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Recalibrating NATO Nuclear Policy

Edited by
Andrea Gilli



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Note by the editor

This *Research Paper* is the product of the first edition of the Early-Career Nuclear Strategists Workshop (ECNSW) held in July 2019 at the NATO Defense College (NDC) and organized in cooperation with the Nuclear Policy Directorate of NATO HQ. The ECNSW aims to bring together emerging and established scholars as well as policy-makers to foster research, discussion and understanding on issues related to nuclear deterrence and arms control. The ECNSW takes place every year and the NDC Research Division aims to publish a selection of papers presented during each edition of the workshop.

Andrea Gilli

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List of abbreviations

A2/AD	Anti-Access/Area-Denial
BMD	Ballistic Missile Defense
CPGS	Conventional Weapons Prompt Global Strike
DCA	Dual Capable Aircraft
ELN	European Leadership Network
ICAN	International Campaign to Abolish Nuclear Weapons
ICBM	Intercontinental Ballistic Missile
INF	Intermediate-Range Nuclear Forces Treaty
JASSM	Joint Air-to-Surface Standoff Missile
MAD	Mutually-Assured-Destruction
MIRVs	Multiple Independently Targetable Re-entry Vehicles
MTCR	Missile Technology Control Regime
NATO	North Atlantic Treaty Organization
NPR	Nuclear Posture Review
NPT	Non-Proliferation Treaty
OODA	Observe, Orient, Decide and Act
PNIs	Presidential Nuclear Initiatives
SLBM	Submarine-Launched Ballistic Missile
SLCM	Sea-Launched Cruise Missile
SSC-8 (9M729)	Russian ground-launched cruise missile with a 500-5,500km range
START	Strategic Arms Reduction Treaty
UK	United Kingdom
US	United States

Introduction

Jessica Cox

Why should NATO Allies still care about nuclear deterrence? In the age of increasingly capable conventional munitions, cyber warfare, and autonomous robots, aren't these weapons just a relic of the Cold War that have now ceased to be relevant? Why are these weapons still deployed on the territory of a peaceful Europe?

These are the questions that I often hear from activists, the public and the press. At a time when discussions on lethal autonomous weapons, drone swarms, and the weaponization of outer space make modern warfare seem like a sci-fi thriller, nuclear weapons can seem as retro as a Sony walkman or a landline telephone. And yet, nuclear-armed nations such as Russia and China are once again investing heavily to create more sophisticated and diverse nuclear arsenals, North Korea is continuing its nuclear expansion apace, and Iran is once again making headlines for its nuclear developments.

Nuclear weapons have been the foundation of NATO's collective security since its inception. Both the national stockpiles of the NATO nuclear weapons states – the United States, the United Kingdom, and France – as well as the US nuclear weapons forward deployed in Europe have provided for the deterrence of the Alliance – and reassurance for Allies – for over 70 years. NATO Heads of State and Government have repeatedly affirmed that NATO is a nuclear alliance and will remain so as long as nuclear weapons exist.

Quite simply, we still have nuclear weapons because nuclear deterrence is still necessary and its principles still work.

At the height of the Cold War, there were approximately 7,300 US nuclear weapons deployed in Europe providing extended deterrence and US security guarantees to NATO Allies. Today, the number of nuclear weapons deployed in Europe by the United States in support of NATO has been reduced to a small fraction of that amount – with a 90 percent reduction since the end of the Cold War. Between 1991 and 1993 alone, the United States removed approximately 3,000 nuclear weapons from Europe. Between 2000 and 2010, the United States continued to reduce the number of nuclear weapons deployed in Europe and consolidated them in fewer bases. That posture remains the same to this day.

The enactment of the Intermediate-Range Nuclear Forces (INF) Treaty in 1987,

followed by the Strategic Arms Reduction Treaty (START) in July 1991, and the Strategic Offensive Reduction Treaty (SORT) in 2002 provided a steady drum beat of strategic nuclear weapons reductions between the United States and Russia, locking in steadily falling numbers through treaty implementation. But the most significant reduction in nuclear weapons in Europe took place in September 1991 and was not governed by an arms control treaty at all.

On September 27, 1991, President George H. W. Bush outlined sweeping changes to the US nuclear force posture in response to the collapse of the Soviet Union and called on leaders in the Kremlin to reciprocate in kind. Days later, President Gorbachev announced that the Soviet Union would take similar steps to reduce, dismantle and destroy much of its non-strategic nuclear forces.

These Presidential Nuclear Initiatives (PNIs) resulted in the most significant reduction of tactical nuclear weapons in the European theatre in history. The United States destroyed approximately 2,000 ground-launched nuclear artillery shells and short-range ballistic missiles, removed all tactical nuclear weapons on navy surface ships, attack submarines, and on naval aircraft, destroyed all nuclear depth bombs, de-alerted strategic bombers, and cancelled the planned modernization of some nuclear systems.

Soviet and subsequently Russian leaders pledged to eliminate all nuclear artillery, nuclear warheads for tactical missiles, and nuclear land mines as well as remove tactical nuclear weapons from ships, multipurpose submarines, and naval aircraft. These weapons, along with nuclear warheads from air defence missiles, were to be put into central storage and a portion would be destroyed. Additionally, a third of Russia's sea-based tactical nuclear weapons and half of its ground-to-air nuclear missile warheads were to be eliminated along with half of the Russian airborne tactical nuclear weapons stockpile. By 2010, Russia had consolidated its tactical nuclear weapons at "central storage facilities" in Russia, removed tactical nuclear weapons from its ground forces, and dramatically cut the tactical nuclear arsenal of the Air Force, missile defence troops, and Navy, reducing the number of non-strategic nuclear weapons by 75 percent.

The combined reductions from both the United States and Russia represented the most transformative change to the nuclear posture in Europe, and resulted in a significant reduction in tactical nuclear weapons and the easing of military tensions. Unfortunately, the gains made in the mid-1990s did not translate into sustained and verifiable progress for the dismantling of tactical nuclear weapons. While the United States unilaterally reduced its tactical nuclear forces over time, there is a debate about whether or not Russia fully implemented its commitments – as these political statements and actions did not include

verification or compliance mechanisms.

In recent years, Russia has chosen once again to rely on nuclear weapons deployed in the European theatre, in order to counter what it perceives as NATO's conventional superiority. As part of its overall military modernization, Russia has modernized approximately 80 percent of its strategic nuclear forces since the early 2000s. The United States is only now embarking on its own 30+ year modernization programme, including the life extension programme of the B61 gravity bombs deployed to Europe for NATO's nuclear sharing mission. Because of this, Russia is better poised to rapidly add new strategic warheads on its deployed ICBMs and bombers when treaty-imposed constraints from the New START expire – either in 2021 or in 2026 – which is particularly significant given that there is little progress on negotiating a new arms control treaty regime for strategic systems before the New START ends.

Additionally, Russia is developing new types of missile systems such as the strategic-range hypersonic glide vehicle *Avangard* and the non-strategic range *Tsirkon* hypersonic cruise missile, which Russia is testing and fielding on a variety of delivery platforms. Hypersonic weapons fly at super-high speeds, at low altitudes, and have the capability to maneuver during flight – a combination of capabilities that make hypersonic missiles difficult to track and impossible to defend against. While the United States has begun to increase its own investments into hypersonic missile systems development, it is lagging behind Russia (and China). In addition to hypersonics, Russia is also in the process of developing “novel” nuclear systems such as a nuclear-powered nuclear cruise missile and an underwater unmanned nuclear torpedo, both of which can be used to intimidate, coerce and attack NATO Allies, with little warning or ability to respond.

But perhaps the largest discrepancy between NATO and Russia is in the area of tactical or non-strategic nuclear weapons. These include systems armed with lower-yield nuclear warheads, such as air-, sea- and ground-launched cruise missiles. Russia now has a significant arsenal of missile systems that are designed to be dual-capable for either conventional or nuclear weapons delivery. These can reach all of NATO Europe territory from land, sea or air. With its comparatively large arsenal of non-strategic nuclear warheads – estimated to be between 1,500-2,000 in storage depots compared with an estimated 150-200 US gravity bombs stored in vaults in Europe according to open source information – Russia poses a renewed challenge to NATO's regional deterrence and defence activities.

Given this changing security environment, and until our competitors and potential adversaries are ready and willing to forgo nuclear weapons themselves, NATO must be able to deter nuclear threats, and potentially respond to nuclear use by Russia in order to

safeguard the security of the millions of people who live under the NATO umbrella. As NATO's Heads of State have agreed, NATO's nuclear weapons are intended to "preserve peace, prevent coercion, and deter aggression". This includes reassuring Allies of the strong trans-Atlantic commitment to collective security, demonstrated by NATO's nuclear sharing arrangements in which European and North American Allies share the risks and responsibilities of nuclear deterrence. It also sends a strong signal to Russia that it will not achieve its objectives by resorting to even the limited use of nuclear weapons in a conflict; that NATO has the capability and resolve to impose unacceptable costs greater than any intended gain, and, in short, that any nuclear attack by Russia will not succeed.

The continuing role of nuclear weapons for NATO security was the focus of a Workshop for early- to mid-career nuclear strategists convened at the NATO Defense College in July 2019, and organized and run by Andrea Gilli. The articles in this volume, which were drafted by several of the speakers at the event, highlight a number of the most critical challenges to NATO's nuclear deterrence policy and propose recommendations for further NATO action. Carrie Lee provides detailed analysis on the development of hypersonic missile systems by great powers, assesses their unique characteristics and reviews the potential implications of these systems on strategic stability and deterrence. Jacek Durkalec dives deep into Russia's nuclear strategy and doctrine and proposes some additional steps that NATO can take to be more effective in deterring Russia. Katarzyna Kubiak examines the security challenges posed by the end of the INF Treaty and assesses a range of nuclear response options that NATO could consider. Finally, Harrison Menke reviews Russia's integration of conventional and nuclear forces in its defence strategy and argues that NATO should take steps to better align its own conventional and nuclear forces and operations in order to enhance deterrence.

NATO strategy to counter nuclear intimidation

Jacek Durkalec

Given Russia's nuclear-related statements, actions and investments, in recent years NATO had to wake up to a challenge of deterring and responding to nuclear coercion and nuclear use. The process of the Alliance's nuclear adaptation has already brought results as the Allies made progress in updating NATO nuclear policy and posture. The process, however, is not yet finished. NATO must improve its own counter-nuclear intimidation strategy to send a clear message to Moscow that its coercive attempts in peacetime, crisis or a conflict will be futile – that they will not negatively affect the Alliance's cohesion and resolve to defend their politico-military interests – and counter-productive – that their costs will outweigh any potential benefits. This chapter outlines why a NATO strategy to counter nuclear intimidation is needed, what progress has been made so far, what additional steps are necessary, and how to make their implementation possible.¹

Implications of Russia's "theory of victory" for NATO nuclear strategy

Studies of Russia's nuclear strategy and its implications for NATO tend to focus on whether Moscow adopted the so-called "escalate-to-deescalate" nuclear doctrine and how NATO should deter and respond to a potential Russian nuclear first strike during a conflict.² While such considerations are important, they do not capture the broader role of nuclear weapons in Russia's "theory of victory" – that is Moscow's set of ideas about how to secure its interests in peacetime, crisis, and war.³ On the one hand, Russia's nuclear capabilities

1 The views and opinions expressed herein do not necessarily state or reflect those of the United States government or Lawrence Livermore National Security, LLC. This work was performed under the auspices of the US Department of Energy by Lawrence Livermore National Laboratory (LLNL-JRNL-796260).

2 See, for example: M. Kroenig, *A strategy for deterring Russian nuclear de-escalation strikes*, Atlantic Council, April 2018, <https://atlanticcouncil.org/in-depth-research-reports/report/a-strategy-for-deterring-russian-de-escalation-strikes/> (accessed 25 October 2019); J. Ross, "Time to terminate escalate to de-escalate – it's escalation control", *War on the rocks*, 24 April 2018, <https://warontherocks.com/2018/04/time-to-terminate-escalate-to-de-escalateits-escalation-control/> (accessed 25 October 2019).

3 More on Russia's "theory of victory", see Chapter 4 in: B. Roberts, *The case for US nuclear weapons in the 21st century*, Stanford, California, Stanford University Press, 2016. See also: *"Compete, deter, and win" in a trans-regional perspective: on meeting the new chal-*

contribute to its portfolio of options aimed to shock NATO and eventually compel it into surrender during a conflict. They thus influence Russia's perception on whether and how it can win with NATO in a "short war". On the other hand, nuclear capabilities can play a useful role in helping Russia secure its interests below the threshold of direct confrontation. They can enable Russia to win "short of war". This will happen if Moscow succeeds in convincing NATO Allies that defending their security interests is not worth the price of increasing nuclear risks – the risks that Moscow deliberately incites.

Even though nuclear weapons play a central role in Russia's approach to conflict, they cannot be seen in isolation from other instruments at Moscow's disposal. The integrated Russian political-military strategy encompasses the coordinated use of non-military and military instruments during peacetime and all phases of conflict – from the aggressive actions in the grey zone to multi-domain escalation.⁴ Focusing on Russia's nuclear capabilities without reference to non-nuclear tools is as mistaken as concentrating on Moscow's conventional capabilities or "grey zone" actions in isolation from the nuclear context.

The most important consequence of the role of nuclear weapons in Russia's "theory of victory" is for NATO: the Alliance needs to be prepared to withstand and respond to Russia's nuclear threats in a broad spectrum of scenarios. Specifically, NATO has to ensure that Russia will not miscalculate the effectiveness of its nuclear threats or nuclear employment and mistakenly believe that they can help it win in a "short war". For this purpose, the Allies have to dissuade Russia from believing that nuclear-first-use threats can deter NATO from launching conventional strikes against Russia's military targets which in turn are critical for NATO's success in a subsequent conventional fight.⁵ However, NATO Allies also have to think about how to deter Russia's nuclear employment during a conflict, and on how to react should deterrence fail.

To be fully successful, NATO strategy to counter nuclear intimidation cannot focus solely on a scenario of conflict. It must also address a problem of Russia's instrumentalization of nuclear threats to win "short of war". In peacetime, NATO must negate Russia's attempts to exploit Western fears of a new nuclear arms race and crisis instability to divide the Allies, make their publics anxious, and influence NATO Allies' positions about the fu-

lenges of extended deterrence. *Workshop summary*, Center for Global Security Research Lawrence Livermore National Laboratory Livermore, California, February 2019, https://cgshr.llnl.gov/content/assets/docs/ED_Workshop_Summary_FEB2019_Final.pdf (accessed 25 October 2019).

4 D. Johnson, "Russia's conventional precision strike capabilities, regional crises, and nuclear thresholds", *Livermore Papers on Global Security*, No.3, Livermore, California, Center for Global Security Research, Lawrence Livermore National Laboratory, February 2019, <https://cgshr.llnl.gov/content/assets/docs/Precision-Strike-Capabilities-report-v3-7.pdf> (accessed 25 October 2019).

5 H. Binnendijk, D. Gompert, "Decisive response: a new nuclear strategy for NATO", *Survival*, 2019, Vol.61, No.5, p.115.

ture of the Euro-Atlantic security architecture. The Alliance must be ready to face nuclear threats in “grey zone” scenarios of aggressive actions below the threshold of Article 5.

An effective response to Russia’s attempts at nuclear intimidation during peacetime, crisis and conflict requires a broad set of non-military and military tools. Among them, non-nuclear instruments play an essential role in reducing the risk of conflict with Russia and thus in making nuclear escalation less likely. Self-standing, however, these instruments are not sufficient. NATO counter nuclear intimidation strategy requires a nuclear component too as, in peacetime, NATO can afford to ignore Russia’s nuclear threats only if it is and remains a credible “nuclear alliance”. Conventional capabilities are not sufficient to guarantee comparable confidence and assurance. Even if NATO nuclear capabilities are ill-suited to responding to a plethora of hybrid challenges, they can still negate Moscow’s attempts to bolster its own hybrid tactics by overt and covert nuclear threats. Also, while a robust conventional posture may deter Russia from attempting to secure a conventional *fait accompli*, it may be of limited value if Russia bolsters conventional aggression with nuclear intimidation or actual nuclear employment.

NATO’s counter-strategy: progress so far

Russia’s nuclear messaging that backed up aggressive actions against Ukraine was a wake-up call for NATO.⁶ The Alliance had to reverse its post-Cold War nuclear trajectory which until 2014 was based on an expectation that the role of nuclear weapons in Europe could be further reduced by cooperative means. From emphasizing efforts to pursue further nuclear reductions, the Alliance had to refocus on deterrence.⁷

The process of nuclear adaptation was not easy, given the Alliance’s starting point. NATO’s post-Cold War efforts aimed at achieving further reductions in the numbers and value of nuclear weapons. As a result, the Alliance’s public narrative could not be easily adapted to the nuclear threats posed by Russia and the renewed value of nuclear deterrence for its own posture. Disarmament pressures, including the actions of the International Campaign to Abolish Nuclear Weapons (ICAN), as well as the various supporters of banning nuclear weapons and making nuclear deterrence illegal, made the shift even more challenging.

6 J. Durkalec, “Nuclear-backed ‘little green men’: nuclear messaging in the Ukraine crisis”, *PISM Report*, Polish Institute of International Affairs, Warsaw, July 2015, <https://www.files.ethz.ch/isn/193514/Nuclear%20Backed%20Little%20Green%20Men%20Nuclear%20Messaging%20in%20the%20Ukraine%20Crisis.pdf> (accessed 25 October 2019).

7 For more on NATO nuclear adaptation in recent years, see: J. Durkalec, “NATO nuclear adaptation at the Warsaw Summit” in K. Friis (ed.), *NATO and collective defense in the 21st century: an assessment of the Warsaw Summit*, Routledge, 2017; J. Durkalec, *The 2018 US nuclear posture review, NATO’s Brussels Summit and beyond*, Livermore, California, Center for Global Security Research, Lawrence Livermore National Laboratory, June 2018, <https://cgsl.llnl.gov/content/assets/docs/NPR-2018BOOKdigital.pdf> (accessed 25 October 2019).

Additionally, when Russia's nuclear threats emerged, NATO had no appetite to re-open nuclear discussions, as the echo of discussions on the deployment of US non-strategic nuclear weapons could somehow still be heard. It was hence difficult for the Allies to change their mindsets from thinking in terms on whether to maintain nuclear sharing arrangements to questions on how to make them more operationally credible in the new strategic landscape. Assessing how NATO's overall posture should adapt to negate nuclear-armed Russia's multi-domain strategy was also hard given the fact that nuclear weapons within the Alliance were politically, institutionally and operationally separated from other elements of its posture.

Despite all these obstacles, since 2014 NATO Allies made substantial progress in updating their counter nuclear-intimidation strategy. In particular, they improved their public communication by recognizing nuclear challenges posed by Russia and signalling their common resolve. They also recognized a need for making their nuclear capabilities more robust and operationally credible, and more closely aligned with overall deterrence and defence posture.

First, regarding public messaging, at the 2016 Warsaw and 2018 Brussels summits NATO Allies recognized the nuclear dimension of Russia's destabilizing actions and warned Russia that "any employment of nuclear weapons against NATO would fundamentally alter the nature of a conflict".⁸ In addition to sharpening NATO's declaratory language, NATO was also engaged in other forms of public communication of its confidence in facing nuclear risks, including through statements of the NATO Secretary General and reports from officials' visits to nuclear facilities in the United States, the United Kingdom and France.⁹ The Alliance did not shy away from pointing out that Russia's missiles SSC-8/9M729, which violated the INF treaty, are nuclear capable (see next chapter by K. Kubial).¹⁰ The collective message was supplemented by strong language on Russia nuclear-related activities of some NATO Allies, including the United States in the 2018 US *Nuclear Posture Review* (NPR).¹¹

8 NATO, Warsaw Summit Communiqué, 8-9 July 2016, par.10, p.54; NATO, Brussels Summit Declaration, 11-12 July 2018, par.6, p.36.

9 See, for example: "Press conference by NATO Secretary General Jens Stoltenberg following the meetings of NATO Defence Ministers", 13 February 2019, https://www.nato.int/cps/en/natohq/opinions_163394.htm (accessed 25 October 2019); "Away-days in France of NATO deputy permanent representatives and defense counsellors", 22-23 March 2018, <https://otan.delegfrance.org/Away-days-in-France-of-NATO-deputy-permanent-representatives-and-defense> (accessed 25 October 2019); "NATO Secretary General visits US STRATCOM in Nebraska, Sheppard Air Force Base in Texas", 5-6 April 2018, https://www.nato.int/cps/en/natohq/news_153471.htm (accessed 25 October 2019).

10 "NATO and the INF Treaty", 2 August 2019, https://www.nato.int/cps/en/natohq/topics_166100.htm (accessed 25 October 2019).

11 *Nuclear Posture Review 2018*, US Department of Defense, February 2018, <https://media.defense.gov/2018/Feb/02/2001872886/-1/-1/1/2018-NUCLEAR-POSTURE-REVIEW-FINAL-REPORT.PDF> (accessed 25 October 2019).

Second, with regards to nuclear capabilities, NATO has reaffirmed the contribution of strategic nuclear forces to the Alliance's security both in rhetoric and actions. For example, visible deployments of US strategic bombers to Europe are now routine.¹² NATO has also re-emphasized the value of US non-strategic nuclear weapons forward-deployed in Europe and the Allies' related capabilities and infrastructure. More attention was given to operational effectiveness, readiness and the survivability of dual capable aircraft (DCA). Furthermore, the 2018 US *Nuclear Posture Review* introduced two low-yield supplemental capabilities aimed at shattering any perceived Russia miscalculation that its nuclear use against NATO Allies will not lead to the US nuclear response.¹³

Last but not least, since 2014 NATO has made progress in augmenting nuclear-related political and military exercises and planning. At the political level, efforts were made to raise the "nuclear IQ" of decision-makers. For example, NATO conducted table-top exercises to familiarize the North Atlantic Council with the nuclear dimension of potential crises.¹⁴ At the military level, steps were taken to rebuild the residual nuclear adaptive planning and operations expertise.¹⁵ All Allies also recognized the need for strengthening coherence between nuclear and non-nuclear operations.¹⁶

Improvements required

While NATO has considerably improved its counter nuclear intimidation strategy, there is room for making it more effective. To negate Russia's strategy of winning "short of war" and in a "short war", NATO must do more to increase its self-confidence and signal to Russia the costs and futility of nuclear coercion during peacetime, crisis and conflict. This requires further improvements in NATO's public communication, capabilities, and preparedness to act. First, the Allies should do more to communicate their resolve to face nuclear risks, strengthen public resilience against nuclear intimidation, and impose costs on

12 See, for example: "US Air Force B-52s deploy to Europe", US Strategic Command, 14 March 2019, <https://www.stratcom.mil/Media/News/News-Article-View/Article/1785997/us-air-force-b-52s-deploy-to-europe/> (accessed 25 October 2019).

13 *Nuclear Posture Review 2018*, *op.cit.*, p.36.

14 "Joint Press Conference at Faslane by NATO Secretary General Jens Stoltenberg, with UK Secretary of State for Defence Sir Michael Fallon", 2 October 2017, https://www.nato.int/cps/en/natohq/opinions_147470.htm (accessed 25 October 2019).

15 See L. D. Veigas, "The revitalization of theater nuclear operations planning", *Countering WMD Journal*, No.15, 2017, pp.37-40, <https://www.nec.belvoir.army.mil/usanca/CWMDJournal/Issue%2015%20CWMD%20Journal%2003APR17%20Web.pdf> (accessed 25 October 2019).

16 NATO, Brussels Summit Declaration, 11-12 July 2018, par.35; K. Sloan, "Back to the future: integrating nuclear and non-nuclear warfighting", *Countering WMD Journal*, No.17, 2018, pp.4-8, [https://www.nec.belvoir.army.mil/usanca/CWMDJournal/Issue%2017%20CWMD%20Journal%20Digital%20Edition%20\[FINAL\].pdf](https://www.nec.belvoir.army.mil/usanca/CWMDJournal/Issue%2017%20CWMD%20Journal%20Digital%20Edition%20[FINAL].pdf) (accessed 25 October 2019).

Moscow for unacceptable rhetoric and actions. Second, NATO Allies should more actively demonstrate that they have credible capabilities for the collective sharing of nuclear risks and burdens. Third, NATO planning and exercises should better prepare NATO Allies to collectively, and in a tailored way, signal resolve to face nuclear risks in any circumstances, and effectively respond to nuclear use if deterrence fails. In all of these three areas, there are concrete steps that the Alliance should take.

Regarding the public communication aspect of the counter nuclear intimidation strategy, a message of resolve from NATO would be stronger if a higher number of individual NATO Allies were to publicly discuss the nuclear dimension of Russia's aggressive actions. Despite the progress made in recent years, there is still a dissonance between NATO official language, strong statements by Allies such as the United States, and the reluctance of some other Allies to publicly discuss the nuclear risks affecting the security of the Alliance. As a result, instead of conveying a message of resolve, NATO Allies may inadvertently signal to Moscow that they lack the will to collectively confront a nuclear problem and want to hide it from their public. This lack of clarity has also an additional negative consequence: NATO Allies also miss an opportunity to educate their public and make it more resilient to Russia's intimidation attempts. NATO Allies can also do more to collectively and individually impose diplomatic costs on Russia in reaction to unacceptable forms of nuclear-related behaviour. Public condemnation of the most outrageous forms of Russia's actions could enable NATO to turn Moscow's coercive attempts against Russia. The Alliance would also avoid sending the unintentional signal that Russia's coercive actions are permissible and justified and give Russia a free hand in promoting its own nuclear narrative.

To make its communication more regular, frequent and purposeful, NATO could, for example, return to the practice of publishing communiqués after the ministerial-level meetings of the Nuclear Planning Group. Other options of messaging include, an annual speech from the NATO Secretary General devoted exclusively to nuclear risks that the Alliance faces or, alternatively, more elaborate descriptions of the Alliance's nuclear environment in the Secretary General's annual report. The results of these efforts would not be instantly visible, but they could help Allies synchronize their public nuclear messaging over time. These collective actions could also be supported by individual efforts. For instance, the declassification of additional information about Russia's worrisome nuclear behaviour could inform public debates about the nature of Russia's nuclear challenge. Of great added value could also be public communication efforts, such as joint press op-eds of foreign ministers from several NATO countries identifying nuclear risks for the Alliance and the role of nuclear deterrence and arms control in mitigating these risks.

Concerning nuclear capabilities, while the deterrent value of the US, UK and French strategic nuclear forces is unquestioned, NATO needs to do more to defuse any persisting doubts about the credibility of a collective nuclear mission based on US nuclear gravity bombs and DCA. Given Russia's integrated air defences, the number of scenarios in which NATO could collectively demonstrate resolve and respond to nuclear use is shrinking. As a result, it may become increasingly difficult for NATO to fulfil its political goal of convincing potential adversaries (as well as individual Allies) that an attack on one Ally will be met with response from all Allies, not only the individual nuclear weapon states. This would not help the Alliance as a whole to confidently face nuclear intimidation during peacetime, crisis, or conflict.

Strengthening the perception of operational effectiveness of DCA and nuclear-gravity bombs may require steps beyond modernizing these capabilities. It may require an increase in the number and readiness of DCA, more realistic training exercises, and a further increase in the number of Allies which support DCA's nuclear mission. For the time being, the shape of nuclear sharing arrangements should be regarded as a litmus test of NATO's collective commitment to face nuclear risks. NATO, however, should also start assessing solutions on how to preserve the DCA's collective mission in the long-term: this should include analyses of new capabilities and/or an extension of the scope of NATO nuclear consultations.

With regards to NATO planning and exercises, the Alliance should strengthen its efforts to ensure that the political and military leaders of the Alliance are ready to respond to Russia's nuclear coercion in any plausible circumstances. For this purpose, more can be done to increase the visibility and realism of NATO nuclear training and exercises.¹⁷ The Alliance should also continue to expand the list of potential response options to different types of Russian nuclear coercion campaigns during peacetime, crisis, and conflict. While NATO responses may be nuclear-related, the toolkit could also include non-nuclear and non-military means, including diplomatic steps. Table-top exercises and war-gaming could be particularly useful for the Alliance to further increase its nuclear risk management proficiency.

Looking towards the future

NATO counter-nuclear intimidation strategy will not be improved overnight. Its further development requires years of persistent political and military attention, a painstaking con-

17 A. Corbett, "NATO's nuclear deterrence deficit", in N. Vanaga, T. Rostoks (eds.), *Deterring Russia in Europe. Defence strategies for neighbouring states*, London and New York, Routledge, 2019, p.55.

sensus-building process, as well as concrete steps to implement it. What makes progress difficult is that despite the advances made in recent years, nuclear weapon-related issues remain sensitive within the Alliance. There is a widespread perception within NATO that when it comes to nuclear matters, the better can be the enemy of the good and going too fast can stop or reverse the process of nuclear adaptation. Yet, the Allies must take into account that without moving forward, Russia's strategy and capabilities can change the balance of power and push NATO into a position of disadvantage. Reluctance to adapt accordingly could only increase short- and long-term nuclear risks for the Alliance.

The counter-nuclear intimidation strategy could be further improved only if it is tied up with NATO's dual-approach to security that combines deterrence and dialogue. While steps needed to implement the strategy will reinforce deterrence, they can be also used to further substantiate the need for meaningful engagement with Russia on arms control and confidence-building measures. Any future NATO nuclear arms control proposals would, by definition, be aimed at constraining Russia's manoeuvre to intimidate. If NATO counter-nuclear intimidation strategy were to successfully convince Russia that nuclear coercion would be only futile and counter-productive, it may in fact strengthen Moscow's interests in nuclear risk reduction measures.

Improving NATO's nuclear strategy requires collective actions. NATO summit decisions and statements create the room for individual NATO members to discuss issues which otherwise would be too sensitive for domestic political reasons. Additionally, many Allies prefer that nuclear problems be raised collectively. NATO officials, including the Secretary General, also have an important role in informing the decisions and public debate in a way that does not encroach on sensitivities of any individual NATO member. Ultimately, however, NATO cannot succeed in countering nuclear intimidation if individual NATO members do not assert leadership and engage in public dialogue on ethical, operational, arms control, deterrence as well as international order issues related to the nuclear challenges faced by the Alliance.¹⁸

18 The problem is not new. See: D.S. Yost, "The delegitimization of nuclear deterrence?", *Armed Forces & Society*, Vol.16, No.4, 1990, p.505.

NATO's nuclear response to the INF Treaty violation

*Katarzyna Kubiak**

Russia's violation and the subsequent demise of the Intermediate-Range Nuclear Forces (INF) Treaty have been giving, over the past few years, further impetus to NATO's readjustment of its deterrence and defence posture whose aim also included addressing a broad pattern of Russian threats and expansion of its military capabilities.

At the centre of Russia's violation of the INF, is the SSC-8, a ground-launched cruise missile violating key terms of the Treaty, i.e. its range exceeds 500km. NATO has thus recently considered, and is progressively implementing, a package of measures in response to what it defines as "significant risks". According to NATO Secretary General Jens Stoltenberg, the package will consist of: (1) exercises; (2) intelligence, surveillance and reconnaissance; (3) air and missile defence; (4) conventional capabilities; and (5) ensuring that NATO's nuclear deterrent remains safe, secure and effective.¹

With a mix of measures of this sort, the Allies want to ensure that Moscow's INF violations are sanctioned. Presumably, the Allies intend to send both reassurance messages towards fellow Allies and worthwhile signals of resolve towards Russia, with the twin-goal of discouraging Moscow from expanding its SSC-8 deployments and deterring the threat or actual use of the SSC-8 against NATO.

Each single measure, as well as the package as a whole deserves a thorough analysis. For the sake of coherence, this paper focuses solely on the nuclear-related options (other than the deployment of nuclear intermediate-range missiles by NATO itself, which NATO Secretary General says the Alliance does not intend to do).² A response in the nuclear domain would meet the widely accepted political instincts of most NATO Allies. And, in contrast to other measures currently under consideration, nuclear-related options seem to

* The author is grateful for commentary on earlier drafts of this essay by Adam Thomson, Simon Lunn and participants at the Early-Career Nuclear Strategists Workshop in July 2019 at the NATO Defense College in Rome and the Project on Nuclear Issues – International Exchange in September 2019 in the United States.

1 NATO, Press point by NATO Secretary General Jens Stoltenberg, on the INF Treaty, 2 August 2019.

2 *Ibid.*

be somehow more “achievable”. Europeans do not possess conventional capabilities readily available to counter or defend against the Russian missile. The United States is currently considering deployments of its conventional INF-range missiles in the Asia Pacific area rather than in Europe,³ but were that to change the stationing of such systems in NATO countries closer to Russia (and potentially more interested in hosting such systems) would make them an easy target for Russian *Iskander* missiles. Last but not least, nuclear arms control has reached at least a temporary dead-end and might not bring about any INF solution in the short to mid-term.

Yet while a nuclear-related response might seem “right”, “rational” or “achievable”, it should be based on a thorough evaluation of whether it will be “balanced, coordinated and defensive”.⁴ This requires an understanding of the SSC-8’s implications for NATO in the first place. The final package must also live up to NATO’s objectives and factor in any potential side-effects. This is the purpose of the current chapter.

Defining the “significant” risk

There is only limited and conflicting official information about the new SSC-8⁵ Russian missile. One training battalion of the SSC-8 is supposed to be stationed at Kapustin Yar, while others are “co-located with *Iskander* units”⁶ in Kamyshev, Mozdok and in Shuya.⁷ Given these deployment locations, one can assume that the SSC-8 is a road-mobile derivative of the *Kalibr* missile rather than a fixed-base *Iskander* with a range capability of 2,000 km when armed with a conventional payload and a 2,350 km range when carrying a nuclear warhead.⁸ Each battalion comprises four launchers, with each launcher carrying four⁹ or six¹⁰ missiles. This makes a total between 64 and 96 missiles.

NATO classifies the missile as dual-capable.¹¹ At this stage, some experts believe it to be

3 US Department of Defense, Secretary of Defense Esper media engagement en route to Sydney, 2 August 2019.

4 NATO, Statement by the North Atlantic Council on the Intermediate-Range Nuclear Forces Treaty, 2 August 2019.

5 P. Podvig, *Did the United States just change its theory of INF violation?*, Russian strategic nuclear forces, 19 February 2019, http://russianforces.org/blog/2019/02/did_the_united_states_just_cha.shtml

6 H. M. Kristensen and M. Korda, “Russian nuclear forces”, *Bulletin of the Atomic Scientists*, No.75, Vol.2, 2019, p.81.

7 Radio Free Europe, *Report: Russia has deployed more medium-range cruise missiles than previously thought*, 10 February 2019, <https://www.rferl.org/a/report-russia-has-deployed-more-medium-range-cruise-missiles-than-previously-thought/29761868.html>

8 A. Panda, “US Intelligence: Russia tried to con the world with bogus missile”, *Daily Beast*, 18 February 2019, <https://www.thedailybeast.com/us-intelligence-russia-tried-to-con-the-world-with-bogus-missile>

9 H.M. Kristensen and M. Korda, “Russian nuclear forces”, *Bulletin of the Atomic Scientists*, No.75, Vol.2, 2019, p.81.

10 CSIS, Missile Defense Project, “SSC-8 (Novator 9M729)”, Missile Threat, 23 October 2018, <https://missilethreat.csis.org/missile/ssc-8-novator-9m729/>

11 NATO, Press conference by NATO Secretary General Jens Stoltenberg following the meeting of the NATO-Russia Council, 25 January 2019, https://www.nato.int/cps/en/natohq/opinions_162658.htm

deployed as a conventional system only.¹² It is possible that Russia has no interest in passing the nuclear threshold: thanks to improvements in sensing accuracy and warheads' kinetic power, conventional precision-guided systems have the advantage of potentially putting high-level targets at risk without the need to resort to nuclear weapons.¹³ NATO, however, will probably rely on several aspects to assess the missile's primary mode: whether the missile has been tested in a nuclear mode; the configuration changes or training requirements necessary for the system to be made nuclear-capable; and the location of storage sites for related nuclear warheads. Realistically, because of its dual-capable nature, its nuclear potential will likely be preeminent in NATO's threat assessment.

Russian motives and intentions regarding the SSC-8 remain largely unknown. Three factors suggest that Russia pays particular attention to the European theatre: the SSC-8 has been deployed in the European part of Russia; the Russian North Sea Fleet (and not the Pacific Fleet) has been equipped with *Kalibr* cruise missiles; and Russia's nuclear weapons storage capacities have been enhanced in Europe.¹⁴ However, the SSC-8 is not a military game changer, Russian missiles can already target the entire European territory of NATO. The missile thus grants some additional military flexibility, but its range is unlikely to represent the sole motivation behind Russia's decision to develop it.

Overall, the SSC-8 is harder to detect and trace, and consequently harder to defend against or attack than a ship or aircraft, which carries comparable missile capabilities. This in turn improves Russian surprise attack capability and frees up Russian sea- and air-based assets. In particular, through strikes against NATO critical infrastructure and command centres, Russia could constrain NATO's freedom of manoeuvre in the early stage of a conflict.¹⁵ It could also weaken or even paralyze NATO's decision-making ability by reducing the Alliance's advanced warning and reaction time.¹⁶ And because the SSC-8's range covers the whole of Europe but cannot reach the United States, it has the potential to decouple

12 House Armed Services Committee, INF withdrawal and the future of arms control: implications for the security of the United States and its Allies, 26 February 2019, <https://armedservices.house.gov/hearings?ID=7B4D-C7D4-DF20-4DB6-BE28-BCF61C73FB85>

13 K.A. Lieber and D.G. Press, "The new era of nuclear weapons, deterrence and conflict", *Strategic Studies Quarterly*, Vol.10, No.5, 2016.

14 H. Brauß and J. Krause, "Was will Russland mit den vielen Mittelstreckenwaffen?", *SIRIUS*, 2019, Vol.3, Iss.2, pp.154-66.

15 The Heritage Foundation, "Transatlantic security after the Intermediate-Range Nuclear Forces treaty", 27 March 2019, <https://www.heritage.org/arms-control/event/transatlantic-security-after-the-intermediate-range-nuclear-forces-treaty>; Office of the Director of National Intelligence, "Director of National Intelligence Daniel Coats on Russia's Intermediate-range Nuclear Forces (INF) Treaty violation", 30 November 2018, <https://www.dni.gov/index.php/newsroom/speeches-interviews/item/1923-director-of-national-intelligence-daniel-coats-on-russia-s-inf-treaty-violation>; A. Kacprzyk, "NATO's options and dilemmas after the INF Treaty; Council of Councils", 8 April 2019, <https://councilofcouncils.cfr.org/global-memos/natos-options-and-dilemmas-after-inf-treaty>.

16 H. Brauß and J. Krause, "Was will Russland mit den vielen Mittelstreckenwaffen?", *SIRIUS*, 2019, Vol.3, No.2, pp.154-166.

European security from that of the United States, undermining US nuclear extended deterrence for Europe.¹⁷ However, given already existing Russian conventional and nuclear capabilities, the SSC-8's real significance or value-added will probably remain debatable, although the previous arguments will probably influence NATO's response.¹⁸

Assessing NATO's nuclear response options

NATO's nuclear response to Russia's INF violations can comprise four measures: exercises, raised readiness levels, modernization of the dual-capable aircraft force structure and deployment of new US nuclear systems.

Intensifying nuclear exercises

In August-September 2019, a US B-2 *Spirit* strategic nuclear bomber task force trained over the Norwegian Sea and made a historic landing in Iceland, ultimately projecting American airpower in Europe.¹⁹ Before that, in March 2019, six B-52 *Stratofortress* strategic bombers flew over Europe.²⁰ In March 2020, a similar mission with Iceland as final destination occurred.²¹ This deployment was particularly notable as the number of aircraft exceeded previous flights of three to four aircraft,²² with each bomber carrying up to 20 conventional JASSM cruise missiles.²³ The deployments were a strong and coordinated signal of US commitment to European security and no doubt reminded Moscow of the US's overall advantage in INF Treaty-range missiles.

However, the retrospective presence in Europe of US strategic bombers in response to unwanted Russian behaviour does not hold much promise that additional flights would deter Russia from continuing its actions, let alone of persuading Russia to reverse its SSC-8 deployments. The slight risk is, however, that in a crisis Russia could misunderstand, or

17 *Ibid.*

18 NATO, Brussels Summit Declaration, 11 July 2018, https://www.nato.int/cps/en/natohq/official_texts_156624.htm

19 Whiteman Air Force Base, USAF bombers conduct training flights with US F-15 and UK F-35s in vicinity of Norwegian Sea, 17 September 2019, <https://www.whiteman.af.mil/News/Article-Display/Article/1963918/usaf-bombers-conduct-training-flights-with-us-f-15-and-uk-f-35s-in-vicinity-of/>

20 United States Air Force, US Air Force B-52s deploy to RAF Fairford, 3 March 2019, <https://www.afgsc.af.mil/News/Article-Display/Article/1785036/us-air-force-b-52s-deploy-to-raf-fairford/>

21 D. Cenciotti, "The B-2s of the BTF 20-2 have flown a mission to Iceland", *The Aviationist*, 17 March 2020, <https://theaviationist.com/2020/03/17/here-are-some-cool-shots-of-u-s-f-15cs-and-rnoaf-f-35as-escorting-b-2-bombers-during-mission-over-iceland/>

22 United States Air Force, US Air Force bombers fly coordinated missions from Indo-Pacific, Europe, 19 March 2019, <https://www.afgsc.af.mil/News/Article-Display/Article/1791284/us-air-force-bombers-fly-coordinated-missions-from-indo-pacific-europe/>

23 H. Kristensen Twitter, 23 March 2019, <https://twitter.com/nukestrat/status/1109520885185159168>

pretend to, the presence in Europe of such bombers as preparation for a preemptive strike.

Readiness level increase

Another measure NATO as an Alliance could adopt concerns the readiness level of its nuclear weapons, i.e. their delivery time, in order to exert pressure on Russia. Three considerations are in order. First, the readiness of NATO countries' nuclear forces varies. The aircraft of the countries contributing to NATO's nuclear mission are available "at various levels of readiness", with the shortest notice measured in weeks.²⁴ France and the UK each have one submarine at sea at all times,²⁵ with the UK patrol submarine operating at several days' notice to fire missiles.²⁶ Conversely, some of the US strategic nuclear forces remain "on prompt alert".²⁷ Since some countries' nuclear forces are already on high readiness levels, it is questionable that any measure altering NATO's overall readiness could achieve its intended results. Second, and related, the possible effect would be difficult to measure in any case, especially as the background check is deterrence, a very complex parameter to test any action or theory. Last, but not least, NATO's nuclear communication strategy suffers from several problems, from porosity to ambiguity: this is in part due to the difficulty of reaching consensus within the North Atlantic Council. Any attempt to convey a message about readiness could thus prove difficult and, because of its effects on Russia's nuclear planning and operations, could potentially even be counterproductive.

New tangibles for NATO's nuclear strike mission

Five countries participate in NATO's nuclear strike mission: the Netherlands, Belgium, Italy, Turkey and Germany. All five are currently replacing their aging dual-capable aircraft (DCA), i.e. combat aircraft designated for the nuclear delivery role. Italy and the Netherlands already operate the multinational and multirole F-35 *Lightning II*/*Joint Strike Fighter* combat aircraft, while Belgium recently decided to procure it.²⁸ The White House has re-

24 NATO, NATO's nuclear deterrence policy and forces, 17 March 2018, https://www.nato.int/cps/en/natohq/topics_50068.htm

25 H. Kristensen, *Alert status of nuclear weapons*, AIP Conference Proceedings, 15 November 2017, <https://aip.scitation.org/doi/pdf/10.1063/1.5009208>

26 National report pursuant to actions 5, 20 and 21 of the Nuclear Non-Proliferation Treaty (NPT) 2010 Review Conference final document, report submitted by the United Kingdom of Great Britain and Northern Ireland, 25 April 2019, <https://undocs.org/NPT/CONF.2020/PC.III/7>

27 H. Kristensen, *The status of nuclear weapons: arsenals, modernizations, and operations*, 22 September 2017, https://fas.org/wp-content/uploads/2014/05/Brief2017_Italy2.pdf

28 "World nuclear forces", *SIPRI Yearbook 2018*, pp.242-243, <https://www.sipri.org/sites/default/files/SIPRIYB18c06.pdf>

cently removed Turkey from the F-35 programme in response to Ankara's acquisition of Russian air and missile defence systems.²⁹ The impending German decision on a successor to its aging *Tornado* could yet become part of NATO's strategy of signaling resolve and unity. Evidence that Berlin intends to continue its nuclear mission might particularly resonate in Moscow, coming from a country that is generally less inclined to confront Russia in military terms. But the decision will be a hard sell domestically, given Germany's long-standing public commitment to nuclear disarmament, and the population's negative view of nuclear weapons (as of 2017, 85 percent would prefer the removal of American bombs from the Büchel airbase).³⁰ At the same time, however, none of the basing countries seems interested in giving a public profile to their individual modernization decisions.

In order to signal greater effectiveness, and especially as a response to Russia's deployment of the SSC-8 missile, the overall DCA package would need to bring some clear added value in comparison to its predecessor – such as increased penetration of enemy anti-access/area-denial (A2/AD) capabilities. At this stage, this added value is not so evident. DCAs carry a gravity bomb and the new bomb, the US B61, does not deliver a significant change in capabilities to be seriously understood as an effective response to the SSC-8. In other words, the DCA replacement and the B61 modernization would ensure a continuation of NATO's nuclear mission, but can hardly be represented as a response to Russian INF violation.

New US missiles

The US 2018 *Nuclear Posture Review* framed two new nuclear measures as a response, among others, to Russia's INF violation: modifying a small number of existing submarine-launched ballistic missile (SLBM) warheads to provide a low-yield option, and in the longer term, pursuing a modern nuclear-armed sea-launched cruise missile (SLCM).³¹

Both steps are highly controversial. Their proponents argue that the United States and its Allies need flexible response options for a contingency in which Russia uses a low-yield nuclear weapon against conventional military targets, including in Europe. Opponents argue that a nuclear exchange cannot be limited, that deterrence works best when high stakes are involved, that lower-yield weapons presume a lower threshold for use and that the

29 White House, Statement by the Press Secretary, 17 July 2019, <https://www.whitehouse.gov/briefings-statements/statement-press-secretary-64/>

30 J. Berghofer, "Euro-Atlantic security under the new US administration: will Trump destroy the international security architecture?", 16 June 2017, HBS, <https://eu.boell.org/en/2017/06/16/euro-atlantic-security-under-new-us-administration-will-trump-destroy-international>

31 Office of the US Secretary of Defense, 2018 Nuclear Posture Review, Washington, DC, 2018, <https://media.defense.gov/2018/Feb/02/2001872886/-1/-1/1/2018-NUCLEAR-POSTURE-REVIEW-FINAL-REPORT.PDF>

United States possesses appropriate lower-yield capabilities already. Eventually, this doctrinal/philosophical discussion will narrow down to a Congressional decision on funding, currently being debated within the framework of the 2020 budget.

As sea-based systems, neither measure requires deployment in Europe. But they are still relevant to NATO even though they are the direct business and concern only of the US. US development plans, the deterrence implications of introducing such capabilities and the use or threat of use of either capability in a NATO contingency or on NATO's behalf would all undoubtedly require consultations with Allies.

Additionally, the operational flexibility of any ships carrying such weapons would be constrained by the block that several Allies place on the deployment of nuclear weapons on their territories (Denmark, Norway and Spain – in peacetime; Iceland and Lithuania – at any time).³² Additionally, critics highlight that sending ships or submarines equipped with such capabilities to European ports would risk creating tensions with NATO Allies, thus damaging NATO's cohesion.

Conclusions

Russia's violation of the INF is unquestionable and, potentially, destabilizing. However, the nuclear-related responses discussed above do not seem to contribute significantly to any goal they are intended to reach. Politically, they can be represented as the appropriate answer to Russia's violations. Additionally, if implemented after due consultation and with consensus, they could signal resolve and reassurance to NATO Allies and partners. However, at least at this stage, no European Ally is supporting NATO's nuclear-related response, thus undermining one rationale for these measures.

These measures, however, are intended towards Russia: their effectiveness is difficult to gauge. The US withdrawal from the INF treaty and NATO's collective condemnation of Russian INF violation have, so far, delivered few results. Time will tell, but it is legitimate to remain sceptical that US nuclear exercises or increased NATO nuclear readiness levels will be more effective in this respect: the Kremlin has made various proposals which, given their nature, are unlikely to be accepted.³³ In other words, the modernization of the DCA package and the development of new US nuclear-capable missiles have not really impacted Moscow's thinking, at least until now.

32 L. Eide, "A ban on nuclear weapons? What's in it for NATO?", *Nuclear Weapons Project Policy Paper* No.5, International Law and Policy Institute, February 2014, <http://nwp.ilpi.org/wp-content/uploads/2015/03/PP05-14-NATO-and-a-BAN.pdf>

33 TASS Russian News Agency, "Russia's proposed moratorium on missile deployment 'not a credible offer', says NATO", 25 September 2019, <https://tass.com/defense/1079859>

Similar considerations apply with respect to deterrence and strategic stability. These measures do little to deny the time advantage the deployment of SSC-8 yields to Russia. Additionally, their effectiveness depends on the accuracy – and to some extent, the public acceptability – of NATO’s (nuclear) response. As a matter of fact, Russia has not changed course yet – whether they will affect Moscow’s nuclear calculus is still to be seen, but one can legitimately be sceptical. A final aspect deserves attention. Most observers would not question the need of a military response to the INF violations. The real problem, however, lies elsewhere: geopolitical shifts, rapid socio-economic changes and technological developments make cohesion within the Euro-Atlantic community increasingly difficult.

Aligning the nuclear and conventional elements of NATO's deterrence

*Harrison Menke**

The European security environment is increasingly competitive and dangerous. In particular, Russia has reemerged as a strategic rival seeking to overturn the current European political order. To that end, nuclear weapons are central to Russia's foreign policy and planning which explicitly intend to intimidate, coerce and potentially defeat, militarily, its neighbours and the NATO Alliance. Russia has integrated nuclear weapons with non-military and non-nuclear concepts, capabilities and operations to expand its range of coercive options and signaled a willingness to rapidly and deliberately escalate early a "conventional" crisis or conflict to, and potentially past, the nuclear threshold to secure a favorable outcome.

To foreclose the coercive options this creates for Russia, NATO could seriously consider better aligning the conventional and nuclear elements of its own deterrence posture. Rather than imitating Russia, however, a key aspect for NATO is to avoid Moscow identifying exploitable advantages from its aggressive nuclear posture. A more cohesive and comprehensive deterrence posture can help influence Russian leaders against the use of nuclear weapons, thereby strengthening deterrence.

The role of nuclear weapons in Russia's integrated defence strategy

Nuclear weapons are a central, indispensable feature within Russian military planning *vis-à-vis* NATO. Russian leaders have identified NATO as a principal national security threat.¹

* This essay is informed in part by the author's recent co-authored publication: R. Peters, J. Anderson, and H. Menke, "Deterrence in the 21st century: integrating nuclear and conventional force", *Strategic Studies Quarterly*, Vol.12, No.4, Winter 2018. The views expressed here are his own, and do not necessarily represent those of the National Defense University, the Department of Defense, or the United States Government.

1 "New Russian military doctrine labels NATO as main threat", *Defense News*, 28 December 2014, <https://www.defense-news.com/global/europe/2014/12/28/new-russian-military-doctrine-labels-nato-as-main-threat/>

Given NATO's conventional military and economic advantages, Russian leaders appear to view nuclear weapons as necessary to preserve the ruling regime, support regional revanchism, to put pressure on and fracture the NATO Alliance, add stress to NATO defence planning, and defeat NATO in the event of war.² Notable experts have concluded that nuclear threats, brinksmanship, and the actual employment of nuclear weapons in unison with other hard and soft power instruments can help Moscow achieve these ends.³ Consequently, the role of nuclear weapons in Russia's approach to conflict has become more expansive and nuanced, increasingly intertwined with non-military and non-nuclear capabilities to form a seamless and fully integrated approach.⁴

At least three implications can be drawn from Russian strategic innovations. First, any confrontation with Russia will likely include an active nuclear dimension from the outset. Some experts suggest Russia views conflict as a continuous spectrum – rather than a nuclear/non-nuclear binary phenomenon – that expressly includes a nuclear component throughout, to include in the “shaping” phases prior to the initiation of armed conflict.⁵ Here, nuclear forces and the attendant risk of escalation are envisioned to play a dynamic role across this continuum, encompassing deterrence, intimidation, coercion, and compellence. Nuclear brinksmanship is considered an important means to restrain Russia's enemies and thereby control escalation.⁶

Second, Russian strategy reportedly envisions the possibility of employing nuclear weapons at any point in a conflict and of relying on “limited” nuclear strikes – potentially in the early phases – to inflict a tailored-level of damage on the adversary in order to terminate a conflict on its own terms.⁷ The threat of deliberate escalation is underwritten by modern nuclear capabilities. Russia is developing and fielding diverse non-strategic nuclear forces capable of calibrated employment against political and military targets throughout Europe. This force features new dual-capable delivery systems such as the SS-26 *Stone* short-range ballistic missile, the Su-34 *Fullback* fighter-bomber, and the SS-N-30A submarine-launched

2 P. Bernstein, *Countering Russia's strategy for regional coercion and war*, Center for the Study of Weapons of Mass Destruction, 19-20 January 2016.

3 For example, see E. Colby, “Countering Russian nuclear strategy in Central Europe”, *CNAS Reports*, 16 November 2015.

4 D. Johnson, “Russia's conventional precision strike capabilities, regional crises, and nuclear thresholds”, *Livermore Papers on Global Security*, No.3, February 2018. D. Johnson, *Nuclear Weapons in Russia's approach to conflict*, Fondation pour la Recherche Stratégique, No.6, November 2016.

5 D. Adamsky, “Cross-domain coercion: the current Russian art of strategy”, *Proliferation Papers* No.54, IFRI Security Studies Center, November 2015.

6 J. Durkalec, *Nuclear backed “little green men”: nuclear messaging in the Ukraine crisis*, The Polish Institute of International Affairs, July 2015.

7 N. N. Sokov, “Why Russia calls a limited nuclear strike ‘de-escalation’”, *Bulletin for Atomic Scientists*, 13 March 2014, <https://thebulletin.org/2014/03/why-russia-calls-a-limited-nuclear-strike-de-escalation/>

cruise missile.⁸ Important to Russian strategies is the assumption that the initial, limited employment of non-strategic nuclear weapons will not necessarily lead to strategic nuclear employment, and might not even generate a proportionate response from NATO. In this way, Russian leaders may believe that escalation up to, and if needed beyond, the nuclear threshold is a manageable risk. As Barry Watts has suggested, “Russian leaders appear to have a very different view [from NATO] about limited nuclear use in a theater context”.⁹

Finally, the scale and scope of Russian nuclear employment could vary dramatically. As noted by Brad Roberts, Russia maintains “options for diverse and continuous nuclear operations at the sub-strategic level that are truly unique”.¹⁰ This may include nuclear employment to help asymmetrically negate the overall advantages in conventional capabilities of a mobilized NATO.¹¹ Indeed, reports suggest that Russia has sought to retain and modernize its substantial Cold War arsenal of nuclear weapon systems intended for battlefield use, including nearly 2,000 nuclear-armed nuclear free-fall bombs, artillery, anti-ship missiles, torpedoes, depth charges, and landmines.¹² These forces are designed to disrupt, deny, or destroy important *conventional* targets as part of a broader war-winning – not just a deterrence – strategy.¹³ Russian posture coupled with insistent secrecy on the roles and numbers of these weapons increases ambiguity over when and how such weapons may be employed in a conflict.

Nuclear-conventional alignment: a necessary adaptation

Russia's integrated posture presents grave risks to nuclear deterrence and strategic stability in Europe. This has been in part due to NATO's decision to separate nuclear forces from broader defence planning after the end of the Cold War. Over time this has eroded the operational and intellectual proficiency necessary to plan for the complexities involved in a future conflict in which nuclear weapons play a significant or even dominant role. Russia may be emboldened to engage in further reckless and aggressive behaviour if it believes that NATO is unprepared or incapable of responding to its nuclear threats. This greatly undermines deterrence stability and increases the possibility that nuclear weapons may be

8 Office of the Secretary of Defense, *Nuclear Posture Review*, Washington, DC, 2018.

9 B. D. Watts, *Nuclear-conventional firebreaks and the nuclear taboo*, Center for Strategic and Budgetary Assessments, 2013.

10 B. Roberts, *The case for US nuclear weapons*, Stanford, Stanford University Press, 2016.

11 R. N. McDermott, *Russia's conventional military weakness and substrategic nuclear policy*, The Foreign Military Studies Office, 2010.

12 Nuclear posture review, 2018.

13 D. Johnson, “Nuclear weapons in Russia's approach to conflict”, *Fondation pour la Recherche Stratégique*, No.6, November 2016.

used in the future.

A serious, and realistic option for the Alliance is adopting an appropriate level of nuclear-conventional coherence to more closely align nuclear and conventional forces as part of a holistic deterrence strategy tailored to Russia. Nuclear-conventional alignment is fundamentally about understanding the relationship between the conventional and potential nuclear dimensions of conflict and reflecting this understanding in policies, plans, forces, and decision-making so as to maximize the prospects for deterrence success. Preparations governed by this mindset are intended to ensure that Russia's leaders do not see any seams or gaps in NATO's deterrence. To this end, nuclear-conventional alignment encompasses at least three aspects: leveraging deterrence forces for harmonizing nuclear deterrence and conventional operations; planning conventional campaigns for shape Russian strategic calculus; and finally understanding the impact of nuclear employment on conventional operations. These issues are discussed more in detail in the following three sections.

Leveraging deterrence forces: harmonizing nuclear deterrence and conventional operations

For NATO, it is important to be able, in case of need, to leverage all of its deterrence forces to deter aggression at all levels, including adversary attempts at nuclear intimidation, coercion, or aggression during an otherwise "conventional" campaign. NATO nuclear forces, even if used solely for messaging and signaling purposes, must be ready to carry out deterrence operations both before and after the onset of hostilities. Such a posture would communicate to Russia that it cannot ignore, isolate, discount, or hope to neutralize NATO nuclear-capable forces, but in fact faces a robust full-spectrum military toolkit. This must be done without detracting from broader NATO preparations or operations to prevail in the ongoing conflict. Indeed, simultaneous nuclear deterrence and conventional missions can create operational conflicts as well as competing resource demands for tankers, fighter escorts, and other supporting elements. NATO could increase exercises that explicitly practice the transition from conventional to nuclear conflict. Greater emphasis on military escalation scenarios that include – rather than separate – nuclear employment would greatly benefit the Alliance.¹⁴

Moreover, if not properly aligned, nuclear deterrence operations in the context of broader conventional campaign execution could send a mixed or uncertain message to

14 S. de Galbert and J. Rathke, "NATO's nuclear policy as part of a revitalized deterrence strategy", *CSIS Commentary*, 27 January 2016, <https://www.csis.org/analysis/nato%E2%80%99s-nuclear-policy-part-revitalized-deterrence-strategy>; K. Reif, "NATO weighs nuclear exercises", *Arms Control Today*, November 2015, <https://www.armscontrol.org/act/2015-11/news/nato-weighs-nuclear-exercises>

Russia's leaders. To reduce prospects for misperception and miscalculation, such missions must be – and be seen as – responsive to the political-military objectives set by NATO leadership. This requires significant consideration before a crisis or conflict in order to help NATO leaders better understand how Russia may interpret certain signals or actions (in combination with other ongoing activities). Sustained table-top exercises and workshops should continue to be used to examine these issues with an eye toward reducing the risks of robust deterrence postures.¹⁵ Even so, during a conflict NATO planners and leaders must be attuned to their own actions and to how they may be received. Ensuring the closest possible synchronization of nuclear deterrence missions with conventional plans and operations is essential but will require careful collaboration between NATO's political and military authorities.

Planning conventional campaigns to shape Russian strategic calculus

The way NATO plans to mobilize and fight can influence Russia's decision to employ nuclear weapons. A recurrent concern in Russia's planning circles is NATO's capacity to deny Moscow its nuclear arsenal, disrupt its command and control, and decapitate its leadership through rapid and deep conventional strikes during a conflict.¹⁶ Actions perceived as a prelude to territorial loss or regime change may thus hasten nuclear escalation – regardless of whether Russia initiated the conflict. For example, significant NATO force mobilization – primarily of air assets – may be interpreted as preparation to expand the scope of a conflict far into Russian territory. During a conflict, the destruction of certain targets may unintentionally signal to Russia a decision to broaden the war's scope. Conventional planning cannot be disconnected from this sensitivity; as explained by Robert Scher, former US Assistant Secretary of Defense, "Integration means conventional operations must be planned and executed with deliberate thought as to how they shape the risk that the adversary will choose nuclear escalation".¹⁷ Throughout each phase of a conflict, a key consideration for NATO concerns how its actions and intentions are perceived. Communicating the correct intent may change some assumptions or objectives in current campaign planning to prevent escalation. This impacts NATO mobilization tactics as well as the identification of strategic targets – at least in the initial phases – in order to clearly

15 "NATO diplomats and experts meet in Riga to discuss NATO's nuclear deterrence", NATO, 5 September 2019, <https://www.nato.int/cps/en/natohq/168595.htm?selectedLocale=en>

16 K. Lieber and D. Press, "Coercive nuclear campaigns in the 21st century: understanding adversary incentives and options for nuclear escalation", *PASCC Report*, No.2013-001, March 2013.

17 R. Scher, Statement before the Senate armed services subcommittee on strategic forces, 9 February 2016, http://www.armed-services.senate.gov/imo/media/doc/Scher_02-09-16.pdf

communicate limited campaign plans (i.e. removing Russian forces from NATO territory). Importantly, any promise of restraint must be coupled with the clear understanding that Russia cannot escalate its way to victory; NATO will defend its Allies with all available means necessary. Russian forces participating in aggression or supporting aggression (anti-access/area-denial) will be at risk from NATO's high-intensity conventional operations. Considering conventional campaign planning from this perspective can enable NATO decision-makers to make more informed decisions regarding escalation prevention.

Understanding the impact of nuclear employment on conventional operations

NATO should consider the contingency of deterrence failure and thus, its planning should be geared at anticipating the potential impact of even a limited use of nuclear weapons by an adversary on operating forces and conventional warfighting plans. While the material and psychological effects resulting from a limited use of nuclear weapons cannot be known in advance with great confidence, it is of crucial importance for military authorities to have in place the tools necessary to make a timely assessment of the operational impact. This would allow Alliance leaders to determine if NATO's military campaign can continue as planned, or requires revision in order to achieve the desired operational and strategic end state. Conventional forces must possess some demonstrable ability to operate in a nuclear hazard environment, and those planning NATO military operations must possess the means to adapt operations as needed. Operational resilience – forces, infrastructure, and plans – to limited nuclear attacks is vital to deterring such attacks. In this way, every NATO soldier has a critical role to play in deterring Russian nuclear attack. Additionally, should Alliance leaders feel compelled to consider a NATO nuclear response to an adversary's initial nuclear use, it will be critically important to assess how employment options could affect NATO's conventional campaign objectives and operations. Nuclear response options should not impair or endanger conventional forces. Rather, nuclear employment, if necessary, should be consistent and aligned with broader political-military objectives.

The above-mentioned discussion is not a call for NATO to return to its Cold War playbook or to mimic the Russian approach. NATO publicly reaffirmed in the 2018 Brussels Summit Declaration that nuclear weapons would fundamentally alter the nature of a conflict, and the circumstances in which NATO might consider the use of nuclear weapons are extremely remote.¹⁸ Modest improvements to the Alliance's strategies, plans, and posture do not suddenly eliminate this longstanding pledge, nor will it encourage NATO in the direction of normalizing nuclear weapons.

18 Brussels Summit Declaration, 22 July 2018, https://www.nato.int/cps/en/natohq/official_texts_156624.htm

If NATO were truly mimicking or mirror-imaging Russia, it would take actions to expand the role and usefulness that nuclear forces play in NATO policy. This would include a significant expansion of the arsenal's size and diversity, plans for early nuclear use or prolonged nuclear exchanges to support military campaigns, and the use of nuclear weapons for coercive political purposes. Alignment promotes none of these ideas, and is focused squarely on enhancing stability and credibility without making dramatic changes to NATO's nuclear posture that would move the Alliance down the path that Russia has taken.

Indeed, deterrence – not warfighting – is the principal purpose. Nuclear-conventional alignment helps ensure that the nuclear threshold remains appropriately high by minimizing the likelihood of Russian nuclear use. Indeed, enhancing NATO's posture in this way can help influence Russian leaders to assess that their integrated nuclear/non-nuclear approach offers little value. Russia must understand, in the strongest possible terms, that nuclear force will not impede NATO from opposing Russian aggression nor will it shield Russia from unacceptable costs. A more aligned, cohesive, and mutually supportive posture adds credibility to deterrence threats, especially when paired with the other modest adaptations to enhance NATO's nuclear force posture (such as increased readiness and survivability) and demonstrations of resolve. Clearly conveyed preparedness to decisively respond to Russia coercion or aggression is important in shaping Russian perceptions of risk and the likelihood of success. A more credible NATO deterrence posture can disincentivize coercive nuclear options and encourage restraint, thereby strengthening deterrence.

Conclusion

Achieving a deeper degree of alignment between conventional and nuclear forces and operations will visibly demonstrate NATO's resolve and readiness to confront Russia's integrated approach to conflict and contribute directly to a stronger deterrence posture. While the adaptations necessary to move in this direction are relatively modest, they extend well beyond declaratory statements and require real planning, training, exercising, and leadership attention to execute.

Asking the right questions: hypersonic missiles, strategic stability, and the future of deterrence

Carrie A. Lee *

Does the introduction of hypersonic missiles into the arsenal of great powers fundamentally alter strategic stability? Breakthroughs in technology over the last decade have made hypersonic weapons a reality for the deterrence community, and increasingly are receiving significant amounts of public attention.¹ There has been widespread speculation that these weapons will prove destabilizing to the balance of power: warhead ambiguity may cause potential adversaries to misinterpret intentions; target ambiguity may result in perceived “use it or lose it” situations; the nullification of missile defense systems increases vulnerability; increased vulnerability to decapitation strikes may result in more risky forward posturing; and the proliferation of this technology to powers with less established command and control systems could prove highly destabilizing.² Similarly, there exists a burgeoning literature exploring arms control solutions to the introduction of hypersonic weapons.³ However, the literature to date has missed an important step in the discussion of this new technology, and there exists little if any systematic social science work done to understand whether and why hypersonic weapons change the nature of deterrence in the world today. This paper seeks to generate an analytic line of questioning and evaluating the dimensions along which hypersonic cruise missiles and glide vehicles may impact the conventional and nuclear deterrence. It suggests that the ultimate impact of hypersonic weapons depends on their speed, maneuverability, numerics and nuclear-conventional dual-capability.

* Opinions and conclusions expressed in this chapter are those of the author's and do not reflect official policy or position of the US Department of Defense, US Air Force, or the US Air War College.

1 R. Jeffrey Smith, “Hypersonic missiles are unstoppable. And they’re starting a new arms race”, *New York Times*, 19 June 2019, <https://www.nytimes.com/2019/06/19/magazine/hypersonic-missiles.html>

2 J. Acton, *Silver bullet? Asking the right questions about conventional prompt global strike*, Carnegie Endowment for International Peace, Washington, DC, 2013; R. Speier, G. Nacouzi, C. Lee and R. Moore, *Hypersonic missile nonproliferation: binding the spread of a new class of weapons*, RAND Corporation, Santa Monica, CA, 2017.

3 H. Williams, “Asymmetric arms control and strategic stability: scenarios for limiting hypersonic glide vehicles”, *Journal of Strategic Studies*, Vol.42, Iss.6, 2019, pp.789-813.

The rush for solutions

The last several years have witnessed growing worries about the introduction of hypersonic-speed weapons into Great Powers' arsenals. Concerns that this will spark a new, tri-partite arms race between the United States, Russia, and China have been widely discussed across both the policy world and academia.⁴ This new class of weapon skims along the top of the atmosphere at speeds more than 5 times the speed of sound and is highly maneuverable: as a result, it threatens to make missile defense systems obsolete and return the world to an era of mutually assured destruction.

The biggest concern amongst policy makers, however, is that hypersonic weapons may re-inject a significant amount of uncertainty into a relatively stable global deterrence system.⁵ In particular, hypersonic weapons challenge a state's ability to discern whether or not an incoming strike is, first, intended for the state at all, and, second, carrying a nuclear payload. While the United States has declared its intention to arm hypersonic missiles with only conventional payloads (an initiative called Conventional Prompt Global Strike, or CPGS), other countries have been explicit in their intent to use hypersonic missiles to modernize their nuclear delivery capabilities. There is nothing to say that the United States would not respond to this reality in kind.⁶ While ICBMs follow a generally predictable trajectory, and cruise missiles are launched close enough to the intended location to signal a likely target, a nuclear armed power in the vicinity of a target of CPGS may have considerable uncertainty about whether the missile is, in fact, intended for its own territory. Some have argued that this lack of predictability could result in a series of risk-accepting postures across the globe that ultimately may increase the likelihood of inadvertent escalation, including launch-on-warning postures and the devolution of command and control of warheads into the field.⁷

In response, many have begun to develop strategies that could limit the spread of hypersonic cruise missiles and hypersonic glide vehicles. Some focused on preventing the spread of the technology itself beyond the top three indigenous programs (US, Russia, and China). Speier, Nacouzi, Lee and Moore explored ways in which existing non-proliferation agreements such as the Missile Technology Control Regime (MTCR) might be modified to accommodate technology associated with hypersonic weapons.⁸ Others have focused on

4 K. Saylor, "Hypersonic weapons: background and issues for Congress", *Congressional Research Service Report R45811*, 17 March 2020.

5 See, for example, Acton, *op.cit.*

6 V. Putin, Presidential address to the Federal Assembly", 1 March 2018, <http://en.kremlin.ru/events/president/news/56957>; A. Woolf, "Conventional prompt global strike and long-range ballistic missiles: background and issues", *Congressional Research Service Report R41464*, 14 February, 2020; Saylor, *op.cit.*, p.4.

7 Speier *et al.*, *op.cit.*

8 *Ibid.*

limiting the use and deployment of hypersonic weapons once they are already introduced into a state's arsenal. Williams explored how six different versions of arms control arrangements might be implemented to limit the use and deployment of hypersonic glide vehicles.⁹

Taking a step back

These efforts, however, miss a critical step in the design of policy solutions – they have yet to determine exactly what problems hypersonic weapons pose to global strategic stability. Rather, they appear to rely upon assumptions that either the spread of the technology is fundamentally destabilizing and therefore nonproliferation must be a priority,¹⁰ or that any kind of arms control agreement will be a step toward solving destabilizing properties associated with hypersonic glide vehicles.¹¹ Indeed, little systematic analysis has been conducted to identify which of the several changes hypersonic weapons introduces into nuclear and conventional deterrence pose the greatest risks to strategic stability. Perhaps more troubling, there has been no effort to examine whether certain aspects of hypersonic weapons may in fact restore stability to a world that has been increasingly trending toward first-strike counterforce strategies. As a result, arms control analysis risks developing solutions for the wrong problems, or even developing “solutions” that risk further destabilization.

The rest of this paper is devoted to asking these more fundamental questions, with the aim of prompting a research agenda that begins to explore and explain the role that hypersonic weapons will play in deterrence in the 21st century. I identify four areas where the introduction of hypersonic weapons into a state's arsenal may impact deterrence, both in theory and in practice: the speed of the missile, its maneuverability, the addition of more nuclear delivery devices, and the dual-use (conventional/nuclear) nature of hypersonic delivery systems. While there are potentially other areas in which hypersonic weapons may affect strategic stability, the four examined here are those most often mentioned in the existing arms control literature, and therefore most in need of exploration and examination.

Speed

The first major improvement that hypersonic weapons make upon existing weapons is the speed with which they can reach a target. With the ability to skim along the surface of the Earth's atmosphere at speeds up to Mach 20, as opposed to following a ballistic

⁹ Williams, *op.cit.*

¹⁰ Speier *et al.*, *op.cit.*

¹¹ *Ibid.*

trajectory, a hypersonic glide vehicle would significantly decrease the amount of time a nation would have to detect and respond to a nuclear attack – some reports indicate as little as six minutes.¹² The decreased time both to deliver a strike and to react to a potential attack challenges missile defense systems, decreases response times, and reintroduces decapitation as a viable strategy.

What impact does this have on strategic stability? The compressed time frame in which a state has to react to a potential incoming strike, combined with the introduction of decapitation as a potentially viable strategy, likely reduces strategic stability in important ways. Popular assessment would suggest that a compressed timeframe requires a state to take precautionary measures so that it retains the ability to preserve sufficient nuclear weapons to launch a second strike. For the United States' nuclear triad, this means keeping forces on a "hair trigger" alert similar to protocols set in place during the Cold War, and possibly increasing threat levels.¹³ For states with smaller nuclear arsenals, this could result in a series of changes to command and control that ultimately inject yet more risk into the regional or international environment.¹⁴ Current US land-based missiles are able to launch within five minutes of a presidential order, but the time between when a missile is launched and when a leader receives word, then makes a decision, could be considerably longer. As a result, many countries, including the United States, might face incentives to give launch authority to military commanders at much lower levels, again increasing risk.¹⁵

These operational adjustments could then negatively impact strategic stability in three ways. First, the risk of accidentally deploying or using a nuclear weapon increases. No deployment or alert is 100 percent safe, and the law of large numbers suggests that the more often nuclear weapons are forward-positioned or alerted, the more likely it is that an accident will happen.¹⁶ Second, it increases the potential for inadvertent escalation as adversaries may misinterpret US actions as aggressive, escalatory, or preparatory for war when in fact they are simply a reflection of appropriate force posture given the compressed decision-making timeframe – a classic security dilemma with potential for escalation.¹⁷

12 Speier *et al.*, *op.cit.*

13 For an explainer of what "hair trigger" alert means, and the dangers associated with it, see Union of Concerned Scientists, "What is hair-trigger alert?", *UCSUSA Explainer*, 3 October 2014, <https://www.ucsusa.org/resources/what-hair-trigger-alert>

14 See, for example, the strategies outlined by V. Narang, *Nuclear Strategy in the Modern Era: Regional Powers and International Conflict*, Princeton, NJ, Princeton University Press, 2014.

15 *Ibid.*

16 S. Sagan, *The limits of safety: organizations, accidents, and nuclear weapons*, Princeton, NJ, Princeton University Press, 1995.

17 B. Posen, *Inadvertent escalation: conventional war and nuclear risks*, Ithaca, NY, Cornell University Press, 1994; for an updated assessment regarding US-China relations, see C. Talmadge, "Would China go nuclear? Assessing the risk of Chinese nuclear escalation in a conventional war with the United States", *International Security*, Vol.41, Iss.4, 2017, pp.50-92.

Finally, the compressed timeline alters the incentives of decision-makers in ways that encourage a leader to “shoot first and ask questions later.” Given the cost of delay to a state’s second strike capabilities, there is already very little time to question an adversary’s intentions or whether the warning data is verified. With a decision-making timeframe generously estimated at a quarter of what it is now, leaders will have little choice but to adopt “launch on warning” postures that leave little room for error.¹⁸

To say that a change in time horizon, however, necessarily affects how states think about their deterrence posture assumes that the time between an adversary launching an attack until the time of impact matters significantly in the credibility of a state’s threat to retaliate. Is this true? Does the credibility of state’s retaliatory threat rest upon its ability to react before impact? I have outlined above some of the operational consequences that we may observe as states seek to preserve their second strike capabilities in the shadow of six minutes of warning. However, assuming that a state is able to adequately cordon off “enough” nuclear weapons to preserve a viable second strike, how long does the decision-making process have to last in order to ensure retaliation? John Boyd identified long ago that decision-makers typically go through four stages when responding to a threat: Observe, Orient, Decide, and Act (OODA). Hypersonic weapons force us to ask if there exists a point at which the speed of weapons can break the nuclear “OODA Loop”, and if so, does this matter for how states view their adversary’s credibility?

Consider a scenario where a massive first strike by State A destroys the vast majority of State B without warning or the ability to respond before being hit. What then is the strategic rationale behind launching a retaliatory second strike at all?¹⁹ Once nuclear weapons have already made impact with State B, it is conceivable that the “game” may reset, where State A has presented State B with a *fait accompli*, and State B is now attempting to deter State A from launching another hypersonic attack. In this sense, the moment when the retaliatory strike is set into motion may in fact make a large difference, suggesting that hypersonic missiles may substantially alter the way in which states think about credibility and deterrence. On the other hand, in a tri-polar world, State B may be required to retaliate simply in order to preserve the credibility of its retaliatory threat for other nuclear powers with hypersonic weapons. In this case, when the impact occurs matters less, because there are incentives to retaliate beyond malice.

18 Speier *et al.*, *op.cit.*; Narang, *op.cit.*

19 We see this dilemma play out in British discussions about scenarios in which they would potentially use their nuclear capabilities. Ultimately, British planners realized that the use of such weapons, even in retaliation, had very little strategic logic or advantage. M. Navias, *Nuclear weapons and British strategic planning, 1955-1958*, Clarendon Press, Oxford, 1991. Credit to Ron Gurantz for pointing this out.

Maneuverability

The second major improvement that hypersonics make is the ability to maneuver and change trajectory fairly late in flight. While cruise missiles have long had the ability to maneuver and change direction in flight, missiles traveling longer distances have traditionally been forced to follow a ballistic trajectory, making their targets easy to identify and, increasingly, defend against.²⁰ Hypersonic missiles, however (and particularly glide vehicles able to travel across continents), retain the ability to change trajectory, introducing both uncertainty as to the intended target as well as significantly reducing a targeted state's ability to defend itself against the missile.²¹

Here the implications for strategic stability are likely mixed, but not necessarily counteracting. While challenges to missile defense systems may have the immediate effect of making advanced countries like the United States less safe, it also represents a return to a mutually-assured-destruction (MAD) world, where no one is invulnerable to attack. Critics of ballistic missile defense (BMD) have long argued that the acquisition of missile defense fundamentally alters the incentives of states who possess such systems in ways that undermine long-term strategic stability. Indeed, if we think about deterrence broadly as the ability to convince an adversary not to attack by threatening either that such an action will be met with intolerable consequences (deterrence by punishment), or that it is ultimately futile (deterrence by denial), the lack of fear of punishment due to missile defense systems necessarily makes a state more willing to escalate and attack. As a result, because hypersonic weapons return the international system to a MAD world, they may in fact restore elements of strategic stability as great powers no longer see themselves as immune from retaliation.²²

On the other hand, increased maneuverability also means that states have less time to determine whether a strike is intended to hit a nuclear target or not, if at all. James Acton describes this phenomenon as "target ambiguity".²³ This matters because different targets have different values (and signals) associated with them. Targeting conventional capabilities versus nuclear command and control, for example, sends a very different signal to a receiving state. Degraded command and control capabilities affect a state's ability to further defend itself, and may signal a wider intent to escalate. Targeting purely conventional sites, on the

20 US Navy, *Principles of guided missiles and nuclear weapons*, Bureau of Naval Personnel; Arms Control Association, "Missile defense systems at a glance: fact sheets and briefs", 1959, <https://www.armscontrol.org/factsheets/missiledefenseatagance>

21 Sayler, *op.cit.*

22 See P. Podvig's comments in A. Mackinnon, "Russia's new missiles are aimed at the US", *Foreign Policy*, 5 March 2019, <https://foreignpolicy.com/2019/03/05/russias-new-missiles-are-aimed-at-you-weapons-hypersonic-putin-united-states-inf/>

23 Acton, *op.cit.*

other hand, may signal a desire to prevent escalation.²⁴ However, when a receiving state is unable to determine which type of site an adversary is targeting, it will almost certainly be forced to assume the worst case. What's more, if a state does believe that an incoming missile is intended to disrupt its ability to launch a second strike, leaders may believe that they have been placed in a "use it or lose it" situation. They then may face strong incentives to launch their own nuclear arsenal before it has the chance of being destroyed in a first strike. This is likely particularly the case in states with small stockpiles, where a first strike could conceivably destroy most if not all of its inventory. However, the degree to which this kind of target ambiguity would either represent such a significant change in leaders' incentives, or alter nuclear postures that already operate on hair-trigger warning, is unclear and requires further investigation and research.

Increased maneuverability, combined with the speed at which hypersonic weapons travel, may also introduce decapitation as a viable strategy, which may further destabilize strategic security on the international stage.²⁵ While most states already struggle with ensuring that lines of command and control remain viable in the event of a major nuclear strike, systems that work to preserve the survivability of the serving executive would be left with little to no advanced warning, and no ability to determine *ex ante* where a missile might hit. As a result, hypersonic weapons generate a far greater probability that a decapitation strike would be successful, thereby increasing incentives for great powers to pursue such strikes. In countries with defined protocols and procedures for the orderly transition of power, this may not present a particular problem.²⁶ However, regimes that concentrate power at the top with a single person or family without a clear line of succession, or what we might call personalist regimes, may be more vulnerable.²⁷ These vulnerable states may then take preventive measures. One way may consist in ensuring regime survival, such as devolving command and control of nuclear retaliation beyond the executive. This delegation of authority may ensure that a state will retaliate if struck, but necessarily results in increased acceptance of risks associated with rogue actors or accidental detonation. Another way is adopting a more aggressive nuclear posture, whereby nuclear weapons are immediately employed when the leadership is threatened. While more escalatory, the latter better fits,

24 K. Kartchner and M. Gerson, "Escalation to limited nuclear war in the 21st Century", in J. Larsen and K. Kartchner (eds.), *On limited nuclear war in the 21st century*, Stanford, CA, Stanford University Press, 2014.

25 Narang, *op.cit.*

26 J. Jordan, *Leadership decapitation: strategic targeting of terrorist organizations*, Stanford, CA, Stanford University Press, 2019; A. Long, "Wack-a-mole or coup de grace? Institutionalization and leadership targeting in Iraq and Afghanistan", *Security Studies*, Vol.2, Iss.3, 2014, pp.471-512.

27 For a fuller description of regime types, particularly for autocracies, see B. Geddes, *Politician's dilemma: building state capacity in Latin America*, Berkeley, Los Angeles, London, University of California Press, 1994.

regimes where control is more rigid and centralized.²⁸

Numerics

On a more basic level, hypersonic weapons also add nuclear delivery devices to the arsenal, after years of attempts at limiting the number of delivery systems through arms control negotiations. In theory, increasing the number of warheads is meaningless unless a state can also increase the number of vehicles capable of delivering those warheads. The introduction of multiple independently targetable re-entry vehicles (MIRVs) in the 1960s – capable of releasing multiple nuclear warheads from a single missile – led to an emphasis in arms control negotiations not just on the number of delivery devices but also on the number of warheads a state may possess.²⁹ More importantly, treaty negotiators operate under the assumption that fewer nuclear warheads necessarily results in increases in strategic stability. These two issues – limiting the number of warheads as well as delivery vehicles – have therefore formed the pillar of arms control talks for over fifty years. The New START treaty signed by both Russia and the United States limits the number of missiles and bombers to 700, non-deployed launchers to 800, and the number of deployed nuclear warheads is set at 1,500.³⁰

The introduction of hypersonic missiles raises important questions about both the validity of existing assumptions around arms control and the relevance of existing treaties. First, hypersonic weapons represent a new class of delivery vehicle not currently covered by existing arms control treaties.³¹ As a result, the acquisition of new missiles and glide vehicles is not limited or prohibited by any international agreement, which could significantly increase the number of nuclear delivery vehicles available to either Russia or the United States. If we believe that limiting the number of delivery vehicles is an important and necessary part of effective arms control and contributes to strategic stability, then the emergence of a new and uncontrolled class of launcher likely reduces strategic stability, and may in fact start a new arms race.

Second, even if hypersonic weapons are introduced as delivery vehicles akin to ICBMs, as the number of nuclear warheads and delivery vehicles has continued to decline, treaty

28 N. Friedman, *The US maritime strategy*, Janes Information Group, London, 1988.

29 D. Buchonnet, “MIRV: a brief history of minuteman and multiple reentry vehicles”, *Classified report by Lawrence Livermore Laboratory*, February 1976. Declassified and released via FOIA Request to Defense Department, June 1997.

30 US State Department, “Treaty between the United States of America and the Russian Federation on measures for the further reduction and limitation of strategic offensive arms”. Signed on 10 April 2010. Text available at <https://2009-2017.state.gov/documents/organization/140035.pdf>

31 Speier *et al.*, *op.cit.*

negotiators have been careful not to pursue reductions so radical that they would jeopardize second-strike capabilities and, by extension, a state's ability to deter a counter-force first strike. Part of this logic, however, relies upon an ability to receive adequate warning and launch authority for missiles and bombers to deploy before being destroyed by an incoming warhead. The introduction of nuclear-capable hypersonic weapons raises questions about whether current limitations are high enough to ensure that some percentage of existing delivery vehicles can survive a first strike. If not, then the introduction of even a small number of hypersonic missiles – far from requiring additional arms control measures to ensure strategic stability – may in fact paradoxically require upwards revisions of existing limits in order to preserve strategic stability.

More research therefore needs to be done to determine exactly how the introduction of hypersonic weapons as a nuclear delivery device may alter states' perception of their second strike capabilities.³² Further, more exploration is needed into understanding whether hypersonic weapons represent just one additional delivery vehicle (i.e. represent a one-for-one exchange with other missiles), or whether they introduce multiplicative effects due to speed and maneuverability.

Dual capability

Finally, hypersonic weapons have the capacity to deliver both nuclear and conventional warheads. This dual capability (which James Acton has called “warhead ambiguity”) has the potential to lead to inadvertent escalation and conflict spirals from which states cannot recover. Indeed, according to current US policy, hypersonic glide vehicles will only be used to deliver conventional payloads (known as Conventional Prompt Global Strike).³³ By contrast, both China and Russia (as well as other states lagging in development such as France) have announced their intention to use hypersonic weapons to modernize their nuclear forces.³⁴ These conflicting policies, and the ease with which they can change, introduce additional uncertainty into leaders' decision-making when trying to decide whether an incoming strike will be nuclear or not.

Intuitively, conventional strikes signal very different intentions from nuclear strikes. However, warhead ambiguity introduces uncertainty into decision-making because leaders are unable to tell the difference between a conventional versus nuclear strike until it is

32 A. Long and B. Rittenhouse Green, “Stalking the secure second strike: intelligence, counterforce, and nuclear strategy”, *Journal of Strategic Studies*, Vol.38, Iss.1-2, 2016, pp.38-73.

33 Saylor, *op.cit.*

34 *Ibid.*

too late. Leaders may therefore be forced to assume the worst – that any incoming strike using a hypersonic missile is nuclear in nature. Nuclear strikes signal a far more serious exchange, and in many cases are considered a prelude to total war. By being forced to assume that any hypersonic weapon is carrying a nuclear payload, the risks of escalation increase significantly.

The speed and maneuverability of the missile further complicated the dilemmas presented by the ambiguous nature of hypersonic weapons. In addition to introducing warhead ambiguity, which forces adversaries to assume that every missile is carrying a nuclear payload, the characteristics of the missile itself introduce target ambiguity. This means that hypersonic weapons introduce even more uncertainty into leaders' decision-making because leaders are unable to determine an expected target until very late. As a result, leaders cannot know until a missile lands whether it is aimed at a minor target or major command and control systems. Hence, leaders may also assume the worst about a target in order to preserve a second strike capability.

Overall, this means that even a conventional payload on a hypersonic weapon targeting a terrorist cell has the possibility of being interpreted as a nuclear assault on a great power's nuclear command and control system. This set of assumptions runs a great risk of inadvertent escalation, and could significantly decrease strategic stability.

The way forward

Solutions to the dilemmas that hypersonic missiles generate require a deep understanding of the risks that they pose to strategic stability. Arms control negotiations of any kind require that all sides recognize these risks and develop creative solutions that move the world toward stability while protecting national security interests. Different challenges necessarily require different prescriptions – if even one hypersonic weapon is enough to potentially escalate a conflict, this requires a different approach from one in which the objective is to simply limit the number of possible nuclear delivery devices. Similarly, if it is the speed of hypersonic weapons – and in particular the potential first strike counterforce options to again be viable – that primarily affects stability, the prescriptions for arms control are different than if we are predominantly worried about the re-introduction of decapitation as a strategy.

Hypersonic weapons undoubtedly raise important questions about the future of strategic stability and deterrence in today's environment. All three major powers will likely have these weapons as viable parts of their arsenal within the next five years, meaning that the international system will be faced with the very dilemmas and decisions outlined above,

in the near future. Understanding how missile delivery, speed, and technological change impact decision-making and strategic thought at the highest level is therefore of paramount importance in an increasingly challenging international environment.

Conclusion

Andrea Gilli and Matteo Taraborelli

What is the future of nuclear deterrence in Europe? Will major actors including NATO, the European Union as well as nuclear powers like the United States, France, the United Kingdom and Russia manage to preserve nuclear stability or will tensions or escalatory dynamics – inadvertent or deliberate – be inevitable?

The year 2019 will likely mark a turning point in the history of nuclear deterrence. In the month of August, the US government with its NATO Allies decided to pull out of the Intermediate-range Nuclear Forces (INF) Treaty as a response to Russia's continued violations, namely the deployment of the SSC-8 missile, as discussed in depth in the chapter by Katarzyna Kubiak.¹ The end of the INF did not exactly come as a surprise, however. On the one hand, the INF was at the heart of European security by contributing to strategic stability in the post-Cold War period.² Violations of the INF thus represented a major threat not only to one pillar of the existing arms control architecture but also, more generally, to security in Europe.³ On the other, these violations have been reported for a decade and various parties tried, without success, to bring Russia back into compliance.⁴ Suffice it to say that, according to former members of Barack Obama's Administration, had Hillary Clinton won the elections, the US would have withdrawn from the Treaty regardless.⁵

Despite the political and emotional reaction to the end of the INF, one aspect deserves attention: NATO left the Treaty from a position of relative strength.⁶ NATO is the strongest alliance in the history of humankind and, since 2014, its Allies, individually and collectively, have taken a set of measures aimed at further enhancing their military

1 See also A. F. Woolf, "Russian compliance with the Intermediate range Nuclear Forces (INF) Treaty: background and issues for Congress", *CRS Report*, Washington, DC, Congressional Research Service, 2017.

2 U. Kühn and A. Péczeli, "Russia, NATO, and the INF Treaty", *Strategic Studies Quarterly*, Vol.11, No.1, 2017, pp.66-99, www.jstor.org/stable/26271591

3 I. Anthony, "European Security after the INF Treaty", *Survival*, Vol.59, No.6, 2017, pp.61-76.

4 *Capturing Technology. Rethinking Arms Control*, Conference held in Berlin on 15 March 2019 at the German Ministry of Foreign Affairs.

5 Conversation with a previous member of the Obama Administration, Spring 2019, Rome, Italy. See also Defence Committee, "Missile misdemeanours: Russia and the INF Treaty", *Fifteenth Report of Session 2017-19*, London, House of Commons, 2019.

6 T. Tardy (ed.), "NATO at 70: no time to retire", *NDC Research Paper* 8, Rome, NATO Defense College, 2020.

capabilities, modernizing the Alliance's force and command structure, as well as signaling their cohesion and resolve.⁷ In this volume Jacek Durkalec and Harrison Menke, in their respective chapters, highlight some areas where NATO could further enhance its deterrence and defence posture or better avoid potentially escalatory dynamics. The fact remains that, since Russia illegally annexed Crimea, NATO is better positioned to accomplish its deterrence and defence goals, also in the nuclear domain.⁸

This is particularly important in light of the INF violations as well as other Russian actions, from nuclear sabre rattling to intrusion into NATO Allies' and partners' airspace, from disinformation campaigns to the perilous use of chemical weapons on other countries' territory, as well as other more or less brazen attempts to sow instability in Eurasia.⁹ Obviously, a key part of the equation is the nature of the Russian regime and the ambitions of the elite in power, starting with President Vladimir Putin, who in early 2020 succeeded in further extending his term of office. While of central importance, this issue is beyond the scope of this volume. However, we can examine its most immediate implications: nuclear risks – from nuclear coercion to inadvertent escalation – are likely to stay with us in the near future.¹⁰

This is why, in this concluding chapter, it is useful to look at three potential issues that will affect nuclear deterrence as well as arms control discussions in the years ahead. First and foremost, as reminded by Jessica Cox in the Introduction to this volume, there is a risk that nuclear deterrence will once again be neglected, also because of the socio-economic crisis triggered by COVID-19. Second, the interplay between technological change and nuclear capabilities, especially cyber and space, deserves special scrutiny. Finally, as other arms control treaties come to their natural end, important questions loom on the horizon of strategic stability.

Since the end of the Cold War, understanding and skills in security studies, in general, and in the domain of nuclear deterrence, in particular, have atrophied. This is particularly true in Europe: in the official programme of the 12th Pan-European Conference on International Relations held in Prague in September 2018, for instance, fewer than five papers – out of thousands – had the word deterrence in their title. There are multiple reasons

7 M. Ozawa (ed.), "The Alliance five years after Crimea: implementing the Wales Summit pledges", *NDC Research Paper 7*, Rome, NATO Defense College, 2019.

8 J. A. Larsen, "NATO nuclear adaptation since 2014: the return of deterrence and renewed Alliance discomfort", *Journal of Transatlantic Studies*, Vol.17, 2019, pp.174-193.

9 C. Ben et al., *Russia's hostile measures: combating Russian grey zone aggression against NATO in the contact, blunt, and surge layers of competition*, Santa Monica, CA, RAND Corporation, 2020.

10 S.R. Covington, "Putin's choice for Russia", *Defense and Intelligence*, Cambridge, MA, Belfer Center for Science and International Affairs, 2015.

for this, including the fact that the 1990s gave the illusion that history, if not over, would at least move away from deterrence. The 2000s brought policymakers and scholars alike to study other important topics, from civil wars to counterinsurgency and non-traditional threats. While the 2010s gave strategic prominence to other issues, including energy, the environment and inequality. As the generation of Cold Warriors retired, a decreasing number of individuals came to know and understand nuclear deterrence, resulting across Europe, in only a handful of universities teaching specific classes on nuclear deterrence.¹¹ This first part of 2020, with the COVID-19 crisis, has caused various socio-economic and political disruptions.¹² What the short- and long-term implications will be is still to be seen.¹³ However, it is not unlikely that nuclear issues will once again be sidelined. This would be very unfortunate, as deterrence is even more important in moments of crisis, i.e. when windows of vulnerability potentially open up. There is also another related reason: some key choices concerning nuclear deterrence will have to be made in the years ahead, including most prominently those concerning nuclear sharing as well as ballistic missile defence.¹⁴ A lack of attention to these and other themes, even for legitimate reasons, could inevitably jeopardize some key pillars in NATO's nuclear posture.

Nuclear modernization indubitably takes us to another issue – technological change and its impact on strategic stability.¹⁵ As we develop more capable weapon systems, technological change offers new opportunities but may also pose some risks. Carrie Lee's chapter in this volume touches upon one, of the many, potential aspects of this discussion: hypersonic weapons. Fortunately, so far, no crises have arisen from uncontrolled technological developments and neither have new technologies brought about deterrence failures. But we cannot be so confident about the future. In the 1980s, the so-called Second Offset Strategy ultimately showed that through stealth, long-range surveillance and precision strike, it was possible for conventional weapons to determine strategic effects, thereby affecting the nuclear balance.¹⁶ The Third Offset Strategy was launched a few years ago and although cyberwarfare was not its central pillar, it is plausible that cyberwarfare capabilities could raise

11 In most of Europe, there are at best only a couple of individuals per country able to deliver classes on nuclear deterrence, which include relatively basic discussions on technology and doctrine.

12 T. Tardy (ed.), "COVID-19: NATO in the age of pandemic", *NDC Research Paper*, No.9, May 2020.

13 B. Tertrais, "Year of the rat. The strategic consequences of the Coronavirus crisis", *Note de la FRS*, No.17, Paris, Fondation pour la Recherche Stratégique, 2020.

14 T. McCrisken and M. Downman, "Peace through strength: Europe and NATO deterrence beyond the US Nuclear Posture Review", Vol.95, No.2, March 2019, pp.277-295.

15 A. Gilli, "Preparing for 'NATO-mation': the Atlantic Alliance toward the age of artificial intelligence", *NDC Policy Brief* No.4, Rome, NATO Defense College, 2019.

16 R. Martinage, *Toward a new offset strategy: exploiting US long-term advantages to restore US global power projection capability*, Washington, DC, Center for Strategic and Budgetary Assessment, 2014.

similar and important questions in the future. To what extent can cyberattacks neutralize strategic arsenals? How can cyber capabilities be introduced into countries' nuclear strategy, posture and doctrine? Last but not least, how does this affect signaling and declaratory policy? Should we also pursue an INF-like treaty on strategic cyber weapons, and how would effective monitoring, enforcement and sanctioning occur? Cyber became a domain for NATO in 2016: a sign that the Alliance is trying to cope with a fast-paced world. In 2019, space also became a domain while NATO has been keenly attentive to other realms, like big data and machine learning. These, and other instances of technological change – including progress in quantum because of its implications for cryptography and 5G telecommunication networks – raise other important questions for the future, from posture to doctrine, from nuclear command, control and communications (NC3) to arms control and confidence-building mechanisms.

The last topic we want to briefly discuss, already raised by Jessica Cox in her introduction to this volume, concerns the future of arms control and in particular two fundamental arms control treaties close to important deadlines, the Nuclear Non-Proliferation Treaty (NPT) and the New Strategic Arms Reduction Treaty (New START). First, as hinted before, arms control and nuclear deterrence are two sides of the same coin – despite the ideological and epistemological split in their respective academic communities. Arms control, without deterrence, exposes to coercion. Deterrence, without arms control, opens the way to escalation. With respect to the NPT, 5 March 2020 marked the 50th anniversary of its entry into force: all signatory states were due to meet in New York at the end of April 2020 for the 10th Review Conference to celebrate this important date. However, the meeting was postponed “to a later date, as soon as the circumstances permit, but no later than April 2021” due to the COVID-19 pandemic.¹⁷ The NPT is one of the most successful arms control treaties in history given that it managed to slow down the spread of nuclear weapons.¹⁸ Following the letter and the spirit of the Treaty, 160 of the 190 signatory States are currently interested in the reduction, and eventually the complete elimination, of nuclear weapons “under strict and effective international control”, as in Article VI.¹⁹ Half a century after its entry into force, this goal, however, seems far from being achieved. As a result, an increasing number of non-nuclear-weapon States has begun to question the traditional NPT review process. Although the NPT has no expiration date, it is not inconceivable that

17 D. G. Kimball, “NPT Review Conference postponed”, *Arms Control Today*, April 2020.

18 J. Walsh, “Learning from past success: the NPT and the future of non-proliferation”, *Paper 41*, Stockholm, Weapons of Mass Destruction Commission, 2005.

19 Treaty on the Non-Proliferation of Nuclear Weapons (NPT), <https://www.un.org/disarmament/wmd/nuclear/npt/text/>

tension and disagreements may emerge in the years ahead with consequences that cannot be fully appreciated at this stage.

The New START does have an expiration date – 2021. The New START is the only remaining treaty limiting the world's two largest nuclear weapons arsenals, unless both the US and the Russian governments agree to extend its duration. The Treaty imposed a limit on both the carriers and the nuclear warheads of the two countries:

- 700 deployed intercontinental ballistic missiles (ICBMs), deployed submarine-launched ballistic missiles (SLBMs), and deployed heavy bombers equipped for nuclear armaments;
- 1,550 nuclear warheads on deployed ICBMs, deployed SLBMs, and deployed heavy bombers equipped for nuclear armaments (each heavy bomber is counted as one warhead toward this limit);
- 800 deployed and non-deployed ICBM launchers, SLBM launchers, and heavy bombers equipped for nuclear armaments.

Verification measures under the Treaty include on-site inspections and demonstrations, data exchanges and notifications related to strategic offensive arms and facilities covered by the Treaty, and provisions to facilitate the use of national technical means for treaty monitoring.²⁰ And yet, the future of the New START is still uncertain. Russia has proposed a five-year extension without any conditions while the US government has not yet taken an official position. Part of the reason, related to the INF treaty withdrawal, concerns the interest in involving China in these strategic-level discussions and negotiations. So far, the Chinese government has officially expressed a lack of interest in such an approach since it continues to have a limited nuclear arsenal, not numerically comparable to that of the United States or Russia, for the purpose of maintaining a minimum deterrence for national security.²¹

Last but not least, the Open Skies Treaty, signed in 1992 but based on the 1955 proposal of US President Dwight Eisenhower, is one of the few remaining multilateral mechanisms through which Russia engages in military-to-military contact with NATO countries. Here again, its future is not clear: should it expire, the entire post-Cold War arms control architecture would in effect collapse.²²

20 New START Treaty, <https://www.state.gov/new-start/>

21 F. S. Cunningham and M. Taylor Fravel, "Assuring assured retaliation: China's nuclear posture and US-China strategic stability," *International Security*, Vol.40, No.2, Fall 2015, pp.7-50; A. Panda, "China won't join the INF Treaty – But can it forever dodge arms control?", *The Diplomat*, 25 February 2019.

22 S. Pifer, "Is this the end of the Open Skies Treaty?", *The National Interest Online*, 9 March 2020.

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