



NATO PARLIAMENTARY ASSEMBLY

# DEFENCE AND SECURITY COMMITTEE (DSC)

## INTERNATIONAL ARMS CONTROL: CHALLENGES AHEAD

General Report

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## EXECUTIVE SUMMARY

In the past two decades, the United States, Russia, and China have developed diverging perceptions of the international security environment. At the US-Russia bilateral level, this has become increasingly evident through the collapse of important arms control agreements in recent years – most notably the Intermediate-range Nuclear Forces (INF) Treaty. In February 2021, the only remaining nuclear arms control agreement between the two powers, New START, was renewed only two days before its expiration. Remaining arms control agreements are under considerable strain. This is largely due to Russian direct violation or selective implementation of its arms control obligations, and Chinese disinterest to engage in meaningful arms control negotiations.

This report outlines key considerations as Allies seek to maintain and further an international arms control regime built on reciprocal transparency, meaningful confidence-building measures, and solid verification. The core premise of the report is straightforward: arms control supports Allied security but is under severe strain from several forces, which NATO member states must confront. These forces are threefold. First, nuclear weapons states outside the Alliance – especially Russia and China – are developing new nuclear weapons systems that upset strategic stability. Second, the risk of uncontrolled nuclear proliferation is greater today than at any point since the signing of the 1968 Nuclear Non-Proliferation Treaty (NPT), increasing the prospects of nuclear proliferation to new and potentially malign actors. Finally, emerging and disruptive technologies (EDT) are increasingly undermining the fundamentals of nuclear deterrence, deepening uncertainty in ways antithetical to arms control. Taken together, these challenges undercut the mutual trust required for effective arms control agreements and, if left unaddressed, could fuel a dangerous arms race.

Parliamentarians possess some valuable tools to support NATO governments in confronting these challenges. Their efforts can help foster a shared perspective on the mutual security benefits arms control offers. As legislators across the Alliance's 30 nations, parliamentarians can advocate for arms control negotiations, build public support, and enact effective legal frameworks. In addition, as delegates to international institutions, NATO parliamentarians can work together for the establishment of norms and standards for the implementation of EDTs in nuclear systems. As the report concludes, the forces militating against arms control are stronger than they have been in decades, but there remain opportunities that the Allies can and must exploit to restore arms control as a strong and effective pillar of Euro-Atlantic, and even global, security well into the future.

## I. INTRODUCTION

1. Just two days prior to its expiration on February 5, 2021, the United States and Russia agreed to extend the New Strategic Arms Reduction Treaty (New START) for five years.<sup>1</sup> Had New START expired, the last remaining restrictions on the world's two largest nuclear arsenals would have lapsed, with both sides free to deploy new weapons without limitations for the first time since the 1970s. In parallel, other long-standing agreements, such as the conventional arms control agreements underpinning Euro-Atlantic security in the wake of the Cold War, are under considerable strain or risk imminent collapse.

2. Today's challenges to arms control stem from the global great powers' diverging perceptions of and strategies relating to the international security environment. Strategic stability between the United States, Russia, and, increasingly, China is complicated by widespread nuclear force modernisation and the development of emerging and disruptive technologies. The potential spread of nuclear weapons in the Middle East and Asia remains an equally palpable threat. As such, arms control is entering a period of profound unpredictability.

3. This report identifies three key historical lessons and priorities that underpin the current arms control frameworks; the need for open communications for crisis management; proliferation risk mitigation; and arms race limitation. Well-functioning arms control, therefore, allows states to reap the peace and stability benefits from the cycles of negotiation, dialogue, and cooperation. Understanding these lessons can help leaders focus on ways to overcome the challenges facing arms control today.

4. Focused and engaged policies toward Russia and China will be essential to the maintenance and evolution of arms control. NATO Allies view arms control as an essential tool to enhance Allied security, complementing a credible and effective defence and deterrence posture. Allies therefore remain committed to a dual-track approach of deterrence and dialogue with Russia and continue to shape their position on China. The Alliance is actively seeking ways and means to balance potential opportunities of cooperation, while remaining clear eyed about the challenges associated with China's rise. Agreed upon at the June 14 Summit, NATO's 2030 agenda, which includes the development of the new Strategic Concept, presents key opportunities to indicate Allies' commitment to strengthening existing arms control agreements, and to signal their collective political will to negotiate frameworks to handle current and new challenges.

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<sup>1</sup> The New START Treaty limits the US and Russia to 1,550 deployed nuclear warheads, 700 deployed strategic nuclear delivery systems, and 800 total deployed and non-deployed strategic delivery systems. To ensure adherence, New START includes an unprecedented verification regime requiring the application of "unique identification numbers" to all treaty-accountable weapons. These ID numbers allow both sides to track relevant warheads and delivery systems; whenever a weapon is produced, deployed, or withdrawn, a notification is sent to the opposing party describing when and where a weapon is being moved (IISS, 2020). Under New START, strategic nuclear delivery systems include ICBM launchers, SLBM launchers, and heavy bombers equipped with nuclear weapons. The number of warheads on each ICBM and SLBM is counted as the number of re-entry vehicles, while all heavy bombers are counted as a single warhead regardless of total warheads onboard (Center for Arms Control and Non-Proliferation, 2017). Moreover, New START defines a heavy bomber as any nuclear weapons-capable bomber with a range of over 8,000 kilometres or capable of carrying long-range missiles armed with a nuclear warhead (Vaddi, 2019). New START places no limits on stockpiled (non-deployed) nuclear warheads. The parties were granted seven years from ratification to comply with these limits, which they achieved in 2018 (US State Department, 2021).

5. While individual states sign and adhere to new arms control agreements, NATO as an institution and member state parliaments will have essential roles to help strengthen implementation and adherence, share information for policy clarity, and create strong supporting legal frameworks to support them within each member state. As such, the report concludes with recommendations for committee members to consider for discussion and action.

*Focus of the Report*

1. While arms control is a complex subject covering a wide range of issue areas, from strategic forces to small arms, this report focuses principally on the evolving challenge of achieving increased stability among great powers' nuclear forces and the extended benefits this stability provides to arms control more broadly. Stability in modern arms control flows from nuclear forces to the conventional, not vice versa.
2. As such, this report highlights the benefits of 'nuclear learning' between the United States and the Soviet Union during the Cold War, which translated into broader post-Cold War conventional arms control measures. Unfortunately, today, as any arms control expert will attest, this framework is unstable and is in need of focused attention. To explore the debate regarding arms control fully, then, this report not only discusses the utility and benefits of arms control, but also its shortcomings and risks.

## II. THE LOGIC OF ARMS CONTROL

6. States pursue arms control to reduce the likelihood of war. In theory, arms control agreements bolster security and stability by enhancing the transparency of the participants' armed forces and military deployments through set limitations. Adversaries familiar with one another's armed forces – including their composition, size, and physical location – are less likely to misperceive one another's intentions and escalate with offensive military actions. Transparency between adversaries also undercuts the motivation to arms race, thereby achieving important cost-saving benefits. These cost-saving measures can result in a so-called "peace dividend." By mutually reducing the size of armed forces, arms control agreements can liberate funds to be spent on non-military programs. Further, cost-saving measures in one area of a defence budget could facilitate greater expenditures in another area deemed more beneficial to a state's overarching security needs.

7. The principal obstacle to successful and durable arms control is, of course, mutual distrust. Adversaries are fearful of one another and seek military advantages to preserve their security. National governments, then, are deeply sceptical of attempts to limit their military capabilities, fearing that their adversaries will cheat, circumvent, or violate mutually agreed-to arms control restrictions to gain relative advantages. To overcome mistrust, states craft robust verification regimes ranging from the mutual exchange of notifications to rigorous on-site inspections of weapons sites. Verification procedures are intrusive by definition, but certify treaty compliance, foster transparency and predictability, and, in turn, build confidence and trust.

8. Nonetheless, some experts criticise this system, on the basis that verification regimes and other trust-building measures will never fully ensure mutual adherence to an arms control agreement. Under such circumstances, arms control could instead act as an unnecessary constraint on states' military capabilities and thus potentially undermine defence and deterrence. Viewed from this perspective, arms control could instead increase the likelihood of war rather than reduce it. The present report does not support this view.

## A. KEY EARLY LESSONS IN ARMS CONTROL: 1962 – 1989

9. An essential building block of modern arms control<sup>2</sup> was laid in the 1950s with US President Eisenhower's proposal for an international institution to monitor the transfer of peaceful nuclear technology while safeguarding against the emergence of new nuclear weapons states. His efforts resulted in the establishment of the International Atomic Energy Agency (IAEA) in 1957. The UN took up the issue of nuclear non-proliferation that same year, which gained momentum in the early 1960s.

10. It was the Cuban Missile Crisis that really focused the two superpowers' minds: Having gone to the brink during the crisis, both superpowers recognised their mutual interests in preventing another crisis – thus jumpstarting a process now referred to as “nuclear learning” (Nye, 1987). Over the next three decades, the US and the Soviet Union would continuously return to the negotiating table to resolve issues they considered to be of mutual strategic concern. With each successful round of negotiations, the foundation for a broader arms control architecture was strengthened, transparency and familiarity increased, and trust and confidence deepened.

11. The first lesson learned after 1962 was the need for **open lines of communication and effective crisis management**. During the crisis, strategic communications between Washington and Moscow had been dangerously deficient. Messages were relayed slowly, allowing time for new, contradictory messages to arrive that sowed confusion on both sides. Each also lacked an understanding of the other's strategic perspective, opening the possibility of accidental but no less disastrous escalation. After the crisis had subsided, leaders in Washington and Moscow established a direct communications line which could relay messages instantly and with consistency. In June 1963, the superpowers signed the “Memorandum of Understanding,” often referred to as the “hotline agreement.” This original agreement has since been continuously updated to take advantage of improvements in technology (Arms Control Association, 2020a).

12. The next lesson was the need for **limits on the “horizontal” proliferation of nuclear weapons**. The 1962 Crisis impressed on both sides the need to limit the number of nuclear decision-makers to reduce the risk of nuclear crises that were out of their direct control.<sup>3</sup> By the mid-1960s there was a concerted effort at the United Nations (UN) to put in place a treaty to uphold nuclear non-proliferation as a norm of international behaviour. In 1968, with the final text agreed upon, the superpowers corralled the international community to sign the Treaty on the Non-Proliferation of Nuclear Weapons (NPT), a cornerstone agreement committing signatories to halt

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<sup>2</sup> The first international efforts to establish forms of arms control began with the Hague Conventions at the turn of the 20<sup>th</sup> Century, which resulted in early attempts to ban certain types of munitions, the use of asphyxiating gases, and projectile delivery systems (such as via hot air balloons). None of these restrictions was respected in WWI. After WWI, another series of treaties and agreements sought to limit and, in some cases eliminate, some forms of armaments. For example, the Washington Naval Conference (1921-22) produced three major treaties limiting great power naval arms racing and the 1925 Geneva Protocol prohibited the use of asphyxiating and poisonous gases and bacteriological weapons in international conflicts. Despite its limitations, the Geneva Protocol remains the legal foundation for a series of subsequent related arms control treaties.

<sup>3</sup> Prior to the crisis, the United States had already sought to limit the number of new nuclear states by extending its nuclear deterrent to Europe as Soviet expansionist objectives became clear (Trachtenberg, 2012). The subsequent nuclear sharing agreements that came out of the 1950s were in place by the time of negotiations for the Nuclear Non-Proliferation treaty (NPT) and ‘codified by the United States and the Soviet Union as a precursor for the final agreed NPT text.’ (NATO, 2021a; Alberque, 2017)

the spread of nuclear weapons, to assist non-nuclear states with the peaceful use of nuclear energy, and, eventually, to work towards verifiable disarmament.<sup>4</sup> In 1975, the US and the Soviet Union also worked closely together to found the Nuclear Suppliers Group (NSG), a critical non-proliferation regime that controls the global transfer of nuclear materials and technology (Georghe, 2019).

13. The final lesson was the clear need for “**arms race stability.**” Even while they deepened strategic communications and worked together on regimes like the NPT, both superpowers raced to develop larger and more varied nuclear arsenals relative to one another. Both superpowers challenged the concept of mutually assured destruction (MAD) and sought advantages over the other; each also feared that technological innovations could one day render their arsenals vulnerable to the other’s capabilities (Green and Long, 2017). In the resulting arms race, huge sums of money were spent, but for little to no relative gain. Neither side could escape the logic of MAD or their rivals’ ability to keep pace. Beginning in the 1970s, with both superpowers encountering significant economic difficulties, each side agreed to first limit and eventually reduce their nuclear arsenals. In 1972, they signed the Strategic Arms Limitation Talks (SALT I) agreement, which constrained the number of ICBM launchers on each side. A core component of SALT I was the Anti-Ballistic Missile (ABM) Treaty, which limited the superpowers’ deployment of Ballistic Missile Defence (BMD) systems (Thompson, 2016). Throughout the second half of the 1970s, the two sides also negotiated the SALT II agreements, although its limitations never entered into force. Finally, in 1987, the US and the Soviet Union capped off a decades-long process to eliminate the deployment of ground-launched intermediate and medium range nuclear missiles in Europe with the Intermediate-Range Nuclear Forces (INF) Treaty.<sup>5</sup>

14. These three core nuclear lessons still inform the basis of arms control and nuclear deterrence today. Open communication, non-proliferation, and strategic arms limitations together formed the foundation on which subsequent arms control agreements could be constructed. This included further reductions in strategic nuclear forces, but also limitations on non-nuclear related forces.

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<sup>4</sup> The superpowers also signed the 1963 Partial Test Ban Treaty, which limited the testing of nuclear weapons to underground tests, and the 1967 Outer Space Treaty, which prohibits the deployment of nuclear weapons in space.

<sup>5</sup> The INF Treaty banned all missile systems with ranges between 500 and 5 500 kilometres. INF was a landmark agreement that significantly reduced tensions on the European mainland. Beginning in 1976, the Warsaw Pact had deployed the SS-20 IRBM system in Europe. The SS-20 deployment raised concerns amongst the Allies that the Soviet Union would look to “decouple” NATO Europe from its North American Allies. In 1983, NATO deployed Pershing II MRBMs and BGM-109G GLCMs in response.

## **B. THE EXPANSION OF ARMS CONTROL, 1989 – 2001**

15. In 1989, as the Soviet Union and Warsaw Pact unravelled, an environment permissive to further arms control agreements emerged, during which negotiators strove to expand the scope of arms control beyond the nuclear realm. The promise of the Helsinki Final Act (1975), which established confidence and security-building measures (CSBMs) to help reduce the chances for armed conflict by miscalculation, appeared ripe to be fulfilled (OSCE, 1975). The negotiation of the 1990 Vienna Document established a framework of transparency and verification mechanisms covering armed forces and larger weapons platforms. NATO and Warsaw Pact members subsequently signed the Conventional Forces in Europe (CFE) Treaty, drastically reducing the number of conventional forces deployed on the European mainland. Finally, the Open Skies Treaty, first negotiated in 1992, came into effect in 2002, mandating its participants to grant mutual aerial observation over other participating states' entire territory.

16. The Vienna Document, CFE Treaty, and the Open Skies Treaty served as three mutually reinforcing pillars of conventional arms control in the Euro-Atlantic region. As a result of the predictability, transparency, and military stability created by adherence to all three, there was a significant level of disarmament and force reduction in Europe. Since the CFE Treaty entered into force in 1992, its signatories have destroyed approximately 100,000 pieces of treaty-limited equipment such as tanks, helicopters, and artillery systems (NATO, 2021b). The resulting cost savings related to reduced force commitments accrued absolute gains for all (CBO, 1991).

17. While these three pillars were negotiated in the shadow of SALT I and the INF Treaty, the permissive environment of the 1990s also opened the possibility for further reductions in the superpowers' nuclear arsenals. In 1991, the Strategic Arms Reduction Treaty (START) committed both superpowers to reductions in their nuclear stockpiles and delivery systems – especially ICBMs. In 1993, the US and the newly sovereign Russian Federation then concluded START II, which aimed to further reduce strategic nuclear forces. While START II never entered into force, in 2002 Russia and the US signed the Strategic Offensive Reductions Treaty (SORT)<sup>6</sup>, which brought down strategic arsenal levels to below those originally agreed to in START II (Thompson, 2016; Freedman, 2018). In 1995, the signatories of the NPT also agreed to extend the treaty indefinitely.

18. In parallel, significant advances in arms control related to other forms of Weapons of Mass Destruction (WMD) also accrued as a result of the auspicious moment of the 1990s. For example, the Chemical Weapons Convention (CWC) was signed in 1993 and entered into force in 1997, thereby banning the production, stockpiling, and use of chemical weapons, and mandates their verifiable destruction.<sup>7</sup>

## **C. THE EROSION OF ARMS CONTROL: PART ONE 2001 – 2014**

19. The terrorist attacks of 9/11 brought an end to the strong progress in arms control that had characterised the 1990s. These attacks provoked a sea change in perceptions of the international security environment. Awakened to new dangers emanating from rogue state and non-state actors, decision-makers in NATO – and the United States in particular – began directing their energies

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<sup>6</sup> Also referred to as the Moscow Treaty.

<sup>7</sup> The success of the CWC added to the 1925 Protocol for the Prohibition of the Use in War of Asphyxiating, Poisonous or other Gases, and of Bacteriological Methods of Warfare (or Geneva Protocol) and to the 1972 Biological and Toxin Weapons Convention, which prohibits signatories from developing biological or toxin weapons and to destroy any stockpiles of supply which have no justification for prophylactic, protective, and other peaceful purposes.



toward the threat of terror attacks – especially those potential attacks that could be delivered via missile launches in regions like the Middle East, Central Asia, and the Korean Peninsula. In response to this changing strategic environment, the United States announced its withdrawal from the ABM Treaty with Russia in December 2001 and declared its intention to develop limited BMD capabilities that could neutralise the threat of missile attacks sourced from (amongst other regions) NATO's south-eastern flank in the Middle East.

20. While the Alliance pursued a strategic reorientation to adapt to this changing international security environment, Russia's perception of that same environment remained regrettably unchanged. Whereas Washington and the Allies' shifted their focus squarely on the emerging threat of non-state actors and rogue states, Moscow continued to be unsettled by its post-Cold War role in Euro-Atlantic security. Russia misinterpreted Allies' actions as directed towards Moscow's strategic missile-based nuclear deterrent, despite assurances that Allied BMD systems were not capable against Russia's strategic deterrent (nor designed to possess a capability against those systems in the future) (NATO, 2021e). The 2002 withdrawal from the ABM Treaty was judged by Russian President Vladimir Putin to be "a mistake," one that necessitated a response in terms of Russia's nuclear strategy and posture (Neilan, 2001). Even so, Allies' bona fides toward a genuine new phase of cooperation with Russia can be clearly seen in the NATO-Russia joint statement and the subsequent creation of the NATO-Russia Council in 2002.<sup>8</sup>

21. Despite these and other Allied attempts to partner against shared international security challenges, Russia instead pursued a foreign policy detrimental to both arms control and Euro-Atlantic stability. In December 2007, Russia announced it would cease implementation of its CFE Treaty obligations, citing, among other things, that the Treaty's restrictions did not apply to China. As the divergence on missile defence continued, Russia also turned its focus to the development of new missile systems in violation of the INF Treaty. Some of the restarted programmes were legacy systems begun in the 1980s that had been subsequently halted due to INF Treaty commitments (Cooper, 2018). A key component of this renewed programme was the development of a medium-range ground launched cruise missile (GLCM) system known as the 9M729 (or SSC-8 in NATO nomenclature) which was in contravention the INF Treaty and that Russia began testing as early as 2008 (Woolf, 2020a).

22. The new decade nonetheless brought hope for a critical breakthrough. In 2010, the NATO-Russia Council pledged to develop a comprehensive joint analysis for NATO-Russia missile defence cooperation, raising hopes of a potential policy reversal on the part of Moscow (NATO, 2010). Unfortunately, serious attempts at negotiation only lasted from November 2010 to the three months following the NATO 2012 Summit. Russia ceased cooperation on BMD cooperation in 2013. Neither side was able to surmount fundamentally opposing views on the construction of a cooperative missile defence system (Zadra, 2014).

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<sup>8</sup> In 2002, Allies sought to reboot the breadth and depth of their cooperation with Russia via the launching of the NATO-Russia Council. The NRC's original agreement pledged to work on eight key areas, including terrorism, non-proliferation, arms control and confidence-building measures, and theatre missile defence (NATO, 2002).

#### D. THE EROSION OF ARMS CONTROL: PART TWO 2014-2021

23. In 2014, Russia dramatically escalated its divergent views with Allies on the role Moscow should have in Euro-Atlantic security. Russia's illegal and illegitimate annexation of Crimea set off a chain of provocative Russian brinkmanship articulated well in the Alliance's 2018 summit declarations:

*“The Euro-Atlantic security environment has become less stable and predictable as a result of Russia’s illegal and illegitimate annexation of Crimea and ongoing destabilisation of eastern Ukraine; its military posture and provocative military activities, including near NATO borders, such as the deployment of modern dual-capable missiles in Kaliningrad, repeated violation of NATO Allied airspace, and the continued military build-up in Crimea; its significant investments in the modernisation of its strategic forces; its irresponsible and aggressive nuclear rhetoric; its large-scale, no-notice snap exercises; and the growing number of its exercises with a nuclear dimension. This is compounded by Russia’s continued violation, non-implementation, and circumvention of numerous obligations and commitments in the realm of arms control and confidence- and security-building measures (NATO, 2018a).”*

24. Additional Russian violations have since further fractured the existing arms control framework. In the past decade, Moscow has displayed brazen indifference for its obligations under the Chemical Weapons Convention (CWC). First, Russia has defended the Syrian regime of Bashar al-Assad after it has verifiably used chemical weapons against his own people since 2014, and actively blocking, obfuscating, and undermining investigations by the Organisation for the Prohibition of Chemical Weapons (OPCW) into chemical weapons use in Syria (Arms Control Association, 2021). Also, in clear violation of CWC prohibitions, Russia has repeatedly used chemical weapons to assassinate political dissidents both at home and abroad. Most shockingly, Russia has employed chemical weapons on Allied soil: In 2018, Russian agents used the military grade nerve agent Novichok in the United Kingdom, resulting in the severe poisoning of three British nationals (including former Russian agent Sergei Skripal) and the subsequent death of another British national (NATO, 2018b).

25. In 2019, Russia's continued intransigence regarding the development, production, and deployment of the 9M729 missile system equally left the United States with no choice but to withdraw from the INF Treaty, with the political support of other NATO Allies (NATO, 2019a). Russia has also consistently eroded the provisions of the Vienna Document by selectively implementing its requirements: It has never opened a military exercise to mandatory observation by OSCE members (as stipulated in the Document) and has blocked efforts to update the Document's contents (NATO, 2019b).

26. In November 2020, with Allied support, the United States withdrew from the 2002 Open Skies Treaty for reasons similar to those cited when it announced its withdrawal from the INF Treaty: Russia's persistent noncompliance with the Treaty's obligations. Amongst the key issues raised at the Open Sky Treaty Review Conference were Russia's non-compliant flight restrictions over Kaliningrad and the Russian border with Georgia. For years Russia had been systematically violating and politicising the Open Skies Treaty. Since 2010, Russia has subverted the spirit and letter of the treaty in an attempt to adhere legitimacy to the post-conflict independence proclamations of the Russian-occupied Georgian territories of Abkhazia and Tskhinvali since the end of the 2008 war with Georgia.<sup>9</sup> Russia banned observation flights within a 10-kilometer zone

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<sup>9</sup> International rejection of Russia's attempts to garner recognition of both Abkhazia and Tskhinvali (South Ossetia) remains strong. Both occupied territories are only recognised as independent states

off its occupied regions, claiming that these so-called independent countries are not parties to the treaty and, therefore, are not subject to its provisions.

27. The Biden Administration informed Russia on May 27 that it would not re-join Open Skies (Lee, 2021). In response, Russia announced its intention to withdraw from Open Skies on 7 June 2021; according to treaty stipulations, Russia's withdrawal will take effect in six months (Isachenov, 2021). Again, Allies summed up their position in a clear statement following Russia's decision:

*"We have repeatedly called on Russia to return to full compliance with the Treaty and have taken multiple steps, including during the 4th Review Conference of the Treaty on Open Skies, to constructively resolve outstanding issues of compliance. Russia has instead failed to engage constructively, and has not taken steps towards returning to full compliance. The United States cited Russia's refusal to fully comply as a significant factor in its decision to withdraw from the Treaty in November 2020, in accordance with its provisions. We share the concerns the United States referred to in its decision"* (NATO, 2021c).

28. In light of this steady breakdown, there was understandable pessimism about the likelihood both the United States and Russia could come to an agreement on the extension of the New START agreement, due by 5 February 2021. Despite lingering disagreements about the expansion of the scope of the treaty (to cover tactical nuclear weapons) and the failure to expand the number of signatories (China's refusal to participate), New START was extended in quick order by the United States and Russia in the weeks following the inauguration of President Biden.

29. Allies welcomed the extension of New START via a statement from the North Atlantic Council, noting the treaty's major contribution to international security, and calling for 'early and active dialogue on ways to improve strategic stability.' Allies also noted that they 'see the treaty's extension as the beginning, not the end, of an effort to address nuclear threats and new and emerging challenges to strategic stability' (NATO, 2021d).

30. At their June 16 Summit in Geneva, US President Biden and Russian President Putin agreed to establish a new initiative, the Strategic Stability Dialogue, to encourage increased communication and thinking about future arms control and risk mitigation. The first round of the new dialogue began on 28 July 2021.

### **III. ARMS CONTROL IN A NEW NUCLEAR AGE – CHALLENGES AHEAD**

31. Today, the international arms control architecture rests on New START. As the final remaining arms control agreement limiting the world's two largest strategic nuclear arsenals, New START essentially acts as the fragile keystone holding up a broader complex of arms control agreements that emerged in the 1990s.

32. The five years that remain within the New START framework are an undeniable historic juncture for arms control. In essence, the extension of New START granted the international community a one-time, five-year deferral to rescue and reshape arms control to respond to a

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by Russia, Venezuela, Nicaragua, Nauru, and Syria, which Vanuatu recognises Abkhazia, but not South Ossetia. Every other UN member state views the territories as Georgian regions occupied by Russia since the end of the 2008 Russo-Georgian War.

rapidly evolving and increasingly volatile international security environment. In the broad scope of arms control history, a five-year window is short. Indeed, what was built over half a century beginning after the Cuban Missile Crisis could easily fall apart in the next half decade unless concerted and deliberate action is taken. Unfortunately, there are significant obstacles to strengthening the current arms control frameworks and negotiating new ones.

33. A “new nuclear age”, one that arguably holds greater challenges compared to the Cold War nuclear era, is clearly in the making (Lieber and Press, 2017; Miller and Narang, 2019; Levgold and Chyba, 2020). A defining characteristic of this new nuclear era is the emergence of “nuclear multipolarity,” a sharp departure from the relative stability of the bipolar Cold War nuclear order. Nuclear multipolarity is driven by the “vertical” proliferation of existing nuclear arsenals in states like China, North Korea, India, and Pakistan as well as the increasing potential of “horizontal” proliferation of nuclear weapons to non-nuclear states in regions like the Middle East and East Asia.

34. An ongoing revolution in technology is fuelling vertical nuclear proliferation. NATO’s nuclear adversaries are modernising and enlarging their arsenals to take advantage of increasingly capable precision guidance systems and new capabilities offered by emerging and disruptive technologies like Artificial Intelligence (AI). In a repeat of the Cold War arms race, states like Russia and China are developing new nuclear weapons and modernising their existing arsenals, both in an attempt to gain potential advantages over NATO member states and to hedge against unforeseen technological developments. As the lessons of history show, however, this nascent arms race is likely to be as expensive as it will be inconclusive.

35. Further complicating matters is the fact that Allies are entering a new era of great power competition with both Russia and China, two of the world’s three largest nuclear powers. Russia and China have found common cause in presenting an authoritarian challenge to the rules-based international order, the core values of which underpin the common bond between NATO Allies. China’s expanding global ambitions and assertive policies are progressively rubbing up against a growing range of Allied interests, particularly the cyber, space, and maritime domains. It is increasingly clear that Russia no longer feels obliged to uphold its existing arms control commitments, and it is questionable how much either Beijing (or Moscow) views new constraints on its expanding modern arsenals as in their interests.

## **A. VERTICAL NUCLEAR PROLIFERATION**

36. Non-NATO nuclear powers are actively expanding their arsenals, particularly Russia and China. Considering the above, this development is concerning from the perspective of crisis stability and difficulties in inter-state nuclear communications, as de-escalation mechanisms are crucial.

37. During the Cold War, a key element of nuclear learning was the growing familiarity that emerged between the United States and the Soviet Union. Because leaders in both superpowers came to develop strong – indeed, intimate and personal – relationships with their counterparts, there was increased predictability in the management of Cold War competition. In a world of nuclear multipolarity where states such as Russia, China, India, and Pakistan are all building up their nuclear arsenals while several proliferation crises (North Korea, Iran) continue to challenge the international non-proliferation regime, the lessons of crisis stability and open communications,

as well as the interpersonal relationships through which those lessons were shared, could be lost in a complex web of novel and contentious nuclear relationships.<sup>10</sup>

## 1. Russia

38. Since the mid-2000s, Russia has revamped its nuclear arsenal, recapitalising 80 percent of its nuclear delivery systems while expanding its tactical nuclear arsenal (NATO, 2021e). In 2021, Russia plans to deploy the RS-28 *Sarmat* ICBM (SS-X-29 or SS-X-30), which is expected to replace the Cold-War era R-36M ICBM (SS-18 *Satan*) as the Russian strategic arsenal's mainstay system. Russia is also developing "hypersonic" weapons systems.<sup>11</sup> These include the *Avangard* hypersonic "boost-glide" vehicle (HGV), a guided warhead designed to carry a two-megaton payload as well as the 3M22 *Tsirkon* hypersonic cruise missile, a tactical nuclear weapon engineered to manoeuvre at high speeds and low altitudes to evade radar coverage.<sup>12</sup> To that end, Moscow is also steadily expanding both the quantity and quality of its tactical nuclear weapons arsenal, which now numbers well into the thousands of warheads. These smaller warheads could be delivered by the 9M729 (SSC-8) GLCM (the system that led to the abrogation of the INF Treaty), the aforementioned *Tsirkon* system, which is still in development, and, one day soon, the potentially hypersonic *Kinzhal* (Dagger) ALBM (Episkopos, 2020).

39. Finally, and perhaps most concerningly, Russia has also announced the development of two exotic nuclear delivery systems: the outlandish *Poseidon*, an autonomous nuclear torpedo designed to trigger a nuclear-induced tsunami off an adversary's coast, and the *Burevestnik*, a nuclear-powered cruise missile with an ostensibly unlimited range due to its nuclear propulsion system (Woolf 2020b; Barrie and Boyd, 2021). Both systems upset strategic stability due to their unorthodox delivery methods, pose major problems for categorisation and counting under existing arms control treaties, and could carry major accident risk or environmental damage if deployed.

40. These new nuclear systems are especially worrisome when placed in the context of Moscow's increasingly opaque nuclear doctrine and Russia's aggressive actions in the Euro-Atlantic region. In 2009, Moscow declared that it reserved the right to launch "pre-emptive nuclear strikes" in conflicts as small as "local wars" (Reuters, 2009). Since then, defence analysts have hotly debated whether or not Moscow has further transitioned to a so-called *escalate to de-escalate* strategy, wherein, during a crisis or a conventional war, Russian forces might initiate a limited nuclear strike with a low-yield tactical weapon to signal resolve and compel the enemy to back down (Oliker and Baklitskiy, 2018).<sup>13</sup> This debate was not resolved with the 2020 release of the *Basic Principles of State Policy of the Russian Federation on Nuclear Deterrence* (Panda, 2020; Oliker, 2020). Taken together, Russia's modernised arsenal, its opaque nuclear strategy, and its aggressive actions undermine crisis stability with NATO nuclear states. Although open lines of communication dating back to the Cold War remain relatively strong, the current trajectory of Moscow's arsenal and doctrine undercut these historical gains.

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<sup>10</sup> See Annex A for details on North Korean, Indian, and Pakistani modernisation efforts.

<sup>11</sup> Hypersonic weapons are those that fly at speeds over Mach 5. They can often manoeuvre mid-flight and are difficult for radar systems to detect due to their variable flight paths and high speed.

<sup>12</sup> Russia plans to mount *Avangard* weapons atop *Sarmat* ICBMs when the latter become fully operational. Meanwhile, the *Tsirkon* is in the testing phase. Reports indicate that trials will conclude in 2021 (Suciu, 2021).

<sup>13</sup> During the "Zapad" military exercises in 2009 and 2011, Russia simulated tactical nuclear strikes on Polish and Swedish forces, including a strike on Warsaw (Stoltenberg 2015).

## 2. China

41. As China's power and stature has risen, so too has its appetite for a larger and more diverse nuclear arsenal. China has historically maintained an estimated nuclear stockpile of roughly 200 to 320 high-yield warheads, deliverable mostly via land-based systems (Kristensen and Korda, 2020a). Today, however, China's nuclear posture is undergoing visible changes in terms of quality and quantity.

42. With regards to quantity, US military officials estimate Beijing will double its nuclear warheads stockpile by 2030 (Gould, 2020). Meanwhile, some Chinese state media commentators suggest Beijing could grow its arsenal to as many as 1000 nuclear warheads (Tian, 2020).

43. The most significant changes taking place, however, relate to the quality of China's nuclear forces. Beijing is rapidly developing a robust nuclear triad, with particular emphasis on its land-based pillar. In June 2021, US-based academic researchers using commercial satellite imagery discovered a vast network of nearly 120 hardened missile silos under construction at Yumen in the country's north-western desert (Warrick, 2021). Experts believe these silos will be armed with DF-41 ICBMs, China's most powerful strategic delivery system (15,000 kilometres range), capable of reaching almost the entirety of the US mainland (Warrick, 2021). The compact nature of the silo network, which is deployed in a tight grid pattern across an area of only a few hundred square kilometres, also raises the prospects that China will operate a "shell game" with its land-based forces.<sup>14</sup> On July 26, researchers, again using commercially available satellite imagery, discovered a second silo field over an area of eight hundred square kilometres to the northeast of Yumen at Hami. The construction site appears to contain 110 silos at various stages of construction (Broad and Sanger, 2021). As researchers note, the discovery of the new fields could signify a vast expansion of China's nuclear arsenal (Kristensen and Korda, 2021).

44. The People's Liberation Army (PLA) is also replacing its older, liquid-fuelled, road-mobile missile systems with a new generation of solid-fuelled, mobile missile systems. These include the DF-26 IRBM, a system equipped to carry both conventional and nuclear missiles (Kristensen and Korda, 2020a). These dual-use systems are especially concerning, as in the event of a crisis, an adversary may unwittingly target nuclear systems believing them to be conventionally armed, leading to inadvertent escalation (Talmadge, 2017). In this sense, hypersonic missiles present very serious concerns over miscalculation and escalation.

45. China is equally investing in its air-based and sea-based nuclear deterrents. Beijing has recently deployed the H-6N long-range strategic bomber variant, an aircraft potentially capable of delivering nuclear-tipped long-range ALBMs (Panda, 2018). More importantly, Beijing has also likely cleared the final technological hurdle in the development of a triad, namely, the deployment of a credible submarine-borne sea-based deterrent. Under development since the mid-2000s, China's *Jin*-class SSBN is now entering service and is the most advanced subsurface vessel deployed by the PLAN. Still, the *Jin*-class's vulnerability to advanced ASW capabilities is yet to be evaluated, with some analysts claiming the *Jin*-class radiates sonar signatures during radio silence, a critical vulnerability (Zhao, 2018; CSIS, 2015).

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<sup>14</sup> Under a shell game strategy, only a small number of silos will be armed at any given time, with the rest acting as decoys; a network of subterranean tunnels allows for rapid and clandestine exchange of missiles between the silos. This strategy, which closely resembles a US Cold War strategic concept designed in the 1980s to deploy the MX missile, would significantly improve the survivability of China's nuclear forces while also achieving modest cost-saving benefits.

46. With the expansion and modernisation of China's nuclear arsenal, there is the issue of China's unclear nuclear doctrine. For decades, Western strategists have puzzled over China's so-called "minimum deterrence" nuclear strategy. China has historically maintained a no first use policy and a relatively small stockpile of nuclear weapons; likewise, its strategic culture has remained shrouded, generating uncertainty regarding Chinese planners' perspectives and intentions on the use or non-use of nuclear weapons in a crisis (Fravel and Medeiros, 2006). With Beijing taking steps to expand its arsenal and delivery systems significantly – especially the land-based leg of its triad – there is a risk China's unclear doctrine transitions from a theoretical concern to a clear and present danger that undermines strategic stability, especially if dual-use systems like the DF-26 become the backbone of China's arsenal.

47. Allies addressed Beijing's growing nuclear arsenal within the broader context of China's rise and its implications for Allied interests in their communiqué from the June 14, 2021 Summit in Brussels in the following manner:

*China's stated ambitions and assertive behaviour present systemic challenges to the rules-based international order and to areas relevant to Alliance security. We are concerned by those coercive policies which stand in contrast to the fundamental values enshrined in the Washington Treaty. China is rapidly expanding its nuclear arsenal with more warheads and a larger number of sophisticated delivery systems to establish a nuclear triad. It is opaque in implementing its military modernisation and its publicly declared military-civil fusion strategy. It is also cooperating militarily with Russia, including through participation in Russian exercises in the Euro-Atlantic area. We remain concerned with China's frequent lack of transparency and use of disinformation. We call on China to uphold its international commitments and to act responsibly in the international system, including in the space, cyber, and maritime domains, in keeping with its role as a major power (NATO, 2021e).*

## **B. HORIZONTAL NUCLEAR PROLIFERATION**

48. With intensifying strategic competition throughout the international system – driven in part by emerging nuclear multipolarity – non-nuclear weapons states may increasingly feel the need to acquire a nuclear deterrent to guarantee their national security. Of course, the more states that possess nuclear weapons, the more challenging arms control will become – if only due to the added number of players that must be negotiated with. Such an outcome would also undermine the rules-based international order (of which the NPT is a key pillar) and thereby lessen the authority of negotiated treaties that are the basis of effective and verifiable arms control.

49. Horizontal proliferation can significantly increase the likelihood of misperception and escalation between states. Logically, the greater number of actors with nuclear weapons, the greater the risk of accidental escalation. In other words, if nuclear multipolarity is a defining destabilising characteristic of the new nuclear age, horizontal proliferation will only magnify its instability.

50. Still, proliferation brings more immediate, tangible threats in the form of deliberate, non-nuclear escalation between nations. As nuclear weapons pose an existential threat to a state's survival, leaders perceive their rivals' attempts to acquire them as a justification for drastic action. Some states have opted for preventive strikes against their rivals' nuclear facilities in an attempt to prevent them from acquiring such a capability in the first place. Perhaps the most well-known example is Israel's preventive strikes on Iraq's Osirak nuclear reactor in 1981 (Mizokami, 2019). Of course, just because a state lacks the nuclear capability with which to retaliate does not mean

that it is not capable of a robust conventional response. Indeed, while the Osirak attack in 1981 did not prompt an immediate response on the part of Saddam Hussein's regime, which was occupied by the ongoing war with Iran, the strategic context in regions like the Middle East and East Asia today (where proliferation is most likely) are far more likely to produce a prompt and robust response.

51. In this regard, proliferation's regional "cascading" character is another concern. When states acquire nuclear weapons, their rivals are pressured to match their capability in search of security, which, in turn, generates an exponential cascade of other rivals seeking nuclear arms as well (Allison, 2004). East Asia is a focus of such fears today. Three regional non-nuclear players (Japan, South Korea, and Taiwan) stand out as nuclear "hedgers" or "turnkey" states, meaning each possesses the technological and economic capacity to build a nuclear weapon on short notice. In the shadow of a more aggressive China and a North Korea seeking recognition as a nuclear state, these non-nuclear states might be inclined to match their rivals' capability. Cascade risks are also palpable in the Middle East. As Iran continues to develop a nuclear capability in a dangerous and concerning way, and in violation of its JCPOA commitments, its regional rivals have expressed their willingness to pursue a similar capability in response. Saudi Crown Prince Mohammed Bin Salman has openly stated he would match an Iranian bomb (Reuters, 2018).

52. Finally, proliferation also raises the risks of nuclear terrorism and of nuclear weapons falling into the hands of non-state actors. Terrorist groups like Deash have made explicit their desire to acquire a nuclear capability, while Al-Qaeda and other criminal organisations' past efforts to acquire nuclear weapons on the black market are well documented (Ward, 2018; CFR, 2006). Increased proliferation will facilitate these actors' quest: The more nuclear weapons that exist, the greater the chances one of those weapons could be stolen, sold, or simply lost. Indeed, while the US, the UK, and France place strict controls on their nuclear weapons, not every state is as assiduous. During the chaos that followed the fall of the Soviet Union, the threat of "loose nukes" was all too real. Several criminal syndicates were caught trying to smuggle Highly Enriched Uranium (HEU) out of the country, spurring the US to work directly with the Russian Federation to secure the erstwhile Soviet arsenal (CFR, 2006).

### **C. EMERGING AND DISRUPTIVE TECHNOLOGIES**

53. Finally, technological changes arriving in the next decades raise more profound questions for arms control. Will emerging and disruptive technologies alter the fundamental calculus of nuclear deterrence? Will advances in missile technology and surveillance undermine MAD? These questions probe at the very foundations of NATO security and must be answered for future arms control to have durability.

54. The most difficult challenge arms control faces is the increasing uncertainty and opacity of the future, which is exacerbated by the emergence of powerful new technologies. If states cannot be assured that the *quality* of their nuclear systems will be adequate against their adversaries' technologies, they will almost certainly pursue an expansion in the *quantity* of their systems as compensation. A qualitative arms race is already underway as we speak – and placing limitations on it becomes more difficult as time passes. A quantitative arms race has yet to begin in earnest, but the more time lost, the more likely it becomes a pressing reality.



55. Several emerging technology domains are particularly threatening to the two key qualitative pillars of nuclear survivability – hardening and concealment (Lieber and Press, 2017).<sup>15</sup> If those two qualitative pillars are undermined by new technologies, we are likely to see a reliance on the third, quantitative pillar of deterrence – namely, redundancy.<sup>16</sup> An increasing reliance on redundancy would have disastrous implications for arms race stability.

56. First, improvements in **missile accuracy** have rendered most hardening measures obsolete. Many states have equipped their missile systems with advanced onboard GPS and inertial guidance systems that allow even long-range ICBMs to strike hardened targets with remarkable precision. Missile accuracy portends sea-changes to nuclear deterrence. Accurate missiles render so-called “counterforce warfighting,” where states engage in controlled nuclear exchanges against one another’s delivery systems, far more realistic. The more accurate the missile, moreover, the smaller the payload required for a successful strike (Lieber and Press, 2017). Smaller payloads significantly lower the environmental damage involved in nuclear strikes, paving the way for “low-casualty” nuclear use (Kristensen and Korda, 2020b). Improved missile accuracy may soon allow for the use of conventional warheads against hardened nuclear targets.

57. Advances in **Intelligence, Surveillance, and Reconnaissance (ISR)** capabilities equally undermine concealment measures. Since the late Cold War, the United States has been developing ISR tools capable of tracking SSBNs and mobile ICBMs (Long and Green, 2015; Bin, 2007). Improvements in military-grade remote sensing through radar satellites and remotely piloted aircrafts that have taken place in the past three decades have deepened these capabilities (Lieber and Press, 2017). When coupled with advances in missile accuracy and the ongoing advances in Anti-Submarine Warfare (ASW) capabilities, advanced militaries with high-grade ISR may soon find themselves in the position to “see” the entirety of a state’s nuclear arsenal. In a conflict, they would therefore have an incentive to launch a disarming first strike. This is especially true against a weaker nuclear power like North Korea, which lacks a sophisticated undersea deterrent.<sup>17</sup>

58. Moreover, **Artificial Intelligence (AI) and other advanced computing systems** could further revolutionise nuclear deterrence. AI could allow states to process ISR data at rates previously thought impossible. Currently, our ability to collect data on mobile nuclear assets vastly outstrips our ability to process that data into actionable insights (Pomerleau, 2017; DARPA, 2019). The introduction of powerful new AI software bridges the gap (SIPRI, 2019). AI portends such immense advances in computing power that reconnaissance platforms will no longer be required to look for the needle in the haystack but instead will be able examine at speed every single strand of hay in the stack to determine if one of them is a needle. This ISR revolution is especially impactful for detecting sea-based nuclear systems like SSBNs (Geist and John, 2018).

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<sup>15</sup> Hardening entails the construction of missile silos and platform shelters capable of withstanding or “soaking up” nuclear strikes. Concealment entails the use of deception and mobility to evade targeting altogether. Concealment efforts range from the use of simple measures like camouflage and decoys to the employment of highly sophisticated mobile delivery systems like SSBNs and road-mobile ICBMs.

<sup>16</sup> Redundancy involves the numerical build-up of nuclear warheads, their delivery systems, and the Nuclear Command, Control, and Communication (NC3) networks needed to operate them. The logic of redundancy is to deploy such a vast quantity of systems that only a very small percentage of systems are needed to ensure a retaliatory strike.

<sup>17</sup> Such a possibility is hotly debated amongst academics and military officers. That said, there is no debate that these technological advances are rendering the possibility of “counterforce warfighting” more salient than at any time since the 1970s (Lieber and Press, 2017).

59. Beyond tracking nuclear weapons, there could soon be **AI-enabled autonomous systems** that target delivery systems more effectively. AI application in conventional air defence systems already undermines the most vulnerable pillar of the nuclear triad, the long-range bomber, as defending radar stations and batteries can rapidly and effectively identify and shoot down incoming targets via AI-powered “kill webs” (The Economist, 2021). Soon however, more futuristic capabilities like AI-coordinated undersea drone swarms or Highly Autonomous Unmanned Ships could be used to undermine the sea-based leg of the nuclear triad. One day, AI-backed BMD could even undermine missile-based deterrent forces as well (Bidwell et al., 2018; DARPA, 2019; SIPRI, 2020).

60. Challenges may also emerge with **AI-powered Nuclear Command, Control, and Communications (NC3)**. In the late 1980s, the Soviet Union developed and deployed the Perimeter system, often referred to as the “Dead Hand” nuclear response system (Lowther and McGriffin, 2019). The system was designed to trigger a nuclear response automatically in case a state’s leadership is incapacitated by the enemy (Peck, 2018). Today, experts fear states could equip their strategic forces with much more advanced AI systems, which might then mistakenly trigger a nuclear launch due to a glitch or an error in early warning systems. Moreover, AI is potentially vulnerable to spoofing and hacking. AI-powered NC3 systems could in theory misinterpret the strategic environment facing them, leading to tactical and strategic errors. Software designed to camouflage or spoof systems already exists (Goya, 2019).

61. In fact, AI directly threatens NC3 itself by facilitating **offensive cyber capabilities**. Rapid advances in the capabilities of AI-powered algorithms improve the scale and intensity of cyber-attacks. These AI-powered cyber-attacks could be used as force multipliers that magnify or complement an incoming first strike (SIPRI, 2020). A potential attacker could use cyber to overload or disable the NC3 systems that govern the use of the defender’s nuclear weapons. In this context, the most destabilising aspect of AI is its machine-like speed. Already, the use of missiles in nuclear deterrence dramatically compresses the timeframes leaders have in crisis situations. The use of AI will further compress these decision-making windows, deepening the stress that leaders experience, thus increasing the possibility of miscalculation (Johnson and Krabill, 2020).

62. Finally, new developments in **anti-satellite (ASAT) weapons** could add yet another challenge to strategic stability. As of late 2020, the United States, Russia, China, and India have successfully tested land-based missile systems capable of kinetically striking satellites in orbit – although the United States and NATO Allies have expressly forsworn the use of such systems for offensive purposes (Harrison, 2020). Alongside so-called “non-kinetic” space weapons which utilise cyber-attacks and robotic arms, ASATs could undermine the very foundation on which modern militaries function. The organisational and technical systems that allow militaries to operate – often referred to as Command, Control, Communication, Computers, Intelligence, Surveillance, and Reconnaissance (C4ISR) – are reliant on interconnected, electronic systems embedded in orbiting satellites. In a nuclear crisis – or any other crisis between ASAT-armed militaries – the first use of ASAT systems to “blind” adversary C4ISR could severely undermine strategic stability and result in nuclear escalation (Blair, 2019).

#### **IV. ARMS CONTROL TOMORROW – ALLIED WAYS AND MEANS**

63. The challenges of the new nuclear era are daunting. Still, the Allies should take heart in the fact that they possess both the institutional *memory* and the institutional *means* to tackle these challenges head on. The lessons of the Cold War – the need for open communications and crisis management, strong and robust non-proliferation regimes, and arms race stability – are all readily accessible to arms control experts. Equally, there exists a vast wealth of experience in arms control negotiation and formulation within the Alliance that can be tapped into on relatively short notice.

##### **A. LESSONS FROM THE COLD WAR – A BLUEPRINT FOR THE FUTURE?**

64. The new nuclear era’s three core challenges of vertical proliferation, horizontal proliferation, and emerging and disruptive technologies each reflect lessons from the initial period of nuclear learning that took place between the United States and the Soviet Union after the Cuban Missile Crisis.

65. First, the vertical expansion of existing nuclear arsenals in Russia and China should impress on all parties the need for open communications and better mechanisms for crisis stability. As Russia and China expand their nuclear arsenals and develop new delivery systems, their nuclear use doctrines have become increasingly muddled in the eyes of the Allies. While the Allies possess dedicated hotlines with both Moscow and Beijing, there is every reason to believe that communications on a substantive level must be deepened (Arms Control Association, 2020a). As such, Allied arms control efforts should home in on the need to break existing barriers of communication between the nuclear powers, all while developing a greater capacity for consultations between the nuclear powers – especially between NATO member states, on one hand the United States, France, and United Kingdom, and between Russia and China on the other. For example, the “P5 Process,” which brings together the five permanent members of the UN Security Council (China, France, Russia, the United Kingdom, and the United States) to discuss basic definitions, nuclear concepts, and other issues annually, is one such consultative forum already in existence. This and other forums could be strengthened and expanded to the mutual benefit of all parties. France has long advocated for an enlargement of the Security Council in both categories of permanent and non-permanent membership.

66. The increasingly long shadow of potential horizontal proliferation should also impress on the system’s great powers – namely, the United States, Russia, and China – the need for closer cooperation on non-proliferation efforts. Indeed, it was the tight knit cooperation between Washington and Moscow that gave the NPT and NSG the wherewithal needed to be an effective non-proliferation regime for the past fifty years. With the development of larger nuclear powers like China, future arms control efforts will be required to maintain strict controls on the distribution of nuclear materials globally (Georghe, 2019).

67. Finally, the changing technological environment, characterised by emerging and disruptive technologies, could naturally spark a fully-fledged arms race between the US, Russia, and China. To a certain extent, such an arms race is already underway as we speak. All parties are currently seeking the most advanced technologies and looking to apply them creatively to their nuclear postures. This is concerning – especially from the perspective of cost-savings. The development and implementation of new technologies like AI and robotics will be hugely expensive and will consume enormous amounts of energy from the system’s great powers. While these technologies will be pursued regardless of their application to nuclear systems, Allies should work to focus on the positive impacts these technologies can have on nuclear weapons.

68. Indeed, despite the potentially significant challenges associated with Artificial Intelligence outlined above, some experts have argued that the nuclear policy community must think seriously about how to “harness the power of AI as a tool for greater stability, transparency, and security” (Cox and Williams, 2021). Given predictions that AI will play an outsized role in all aspects of civilian and military policies in the not-so-distant future, such propositions should be taken in earnest. Indeed, many convincing arguments can be made to advocate for AI as a positive force for both deterrence and arms control.

69. Key arguments in favour of AI having a positive role for strategic stability can be encapsulated as follows. First, AI-enhanced information can likely offer a more accurate picture of any given scenario facing decisionmakers, thereby reducing the uncertainty in a crisis, which in turn allows for better and, by extension, safer decisions. AI early warning systems may also provide a crucial additional layer of stability to countries that do not possess the advanced satellites, sensors, and forward deployed radar systems at the scale needed to detect and accurately assess threat potential within the very compressed timeframe necessary for reaction. There is also an argument that AI-enhanced training could strengthen nuclear deterrence by making the humans managing the nuclear systems more capable (Cox and Williams, 2021).

70. Two specific AI applications – object identification and pattern recognition – may play essential future roles to guarantee more effective verification in arms control. For example, AI can greatly improve object identification to assist with everything from mobile missile tracking to facility oversight. AI-enabled systems can also rapidly construct an understanding of normal behaviour patterns versus cheating when dealing with, for example, new potentially destabilising military behaviours. (Cox and Williams, 2021). However, software aimed at spoofing artificial intelligence is developing rapidly, as noted above, which should encourage serious caution on the matter.

## **B. NATO’S ENDURING ROLE IN ARMS CONTROL AND NON-PROLIFERATION**

71. As political leaders look to negotiate new arms control frameworks moving forward, NATO will play an important part. As reflected in this report, the Alliance plays an important role as a consultative forum for Allied understanding of and policy towards arms control agreements and issues. While NATO member states enter treaties individually, the NATO Alliance serves as an invaluable clearing house for information regarding those treaties while providing a 30-nation platform to amplify an arms control consensus.

72. NATO Allies have been modernising their nuclear forces to ensure the safety, security, and effectiveness of existing systems – as Allies stated clearly in the June 14 Brussels Summit communiqué, “Allies’ goal is to continue to bolster deterrence as a core element of our collective defence and to contribute to the indivisible security of the Alliance. As long as nuclear weapons exist, NATO will remain a nuclear alliance” (NATO, 2021e). Alongside US, French, and UK modernisation efforts<sup>18</sup>, the Alliance also plays a part in ensuring that existing arms control and non-proliferation efforts remain robust and rigorous. Important committees meet frequently at NATO Headquarters to consider the key security implications for Allies – particularly, challenges such as the changing strategic environment, the unravelling arms control architecture, as well as the means available to respond. These include the High-Level Task Force on Arms Control, the Verification and Coordination Committee, the Arms Control, Disarmament and Non-Proliferation Committee, and the Committee on Proliferation. Through these committees, NATO member states

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<sup>18</sup> See Annex B on Allied Nuclear Modernisation Efforts.

also work to coordinate their positions and approaches to the issues of arms control, non-proliferation, and disarmament issues.

73. Broader Allied participation in NATO's nuclear posture is equally indispensable to continued Allied security and deterrence. As NATO public documentation notes: "NATO's nuclear deterrence also relies on US nuclear weapons deployed<sup>14</sup> in Europe and supporting capabilities and infrastructure provided by Allies. A number of European NATO members have dual-capable aircraft dedicated to the delivery of these US nuclear weapons" (NATO, 2020a). Nuclear sharing amongst willing Allies is critical to the Alliance. It shares the benefits, responsibilities, and risks of nuclear deterrence amongst the Allies via the provision of supporting capabilities, the maintenance of dual-capable aircraft and coordinating organisations like the Nuclear Planning Group (NPG).<sup>19</sup> Nuclear sharing is an essential trust-building measure that strengthens NATO's deterrent credibility. Finally, it is an essential element to non-proliferation, as it removes the incentives for nations to develop their own nuclear capability (Stoltenberg, 2020).

74. Similarly, the Alliance is opposed to the Treaty on the Prohibition of Nuclear Weapons (TPNW). NATO Allies believe that the TPNW does not reflect the increasingly challenging international security environment and is at odds with the existing non-proliferation and disarmament architecture. As the North Atlantic Council succinctly noted in a public statement on the TPNW, "a world where states that challenge the international rules-based order have nuclear weapons, but NATO does not, is not a safer world" (NATO 2020b). In a time when NATO adversaries are expanding their nuclear arsenals, now is not the time to engage in unilateral and unverifiable disarmament. NATO has clearly affirmed that the NPT is the only credible path to nuclear disarmament. By contrast to the NPT, TPNW lacks rigorous mechanisms for verification (NATO, 2020b).

75. Allies reasserted their commitment to arms control at the June 14, 2021 Brussels Summit, proclaiming it 'a key element of Euro-Atlantic security,' helping to ensure strategic stability and collective security. Allies also 'welcome[d] new strategic talks between the United States and Russia for future arms control measures, taking into account all Allies' security.' Further arms control negotiations are also supported by Allies, but they must, as the communiqué notes, reflect 'the prevailing international security environment.' Such statements demonstrate Allies' concerns about the growing complexity of the international security environment and the challenges it poses to broader strategic stability as well as the arms control frameworks underpinning Euro-Atlantic security.

### **C. THE ROLE OF PARLIAMENTS IN ARMS CONTROL**

76. The impact arms control has on national security is important for a parliamentary audience. Parliamentarians' choices about force modernisation and deployments are (at least in part) shaped by national governments' international arms control commitments. Further, arms control is an issue that often features prominently in the court of public opinion, which requires an informed parliament

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<sup>19</sup> The Nuclear Planning Group (NPG) is the principal discussion forum for Allies within NATO on nuclear issues. The NPG reviews NATO's nuclear policy, to include the safety, security and survivability of nuclear weapons, and communication and information systems. All Allies are members of the NPG, except for France, which decided not to participate (NATO, 2020a). The NPG High Level Group (HLG) serves as the senior advisory body to the NPG. The HLG's remit is NATO's nuclear policy, planning and force posture, in addition to matters related to the safety, security, and effectiveness of NATO's nuclear deterrent (NATO, 2020a).

to act as a democratic conduit for the views of their constituents and the positions eventually taken by the government in the name of their citizens.

77. Additionally, parliaments also have a critical role in the development of national arms control policy, treaty negotiations and ratification, as well as implementation. As a result of international arms control commitments, parliaments must also play a role in enacting and maintaining a national legal framework reflecting these commitments – specifically overseeing such critical actions as export controls and sanctions regimes.

78. Finally, parliaments serve as vital democratic fora for accountability and scrutiny of government policies. Parliaments have a duty to hold governments accountable for arms control commitments, and, at times, to allow for criticism of government policies and decisions. Parliamentary scrutiny of national commitments to international arms control, therefore, further fosters one of its essential elements – transparency. Increased transparency acts as a reinforcement mechanism for confidence among arms control signatories, thereby lengthening the shadow of future stability offered by the understanding that both governments and parliaments are working assiduously to uphold and maintain national commitments to international arms control.

## **V. CONCLUSION AND RECOMMENDATIONS FOR NATO PARLIAMENTARIANS**

79. The drivers of the new nuclear age present significant obstacles to arms control. The expansion of existing nuclear arsenals, potential proliferation cascades, and the uncertain ramifications of emerging and disruptive technologies each undermine Allied efforts to preserve stability and security in the international system. Still, this new nuclear age could be remembered as an era where arms control was redoubled rather than rejected. NATO Allies – and the parliamentarians that participate in member state governments – will have a defining impact on how this era is remembered. As such, this report recommends the following initiatives. Allies must:

- a. Encourage the fostering of a new generation of arms control experts. While the lessons of the past are as salient as ever, the Alliance increasingly lacks a supply of trained professionals to meet the demand. Further, the human capital that exists within the Alliance must be rejuvenated and directly put into contact with the older generation of arms control experts. To do so, NATO parliamentarians could encourage the development of new training programs, expand in-house arms control expertise via new hiring, and of a dedicated working group of professionals from a range of worlds – policy, academic, science, and engineering – to feed an interoperative community constantly seeking to refresh dynamic thinking on the myriad challenges facing the Allies. Emphasis should be placed on scientific and technical expertise to develop new methods of verification and regimes for treaty implementation – especially new methods that take advantage of emerging and disruptive technologies. All of these would serve to boost the profile of NATO as the key forum for consultation on nuclear and arms control issues.
- b. Maintain the ongoing pressure campaigns (via sanctions and other diplomatic channels) to bring Russia back to compliance with its international obligations in the field of arms control, as well as to the bargaining table for future arms control frameworks. Allies must find ways to convince Moscow that Russia's future peace and security will benefit from its cooperation on arms control. US President Biden's June 16 meeting with Russia's President Putin is an important step in this direction. Their summit's key outcome was their mutual support for a new Strategic Stability Dialogue, to help 'lay the groundwork for future arms control and risk reduction measures'. Allies noted in their June 14 communiqué their support of new strategic talks between the United States and Russia 'taking into account all Allies' security'.

With strong Allied support, the Strategic Stability Dialogue initiative by Washington and Moscow can go a long way to help rebuild the confidence and trust that is in short supply today.

- c. Work in concert to develop a coherent NATO policy to induce Chinese participation in arms control frameworks early in the process as a means of engaging it with other global powers responsible for the maintenance of global peace and security. Such efforts can help persuade China that its future security can benefit significantly from multilateral cooperation on a range of arms control issues. In order to bring China closer to the negotiating table of future treaties in this area, it could be asked to provide transparency and confidence-building measures on its nuclear doctrine and arsenal as a first step. A key means of bringing China to the bargaining table for future arms control treaties will be via the pressing need to regulate norms for the use of many of the key EDTs outlined in this report, which have the potential to undermine deterrence and lead to an increasingly unstable global strategic environment.
- d. Continue to be strong advocates of effective current and future arms control treaties that reflect the strategic environment in which the Alliance exists. Many of the challenges posed by nuclear force modernisation and expansion by NATO's competitors would benefit from the transparency provided by the exchange of information, dialogue, and limitations provided by well-functioning arms control. Allies can play their part to be strong advocates of arms control by upholding their commitments and being vigilant about their expectations that all signatories follow suit. The upcoming NPT Review Conference is an ideal venue to reposition Allied focus and determination to engage with the challenges facing arms control, disarmament and non-proliferation, today and over the horizon. To this end, Allies must continue to voice their strong commitment to the NPT and its provisions. Allies should also maintain a unified consensus that the TPNW is not in the interest of global stability, as it does not promote effective and verifiable disarmament and ignores the realities of today's global strategic environment. Still, it should be acknowledged that, while the Alliance's technical arguments against the TPNW remain sound, the broader movement driving the treaty could have an emotional resonance with democratic audiences. Parliamentarians can serve as essential links to help maintain a better-informed public about the treaty's dangers and Allies' efforts to uphold their NPT commitments more broadly.
- e. Seize upon the opportunity of the new Strategic Concept in 2022 to signal Allies' strength, unity, and determination in the face of an increasingly complex, dangerous, and unpredictable international security environment. The new Strategic Concept must reflect Allies' continued efforts to reinforce and maintain a dynamic and adaptable collective defence and deterrence posture, which "will continue to be based on an appropriate mix of nuclear, conventional, and missile defence capabilities" (NATO, 2021e). The new Strategic Concept, however, must also stress Allies' continued commitment to arms control, disarmament, and non-proliferation as a key element of Euro-Atlantic security in particular, and to global peace and security in general. Existing and future efforts along these lines must take into account and reflect the realities of the international security environment. The challenge, therefore, will be for Allies to find the ways and means to meet the challenge of a new nuclear age, while simultaneously seeking new avenues for arms control to forestall any future unchecked nuclear rivalry, and to remain true to longstanding commitments. Success in such an endeavour will clearly require a whole-of-alliance effort.
- f. Protect and, if possible, deepen their science and technology edge – especially as it relates to technologies critical to a strong, durable nuclear deterrent. Focus should be paid to developing new defensive countermeasures that can negate gains in offensive nuclear capabilities. Already, the Allies have taken welcome strides to expand investment in these

areas; however, even greater efforts should be made to encourage inter-Allied partnerships and sustained, deep cooperation with private industry in the development of new and emerging technologies. Such partnerships not only expand NATO's scientific and technological capability, but also help the Allies determine which technologies are most ripe for investment, application and deployment.

- g. Encourage an exploratory debate regarding the future development, implementation, and use of AI in all weapon systems – especially as it relates to nuclear command-and-control. Although AI arguably remains an “emergent” technology, one whose ramifications may not be fully felt for another decade, AI will revolutionise warfare through its potential as a force multiplier. AI will likely make decision-making by both human and autonomous sources far more comprehensive, intelligent, and rapid than is currently the case. This multiplication effect could act as stabilising force, one that improves early warning systems, retaliatory capabilities, and other systems used for robust defence and deterrence, or it could act as a destabilising force, one that strengthens offensive systems, thereby encouraging pre-emptive offensive attacks and the erosion of crisis stability. Parliamentarians should consider AI's current gestation period as a window of opportunity during which they can formulate “rules-of-the-road” for stabilising AI implementation.
- h. Work towards the establishment of standards and norms of behaviour in the space domain. An evolving new class of potential space-based weapons poses a critical threat to all global communications systems. Disrupted or destroyed satellite networks can have not only seriously adverse economic and social impacts, but, in the worst-case scenario, could also lead to precipitous and dangerous escalation to unintentional nuclear use if a state believes such an attack on a satellite network would limit command and control of their nuclear systems.
- i. Advocate for the establishment of standards, norms, and predictability in the use of offensive cyber systems against nation states – especially as it relates to nuclear deterrence. Cyber-attacks on nuclear command and control systems are especially dangerous as they carry similar escalatory risks as space weapons but are far more difficult to attribute. In the event of a cyberattack on nuclear command and control systems, there is a real risk that a state might attribute the attack to the wrong actor, thereby adding a new and dangerous wrinkle to the problem of misperception and unintentional nuclear use.



## ANNEX A – NORTH KOREA, INDIA, AND PAKISTAN NUCLEAR FORCE EXPANSIONS AND MODERNISATION

**North Korea** has illegally developed a small but potent nuclear arsenal. Experts believe Pyongyang has a stockpile of 30 to 40 nuclear weapons and fissile material to expand their arsenal to 70 weapons (Arms Control Association, 2020b). Likewise, a recent report suggests North Korea has successfully miniaturized its nuclear devices – a critical step for mounting nuclear warheads atop ballistic missiles (Nichols, 2020). Pyongyang aggressively tested its Hwasong-class missile systems throughout 2017, with the largest Hwasong-15 achieving a purported range of 13,000km – enough to strike the United States’ Eastern seaboard. In January 2021, North Korea also unveiled an SLBM missile at a military parade, though it remains unclear whether this system has been tested (BBC, 2021). At the same parade, North Korean leader Kim Jong-un unveiled an ambitious modernisation program for the next decade, including the development of tactical nuclear weapons and new ICBM systems (Herskovitz and Lee, 2021). With its small and still rudimentary arsenal, North Korea has maintained an opaque nuclear strategy. Kim Jong-un has consistently engaged in inflammatory nuclear rhetoric and hinted he would use nuclear weapons first; however, North Korea is yet to outline an official doctrine. Similar to China, a lack of doctrinal clarity raises the possibility of misperception and escalation. Indeed, some argue that Pyongyang employs a “dynamic” nuclear strategy that varies according to the actions of its adversaries (Manseok Lee, 2021). A misunderstanding of how North Korea “varies” its strategy, then, could easily precipitate an escalation – even if the initial ambition is to ease nuclear tensions.

**India** has developed a nuclear arsenal of roughly 150 warheads, deliverable by a nascent nuclear triad. India relies primarily on its road-mobile strategic missile systems like the *Agni* series missiles as well as several road-mobile tactical nuclear delivery systems like the *Prithvi* SRBMs, most of which were developed as a response to Pakistani and Chinese threats. India is also one of the few nuclear powers to still rely heavily on its arsenal of air-launched gravity bombs and ALBMs (Kristensen and Korda 2020c). Finally, India has deployed the *INS Arihant* SSBN since 2016, with Indian Prime Minister Narendra Modi declaring India’s full triad in 2018 (Dutta, 2018). After an embarrassing accident during *Arihant* sea trials, though, experts doubt India can sustain continuous sea-based deterrent patrols (Keller, 2018). In light of rapidly escalating strategic competition with China – not to mention ongoing tensions with arch-rival Pakistan – India continues to undertake expensive modernisation of its nuclear weapons arsenal. This includes the development of intercontinental range *Agni-VI* missiles as well as two further *Arihant* class SSBNs (O’Donnell and Bollfrass, 2020). While India’s relatively strong conventional military offsets concerns that India will develop a destabilising first use doctrine, mounting tensions with the conventionally superior PLA are cause for concern.

**Pakistan’s** nuclear weapons programme mostly mirrors developments in India’s military posture; however, the asymmetric conventional military balance between the two pressures Pakistan to threaten nuclear first use. Like India, Pakistan professes to maintain a nuclear doctrine of “credible minimum deterrence,” but there is significant disagreement as to what Pakistan considers to be the “minimum” (Mills, 2020). The Pakistani military thus maintains a policy of nuclear first use against other nuclear armed powers – namely, India – and has recently expanded its nuclear stockpile to 160 warheads, with some arguing Pakistan’s arsenal is “the fastest growing in the world” (Sen, 2020). Like India, Pakistan also mostly relies on its land and air-based deterrent components to deliver its nuclear weapons. This includes an extensive collection of tactical, ground-based systems like the *Shaheen*-class SRBM/IRBM and *Babur*-class GLCM. Unlike India, however, Pakistan is yet to deploy a sea-based nuclear capability or an ICBM class missile – although both are under development (Arms Control Association, 2018).

## ANNEX B – ALLIED NUCLEAR FORCE MODERNISATION

The **United States** is undertaking an extensive nuclear modernisation program, with plans to spend USD 494 billion in the next decade and USD 1.2 trillion by 2046. The program's contours follow recommendations made in the 2018 US Nuclear Posture Review (NPR), which called for the renewal of the US nuclear triad, the upgrading of the US NC3 and early-warning systems, and the development of a new sea-launched cruise missile (SLCM) in response to Russia's deployment of the 9M729 (CBO, 2019). In the short term, the US is actively reducing the number of warhead types in its arsenal from ten to five and is refurbishing its aging triad forces of *Minuteman III* ICBMs, the *Trident II* SLBM, and B-2 and B-52 long-range strategic bombers. In the longer term, the US is developing new systems to replace its Cold War-era arsenal. The B-21 bomber should begin replacing the existing strategic bomber force of B-1, B2, and B-52 aircraft in the mid-2020s, while the Ground Based Strategic Deterrent is slated to replace the *Minuteman III* starting in 2028. Finally, the first *Columbia* class SSBNs will enter service in 2023 and replace the current *Ohio* class SSBN forces beginning in 2031 (Arms Control Association, 2018).

**France**, in the context of maintaining the effectiveness of its deterrent, aims to replace all its key systems by 2035. French modernisation involves the development of new delivery systems and platforms as well as a more expansive approach to nuclear training simulations. Over the past decade, France has installed new M51 SLBMs throughout its deployed SSBN forces; in February 2021, France also launched its program to complement and eventually replace the current *Le Triomphant* class SSBN (Mackenzie, 2021). Similar to its sea-based deterrent upgrades, moreover, Paris has fully substituted its air-based deterrent force of Mirage 2000N aircraft squadrons with new Rafale B fighter-bombers, and plans to equip these with the ASN4G, a potentially hypersonic air-launched cruise missile, beginning in 2030 (Tertrais, 2020). Finally, France is enhancing nuclear readiness through regular exercises of its oceanic and airborne nuclear components, including an 11-hour mission in 2019 that tested all phases of a Rafale-led strike (Reuters, 2019).

The **United Kingdom** is also modernising its nuclear forces alongside the United States. As the United Kingdom's nuclear deterrent consists of a sea-based deterrent only, London is focusing its efforts on replacing its older *Vanguard* class SSBNs with the new *Dreadnought* class, slated to enter service by the early 2030s at a cost of GBP 41 billion. Likewise, in February 2020 the United Kingdom also announced it would pursue the development of a new nuclear warhead to replace its current Holbrook design. This latter program, as well as the refurbishment of *Trident II* D5 missiles, is being pursued in close cooperation with the United States (Ministry of Defence, 2020). As part of its Integrated Review of Security, Defence, Development and Foreign Policy, the United Kingdom announced in March 2021 that it would increase its stockpile of nuclear warheads from a current ceiling of 180 to a proposed ceiling of 260 total warheads. The move marks the first time that the United Kingdom will expand its nuclear capabilities since the end of the Cold War, reflecting its recognition of the rapidly changing international security environment.

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