North Korean deterrent in light of highly publicized South Korean planning for a decapitation strike. In April 2022, Kim reiterated that the primary mission of the North Korean nuclear arsenal is to deter an attack, but also to repel an attack if deterrence fails. This could be suggesting that nuclear weapons have a warfighting purpose. The law states that the nuclear forces "shall carry out an operational mission for repulsing hostile forces' aggression" to achieve victory if "war deterrence fails." Some of the descriptions accompanying missile tests in October 2022 seem designed to underscore this capability. For example, on October 13, 2022, KCNA announced successful tests of long-range nuclear-capable cruise missiles, adding that they were already deployed with units of the Korean People's Army. Kim Jong Un was quoted on expansion of "the operational sphere of the nuclear strategic armed forces to resolutely deter any grave military crisis and war crisis at any time and completely take the initiative in it."

It is not entirely clear how far and how fast North Korea is implementing its plan to make its nuclear weapons more usable, but the new law suggests more roles for nuclear weapons. It foresees the use of nuclear weapons if a "fatal military attack against important strategic objects" is "judged to be on the horizon" or if necessary for "taking the initiative in war." Although the 2013 doctrine did not explicitly call for no-first-use, many concluded North Korea's arsenal was a weapon of last resort, designed to deter war. The new formulation seems to support first use against a non-nuclear-weapon state or preemptive nuclear strikes. Of course, the main purpose of threatening to lower the nuclear threshold is to shore up deterrence. In this, North Korea seems to be no different from Russia or the United States.

United States

U.S. strategic forces play an obvious role in extended deterrence for its Northeast Asian allies Japan and South Korea. With the end of the Cold War, U.S. tactical nuclear weapons were removed from both of those countries and from US surface ships. Given the recent developments in China and North Korea and as the threat to the United States and its allies grows, pressures on Washington to develop and deploy new weapons in the region may increase. One possibility is the deployment in the region of intermediate-range nuclear-capable delivery systems that had previously been banned by the now-defunct INF Treaty. Some analysts have argued that new ground- and sea-launched nuclear-tipped cruise missiles would help bolster extended deterrence against rising Chinese and North Korean threats. Proponents of such systems have argued that shorter-range and lower yield nuclear weapons would be "capable of proportional, discriminate response based on survivable, regionally present platforms, and with the necessary range, penetration capability, and effectiveness to hold critical adversary targets at risk" (Woolf 2022). Deployments, in the long term, might provide the United States with more negotiating leverage in seeking other countries' agreement to limit their missiles (Woolf 2022).

Opponents of such systems have argued that regional presence, lower yield and discriminate attack options would lower the threshold for nuclear use and thereby increase the prospect of actual nuclear war. Other analysts have suggested that the presence of conventionally armed and nuclear-armed assets would introduce uncertainties that complicate deterrence immeasurably. If the target country is unable to distinguish between nuclear- and conventionally-armed missiles, planners may need to assume the worst. As noted earlier, the Biden administration cancelled the Trump administration's nuclear-armed SLCM but kept the low-yield warhead for SLBMs. Any future systems would require significant lead-time before introduction into the theater.

Japan and South Korea

Japan and South Korea have relied on U.S. extended deterrence instead of developing their own nuclear weapons. The fact that either country could develop nuclear weapons in short order after producing or acquiring the requisite fissile material brings particular pressure to bear on the credibility of U.S. commitments. It is unclear what would trigger a decision to cross the nuclear threshold for either country, since arguably the most significant threat to both occurred when North Korea tested its first nuclear weapon in 2006. The short list of such redlines

might include use of a nuclear weapon by North Korea, initiation of full-scale conventional war by North Korea against South Korea, or a hostile takeover of Taiwan by China, among others.

In Japan, former Prime Minister Shinzo Abe revived a debate about nuclear weapons after Russia invaded Ukraine in February 2022. On Japanese television, former PM Abe suggested that Japan might adopt a NATO-style nuclear-sharing agreement with the United States (Romei 2022). This is less controversial than some of his earlier statements while in office about nuclear weapons and their constitutionality. In mid-2022, a Sankei Shimbun–Fuji News Network public opinion survey revealed that 83.1 percent of respondents supported at least having a debate on nuclear sharing and the deployment of American nuclear weapons to Japanese territory. In addition to lessons from Ukraine, Japanese defense experts have cited the deterioration of the security environment in East Asia, North Korea's accelerated missile development and tensions in the Taiwan Strait as contributing to rising fears, accompanied by massive and rapid buildup of Chinese conventional and nuclear forces. In the view of one expert, a nuclear-sharing arrangement wherein operational planning is shared between US and Japanese military officials would strengthen U.S. reassurances to Japan (Kuniichi 2022). In the view of other experts, the absence of a US-Japan joint operational consultation and planning function is a weakness of the U.S.-Japan extended deterrence dialogue. Therefore, sharing operational planning for various scenarios including one involving nuclear use could strengthen the credibility of US commitment of extended deterrence.

In South Korea, public opinion polls have shown significant support for redeployment of U.S. nuclear weapons to South Korean soil and even indigenous development of nuclear weapons. According to the Korea Institute for National Unification, the percentage of respondents indicating that South Korea should acquire its own nuclear weapons if North Korea does not give them up rose from about 60% in April 2019 to over 70% in October 2021 (Lee 2021). About 61% of respondents thought Korea should keep nuclear weapons after reunification. However, if forced to choose between US forces in Korea and South Korean nuclear weapons, a majority seems to prefer US forces in Korea (about 49.6% versus 35% for nuclear weapons; about 15% is undecided). Another poll conducted by the Chicago Council on Global Affairs and the Carnegie Endowment for International Peace found that South Koreans preferred developing their own arsenal to deploying US nuclear weapons by a margin of 71% to 56% (Dalton, Friedhoff, Kim 2022). Some observers have suggested that the purported reluctance of the United States to respond with nuclear weapons to a potential nuclear weapons use by Russia in Ukraine could damage the credibility of U.S. extended deterrence, leading to increased calls for a South Korean nuclear deterrent (Kang 2022). A statement issued by the Extended Deterrence Strategy and Consultation Group (EDSCG) on September 16, 2022 declared that “that North Korea would face an ‘overwhelming and decisive’ response in the event of a nuclear attack.” Later statements in October 2022 by U.S. State Department officials specifically mentioned that all responses, including nuclear weapons use, would be considered.

A third option debated by experts to strengthen deterrence is a nuclear-sharing arrangement, as in the case of Japan. While this might strengthen the credibility of the U.S. commitment, it could increase tension and crisis instability. This is also true of the other two nuclear options – redeployment of U.S. sub-strategic nuclear weapons or an indigenous ROK nuclear weapons program.

Missile Delivery systems

The proliferation of missile systems in Northeast Asia acutely complicates security calculations, particularly when some missiles can be armed with either conventional or nuclear-tipped warheads.

North Korea began developing missiles in the 1970s with assistance from the Soviet Union and produced variants of SCUD short-range missiles for domestic use and export. Its missile technology sharing generated cash for the regime through exports to Pakistan and Iran. North Korea tested its first medium-range ballistic missile, the NoDong, in 1990. In 1999, the DPRK agreed to a long-range missile test moratorium, only to resume such testing in 2006. In the last decade, North Korea has devoted considerable resources to its missile program, testing at a significant rate, particularly in 2016 and 2017. From May 2019 to August 2020, it conducted 16 tests of short-range ballistic missiles. Its missiles have increased in sophistication, to include developing solid-fuel propelled missiles,

hypersonic glide vehicles, and irregular trajectory systems for its ICBMs with an aim to overwhelm missile defense installations in the United States. Its June 5, 2022 launch of an ICBM was the first successful ICBM missile launch since 2017. In October, it successfully tested two long-range cruise missiles, reportedly for use with nuclear warheads. In 2022 thus far, the DPRK has conducted forty-one missile launches.

North Korea's development of road-mobile missile launchers, along with the associated technology increases the survivability of its missiles and, arguably, the credibility of its deterrent, since some forces could survive a potential first-strike conventional or nuclear attack. The development of a submarine-launched ballistic missile capability is another means of accomplishing the same goal, one which North Korea has not yet mastered, but is clearing working on. North Korea has conducted several cold tests of underwater-launched ballistic missiles. Although it will rely for the foreseeable future on diesel-electric submarines, there is no reason to doubt that it may eventually seek to deploy a nuclear-powered submarine which would increase the range and survivability. Submarine-launched nuclear capabilities would allow North Korea to more persuasively threaten Japan, protect its missile from US attacks, and "expand the foundation for retaliatory attacks on Japan and the ROK" (Lee, 2022).

TABLE 2.2
North Korea's Missiles

CATEGORY	NAME	RANGE	REMARKS
IRBMs	Pukguksong-2	2000-2500km	2016; liquid fueled
	Musudan	3,000+ km~	Operational since 2016
	Hwasong-12	5,000+ km~	Test launch, May 2017
	Hwasong-14	10,000+ km~	Test launch, July 2017
	Hwasong-15	13,000 km	Test launch, Nov. 2017
ICBMs	Hwasong-17	13,000+ km~	Revealed, Oct. 2020 parade
SLBMs	Pukguksong-1	2,000-2500km	Test launch, April 2016
	Pukguksong-3	2,500km	Test launch on a barge, Oct. 2019
	Pukguksong-4	2,0500km	Revealed, Oct. 2020 parade
	Pukguksong-5	9,000km	Revealed, Jan. 2021 parade
	Sinpo class submarine, also called the <i>Gorae</i> (whale)	1,800 ton displacement	Loaded operational With 1 SLBM
	Mid-size submarine	3,000 ton displacement	Loaded with 3-4 SLBMs, Shaft assembly complete
Submarines	Nuclear submarine	5,000+ displacement ton	SLBM capacity design phase unknown
New Tactical (short-range) missiles	KN-23	600km	Test launch, May 2019, <i>aka</i> North Korean <i>Iskander</i>
	KN-24	400km	Test launch, Aug. 2019, <i>aka</i> North Korean <i>ATCAMS</i>
	KN-25	400km	Operational 'Super-large' rocket system since July 2019, multiple launch
	KN-09	100km	Continuously upgrading, first revealed in Oct. 2015, 300mm rocket artillery system

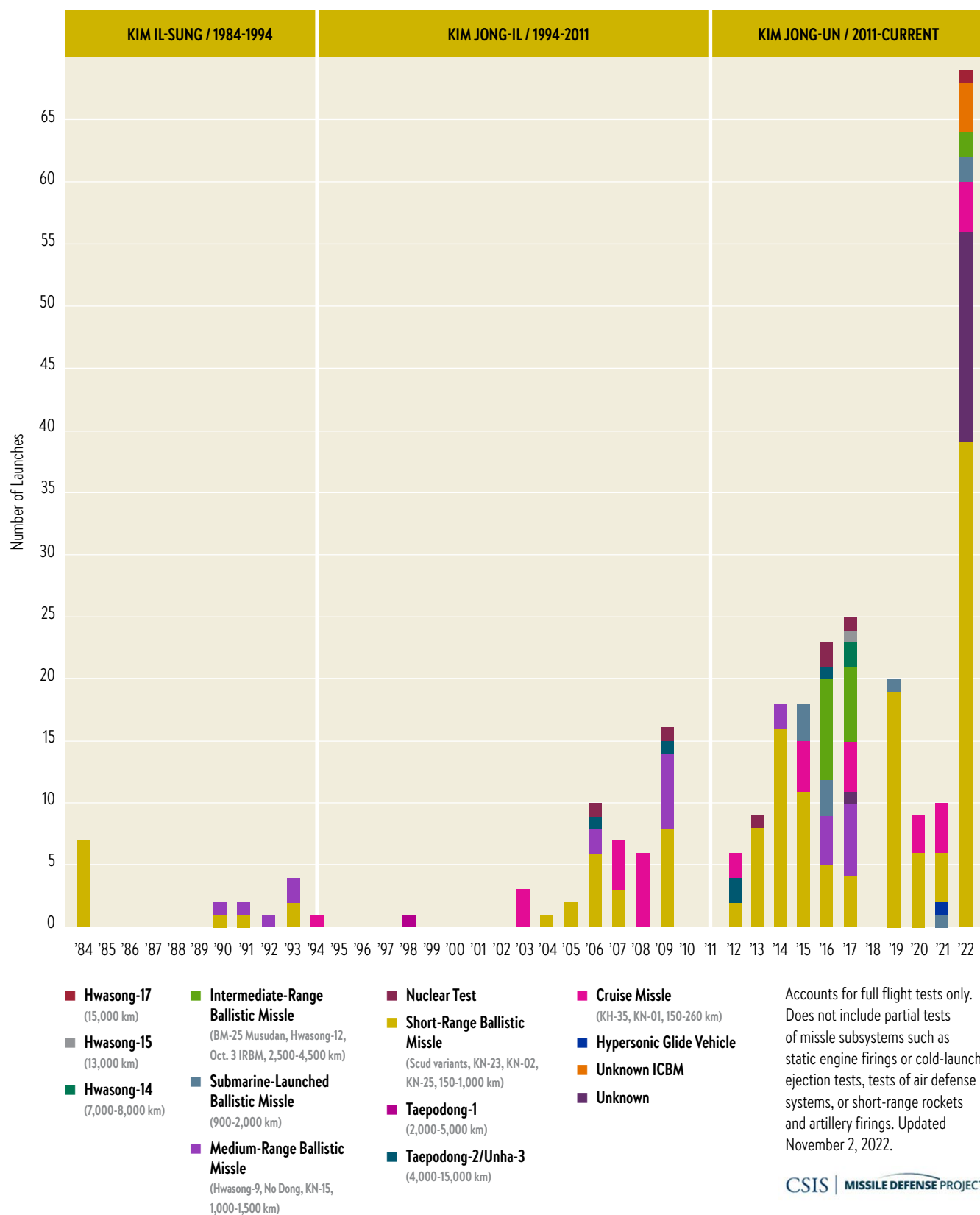
Sources: Adapted from Lee Sang-hyun 2022; globalsecurity.org website

In September and October 2022, North Korea ramped up its ballistic missile tests to announce its displeasure over several exercises conducted by the United States, the ROK, and Japan. A joint US-ROK naval exercise featured a US nuclear-powered carrier, the USS Reagan, which the US has not deployed near the Korean peninsula since 2017. On the fifth day of that exercise, Japanese self-defense forces joined the US-ROK forces for anti-submarine warfare maneuvers. A unilateral exercise by South Korea prompted a barrage of artillery firings from both coasts of North Korea.

On October 13, 2022, KCNA announced that North Korea had successfully tested long-range cruise missiles that were capable of carrying nuclear warheads, adding that they were already deployed with units of the Korean People's Army. The KCNA report, which declared that the missiles hit targets 2000 km away, quoted Kim Jong Un as saying "We should continue to expand the operational sphere of the nuclear strategic armed forces to resolutely deter any grave military crisis and war crisis at any time and completely take the initiative in it." Kim was quoted also as saying "We should focus all efforts on the endless and accelerating development of the national nuclear combat armed forces" (Pyongyang Times 2022). Figure II.1 depicts North Korea's missile testing through November 7, 2022.

FIGURE 2.1

North Korean Missile Launches (from CSIS Missile Defense Project)



South Korea's missile development was, for more than four decades, shaped by missile guidelines developed with the United States in exchange for sharing missile technology. The guidelines were gradually expanded, first allowing South Korea to increase the range of missiles, and then the weight of payloads. In 2012, the limits were revised to allow development of solid propellants and in 2017, they were partially suspended after North Korea's nuclear test. In May 2021, the parties ended all limitations in light of North Korean missile developments.

In the last decade, South Korea has been developing its so-called K3 suite of capabilities: Kill Chain, Korea Air and Missile Defense, and Korea Massive Punishment and Retaliation (KMPPR). These capabilities have been described alternately as a retaliatory response against a North Korean attack or as a preemptive initiative. Regardless, the strategy combined with few limits on South Korea's missile development have resulted in bunker-buster type missiles (e.g., the Hyunmoo-4 with a range of 800 km and a 2-ton warhead) and multiple-warhead underwater ballistic missiles. In September 2021, South Korea conducted two submarine-launched ballistic missile (SLBM) tests, a long-range air-to-surface missile test, and revealed previous progress on building a supersonic cruise missile, a "high-power ballistic missile," and a new solid-propellant engine for space launch vehicles. North Korea, in turn, tested a new long-range cruise missile and what might be a short-range ballistic missile, demonstrating a new train-launch capability. South Korea's pursuit of an operational SLBM, the recent lifting of range restrictions on its missile program, and its active testing regime could either make future talks to curb North Korea's nuclear and missile development impossible, or create greater incentives for North Korea to bargain, but perhaps with a different focal point for concessions.

Japan is also increasingly concerned about the development of North Korea's and China's nuclear and missile capabilities, especially in light of improvements shown in maneuvering and targeting systems equipped on their missiles. In December 2020, the Japanese government announced a new policy to upgrade its missile defense systems to address the evolving missile threats in Northeast Asia and beyond. Furthermore, Japan is planning to deploy the Ground Self-Defense Force (GSDF) missile units in 2023 on the island of Ishigaki, located just 300 kilometers off the coast of Taiwan. The move is aimed at countering Beijing's increasing naval presence in the South China Sea and any potential missile attacks. Currently, Japan's National Security Strategy is being drafted, and is expected to be published in December. One of the major issues is a decision to pursue so-called "counter-strike capability" or medium-range strike capability, which could reach bases on the Asian continent. Along with strengthening resilience, it is now a focal point of debates related to the National Security Strategy.

Undersea technology

A relatively new development is the migration of capabilities beneath the Pacific Ocean. For many years, China had a rudimentary capability in nuclear-powered and nuclear-armed submarines. North Korea operates conventionally powered submarines and is developing a nuclear-powered submarine while South Korea has declared it would like to acquire nuclear-powered submarines.

The People's Liberation Army Navy (PLAN) currently operates six SSBNs, six SSNs, and 46 diesel-powered attack submarines (SSs). The US Department of Defense estimates that PLAN will likely maintain 65 to 70 submarines through the 2020s. Conventionally powered submarines are capable of firing advanced anti-ship cruise missiles (ASCMs); PLAN purchased 12 Russian-built Kilo class SS units, eight of which can launch ASCMs. China has produced 30 of its own diesel and diesel-electric submarines and may produce another 25 by 2025 (replacing older SSs). PLAN's Jin-class SSBNs can carry up to 12 JL-2 SLBMs. The next generation Type 096 SSBN, which may soon begin construction, will have a new SLBM. No more than eight SSBNs are expected to be operational by 2030 (DoD CMP 2021; 49). China is also adding attack submarines.

North Korea has a fleet of between 64 and 86 submarines, which include 40 coastal submarines, 20 conventional (diesel) Romeo-class submarines acquired first from China, 20 mini-sub and 2 that can carry ballistic missiles. It has one vessel that has air-independent propulsion. It does not field attack submarines. North Korea has a single diesel-electric submarine (Gorae or Sinpo) that can fire an SLBM. It is not clear whether North Korea intends to simply arm conventionally fueled submarines with nuclear cruise or ballistic missiles, or develop nuclear-powered

submarines also. Testing of the first generation, liquid-fueled missile began in 2014 from stationary underwater platforms but the first five were unsuccessful. The first successful test, with solid fuel, occurred in August 2016, flew about 500km. The missile has an estimated range of 1200km. North Korea has tested 5 variants, most recently the Pukkuksong-5 in January 2021. In May 2022, North Korea tested a short-range submarine-launched ballistic missile.

South Korea operates a fleet of 16 attack submarines: 9 Chang Bogo Type-209 submarines (diesel-electric) and 7 Son Won Il-class (Type 214) hybrid diesel-electric/fuel cell vessels with air-independent propulsion (AIP). The ROK established a formal submarine command in 2015 at the Jinhae Naval Base.

While this is a smaller fleet than North Korea's, it is far more sophisticated. Using air-independent propulsion, almost half of its submarines can remain submerged for about 50 days without surfacing (Kim 2021). According to one observer, South Korea demonstrated its capacity to successfully detect and destroy nuclear-powered submarines, including the most advanced U.S. Ohio-class SSBNs, during the RIMPAC exercise (Kim 2021). Analysts have suggested that diesel-electric submarines with an air-independent-propulsion system, such as South Korea's Type-214 submarines, could be more effective than nuclear-powered submarines. One advantage is that diesel-electric submarines can switch to battery power when submerged underwater, while SSBNs cannot turn off their nuclear reactors. Reportedly, Japan's diesel-electric submarines can detect China's nuclear-powered submarines, but not the other way around, according to Chun Yong-woo, former national security adviser to President Lee Myung-bak (Kim 2021).

In 2017, Moon Jae-In told campaign supporters he favored nuclear-powered submarines to counterbalance North Korea's emerging capabilities and his administration set up a navy task force to assess the feasibility of construction. In July 2020, Kim Hyun-chong, second deputy director of the National Security Office, declared that "the next-generation submarine will be equipped with an engine that uses nuclear fuel (Kim 2021). The 2021–2025 Mid-term Defense Plan issued by the ROK Ministry of National Defense in August 2020 stated the plan to construct three 4,000-ton submarines, although not specified as nuclear-powered. In January 2021, the Agency for Defense Development and the Defense Acquisition and Program Administration proposed nuclear-powered unmanned nuclear depot ships, which run on low-enriched uranium. South Korean public opinion strongly favors (75.2% favors; 24.9% opposes) acquiring nuclear-powered submarines, but there are several obstacles to their development. A significant one is that South Korea would need to find a source of enriched uranium for fuel from a partner that did not object to selling uranium for a military purpose. Many existing nuclear cooperation agreements are generally written to prohibit cooperation for any military purpose whatsoever, including those extended by South Korea.

Given that the United States, along with the United Kingdom, agreed recently to help Australia develop nuclear-powered submarines, Seoul may now see an opening to press the United States again for access to the same technologies.

EXISTING ARMS RESTRAINT

The baseline for arms restraint in Northeast Asia is thin. Broadly speaking, arms restraint has been individual, rather than collective. For example, China's long-standing minimal deterrence policy dictated the level of its nuclear forces while Japan's constitutional restrictions have limited many aspects of its military forces. Other restraints, like South Korea's previous missile-range limits, have been the result of bilateral negotiations. As far as WMD are concerned, participation in global regimes has served to restrain WMD capabilities but the success is somewhat mixed. Table II. 3 shows regime adherence in Northeast Asia

TABLE 2.3**Arms Control/Nonproliferation Treaty Adherence in Northeast Asia**

COUNTRY	NPT	CTBT	BTWC	CWC	TPNW	OTHER TREATIES
DPRK	●	●	●	●	●	
ROK	●	●	●	●	●	
Japan	●	●	●	●	●	
China	●	Signed	●	●	●	
US	●	Signed	●	●	●	New Start
Russia	●	●	●	●	●	New Start

Key: NPT=Nuclear Nonproliferation Treaty; CTBT=Comprehensive Test Ban Treaty; BTWC= Biological and Toxin Weapons Convention; CWC=Chemical Weapons Convention; TPNW= Treaty on the Prohibition of Nuclear Weapons

North Korea has not signed the Chemical Weapons Convention (CWC) and is estimated to have between 2,500 and 5,000 tons of chemical agents, including mustard, phosgene, blood agents, sarin, tabun and V-agents (persistent nerve agents). The stockpile does not appear to be increasing but is already sufficient to inflict massive civilian casualties on South Korea. North Korea could deliver such munitions with long-range artillery, multiple rocket launchers, ballistic missiles, aircraft and naval vessels.

North Korea signed the Biological and Toxin Weapons Convention (BTWC) in 1987 and the Geneva Protocol, which prohibits the use of chemical and biological weapons in war. The government denies having CW or biological weapons (BW) programs but claims to be threatened by South Korean and U.S. CBW even though Seoul and Washington are parties to the CWC, BTWC and the Geneva Protocol. South Korea had a CW program but completed the destruction of its chemical weapons stockpile in 2008 and is in compliance with all its CBW arms control commitments. The United States has not completed destruction of its stockpile, which is now estimated to be completed in 2023.

STATUS OF RISK REDUCTION AND CONFIDENCE-BUILDING IN NORTHEAST ASIA

Although no forum exists for regional risk reduction in Northeast Asia, states have availed themselves of the ASEAN Regional Forum, established in 1994. ASEAN, or the Association of Southeast Asian Nations, was established in 1967 and eventually grew to include ten countries (Brunei, Cambodia, Indonesia, Laos, Malaysia, Myanmar, the Philippines, Singapore, Thailand and Vietnam). The ASEAN Regional Forum (ARF) added Australia, Bangladesh, Canada, China, DPRK, European Union, India, Japan, Mongolia, New Zealand, Pakistan, Papua New Guinea, Republic of Korea, Russia, Sri Lanka, Timor-Leste, and the United States in 1994.

In the field of security, the ASEAN Regional Forum has produced workplans for cooperation across a range of issue areas, including preventive diplomacy, counter-terrorism and transnational crime, disaster relief, maritime security, non-proliferation and disarmament, the use of information and communications technology, and defense. Projects in these areas have included capacity-building, seminars, and multilateral tabletop or field exercises. It is possible that the ARF, because it includes China, the DPRK, Japan, ROK, Russia, and the United States, could function as a forum like the Organization for Security and Cooperation in Europe to negotiate and implement tension and risk reduction measures as well as CBMS, particularly related to conventional forces in Northeast Asia. In addition, ARF has a long history of interest in CBMs. Given the concentration of nuclear capabilities outside of ASEAN, however, negotiations on nuclear capabilities are much more likely to be carried out, if they occur, in a smaller forum. Nonetheless, the ARF structure could be used to facilitate tension reduction measures described in the next section.

By far the most significant and far-reaching CBM agreement in the region is the historic 2018 Panmunjom Declaration, which laid out a vision for risk reduction and confidence-building. In addition to sweeping language about reconciling division and confrontation, the declaration specifically called for “joint efforts to alleviate the acute military tension and practically eliminate the danger of war on the Korean Peninsula.” Specifically, South and North Korea agreed to “completely cease all hostile acts against each other in every domain, including land, air and sea” (MOFA, Panmunjom Declaration 2018). One physical manifestation of this, outlined in the later 2018 Comprehensive Military Agreement (CMA), was the transformation of the Joint Security Area into a peace zone by eliminating guard posts and creating a civil police force. This was accomplished before the end of 2018. Similarly, the areas around the Northern Limit Line in the West Sea were to be transformed into a maritime peace zone to prevent accidental military clashes and guarantee safe fishing activities. Exchanges, visits and contacts were also outlined in the CMA, to include a Defense Ministers Meeting.

The 2018 Comprehensive Military Agreement covered consultations, voluntary restraints on hostile acts, cessation of live-fire and maritime maneuver exercises, no-fly-zones, warning procedures, and permanent communications links. The demilitarization of the Joint Security Area (JSA) at Panmunjom required creating a trilateral commission consisting of the United Nations Command (UNC), ROK, and DPRK to manage changes to the JSA, the removal of all weapons from the JSA, the sharing of surveillance feeds by both sides, and the establishment of joint checkpoints where UNC and KPA troops would serve side by side. Implementation of the JSA demilitarization, according to one account, was crisp and effective (Kim 2019, Morrow 2020). The successful implementation at the end of 2018 demonstrates that with the right political will, significant steps are possible. Under the right circumstances, it might be possible to reconstitute, update, or expand such measures.

Other parties in the region have had much narrower confidence-building agreements, but these too could serve as building blocks. For example, a US-China MOU exists on avoiding air and naval clashes, and Japan and China agreed on the Maritime and Aerial Communication System in 2007, implementing it first in 2018. The potential to revitalize and/or expand existing arrangements is explored in further detail in the next section.

KEY PRIORITIES

Rising tension on the Korean peninsula, competition between the United States and China, and growing conventional deterrence capabilities by Japan and South Korea suggest a need for mechanisms to relieve pressure to act. Crisis stability measures, especially communication channels, notifications, and Track II talks should be a first order of business. Arms race stability, particularly in missiles, could be a topic for South and North Korea to explore; it is likely that the United States will see little utility in discussions on arms race stability for a long while with regard to North Korea. As China creeps closer to U.S. arsenal numbers, however, the perceived need for arms race stability will grow. Japan and South Korea will be keen to ensure that arms race stability between China and the United States does not provide China with wider maneuverability in the region in a way that would detract from their security.

3. RISK REDUCTION AND ARMS CONTROL OPTIONS

The options discussed below begin with tension reduction measures, which are largely tangential to arms control and denuclearization, and then graduate to risk reduction, confidence-building, and, finally, arms control options. Measures from any or all of these categories can be implemented singly or as part of a package and do not necessarily rely on precedents. It should be noted that tension and risk reduction measures typically do not require compromises on sovereignty, which may make them easier to implement. However, they may require engaging North Korea in situations where North Korea is typically excluded. The analysis attempts to score, roughly, these options according to the following criteria: ease of implementation; urgency of the threat; scope or breadth of the measure; value to crisis stability (avoiding war) and/or to arms race stability; and whether it can be monitored or verified.

None of these criteria is quantifiable, purely objective or simple. Several encompass multiple considerations. Nonetheless, the rankings should be suggestive of what policymakers may need to think about. In practice, measures become easy to implement when there is political will at the top for implementation. The quick implementation of some of the Comprehensive Military Agreement measures in 2018 is substantial proof of that. As a general rule, measures that require complicated steps, significant incursions into sovereignty, multiple partners, overcoming significant international barriers or large expenses are ranked less easy to implement. Measures are ranked urgent if they need to be addressed sooner rather than later; less urgent measures may be considered timely or not urgent/long-term. Measures with a broader scope are ranked higher than narrower measures, based on the fact that they may lead to broader cooperation. Those that contribute to crisis or arms race stability are ranked higher than those that do not. Finally, those that can be monitored or verified receive a higher ranking. The chart below provides a description of the criteria and rankings.

FIGURE 3.1

Criteria for Assessing Usefulness of Measures

SCORE	EASE	URGENCY	SCOPE	CRISIS STABILITY	ARMS RACE STABILITY	MONITORABILITY/ VERIFIABILITY
+	Easy	Urgent	Wide	Yes	Yes	Easy
0	Moderate	Timely	Moderate	Neutral	Neutral	Moderate
—	Hard	Long term/ not urgent	Narrow	No	No	Hard

TENSION REDUCTION OPTIONS

Tension and risk reduction measures can help shape the security environment in Northeast Asia to facilitate future denuclearization of North Korea. At the lowest rung of cooperation, tension reduction measures can form the basis for building trust. North and South Korea have already had some limited successes in the past in implementing agreements, particularly the Comprehensive Military Agreement signed in 2018. Table III.1 suggests a few areas where cooperation with North Korea in areas not necessarily related to its nuclear weapons might be useful.

Obviously, there are several difficulties in engaging in tension reduction measures with North Korea. The first is navigating the vast array of sanctions in place against North Korea. Dialogue, assistance that does not entail the transfer of physical goods or funds, consultations, and visits are all possible, with potential obstacles, in the current environment. Whether it is possible, however, does not mean that it is necessarily a good thing to do. The options suggested would not contribute to any North Korean WMD program. At the same time, cooperation in the area of environmental remediation, search and rescue, climate change data exchange, nuclear safety and the humanitarian impact of nuclear weapons are, presumably, areas in which all partners stand to benefit, not just North Korea.

The West Sea has long been an area of confrontation, not least of all because of overlapping jurisdictional claims. In 2018, the Comprehensive Military Agreement established “peace zones” along the Northern Limit Line in the West Sea. Coastal artillery was shut down temporarily and the two sides agreed to establish a pilot joint fishing program. Although North Korea continues to reject the Northern Limit Line, other efforts to regulate behavior could be helpful. According to news reports, the two sides exchanged information on “foreign vessels” (i.e., Chinese fishing boats) operating in the West Sea in 2021. It is unclear if or how much any of this has continued. A smaller step might be to collaborate, possibly with Chinese and/or U.S. help, in environmental remediation of certain areas of the West Sea. This could be conducted regardless of the status of the CMA.

Collaborative search and rescue efforts in both the West and the East Sea could be another strand of cooperation. Given that the DPRK is not a member of the 1979 Search and Rescue Convention, outreach efforts to North Korea by the ROK, China and /or Japan could be useful. Since parties are required to coordinate SAR missions, facilitating North Korea’s adherence to the convention could be helpful. Outreach to North Korea on joining the London Convention on the prevention of marine pollution could also be part of a broader effort to mitigate the impact of pollution and climate change. Specifically, cooperative monitoring or data exchange regarding the impact of climate change on the West Sea could be helpful; China could take the lead here. More general exchanges on climate change are possible, but keeping a focus close to home could connect tangible outcomes for North Korea.

Two nuclear-related items to reduce tensions may also be possible. The first is establishing consultation on nuclear safety with the DPRK. Since leaving the IAEA in 1994, the DPRK has had no access to technical cooperation programs and little access to international nuclear safety expertise. Safety standards were low when U.S. experts visited the Yongbyon reactor in the 1990s to implement the Agreed Framework. Later, when North Korea began

building its experimental light water reactor, safety issues were raised by visiting scientists and experts, including Dr. Siegfried Hecker (Milonopoulos and Blandford 2014).

Improving the safety of nuclear facilities used for the weapons program is out of the question (and could be considered to violate Article I of the NPT) until there is a negotiated agreement to either dismantle or repurpose them, but ensuring that North Korea's experimental light water reactor meets international safety standards could be useful. It may be possible to hold consultations at the nuclear regulators' level with North Korea, just as the US conducted with India in the late 1990s before formal nuclear cooperation was possible. Regulators from China, Japan and South Korea could host a forum, briefing on their own trilateral dialogue begun after Fukushima and/or the IAEA could brief DPRK officials on its advisory and peer review capabilities. A narrower approach might entail a briefing to share information on the Fukushima accident and mitigation measures, bilaterally (DPRK-Japan or DPRK-ROK) or trilaterally. Joint environmental monitoring of the discharge of treated water from Fukushima specifically or, more generally, ocean environmental monitoring, could also be undertaken.

Finally, and especially given recent North Korean statements on the potential utility of tactical nuclear weapons against threats from South Korea, it could be useful to begin a dialogue with North Korea on the humanitarian and environmental impact of nuclear weapons (Lawrence et al 2015). This might be best accomplished through outreach from member states of the Treaty on the Prohibition of Nuclear Weapons (TPNW), in coordination with NGOs such as the International Campaign Against Nuclear Weapons (ICAN) that have been involved with the conferences leading up to the negotiation of the TPNW. Other options might include an invitation for North Korean officials to visit Hiroshima and/or Nagasaki and/or discussions on the environmental effects of underground nuclear testing. Kazakhstan and Russia could be useful interlocutors there.

RISK REDUCTION OPTIONS

Another category of measures aims to reduce the risks of military confrontation in Northeast Asia, specifically in and around the West Sea, East China Sea, and East Sea (Sea of Japan). Hotlines and codes of conduct such as the Code for Unplanned Encounters at Sea (CUES) and the ASEAN-China declaration on conduct in the maritime environment have been established but could be reinvigorated, expanded or coordinated. Both the US and Japan have specific hotlines with China set up to defuse maritime risks and two of the 33 hotlines between the ROK and DPRK are devoted to sea transport. The ROK-DPRK leadership hotline, put in place in 2018, was restored in October 2021 after Kim Jong Un severed it in August 2021 to protest US-ROK exercises. It may be useful, however, to establish a lower-level hotline that could continue to function quietly through periods of tension and that is devoted specifically to maritime encounters that involve military or government vessels or forces. It would also be useful to avoid incidents like the one in December 2018 when an ROK navy destroyer painted Japanese maritime SDF patrol aircraft (P-1) with its fire-control radar. Reportedly, the ROK vessel was conducting a rescue of a shipwrecked North Korean fishing boat operating illegally off the coast of the Noto Peninsula within Japan's exclusive economic zone. It was not clear how the ROK knew the location of the ship while Japan failed to receive search and rescue signals from the North Korean ship.

With regard to CUES, Japan, the ROK, China, Russia and the United States have endorsed the so-called "rules of the road," which are based on COLREG regulations to prevent collisions at sea. North Korea is party to the COLREG convention, but attending the Western Pacific Naval Symposium, initially as an observer and potentially later as a participant, could strengthen its commitment to adhering to international norms of behavior. The Western Pacific Naval Symposium began in 1988 and now has 21 participants (Australia, Brunei, Cambodia, Canada, Chile, China, France, Indonesia, Japan, Malaysia, New Zealand, Papua New Guinea, Peru, Philippines, Russia, Singapore, South Korea, Thailand, Tonga, USA, and Vietnam.) and six observing countries: Bangladesh, Colombia, India, Pakistan, Sri Lanka and the United Kingdom. Naval officers at the rank of captain participate.

A broader declaration on the conduct of parties in Northeast Asian maritime environments could be patterned after the 2002 China-ASEAN declaration on the Conduct of Parties in the South China Sea. While that declaration did not settle territorial disputes (and, arguably, has not been as effective as parties might have hoped), it high-

TABLE 3.1**Potential Tension Reduction Measures for Northeast Asia**

MEASURE	TYPE/FOCUS	PARTIES	EASE	URGENCY	SCOPE	CRISIS STABILITY	ARMS RACE STABILITY	MONITORABILITY/ VERIFIABILITY	SCORE
West Sea Cooperation	Environmental remediation	ROK-DPRK Add China? Add US?	0	0	0	0	0	0	0
	Search & Rescue	ROK-DPRK Add China?	0	0	0	+	0	0	+
East Sea	Search & Rescue	ROK-DPRK Add Japan?	0	0	0	+	0	0	+
Climate Change	Data Exchange Cooperative Monitoring	ROK-DPRK Add China?	+	0	+	0	0	0	++
Nuclear safety	Consultation	Add DPRK, US to existing Japan, ROK, China consultation?	+	0	0	+	0	0	++
Humanitarian Impact of Nuclear Weapons	Dialogue	TPNW outreach?	+	+	—	0	0	0	+
	Visit (Hiroshima, Nagasaki)	Japan	0	0	—	0	0	0	—
	Dialogue/visit (accidents? Test sites?)	DPRK-KAZ US?	0	0	—	0	0	0	—

lighted several areas of potential collaboration between the parties. These include: Marine environmental protection; Marine scientific research; Safety of navigation and communication at sea; Search and rescue operation; Combating transnational crime, including but not limited to trafficking in illicit drugs, piracy and armed robbery at sea, and illegal traffic in arms. In the case of North Korea, at least the first four areas of collaboration may be possible. Obviously, collaboration on combating transnational crimes would require North Korea to give up such state-sponsored activities.

Finally, as noted earlier in the report, the Comprehensive Military Agreement signed and partially implemented in 2018 contained significant risk reduction elements. Pending a broader political agreement, some elements could be adopted relatively easily, for example, consultations and cessation of live-fire drills. A more significant step would be to create a risk reduction center, patterned after the nuclear risk reduction centers established by the US and Soviet Union in 1988. In the case of the United States, the scope of the center was expanded beyond communicating with Russia to exchanging notifications across a wide range of treaties and security arrangements, including the Organization for Security and Cooperation in Europe, the Secretariat of the Organization for the Prohibition of Chemical Weapons, the Secretariat of the Hague Code of Conduct, and other international partners on nuclear and conventional arms control, ballistic missile launch notifications, chemical weapons destruction, and international cyber incidents. Two prerequisites for such a center in the case of the DPRK are missing – participation in a variety of treaties and agreements and the political will to reduce rather than escalate risks. However, operating a center could, over time, help demonstrate how the provision of information can reduce uncertainties and misunderstandings, a critical element where nuclear weapons and other WMD are involved.

CONFIDENCE-BUILDING OPTIONS

Confidence-building measures, as addressed in this report, take a step beyond avoiding conflict and improving crisis stability toward operationalizing constraints, developing transparency and modest verification. Constraints on conventional forces like demilitarized or thinned-out zones and limits on exercises are two potential measures; prenotification requirements for exercises or data exchanges and voluntary observations could improve transparency. Aerial and/or on-site inspections could help verify limits. Any system of confidence-building would require continued engagement among the parties for the operation and implementation of the CBMs and likely at least political documents, if not treaties.

Europe conducted the most extensive exercise in confidence-building measures to reduce the risk of war between NATO and the Eastern bloc between 1972 and 2015. The decision by Nixon and Brezhnev in 1972 to conduct risk reduction negotiations on two tracks – political and military – resulted in mutually reinforcing processes. The political track produced the 1975 Helsinki Accords, which established a set of principles of non-interference and territorial integrity and a framework for further progress (See text box). The military track, which began as the Mutually and Balanced Force Reduction Talks, ultimately produced the Treaty on Conventional Forces in Europe. For the purposes of this analysis, it should be noted that negotiations on conventional forces were spurred by concern about the risk of escalation to nuclear war and came after significant progress on reducing nuclear risks. For example, the US and USSR had already signed the Hotline Agreement and the Limited Test Ban Treaty in 1963, the 1971 Accident Measures Agreement, the Interim Agreement (SALT) and the ABM Treaty, as well as INCSEA in 1972, and the Prevention of Nuclear War Agreement in 1973. There was widespread recognition of the need for measures to reduce risks.

Nonetheless, there are steps that could and should be taken in Northeast Asia to introduce greater predictability about force levels, operations, and capabilities. Information exchange was a key element of early confidence-building measures. While it may seem that the ubiquity of information on the internet makes this unnecessary, quantity should not be equated with quality – there is a significant need for authoritative information. Government provision of information also would allow follow-up requests for clarification or elaboration. While the Vienna Document provides a comprehensive template, parties may choose to start smaller. At a minimum, it would be useful to include in those declarations information about naval forces and missiles.

TABLE 3.2**Potential Risk Reduction Measures for Northeast Asia**

MEASURE	TYPE/FOCUS	PARTIES	EASE	URGENCY	SCOPE	CRISIS STABILITY	ARMS RACE STABILITY	MONITORABILITY/ VERIFIABILITY	SCORE
Hotline	Crisis communications	ROK-DPRK J-China US-China Trilateral?	+	+	+	+	NA	NA	++++
Code for Unplanned Encounters at Sea (CUES)	Rules of road	Add DPRK to WPNS	0	0	—	+	NA	NA	0
CMA-like agreement	Consultations Cessation of live-fire drills	ROK-DPRK Add US?	+	+	—	+	NA	+	+++
2002 ASEAN-China declaration on conduct in maritime environment	Declaration	ROK-DPRK China, Japan US	0	—	—	+	NA	0	—
Risk Reduction Center	Information Exchange	DPRK-ROK	0	+	+	+	Possibly	0	+++

The Hague Code of Conduct, which Japan, the ROK, US and Russia adhere to, suggests another useful template:

- Annual declarations outlining ballistic missile and space launch vehicle (SLV) policies
- Annual information on number/class of ballistic missiles and SLVs launched
- Pre-launch notifications

China and North Korea should be encouraged to adhere to the Hague Code of Conduct. But, clearly, a more tailored approach to the region would be useful. Including information on cruise missiles and restrictions on numbers/frequency of tests, exercises, etc. could have some value. As a first step, North Korea could be urged to issue prelaunch NOTAMs (notice to air missions) that would provide rough information to airmen and mariners in the vicinity of missile tests. The DPRK is a member of both ICAO and IMO but has barely engaged in issuing NOTAMs of any sort over the years. As in the nuclear area, where some safety topics could be addressed without unduly revealing information, safety for civilians who may be affected by North Korean missile tests could be enhanced with a little more transparency. This could be conducted bilaterally between ROK and DPRK or within in a multilateral context.

Talks on doctrine and strategic stability appear to be increasingly necessary as North Korea operationalizes its nuclear weapons capability. These could be orchestrated on different levels –Track 1.5 (civilians on US side; DPRK officials) and/or Track 1 (government officials for both). Such talks would have been unthinkable twenty years ago, but would now be useful in light of destabilizing doctrines espousing limited uses of nuclear weapons. In particular, talks could first address difficulties (risk of accidental launches, deterioration of chain of command) inherent in relegating control of nuclear weapons to battlefield commanders. A second topic for discussion would be escalation risks, perhaps using historical examples from the U.S.-Soviet competition. A third topic could be how and where to improve predictability regarding nuclear weapons. On strategic stability, discussions could focus on how to achieve stability at low numbers of nuclear weapons, a topic that will need to be broached if countries make progress toward nuclear disarmament.

Freezes on military activities have long been a part of the denuclearization process with North Korea. The CMA provides a useful template. Some elements appear no longer to be in operation but could be revitalized.

The Helsinki Final Act and Vienna Document

The Helsinki Final Act suggested progress should proceed evenly in three different areas, or “baskets”—security and confidence-building; economic, science, technology, and the environment; and cooperation in humanitarian issues and other areas. The Helsinki Final Act called for advance (21 days) notification and observation of major military maneuvers involving more than 25,000 troops. The follow-on conference held in Stockholm on Confidence- and Security-Building Measures and Disarmament further developed the CBMs to include a longer pre-notification period (42 days); mandatory observation above maneuvers involving 17,000 troops, on-site inspection from the air or ground or both, with no right of refusal, and exchange of annual forecasts of all notifiable military activities (exercises with 75,000 troops require 2-year advance notice; those with 40,000 at least 1 year). Beginning in 1990, the Vienna Document built upon the CBMs, with updates every few years. By 2011, the Vienna Document contained eleven chapters devoted to:

- Annual exchange of military information (command structure, strength, weapons, etc)
- Defense planning (policy, doctrine, force planning, budgets,
- Risk reduction (consultation on unscheduled military activities, hazardous incidents, etc.)
- Contacts (visits to air bases, exchanges, joint exercises, experts, seminars, demonstration of new weapon systems)
- Prior notification of certain military activities
- Observation of certain military activities
- Annual calendars
- Constraining provisions (limit of one maneuver > 40,000 troops in a 3-yr period; limit of 6 activities with > 13,000 troops ; 3 with > 25,000 ; three simultaneous with > 13,000)
- Compliance and verification (inspections, evaluations)
- Regional measures
- Annual Implementation Assessment Meeting
- Final provisions

In terms of unilateral confidence-building measures, North Korea has twice demonstrated its willingness to take steps aimed at building confidence in its intentions. The first was destroying the cooling towers of the Yongbyon reactor in 2008 and the second was destroying some of the tunnel

openings in 2018 at the Punggye-ri nuclear test site. In both cases, however, it appears that North Korea has been able to reconstitute its capabilities. On December 31, 2019, Kim Jong Un declared North Korea would no longer be bound by its declared moratorium on long-range ballistic missile tests and nuclear tests, apparently to express its disappointment in the United States not meeting a December 31 deadline for concessions (Choe 2019). In early 2022, U.S. and other officials began to publicly declare that North Korea was preparing for a seventh nuclear test. There is very little information available about the test, including timing and purpose. If North Korea does not intend to test again, it could consider a range of measures to demonstrate its intentions. However, North Korea likely sees few incentives in proving this, since ambiguity may serve its purposes more. If, however, North Korea considered reinstating the nuclear testing moratorium, it might consider allowing aerial or on-site inspection of Punggye-ri and any other potential sites, perhaps in exchange for scientific dialogue on environmental safety measures for closed nuclear test sites. China and South Korea, as two bordering states, would benefit most from such exchanges. Again, Kazakhstan could be a useful interlocutor here, given its experience with significant environmental degradation at the Semipalatinsk nuclear test site.

TABLE 3.3

Potential Confidence-Building Measures for Northeast Asia

MEASURE	TYPE/FOCUS	PARTIES	EASE	URGENCY	SCOPE	CRISIS STABILITY	ARMS RACE STABILITY	MONITORABILITY/ VERIFIABILITY	SCORE
Open source information exchange along lines of Vienna Document or HCOC	Information exchange	Bilateral: ROK-DPRK, US-DPRK, US-China Trilateral: ROK-DPRK-US	—	+	+	+	+	0	+++
Talks on doctrine, strategic stability	Dialogue	US-DPRK Add China? Russia?	0	+	+	+	+	NA	++++
Freeze on military activities per CMA		ROK-DPRK Add US?	+	+	0	+	0	+	++++
Nuclear testing Moratorium	Inspection – aerial or onsite	DPRK-China?	—	+	—	0	+	+	+
Securing, making safe closed sites	Data exchange	DPRK-China? Add Kazakhstan?	0	0	—	0	0	0	—
No-attack pledge on nuclear facilities	Declaration	DPRK-ROK	+	+	—	+	0	0	++
	DMZ, no-fly-zone around facilities		0	+	—	+	0	+	++
Fissile Material	Dialogue	INFCIRC/549 parties with DPRK	+	0	0	0	0	0	+

TABLE 3.4**Nuclear Arms Control/Disarmament Measures**

TARGET	TYPE	EASE	URGENCY	SCOPE	CRISIS STABILITY	ARMS RACE STABILITY	MONITORABILITY/ VERIFIABILITY	SCORE
Nuclear delivery vehicles	Ceilings Elimination	0 —	+ 0	0 0	+ +	Depends on details* Depends on details	Focus on missiles	++ 0
Nuclear warheads	Ceilings Elimination	— —	+ 0	0 0	+ +	Depends on details* Depends on details	Counting rules	+ 0
Fissile Material	Freeze production for weapons purposes	0	+	0	0	+	+	+++
Nuclear Testing	Moratoria	+	+	—	0	+	+	+++
	Prohibition (ratify CTBT)	—	0	—	0	+	+	0

* A key question is which arms race, since there may be more than one.

An important nuclear-related confidence-building measure possible even in the absence of a broader agreement would be a no-attack pledge for nuclear facilities, perhaps coupled with an agreement for demilitarized zones (especially no-fly, no-drone zone) around nuclear facilities. This appears more urgent in light of Russia's wartime abuses of the Zaporizhzhia nuclear power plant in Ukraine. In this case, South Korea could benefit from assurances about protecting its nuclear power plants in the event of a conventional conflict. Although this kind of assurance, akin to a no-first-use pledge, always carries uncertainty about how events will play out in a crisis, some benefit may accrue to the civilian nuclear energy industry in terms of popular perceptions of risk.

A longer-term confidence building measure would be North Korea's participation in the Guidelines for Plutonium Management, or INFCIRC/549 (Squassoni 2019). The motivation would be the need for greater transparency about plutonium stockpiles in Asia more generally—not just DPRK, but also Japan and China. In particular, China needs to submit its annual declarations going back to 2017, which have been missing. Both North and South Korea should be invited to participate, given South Korea's accumulation of spent fuel and potential plans for pyroprocessing or reprocessing. One of the benefits to bringing on new members is that participating states have used the guidelines also for declarations about their national nuclear fuel cycle policies and highly enriched uranium stockpiles (Squassoni 2019) as well as excess defense material. Providing voluntary declarations about fissile material holdings with the objective of providing greater accountability among states with such fissile material would be a step toward more responsible nuclear behavior, although provide little tangible risk reduction. This kind of measure would not merit any sanctions relief, although one could envision sanctions relief for joining the CTBT or other treaties meant to limit capabilities.

NUCLEAR ARMS CONTROL OPTIONS

In theory, nuclear arms control can target the full range of nuclear weapons capabilities, including delivery vehicles, warheads, fissile material, and nuclear testing. A rough ranking according to the criteria described earlier appears in the table below Table III.4.

In practice, the US and Russia (earlier, the Soviet Union) have largely engaged in limiting and eliminating (INF Treaty) delivery vehicles, but have been able to “capture” warheads under New START with an accounting convention. In other words, parties set the number of warheads possibly deployed on a delivery vehicle by the number of reentry vehicles on missiles. Each strategic bomber is counted as carrying one bomb, regardless of how many it can carry. The number of non-deployed ICBMs and SLBMs are not counted or verified under New START.

Limits on nuclear testing have been accomplished, over time, through parallel moratoria, a bilateral treaty (1974 Threshold Test Ban Treaty), and multilateral treaties such as the 1963 Partial Test Ban Treaty (banning tests in the atmosphere, in space and underwater), and the Comprehensive Test Ban Treaty, which opened for signature in 1996 and prohibits all nuclear testing. The text box below suggests some lessons from this experience.

Nuclear Testing Limits: Learning from Precedents

The example of nuclear testing limits may be instructive in considering nuclear arms control options for North Korea. In 1954, the US Castle Bravo thermonuclear test shocked the international community. Designed for 5 megatons, the device yielded 15 MT. It was called the “second Hiroshima” and its radiation contaminated islands across 100 miles. The contamination of a Japanese fishing boat, the Lucky Dragon, 60 miles away, sparked worldwide condemnation. The US and the Soviet Union stopped nuclear testing from 1958 to 1961, ultimately negotiating the 1963 Partial Test Ban Treaty, which banned nuclear weapons tests in the atmosphere, space, and underwater. The US and USSR concluded a bilateral treaty in 1974 (Threshold Test Ban Treaty) that placed an upper limit (150 KT) on underground nuclear tests. In 1996, the Comprehensive Test Ban Treaty opened for signature. It will not enter into force until 8 additional states ratify it, including China, the US, and the DPRK. Meanwhile, China and the US are adhering to nuclear testing moratoria. This example suggests the following points: 1. Environmental contamination/humanitarian impact can be a powerful motivation for halting destructive activities; 2. First steps might include individual, parallel or bilateral moratoria; 3. The pathway may not necessarily be linear; 4. Partial steps can lead to more comprehensive arrangements; and 5. Institutionalization (for example, through the Preparatory Commission of the CTBT Organization) can help put in place global cooperative monitoring infrastructure.

Most importantly, nuclear testing limits, while negotiated separately from limits on strategic arms, contributed to the arms control architecture that, arguably, sustained US-Soviet/Russian arms control for decades.

Measures related to fissile material have not been woven into US-Soviet nuclear arms control, but handled within the context of disarmament measures. Four of the five NPT weapon states (US, Russia, France, UK) declared moratoria on producing fissile material for weapons in 1995; China reportedly halted production of fissile material for nuclear weapons but has not declared such a policy. Efforts to get a multilateral fissile material treaty under negotiation at the Conference on Disarmament have been stalled for almost thirty years. Inside or outside the NPT, there may be little that can be done to freeze or halt North Korea’s production of fissile material for weapons within an arms control framework. The likely venue for addressing this would be regional or global restraints on fissile material for weapons.

Below are a few ideas for an arms control-oriented approach to restraining North Korea focused on the three key arms control objectives of avoiding war (through improving crisis stability and/or arms race stability), minimizing the costs and preparations for war and minimizing the damages of war. These are a regrouping of the options discussed earlier according to the arms control objectives they help achieve. Some of these lend themselves to unilateral action; others only make sense in a bilateral context. Still others can benefit from adding a multilateral dimension, either at a later stage or from the start. Section IV will address the gap between ideal and pragmatic approaches and suggest how a few measures might be combined together.

TABLE 3.5**Measures to avoid war: Crisis Stability**

TYPE	MEASURE	FOCUS	UNILATERAL	BILATERAL	MULTILATERAL
Tension reduction	Search & Rescue Collaboration	West, East Sea	●	●	●
	Nuclear Safety talks		●	●	●
Risk Reduction	Hotlines	Communication links	●	DPRK-ROK DPRK-US US-Ch	
	CUES	Maritime predictability		DPRK-ROK	Add US, Japan, China?
	CMA-like measures	Freeze live fire drills		●	●
	Risk reduction center	Communication link	●	●	Focus on missile tests notifications?
CBMs	Deployment notifications	Information exchange	●		
	Exercises	Notifications Observation Access Ceilings			DPRK ROK US + China
	Freeze on live-fire drills	Quantitative		DPRK, ROK	DPRK, US, ROK
	Doctrine dialogue	Information exchange	●	DPRK-US	Battlefield nw + cyberattacks should be addressed
	No-attack pledge	Nuclear facilities	?		●
Arms Control	Limits on tactical nuclear weapons	Smaller, battlefield (ADMs, etc)	DPRK unilateral?		●
	Limits/ban on cruise missiles?			DPRK-ROK	

Two developments point to an especially deteriorating environment on the Korean peninsula: the acceleration of ballistic and cruise missile testing in 2022, and repeated statements about the usability of nuclear weapons. These suggest particular attention should be focused on improving crisis stability. Arms control options that support crisis stability would focus on limiting or eliminating the most destabilizing of developments with regard to nuclear warheads and delivery systems. At the moment, North Korea's increasing emphasis on tactical nuclear weapons should be a focus of effort, because it could shorten the fuse for escalation from conventional to nuclear war. An important element should be dissuading North Korea from delegating authority to launch nuclear weapons to battlefield commanders based on historical experience, either in the US or Russia. As noted earlier in this report, this is a conversation that might best be handled on a Track 1.5 level.

One of the problems with seeking constraints on North Korean cruise missiles is, again, the disparity in capabilities. It is unclear what North Korea has fielded, whereas it is quite clear that the US only fields air-launched cruise missiles, designated for strategic missions beyond deterring North Korea. One option could be to consider limits on a range of nuclear munitions that the United States has already abandoned, from those that could be revived, like nuclear-armed land and sea-based cruise missiles, to those long abandoned, like atomic demolition munitions, nuclear artillery and so-called "nuclear backpacks." Such a task would indeed be challenging and one that the US

was not able to successfully execute with Russia except as voluntary measures. A first step could be to propose a bilateral or trilateral experts' dialogue (DPRK, US and possibly Russia) on lessons from the Presidential Nuclear Initiatives, which removed U.S. and Russian tactical nuclear weapons from deployments overseas. Another option would be to negotiate cruise missile limits between the DPRK and the ROK.

An alternative approach would be to negotiate tradeoffs in the conventional area, such as elimination of exercises (especially decapitation exercises) or reduction of forces, for limits on North Korea's tactical nuclear weapons development. It might be possible to obtain something smaller, like a voluntary suspension of testing on cruise missiles, for example, while negotiations are proceeding in areas where North Korea is seeking reductions or eliminations. The price, however, could be high.

Another approach might be to pursue a dual-track approach to negotiations and deployment, such as was done in West Germany in the 1980s with the Pershing and cruise missiles that ultimately were eliminated under the INF Treaty. A dual-track approach could increase the risk of escalation by North Korea, but it also could 1) send a signal to North Korea that the US is willing to engage DPRK while not intending to compromise, and 2) reassure both ROK and Japan. (Any operation on the Peninsula would inevitably involve Japan, as US and UN Command military operations would be impossible without logistical operations at or from bases in Japan.) Reassurance might be especially needed if the broader approach is viewed as acceptance of North Korea as a nuclear-armed state.

Beyond the political risk, this would be an expensive approach for the US and ROK, however. And, the INF Treaty resolved verification difficulties by eliminating an entire class (not just nuclear-capable) missiles. In addition, North Korea would likely require some restrictions on U.S. nuclear-armed sea-launched cruise missiles (SLCMs). Historically, the US and the Soviet Union could not agree to include nuclear-armed SLCMs in the START treaty, opting instead to make politically binding declarations on the number deployed. When the Soviet Union collapsed, the US decided to retire its nuclear-armed SLCMs under the Presidential Nuclear Initiatives. The Biden Administration announced it did not need the capabilities of a nuclear-armed SLCM in its 2022 Nuclear Posture Review, citing the capabilities provided by the low-yield submarine-launched ballistic missile warhead W-76-2. Such a program could be revived by the next administration, which would be much less likely to negotiate it away. A lingering question is whether verification techniques can effectively ensure the absence of nuclear-armed SLCMs without too much intrusiveness. Much of the literature considered this question in the late 1980s but technology has improved considerably since then (Gottemoeller 1988).

For the United States, arms control measures designed to minimize the costs and risks of preparing for war are much less of a concern regarding North Korea than they are with respect to its peer competitors, China and Russia. The United States is not engaged in a direct, bilateral competition with North Korea and has enormous conventional and nuclear force advantages. On the other hand, South Korea's costs and risks of preparing for war are influenced directly by North Korea's actions. Finally, North Korea, despite recent rhetoric from Kim Jong Un, should be highly motivated to find ways to cap its quest for continually improving its nuclear forces relative to US forces.

Table III. 6 highlights three confidence-building measures and a few arms control measures that aim toward minimizing the costs and risks of preparing for war. The information exchange along the lines of the Vienna Document could help minimize costs on the conventional side. Detailed information about defense planning and military strength may not be possible without a broader political agreement, but prior notification or even observation of certain military activities might be possible. Consultation on unscheduled military activities may also be possible at the start. Finally, provisions that constrain the scope and pacing of maneuvers could be discussed.

Obviously, continuation of nuclear test moratoria by the DPRK, US and China (and tacitly, South Korea) also help minimize the costs of preparing for war by limiting qualitative advancements (not all but some) for nuclear weapons. Talks on strategic stability may also help to ratchet down a nuclear arms race. The US interest lies in tamping down quantitative and qualitative improvements to the Chinese and North Korean arsenals. This is more important between the US and China, than the US and DPRK. Such talks with the DPRK would need to be creatively shaped to avoid lending legitimacy to North Korea as a nuclear weapon state but more importantly, to move North Korea in the direction of never threatening to use nuclear weapons, never using nuclear weapons, and ultimately, reinforcing its previous commitment to denuclearize.

TABLE 3.6**Measures to minimize cost/risks of preparing for war**

TYPE	MEASURE	FOCUS	UNILATERAL	BILATERAL	MULTILATERAL	NOTES
CBMs	Information exchange a la Vienna Document	Limits on missile ranges?	Both?	DPRK, ROK	DPRK, US, ROK	
	Talks on strategic stability					
	Nuclear testing cessation		DPRK			
Arms control	Ceilings on total missile numbers					Best as regional or global
	Verified halt to nuclear testing		DPRK		+ US, China	CTBT ratification
	Agreement on no MIRV, MARV		DPRK	DPRK-ROK	+US, China, Russia?	

Arms control measures like placing ceilings on the total number of missiles (whether cruise or ballistic), verified halts to nuclear testing and agreements to limit qualitative improvements like multiple warheads all could contribute to reducing the costs/risks of preparing for war, mostly for the DPRK.

Lastly, measures to reduce the scope and/or violence of war are in the interest of every party that could be involved in an inter-Korean conflict. Hotlines for communicating de-escalation are absolutely necessary and do not detract from deterrence. A freeze in nuclear testing by the DPRK ultimately limits the qualitative development of its arsenal, thereby potentially reducing the consequences of any nuclear strike conducted by the DPRK. And of course, eliminating delivery vehicles, especially missiles, helps reduce the scope of nuclear war, whether it is confined to the Korean peninsula or extends also to the US homeland.

TABLE 3.7**Measures to reduce scope/violence of war**

TYPE	MEASURE	FOCUS	UNILATERAL	BILATERAL	MULTILATERAL
CBMs	Hotline	Communicating de-escalation		DPRK, ROK	DPRK, US, ROK
Arms control	Freeze	Nuclear testing	DPRK		
	Eliminate nuclear-armed SRBMs				
	Eliminate nuclear-armed MRBMS				Global INF?

4. IDEAL VERSUS PRAGMATIC APPROACHES

The previous section of this report explored types of measures and their applicability to a range of risk reduction and arms control objectives on the Korean peninsula. This section assesses the potential for tapping into existing treaties and agreements and suggests a few scenarios for implementation. Two important considerations for political feasibility are the presence of a recognized common interest and the possibility of reciprocation and cooperation.

TAPPING INTO EXISTING ARRANGEMENTS

Nuclear Treaties

From a nonproliferation perspective, the ideal solution to North Korea's denuclearization would be its rejoining the NPT. In fact, this has been a staple of many roadmaps because it is the logical antidote to North Korea's proliferation behavior. While it should not be taken entirely off the table, rejoining the NPT would only be possible in a scenario of high cooperation at the end of a long process that included a broader peace agreement, and security assurances. In the absence of unification, however, relinquishing both weapons and status is difficult to imagine. If it were at all plausible, North Korea would likely insist on rejoining the treaty on its own terms, much the same as South Africa did when it joined the NPT. Rather than having compliance "imposed" upon it, North Korea likely would try to follow the path of South Africa, which dismantled its weapons, providing documentation rather than direct access or observation (Albright and Stricker 2016). Given North Korea's much larger arsenal and infrastructure, this could be a long process fraught with considerable uncertainty. However, the importance North Korea now places on the role of nuclear weapons in its security virtually guarantees it will seek a different path if it decides to reduce or relinquish its arsenal.

North Korean officials have remarked for years in Track 1.5 talks that they support global denuclearization. The Treaty on the Prohibition of Nuclear Weapons (TPNW) is a new mechanism for global denuclearization, entering into force in 2021 with the ratification of the treaty by 50 states. North Korea voted favorably in the First Committee of the UN General Assembly in 2016 for the draft resolution supporting TPNW negotiations but did not vote on its adoption later that year. It abstained in 2017 and 2018 on the UNGA resolution welcoming the TPNW and voted no in 2020. Like other states with nuclear weapons, it did not participate in the negotiations. The basic prohibitions cover a wider scope than the NPT (See text box).

Treaty on the Prohibition of Nuclear Weapons Basic Obligations

Each party undertakes not to:

- (a) Develop, test, produce, manufacture, otherwise acquire, possess or stockpile nuclear weapons or other nuclear explosive devices;
- (b) Transfer to any recipient whatsoever nuclear weapons or other nuclear explosive devices or control over such weapons or explosive devices directly or indirectly;
- (c) Receive the transfer of or control over nuclear weapons or other nuclear explosive devices directly or indirectly;
- (d) Use or threaten to use nuclear weapons or other nuclear explosive devices;
- (e) Assist, encourage or induce, in any way, anyone to engage in any activity prohibited to a State Party under this Treaty;
- (f) Seek or receive any assistance, in any way, from anyone to engage in any activity prohibited to a State Party under this Treaty;
- (g) Allow any stationing, installation or deployment of any nuclear weapons or other nuclear explosive devices in its territory or at any place under its jurisdiction or control.

To join the TPNW, North Korea would need to make declarations about its nuclear weapons (ownership, possession, control) and whether it had eliminated them under Article 2 of the treaty. Even if it eliminated its weapons before joining, Article 4 would require cooperation with a “competent international authority designated” for the purpose of verifying the irreversible elimination of its nuclear weapons program. The states party to the treaty have not yet designated a competent international authority; it is by no means assured that the International Atomic Energy Agency will be designated for the role. In any event, if North Korea were to sign the TPNW without first eliminating its nuclear weapons, Article 4 Paragraph 2 would require North Korea to immediately remove them from operational status, and destroy them as soon as possible but not later than 10 years, as determined at the first meeting of states parties in June 2022.

A case could be made that some of North Korea’s security concerns could be ameliorated by North Korea and South Korea joining the TPNW because of the prohibition on stationing nuclear weapons on their territory. This would preclude the United States from reintroducing nuclear weapons to the Korean peninsula. It would also preclude South Korea from relying on extended nuclear deterrence from the United States, a good development for North Korea and a bad development for South Korea. Article 1 (f) says that state parties are prohibited from seeking or receiving “any assistance in any way, from anyone to engage in any activity prohibited to a state party under this treaty.” The activity in question would be Article 1 (d), not to “use or threaten to use nuclear weapons or other nuclear explosive devices.” In effect, the boycott of all states (except the Netherlands) under the U.S. nuclear umbrella from the TPNW negotiations indicates that they clearly understand the treaty seeks to sever the extended nuclear deterrence bond. South Korea, however, must also consider the threat from China, which will persist regardless of what happens with North Korea. This is true also for Japan. Given that the probability of China or the US joining the TPNW is close to zero, especially without the participation of other states holding nuclear weapons, makes this option likely a non-starter.

The likelihood of North Korea (re)joining either the NPT or the TPNW should be ruled out, certainly in the short term. However, for reasons articulated in the previous section, specific outreach or dialogue in connection with these treaties could serve some common interests. A possible confidence-building measure could be a trilateral (ROK-DPRK-Japan) declaration that all three countries would join the TPNW once denuclearization of the Korean

peninsula is complete. Possible obstacles are Japan's lingering concerns about China and North Korean lingering concerns about United States.

Other treaties and agreements addressing elements of nuclear restraint could be useful to consider in approaches to North Korea. Two testing treaties – the Comprehensive Test Ban Treaty (CTBT) and the Partial Test Ban Treaty (PTBT) – are multilateral, global, and nondiscriminatory treaties that could help curb North Korea's nuclear testing. The PTBT would largely be for confidence-building while the CTBT would have a major impact. An informal agreement among a small group of states on international plutonium management could also serve a confidence-building function.

Comprehensive Test Ban Treaty

A halt in nuclear testing long has been considered the first step towards nuclear disarmament, followed by a halt in production of fissile material, elimination of delivery vehicles and stockpiles and then monitoring of peaceful activities to make sure nothing is reconstituted. The CTBT has not yet entered into force and will not until eight countries ratify the treaty and/or accede – these include North Korea, the US, and China. Russia, the UK and France have all ratified; both China and the US have signed, but not ratified. While North Korea is unlikely to join the CTBT on its own, a trilateral approach by the United States, China and North Korea to join together could be appealing. To North Korea, it could convey some status; to the United States, it would limit both North Korean and Chinese modernization, and the value to China would lie in capping North Korea's capabilities and limiting environmental damage from further testing. Since signing the CTBT, the US has abided by its obligations and would be at no disadvantage vis-à-vis China or North Korea, given the large number of tests it conducted over decades. The question of Senate consent to ratification always looms of course, but reducing the risks from North Korea, which was not a weapon state when the treaty was first negotiated, adds a potential benefit for the United States. Of course, such an approach would have to be handled extremely carefully in the United States to avoid political backlash. It is not clear whether US ratification would be enough to induce China to also ratify, or whether China would insist on ratification by the other five – India, Pakistan, Iran, Egypt, and Israel.

Partial Test Ban Treaty (also known as Limited Test Ban Treaty)

The DPRK has not signed the PTBT which bans testing in space, the atmosphere and underwater, nor has China. Both countries could easily sign this treaty, although the substantive impact would be small. However, North Korean officials raised the possibility of conducting a live nuclear missile test in 2017 in response to President Trump's remarks at the UN General Assembly to "totally destroy" North Korea (Shin and Sieg 2017). The United States only tested a live submarine-launched nuclear ballistic missile once, in May 1962, which detonated in the Pacific Ocean.

Historically, China was not ready to sign the PTBT in 1963 (it began nuclear testing in 1964) but China's signature on the CTBT now obviates the need for China to sign the PTBT. China last conducted an atmospheric test in 1980. However, China could have an incentive to persuade the DPRK to sign the PTBT because in addition to banning tests in space, the atmosphere and underwater, the treaty also bans nuclear tests "in any other environment if such explosion causes radioactive debris to be present outside the territorial limits of the State under whose jurisdiction or control such explosion is conducted." Evidence of venting after the September 2017 test, which was estimated to yield between 50 and 140 kilotons, sparked concerns in China about the environmental impact of containment failures. China, Russia and South Korea, as neighbors of North Korea, are obvious stakeholders in this issue.

INFCIRC/549, Guidelines for Plutonium Management

Although not a treaty, INFCIRC/549 is a voluntary reporting scheme for countries with significant quantities of plutonium. The P-5 (US, UK, France, China, Russia), Germany, Japan, Belgium and Switzerland, joined talks in 1997 to discuss how to limit the growth in plutonium (Squassoni 2019). The guidelines initially had four goals: underscore the commitment of each state to existing standards of security and safeguards; spur strategic management of plutonium; improve transparency; and enhance controls on international transfers (for example, implementing end-user certificates). The countries committed to sharing annual reports on separated plutonium holdings; annual statements on plutonium estimated to be contained in spent civil reactor fuel and occasional statements

explaining national strategies for nuclear power and the nuclear fuel cycle. China specifically did not agree to share information on plutonium contained in spent nuclear fuel (Annex C) and never has shared such information. All countries except Russia and China agreed to also share information on highly enriched uranium (HEU).

In a scenario wherein denuclearization comes at the end of decades of small steps to reduce risks and build confidence, participating in the plutonium management guidelines could be an early step. Starting small, North Korea could rejoin the International Atomic Energy Agency (IAEA), which it left in 1994. It would start by submitting a Note Verbale to the Director General. The IAEA Secretariat would transmit the application to the Board of Governors, which would then transmit it to the General Conference for approval. The process of adhering to INFCIRC/549 would be much less formal, but would also require submitting a Note Verbale to the IAEA Director General. In all likelihood, participating states would probably gather to consider North Korean adherence. In the present environment, where steps to build confidence in its intentions tend to be welcomed by North Korea's neighbors and other stakeholders, rejoining the IAEA may not be so far-fetched. Although North Korea's antipathy to the IAEA is well-known, rejoining the organization would allow North Korea to potentially engage in technical cooperation projects, which would have to be limited in the short term to safety-related projects. North Korea could then submit a Note Verbale to the IAEA Director General indicating its intention to adhere to INFCIRC/549 guidelines. The content of its declaration would depend very much on where North Korea was in the process of denuclearization. As noted earlier, it could be useful for both South Korea and North Korea to adhere to INFCIRC/549, taking the step together. This step is feasible in the short term with moderate cooperation.

One potential perceived advantage for North Korea to make such a declaration within INFCIRC/549 is that it would be tied less to US-DPRK relations and more to reintegration of North Korea into a community of countries dedicated to reducing nuclear risks. Eventually, its declarations could cover HEU or even material excess to its defense program (as the US and UK declarations do). This might not be the complete stockpile, but an amount perhaps sufficient for 10-20 bombs (80-150kg).

OTHER MULTILATERAL WMD TREATIES

North Korea is a state party to the Biological and Toxin Weapons Convention, but it has not signed or ratified the Chemical Weapons Convention. Intelligence assessments of North Korean capabilities over the years have varied on the scope and threat of such programs, but any comprehensive approach to security on the Peninsula and in Northeast Asia will have to consider restraints (Parachini 2018). The 2017 killing of Kim Jong Nam in the Kuala Lumpur airport with VX nerve agent certainly demonstrated the availability of chemical weapons in North Korea. It could be useful, as one scholar has suggested, for North and South Korea to pledge "no-first-use" regarding biological and chemical weapons on the peninsula (Parachini 2018). Such a pledge is feasible in the short-term and would not necessarily require high confidence levels as a prerequisite. Ultimately, joining the CWC could provide important experience in participating in a major international treaty with verification processes.

EXISTING BILATERAL NUCLEAR TREATIES

Although not a treaty, the Joint Declaration on the Denuclearization of the Korean Peninsula already contained many of the prohibitions encapsulated in the TPNW, as well as a prohibition against any domestic uranium enrichment and spent fuel reprocessing. However, it did not prohibit relying on other countries' nuclear weapons for extended deterrence. Arguably, the Joint Declaration is a strong starting point if bilateral negotiations are the focus. Unfortunately, there are few incentives for North Korea to engage in such a bilateral agreement given the asymmetry of nuclear capabilities today versus in 1992. In addition, South Korea may have its own reasons for rejecting limits on domestic uranium enrichment and spent fuel reprocessing. South Korea reportedly has been seeking US approval for both domestic uranium enrichment (as an amendment to the existing nuclear cooperation agreement) and for pyroprocessing, two capabilities it sees as important for securing nuclear supply contracts for its reactor exports. It is not clear how long-standing interest in these capabilities would play out domestically against the prospects for a significant agreement with North Korea.

EXISTING MULTILATERAL NUCLEAR COMMITMENTS

The permanent five (P-5) members of the UN Security Council have made commitments in the past to demonstrate progress toward nuclear disarmament, as they define it. Examples include statements declaring the end of fissile material production for weapons, as well as nuclear test moratoria. Often, these commitments are carried out under the auspices of the NPT Review Conference process, specifically crafted to demonstrate progress in the face of criticism. For example, in December 2021, in advance of the 10th NPT Review Conference, the P-5 reiterated that statement made by Mikhail Gorbachev and Ronald Reagan that a nuclear war cannot be won and should not be fought. Engaging North Korea in a discussion of why that statement is important and how to operationalize such a statement (including eliminating or restraining capabilities that lower the so-called nuclear threshold) could be a confidence-building measure. Inviting North Korea to join them in any such declarations, moratoria, and so-called “rules of the road” would not constitute arms control, but could be part of an education process about so-called “responsible” behavior regarding nuclear weapons. While potentially easy to implement, they would have little effect on crisis or arms race stability, unless they pertain to fissile material production or nuclear or missile testing. The disadvantage to such an approach is that it could confer legitimacy upon North Korea’s nuclear weapons and risk angering further the vast majority of countries that are unhappy with these unverified, voluntary commitments. However, North Korea might find this appealing as it has sought to convey its “responsible” nuclear behavior, likely targeted at ultimately reducing sanctions leveled upon it.

FINDING COMMON INTERESTS IN ARMS CONTROL

The major (and hopefully enduring) challenge is that North Korea’s nuclear weapons capabilities are far inferior to those of the US, Russia and China in quantity and quality. North Korea might be reluctant to engage in arms control at an early stage, in much the same way that China has said it will only engage in arms control when US and Russian arsenals are closer in size to that of China. However, North Korea could also perceive political value in engaging in arms control. If so, it would likely seek to control the narrative to push for relief from sanctions based on the “legitimacy” of its nuclear weapons program versus its proliferant status of the past.

Recent statements from Kim Jong Un in 2022 superficially suggest there is no openness to negotiations. Kim recently stated that nuclear forces would not be a bargaining chip and that abandonment or “denuclearization first” will “never be such a thing.” However, like some U.S. policy statements declaring the need to create the environment for nuclear disarmament, Kim’s statements in September 2022 suggest that changes in the political and military environment on the Korean peninsula (and in the world) could change North Korea’s nuclear policy. The text box below summarizes relevant portions from recent statements.

Kim Jong Un Statements in 2022

April 26, 2022; Military parade in Pyongyang

Kim vows to expand arsenal “at the fastest speed possible.” “The nuclear forces, the symbol of our national strength and the core of our military power, should be strengthened in terms of both quality and scale.” “Our nukes can never be confined to the single mission of war deterrent.” “If any forces try to violate the fundamental interests of our state, our nuclear forces will have to decisively accomplish its unexpected second mission”

September 9, 2022: Supreme People’s Assembly

Kim states: “the adoption of a law related with the policy of the nation’s nuclear forces...proclaimed ...that we have come to possess by law a war deterrent as a means for defending the state.” “Our nuclear weapons are a means for containment and ultimate weapon.” “We can never give up the nuclear weapons however harsh the circumstances are in the political and military situations the United States has created on the Korean peninsula” the position of our state as a nuclear nation has become irreversible...If our nuclear policy is to be changed now, the world has to be changed, and so should the political and military environment on the Korean peninsula. There will never be such a thing as our abandonment of the nuclear weapons or denuclearization first, nor will there be any negotiations to this end or bargaining chip in these processes.”

October 13, 2022: KCNA

Kim: “Our nuclear combat forces ... proved again their full preparedness for actual war to bring the enemies under their control.”

Nuclear weapons for North Korea have become the antidote to existential conventional and nuclear threats. Recent statements also suggest they are the antidote for decapitation strikes. In September 2022, the new law on nuclear weapons reiterated that Kim has sole authority to use nuclear weapons, but noted that “a nuclear strike shall be launched automatically and immediately” according to an “operation plan decided in advance” if the leader’s command and control “is placed in danger owing to an attack by hostile forces.” It is not clear whether this is a “dead hand” approach to launching nuclear weapons patterned after Soviet past practices, or whether Kim has decided to delegate authority down to battlefield commanders. In any event, such language sends a clear message that decapitation strikes, even those using solely conventional weapons as envisioned by South Korea, will not prevent use of North Korean nuclear weapons.

Ultimately, North Korea seeks greater confidence regarding US and South Korean intentions. However, there is a significant divergence when it comes to joint military exercises, which the North views as provocative and the US and ROK view as defense preparedness. The development of a credible deterrent to create a standoff on the peninsula suggests there could be a common interest in crisis stability and yet the two parties continue to engage in activity that each side sees as provocative. In central Europe, the system of notifications, observation and limits on military exercises reduced the risk that routine defense preparedness exercises would be mistaken for preparations for war (although there is some debate about the 1983 Able Archer NATO exercise).

President Yoon’s “audacious plan” to achieve North Korea’s denuclearization, unveiled in August 2022, contained significant economic and humanitarian benefits to North Korea in exchange for substantive progress in denuclearization. Large-scale food aid and assistance for power generation, transmission, and distribution infrastructure and projects to modernize ports and airports for international trade were part of the package. President Yoon also offered to provide technical support in the humanitarian area to improve agricultural productivity, modernize hospitals and medical infrastructure and provide international investment and financial support. According to Kim Tae-hyo, a deputy national security advisor, the concept would provide aid early in the process as North Korea moves through denuclearization (Ji 2022). The focus reflects a traditional approach of providing economic incentives for

the dismantling of North Korea's arsenal. But in interviews describing the audacious plan, Minister of Unification Kwon Yong-se also stressed the inclusion of military and political normalization as a way of differentiating the plan from Lee Myung-bak's Vision 3000.

For its part, the United States saw no divergence in the South Korean plan from its own objectives of dialogue and denuclearization and in fact, Minister Kwon stressed he would consult with the United States before making more specific proposals to the North Koreans.

North Korea did not waste any time rejecting the plan, specifically in a dismissive statement by Kim Yo Jong to KCNA a few days later. When annual US-ROK exercises resumed, North Korea responded with a barrage of missile tests and live artillery rounds off both coasts in clear violation of the CMA. U.S. State Department officials stressed U.S. support would span the full range of options to help deter further North Korean aggression, including nuclear, conventional and missile defense capabilities.

Crisis stability in theory is easy to support, yet sometimes erodes in the course of actions taken in the name of deterrence. For example, South Korea's increasingly sophisticated conventional missiles and proposed acquisition of nuclear-powered submarines are intended to bolster its defenses but can easily be seen by North Korea as destabilizing. China's build-up of its strategic nuclear weapons is intended to bolster its second strike survivability and therefore deterrence and crisis stability but is seen by the United States as destabilizing. North Korea is developing weapons for battlefield use as a way of deterring war that certainly impinge on crisis stability. However, since the baseline of criticism against North Korea's nuclear weapons program is that all developments are bad, it has not been possible to discuss which developments are more rather than less destabilizing. As ever, there is a strong desire to avoid tacit acceptance of any part of North Korea's nuclear program.

Elements of the "audacious" plan could be proposed within an arms control framework that focuses on risk reduction. Avoiding war would be the topline goal, with improving crisis stability as a supporting goal. Economic assistance should not be portrayed as recompense for denuclearization, but gradually increasing economic ties as the natural outgrowth of political rapprochement and reduction in military tensions.

SCENARIOS FOR ARMS CONTROL APPROACHES

The scenarios below represent starting points for negotiations with North Korea, not end points. Their objectives are limited, but the intent is to provide an entry into a process that becomes sustainable over time. The United States and Russia proposed nuclear disarmament in the 1940s, but almost twenty years passed before they could agree to limit the most egregious activity spawned by the nuclear arms race – atmospheric nuclear testing. It also took time before other countries joined the international consensus.

As in the case of nuclear disarmament, denuclearization must remain the end objective of this process, whether or not that term is used. The following messages will be critical to stress in any description of an arms control approach:

- All partners have a mutual interest in avoiding nuclear war
- The humanitarian, environmental, and financial costs of nuclear weapons are enormous
- Some nuclear capabilities increase the risk of use, including accidental or unauthorized launch
- Cooperative approaches that include transparency can enhance stability
- Arms control includes all forms of military cooperation in the interest of reducing the likelihood of war, the costs, and effects.

Framing an arms control approach in this way is important to avoid the perception that North Korea is "off the hook" for eventual denuclearization, that North Korea is a peer of the United States, or that North Korea is a "responsible" nuclear state.

Scenario I: Start with Preventing Nuclear War (Accidents, Prevention Of Nuclear War)

1. Declarations re: accidental nuclear war; prevention of nuclear war
2. Establish risk reduction center
3. Seek to engage DPRK in regional Helsinki-like dialogue with political and military tracks

This scenario starts from a minimal baseline, focused on reducing risks. The United States and ROK would approach the DPRK as a partner to declare their intentions to not stumble accidentally into nuclear war, and their intention to prevent nuclear war, using the 1971 and 1974 agreements as templates. Bilateral declarations with regard to other pledges (not to attack nuclear facilities and/or not to use biological/chemical weapons) could be added to this.

The first two steps of this scenario are not terribly difficult if both sides agree this can be accomplished at a fairly senior (but not summit) level. North Korea may see such declarations as tacit acceptance of its nuclear weapons status and may attempt to engineer them for maximum exploitation, which should be avoided as much as possible. Foreign Ministers could sign the declarations in person or this could be done at the head-of-state level without a summit. The risk reduction center could be trilateral or even quadrilateral (DPRK, ROK, Japan, US), perhaps funded with private money.

Establishing a regional Helsinki-like dialogue designed to produce political and military agreements is, obviously, ambitious and difficult. Yet many of the elements of the Comprehensive Military Agreement were drawn from experience in the Helsinki process. The overall point is to connect nuclear risk reduction with conventional forces risk reduction. North Korea may take a narrow view of risk reduction simply as an issue of the US and ROK giving up exercises, so it will be important to persuade North Korea of the need for a regional approach. China could be a major stumbling block here, given its desire for freedom of action overall in the Pacific. However, there may be tradeoffs (for example, discussions on missile defenses) that could enhance the attractiveness of a Helsinki-type dialogue for the Chinese.

Scenario II: Improve Crisis Stability for Conventional and Nuclear Forces

1. Tension reduction measures for the maritime environment would be explored: climate change, environmental remediation in the West and East Seas, and joint fishing area.
2. No-attack pledges on peaceful nuclear facilities in wartime by ROK, DPRK.
3. In the nuclear sphere, seek parallel tracks on nuclear safety (test site remediation; nuclear power plant accident mitigation) and doctrinal talks (focused on risks/experiences with tactical nuclear weapons).
4. Approach DPRK to join CUES.
5. The ROK and DPRK would engage in talks designed to patch together renewed adherence to the Comprehensive Military Agreement.

This scenario would begin with tension reduction measures to probe North Korea for its capacity for cooperation, albeit in non-security-related areas. It would seek to enhance cooperation in the maritime environment first, through collaboration on climate change and environmental remediation in the West and East Seas. This could be bilateral or also include the United States. A no-attack pledge regarding nuclear facilities, prompted by actions in Ukraine in and around nuclear power plants, could diminish risks even in a potential conventional war. Limiting such pledges to purely civilian facilities would grant South Korea much more “protection” than North Korea, but widening the pledge to all facilities with radioactive materials in them would require North Korea to declare more facilities. In any event, North Korea might require similar assurances from the United States. The US might be able to give such assurances with proof of civilian character – for example, connection to an electricity grid or IAEA safeguards, applied even under a facility-specific safeguards agreement (INFCIRC/66-type).

Along the lines of tension reduction, it would be useful to explore North Korea's understanding of nuclear safety regarding nuclear power plant accident mitigation. As noted earlier, this could take the form of Track 1.5 with Japanese or Ukrainian nuclear experts or even Track I with officials. North Korean officials could be invited to observe the trilateral exchanges between Japan, China, and ROK on nuclear safety set up after Fukushima. Expanding the safety discussion to the environmental impact of underground nuclear testing would be a first turn toward security-related issues.

More difficult and yet essential would be nuclear doctrine talks, perhaps on a Track 1.5 level at first. Every attempt should be made to dissuade North Korea from an "escalate to deescalate" posture, and the dangers of tactical nuclear weapons should be addressed specifically. Two other more difficult elements in this scenario include approaching DPRK to join CUES, and bilateral talks on renewed adherence to the CMA. These measures become more feasible if North Korea refrains from provocative tests, missile and artillery firings, and uses existing communications channels on a more regular basis.

Scenario III: Chip Away at North Korean Capabilities via Treaties

1. Engage North Korea in discussions about the humanitarian impact of nuclear weapons, particularly nuclear testing through TPNW, perhaps Kazakh interlocutors on impact of Soviet testing on Semipalatinsk.
2. Nuclear test site safety talks; environmental remediation
3. Outreach from CTBTO on joining CTBT; US-China-DPRK talks (ambitious).
4. No-first-use pledge of biological or chemical weapons
5. Separate efforts on adherence to CWC.
6. Regional dialogue on transparency regarding plutonium (INFCIRC/549).

In this scenario, promoting arms control approaches to North Korea would first focus on seeking adherence to the CTBT and CWC. Formal approaches could be preceded by confidence-building measures like engaging North Korea on the humanitarian and environmental impact of nuclear testing and/or chemical weapons uses. Outreach from NGOs, scientists of member states of the TPNW could be useful, as well as outreach from the treaty organizations (CTBTO and OPCW). As a country that has conducted both nuclear tests and used chemical weapons, there will be sensitivities. At a minimum, it would be useful to learn exactly what those are.

The most ambitious element of this would be a trilateral agreement by the US, DPRK and China to ratify the CTBT. On their own, this would not bring the treaty into force, but could place additional pressure on the last five non-adherents. Israel will protest, because it will not want to be in the company of Egypt, India, Pakistan and Iran, but getting ironclad restraints on the DPRK, the only country still testing nuclear weapons, could be attractive to the United States. As noted earlier, this assumes ratification obstacles in the Senate are overcome (which might only be possible under a Republican administration).

A first step with respect to chemical weapons might be a bilateral pledge by ROK and DPRK not to use biological or chemical weapons on the peninsula. A potential major obstacle to North Korea joining the CWC is the 2017 killing of Kim Jong Nam with VX agent. It is likely that state parties would insist on a formal OPCW investigation, and likely that North Korea would require lifting of sanctions imposed on it as a result of individual countries' investigations. Negotiators would need to weigh the benefits of eliminating DPRK's CW stockpile (and confidence in thereof) against the need for resolution of the issue. Although North Korea may see some value in joining the CWC because it is not a nuclear treaty, because its nuclear deterrent makes chemical weapons less attractive, and because joining the CWC could open the door for technical cooperation and trade in the chemical area, particularly safety, these will all be weighed against the costs of transparency.

Lastly, international plutonium management guidelines may provide a starting point for engaging North Korea on fissile material issues. Either as a bilateral effort with ROK or as a regional effort to build transparency on nuclear energy and fissile material, partner states adhering to the guidelines could open talks with North Korea to as-

sess common interests. The group is not just composed of nuclear weapon states, but other countries that have separated plutonium (Germany, Switzerland, Belgium, Japan). Obviously, North Korea sees zero reason to share information on its fissile material production in the context of nonproliferation. As a voluntary arrangement, there is no monitoring of INFCIRC/549. In fact, China's declarations have been missing since 2018, but this is another reason to reinvigorate the effort. The feasibility of this option would be enhanced by South Korean interest.

Scenario IV: Limit/eliminate the most destabilizing elements of North Korean arsenal

1. Crisis stability talks, especially on role of tactical nuclear weapons & escalation; doctrine; deterrence
2. Tension reduction measures for the maritime environment as warranted.
3. The ROK and DPRK to explore renewed adherence to the Comprehensive Military Agreement.
4. Missile code of conduct or limitations agreement.

In this scenario, the focus would be to dissuade further development by North Korea of tactical nuclear weapons capabilities and nuclear-armed cruise missiles and seek limits and/or elimination. Tension reduction measures may be useful (per Scenario II) to get North Korea to the table, but should be focused on those that improve crisis stability (vice, for example, measures to improve nuclear safety). Re-establishing adherence to some elements of the CMA would be the major task for the ROK and could require financial inducements for North Korea. In parallel, the DPRK, ROK, and US, should open talks on doctrine, deterrence and crisis stability, involving China, Japan and/or Russia as warranted.

Talks to determine the kinds of capabilities both sides would like to limit in the future might address drones, hypersonics and cruise missiles, all designed to circumvent missile and air defenses. Looking ahead, North Korea may be especially concerned about the threat posed by future U.S. air-launched nuclear-tipped cruise missiles (LRSO), planned to enter the inventory in 2030.

Achieving limits on North Korea's most destabilizing capabilities will require significant tradeoffs. One approach, undertaken in Europe in the 1980s that ultimately led to the INF treaty, is to pursue a two-track approach (negotiations and deployment). For the United States, deployable sub-strategic nuclear weapons would likely be bombs rather than cruise missiles, particularly since the Biden administration rejected resuscitating the sea-launched nuclear-tipped cruise missile. While negotiating, western partners could insist on a freeze on new deployments and/or testing of ballistic and cruise missiles. The end goal should be real limits – constraints at least on deployments if not testing and/or production– for the most destabilizing missiles affecting the Korean peninsula.

At a minimum, North Korea should be urged to provide standard prenotification of its missile tests to airmen and mariners (NOTAM) per guidelines of the International Civil Aviation Organization and International Maritime Organization for safety reasons. This could be a small step toward providing more detailed information through the Hague Code of Conduct. In the area of missiles, there may be tradeoffs between ROK and the DPRK that could be considered. For example, the ROK and DPRK could have an inter-Korean agreement not to MIRV any ballistic missiles – conventional on the ROK side and dual-capable on the DPRK side. Or, the ROK might consider dropping some of the capabilities it has been developing and fielding under its program to preemptively strike DPRK leadership (the so-called “Kill Chain” program) in exchange for an agreement from North Korea not to MIRV its missiles. The ROK would be able to monitor whether the DPRK was testing MIRVed warheads.

5. RECOMMENDATIONS

North Korean nuclear and missile capabilities have been growing unchecked by negotiated constraints for several years. Sanctions and export controls continue to slow those programs, but Kim Jong Un continues to institutionalize nuclear weapons development, planning, and doctrine, expanding the scenarios for possible nuclear weapons use. The greater attention to nuclear weapons as a coercive tool in Russia's war against Ukraine in 2022 likely has contributed to increasing emphasis by the Pyongyang regime on the utility of nuclear weapons.

North Korea first needs to be dissuaded from further entrenchment in its nuclear weapons as a coercive, usable military instrument. This will require candid dialogue perhaps with more than one nuclear-armed state. Second, it needs to take steps along the path toward disarmament. This will be much slower than immediate denuclearization. Although immediate denuclearization is desired by South Korea and the United States to enhance their security, North Korea likely views this as inherently destabilizing. How security can be assured for both North and South Korea without nuclear weapons needs to be discussed.

Given all this, continuing to insist on North Korean denuclearization as a prerequisite for other integrative steps is not a path for progress. Nor should it be treated as the final outcome in resolving a proliferation dilemma. Instead, promoting a menu of practical mechanisms that contribute, ultimately, toward North Korean denuclearization within a broader security architecture, may open up avenues for discussion among key countries in the region that reduce some nuclear risks.

An initiative that encompasses tension and risk reduction, confidence-building, and modest arms control could set a foundation for progress toward denuclearization. Some may view any policy that stops short of denuclearization as adding further legitimacy to North Korea's nuclear arsenal, but in the absence of any negotiated restraints, the only brakes on the North's program are sanctions and export controls. These slow but do not completely stop its program. Furthermore, the nonproliferation regime that has slowed down the advance of North Korea's nuclear program is unlikely to function better in the future than it has in the past, given worsening prospects for cooperation from Russia and China. The task going forward will be to prevent a collapse of the sanctions regime, while calibrating any adjustments to a functioning arms control process.

Arms control is one way to reduce risks and complements South Korea's three pillars of North Korea policy – deterrence, dissuasion, and dialogue. Arms control is integral to all three of those pillars, but it shares an especially

important objective with deterrence of avoiding war. It is a more hands-on approach to both crisis stability and arms race stability than simple reliance on deterrence. The United States explicitly stated in its 2022 Nuclear Posture Review that deterrence alone will not reduce nuclear dangers and that it will pursue “a comprehensive and balanced approach that places a renewed emphasis on arms control, nonproliferation, and risk reduction to strengthen stability, head off costly arms races, and signal our desire to reduce the salience of nuclear weapons globally” (U.S. DoD 2022).

An old adage holds that arms control is possible precisely when it isn’t needed anymore. In other words, once sufficient trust makes cooperation possible, the threats from postures, doctrines, and armaments no longer seem as great. Proponents of arms control, on the other hand, suggest that it is precisely when relations between countries are at their lowest that arms control is necessary to create stability where there is none. More importantly, guardrails on nuclear arsenals are essential to maintain when relations decline, as they have in the case of the United States and Russia.

At the same time, the level of tension makes getting to negotiations difficult. Belligerent statements from North Korea about never giving up its arsenal are apparently credible to most South Koreans (92.5% believe North Korea will not abandon its nuclear weapons) and reason enough for a slim majority (55.5%) to support a South Korean nuclear weapons option (Kang 2022). Perhaps North Korea hopes that its nuclear weapons will be accepted as a *fait accompli*, as those of India, Pakistan, and Israel have been “accepted.”

Simply accepting North Korea’s nuclear weapons as a *fait accompli* would be wrong for many reasons. They pose an unacceptable threat to human life and the environment on the Korean peninsula, far in excess of conventional armaments, or other weapons of mass destruction like biological and chemical weapons. Accepting North Korea’s nuclear weapons would send a signal to other parties to the Nuclear Nonproliferation Treaty that withdrawing from the treaty and subsequently developing nuclear weapons is tolerable. This is a quite different problem from that created by the nuclear weapons arsenals of India, Pakistan, and Israel, which refused from the start to join the nonproliferation regime.

Predicating acceptance of North Korea’s nuclear weapons on the widespread acceptance of the other countries’ nuclear weapons would also be wrong. Within those countries, there is likely widespread belief that nuclear weapons are necessary but this is not the same as global acceptance. (In one country – South Africa—the ruling elite ultimately determined its nuclear weapons were dangerous, given the approaching dissolution of political control. In other countries such as Argentina and Brazil, nuclear weapons were abandoned along with their military dictatorships.) The 2017 negotiation of the Treaty on the Prohibition of Nuclear Weapons (TPNW), which now has 91 signatories, is one indication of widespread impatience about the pace of disarmament by nuclear-armed states. Even within nuclear-armed countries, there has been growing recognition that nuclear weapons pose risks of accidental or unauthorized use, particularly in the last fifteen years.

In addition, believing that nuclear weapons are necessary need not be equated with acceptance. For example, the argument that nuclear weapons are required for stability and deterrence on the path toward disarmament is not necessarily a rejection of disarmament, but an acknowledgement of the upcoming obstacles on that path. After all, at least five states with nuclear weapons have committed to eventual nuclear disarmament under Article VI of the NPT. Those same five states reiterated in December 2021 that a nuclear war cannot be won and should not be fought. The 2022 Nuclear Posture Review stated that the United States “actively pursues the goal of a world without nuclear weapons.”

In terms of North Korea’s nuclear capabilities, the most important capabilities to capture are nuclear testing, missile testing, and fissile material production. Nuclear testing and missile testing will contribute to both North Korea’s ability to threaten the U.S. homeland with a nuclear-tipped ICBM and to make smaller warheads usable for battlefield use. It may be harder for an arms control framework to capture missile testing and fissile material production, which historically have not been objectives of arms control. Restraining conventional capabilities and postures that increase risks will be key.

CRAFTING A NARRATIVE

Characterizing a different approach towards North Korea should avoid acceptance of North Korea's nuclear weapons, damage to the nonproliferation regime, or delegitimizing the current sanctions regime. Therefore, initiatives might use general labels like risk reduction or crisis stability rather than arms control. "Risk reduction" may be easier to accept as a term than arms control, which at least in the U.S. context can evoke negative reactions because of the constraints it places on decision-making and flexibility. A focus on arms control could also connote symmetrical reductions in forces which are not feasible or desirable in this case. However, South Korea and its allies will have to make this attractive to North Korea in some way.

A narrative designed to emphasize top priorities and minimize damaging effects could emphasize the following:

- Avoiding nuclear war is paramount. Dialogue is essential to reduce the risks of intended and unintended use, but particularly escalation from conventional conflicts.
- High priorities are crisis stability and management.
- Arms control is not a substitute for denuclearization but essential to it.
- The purpose of sanctions is not denuclearization but reduction of nuclear and missile risks. Negotiated solutions could ultimately render sanctions unnecessary.

An important element to control in any dialogue with North Korea is the linkage between sanctions and progress in risk reduction. South Korean statements to the effect that sanctions are purely aimed at denuclearization and nothing more undercut the continued imposition of sanctions within an arms control framework. It would be important to stress that arms control is a process leading towards denuclearization rather than a substitute for it. The implication is that other participants in arms control are also moving toward denuclearization, which is hard for defense establishments to remember and support, despite their obligation under Article VI of the NPT. Although North Korea clearly would prefer lifting all sanctions immediately while slow-rolling denuclearization, some balance between the two will need to be reached. In addition, although North Korea may chafe at use of the term denuclearization, it will be important to preserve this in some fashion.

LOOKING FORWARD

The outcome of the war in Ukraine could have a bearing on issues of nuclear risk reduction in Northeast Asia in a few ways. First, the strong alliance between Russia and China may founder or grow stronger, depending on the outcome. Second, arms control between the US and Russia could collapse. Third, lessons about the utility of nuclear weapons may be drawn from the conflict, potentially to the detriment of crisis stability on the Korean Peninsula.

A poor result for Russia in its war against Ukraine (or Russian nuclear weapons use) could further isolate Russia. Should China withdraw support for Russia, Russia might see value in propping up North Korea and aiding its nuclear program to complicate the security calculations of both the US and China, paving the way for a doubling/tripling of the North Korean arsenal in the medium term (beyond 10 years).

Although Putin and Biden managed to extend New START for another five years in the beginning of 2021, it is completely possible for US-Russian strategic arms control to collapse completely. While Russia is unlikely to seize the opportunity to build up its nuclear forces as it conducts a war on its border, the collapse of strategic nuclear arms control would free the United States from all restraints. Although it is highly unlikely the United States would build up its nuclear weapons, the ability to do so could potentially give the United States potentially greater leverage in dealing with China, if not North Korea. Whether this would exacerbate or calm current tensions is debatable. On the one hand, the United States already has a significant margin of nuclear capability beyond China's so it is unclear whether growth would further threaten China. On the other hand, China may find U.S. threats to escalate Taiwan to a strategic nuclear conflict incredible, and seek to test the proposition.

Lastly, lessons about the utility of nuclear weapons and a doctrine of escalating to deescalate depend somewhat on whether Russia issues additional nuclear threats or uses nuclear weapons in the context of the Ukraine war. Addi-

tional, credible nuclear threats by Russia that cause the United States and/or NATO allies to withhold or withdraw assistance resulting in Ukraine's defeat would be a victory for nuclear coercion as a strategy. North Korea could be emboldened in that case. Russia's use of a nuclear weapon causing Ukraine's capitulation would break the nuclear use taboo and likely spur proliferation by other states, including perhaps South Korea. Russia's use of a nuclear weapon that prompts greater conventional assistance by other states would break the nuclear use taboo but possibly disprove that nuclear escalation is inevitable – a negative consequence perhaps, unless Ukraine prevails. A nuclear response to Russian nuclear use would be devastating but potentially have a sobering effect on other nuclear crisis points around the globe, including the Korean Peninsula. Finally, a resolution of the war that does not result in nuclear use or nuclear proliferation could suggest the fundamental disutility of nuclear weapons for coercion or strategic advantage.

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ABOUT THE AUTHOR

Sharon Squassoni is Research Professor of the Practice of International Affairs at the Institute for International Science and Technology Policy, Elliott School of International Affairs at The George Washington University. Prior to joining the faculty in 2018, she led the Proliferation Prevention Program at the Center for Strategic & International Studies. She advised Congress from 2001 to 2007 on weapons of mass destruction as a senior specialist at the Congressional Research Service and spent a decade at the State Department and Arms Control & Disarmament Agency as a nonproliferation and arms control expert. She is a Board member of the Center for Arms Control and Nonproliferation and co-chairs the Science and Security Board of the Bulletin of the Atomic Scientists. Her research focuses on the intersection of nuclear weapons, nuclear energy, nonproliferation and arms control.