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Chapter 14

APLN

ASIA-PACIFIC LEADERSHIP NETWORK
FOR NUCLEAR NON-PROLIFERATION AND DISARMAMENT

Great Power Risk Reduction Measures and Lessons for the Asia-Pacific

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Introduction

Risk reduction is one of the major tasks the international arms control, non-proliferation, and disarmament community struggles with today. Risks in the nuclear domain are among the most threatening faced by humanity for the simple reason that nuclear weapons are the most destructive instruments of war ever deployed and seem to remain so for a long time.[1] If living under constant threat of nuclear devastation is unnerving, it is even more so when one learns from senior nuclear decision makers that it was sheer luck as much as good judgement that humanity has survived this long.[2] It is irresponsible to leave the matters of such importance and danger to luck, so some actual nuclear risk reduction measures have been developed and put in place, with different levels of success.

There is substantial research on the topic of nuclear risk reduction.[3] This paper focuses on practical takeaways and solutions.

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[1] Other weapons of mass destruction are a great threat to humanity as well, however the immediate destructive power of nuclear weapons explosion (blast wave, radiation, fire) is simply unmatched by anything else ever created by people, not to mention the radiobiological effects and long-term contamination. Detailed information on nuclear weapons effects is available via the Atomic Archive project: https://www.atomicarchive.com/science/effects/index.html

[2] Interview with Robert McNamara, The National Security Archive, Accessed November 12, 2020, https://nsarchive2.gwu.edu/coldwar/interviews/episode-11/mcnamara2.html

[3] Example: Wan, Wilfred [ed]. 2020. "Nuclear Risk Reduction: Closing Pathways to Use" Geneva, Switzerland: UNIDIR, Accessed November 12, 2020, https://doi.org/10.37559/WMD/20/NRR/01

The Evolution of Nuclear Power Learning

Great powers, which can be conveniently defined as "nations that figure most decisively in international affairs,"[4] unfortunately, tend to compete, and within such competition they regularly find themselves embroiled in major crises. Once nuclear weapons entered the equation, the consequences and risks of these crises grow dramatically. A number of flashpoints during the Cold War—Suez 1956, Berlin 1961, Cuba 1962, Yom Kippur War 1973, Able Archer 1983, and others—brought major military powers on the brink of actual warfighting, which could have easily involved nuclear weapons. Probably the major takeaway from the resolution of all these crises was the need to set up and preserve lines of communication at all times—either informal (for example, between Kennedy and Dobrynin in 1962) or formal (hotlines, and, ultimately, Nuclear Risk Reduction Centers, as well as deconfliction mechanisms). Although the parties involved still tended to behave in ways that exploited or carelessly incurred risk at times, the intention not to spiral toward nuclear war was clearly demonstrated most of the time.

Even after such major stand-offs, however, many countries retain a chronic habit of mirror imaging.[5] Everyone plans for the worst-case scenario and sees only malign intentions in the other, no matter what the actual declarations behind different military postures or actions. Worst of all, the wrong perceptions of the adversary's calculus may lead to counteractions that contribute to speeding up the arms race and increase reliance on 'hard' deterrence based on military capabilities, thereby undermining readiness to pursue joint security mechanisms to ensure national security.

One event that exemplified such logic was the 'missile gap' perceived by the US military and intelligence in the 1970s. At the time, the Americans believed that Soviet missile development (both in terms of quality and quantity) was focused on achieving counterforce capability so to destroy most of the US nuclear delivery vehicles in a disarming first strike. Declassified documents

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[4] "Great power," *Merriam-Webster.com Dictionary*, Merriam-Webster, Accessed November 12, 2020, https://www.merriam-webster.com/dictionary/great%20power
[5] Michael Krepon, "Mirror Imaging," Arms Control Wonk blog, June 24, 2019, Accessed November 12, 2020, https://www.armscontrolwonk.com/archive/1207629/mirror-imaging/

show that this was neither the intention nor the actual capability of the USSR, but the US military "counter-buildup" was started and contributed to increased tensions of the early 1980s.[6]

Today we have similar dynamics in play with regard to Russia's alleged but actually non-existent "escalate-to-deescalate" strategy, which is used as a reason by the United States to develop weapons like low-yield nuclear warheads for submarine-launched ballistic missiles.[7]

Yet another example is how the US missile defense developments, which are (as of today) still incapable of substantially undermining strategic nuclear retaliation from any country, drive the military in Russia, China,[8] and, to some extent, even the Democratic People's Republic of Korea (DPRK) to develop countervailing offensive nuclear weapons which in turn lead to more arms racing. Of course, the reason to engage in "sword on shield" competition is that there are no limits on enhancing the "shield," as was understood long ago, when the original ABM Treaty was signed. It is noteworthy that the now-adamant Russian belief in the "negative" link between strategic defensive and offensive weapons is also an example of "learning," as originally this was an American idea.

Eventually, 'proper' arms control treaties first limiting, and then reducing nuclear arsenals (including destruction of some weapon classes) came into being, and the most important concept jointly developed and understood by the end of Cold War was that of "strategic stability," based on the idea to "remove incentives for a nuclear first strike."[9] This core notion remains relevant even today, including in ongoing Strategic Stability Dialogue between Russia and the United States. As President Vladimir Putin disclosed back in November 2020, Russia's "proposals on devising a new "security equation," that "take into consideration all factors affecting strategic

[6] Pavel Podvig, "The Window of Vulnerability That Wasn't: Soviet Military Buildup in the 1970s—A Research Note"—A Research Note, *International Security*, 33:1, 2008, 118-138, Accessed November 12, 2020, https://doi.org/10.1162/isec.2008.33.1.118

[7] Konstantin Bogdanov, "Not-so-Nuclear War," Russian International Affairs Council, March 10, 2020, Accessed November 12, 2020, https://russiancouncil.ru/en/analytics-and-comments/analytics/not-so-nuclear-war/

[8] Ankit Panda, ("On 'Great Power Competition'" (Nuclear Risk Reduction Policy Brief No. 1). Geneva, Switzerland: UNIDIR, 2020, Accessed November 12, 2020, https://doi.org/10.37559/WMD/20/NRR/02

[9] Soviet-United States Joint Statement on Future Negotiations on Nuclear and Space Arms and Further Enhancing Strategic Stability, 1990-06-01, Accessed November 12, 2020, https://bush41library.tamu.edu/archives/public-papers/1938

stability with a special emphasis on first-strike capability" were sent to American partners.[10] This proposal remains standing and was re-iterated in April 2021, and, hopefully, negotiations can include other nuclear weapon states as well.[11]

Formal and Informal US-Soviet Rules of the Road

As prefigured previously, one of the most important ways to manage great power competition is to establish a framework of deconfliction formats and communication channels.

The content of existing agreements[12] on the prevention of dangerous military activities can be distilled into three main areas of action:

- incident prevention

- assured communication

- help in the event of an incident

The types of dangerous military activities addressed by such measures, as a rule, include the following:

- entry of military personnel and/or equipment of the one party into the national territory of the other party, due to *force majeure*, that is, as a result of unintentional actions;

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[10] Meeting with senior Defence Ministry officials, heads of federal agencies and defence industry executives, November 10, 2020, Accessed 12 November 2020, http://en.kremlin.ru/events/president/news/64392

[11] "As the leader in the creation of new-generation combat systems and in the development of modern nuclear forces, Russia is urging its partners once again to discuss the issues related to strategic armaments and to ensure global stability. The subject matter and the goal of these talks could be the creation of an environment for a conflict-free coexistence based on the security equation, which would include not only the traditional strategic armaments, such as intercontinental ballistic missiles, heavy bombers and submarines, but—I would like to emphasize—all offensive and defensive systems capable of attaining strategic goals regardless of the armament." Presidential Address to the Federal Assembly, April 21, 2021, Accessed April 23, 2021, http://en.kremlin.ru/events/president/news/65418

[12] For example, Agreement Between the Government of The United States of America and the Government of The Union of Soviet Socialist Republics on the Prevention of Incidents On and Over the High Seas, Accessed November 12, 2020, https://2009- 2017.state.gov/t/isn/4791.htm

- the use of a laser in such a way that it can harm the personnel or damage the equipment of the armed forces of the other party;
- hindering the actions of the military personnel and/or equipment of the other party in a way that may cause harm to personnel or damage to equipment;
- interfering with control networks,[13] which may harm personnel or damage equipment of the armed forces of the other party.

The parties are obliged to undertake measures such as those in the US-Soviet 1989 agreement for the prompt "termination and resolution of peaceful means, without resort to the threat of use of force, or any incident which may arise as a result of dangerous military activities."[14] It is useful to note that while Russia has concluded several relevant bilateral agreements with the United States, similar documents have been drawn up and signed by Russia with numerous other countries, including Greece, Canada, and the Republic of Korea.

In the agreements between the Soviet Union and other countries (mainly NATO members) on the prevention of incidents on the high seas and in the airspace above it, the parties assumed the following obligations:[15]

- stay at a sufficient distance;
- avoid any manoeuvres that impede action or create a hazard;
- adhere to the standard or other mutually agreed signals;
- not undertake simulation attacks by turning guns, launchers, torpedo tubes, and other types of weapons in the direction of the oncoming ship of the other party, not throw any objects in the direction of the oncoming ships of the other party, and not use searchlights

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[13] This part actually provides some kind of a blueprint for future agreements addressing cyberwarfare and electronic warfare.

[14] Agreement Between the Government of The United States Of America and the Government of the Union of Soviet Socialist Republics on The Prevention Of Dangerous Military Activities, signed January 12, 1989, text at: https://www.jstor.org/stable/20693340?seq=1

[15] More details can be found, for example, in the European Leadership Network Policy Brief "Managing Hazardous Incidents in the Euro-Atlantic Area: A New Plan of Action" by L.Kulesa, T.Frear and D.Raynova, November 2016, https://www.europeanleadershipnetwork.org/wp-content/uploads/2017/10/ELN-Managing-Hazardous-Incidents-November-2016.pdf, Accessed April 23, 2021.

or other powerful lighting means for illuminating the bridges of oncoming ships of the other party;

- share relevant information on collisions, property damage incidents, or other incidents at sea between ships and aircraft.

Another document, which is even more closely related to the topic of nuclear risk reduction, is the Agreement on the Prevention of Nuclear War between the USSR and the United States.[16] Despite its high-level goal, however, this agreement is a typical example of a boilerplate set of measures to reduce risk that largely reiterate existing commitments under international law. According to this document, the parties undertake to "refrain from the threat or use of force against the other Party, against the allies of the other Party, and against other countries in circumstances that may endanger international peace and security." In the event of a risk of nuclear war, they undertake the following obligations: "Acting in accordance with the provisions of this Agreement, [to] immediately proceed to urgent consultations with each other and make every effort to prevent this risk" and to inform the "UN Security Council, the UN Secretary General and the governments of allied or other countries on the progress and results of the consultations."

It is noteworthy that the recently released "Basic Principles of State Policy of the Russian Federation on Nuclear Deterrence"[17] to some extent follow the steps of the aforementioned Agreement when it states (at page 20):

> The President of the Russian Federation might, if necessary, inform the military-political leadership of other states and/or international organizations about the Russian Federation's readiness to use nuclear weapons or about the decision taken to use nuclear weapons, as well as about the fact that nuclear weapons have been used.

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[16] Agreement Between the United States of America and The Union of Soviet Socialist Republics on the Prevention of Nuclear War, US Department of States, Archived Content, Accessed November 12, 2020, https://2009-2017.state.gov/t/isn/5186.htm

[17] Basic Principles of State Policy of the Russian Federation on Nuclear Deterrence, Accessed November 12, 2020, https://mid.ru/ru/foreign_policy/international_safety/1434131/?lang=en

It seems that the array of international agreements in the field of preventing military incidents between the signatory countries is a valuable tool. Concurrently, the agreements leave room for interpretation and, in some cases, even provide arguments for the escalation of rhetoric, indicating the extremely provocative nature of the actions of one side or another in a military confrontation.

Bringing in Other States: the NPT Regime

The world does not consist only of the great powers. For many countries who do not otherwise rise to great power status, nuclear weapons capability is viewed as an "entry ticket" to enter the great power club. The Nuclear Non-Proliferation Treaty (NPT) was established to address this challenge. The NPT regime itself was and remains mostly related to the reduction of the risk of nuclear proliferation, not the risk of the use of nuclear weapons. However, its Article VI, providing for nuclear disarmament, as well as (what is often forgotten) general disarmament,[18] of course contributes to the nuclear risk reduction as well.

At the same time, the four countries outside of the NPT regime that possess nuclear weapons complicate nuclear war risk management, but they also present opportunities for local and regional risk reduction measures because they are—or should be—universally applicable.

The most significant nuclear risk reduction architecture is that proposed in the so-called P5 format, that is, between and among the five permanent (and nuclear-armed) members of the UN Security Council. Regular meetings and statements by the "NPT-legitimated" nuclear weapon states contribute to greater understanding between these five countries and help to develop or at the very least discuss some joint initiatives.[19] Moreover, some of the official P5 statements positively affect the nuclear risk reduction process, for example, the one made in the year 2000 on de-targeting:

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[18] Treaty on the Non-Proliferation of Nuclear Weapons (NPT), Accessed November, 12 2020, https://www.un.org/disarmament/wmd/nuclear/npt/text

[19] The European Leadership Network contributes to this process a lot, for example, Accessed November 12, 2020, https://www.europeanleadershipnetwork.org/the-p5-process/

> Emphasizing the essential importance of cooperation, demonstrating and advancing mutual trust among ourselves, and promoting greater international security and stability, we declare that none of our nuclear weapons are targeted at any State.[20]

Of course, nuclear de-targeting in itself is a big challenge in terms of verification, and, given the current level of technological development, "re-targeting" probably can be done in a matter of minutes. Nonetheless, such statements highlight the inclination of the great powers to reduce the risk of nuclear war and send the positive, risk-reducing signals to the international community. Thus, it is most welcome that de-targeting was re-iterated by the P5 in January 2022, together with the joint statement affirming that "a nuclear war cannot be won and must never be fought."[21]

Nuclear Taboo, the ICJ Ruling, and the LOAC

So far, the nuclear taboo, understood as the non-use of nuclear weapons in warfighting, has stood for the last seventy-six years, and it is augmented with an almost universal cessation of nuclear tests.

However, this nuclear taboo is more of a customary phenomenon rather than a legal one. In 1996 the International Court of Justice (ICJ) rendered its Advisory Opinion on the legality of the threat or use of nuclear weapons,[22] which emphasized the controversial nature of the problem in question: while there are no explicit prohibitions on the nuclear weapons, their characteristics make the Law Of Armed Conflict (LOAC) challenging to apply, especially in relation to the protection of civilians and avoidance of unnecessary suffering to the combatants.

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[20] Letter dated 1 May 2000 from the representatives of France, the People's Republic of China, the Russian Federation, the United Kingdom of Great Britain and Northern Ireland, and the United States of America addressed to the president of the 2000 Review Conference of the Parties to the Treaty on the Non-Proliferation of Nuclear Weapons, Accessed November, 12, 2020, https://documents-dds-ny.un.org/doc/UNDOC/GEN/N00/411/96/pdf/N0041196.pdf?OpenElement

[21] Joint Statement of the Leaders of the Five Nuclear-Weapon States on Preventing Nuclear War and Avoiding Arms Races, January 03, 2022, Accessed January 12, 2020, https://www.whitehouse.gov/briefing-room/statements-releases/2022/01/03/p5-statement-on-preventing-nuclear-war-and-avoiding-arms-races/

[22] Legality of the Threat or Use of Nuclear Weapons, Accessed November 12, 2020, https://www.icj-cij.org/en/case/95

Nevertheless, some nuclear armed states declare adherence to the LOAC in their declaratory policies. Still, this raises the question about the proportionality, and whether such thing can be achieved if the nuclear threshold were in fact to be crossed by nuclear use.

Currently, it seems, a new direction of research is being developed, which focuses on 'responsible' or accountable nuclear arsenals.[23] One of its aims is to find a way to establish limits to the destructiveness of nuclear weapons in possession of every state. This might have the opposite results, however, because if there is no threat of regional (if not global) extermination from nuclear war, some decision makers might become more eager to use nuclear weapons in conflict, that is, break the nuclear taboo. In the worst case, only one nuclear weapon might be used, and when the dust settles and the sky has not fallen, other nuclear weapons states may become more inclined to use nuclear weapons.

One way to reinforce the nuclear taboo is to act at the level of declaratory doctrine. To this end, nuclear armed states should commit to a multilateral version of the Reagan-Gorbachev statement that the nuclear war cannot be won and must never be fought.[24] Such initiatives have been in place for some time[25] and are finally fruitful.[26]

Rules of the Road: Counter-NC3, Strategic ASW, Cyber and Space Warfare

The previous section argued that rules of the road in the nuclear domain should be continuously developed and refined. As mentioned earlier, deconfliction agreements and hotlines are imperfect,

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[23] George Perkovich, Toward Accountable Nuclear Deterrents: How Much is Too Much?, February 11, 2020, Accessed November 12, 2020, https://carnegieendowment.org/2020/02/11/toward-accountable-nuclear-deterrents-how-much-is-too-much- pub-80987

[24] Joint Soviet-United States Statement on the Summit Meeting in Geneva, November 21, 1985, Accessed November 12, 2020, https://www.reaganlibrary.gov/archives/speech/joint-soviet-united-states-statement-summit-meeting-geneva

[25] Lewis Dunn, William Potter, Time to Renew the Reagan-Gorbachev Principle, Arms Control Today, March 2020, Accessed November 12, 2020, https://www.armscontrol.org/act/2020-03/features/time-renew-reagan-gorbachev-principle

[26] Joint Statement of the Leaders of the Five Nuclear-Weapon States on Preventing Nuclear War and Avoiding Arms Races, January 03, 2022, Accessed 12 Jan, 2020, https://www.whitehouse.gov/briefing-room/statements-releases/2022/01/03/p5-statement-on-preventing-nuclear-war-and-avoiding-arms-races/

but they help to reduce risks, including nuclear risks. Unrestrained competition is bad for everyone, no matter what some former US officials had claimed.[27]

There are some domains where such competition is exceptionally damaging for strategic stability, and such off-road behavior should be tightly constrained by what one might term "rules of the road." One of those would be the threats toward nuclear command, control, and communications (NC3) systems that ensure that a nuclear armed state can retaliate under any circumstance (the basis of strategic stability) while also ensuring that nuclear weapons are never used by mistake. The nuclear great powers have all invested in upgrading the reliability and survivability of their NC3 in recent years,[28] the imperative that flows from the possible degradation or complete loss of the NC3 system is to pre-delegate nuclear use authority to the lower echelons of command, with obvious risks of the potential loss of control at critical junctures that might actually cause a nuclear war.

Nevertheless, for military planners it might seem extremely useful to target precisely command and control nodes and centers to limit the warfighting capabilities of the adversary. In case of conventional conflict. such planning might have some deterrent effect. When nuclear weapons and nuclear deterrence are added to the equation, however, the threat of 'decapitation' becomes a grave concern for any actor.

One of the most sensitive dimensions of strategic stability is the relative vulnerability of the sea-based nuclear deterrence. Anti-submarine warfare (ASW) on a strategic level can increase SSBN (ballistic missile-carrying submarines) vulnerability. SSBNs are considered the most survivable 'leg' of the nuclear triad by most countries. If the highest military-political leadership is concerned with the survivability of its nuclear arsenal, such concerns might lead such leaders to 'launch early,' that is, resolve the 'use it or lose it' paradox. As of today, however, it is hard to label ASW capabilities as totally undermining the survivability of the sea-leg of the nuclear triad. The bigger

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[27] "U.S. prepared to spend Russia, China 'into oblivion' to win nuclear arms race: U.S. envoy," *Reuters,* May 21, 2020, Accessed 12 Nov. 2020, https://www.reuters.com/article/uk-usa-armscontrol-idUSKBN22X2LS

[28] For example, Russia's president made such a claim at his Meeting with heads of Defence Ministry, federal agencies and defence companies, "Meeting with heads of Defence Ministry, federal agencies and defence companies," President of Russia Official Website, November 11, 2020, Accessed November 12, 2020, http://en.kremlin.ru/events/president/news/64396

challenge lies in developing reliable and robust 'general purpose' naval capabilities to support SSBN operations. Possible technological breakthroughs in ASW (machine learning, big data, networks of unmanned vehicles, etc.) are indeed possible, but, as in other domains, the development of the submarines themselves (and operational concepts) never stops as well.

Currently, some nuclear powers and their allies consider cyberspace and outer space to be operational and/or warfighting domains. Although the destructive power emanating from these domains is often over-stated, extending confrontation between nuclear weapons states is a challenge in its own right to strategic stability. All nuclear-armed and nuclear-ally states recognize that cyberweapons are a threat to their NC3 systems, and some have declared that such an attack may result in nuclear retaliation. It is therefore urgent to seek joint solutions that can put the most crucial elements of the nuclear decision-making infrastructure away from the 'crosshairs.'[29]

Collapse of Cold War Arms Control and Resurgent Nuclear Modernization

The Cold War framework is now almost completely collapsed. New people with short or no memories of the risks or strategic arms control are in charge, and there are many more actors involved. Gone are the Anti-Ballistic Missile and Intermediate-range Nuclear Forces Treaties due to the US withdrawal. The Conventional Forces in Europe Treaty is in limbo and the Open Skies Treaty might not survive 2021. The extension of the New START to 2026 under the Biden Administration as proposed by the Russian government is a welcome riposte, as it has helped to reduce Russian and American strategic nuclear forces and keep those limited, but it might be not enough to hold back the tide of the coming arms race.

Also, none of these treaties explicitly addressed the Asia-Pacific region, and a resurrection of arms control might start from there. In general, there is a substantial deterioration of arms control frameworks and a shift from joint security measures and transparency to 'hard' deterrence and

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[29] Dmitry Stefanovich, "Russia's Basic Principles and the Cyber-Nuclear Nexus," *European Leadership Network*, 14 July 2020, Accessed November 12, 2020, https://www.europeanleadershipnetwork.org/commentary/russias-basic-principles-and-the-cyber-nuclear-nexus/

ambiguity. New nuclear weapons, delivery systems, and platforms are being developed, although it is yet unclear if these systems will disrupt strategic stability.

The modernization itself might not be inherently something bad: as long as nuclear weapons remain in the arsenals, it is better to have them in good shape, rather than rusting away. Nevertheless, the landscape of mutual nuclear (and non-nuclear) deterrence and vulnerabilities is getting more and more complicated to manage, and therefore the nuclear risks are on the rise.

Shift to Complex Nuclear Risks

Currently there are nine nuclear weapon states, and they can be separated in different 'baskets' in several ways. One way is to group them into the five NPT-NWS basket (China, France, Russia, the United Kingdom and the United States), the two South Asian nuclear-armed states basket (India and Pakistan) and a third 'special cases' basket (Israel and the DPRK).

But there are other ways to categorize them, for example, by "deterrence equations." The combined nuclear forces of the United States, the United Kingdom, and France deter Russia, and vice versa; China is engaged in nuclear deterrence vis-à-vis the United States and India; India vis-à-vis China and Pakistan, etc. Such way of framing grounds the otherwise abstract concept of growing nuclear risks, including those related to miscalculation and/or misperception, in global and regional insecurities.

In all these cases, the type of risk and the level of common understanding of the shared risk can differ between nuclear adversaries. The P5 'Glossary of Key Nuclear Terms'[30] is a good start to overcome these differences, but it is extremely limited. Its long overdue update was finally completed in late 2021.[31] Relatively professional discussions on doctrines also take place only within the P5 process and rarely on a military-military basis.

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[30] P5 Glossary of Key Nuclear Terms, Accessed November 12, 2020, https://www.pircenter.org/media/content/files/13/14313989580.pdf

[31] P5 joint communiqué, 3 December, 2021, Accessed January 12, 2022, https://cd-geneve.delegfrance.org/IMG/pdf/communique_p5.pdf?2488/9bb0569676c7583cdd9a9434539f9c0a22533ff4

Some rather recent initiatives (for instance, Creating an Environment for Nuclear Disarmament (CEND)[32] and the Stepping Stones Approach[33]) are trying to find a broader way for the discussion on nuclear weapons (and disarmament) related challenges, but it remains to be seen how successful those can be, especially given their self-avowed incrementalism.

Fortunately, many top officials in nuclear weapons states recognize the challenge and argue that we need to continue the search for nuclear arms control and risk reduction formats that involve all nuclear weapon states.

Possible Nuclear Risk Reduction Measures in Asia-Pacific

Before addressing the actual risk reduction measures, it is important to define once again what types of risks are managed by such measures. Of the range of possible risks that might lead to nuclear war, two stand out. The first is those that involve any use of nuclear weapons resulting in nuclear explosions. Such uses can be deliberate, accidental, or mixed (because of miscalculation, misinterpretation, etc.). The second is nuclear use by non-state actors, including terrorists.

Given the multi-layered, multi-dimensional state of nuclear affairs, and the complicated global and regional military-political landscapes in which nuclear weapons are deployed, the future seems grim. Yet, because of past crises that generate a pull-demand for risk reduction measures, some of the tools needed today are already available. The challenge is to make a good use of them.

A great deal of research is underway on nuclear risk reduction that provides options for possible implementation (figure 1).[34]

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[32] See https://www.state.gov/key-topics-bureau-of-international-security-and-nonproliferation/

[33] See Paul Ingram and Maxwell Downman, "Stepping Stones to Disarmament," The British American Security Information Council (BASIC), April 2019, https://basicint.org/wp-content/uploads/2019/05/Stepping-Stones-Report-WEB-1.pdf

[34] See, for example, C. Brustlein, "Strategic Risk Reduction between Nuclear-Weapons Possessors, Proliferation Papers," *IFRI,* No. 63, January 2021 https://www.ifri.org/en/publications/etudes-de-lifri/proliferation-papers/strategic-risk-reduction-between-nuclear-weapons

CATEGORY	RISK REDUCTION ACTIVITIES	SAMPLE PROPOSALS
Doctrine	Commitment of non-use or threat of use	- Reaffirm Reagan-Gorbachev statement; convention on prohibition of use
	Lessened role of nuclear weapons in security policies	- Scaling back of modernization programmes; deterrence alternatives
	Declaratory policies on avoiding nuclear use	- "No first use", "sole purpose (is to deter/defend)", "(weapon of) last resort"
	Ban on classes of nuclear weapons or delivery systems	- Lower-yield, dual-capable, e.g. nuclear-armed cruise missiles, IRBMs
	Extension of negative security assurances	- Binding legal agreement, eliminate caveats against WMD use
	Establish principles around nuclear weapons possession	- Develop common lexicon, code of conduct or on nuclear responsibility
Strategy	Protection of nuclear-related technological systems (C3I)	- Agreement on non-cyber interference, respect space assets (e.g. non-attack)
	Agreement not to attack nuclear-related facilities	- Military and/or civilian, with regular list exchange (e.g. South Asia)
	Reductions in numbers of deployed weapons	- Withdrawal, put into central storage, or disassemble
	Restrictions on the nature of deployment	- In geography (submarine proximity) and type of system (mobile launchers)
	Changes to deployment patterns and alert status	- Removal from prompt-launch status
Operations	Strengthen human assessment and decision-making	- 'Dual phenomenology' to verify or refute early warning data
	Physical separation of nuclear weapons	- Nuclear from conventional; de-mating from delivery vehicles
	Mechanisms to delay, disrupt, or deactivate launch	- Silo barriers, safing switches, de-targeting, redundancies
	Enhance safety and security of weapons and materials	- Global materials security system, interdiction of illicit transfers
	Address provocative military practices	- Reconnaissance flights, missile flight tests, buzzing practices
	Pre-notification of actions susceptible to misinterpretation	- Of missile tests, military exercises, deployment
Transparency	High-level dialogues on pertinent issues	- Strategic stability, nuclear risk/threats, nuclear security
	Information exchange on pertinent issues	- Doctrines, capabilities, exercises, weapons hosted
	Communication in crisis situations	- Hotlines, early warning centers, transparency of operations
	Notification of nuclear-related incidents	- Accidents at sea, theft or loss of control of weapons or materials, cyberattack
	Systematized risk assessment and/or analysis	- Database of past incidents, sharing of best practices

Figure 1. Summary of compiled ideas, proposals, and recommendations to reduce the risk of nuclear weapon use.[35]

What is needed now is to refine these ideas and tailor them to current and future circumstances while political will is mustered to implement them. It is also important to keep in mind that there are no perfect, universal solutions (although sets of best practices are always useful). Nuclear nations have different nuclear command, control, and communications architecture, technological, and political culture, possible levels of transparency and attitude to ambiguity, as well as risk-taking ability and appetite. Finding the measures that work across these differences will rule out some approaches that work perfectly for one adversary but not sufficiently well for the other to adopt. "Sufficiently" workable to two or more antagonists party to a given measure might be a key attribute of the most realistic measures.

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[35] "Nuclear Risk Reduction: The State of Ideas," Wilfred Wan, UNIDIR, April 2019, Accessed November 12, 2020, https://www.unidir.org/publication/nuclear-risk-reduction-state-ideas

The expert community must be patient and polite—and at the same time ambitious. It is a truism that the ultimate nuclear risk reduction can be achieved through universal nuclear disarmament—but this, in turn, must be linked with a "conventional disarmament" (as written in the NPT's Article VI), and, eventually, total pacification of the Earth—a far reaching ideal agenda that has little, likely zero prospect of realization in the near future.

Nevertheless, "moonshots" in the nuclear risk reduction are not something to be afraid of, and widening the scope of the analysis to include totally new types of risk reduction measures might help. Even the best ideas will take some time to take effect. Serious goals can and should be put on the table, as well as outlining detailed and feasible steps to achieve those.

It is useful therefore to think about nuclear risks in the most practical terms. For example, there are US nuclear weapons in Europe.[36] The airbases where those weapons are located are probably more vulnerable than the ones on US soil, including to an attack by non-state actors (activists have been able to gain access to these bases in spite of security systems although they never reached the vaults where B61 nuclear bombs are stored.[37]

At the same time, these nuclear bombs make the countries that feel that they are the likely target for such weapons (that is, Russia) nervous—and they threaten the host countries in turn, probably with both nuclear and conventional weapons.

What can be achieved to reduce such risks? The easiest step might be to provide more transparency about missions for these weapons. A next good step can be to de-couple the nuclear weapons from

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[36] Hans M. Kristensen, "U.S. Nuclear Weapons In Europe, Briefing to Center for Arms Control and Non-Proliferation," November 1, 2019, Accessed November 12, 2020, https://fas.org/wp-content/uploads/2019/11/Brief2019_EuroNukes_CACNP.pdf

[37] David Brennan, "EU Politicians Break Into Air Base Holding American Nuclear Bombs to Protest Weapons Stockpiling," *Newsweek,* 2/20/19, Accessed November 12, 2020, https://www.newsweek.com/nuclear-weapons-air-base-europe-belgium-green-politicians-disarmament-protest-1336908

actual dual-capable aircraft basing, thus, to some extent, achieving symmetry with the way Russia stores sub-strategic nuclear weapons at "central storages" away from actual battle units.[38]

Will such steps reduce risk? Definitely. Is it feasible? Technically, assuredly so:[39] But politically, these measures face severe political obstacles, there being too much political capital invested by different countries and NATO as a whole protecting this "nuclear sharing" arrangement as something crucial for allied coherence.[40]

Another practical example is Russia, which employs a concept of non-nuclear deterrence in its military doctrine.[41] This concept is advertised as a measure to reduce reliance on nuclear weapons, and, intuitively, should reduce nuclear risks. But is such reduction actually achieved? From what the Ministry of Defense says and shows in its presentations, non-nuclear deterrence is based on essentially dual-capable systems. In a crisis it is quite possible that faced with dual-use ambiguity, any probable adversary will treat these as nuclear-armed weapons and will respond accordingly, possibly with escalatory conventional or actual nuclear first use. Of course, in the end there is a chance that such ambiguity might lead to crisis resolution without actual warfighting, but the risk of adversarial misinterpretation and the risk reduction measure actually compounding risk exists.

Can such negative outcomes be avoided? First, it must be said that non-nuclear deterrence understood as methods of imposing severe military costs on aggressors without going nuclear is here to stay and is a mainstay now of all the nuclear armed great powers. Long-range precision conventional weapons are both better suited and more usable to wage war than nuclear weapons

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[38] Pavel Podvig, Javier Serrat, "Lock them Up: Zero-deployed Non-strategic Nuclear Weapons in Europe," Accessed November 12, 2020, https://unidir.org/files/publications/pdfs/lock-them-up-zero-deployed-non-strategic-nuclear-weapons-in-europe- en-675.pdf

[39] For example, a set of possible options of gradual or full withdrawal of the US nuclear weapons from Europe without undermining 'NATO cohesion,' and even providing some role for the dual-capable aircraft of NATO countries currently involved in the 'Nuclear Sharing' is listed in Kamp, Karl-Heinz, and Robertus CN Remkes. "Options for NATO nuclear sharing arrangements." *Reducing Nuclear Risks in Europe: A Framework for Action* (2011): 82.

[40] Jessica Cox, "Nuclear deterrence today," *NATO Review,* 08 June 2020, Accessed November 12, 2020, https://www.nato.int/docu/review/articles/2020/06/08/nuclear-deterrence-today/index.html

[41] Alexander Yermakov, Dmitry Stefanovich, "Is Non-Nuclear Deterrence Possible?, Russian International Affairs Council," June 30, 2020, Accessed November 12, 2020, https://russiancouncil.ru/en/analytics-and-comments/analytics/is-non-nuclear-deterrence- possible/

Thus, the risk that use of long-range non-nuclear weapons, depending on their targets and the adversaries' sensor systems, might swiftly lead to nuclear retaliation is real. In Russia's 'nuclear doctrine' mentioned earlier, for example, this conventional-nuclear cascade is specifically mentioned, "The conditions specifying the possibility of nuclear weapons use by the Russian Federation are as follows: arrival of reliable data on a launch of ballistic missiles attacking the territory of the Russian Federation and/or its allies."[42]

Given the state of nuclear arsenals in Asia, and especially in Northeast Asia, the idea of non-nuclear deterrence, nuclear-conventional "entanglement," and how non-nuclear armament—especially disruptive technologies—affect nuclear risk reduction should be a major topic of consultations, as every country pursues such capabilities.

Last but not the least, it is crucial to consider risks associated with further nuclear reductions of delivery systems or actual controls on warheads. On the face of it, reducing the number of weapons should make it easier to ensure that nuclear weapons are never used by mistake and, therefore, to reduce nuclear risk. Conversely, reducing the number of fielded nuclear weapons may make a situation less stable because the belief in the reliability of their second-strike capabilities might decrease within the leadership of both the possessor and the probable adversary. This perception depends on many factors, not just the absolute numbers. Although the number of warheads that each side has relative to those of the adversary that must be targeted is an important determinant of these perceptions, making *mutual* reductions is almost a prerequisite for level-dependent risk reductions to work. It is important to distinguish between nuclear risks and risks related to any war or armed conflict, as sometimes explicit nuclear threats might prevent breakout of hostilities.

Long-run Strategic Arms Control Futures

Although the prospects for arms control might seem grim, there are good options that can be pursued. First and foremost, arms control itself must be "re-branded" as mainly an instrument to enhance national security (through transparency and decreased spending, etc.), not something

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[42] Basic Principles of State Policy of the Russian Federation on Nuclear Deterrence, paragraph 19a, Accessed November 12, 2020, https://mid.ru/ru/foreign_policy/international_safety/1434131/?lang=en

generally good and positive. With that in mind and given the rather deep asymmetries between nuclear and non-nuclear strategic arsenals and postures in different countries, the approach to resume nuclear arms control should be two-fold: First, all factors affecting strategic stability should be defined and agreed upon through consultations. Such consultations can start in several bilateral formats, then switch to P5 fora, and eventually involve other nuclear weapon states and regional powers.

Second, areas of possible "control" should be defined in these discussions. One of those relates to NC3 systems, or rather, agreements to not target NC3. However, this commitment might be challenging due to military considerations. If one prepares for war, degrading adversary command, control, and communications becomes a primary mission. Nevertheless, if there is an agreed understanding that the states involved do not want and will not try to win in a nuclear war, such agreement can be achieved.

In the P5 context, there is one single element that all five countries possess: the sea-based leg of the nuclear triad, that is, SSBNs. Of course, SSBNs in each case differ in terms of numbers, sophistication, range, homeporting, and deployment. But there is room to agree on two things: limit the number of 'boomers' on patrol so other countries will not be concerned with possible decapitating or disarming strike with depressed trajectory submarine-launched missiles fired from a short distance offshore and arriving in a few minutes below early warning radars. Such a limit on deployment at sea would keep the ultimate retaliatory capability intact and also limit the development and deployment of long-range ASW capabilities. This might be more challenging but also have an even higher risk reduction payoff due to the potency of ASW on perceptions of boomer-owning countries of their vulnerability to a disarming nuclear first-strike. As a first step, countries might consider formalizing the existing practices, without reducing anything— effectively agreeing not to increase the number of platforms at sea at any given time. The cost of doing so would be increased visibility of some SSBN 'deterrence patrol' operations that might become correspondingly more vulnerable to countermeasures, as the adversary will be able to tailor their naval posture in terms of numbers and geography to the fixed and transparent numbers of SSBNs. But that cost may be a small price to pay for the overall risk reduction thereby achieved. In the long run, risk reduction and arms control measures are likely to follow the same pattern: start with declarations of numbers (or doctrines) then proceed to transparency and some unilateral

confidence-building measures, thereafter set some limits and, eventually, agree on reductions with concomitant verification mechanisms to follow. This standard Cold War formula, however, is precisely an area with some room for innovation: it seems almost impossible to replicate traditional bilateral approaches in multilateral formats. Yet the Asia-Pacific region is certainly where multilateral measures may be most useful and needed.

One of the easiest possible wins in the region can be a development of a multilateral long-range missile launch notification regime, which is still absent from the realities of today. There are several bilateral regimes (e.g., between Russia and the United States, between Russia and China, between India and Pakistan) with some exemptions, and there is an existing multilateral voluntary data exchange framework within the Hague Code of Conduct. Best practices from all of these formats can be put to good use in the Asia-Pacific region (which can be both narrowed to 'Northeast Asia' or extended to the Indo-Pacific). Moreover, given the ever-growing capabilities of the national Early Warning Systems in the region, there is a possible technical layer providing a kind of verification capability for such multilateral notification regime (land-based Missile Attack Warning System layer in Russia completed the upgrades and is now the "Voronezh" radar network, which is being augmented with multi-band capability; space-based layer of the Missile Attack Warning System—"Tundra" satellites of the "Kupol" system; Russian support and assistance in developing the Chinese Early Warning system development; well-established network supporting the US Missile Defense with input from Japan and South Korea).

Another important domain where much can be done with rather limited 'political' costs, not to mention actual costs in terms of required resources, is the establishment of hardened multilateral hotlines between the capitals of the region. This is hardly a new idea, but there is still room for improvement. Before diving into technical details, a proper Track I discussion on the list of topics that will be covered by such hotlines is needed. For some countries this might be a good way to limit the level of hostility with regard to patrols by long-range aviation (heavy bombers, anti-submarine aircraft, etc.) coming near one's airspace (or into the artificial "Air Defense Identification Zones," which are a provocation in itself). Others might be more concerned with the so-called Freedom of Navigation Operations. Nevertheless, having a dedicated communication network (which can be also used for transmission of notifications mentioned in the previous paragraphs) will be useful for everyone involved—if not to reduce the hostility itself, but definitely

to reduce the risks of misperceptions and have an instrument to raise concerns. Also, as this would be a secure communication channel with limited access, it can be an effective tool to de-politicize possible incidents and solutions.

Finally, one of the most important factors is the political will of the decision makers in every capital involved. Agreeing to any arms control-like measures always comes with a risk of domestic opposition raising concerns about 'surrendering national interests.' To limit such risks the task of paramount importance is to find the right labels for any of the relevant measures, that would be explicitly linked to enhancing both national and international security rather than some goodwill gestures for the future of humanity.

Conclusion

Risk reduction, deconfliction, incidents prevention, arms control—all these concepts and efforts are not new. But those are not easy as well. The number and scope of threats to global peace and security (including those of apocalyptic scale) are hardly decreasing. Under such circumstances, it is a paramount responsibility of national leadership, as well as public, to continue the efforts focused on limiting and reducing the risks of major military conflicts, as those can easily spiral out of control and lead to nuclear use with the most dramatic consequences.