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Reducing the Role of Nuclear Weapons in North East Asia

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Contents

Acronyms and abbreviations

ALCM	Air-Launched Cruise Missile
CBW	Chemical and Biological Warfare
DPRK	Democratic People's Republic of Korea
HDBTs	Hardened and Deeply Buried Targets
ICBM	Intercontinental Ballistic Missile
NPT	Treaty on the Non-Proliferation of Nuclear Weapons
ROK	Republic of Korea
UNIDIR	United Nations Institute for Disarmament Research
US	United States
WMD	Weapon of Mass Destruction

Reducing the role of nuclear weapons in North East Asia

In 2017 the Hiroshima Roundtable of experts and former officials met to discuss pathways towards nuclear disarmament in East Asia. The deterioration in United States (US)–Democratic People's Republic of Korea (DPRK) relations in 2017 precipitated by Pyongyang's technological advances in thermonuclear weapons and long-range ballistic missiles featured heavily.[1] The Chairman's concluding statement suggested that to deter the DPRK, the US and its allies need not rely, or state publicly their reliance, on nuclear weapons due to the range of conventional deterrence options at their disposal.[2] This paper, commissioned by UNIDIR and the Hiroshima Prefecture, examines the extent to which the US can reduce the role of nuclear weapons in its strategy towards the DPRK. The primary concern is one of reducing the risks of nuclear violence in North East Asia in part by reducing the role of nuclear weapons. The broader context is the challenge of creating propitious conditions for progress on nuclear disarmament in antagonistic circumstances in which nuclear weapons remain highly valued.

This paper is primarily concerned with steps the US, alongside the ROK (Republic of Korea), could take to reduce the role of nuclear weapons in its strategy towards the DPRK. Reducing the role of nuclear weapons means diminishing their importance or significance in the security strategies, doctrines, statements and operations that shape each sides' response to the confrontation and its evolution. It is about "denuclearizing" the conflict dynamics if not the antagonists' actual armouries. Moreover, reducing the role, in particular by ruling out the use of nuclear weapons as the final move in any escalating conflict, allows non-nuclear and potentially non-violent policies to assume greater priority. It is, of course, a challenging proposition in the current environment. This paper argues that reducing the role of nuclear weapons is possible for the US because its nuclear weapons are not a necessary component of its war-fighting plans or its wider deterrence posture towards the DPRK. The US could therefore take steps to reduce the role of nuclear weapons in its confrontation with the DPRK by "denuclearizing" its war plans and exercises and extending explicit security assurances to Pyongyang.

Of course, there are two main protagonists in the confrontation, and this paper also looks briefly at short-term steps the DPRK could take to reduce the role of nuclear weapons and the risk of nuclear violence. Over the longer term, this will likely require a process of developing and institutionalizing a non-confrontational security relationship with the US, ROK and Japan (something that will be challenging, but not impossible to do). This paper does not provide a detailed explanation of the DPRK's nuclear weapons programme or its rationales and perceptions; the steps it might take that are outlined towards the end should be read in the context of the current phase of its confrontation with the US.[3] China also has an important, if less direct, role to play in reducing the role of nuclear weapons given its relationship with Pyongyang.

This paper begins by outlining reasons why reducing the role of nuclear weapons is important in terms of the pathologies of nuclear deterrence on the Korean peninsula, before exploring how and why the US might take a lead. It concludes by outlining steps that the DPRK and China could take to reduce the role of nuclear weapons and the risk of nuclear violence.

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[1] For a summary see Junji Akechi, "Hiroshima Roundtable Holds Discussions on Nuclear Disarmament in East Asia", Hiroshima Peace Media Center, 2 August 2017, http://www.hiroshimapeacemedia.jp/?p=76088.

[2] See the Chair's Statement from the 2017 Hiroshima Roundtable, 1–2 August 2017, Hiroshima, http://www.pref.hiroshima.lg.jp/uploaded/attachment/251972.pdf.

[3] For detailed analysis of the DPRK nuclear programme, see chapter six in Etel Solingen, *Nuclear logics: Contrasting Paths in East Asia and the Middle East*, 2007, pp. 118–140; and Jonathan Pollack, *No Exit: North Korea, Nuclear Weapons and International Security*, Adelphi paper 418, 2010. For a debate on US policy towards the DPRK, see Victor Cha and David Kang, *Nuclear North Korea: A Debate on Engagement Strategies*, 2003.

Three reasons for reducing the role of nuclear weapons in the US–ROK–DPRK confrontation

First, nuclear deterrence is becoming ever more embedded in the US–ROK–DPRK relationship, and this brings with it the possibility of nuclear violence. Indeed, planning for nuclear war is inherent to nuclear deterrence since the desired deterrent effect is conditioned upon the credibility of the threat to use nuclear weapons in certain circumstances. For the US, nuclear weapons are perceived as necessary to deter DPRK aggression, to reassure its treaty allies by maximizing the perceived credibility of its extended deterrence commitments, and to reproduce its identity as a global hegemon rooted in unassailable military power.[4] Nuclear deterrence is framed as an essential structure for the US and its allies within which the political goal of complete and irreversible denuclearization of the DPRK might be pursued. From this standpoint, any reduction in the role of nuclear weapons risks undermining deterrence and therefore the security of the US and its allies, particularly the ROK and Japan, and inviting dangerous and destabilizing tests of resolve from Pyongyang.

For the DPRK, nuclear deterrence has become the essential structure within which a "normalization" of political relations with the US might be pursued and the survival of both the DPRK as a State and the Kim dynasty ensured. Nuclear weapons are symptomatic of the extreme militarization of state and society rooted in the DPRK's *songun* (military first) policy that rests on its *juche* (self-reliance) ideology. The specific role of nuclear weapons crystallized further with Kim Jong-un's *byungjin* (parallel development) policy inaugurated in 2013 that promotes the parallel advance of economic growth and the development of an effective nuclear weapons capability.[5]

But framing the US–DPRK relationship in terms of nuclear deterrence has deleterious consequences. It tends to take worst-case assumptions for granted and narrow the range of policy options to threats and military containment at the expense of other broad options such as securing cooperative behaviour.[6] Moreover, a constant need to make the deterrent threat credible can normalize intransigence and discourage negotiation and compromise. The practice of nuclear deterrence can also drive leaders much closer to disaster through brinkmanship in attempts to maximize the credibility of the deterrent threat and through mutual misperception.[7]

Second, the US approach to nuclear deterrence on the peninsula could lead to perceptions that war is the only option. The US currently embraces the security logic of nuclear deterrence for itself and its allies but denies that logic to other States, especially those that it sees as "rogue". Stable deterrence on the peninsula for the US is framed in terms of its nuclear monopoly over the peninsula. One-way nuclear deterrence is both necessary and acceptable but mutual nuclear deterrence is rejected as destabilizing (contra deterrence theorists) and politically unacceptable—not necessarily (or only) because it might prove unstable, but because it limits US freedom of action as a hegemonic power. This is a long-standing feature of US nuclear weapons policy and counter-proliferation policy and reflects the discriminatory logic that is also embedded in the Treaty on the Non-Proliferation of Nuclear Weapons (NPT).[8]

[4] Barry Posen "Command of the Commons", *International Security* 28:1, 2003, pp. 5–46.
[5] For an overview see Anthony Cordesman, "The Military Balance in the Koreas and Northeast Asia", Center for Strategic and International Studies, January 2017.
[6] Michael MccGwire, "Deterrence: The Problem not the Solution", *International Affairs* 62:1, 1986, pp. 55–70
[7] Benoit Pelopidas, "A Bet Portrayed as a Certainty", in Shultz, G. and Goodby, J. (eds), *The War that Must Never Be Fought*, 2015, p. 20; Robert Jervis and Mira Rapp-Hooper, "Perception and Misperception on the Korean Peninsula: How Unwanted Wars Begin", *Foreign Affairs*, 5 April 2018.
[8] Nick Ritchie, "Legitimising and Delegitimising Nuclear Weapons" in Borrie, J. and Caughley, T. (eds), *Viewing Nuclear Weapons through a Humanitarian Lens*, UNIDIR, 2013, pp. 44–77.

Sustaining such an approach can lead to the perceived necessity of violent counter-proliferation by the US in the face of persistent resistance to permanent, coerced nuclear subordination. The alternative is to tacitly accept mutual nuclear deterrence by downgrading the unacceptable to the undesirable. After the 11 September 2001 attacks, for example, US policymakers insisted that Iraq had a viable weapon of mass destruction (WMD) programme, that Saddam Hussein was undeterrable, and that the threat he posed was unacceptable. This left a military attack to eliminate the WMD programme as the only remaining option.

A similar dynamic has been at work with the DPRK over the past year. Following the technological breakthroughs and external support that have enabled Pyongyang to develop a thermonuclear threat to the US, policymakers such as former National Security Advisor H. R. McMaster insisted that the DPRK was undeterrable.[9] In late 2017 the Trump administration reportedly explored the option of giving Pyongyang a "bloody nose" through a limited or "surgical" strike against one or more missile and nuclear facilities.[10] Some of the proponents of the invasion of Iraq in 2003, such as current National Security Advisor and former Ambassador to the United Nations John Bolton and Senator Lindsay Graham, have also argued that the time is right for a preventative attack to terminate the threat of Pyongyang's nuclear and missile programmes once and for all.[11] This is part of a longer history of US plans for a limited, preventative, conventional counter-proliferation attack—from the Nixon administration's "Operation Freedom Drop" in 1969,[12] to the Clinton administration in 1994,[13] and the Bush administration in 2003.[14]

Third, the consequences of a nuclear war would be devastating. A full-scale conventional war with the DPRK would be ruinous enough without the use of nuclear weapons. It would likely cause casualties into the hundreds of thousands, and perhaps over a million, create millions of refugees, cause a massive humanitarian crisis for an already impoverished population, and probably transition into an enduring insurgency.[15] It would leave large parts of Seoul destroyed and have a significant impact on the regional and global economy.[16] The DPRK could also saturate Seoul and surrounding areas with its stockpile of chemical agents, including sarin and VX.[17] As US Defence Secretary James Mattis said, a war with the DPRK "would be probably the worst kind of fighting in most people's

[9] Uri Friedman, "Can America Live with a Nuclear North Korea?", *The Atlantic*, 14 September 2017, https://www.theatlantic.com/international/archive/2017/09/north-korea-nuclear-deterrence/539205/.
[10] Zachary Cohen, Nicole Gaouette, Barbara Starr and Kevin Liptak, "Trump Advisers Clash over 'Bloody Nose' Strike on North Korea", *CNN*, 1 February 2018, https://edition.cnn.com/2018/02/01/politics/north-korea-trump-bloody-nose-dispute/index.html; David Sanger, "Talk of 'Preventive War' Rises in White House over North Korea", *New York Times*, 20 August 2017, https://www.nytimes.com/2017/08/20/world/asia/north-korea-war-trump.html.
[11] Sophie Tatum, "Graham on North Korea: 'We're Headed to a War If Things Don't Change'", *CNN*, 29 November 2017, https://edition.cnn.com/2017/11/28/politics/lindsey-graham-north-korea/index.html; John Bolton, "The Legal Case for Striking North Korea First", *The Wall Street Journal*, 28 February 2018, https://www.wsj.com/articles/the-legal-case-for-striking-north-korea-first-1519862374. See also Edward Luttwak, "It's Time to Bomb North Korea", *Foreign Policy*, 8 January 2018; and Peter Pry, "It's Time for a Military Solution to North Korea", *The Hill*, 11 December 2017, http://thehill.com/opinion/national-security/364239-It%27s-time-for-a-military-solution-to-North-Korea.
[12] Peter Foster, "Richard Nixon Planned Nuclear Strike on North Korea", *The Daily Telegraph*, 8 July 2010.
[13] Jamie McIntyre, "Washington Was on Brink of War with North Korea 5 Years Ago", *CNN*, 4 October 1999, http://edition.cnn.com/US/9910/04/korea.brink/.
[14] David Sanger and Eric Schmitt, "Threats and Response: Nuclear Stand-off", *New York Times*, 31 January 2003, http://www.nytimes.com/2003/01/31/world/threats-responses-nuclear-standoff-satellites-said-see-activity-north-korean.html; Seymour Hersh, "The Cold Test", *The New Yorker*, 27 January 2003, https://www.newyorker.com/magazine/2003/01/27/the-cold-test.
[15] Helen Cooper and Eric Schmitt, "U.S. Banks on Diplomacy with North Korea, but Moves Ahead on Military Plans", *New York Times*, 28 February 2018; Robin Wright, "What Would War with North Korea Look Like?", *The New Yorker*, 6 September 2017; Bruce Bennet, "A Surgical Strike against North Korea? Not an Option", *RAND blog*, 14 July 2017, https://www.rand.org/blog/2017/07/a-surgical-strike-against-north-korea-not-a-viable.html.
[16] Scott Stossel, "North Korea: The War Game", *The Atlantic*, July/August 2005.
[17] For an overview see Nuclear Threat Initiative, "North Korea: Chemical", December 2017, http://www.nti.org/learn/countries/north-korea/chemical/.

lifetimes … the bottom line is it would be a catastrophic war."[18] A war that escalated to the use of nuclear weapons would be even more disastrous and cause many millions of casualties.[19] Reducing the risk of nuclear conflict is therefore paramount given the foreseeable and devastating humanitarian, economic, and environmental effects of nuclear use, particularly if nuclear weapons were detonated in or near populated areas.

Using nuclear weapons against the DPRK

The very real risks of nuclear violence prompt serious thinking about reducing the role of nuclear weapons in the current confrontation. Here, the US could take specific steps to reduce the role of nuclear weapons in war-planning against the DPRK. There are three reasons for focusing on the US. First, the use of US nuclear weapons in a war with the DPRK would be unnecessary. This is because, second, the US and its allies are operating from a position of profound military, economic, and political strength compared to the DPRK. This stark asymmetry in power gives Washington more options and leeway when it comes to the role of nuclear weapons and underlines its profound responsibility for ensuring that nuclear weapons are never used. Third, the asymmetry of interests at stake (i.e. survival, in the case of the Kim regime) means that the DPRK currently has little interest in reducing the role of nuclear weapons, but in increasing their role in order to deter a US attack "as a matter of life or death".[20] This does not exonerate the DPRK of responsibility but instead emphasizes the leadership opportunities and, arguably, obligations of the US. The following sections develop the case for denuclearizing US war plans with respect to the DPRK before discussing the role of reassurance in reducing the role of nuclear weapons.

Any use of nuclear weapons by the US and DPRK would in all likelihood be part of an all-out war between the US–ROK and DPRK that escalated from lower levels of conventional aggression by the DPRK (of which it has a long history) or a limited, preventative, conventional counter-proliferation attack by the US.[21] It is extremely unlikely that the US, ROK, or DPRK would launch a surprise all-out war, but we can imagine plausible pathways from a low level of conflict to nuclear use.[22]

The US has a long history of planning for the use of nuclear weapons against so-called "rogue" States armed with weapons of mass destruction, particularly Iraq, Iran, and the DPRK.[23] Following the Korean War the US deployed hundreds of tactical nuclear weapons in the ROK before withdrawing them in 1991.[24] US nuclear targeting of "rogue" States after the Cold War centred on destroying "hardened and deeply buried targets" (HDBTs) that house leadership bunkers; chemical, biological and nuclear weapons and delivery systems; and command and control facilities. These types of facility cannot be destroyed with conventional weapons but could be destroyed with earth-penetrating nuclear weapons. The 2018 US Nuclear Posture Review, for example, included a specific section on "tailored deterrence" of the DPRK and its hardened and deeply buried military and

[18] CBS News, "Transcript: Defense Secretary James Mattis on 'Face the Nation,' May 28, 2017", 28 May 2017, at https://www.cbsnews.com/news/transcript-defense-secretary-james-mattis-on-face-the-nation-may-28-2017/.
[19] Michael Zagurak, "A Hypothetical Nuclear Attack on Seoul and Tokyo: The Human Cost of War on the Korean Peninsula", 38 North, 4 October 2017, https://www.38north.org/2017/10/mzagurek100417/.
[20] See remarks by Choe Son Hui, head of US affairs at the DPRK Foreign Ministry, at the Moscow Non-Proliferation Conference, 19–20 October 2017, http://cenessrussia.org/ceness/transcripts/8_The%202017%20MNC%20Transcript%20Security%20in%20Northeast%20Asia%20ENG.pdf.
[21] See Robert Jervis, "Unpacking a US Decision to Use Force Against North Korea", 38 North, January 2018.
[22] For example, Philip Gordon, "A Vision of Trump at War", *Foreign Affairs*, 27 March 2017, https://www.foreignaffairs.com/articles/2017-03-22/vision-trump-war; Jeffrey Lewis, "This is how nuclear war with North Korea would unfold", *The Washington Post*, 8 December 2017.
[23] See Hans Kristensen and Joshua Handler, "The USA and counter-proliferation: a new and dubious role for U.S. nuclear weapons", *Security Dialogue* 27:4, 1996, pp. 387–99; Nick Ritchie, *US Nuclear Weapons Policy after the Cold War*, 2008, pp. 59–66.
[24] See Hans Kristensen and Robert Norris, "A history of US nuclear weapons in South Korea", *Bulletin of the Atomic Scientists* 73:6, 2017, pp. 349–357.

command and control facilities, insisting that "the United States will continue to field a range of conventional and nuclear capabilities able to hold such targets at risk".[25]

If the US were to use nuclear weapons to attack DPRK HDBTs, it would likely use its only nuclear "bunker buster" weapon: a stockpile of 50 B61-11 bombs developed in the 1990s that can penetrate 5–8 metres into the ground with a variable explosive yield of up to 400 kilotons.[26] A US nuclear attack against multiple HDBTs that could not be destroyed or incapacitated with conventional weapons would likely involve multiple nuclear detonations at multiple locations in the DPRK.[27]

Beyond targeting HDBTs, the US might also consider the use of lower yield nuclear weapons, such as the B61-3 and B61-4, with a range of yields from 0.3 to 170 kilotons, against DPRK ground forces in the event that US and ROK forces were in danger of defeat. This would appear unlikely given US–ROK advantages in firepower, technology, intelligence, training, and resilience, but a local defeat scenario is not implausible.[28]

Nuclear weapons might also be used to try to destroy a facility thought to contain chemical or biological weapons.[29] Nuclear weapons might have a better chance of destroying the facility compared to conventional weapons depending on the extent of hardening and depth of the facility below the surface. There have been repeated calls in US nuclear debates for the development of low-yield nuclear weapons and "mini-nukes" for battlefield use in such scenarios. This is in part because high-yield multiple-warhead strategic nuclear weapons were deemed unsuitable for deterring "rogue" States.[30]

Limits and consequences of nuclear weapon use by the US

The efficacy of the US using nuclear weapons in the Korean context is, however, very limited. For HDBTs, Ivan Oelrich et al. argue that there is a narrow band of depth that is "greater than can be attacked with conventional weapons but not so deep as to be out of reach even of nuclear weapons".[31] They calculate that a B61-11 could destroy lined tunnels dug into a granite mountain up to 300 metres deep and unlined tunnels up to 550 metres deep. Facilities beyond this depth will not be destroyed by the weapon's pressure wave, and there are no technical hurdles to building at that depth. The DPRK is expert at tunnelling, with a number of its nuclear and military command and control facilities reportedly at depths of 300 metres or more.[32]

Underground facilities are also difficult to detect and characterize leaving substantial intelligence gaps. Even the use of tens of nuclear warheads might not destroy the DPRK's nuclear warheads, long-range missiles, and command and control infrastructure secured in hardened and deeply buried facilities. In the view of Rear Admiral Michael Dumont, Vice Director, Joint Staff: "The only

[25] US Department of Defense, Nuclear Posture Review, 2018, p. 33.
[26] For an overview see Hans Kristensen, "The birth of a bomb: B61-11", The Nuclear Information Project, April 2005, http://www.nukestrat.com/us/afn/B61-11.htm.
[27] See Christopher Woolf, "The Only Effective Arms against North Korea's Missile Bunkers are Nuclear Weapons, Says a Top War Planner", *Public Radio International*, 10 August 2017, https://www.pri.org/stories/2017-08-10/only-effective-arms-against-north-koreas-missile-bunkers-are-nuclear-weapons-says.
[28] See Franz-Stefan Gady, "Military Stalemate: How North Korea Could Win a War With the US", *The Diplomat*, 10 October 2017.
[29] US Department of Defense, "Report of the Defense Science Board Task Force on Future Strategic Strike Forces", February 2004, pp. 1.10, 7.11–7.12.
[30] For example, Thomas Dowler and Joseph Howard, "Countering the Well-Armed Tyrant: A Modest Proposal for Small Nuclear Weapons", *Strategic Review* 19: 4, 1991, pp. 34–40.
[31] Ivan Oelrich, Blake Purnell, and Scott Drewes, "Earth Penetrating Nuclear Warheads against Deep Targets: Concepts, Countermeasures, and Consequences", *Federation of American Scientists*, April 2005, p. 22, https://fas.org/programs/ssp/nukes/newweapons/erthpennuclrwhdsrpt.pdf.
[32] Soon Ho Lee, "Contemporary American Military Technology and North Korea's Hard and Deeply Buried Targets (HDBTs)", *Comparative Strategy* 32: 5, 2013, pp. 391.

way to 'locate and destroy—with complete certainty—all components of [the DPRK's] nuclear weapons programs' is through a ground invasion".[33]

Moreover, the detonation of high-yield earth-penetrating nuclear weapons at depths of a few metres would generate extensive lethal radioactive fallout that would spread across the DPRK, with lower levels of radiation likely to reach Japan and the ROK. The explosion would not be contained by the penetration of the bomb into the ground but would instead loft a vast amount of irradiated earth and surrounding vaporized matter into the air from the roughly 200-metre-wide crater that a B61-11 would create.[34]

The US might also plan to destroy hardened surface or near-surface WMD facilities and command and control bunker complexes using the overpressure created by a nuclear weapon detonated above the target, such as Trident submarine-launched ballistic missile warheads (W76-1 and W88), Minuteman Intercontinental Ballistic Missile (ICBM) warheads (W78 and W87) and Air-Launched Cruise Missiles (ALCM). If detonated at a height at which the fireball did not touch the ground, local radioactive fallout would be much less with little irradiation and dispersion of surface material, but the scale of devastation would be significantly greater than detonations a few metres underground. Use of these weapons is further complicated by the fact that US ICBMs targeting the DPRK would have to overfly the Russian Federation and China; US submarines would need to sail at least 2,500 nautical miles from port to avoid overflying the Russian Federation.[35]

The use of nuclear weapons to destroy DPRK chemical and biological warfare (CBW) agents would be very difficult. Any such use risks dispersion of lethal CBW agents. In 2005 the US National Academy of Sciences noted that:

> an attack with existing conventional weapons could cause the release in respirable form of 0.1 to 5 percent of the agent inventory. Calculations indicate that an attack with a nuclear weapon could result in comparable releases if the weapon was detonated close to but not within a facility, but much smaller releases if the weapon was detonated in the same room as the agent.[36]

The key point is that a nuclear explosion could potentially destroy CBW agents, but only if the weapon were detonated in the chamber where the chemical or biological weapons are stored.[37] The report also notes that a conventional alternative, the US BLU-118B thermobaric bomb, "if detonated within the chamber, may be able to destroy the agent".[38]

The use of nuclear weapons to destroy enemy forces was central to US nuclear doctrine during the Cold War when inferiority into terms of conventional forces incentivized NATO to plan for early use of battlefield nuclear weapons against an advancing Soviet army in Europe. Nevertheless, their use for such a purpose was rejected by US political leaders in the Korean War, Vietnam War, and the

[33] Letter to Representative Ted Lieu from Michael Dumont, Vice Director, Joint Staff, 27 October 2015, https://lieu.house.gov/sites/lieu.house.gov/files/Response%20to%20TWL-RG%20Letter%20on%20NK.pdf.
[34] Ivan Oelrich, Blake Purnell, and Scott Drewes, "Earth Penetrating Nuclear Warheads against Deep Targets: Concepts, Countermeasures, and Consequences", *Federation of American Scientists*, April 2005, p. 22, https://fas.org/programs/ssp/nukes/newweapons/erthpennuclrwhdsrpt.pdf. Full containment of a generic 300 kiloton weapon would require detonation at minimum depth of 800 metres: Committee on the Effects of Nuclear Earth-Penetrator and Other Weapons, *Effects of Nuclear Earth-Penetrator and Other Weapons*, National Academy of Sciences, 2005, p. 33.
[35] Joshua Pollack, "Nuclear Deterrence and the Revenge of Geography", *Arms Control Wonk*, 24 September 2017, https://www.armscontrolwonk.com/archive/1204122/nuclear-deterrence-the-revenge-of-geography/.
[36] Committee on the Effects of Nuclear Earth-Penetrator and Other Weapons, *Effects of Nuclear Earth-Penetrator and Other Weapons*, National Academy of Sciences, 2005, p. 94.
[37] Ibid., p. 93.
[38] Ibid., p. 111.

Gulf War because of the anticipated moral opprobrium. This "taboo" on nuclear use serves as an important political constraint on US behaviour.[39]

The case for planning to use nuclear weapons against the DPRK is therefore extremely limited. The number of HDBTs that could be successfully destroyed with nuclear weapons is small, with no certainty that all targets are known and could indeed be destroyed or disabled. The capacity for nuclear weapons to destroy CBW agents is also very limited. Moreover, the use of nuclear weapons would not and should not be considered purely in the context of the destruction of specific military facilities—any decision to use nuclear weapons would be momentous, particularly if the US were to use them first in a conflict.[40] The widespread civilian harm and environmental damage from the detonation of high-yield earth-penetrating weapons, and possibly high-yield airburst detonations and lower yield tactical nuclear weapons, the lack of warning for surrounding populations given the time sensitive nature of attacking such targets with nuclear weapons, and extensive irradiation of swathes of the DPRK and potentially Japan, ROK, China, and the Russian Federation very seriously undermines the case for nuclear use. This is compounded by the unprecedented international condemnation that would follow the use of nuclear weapons by the US, even if it did not initiate the conflict.

The use of nuclear weapons by the US would also set a very dangerous precedent that could be seen as legitimizing the use of nuclear weapons in other regional conflicts. Moreover, the use of indiscriminate weapons of extreme violence against Koreans would be extremely contentious in the ROK. It would also be extremely controversial in Japan as the only State to have suffered a nuclear attack.[41]

There is also the real risk that other military powers in the region—China, the Russian Federation, and Japan—would be drawn into a nuclear conflict, increasing its violence, harm, and unpredictability. China's *Global Times*, for example, reported that China would not intervene if Pyongyang initiated a conflict, but warned that "If the US and [ROK] carry out strikes and try to overthrow the [DPRK] regime and change the political pattern of the Korean Peninsula, China will prevent them from doing so."[42]

Removing nuclear weapons from US–ROK war plans

The role of nuclear weapons in deterring specific actions (for example, a major attack by the DPRK) by threatening specific nuclear attacks (to destroy or disable WMD and command and control HDBTs and potentially massed DPRK armed forces) is therefore very limited. The added deterrence value of nuclear weapons in the context of the wider and more credible deterrent role of US–ROK conventional forces and economic pressure may also be legitimately questioned.[43]

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[39] Nina Tannenwald, "The Nuclear Taboo: The United States and the Normative Basis of Nuclear Non-Use", *International Organization* 53: 3, 1999, p. 463.

[40] The US would plan on the worst-case assumption that the DPRK leadership would attempt to use some or all of its nuclear weapons early in a conflict while it still enjoyed full command and control of its forces, incentivizing early use of nuclear weapons by the US in a one-sided iteration of what Thomas Schelling described as "the reciprocal fear of surprise attack" in *The Strategy of Conflict*, 1960, pp. 207–230. See Vipin Narang and Ankit Panda, "Thinking through Nuclear Command and Control in North Korea", *The Diplomat*, 16 September 2017.

[41] The taboo against nuclear weapons outlined by Nina Tannenwald took hold in the US for a number of reasons, one of which was linked to race. The use of nuclear weapons against an Asian population after decades of violence against Arab populations in the Middle East would compound critiques of racism in US foreign policy. For example, Mahmood Mamdani, "Good Muslim, Bad Muslim: A Political Perspective on Culture and Terrorism", *American Anthropologist* 104: 3, 2002, pp. 766–775; and Randolph Persaud, "Neo-Gramscian Theory and Third World Violence: A Time for Broadening", *Globalizations* 13:5, 2016, pp. 547–562.

[42] Editorial, "Reckless Game over the Korean Peninsula Runs the Risk of War", *Global Times*, 10 August 2017, http://www.globaltimes.cn/content/1060791.shtml.

[43] See Benoit Pelopidas, "A Bet Portrayed as a Certainty", in Shultz, G. and Goodby, J. (eds), *The War that Must Never Be Fought*, 2015, p. 9.

US–ROK conventional forces constitute the overwhelming deterrent threat to the DPRK, including forward-deployed US troops, weapon systems and materiel, and major conventional military power projection capabilities rotated through the region such as aircraft carrier battle groups, fighter-bombers, and attack submarines. There is little if any doubt that US–ROK forces would defeat the DPRK and terminate the Kim dynasty through conventional firepower and blockades even if Pyongyang used its chemical and nuclear weapons against the ROK, US, and potentially Japan. The US and ROK have standing plans for rapid conventional responses to DPRK aggression that are routinely practiced through small-scale exercises and high-profile annual Key Resolve/Foal Eagle and Ulchi-Freedom Guardian exercises.[44] They are also developing tripartite US–ROK–Japan response plans.[45]

The US could therefore reduce the role of nuclear weapons by explicitly "denuclearizing" its war plans and decoupling nuclear weapons from deterring DPRK aggression. Explicitly denuclearizing war plans and exercises would involve targeting priority HDBTs with conventional weapons. The US has developed a suite of earth-penetrating conventional weapons for precisely this purpose. These include the GBU-57 Massive Ordnance Penetrator, GBU-28 penetrating warhead, and GBU-24 Advanced Penetrator Unit thermobaric bomb.[46] Disabling rather than destroying HDBTs with conventional weapons would likely centre on critical site components within and outside the target, such as blast doors, service tunnels, and energy, air and water systems.[47]

Explicit assurances to the DPRK on nuclear use and preventative war

In addition to formally removing nuclear weapons from war plans and exercises, the US could reduce incentives for Pyongyang to use nuclear weapons first and early in an escalating crisis by providing explicit reassurances to Pyongyang that the US and ROK will never use nuclear weapons against it, or attempt military-led regime change, unless Pyongyang launches a major attack on the US or ROK. This would be the equivalent of a negative security assurance that the US will never use its nuclear weapons against non-nuclear-armed States except under very specific conditions, only this time from a nuclear-armed State to a nuclear-armed State. This could include a commitment not to launch a limited, conventional, preventative attack against the DPRK. The irony here is that the development of nuclear weapons by the DPRK to deter the US–ROK from doing something they have little intention of doing (invading and occupying the DPRK) has become a profound cause of regime insecurity for Pyongyang. It enhances the attractiveness of limited preventative strikes that could escalate to precisely the outcome that the DPRK's nuclear programme was developed to prevent.

An explicit security assurance is not an aberrant suggestion. In August 2017, for example, US Secretary of Defense James Mattis and US Secretary of State Rex Tillerson insisted that "The U.S. has no interest in regime change or accelerated reunification of Korea."[48] Moreover, steps to normalize the US–DPRK relationship in ways that diminish the threat of US-led regime change have

[44] Park Byung-su, "S. Korean and US militaries draw up a new operation plan", *Hankyoreh*, 28 April 2015, http://english.hani.co.kr/arti/english_edition/e_northkorea/706442.html; Choe Sang-hun, "South Korea Plans 'Decapitation Unit' to Try to Scare North's Leaders", *New York Times*, 12 September 2017, https://www.nytimes.com/2017/09/12/world/asia/north-south-korea-decapitation-.html. The ROK outlined a new set of plans in its 2016 Defense White Paper to deter and counter any DPRK aggression: Kill Chain, Korean Air and Missile Defense (KAMD), and Korea Massive Punishment and Retaliation (KMPR). Ministry of National Defense, *Defense White Paper*, Seoul, December 2016, pp. 69–73.

[45] "South Korea, Japan Extend Military Intelligence Pact", *Nikkei Asian Review*, 26 August 2017, https://asia.nikkei.com/Politics-Economy/International-Relations/South-Korea-Japan-extend-military-intelligence-pact.

[46] Committee on the Effects of Nuclear Earth-Penetrator and Other Weapons, *Effects of Nuclear Earth-Penetrator and Other Weapons*, National Academy of Sciences, 2005, pp. 100–102.

[47] See Dennis Gormley, "Force Integration in Global Strike", in Wirtz, J. and Larsen, J. (eds), *Nuclear Transformation: The New U.S. Nuclear Doctrine*, 2005, p. 57.

[48] James Mattis and Rex Tillerson, "We're Holding Pyongyang to Account", *The Wall Street Journal*, 13 August 2017, https://www.wsj.com/articles/were-holding-pyongyang-to-account-1502660253.

been a consistent feature of their episodic diplomatic engagement, and undoubtedly will be again in any future negotiations. The 1994 Agreed Framework included commitments to work towards full political and economic relations and formal US assurances to the DPRK that it would not use or threaten to use nuclear weapons. The review of policy towards the DPRK under President Bill Clinton by Secretary of Defense William Perry recommended a new strategy of step-by-step progress to comprehensive normalization and a peace treaty with the DPRK.[49] In a subsequent joint US–DPRK communique following the historic visit of DPRK Vice Marshal Jo Myong Rok to the White House, both sides agreed that "neither government would have hostile intent toward the other and confirmed the commitment of both governments to make every effort in the future to build a new relationship free from past enmity".[50]

The US and DPRK also agreed through the 2005 Joint Statement of the six-party talks with the ROK, Japan, the Russian Federation, and China to "respect each other's sovereignty, exist peacefully together and take steps to normalize their relations subject to their respective bilateral policies" and "negotiate a permanent peace regime on the Korean Peninsula". The US also "affirmed that it has no nuclear weapons on the Korean Peninsula and has no intention to attack or invade the DPRK with nuclear or conventional weapons."[51]

Non-proliferation and reassurance of the ROK

US nuclear weapons are seen to serve a second purpose beyond deterrence of DPRK aggression—that of reassuring the ROK. A core argument here is that absent US nuclear guarantees, US allies like the ROK would procure their own independent nuclear arsenals.[52] As the 2018 US Nuclear Posture Review put it, "effectively assuring allies and partners depends on their confidence in the credibility of U.S. extended nuclear deterrence. They have reaffirmed that extended nuclear deterrence is essential to their security, enabling most to eschew possession of nuclear weapons".[53]

But the reassurance argument is reductive. It limits Seoul's national security choices to either a US nuclear guarantee or an indigenous nuclear capability. Both choices are nuclear with non-nuclear alternatives discounted.[54] Despite calls for either the reintroduction of US nuclear weapons or an indigenous programme[55], the idea of a ROK nuclear weapons programme to counter the DPRK is politically and strategically problematic. Politically, it would require the ROK to withdraw from the NPT, as the DPRK has done, and disrupt its political relationships with China, Japan, and many other States, perhaps radically so (and which might prompt other States such as Japan to develop their own nuclear weapons). Strategically, a mutual nuclear deterrence relationship on the Korean peninsula would be dangerous given the risk of inadvertent and rapid escalation to nuclear violence

[49] William Perry, "The North Korean Policy Review: What Happened in 1999", 11 August 2017, http://www.wjperryproject.org/notes-from-the-brink/the-north-korean-policy-review-what-happened-in-1999; William Perry, "Review of United States Policy towards North Korea: Findings and Recommendations", 12 October 1999, https://nsarchive2.gwu.edu/NSAEBB/NSAEBB87/nk20.pdf.

[50] US Department of State, "U.S.-D.P.R.K. Joint Communique", 12 October 2000, https://1997-2001.state.gov/regions/eap/001012_usdprk_jointcom.html.

[51] "Joint Statement of the Fourth Round of the Six-Party Talks", 19 September 2005, http://www.atomicarchive.com/Reports/Northkorea/JointStatement.shtml.

[52] Bob Einhorn and Duyeon Kim, "Will South Korea Go Nuclear?", *Bulletin of the Atomic Scientists*, 15 August 2016, https://thebulletin.org/will-south-korea-go-nuclear9778; David McNeil, "Call for Japan to Consider End to Non-nuclear Principles Due to N Korea", *The Irish Times*, 7 September 2017, https://www.irishtimes.com/news/world/asia-pacific/call-for-japan-to-consider-end-to-non-nuclear-principles-due-to-n-korea-1.3212640.

[53] US Department of Defense, Nuclear Posture Review, 2018, p. 23.

[54] See Benoit Pelopidas, "The Nuclear Straitjacket", in Von Hlatky, S. and Wenger, A. (eds), *The Future of Extended Deterrence*, 2015, pp. 73–105.

[55] See "Main opposition party adopts U.S. tactical nuke redeployment as official party line" *Yonhap News*, 16 August 2017, http://english.yonhapnews.co.kr/national/2017/08/16/0301000000AEN20170816007851315.html. See also Richard Sokolsky, "The Folly of Deploying U.S. Tactical Nuclear Weapons to South Korea", *Carnegie Endowment for International Peace*, 1 December 2017, http://carnegieendowment.org/2017/12/01/folly-of-deploying-u.s.-tactical-nuclear-weapons-to-south-korea-pub-74900.

compounded by the absence of early warning, leadership misperception, limited communication, and the fact that the DPRK's nuclear capability appears to be aimed at deterring Washington, not Seoul.

Nuclear reassurance of Seoul by Washington as a solution to the possibility of nuclear coercion by the DPRK is also overplayed. The DPRK might try to use its nuclear capabilities for coercion, but the empirical record on nuclear coercion suggests that it will be ineffective.[56] Nuclear weapons might also embolden the DPRK to engage in riskier conventional attacks, although it already has a long history of conventional violence against the ROK, including attempting to assassinate presidents, downing of commercial airliners, shelling of territory, and sinking of warships.[57] This pattern of behaviour may well continue, but US nuclear weapons (and ROK nuclear weapons were Seoul to develop them) are of little relevance in preventing or deterring lower-level military confrontations that the DPRK might initiate given the depth and breadth of US–ROK conventional responses. The reassurance role played by US nuclear weapons is therefore overplayed in the context of the wider defence relationship and far more credible conventional deterrence commitment of the US.

Reducing the role of nuclear weapons on the Korean peninsula therefore suggests an important role for ROK citizens, parliamentarians, and media. They can play an important part in marginalizing nuclear weapons in US–ROK war planning and military exercises because of the lack of utility of these weapons and the appalling effects of nuclear use. This would require specific ROK understandings of what constitutes a credible non-nuclear security assurance from the US that eschews any role for nuclear weapons. They could also go an important step further and delegitimize nuclear weapons and nuclear deterrence for the US, ROK, and DPRK as dangerous and destabilizing weapons that risk unprecedented civilian harm, environmental destruction, and economic ruin if used. This could be incorporated into President Moon Jae-in's "Sunshine 2.0" policy towards the DPRK that reflects enduring "identity norms" of tolerance and engagement.[58] It would build on the expansion of the US–ROK alliance beyond military patronage to a much deeper partnership encompassing a global foreign policy agenda, one in which US nuclear weapons are of diminishing relevance.[59] Citizens, parliamentarians, and media in Japan could adopt a similar strategy in the context of the US–Japan security relationship and the DPRK. This would necessarily frame nuclear deterrence as part of the peninsula's security problem rather than part of the security solution. This is important because by explicitly or tacitly supporting a role for US nuclear weapons in their national security, the ROK and Japan reinforce the value of nuclear weapons in global politics and the legitimacy of nuclear deterrence for all States that feel similarly insecure—including the DPRK.

Steps the DPRK and China could take to reduce the role of nuclear weapons in the current confrontation

As explained at the outset, this paper has primarily concerned itself with steps the US could take to reduce the role of nuclear weapons in its confrontation with the DPRK. Nevertheless, the onus for taking such steps falls on all parties to the 1953 armistice: the DPRK, the US (representing United

[56] See Todd Sechser and Matthew Fuhrman, "Crisis Bargaining and Nuclear Blackmail", *International Organization* 67:1, 2013, p. 192; Jacek Kugler, "Terror without Deterrence", *The Journal of Conflict Resolution* 28:3, 1984, pp. 479–482; Michael McCGwire, "Is There a Future for Nuclear Weapons", *International Affairs* 70: 2, 1994, p. 214.

[57] See Anthony Cordesman, "The Military Balance in the Koreas and Northeast Asia", Center for Strategic and International Studies, January 2017, pp. 1–5.

[58] Key-Yeoung Son, "Entrenching 'Identity Norms' of Tolerance and Engagement: Lessons from Rapprochement between North and South Korea", Review of International Studies 33, 2007, pp. 489–509.

[59] See The White House, "The United States-Republic of Korea Alliance: Shared Values, New Frontiers", 16 October 2015, https://obamawhitehouse.archives.gov/the-press-office/2015/10/16/joint-fact-sheet-united-states-republic-korea-alliance-shared-values-new.

Nations Command), and China. Each has a responsibility to manage the conflict in ways that preclude open war, especially nuclear war.

There are three specific steps the DPRK could take in the short term to reduce the role of nuclear weapons in the current phase of the confrontation. First, Pyongyang could declare a moratorium on nuclear tests and long-range ballistic missile tests, as it did in the past in the context of its long-range missile tests from September 1999 until July 2006. Second, it could publish a formal declaratory nuclear policy, for the purposes of transparency and predictability, on the conditions under which it would consider using its nuclear weapons, including a commitment to no-first-use and a negative security assurance that it will not use or threaten to use nuclear weapons against non-nuclear armed States.[60] Third, it could develop detailed and practical proposals for a peace treaty to replace the 1953 Armistice Agreement with the US that builds on its previous statements, including how it might be negotiated, and the effects of a peace agreement on its nuclear and ballistic missile programmes.[61] This could include a process by which it would re-join the NPT (which it left in 2003) and the International Atomic Energy Agency (which it left in 1994). It is here that pressure from Beijing could be usefully and plausibly applied.

These suggestions tacitly recognize the DPRK as a nuclear-armed State and could be rejected for legitimizing that status. This would be wrong-headed. The DPRK is a de facto nuclear-armed State, albeit one with a basic capability, and managing the confrontation in ways that reduce the risks of nuclear violence means engaging with that reality.[62] However, one could ask the same question of the DPRK as the one asked here of the US: does it need nuclear weapons to deter attack? Space precludes a detailed consideration, but a case can be made that the harm the DPRK could inflict on Seoul and US citizens and armed forces in the ROK with its conventional capabilities is sufficient, given the interests at stake for the US.[63]

China also has a wider to role to play, potentially in coordination with the US. Although China has not threatened to use nuclear weapons in the context of war on the Korean peninsula, there are three ways in which it could have an indirect effect to reduce the risk of nuclear violence. First, it could use economic pressure to persuade the DPRK not to conduct any further nuclear weapons and long-range ballistic missile tests. Quite how far China is prepared to go beyond recent steps to support United Nations sanctions—and how receptive the DPRK would be to Chinese pressure—remains unclear. Notably since the death of Kim Jong-il, there are indications the relationship has cooled between Beijing and Pyongyang. The relationship appears to be primarily economic and strategic rather than fraternal, despite routine references to their 1961 Treaty of Friendship, Cooperation, and Mutual Assistance and a common history of communist struggle.[64]

Second, Beijing could play an important crisis management role through facilitation of dialogue. This would build on its decision to initiate what became the six-party talks that began with an initial meeting in Beijing in April 2003 between China, the US, and the DPRK to forestall a crisis over Pyongyang's nuclear programme. Managing and de-escalating dangerous phases of the US–ROK–DPRK conflict is a core interest for China. It seeks to avoid a war on the peninsula into which it could

[60] As Vipin Narang and Ankit Panda suggest in "Thinking through Nuclear Command and Control in North Korea", *The Diplomat*, 16 September 2017. For example, in May 2016 during the seventh Workers' Party of Korea Congress, Kim Jong-un declared that the DPRK "will not use a nuclear weapon unless its sovereignty is encroached upon by any aggressive hostile forces with nukes, as it had already declared." Roberto Bendini, "North Korea: Seventh Party Congress Enshrines Nuclear Ambitions but Says Little about Economic Reform", Directorate General for External Policies, European Parliament, June 2016, p. 8.

[61] See D. Shin, "North Korea's Perspectives in its Argument for a Peace Treaty", *Asian Affairs* 48: 3, 2017, pp. 510–528.

[62] Michael Swaine makes this point in "Time to Accept Reality and Manage a Nuclear-armed North Korea", Carnegie Endowment for International Peace, 11 September 2017, http://carnegieendowment.org/2017/09/11/time-to-accept-reality-and-manage-nuclear-armed-north-korea-pub-73065.

[63] Jonathan Pollack, *No Exit: North Korea, Nuclear Weapons and International Security*, Adelphi paper 418, 2010, p. 194.

[64] Eleanor Albert, "The China–North Korea Relationship," *CFR Backgrounder*, Council on Foreign Relations, 27 September 2017, https://www.cfr.org/backgrounder/china-north-korea-relationship.

be dragged, which would certainly affect its economic growth priorities, and could cause a collapse of the DPRK—something Beijing has said it will not accept. Beijing's "freeze-for-freeze" proposal outlined in March 2017 to suspend DPRK missile and nuclear activities in exchange for the halting of increasingly large-scale US–ROK military exercises was the latest example of this approach.[65]

Third, and relatedly, Beijing could extend a formal positive security assurance to the DPRK in the context of any future multilateral negotiations, but conditional upon no-first-use of nuclear weapons at a minimum. Beijing has embedded what John Park calls a "regime security assurance" to Pyongyang through a Communist Party of China–Workers' Party of Korea relationship since the mid-2000s. He describes this as a "package deal" that exchanged regime survival and economic development assistance for nuclear restraint. The dynastic accession of Kim Jong-un and his provocative nuclear and missile tests have strained this deal.[66]

Quite how far China might be prepared to go to coerce the DPRK to relinquish its nuclear arsenal altogether, for example by suspending aid, fully implementing United Nations sanctions, or terminating trade altogether, is uncertain. Steps that risk the collapse of the DPRK will not be accepted and China's capacity to act is often overstated.[67] This has prompted a number of analysts to propose a "grand bargain" between the US and China to resolve or transform their main points of strategic and economic confrontation, which would include denuclearization of the DPRK.[68]

Conclusion

Nuclear weapons and nuclear deterrence have become embedded in the conflict between the US–ROK and DPRK. The risk of escalation to nuclear use is real, with dangerous incentives for use early in a conflict. The US, in partnership with the ROK, could take a number of measures, outlined in detail above, to reduce the role of nuclear weapons:

1. Explicitly removing nuclear weapons from war plans and exercises;
2. Extending formal assurances to the DPRK against nuclear attack or preventative conventional attack provided the DPRK does not launch a major attack against the US or its allies (noting that even under such conditions the use by the US of nuclear weapons would be unnecessary and widely condemned); and
3. Steps by the ROK and Japan to categorically eschew the nuclear component of their extended deterrence relationships.

The DPRK could also take a number of steps to reduce the risk of nuclear violence and China, too, has an important, if less direct, role to play in incentivizing DPRK restraint, crisis management, and the provision of positive security assurances to Pyongyang.

These suggestions run counter to Cold War thinking that says only nuclear weapons can deter nuclear weapons. For this reason, they are likely to face serious political opposition. Nevertheless, the relationship between deterrence and nuclear weapons in US thinking started to shift in the 1990s, particularly after September 2001, with a new emphasis on "tailored deterrence" encompassing all elements—conventional, nuclear and non-military—in a deterrence strategy. This paper suggests that the US and ROK develop a tailored deterrence strategy for the DPRK without

[65] Ministry of Foreign Affairs of the People's Republic of China, "Foreign Minister Wang Yi Meets the Press", 8 March 2017, http://www.fmprc.gov.cn/mfa_eng/zxxx_662805/t1444204.shtml.
[66] John Park, "Assessing the Role of Security Assurances in Dealing with North Korea", in Knopf, J. (ed.), *Security Assurances and Nuclear Nonproliferation*, 2012, pp. 189–218.
[67] For an overview, see Richard Lloyd Parry, "Advantage Pyongyang", *London Review of Books* 35:9, 9 May 2013, https://www.lrb.co.uk/v35/n09/richard-lloydparry/advantage-pyongyang.
[68] For example, Charles Glaser, "A U.S.-China Grand Bargain? The Hard Choice between Military Competition and Accommodation", *International Security* 39: 4, 2015, pp. 49–90.

nuclear weapons as an interim step pending the negotiation of a peace agreement to replace the current armistice and denuclearize the DPRK—a formidable task. Nevertheless, there is some hope at the time of writing that a planned meeting between Donald Trump and Kim Jong-un could herald a new negotiation process. Reducing the role of nuclear weapons in regional conflicts with nuclear-armed adversaries is very difficult. But it is a necessary step on the long-term path towards the global elimination of nuclear weapons as the only assured way of removing the risk of nuclear violence.

UNIDIR

Reducing the Role of Nuclear Weapons in North East Asia

Nick Ritchie

In August 2017 a roundtable of experts and former officials met in Hiroshima, Japan to discuss pathways towards nuclear disarmament in North East Asia. The deterioration in US–DPRK relations in 2017 precipitated by Pyongyang's technological advances in thermonuclear weapons and long-range ballistic missiles featured heavily.

The Hiroshima Roundtable Chairman's concluding statement suggested that to deter the DPRK, the US and its allies need not rely, or state publicly their reliance, on nuclear weapons due to the range of conventional deterrence options at their disposal. In consequence, this paper was commissioned by UNIDIR and the Hiroshima Prefecture, primarily to examine steps the US, alongside the ROK, could take to reduce the role of nuclear weapons in its strategy towards the DPRK.

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