



NATO PARLIAMENTARY ASSEMBLY

DEFENCE AND SECURITY COMMITTEE (DSC)

A NEW ERA FOR NUCLEAR DETERRENCE?

MODERNISATION, ARMS CONTROL, AND ALLIED NUCLEAR FORCES

General Report

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I. INTRODUCTION¹

1. On 8 August 2019, a serious nuclear arms-related accident occurred in Russia, just offshore from the Nenoksa Missile Test Site. While the Russian Defense Ministry issued a statement indicating there was an explosion while testing a liquid propellant jet engine, some intelligence officials and arms control experts have concluded that the Russians were testing a nuclear-powered cruise missile engine (Krzyzaniak, 2019). The failed test and subsequent explosion claimed the lives of several people, including prominent nuclear scientists, and have contaminated a large area surrounding the White Sea testing site, including the city of Severodvinsk. The missile in question is the controversial *Burevestnik*, or the SSC-X-9 Skyfall in its NATO designation, which Russian President Vladimir Putin claims to be the centrepiece of new strategic arms in development by Russia (Sanger, 2019). This incident highlights the dangers of the new nuclear arms race Moscow seems determined to impose upon NATO Allies.

2. Over the last decade, Russia has scrambled to develop a broad range of new, destabilising nuclear forces. A particular focus of this effort has been non-strategic, or tactical, nuclear weapons. In a 2018 address, President Putin claimed these new ‘wonder’ missiles will be capable of overwhelming any possible missile defence system. These missiles include a nuclear-powered and nuclear-armed system with global reach, an intercontinental hypersonic cruise missile, an air-launched ballistic missile, and a nuclear-powered and armed underwater drone. Russia is not alone, however, in its recent efforts to modernise and expand the suite of its nuclear weapons capabilities.

3. China is expected to double the size of its nuclear arsenal in the coming decade (Ashley, 2019). As China modernises and completes its form of a strategic triad, the role of nuclear forces will become increasingly central to China’s military strategy and objectives. Due to technological breakthroughs, North Korea and Iran continue to develop new, disruptive missile systems that could one day allow for the delivery of nuclear warheads (Nikitin, 2019; Cordesman, 2019). As a result, a new, destabilising nuclear security environment is likely just over the horizon.

4. NATO Allies remain committed to respecting the central tenets of their commitments to nuclear arms control, but, as a result of the rapidly changing security environment, nuclear weapons must remain central to the NATO defence and deterrence posture. The 2018 Brussels Summit Declaration puts it succinctly: “As long as nuclear weapons exist, NATO will remain a nuclear alliance.”

5. NATO declaratory policy consistently states that a credible defence and deterrence posture includes a combination of nuclear, conventional, and missile defence capabilities. NATO’s three nuclear power states – the United States, the United Kingdom, and France – provide the Alliance with a credible and survivable nuclear deterrent capability. Retaining these capabilities, however, requires the attention necessary to guarantee that warheads, delivery systems, and their supporting infrastructures remain reliable and secure. As a result, Allies are making the necessary upgrades to ageing delivery systems and warheads to maintain a modern nuclear deterrent.

6. The recent collapse of the Intermediate-Range Nuclear Forces (INF) Treaty has revived concerns about a deteriorating global arms control framework. Behind the collapse is an aggressive Russia that increasingly depends on its nuclear arsenal for sabre-rattling and prestige, and whose leadership sees little strategic promise in the future of arms control. Outside of the bilateral efforts by the United States and Russia, however, there are no other controls on the development and deployment of strategic nuclear forces outside the 1968 Non-Proliferation Treaty. Only one treaty, the New Strategic Arms Reduction Treaty (New START), continues to limit the strategic forces of

¹ Unless otherwise specified, the contents of this report are derived solely from publicly available information.

the United States and Russia, but it does not cover non-strategic weapons, and rising nuclear powers like China are not bound by its limitations.

7. This general report will review the rapidly changing international security environment's impact on the nuclear arms control regime. It will review the key challenges facing NATO's nuclear powers and, therefore, the Alliance's broader nuclear posture. It will also review the Alliance's continuing commitment to broader arms control efforts but highlight the realities of the declining appetite outside of the Alliance for new nuclear arms control measures.

II. A NEW STRATEGIC ENVIRONMENT

8. Renewed great power competition is quickly changing the international security environment. It could be argued that the United States, Russia, and China increasingly see themselves in a zero-sum competition for influence globally. Russian and Chinese efforts to counter and reshape the US-led post-WWII international order add to the existing challenge of powerful armed groups using terrorist tactics to fan the flames of violent extremism where they can. To address the range of challenges it faces, NATO is adapting its defence and deterrence posture to provide Allies with a 360-degree approach.

9. Emboldened by modern armed forces, a resurgent and revisionist Russia is keenly focused on changing the balance of power in the Euro-Atlantic area. An unfortunate victim of Russian aggression and subversion is the longstanding arms control architecture that had provided relative stability and restraint between the United States and Russia for the last several decades which is breaking down. The emergence of many new Russian conventional and nuclear weapons platforms, particularly missile systems, is forcing NATO Allies to review what constitutes the appropriate mix of conventional, nuclear, and missile defence capabilities.

A. THE CHALLENGE OF THE 'MISSILE RENAISSANCE'

10. As noted in the Defence and Security Committee's [2017 report on NATO's Ballistic Missile Defence](#) architecture, the emergence and dissemination of new technologies is rapidly changing the threat Allies face from conventional and nuclear weapons systems. The spread of a range of new ballistic² and cruise³ missile systems poses a particular challenge to NATO member states and their deployed forces. Difficulties in discerning the payload of many new modern dual-capable missile systems, either conventional or nuclear, only adds to the complexity of the issue (Ashley, 2019).

11. Today's missile challenge is global. There are five states⁴ with the ability to target anywhere on the globe with their current missile systems, but this number is likely to grow quickly as fast-paced missile system proliferation continues. North Korea has dramatically expanded the reach of its missile systems in the last few years, and Iran is trying to follow suit (Peçanah and Collins, 2018).

² Ballistic missiles are launched by rockets then follow an unpowered, gravity trajectory toward their targets. Their distance is determined by the rocket capacity and the weight of the payload.

³ Cruise missiles differ from ballistic missiles in that they are sustained by aerodynamic lift and follow a lower-level trajectory, sometimes very close to the surface of the earth, remaining within the earth's atmosphere throughout their trajectory.

⁴ The five states are the United States, the United Kingdom, France, Russia, and China.

12. Many nations view the acquisition of ballistic and cruise missile systems as a means of acquiring national power at relatively low expense (NASIC, 2017)⁵. There are currently approximately 50 different ballistic missile variants spread across 30 different countries (Karako and Williams, 2017). The proliferation of new missile systems in conjunction with the availability of advanced technologies increases the lethality of today's threat; missiles are faster, more accurate, and increasingly mobile and survivable (Karako and Williams, 2017).

13. North Korean missile development involved moving from a relatively short-range Scud⁶ variant missile to an ICBM in 20 years (Peçanah and Collins, 2018). Due to technology transfers from North Korea to Iran, Tehran can now strike with precision throughout the Middle East and into parts of the NATO Alliance's European territory (Peçanah and Collins, 2018). Due to these nations' well-documented disregard for international law, including their support of armed terrorist groups, their possession of increasingly capable missile systems is rightly regarded as a threat to international security (US Department of State, 2019b).

14. Iranian and North Korean support of groups like Hezbollah in Lebanon, Palestinian armed groups, and the Houthi rebel forces in Yemen has been a key element in the growth of the disruptive force of armed groups employing terrorist tactics in the Middle East over the last several decades (Cordesman, 2019; Bechtol, 2010). A recent example is the Houthi rebels' firing of a ballistic missile from Yemen into the Saudi capital of Riyadh (Peçanah and Collins, 2018). Houthi rebel forces in the Yemeni civil war are supported by Iran and Hezbollah, an Iranian proxy. Iran and North Korea continue to work to fit their ballistic missile systems with increasingly powerful warheads, potentially with the goal of obtaining credible nuclear warfighting capabilities and even an ICBM nuclear deterrent capability (Nikitin, 2019; Cordesman, 2019).

B. RUSSIA'S RACE TO DEVELOP A NEW, DESTABILISING NUCLEAR ARSENAL

15. Russia's development of new nuclear forces has increased at a rapid pace in recent years. A key focus of modernisation and investment in Russia's nuclear forces is non-strategic weapons to be deployed by air, land, and sea forces. President Putin noted that the rush to develop new strategic and non-strategic weapons is to 'overwhelm' any form of modern missile defence system (Hodge, 2009). The drivers of the new Russian efforts are likely broader than this; Russian rhetoric, doctrine, exercising, and new systems development all point to a destabilising dependence on nuclear weapons to reassert Russia's position on the world stage as a global power.

16. Russia's nuclear pillar is one of few remaining vestiges of national power for the country. All other fundamental measures of state power indicate a continued future decline: an anaemic economy overwhelmingly dependent on natural resource-based revenues, a declining population,

⁵ The use of cruise missiles as an instrument of nuclear deterrence has been central to the US and Russian nuclear arsenals since the 1950s. Indeed, cruise missiles have some advantages over ballistic missiles: they are easier to move and to camouflage, making them more likely to survive a preventive strike and thus reinforcing a state's second-strike capability. Cruise missiles are particularly stealthy, both because their launch and low altitude are less likely to be detected by traditional radars, and because of their ability to incorporate stealth materials. Improvements to the speed and accuracy of modern cruise missiles makes them increasingly destabilising. Modern dual-capable cruise missile systems, meaning systems capable of carrying either a nuclear or a conventional warhead, often lack the external distinguishing features that would allow an observer to distinguish which type of missile they may be facing. Given their complementarity with ballistic missiles, cruise missiles are increasingly used in conjunction with such systems. See Jean Masson, « Le missile de croisière à capacité duale comme moyen de dissuasion », *Fondation pour la recherche stratégique*, 2018. <https://www.frstrategie.org/programmes/observatoire-de-la-dissuasion/missile-croisiere-capacite-duale-comme-moyen-dissuasion-2018>

⁶ Russia originally developed the Scud missile system in the 1950s to deliver weapons of mass destruction, either a thermonuclear or a chemical warhead.

and a declining GDP.⁷ Since the beginning of his presidency, Vladimir Putin has used the sizeable nuclear arsenal remaining in Moscow's possession at the end of the Cold War to threaten international audiences and to reassure domestic ones (Trenin, 2005; Williams, 2016). Reminding various audiences of Russian nuclear prowess has been a constant theme among Russian leadership since the dissolution of the Soviet Union (Trenin, 2005).

17. President Putin continues to claim that Russia's focus on expanded and modernised nuclear forces started as a response to the 2002 US withdrawal from the 1972 Anti-Ballistic Missile (ABM) Treaty (Putin, 2018). The United States' rationale for its withdrawal from the ABM Treaty was the need for a national missile defence system to respond to a changing strategic environment after the 9/11 terrorist attacks. As US President George W. Bush noted at the time: "[...] we no longer live in the Cold War world for which the ABM Treaty was designed. We now face new threats from terrorists who seek to destroy our civilisation by any means available to rogue states armed with weapons of mass destruction and longer-range missiles" (Boese, 2002).

18. As the United States sought to build up a limited national missile defence system to respond to terrorist threats and the dangers of rogue states, such as Iran and North Korea, which were supplying terrorist groups with increasingly advanced missile systems, Russia quickly moved to break down decades of US-Russian arms control efforts providing restraint, transparency, and predictability regarding each side's conventional and nuclear forces (Moniz and Nunn, 2019).

19. Russia responded to the US withdrawal from the ABM Treaty by noting the United States had made a 'strategic mistake' and almost immediately declared it was no longer bound by the limits on its strategic nuclear forces imposed by the Strategic Arms Reductions Treaty II (START II). In 2007, Russia suspended its participation in the 1990 Treaty on Conventional Forces in Europe. The following year, it was clear to outside observers that Russia was working on new missile systems in contravention of the INF Treaty (Gordon, 2014).

1. RUSSIAN INF TREATY VIOLATION AND THE END OF THE TREATY

20. The recent demise of the INF Treaty has garnered a lot of attention among NATO Allies, and rightly so. The INF Treaty was a pillar of stability on the European continent for over 30 years, extending the shadow of a stable future by creating a transparent and predictable environment regarding ground-launched intermediate and short-range nuclear-capable missile systems in Europe. The following summarises the emergence as well as the collapse of this treaty.

21. In the late 1970s and early 1980s, the United States and its NATO Allies were forced to respond to Russia's deployment of the SS-20 missile system. The SS-20 was an intermediate-range ballistic missile with a nuclear warhead⁸ that dramatically changed the balance of forces in Europe at the time, providing the Soviet Union with the ability to destroy NATO bases and facilities with very little warning. The deployment of such a capability caused Allies to worry that the Soviet Union would be able to 'decouple' NATO North America from Europe by undermining the United States' and Canada's willingness to defend their Allies in Europe in the event of a conflict. This led to the 'dual-track' approach consisting of US deployment of equivalent missile systems in Europe to offset any Soviet advantage as well as engagement in negotiations to pursue arms control.

⁷ The World Bank database indicates Russia's 2018 GDP measured approximately USD 1.657 trillion, while Canada's measured approximately USD 1.709 trillion. Russia's GDP measured approximately USD 2.9 trillion in 2013. <https://data.worldbank.org/country>

⁸ The SS-20 warhead consisted of three 150kt Multiple Independent Re-entry Vehicles (MIRVs). For more information on the SS-20's development and deployment, see <https://missilethreat.csis.org/missile/ss-20-saber-rsd-10/>.

22. The result of the arms control negotiations was the 1987 INF Treaty, according to which both superpowers agreed to eliminate all ground-launched nuclear and conventional missiles with ranges of 500-5,500 km, their associated launchers, support structures, and equipment within three years of the treaty's entry into force in 1988 (INF Treaty, 1987). The treaty included very strict inspection and verification protocols⁹ to ensure compliance.

23. Russian officials began voicing concerns about the limitations of the INF Treaty in the mid-2000s; there were indications that Moscow was concerned about its inability to match Chinese intermediate- and shorter-range missiles¹⁰. This led to some calls in Moscow to withdraw from the treaty in 2005 (Kühn and Peczeli, 2017; Pifer, 2014). As a result of the growing concern about other nations' burgeoning or even already well-established arsenals of missiles with ranges between 500-5,500 km, both the United States and Russia reaffirmed their commitment to the INF Treaty at the UN General Assembly in October 2007 and called on other states to join them in the ban against missiles covered by the treaty (Pifer, 2014). Attempts to multilateralise the treaty became a focus in the following years. However, sources indicate that, in parallel, Russia began to develop and test missile systems that did not comply with the INF Treaty as early as 2008 (Gordon, 2014).

24. In May 2013, Rose Gottemoeller, then the US Under Secretary of State for Arms Control and International Security, raised concerns about Russian violation of the INF Treaty with Russian officials. The United States made its position on Russian non-compliance with the treaty official with its 31 July 2014 Compliance Report (US Department of State, 2019a). Specifically, the United States highlighted Russia's SSC-8 missile system (the Russian designator is 9M729) as the key culprit in a series of new Russian missile systems at the time¹¹. Russia deployed the SSC-8 by February 2017 (Gordon, 2017).

25. Since the issue of Russian violation of the INF Treaty was first raised in 2013, the United States made concerted efforts to compel Russia to comply with the treaty. Since 2017, the Trump administration engaged Russia with an 'integrated strategy of diplomatic, economic, and military measures' that included¹²:

- Over 30 meetings with high-level Russian officials;
- Six expert-level meetings, including two sessions of the Special Verification Commission, the Treaty's implementation body, and four bilateral meetings of technical experts;
- Funding from the US Congress to engage in Treaty-compliant research and development on conventional, ground-launched, intermediate-range systems to demonstrate to Russia the cost associated with endangering the INF Treaty;
- Three formal NATO statements demanding Russian transparency regarding its violation; and,
- Six annual Compliance Reports (2014–2019).

⁹ The treaty required Washington and Moscow to inspect and inventory each other's intermediate-range nuclear forces between 30 and 90 days of the treaty's entry into force. These baseline inspections established a mutual understanding of the size and location of each other's arsenal and, therefore, a basis upon which to implement the treaty in full. Up to 20 short-notice inspections per year were allowed for the first three years of the treaty being in force. The treaty also allowed for certified reductions and eventual elimination of the forces indicated by the treaty via a combination of national technical means and on-site inspections; parties were forbidden from interfering with each other's photo-reconnaissance satellites and from moving or concealing their missiles to impede inspection regimes. www.armscontrol.org/factsheets/INFtreaty

¹⁰ At the time, approximately ten countries were developing or had already deployed ballistic or cruise missiles with ranges between 500 and 5,500 km: China, Egypt, India, Iran, Israel, North Korea, Pakistan, Saudi Arabia, South Korea, and Syria.

¹¹ Two other missile systems, the R-500/SCC-7 GLCM and the RS-26 ICBM, also raised concerns about Russia's violation of the INF Treaty.

¹² The following list is drawn from the US Department of State's Bureau of Arms Control, Verification and Compliance's published list of US efforts to bring Russia back into compliance with the INF Treaty (www.state.gov/inf)

26. However, despite such efforts, economic sanctions, and military messaging, Russia refused to comply and instead relied on spurious arguments¹³ about US non-compliance with the INF Treaty over the same period (US Department of State, 2019a; IISS, 2019).

2. NATO UNITY REGARDING RUSSIAN NON-COMPLIANCE

27. Allied unity behind the United States' position was consistent throughout the INF crisis. As noted above, NATO Allies made several official formal statements regarding concerns about Russian violation of the INF Treaty. The 2018 Brussels Summit declaration perhaps summarised Allies' views on the subject best:

The Intermediate-Range Nuclear Forces (INF) Treaty has been crucial to Euro-Atlantic security and we remain fully committed to the preservation of this landmark arms control treaty. Full compliance with the INF Treaty is essential. The United States is in compliance with its obligations under the INF Treaty and continues to provide substantial transparency on its programs while pursuing a diplomatic dialogue with Russia. At the same time, Allies have identified a Russian missile system, the 9M729, which raises serious concerns. After years of denial and obfuscation, and despite Allies repeatedly raising their concerns, the Russian Federation only recently acknowledged the existence of the missile system without providing the necessary transparency or explanation. A pattern of behaviour and information over many years has led to widespread doubts about Russian compliance. Allies believe that, in the absence of any credible answer from Russia on this new missile, the most plausible assessment would be that Russia is in violation of the Treaty. NATO urges Russia to address these concerns in a substantial and transparent way, and actively engage in a technical dialogue with the United States. Allies will continue their efforts to engage Russia on this issue in bilateral and multilateral formats.

28. During the months following the summit declaration, Allies worked to bring Russia back into compliance with its INF Treaty obligations. Allied Foreign Ministers declared their uniform support of the US position that Russia was in material breach of the INF Treaty and again called for Russia's urgent action to return to compliance (NATO, 2018b). NATO Allies' efforts to engage in constructive dialogue on the subject met with continued Russian denials and obduracy, culminating in a 25 January 2019 NATO-Russia Council meeting during which Russia continued to deny its violation and refused to take any action.

3. THE PATH TO WITHDRAWAL AND THE ALLIED RESPONSE

29. On 1 February 2019, the United States announced the suspension of its obligations under Article XV of the INF Treaty, which meant the United States could withdraw from the treaty six months later if Russia did not return to compliance. In lockstep with the United States, Allies noted their support of the United States in an official NATO statement, in which it was noted that, unless Russia returned to full and verifiable compliance, Russia would bear full responsibility for the end of the treaty (NATO, 2019a). In both US and NATO official statements, the United States and NATO Allies reaffirmed their full commitment to the preservation of effective international arms control, disarmament, and non-proliferation (White House, 2019; NATO, 2019a). NATO Secretary-General Jens Stoltenberg summarised all Allies' sentiment with regard to the INF Treaty crisis succinctly

¹³ Russia's key arguments about US non-compliance centred on the following: US testing of certain types of rocket boosters and use of drones violate the INF Treaty; and US deployment of the Aegis Ashore system in Romania (and the planned installation in Poland) gives the US the ability to launch intermediate-range cruise missiles from land. These arguments are refuted clearly by the US Department of State's 8 December 2017 Fact Sheet – Refuting Russian Allegations of U.S. Non-Compliance with the INF Treaty, www.state.gov/refuting-russian-allegations-of-u-s-noncompliance-with-the-inf-treaty/

when he noted the following at the Munich Security Conference on 15 February 2019: “A treaty that is only respected by one side will not keep us safe” (NATO, 2019c).

30. Russia responded to the mounting crisis by announcing its own intention to withdraw from the INF Treaty on 2 February 2019. Again, Allies worked throughout the six-month window between the announced suspension of obligations and the official withdrawal date of 2 August to convince Russia of the mutual benefits of preserving the INF Treaty. On 26 June, NATO Defence Ministers, after officially urging Russia to return to compliance, announced potential measures that Allies could take to ensure a “safe, secure and effective nuclear deterrent,” such as exercises, intelligence, surveillance and reconnaissance, air and missile defences, and conventional capabilities (NATO, 2019c). NATO also reiterated its position that it will not deploy new land-based nuclear missiles in Europe and is not seeking a new arms race with Russia (NATO, 2019c).

31. On 2 August 2019, the United States’ withdrawal from the INF Treaty took effect. In parallel, Allies made another official statement supporting the US position and placing full blame on Russia for the treaty’s demise. Again, Allies reaffirmed their commitment to “effective international arms control, disarmament and non-proliferation” as a key element to continued Euro-Atlantic security “taking into account the prevailing security environment.” Allies noted that they also agreed to a “balanced, coordinated and defensive package of measures to ensure NATO’s deterrence and defence posture remains credible and effective” (NATO, 2019d).

C. RUSSIA’S UNCLEAR NUCLEAR DOCTRINE, MENACING NUCLEAR RHETORIC AND ACTIONS

32. Since the mid-2000s, Russia has been determined to build up a new range of nuclear-capable missile systems. In parallel, Moscow has issued confusing signals regarding Russia’s potential use of nuclear weapons. The following section looks more closely at the controversy and confusion surrounding the evolution of Russia’s doctrinal statements on the use of nuclear weapons and the escalating rhetoric used by Russian officials to intimidate Allies and their partners.

33. Controversy surrounding Russia’s nuclear rhetoric began in the early 1990s, when a weak post-Soviet Union Russia dropped Brezhnev’s ‘no first use’ pledge due to Moscow’s understanding that its deficient conventional forces might not be sufficient against the spectrum of security challenges that Russia may face (Oliker, 2018). An article published in 1999 by a group of Russian military analysts discussed how such a new nuclear posture may work: Russian forces could use low-yield nuclear weapons in a future conflict to signal resolve and, therefore, compel an enemy to back down, which has become known as Russia’s *escalate to de-escalate* strategy (Oliker, 2018). The following year, Russia’s military doctrine reflected the *escalate to de-escalate* strategy, wherein Russia noted its willingness to use tactical (or low-yield) nuclear weapons to prevail in key battles and, thereby, prevent an escalation to full-scale nuclear war (South, 2019). As the 2000 Russian military doctrine notes, nuclear escalation against a conventional force would be permitted “in response to large-scale aggression utilising conventional weapons in situations critical to the national security of the Russian Federation” (Arms Control Association, 2000).

34. A decade later, Russia released a national security strategy that raised the threshold for the use of nuclear force, allowing for a nuclear response to a weapon of mass destruction (WMD) attack, or in the face of a conventional attack threatening the “very existence of the state” (Oliker, 2018). This same language was reaffirmed in the 2014 Russian military doctrine, which noted the need for Russia to develop non-nuclear deterrence, meaning the capacity and strategy to prevent attacks without the need for the threat of nuclear war behind it (Oliker, 2015; 2018). Yet, doctrinal confusion ensued again as recently as 2017, when the Russian naval doctrine noted that the readiness to use nonstrategic nuclear weapons in an escalating conflict can deter an enemy (Gorenburg, 2017; Oliker, 2018).

35. Additional confusion has been sown by the escalating use of nuclear rhetoric by Russian officials in recent years, instances of which have been particularly acute since Russia's 2014 seizure of the Crimean Peninsula. As relations between Russia and the West worsened after Russia's illegal annexation of Crimea, President Putin warned: "Let me remind you that Russia is one of the world's leading nuclear powers." He continued by noting that "it's best not to mess with us" (Anishchuk, 2014). In 2015, the Russian Ambassador to Denmark, Mikhail Vanin, threatened the NATO Ally by stating that, if Denmark joins the American-led missile defence shield, "Danish warships will be targets for Russian nuclear missiles" (Reuters, 2015). A year later, at the time that NATO announced the initial operating capacity of its Aegis Ashore system in Romania, President Putin threatened Romania directly by stating: "If yesterday in those areas of Romania people simply did not know what it means to be in the crosshairs, then today we will be forced to carry out certain measures to ensure our security. And it will be the same with Poland" (Cohen and Radin, 2019). Poland is the location for the planned installation of an addition to Aegis Ashore, which is slated to be operational by 2020 (GAO, 2019).

36. Russia's exercises in recent years have also involved either a direct or indirect nuclear element. In 2009, Russia's *Zapad* exercise included a simulated tactical nuclear strike on Warsaw (Stratfor, 2013). Then, in 2013, a Russian exercise targeted Sweden with a simulated tactical nuclear strike (Stoltenberg, 2015). Further, Russia often incorporates the *Iskander* and *Kalibr* dual-capable missile systems in its exercises, implying the ability to employ tactical nuclear strikes in the event of a conventional conflict (Oliker, 2018). These exercises involving the potential for either a direct or indirect threat of nuclear strikes come in parallel to a rise in Russian brinkmanship with the West via the reckless use of its armed forces along Allied borders. As Defence and Security Committee members have learned on many visits across the Alliance since 2014, these dangerous encounters have occurred on land, at sea, in the air, and in cyber space from all along the Alliance's eastern flank, from the High North down through the Baltic and Black Seas and into the Mediterranean, as well as in the waters of the North Atlantic, all the way to the coast of North America. Such incidents have also been well documented by various think tanks and governments focused on Euro-Atlantic security (ELN, 2018).

D. RUSSIA'S NUCLEAR MODERNISATION

"We started to develop new types of strategic arms that do not use ballistic trajectories when moving toward a target and, therefore, missile defence systems are useless against them, absolutely pointless."

– Vladimir Putin (1 March 2018, Presidential Address to the Federal Assembly)

1. RUSSIAN STRATEGIC FORCES MODERNISATION

37. Russia is modernising across its nuclear triad. Over the past 15 years, Russia has worked to modernise its land-based ICBM capabilities, which remain the main pillar of Russia's strategic forces and are organised by the Strategic Rocket Forces Command (RSVN); particular focus has been on the deployment of the multiple independently targetable re-entry vehicles (MIRV) version of the RS-24 *Yars* (SS-29)¹⁴ (IISS, 2018). The *Yars* ICBM is solid-fuelled, can be either silo-based or road-mobile, has a range of up to 10,500 km, and can carry up to ten warheads. Russia is also developing the RS-28 *Sarmat* (SS-18), a new liquid-fuelled, MIRV-equipped heavy ICBM (IISS, 2018). Although the programme has been slower than scheduled, the replacement of the remaining Soviet-era ICBMs should be completed by 2024. Russia is also modernising its nuclear infrastructures, such as silos, centres, or garrisons (SIPRI, 2018).

¹⁴ The parentheses indicate the NATO designation for the missile systems.

38. In parallel, the sea-based component is undergoing similar modernisation efforts. A new version of sub-surface ballistic nuclear submarines (SSBN), the Borei class, is gradually replacing the remaining Soviet-era Deltas. Three of the Borei-class are already operational, while five more that have an improved design could be deployed in the next three years (SIPRI, 2018). The Borei-class SSBN is equipped with the *Bulava* missile system, which is both a solid- and liquid-fuelled MIRVed submarine-launched ballistic missile (SLBM) with six warheads and the potential to launch 10-40 decoys simultaneously. The Yuri Dolgoruky test-fired the *Bulava* from the polar region of the Arctic Ocean to a target in the Arkhangelsk region in Russia's Far East on 24 August 2019 (Reuters, 2019).

39. Russia's strategic air force has seen modifications to the existing fleet of 76 bomber aircraft. After modernising most of its Tu-95MS bombers, which constitute the bulk of the current fleet, Russia has announced two next-generation bombers, the Tu-160M2 and the PAK-DA. The Tu-160M2 is an upgraded version of the Soviet-era Tu-160, from which only the airframe remains. The long-range supersonic bomber will carry long-range stand-off missiles, including the Kh-101 and the Kh-102 (nuclear variant) air-launches cruise missiles (ALCM) (IISS, 2018). The first prototype, minus the next-generation engine, began flying in 2018; the first completed aircraft is slated to be ready in 2021. The PAK-DA is supposed to be a subsonic flying-wing aircraft, although with the same engine as the Tu-160M2 (IISS, 2019). Although relatively little is known about the progress on this 6th generation strategic stealth bomber, the first prototype is expected in 2021-2022 (Episkopos, 2019). Some analysts, however, have questioned Russia's ability to carry out the simultaneous development and production of two strategic bombers (Zala, 2019).

2. RUSSIAN NON-STRATEGIC NUCLEAR FORCES

40. As Lieutenant General Robert P. Ashley, Jr., director of the United States Defense Intelligence Agency (DIA), noted in a recent presentation at the Hudson Institute: "Russia's stockpile of non-strategic nuclear weapons, already large and diverse, is being modernised with an eye towards greater accuracy, longer ranges and lower yields to suit their potential war-fighting role" (Ashley, 2019). Conservative estimates note that Russia currently possesses well over 2,000 low-yield tactical nuclear weapons that are stockpiled (Oliker, 2018; IISS, 2019; SIPRI, 2019). Two major missile projects are designed to carry low-yield nuclear warheads, the *Kalibr* (SS-N-27 *Sizzler*) long-range cruise missile and the short-range *Iskander-M* (SS-26 *Stone*). The *Kalibr* missile system has been demonstrated on many occasions by the Russian navy by its firing from surface and subsurface platforms at various targets in Syria since 2015 from both the Caspian Sea and the Mediterranean (IISS, 2018). Russia has deployed the *Iskander-M* in all 12 army and navy missile brigades, including in Kaliningrad, to replace the obsolete *Tochka* (SS-21 *Scarab*) (IISS, 2019). Both systems are dual-capable for delivery of either conventional or nuclear warheads. As DIA Director Ashley noted: "Most Russian systems lack the external distinguishing features that would allow the observer to differentiate between conventional and nuclear variance" (Ashley, 2019).

3. RUSSIA'S NEW, DESTABILISING NUCLEAR FORCES IN PERSPECTIVE

41. Many of Russia's new strategic forces are being modernised to have greater warhead delivery capacity than the systems they are replacing (IISS, 2018). The *Sarmat* missile system is said to carry more warheads than the ten that can be carried on the system that it is replacing (Ashley, 2019). Controversy surrounds the *Iskander-M*, as the mobile launcher can be modified (and was tested) to operate the longer-range cruise missile SSC-8, which, as noted above, is the missile at the centre of Russia's violation of the INF Treaty (Baev, 2019).

42. As mentioned, in his 1 March 2018 presidential address to the Federal Assembly, president Putin was particularly boastful about Russia's new cruise and ballistic nuclear missile systems, which he refers to as Russia's 'wonder missiles' (Baev, 2019). The *Avangard* missile is a supersonic glide vehicle that is capable of reaching speeds up to Mach 20 and is manoeuvrable. The missile acts essentially as a warhead for the *Sarmat* ICBM (Baev, 2019). The *Kinzhal* missile is an air-launched ballistic missile that can manoeuvre at speeds up to Mach 10 (Baev, 2019). Two other missile projects are based on a design which incorporates a nuclear reactor engine that provides the system with almost unlimited range; one is said to be a sea or ground-launched cruise missile, while the other is the *Poseidon* underwater drone. The *Poseidon* is reported to be armed with a 10-megaton nuclear warhead, which, when exploded underwater, would trigger a tsunami (Baev, 2019).

43. Not mentioned in President Putin's address to the Federal Assembly is the *Zircon* (SS-N-23) hypersonic anti-ship (stand-off) missile, which is to be deployed on surface and subsurface naval vessels, as well as the Bastion-P coastal defence system (Baev, 2019). The *Zircon* is a cruise missile that has speeds up to Mach 6 and will be tested on Russian submarines, including the Kazan class, in 2020 (O'Dwyer, 2019).

44. The new, heavier payloads, higher speeds, enhanced manoeuvrability, and incorporation of stealth into many of the above-mentioned systems is a clear challenge to Allies' current air and missile defence systems.

E. ADDITIONAL OVER-THE-HORIZON CHALLENGES: CHINA'S RENEWED ATTENTION TO ITS NUCLEAR ARSENAL

45. As noted earlier, China maintains a relatively small, although incrementally increasing, nuclear arsenal¹⁵. According to the country's official military strategy, Beijing's nuclear policy aims to "strengthen [China's] capabilities for strategic deterrence and nuclear counterattack" by improving "strategic early warning, command and control, rapid reaction, and survivability and protection" capabilities (Chinese State Council, 2015). China's current nuclear strategy, therefore, remains focused on securing its second-strike capability, without seeking to move beyond that point (Rose, 2018).

46. China's nuclear modernisation, which has – to a large extent – improved the quality rather than the quantity of its nuclear arsenal, illustrates its desire to enhance the robustness of its nuclear forces. It has focused on improving its ability to respond to systems deployed by the United States and other countries, notably ballistic missile defences and precision-guided conventional strike systems (SIPRI, 2018; Kulacki, 2018). China is particularly concerned about US progress in intelligence, surveillance, and reconnaissance capabilities. As such, it is currently replacing its ageing silo-based missiles with the mobile, solid-fuelled DF-41, which has an estimated range of 12,000 km. China has also developed several MIRVed ICBMs (SIPRI, 2018). In parallel, China has developed its sea-based nuclear component: four operational JIN class SSBNs, which can be equipped with JL-2 SLBMs. China is already developing its next-next generation Type 096 SSBN, which will be armed with an upgraded JL-3 SLBM; construction is due to begin in the next several years (DoD, 2019).

47. In 2018, China announced that it would reveal its new H-20 stealth bomber in 2019 to celebrate the 70th anniversary of the People's Liberation Army Air Force (PLAAF) on 11 November 2019 (Roblin, 2019). The H-20 will likely have a 'tailless' design and is slated to enter into service in the late 2020s. The H-20 is part of the PLAAF's efforts to create a 'strategic air force', and with the incorporation of the nuclear-capable strategic stealth bomber, China will complete its nuclear triad (IISS, 2019).

¹⁵ In 2010, China's estimated stockpile was about 240 nuclear warheads. It increased to reach 250 in 2014 and 280 in 2018 (SIPRI, 2018).

48. In addition, China is reportedly working on fielding nuclear theatre-range precision-strike systems (Ashley, 2019). The US DIA has indicated that China may double the size of its nuclear arsenal over the coming decade (Ashley, 2019). All the above signal China's commitment to expanding the role of its nuclear forces in its future military planning.

49. The United States and China have no history of arms control, inspection, or verification regimes at the bilateral level. In a sign of challenges to come, China launched more ballistic missiles in 2018 for tests and training than the rest of the world combined (Ashley, 2019).

III. ALLIED NUCLEAR MODERNISATION IN PERSPECTIVE

50. In response to the rapidly changing nuclear environment, and due to the need to upgrade ageing delivery systems and decaying warheads, the United States, France, and the United Kingdom are currently engaged in the modernisation of their nuclear forces. Such measures guarantee the safety and security of the existing arsenals without compromising their pledges to continue to reduce overall stockpiles according to their international treaty commitments.

51. The **United States** is engaged in an extensive modernisation of its nuclear forces, from storage to delivery systems and warheads. The programme is slated to take until 2046 to complete and will cost an estimated USD 1.2 trillion, USD 494 billion of which will be allocated between 2017 and 2026¹⁶ (US Congressional Budget Office, 2019). Its renovation programme aims to upgrade its triad of nuclear delivery systems (ground-, air-, and sea-based), warheads, supporting infrastructures, and command and control systems (SIPRI, 2018). The United States is reducing its number of nuclear warhead types from ten to five and, via its Life Extension Programs (LEP), is refurbishing the remaining warheads (the W76, W80, W87, W88, and B61) (Arms Control Association, 2018b). Likewise, delivery systems, such as the *Minuteman III* ICBM, the *Trident II* SLBM, and the B-2 and B-52 bombers, are undergoing modernisation (SIPRI, 2018). The US Navy is also replacing the older Virginia class SSBNs with the new Columbia class.

52. In addition, the United States has launched the development of new systems to replace some of its bombers and ICBMs: the B-21 is scheduled to enter service in the mid-2020s to replace the B-1 and B-52 bombers, and the Ground Based Strategic Deterrent should replace the *Minuteman III* in 2028 (Kristensen and Norris, 2018a). The United States also plans to modernise its one remaining non-strategic nuclear weapon, the B-61 gravity bomb. As noted above, the US nuclear modernisation programme has almost exclusively focused on upgrading or replacing existing capabilities.

53. Due to Russia's lack of doctrinal clarity, continued nuclear rhetoric, and race to develop a new suite of modern nuclear forces, particularly an arsenal of low-yield weapons, the US Department of Defense's 2018 Nuclear Posture Review (NPR) has indicated that the United States must prepare for "limited first use" by Russia in the event of an armed conflict (DoD, 2018). As the NPR states clearly:

To address these types of challenges and preserve deterrence stability, the United States will enhance the flexibility and range of its tailored deterrence options. To be clear, this is not intended to, nor does it enable, 'nuclear war-fighting'. Expanding flexible U.S. nuclear options now, to include low-yield options, is important for the preservation of credible deterrence against regional aggression. It will raise the nuclear threshold and help ensure that potential adversaries perceive no possible advantage in limited nuclear escalation, making nuclear employment less likely.

¹⁶ The 2017-2026 estimate projects an additional USD 94 billion will be needed to meet the demands of the project.

54. On 18 August 2019, the United States tested a new road-mobile, ground-launched cruise missile system, consisting of modifications to the existing *Tomahawk* cruise missile and Mark 41 Vertical Launch System (Hennigan, 2019). This new mid-range system is still in the early test phases, but US Secretary of Defense Mark Esper noted the following after the test: “The Department of Defense will fully pursue the development of these ground-launched conventional missiles” (Hennigan, 2019). The push to modify existing systems to create a new ground-launched cruise missile is a clear response to Russia’s development and deployment of the SSC-8. NATO Secretary General Jens Stoltenberg has noted repeatedly that the Alliance does not intend to deploy any new nuclear missile systems in Europe (NATO, 2019e).

55. In an address to **France’s** armed forces in January 2018, French President Emmanuel Macron committed to renew both components of the country’s nuclear arsenal – sea and air – by 2035. The French government is allocating EUR 37 billion from 2019 to 2025 for the purposes of maintaining and modernising its nuclear arsenal; the amount budgeted represents almost 10% of the increase in the defence budget (Le Point, 2018). France plans to modernise its four SSBNs, which will be equipped with a new version of the M51 SLBM by 2025, and it has announced its intention to launch a new generation of SSBNs by the 2030s. A new air-to-surface system, the ASN4G, will replace France’s air-launched supersonic cruise missile by 2035 (Granholm and Rydqvist, 2018; Le Point, 2018). In parallel, the Rafale B will replace the Mirage 2000N aircraft as the principal delivery system for France’s air-launched cruise missile arsenal (SIPRI, 2018).

56. The **United Kingdom** is also modernising its sea-based nuclear deterrent as a result of the obsolescence of its Vanguard class SSBNs. The new Dreadnought class SSBNs are slated to enter into service in the early 2030s (SIPRI, 2018). The United Kingdom is also working on the extension of the life of its *Trident II* missiles (Zala, 2019). The cost of these modernisation efforts, originally budgeted at GBP 31 billion with an extra GBP 10 billion to cover possible increases, is likely to rise as a result of significant cost overruns (SIPRI, 2018). In May 2018, the UK National Audit Office warned that an extra GBP 2.9 billion would be necessary over the next decade to maintain the nuclear renewal plans (Polianskaya, 2018).

NATO’S NUCLEAR POSTURE

57. The strategic forces of the United States serve as the backbone of NATO’s nuclear deterrent. The United States remains committed to an extended deterrence posture, which provides Allies with protection under its nuclear ‘umbrella’. To achieve this extended posture, the United States maintains its nuclear triad¹⁷ of delivery systems, forward-deployed non-strategic weapons, and readily deployable US-based nuclear weapons (DoD, 2018). The United States’ nuclear triad has the essential mix of systems needed to provide Allies with guaranteed survivability, which is paramount to the overall stability of NATO’s nuclear deterrent.

58. The independent strategic forces of France and the United Kingdom also play an essential role in the credibility of the Alliance’s nuclear posture. Each of these two nations maintains a fleet of four nuclear-powered SSBNs carrying capable ballistic missile systems; France also maintains an air-launched nuclear strike capacity. The United Kingdom makes all its nuclear weapons available to NATO’s planning and command and control framework¹⁸; France does not. As a NATO Ally, however, France’s strategic forces are a key element of the Alliance’s deterrence posture. As the Alliance notes: “These Allies’ separate centres of decision-making contribute to deterrence by complicating the calculations of potential adversaries” (NATO, 2018a).

¹⁷ Air, land, and sea-capable delivery systems for nuclear warheads

¹⁸ These weapons can, however, be used by the United Kingdom independently, if necessary.

59. According to non-governmental open sources, the United States forward-deploys nuclear weapons¹⁹, specifically B61 gravity bombs, to Europe. As part of NATO's nuclear deterrence mission, these could be delivered by both US and Allied dual-capable aircraft.

60. NATO has both formal and informal structures to oversee nuclear infrastructure, handling, and policy. The most significant formal groups involved in the planning and execution of NATO's nuclear mission are the Nuclear Planning Group (NPG) and the High-Level Group (HLG). The NPG handles NATO nuclear policy and deployment issues. All Allies are members of the NPG, with the exception of France, which decided not to participate in either the NPG or the HLG. Nuclear issues are also, at times, raised in the North Atlantic Council forum (Andreasen et al., 2018). In addition to the formal consultative bodies and decision-making processes, the Alliance also carries out exercises to guarantee readiness to execute a nuclear mission, if necessary (Andreasen et al., 2018).

1. NATO's Evolving Nuclear Posture

61. A key means for the NATO Alliance to articulate its nuclear policy is via the summit declarations that are issued after the meetings of all Alliance heads of state and government. NATO uses these statements to lay out the principles of its nuclear posture to important audiences, deter existing and potential future adversaries, and reassure all Allied populations. NATO's Strategic Concepts and the Deterrence and Defence Posture Review (DDPR) also signal the Alliance's nuclear priorities. NATO's current Strategic Concept dates from 2010 and the DDPR from 2012.

62. The NATO-Russia relationship has declined precipitously since these two documents were last published. The space for positive strategic cooperation between NATO and Russia had already narrowed with Russia's 2008 invasion and occupation of Georgia. Russia's unilateral pause on attempted NATO-Russia missile defence cooperation in 2013 was emblematic of the increasingly sharp divergences in perspective between Russia and NATO on the shape of future cooperation and the broader issue of Euro-Atlantic security in general. A particular turning point in the NATO-Russia relationship took place in the immediate aftermath of Russia's 2014 illegal annexation of Crimea, after which NATO suspended all practical civilian and military cooperation with the NATO-Russia Council²⁰.

63. As noted above, Russia's evolving nuclear policy and race to acquire and deploy destabilising new nuclear systems, coupled with its continued aggression along the Alliance's eastern flank, irresponsible use of nuclear rhetoric toward NATO Allies, and use of illegal chemical agents on Allied territory²¹, has driven a subtle – but important – shift in NATO's declaratory language on its nuclear weapons policy.

64. The 2012 DDPR and the 2014 Wales Summit Declaration use the same language regarding the possible use of nuclear weapons: "The circumstances in which any use of nuclear weapons might have to be contemplated are extremely remote" (NATO, 2012; NATO, 2014). The 2016 Warsaw Summit Declaration makes a subtle, but important, change to the language regarding the potential use of nuclear weapons. The text of paragraph 54 states: "The circumstances in which NATO might have to use nuclear weapons are extremely remote." The 2018 Brussels Summit Declaration uses the same language as was used in 2016 and adds a statement about the declining

¹⁹ See, for instance, Andreasen, Steve, Isabelle Williams, Brian Rose, Hans M. Kristensen, and Simon Lunn, "Building a Safe, Secure and Credible NATO Nuclear Posture", Nuclear Threat Initiative, January 2018. https://media.nti.org/documents/NTI_NATO_RPT_Web.pdf

²⁰ NATO allows channels of political and military communication to continue with Russia to address any particular issues that may arise, and to 'reduce misunderstandings and increase predictability.' https://www.nato.int/cps/en/natohq/topics_50090.htm

²¹ Russian agents used a military-grade nerve agent in an assassination attempt in Salisbury, United Kingdom, on 4 March 2018 (UK Government, 2018).

European security environment and the vital nature of the Alliance's nuclear deterrent. The full text of paragraph 36 states:

The fundamental purpose of NATO's nuclear capability is to preserve peace, prevent coercion, and deter aggression. Given the deteriorating security environment in Europe, a credible and united nuclear Alliance is essential. Nuclear weapons are unique. The circumstances in which NATO might have to use nuclear weapons are extremely remote. NATO reiterates that any employment of nuclear weapons against NATO would fundamentally alter the nature of a conflict. If the fundamental security of any of its members were to be threatened, however, NATO has the capabilities and resolve to impose costs on any adversary that would be unacceptable and far outweigh the benefits that any adversary could hope to achieve. (NATO, 2018a).

65. It is evident that the threshold for Allied use of nuclear weapons is still very high. The message to Russia, however, is clear: the Alliance is watching the evolution of the European security environment closely, particularly Russia's changing nuclear posture, and it is prepared to defend Allied populations and territory by any means.

66. The summit declarations also underscore the necessity of US forward-deployed nuclear weapons, Allied-supported infrastructure to support these weapons, and dual-capable aircraft to deploy and deliver them to target, if necessary (NATO, 2018a).

2. Renewing Existing NATO's Nuclear Burden Sharing Arrangements

67. In the current security environment, the maintenance of NATO's nuclear burden sharing arrangements remains indispensable. As Allies stated in the 2018 Brussels Summit Declaration: "NATO's nuclear deterrence posture also relies on United States' nuclear weapons forward-deployed in Europe and the capabilities and infrastructure provided by Allies concerned. National contributions of dual-capable aircraft to NATO's nuclear deterrence mission remain central to this effort. Supporting contributions by Allies concerned to ensure the broadest possible participation in the agreed nuclear burden sharing arrangements further enhance this mission. Allies concerned will continue to take steps to ensure sustained leadership focus and institutional excellence for the nuclear deterrence mission, coherence between conventional and nuclear components of NATO's deterrence and defence posture, and effective strategic communications." (NATO, 2018a). Such capabilities ensure broad Allied involvement in and solidarity with NATO's nuclear mission; they are also a concrete reminder of US nuclear commitment to the security of NATO's European Allies (Lunn and Williams, 2019)²².

68. US nuclear modernisation efforts will include the upgrade of the country's forward-deployed nuclear bombs on European bases. The B61 tactical nuclear warhead is among the oldest variants in the US arsenal, dating back to the 1960s. As part of a LEP, the United States is consolidating four B61 variants into a single modern variant, the B61-12 guided nuclear bomb. The guided, low-yield nuclear bomb will be deployed in the next decade, and the total production cost for the new B61-12 is estimated to be between USD 7.5 billion and USD 10 billion (GAO, 2018). Stockpile stewardship and management will also require a modernisation of the facilities at which these weapons are stored.

²² B-61 bombs assigned to US and European aircraft are under US control and are only useable with presidential authority. Those weapons assigned to Allied aircraft may only be used after the US president has released them to NATO (Andreasen et al., 2018).

69. In addition, the dual-capable aircraft used as the means of delivering the weapons in the instance they would be required will also require modernisation due to the approaching obsolescence of the current generation aircraft. The United States and other NATO Allies are already taking the necessary steps to do this. Lockheed Martin was awarded the USD 350 million contract to adapt the F-35 joint strike fighter to be capable of carrying and firing the new B61-12.

IV. WHAT FUTURE FOR NUCLEAR ARMS CONTROL?

70. In light of the above examination of the demise of the INF Treaty and the rapidly evolving international environment, questions could legitimately be raised about the future of arms control. The following section describes the NATO Alliance's longstanding and continued commitment to arms control and the potential for maintaining and expanding remaining limitations on strategic nuclear forces.

A. ARMS CONTROL AND NATO

71. Thomas Schelling and Morton Halperin defined arms control as all "forms of military cooperation between potential enemies in the interests of reducing the likelihood of war, its scope and violence if it occurs, and the political and economic costs of being prepared for it" (Schelling and Halperin, 1961). Since its founding, arms control has been central to the mission of NATO. In one way or another, NATO has been involved in drafting almost every significant arms control and non-proliferation treaty since the 1960s. Allies have always understood that deterring enemies from attacking Allied populations and territory is a central premise of NATO's existence and that an arms race is in no member state's interest.

72. A number of dedicated committees meet regularly at NATO headquarters to coordinate policies for the Alliance's obligations in the areas of arms control, disarmament, and WMD non-proliferation; these include: the High-Level Task Force on Conventional Arms Control, the Verification Coordination Committee, the Committee on Proliferation, and the Special Advisory and Consultative Arms Control, Disarmament, and Non-Proliferation Committee. As a result, NATO works continuously to develop policies and negotiate the Alliance's positions in areas critical to Euro-Atlantic security, such as the OSCE Structured Dialogue and the Vienna Document modernisation (Alberque, 2019). It also works with NATO partners, international organisations, non-partner countries, and others to address global arms control, disarmament, and non-proliferation challenges²³.

73. Allies reiterated their continued commitment to arms control, disarmament, and non-proliferation in the 2018 Brussels Summit Declaration: "Allies remain collectively determined to uphold existing disarmament, arms control, and non-proliferation agreements and commitments. Allies remain open to further arms control negotiations, with the aim of improving the security of the Alliance, taking into account the prevailing international security environment" (NATO, 2018a). The declaration also noted: "We regret that the conditions for achieving disarmament have not become more favourable since the 2016 Warsaw NATO Summit." Unfortunately, and as demonstrated in this report, the international security environment for facilitating and maintaining arms control agreements has only become more challenging since the Brussels Summit in July 2018, particularly with regard the control of nuclear weapons. The following section summarises NATO's stance on the proliferation of nuclear weapons.

²³ The NATO Alliance does not sign or implement arms control, disarmament, or non-proliferation treaties or agreements. This is done by each individual member state.

B. NUCLEAR ARMS CONTROL

74. The Treaty on the Non-Proliferation of Nuclear Weapons (NPT) serves as the bedrock agreement of international efforts to prevent the spread of nuclear weapons (and their associated technologies) and to work toward eventual nuclear disarmament. Signed in 1968 and entering into force in 1970, three interrelated and mutually reinforcing pillars support the treaty: non-proliferation (Art. I & II), the right to the peaceful use of nuclear energy (Art. IV), and disarmament (Art. VI)²⁴.

75. All NATO Allies are States Parties to the NPT. At the 2018 Brussels NATO Summit, Allies acknowledged the essential role the NPT plays in international peace and security and reaffirmed their commitment to the full implementation of the treaty in all its aspects (NATO, 2018a)²⁵. Allies have made significant steps toward fulfilling their NPT obligations since the end of the Cold War, particularly their Article VI disarmament obligations. Since the Cold War peak, the number of nuclear weapons committed to NATO defence has been reduced by more than 95 percent (NATO, 2019b).

76. NATO Allies also continue to express their opposition to the Treaty on the Prohibition of Nuclear Weapons²⁶, also referred to as the ‘ban treaty.’ As Allies have stated, the ban treaty “is at odds with the existing non-proliferation architecture, risks undermining the NPT, is inconsistent with the Alliance’s nuclear deterrence policy and will not enhance any country’s security” (NATO, 2018b). William Alberque, Director of NATO’s Arms Control, Disarmament, and WMD Non-Proliferation Centre, told members of the DSC in February 2019 that, as an Alliance, NATO will not support approaches to disarmament that ignore global security conditions or undermine the NPT (Alberque, 2019). Critics also argue that the ban treaty fails to include adequate verification measures, would undermine existing safeguard measures, and will not effectively reduce nuclear arsenals (Onderco, 2017; Ford, 2017). To date, the ban treaty has not been signed by any nuclear weapons state.

²⁴ The full text of the Treaty of the Non-Proliferation of Nuclear Weapons can be accessed at: <https://www.un.org/disarmament/wmd/nuclear/npt/text/>.

²⁵ The nuclear weapons states of the Alliance maintain absolute control and custody of their nuclear weapons, thereby adhering to the non-transfer of nuclear weapons to non-nuclear weapons states as stipulated in Articles I and II of the treaty. As NATO states clearly in paragraph 10 of its 2012 Deterrence and Defence Posture Review: “Allies note that the states that have assigned nuclear weapons to NATO apply to these weapons the assurances they have each offered on a national basis, including the separate conditions each state has attached to these assurances.” (https://www.nato.int/cps/en/natohq/official_texts_87597.htm) NATO’s nuclear arrangements were in place prior to the time of the negotiation and entry into force of the NPT. “The negotiating record of the NPT shows that these arrangements were well known and were, from the very start, part of the acquis of the Treaty intended to prevent the further spread of nuclear weapons and maintain peace.” (https://www.nato.int/nato_static_fl2014/assets/pdf/pdf_2017_03/20170323_170323-npt-factsheet.pdf). For more information on NATO’s nuclear sharing agreements, see William Alberque, “The NPT and the Origins of NATO’s Nuclear Sharing Arrangements”, *Études de l’IFRI, Proliferation Papers*, No. 57, IFRI, February 2017.

²⁶ After conferences at UN Headquarters in New York City, NY, from 27 February-31 March 2017 and then again from 15 June-7 July in 2017, 122 countries voted to approve the Treaty on the Prohibition of Nuclear Weapons. The treaty is not in force, as only 24 of the required 50 countries have ratified the it.

C. STRATEGIC NUCLEAR ARMS CONTROL AGREEMENTS

77. The graphic below outlines the evolution of strategic nuclear arms control agreements since the first serious initiation of such efforts by the United States and the Soviet Union in the Cold War.

Strategic Nuclear Arms Control Agreements								
	SALT I	SALT II	INF Treaty	START I	START II	START III	SORT	New START
Status	Expired	Never Entered Into Force	Expired	Expired	Never Entered Into Force	Never Negotiated	Replaced by New START	In Force
Deployed Warhead Limit	N/A	N/A	N/A	6,000	3,000-3,500	2,000-2,500	1,700-2,200	1,550
Deployed Delivery Vehicle Limit	US: 1,710 ICBMs & SLBMs USSR: 2,347	2,250	Prohibits ground-based missiles of 500-5,500 km range	1,600	N/A	N/A	N/A	700
Date Signed	May 26, 1972	June 18, 1979	Dec. 8, 1987	July 31, 1991	Jan. 3, 1993	N/A	May 24, 2002	April 8, 2010
Date Ratified, U.S.	Aug. 3, 1972	N/A	May 28, 1988	Oct. 1, 1992	Jan. 26, 1996	N/A	March 6, 2003	Dec. 22, 2010
Ratification Vote, U.S.	88-2	N/A	93-6	93-6	87-4	N/A	95-0	71-26
Date Entered Into Force	Oct. 3, 1972	N/A	June 1, 1988	Dec. 5, 1994	N/A	N/A	June 1, 2003	Feb. 5, 2011
Implementation Deadline	N/A	N/A	June 1, 1991	Dec. 5, 2001	N/A	N/A	N/A	Feb. 5, 2018
Expiration Date	Oct. 3, 1977	N/A	Aug. 2, 2019	Dec. 5, 2009	N/A	N/A	Feb. 5, 2011	Feb. 5, 2021*

*New START allows for the option to extend the treaty beyond 2021 for a period of up to five years.

Source: Arms Control Association, July 2019. <https://www.armscontrol.org/taxonomy/term/136>

78. With the collapse of the INF Treaty in August 2019, only one strategic nuclear arms control agreement persists between the United States and Russia: the New Strategic Arms Reduction Treaty (New START). New START entered into force on 5 February 2011 and replaced START I. The 2002 Strategic Offensive Reductions Treaty terminated when New START entered into force (Arms Control Association, 2018a). New START limits the number of accountable deployed strategic nuclear warheads and bombs to 1,550, down from the START limit of 6,000 (Arms Control Association, 2018a). ICBMs, SLBMs, and bombers assigned to nuclear missions are limited to 700, and deployed and non-deployed ICBM launchers, SLBM launchers, and bombers are limited to 800 (Arms Control Association, 2018a).

79. New START limits were reached by the United States and Russia on 5 February 2018, within the seven-year timeframe specified by the treaty (SIPRI, 2019). This is a key reason for the continued decline in each nation's arsenal size in recent years (see Annex A). Under the limits of New START, the United States currently has 656 deployed strategic delivery systems, 1,365 deployed strategic warheads, and 800 deployed and non-deployed strategic launchers (Arms Control Association, 2019a), Russia has 524 deployed strategic delivery systems, 1,461 deployed strategic nuclear

warheads, and 760 deployed and non-deployed strategic launchers (Arms Control Association, 2019b).

80. New START expires on 5 February 2021, but the treaty allows for a five-year extension. Despite some arms control experts' doubts about US intentions to negotiate an extension to New START, the United States has made no official statements to this effect (The Economist, 2019). Debate about New START is a focus of lawmakers in Washington. In early May 2019, the United States Committee on Foreign Affairs of the United States House of Representatives introduced a bipartisan bill calling for the extension of New START (US House of Representatives, 2019). A bill has also been introduced in the US Senate by Massachusetts' Democratic Senators Ed Markey and Elizabeth Warren, which would prohibit funding to increase the number of US strategic nuclear weapons above New START limits if Russia does not do so (Kimball, 2019).

81. US Republican critics of New START believe, however, that the treaty is structurally flawed because it does not limit tactical or non-strategic weapons and needs to be expanded to include China. To support this position, Republican Senators Tom Cotton (Arkansas) and John Cornyn (Texas) introduced alternative legislation that would withhold funds from a New START extension if the new agreement does not cover Russia's entire inventory of strategic and non-strategic nuclear systems and include China (Cotton, 2019). A parallel bill was introduced in the US House of Representatives by Republican Representative Liz Cheney (Wyoming) (Cotton, 2019). US National Security Advisor John Bolton reiterated the Republican position that the treaty is structurally flawed when asked about extending New START in a recent interview with the Washington Free Beacon. He said: "that flaw remains today, so simply extending it, extends the basic flaw" (Gertz, 2019).

82. The debate about whether the Trump administration should negotiate an extension to New START, let the treaty expire, or negotiate a broader and more comprehensive arms control agreement will likely continue over the 18 months remaining in the treaty. The following statement from the 2018 NPR summarises the United States' broader position succinctly:

"The United States is committed to arms control efforts that advance U.S., allied, and partner security; are verifiable and enforceable; and include partners that comply responsibly with their obligations. Such arms control efforts can contribute to the U.S. capability to sustain strategic stability. Further progress is difficult to envision, however, in an environment that is characterized by continuing significant non-compliance with existing arms control obligations and commitments, and by potential adversaries who seek to change borders and overturn existing norms.

In this regard, Russia continues to violate a series of arms control treaties and commitments. [...] In a broader context, Russia is either rejecting or avoiding its obligations under numerous agreements, and has rebuffed U.S. efforts to follow the New Strategic Arms Reduction Treaty (START) with another round of negotiated reductions and to pursue reductions in non-strategic nuclear forces.

Nevertheless, New START is in effect through February 2021, and with mutual agreement may be extended up to five years, to 2026. The United States has already met the Treaty's central limits[...]and will continue to implement the New START Treaty.

The United States remains willing to engage in a prudent arms control agenda. We are prepared to consider arms control opportunities that return parties to compliance, predictability, and transparency, and remain receptive to future arms control negotiations if conditions permit and the potential outcome improves the security of the United States, its allies, and partners." (DoD, 2018)

V. CONCLUSIONS AND RECOMMENDATIONS FOR NATO PARLIAMENTARIANS

83. The international security environment is changing rapidly. Facilitated technology transfers are pushing states to race to develop new weapons systems with greater firepower, longer ranges, and increased accuracy. As noted in this general report, the result is a 'missile renaissance' that is changing the dynamics of international peace and security and putting increased strain on existing arms control frameworks. States like North Korea and Iran, both of which have a long track record of scant attention to international law and support for international terrorism, are working assiduously to fit their advancing missile systems with increasingly powerful warheads. Their ultimate goal is to obtain credible nuclear warfighting capabilities and an ICBM nuclear deterrent capacity. Other states like China, which are not bound by strategic nuclear arms limitation agreements, seem poised to break out into a new era of nuclear force capability. As this report notes, China is on the cusp of completing its own nuclear triad and is predicted to double the size of its nuclear arsenal in the coming decade (Ashley, 2019).

84. Euro-Atlantic security is witnessing a sea change as a result of Russia's efforts to modernise and expand its military capabilities. Russia's race to develop new, destabilising weapons is part of a broader effort to change the balance of power in Europe in its favour. Of particular concern to NATO Allies are Russia's new nuclear-capable strategic and non-strategic missile systems, which President Putin has noted are designed to make any defences against them obsolete, or, in his own words, "pointless" (Putin, 2018). These systems include, among others, ultra-long-range nuclear-powered and armed cruise missiles, hypersonic glide vehicles, and nuclear-powered and armed underwater drones. The development and deployment of one new system, the SSC-8, ultimately brought about the demise of the INF Treaty.

85. Russia's development of new nuclear weapons systems is coupled with evolving military doctrines on the potential use of nuclear force that have been lacking clarity for decades. In addition to shifting nuclear doctrines, Russian officials have used unsettling nuclear rhetoric to attempt to intimidate NATO Allies. In parallel, increased Russian aggression in all forms has been challenging the Alliance's air, land, and maritime forces via dangerous actions of military brinkmanship.

86. As this report highlights, Russia's actions have forced NATO Allies to respond by strengthening and modernising NATO's nuclear deterrence. Allied efforts to update their nuclear systems, however, have focused on replacing existing systems to maintain a capable, credible, and secure modern nuclear deterrent. The Alliance's nuclear posture and stated policy on the potential use of nuclear weapons have responded to Russia's actions but still maintain a very high threshold for any potential use of nuclear weapons. Allies have also reaffirmed their steadfast commitment to arms control, disarmament, and non-proliferation. As the Brussels Summit Declaration states clearly: "Allies remain open to further arms control negotiations, with the aim of improving the security of the Alliance, taking into account the prevailing international security environment" (NATO, 2018a).

87. The international environment for arms control, however, is changing quickly for the NATO Alliance. Russia's leadership is showing clear signs of its lack of interest in the restraints of arms control agreements, and the rapid expansion of new modern missile capabilities across the globe is exposing the limitations of existing bilateral regimes. To date, the only remaining treaty limiting strategic nuclear forces is New START. While Russia is currently adhering to the limitations of New START, it is also developing a range of new weapons systems that are difficult for the United States and other NATO Allies to manage under current arms control agreements. Further, New START does not impose limits on non-strategic nuclear weapons or nuclear powers seeking to expand their nuclear capabilities, like China.

88. NATO has responded to the collapse of the INF Treaty by noting that the Alliance will respond in a "measured and responsible way." NATO Secretary General Jens Stoltenberg has stated that "NATO will now work on issues such as exercises, intelligence, surveillance, and reconnaissance,

air and missile defences, and conventional capabilities, while also ensuring that NATO's nuclear deterrent remains safe, secure, and effective" (NATO, 2019e). As Allies look to the future, it is clear that a new security environment in Europe and across the globe will put increasing pressure on all forms of existing arms control regimes.

89. Still, as the NATO Alliance makes clear in its official statements: "As long as nuclear weapons exist, NATO will remain a nuclear alliance" (NATO, 2018a). As a result, NATO parliamentarians must be able to explain to their constituents why nuclear weapons remain such an indispensable pillar of NATO's defence and deterrence policy. US, British, and French parliamentarians have the challenge of explaining the necessity of each of their nation's significant expenditures to maintain modern, capable, and secure nuclear deterrent capabilities. Other Allied parliamentarians must also be able to explain why their nations continue to invest in the modernisation of forward-deployed nuclear weapons and delivery systems, as these weapons remain a vital pillar of the Alliance's ongoing nuclear mission.

90. NATO parliamentarians should also be aware of the potential for further nuclear proliferation challenges just over the horizon. Nuclear weapons proliferation poses a threat to all NATO Allies, and it is in their collective interest to continue to work to find a way to adapt arms control initiatives to meet these challenges. Such initiatives, however, must be realistic regarding the nuclear weapons environment that they seek to mitigate.

91. Finally, NATO parliamentarians have a duty to be aware of the evolution of the Alliance's role not only as a nuclear alliance, but as an alliance working to promote arms control, non-proliferation, and disarmament. As noted in this general report, NATO remains committed to the NPT and to the essential role it plays in international security. NATO Allies have continued to make significant progress toward fulfilling their NPT obligations since the end of the Cold War, particularly their Article VI disarmament obligations. Since the Cold War peak, the number of nuclear weapons committed to NATO defence has been reduced by more than 95 percent (NATO, 2019b). This is a significant achievement and should be put forward as an argument for continued support for the Alliance, as it continues not only to guarantee the peace and security for all Allied populations, but also to work to be a force for the broader international common good.

ANNEX A: CURRENT GLOBAL NUCLEAR STOCKPILES

In early 2019, the nine nuclear-armed states²⁷ owned approximately 13,865 nuclear weapons,²⁸ a net decrease of 600 compared to 2018²⁹ (SIPRI, 2019). This decline mainly reflects Russian and US efforts to reduce their deployed nuclear forces, as agreed in the 2010 Treaty of Measure for the Further Reduction and Limitation of Strategic Offensive Arms (New START). Russia and the United States possess just over 90% of the world's nuclear warheads, with 6,500 and 6,185, respectively (SIPRI, 2019).

The nuclear arsenals of the nuclear-weapons states other than Russia and the United States are comparatively much smaller. With 300 and 200 warheads, respectively, France and the United Kingdom have also undertaken significant reductions in their arsenals (SIPRI, 2019). Each nation's nuclear policies, however, indicate their willingness to maintain credible nuclear deterrence capabilities as determined by the international security environment. China maintains roughly 290 warheads but is in the process of both modernising and expanding its stockpile (SIPRI, 2019). India (approximately 130-140 warheads) and Pakistan (approximately 150-160 warheads) have also been increasing their nuclear capabilities in recent years (SIPRI, 2019; IISS, 2019). Finally, Israel³⁰ is estimated to possess approximately 80-90 warheads (SIPRI, 2019).

North Korea, a first-generation nuclear power, stands out from the other nuclear states. Although the existence or deployment of operational nuclear warheads by the country remains to be confirmed, it is estimated that North Korea has produced between 20 and 30 nuclear weapons (SIPRI, 2019). It remains unclear, however, whether North Korea has produced a nuclear warhead compact enough to be delivered by a long-range ballistic missile. More specifically, observers doubt that North Korea has developed an operational re-entry vehicle (Nikitin, 2019). Still, North Korea is achieving rapid progress and is expected to be able to produce such missiles in the near future (SIPRI, 2019). Currently, North Korea possesses ten types of short-, medium- and intermediate-range ballistic missiles as potential delivery systems. It is also reportedly developing a road-mobile ICBM capable of reaching the United States and a submarine-launched ballistic missile (SIPRI, 2019).

²⁷ The nine nuclear-weapons states are the United States, Russia, France, the United Kingdom, China, India, Pakistan, Israel, and North Korea.

²⁸ Since there is no authoritative open-source evidence of North Korea's development or deployment of nuclear warheads, figures for North Korea are not included in the total estimates.

²⁹ The figures used in this section reflect the situation as of January 2018.

³⁰ To this day, Israel has neither confirmed nor denied that it has a nuclear arsenal.

ANNEX B: INDIA, PAKISTAN, AND ISRAEL'S NUCLEAR MODERNISATION PROGRAMMES

India: India is believed to be operating seven nuclear-capable systems: two types of aircraft, four land-based ballistic missiles systems, and one sea-based ballistic missile system (Kristensen and Korda, 2018a). In order to modernise its nuclear triad, it is developing at least five new systems. On land, India is seeking to expand the range of its *Agni* missile: the production of the intermediate-range *Agni-IV* missile should be launched shortly, while the near-ICBM³¹ *Agni-V* is entering the last test phases. There is speculation that India is also developing an actual ICBM, the *Agni-VI* (Kristensen and Korda, 2018a). In the air, India is upgrading its current fleet of Mirage 2000 and Jaguar IS/IB Shamsher aircraft in an effort to extend their service life and improve their capabilities. It could also potentially convert its recently ordered 36 Rafale fighter jets to be nuclear-capable (Kristensen and Korda, 2018a). As the most recent addition to its nuclear forces, India is looking to expand its sea-based component via the acquisition of two to four additional SSBNs (Gady, 2017). Finally, India is estimated to possess enough military plutonium for 150 to 200 nuclear warheads and is building new plutonium-production reactors. This underscores Delhi's desire to increase its plutonium resources for missiles currently under development (Kristensen and Korda, 2018a). This expansive nuclear strategy suggests the country is broadening its threat perspective to include China alongside its long-standing efforts to deter Pakistan (Kristensen and Korda, 2018a).

Pakistan: Pakistan is believed to have the fastest-growing nuclear weapons programme, although projections of the size and scope of the programme's increase vary significantly (Zala, 2019). Like India, it is expanding its production of fissile material. Furthermore, Islamabad has focused its modernisation efforts on land-based missiles: it is seeking to extend the range of the *Shaheen-I* short-range ballistic missile and of the *Shaheen-II* medium-range ballistic missile (MRBM). In addition, Islamabad is developing a new MRBM with MIRVs, the *Ababeel* (SIPRI, 2018). Pakistan has prioritised the development of missiles of relatively limited range, signalling its desire to strengthen the tactical level of its nuclear arsenal (SIPRI, 2018). The country's nuclear policy has sought to achieve a "full-spectrum deterrence posture," i.e., covering all three (strategic, operational, and tactical) levels of nuclear weapons. This directly responds to India's "Cold Start" doctrine – a limited-war strategy that entails launching rapid and limited conventional offensive operations through units stationed at the border. Because of the offensive's limited scale, Pakistan would be unable to justify responding to India's attack with nuclear weapons (Sankaran, 2014/15). To a smaller extent, Islamabad is also modernising its squadron of nuclear-capable fighter jets through the replacement of its ageing Mirage with JF-17 Thunder aircraft, jointly developed with China (SIPRI, 2018). Finally, in line with its ambition to pursue parity with India, Pakistan has sought to develop a sea-based nuclear force. To this end, it is working on the development of a submarine-launched cruise missile, the *Babur-3* (SIPRI, 2018). Therefore, Pakistan's nuclear policy remains considerably linked to India's position on the matter (Zala, 2019).

Israel: Israel is expanding the range of its ballistic missiles. It is suspected to have deployed an intermediate-range missile, the *Jericho III*, in 2011 and to have tested its ICBM version in 2013 (SIPRI, 2018). Some have also indicated that Israel may be developing nuclear-armed sea-launched cruise missiles, though this has not been confirmed (SIPRI, 2018).

³¹ India's *Agni-V*, with an approximate range of 5,000 km, technically does not fall into the category of the ICBMs (usually 5,500+ km). This missile, however, gives India the capability to strike China (Keck, 2018).

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