

Missiles, Deterrence and Arms Control: Options for a New Era in Europe

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Cover

Ukraine's President Volodymyr Zelenskyy is greeted by Lithuania's President Gitanas Nausėda, UK Prime Minister Rishi Sunak, US President Joe Biden, Italy's Prime Minister Giorgia Meloni, NATO Secretary General Jens Stoltenberg and NATO Deputy Secretary General Mircea Geoană as he arrives to attend a meeting of the NATO–Ukraine Council during the NATO Summit in Vilnius, 12 July 2023.

Executive Summary

Russia's full-scale invasion of Ukraine in 2022 has seen NATO states increase their defence expenditures. It has also prompted the Alliance to consider new strategies to deter Moscow from future aggression. These developments follow a period characterised by NATO members' arms reductions, decreased defence spending and de-emphasis of deterrence requirements amid Western countries' rapprochement with Moscow in the 1990s and early 2000s.

In 2023, regional security is being destabilised by Russia's violation of the Intermediate-Range Nuclear Forces (INF) Treaty, its disregard for the European security architecture and the Russian armed forces' extensive use of missiles and uninhabited aerial vehicles (UAVs) against Ukraine. Russia's actions are fueling a demand in Western countries for new offensive and defensive missile capabilities.

This degraded security environment imposes upon NATO allies an imperative to address their capability shortfalls and bolster the Alliance's deterrence and defence posture in response to Russia's aggression. Many European NATO members are already expanding and modernising their armed forces. However, the Alliance faces challenges in formulating a cohesive force posture. There is debate about the appropriate extent of NATO's military presence on its eastern flank, whether the United States should deploy new types of long-range ground-launched missiles in Europe, and the potential expansion of

the Alliance's nuclear-sharing arrangements to new member states.

Discussions are also taking place on improving European air and missile defence, notably through competing visions tabled by Germany and France. Berlin proposes quickly acquiring defensive capabilities to address perceived vulnerabilities, while Paris stresses prioritising Europe's industrial resources over foreign procurement. A structured conversation on missile defence will require a thorough examination of the lessons learned from the war in Ukraine, a survey of the existing and emerging missile-threat landscape, and a consideration of the right balance between the offensive and defensive capabilities that best serve Europe's deterrence requirements.

While Europe's current political and security environment is not conducive to new arms-control initiatives, there are avenues for reintroducing arms control into the European security architecture, providing certain conditions are met. One such condition is Russia's full withdrawal from Ukraine. NATO allies must conduct a sustained debate to formalise a coherent strategy that could build upon – but likely not replicate – the precedent set by NATO's 1979 Double-Track Decision. Finally, strengthening the Alliance's capabilities, including through potential deployments of intermediate-range land-based missiles to Europe, could help bring Russia to the negotiating table and should be seriously considered by all NATO allies.

Introduction

Russia's war against Ukraine marks a new era and a clear end to the post-Cold War period's inclusive pan-European security architecture, its unique arms-control framework and the so-called 'peace dividend'. This collapse had started long before Russia's 2022 invasion, however, arguably beginning in 2007 when President Vladimir Putin addressed the Munich Security Conference and admonished the United States for its alleged unipolarity. The speech was followed later that year by Russia's initial efforts to unravel the European arms-control regime through the 'suspension' of Russia's participation in the Treaty on Conventional Armed Forces in Europe (CFE Treaty), its 2008 invasion and occupation of parts of Georgia, and the gradual development and deployment of missile systems in violation of the 1987 US-Soviet Intermediate-Range Nuclear Forces (INF) Treaty.

For years, most European leaders (with the support of public opinion, especially in Western Europe) tried to preserve the architecture of the post-Cold War era and failed to recognise the radically transformed security environment, in which the region's unique

arms-control and confidence-building frameworks were being dismantled and replaced with arms racing and a heightened risk of conflict between NATO and Russia. European attitudes towards nuclear deterrence in the last decade have been described as 'eyes tight shut', as NATO member states have appeared unwilling to relearn the grammar of deterrence, renew their thinking on NATO's defence posture, examine options for improved conventional- and nuclear-deterrence capabilities (while avoiding the pitfall of a Cold War redux) and rethink the potential role of arms control.¹ While Berlin and Paris made limited and distinct attempts to open such an arms-control debate, these efforts were not seriously pursued over time and failed to convince other NATO allies.

It has taken Russia's war on Ukraine – a conventional conflict in Europe of an unprecedented scale since the Second World War, which has in two years eclipsed the bloody conflict of the decade-long Yugoslavian wars – to force a Europe-wide debate on the requirements of deterrence in a new era, develop options and reinvent the role of arms control. This debate has only just begun.

1. From Arms Control to Arms Race

The INF Treaty as a Structure of Post-Cold War European Stability

The end of the Cold War brought about a new era in Europe characterised by significantly reduced defence spending and rapprochement between NATO member states and Russia. After four decades of arms races between the Soviet Union and the US – in which Europe was often the focal point of the nuclear balance of power – the region entered an epoch marked by arms control, arms reductions, decreases in defence spending and a de-emphasis of deterrence requirements. During this time, the number of US forward-deployed nuclear weapons in Western Europe (alongside conventional capabilities) was significantly reduced.² French and British nuclear forces also shrank in number and diversity, reflecting the improved security situation. Soviet and successive Russian nuclear forces were also reduced across the board. These reductions happened alongside an ambitious regional conventional-arms-control regime, the CFE Treaty, as well as an unprecedented transparency- and confidence-building regime through, inter alia, the Vienna Document on Confidence- and Security-Building Measures and the Treaty on Open Skies. These Eurocentric regimes were also complemented by bilateral strategic-arms-reduction treaties between Russia and the US, such as the Strategic Arms Reduction Treaty (START I) and the Strategic Offensive Reductions Treaty (SORT). These agreements were further complemented by the 1991–92 Presidential Nuclear Initiatives, which significantly reduced Russia's and the United States' stockpiles of non-strategic nuclear weapons, particularly forward-deployed US and Soviet/Russian weapons in Europe, as well as certain nuclear-armed air-launched cruise missiles and nuclear missiles based on surface vessels.³

In addition to these mechanisms, the 1987 INF Treaty arguably formed the central component of European strategic stability. Per the agreement, the Soviet Union (and its successor, the Russian Federation) and the US could not possess, produce or flight-test ground-launched ballistic

and cruise missiles with ranges between 500 and 5,500 kilometres. This prohibition also applied to the development of ground-based launchers of those missiles. Existing weapons had to be destroyed, with Moscow and Washington establishing protocols for destroying the missiles and mutual inspections.⁴ By 1991, 2,692 weapons (846 US and 1,846 Soviet missiles) had been removed from various sites in Europe, verifiably decommissioned and destroyed, leading to the elimination of a whole category of nuclear and conventional weapons.⁵

After the collapse of the Soviet Union in 1991, the treaty continued to be applied to Russia, while other newly independent states beyond Russia – such as Belarus, Kazakhstan, Turkmenistan, Ukraine and Uzbekistan – continued to actively apply the treaty provisions, including its verification mechanisms.⁶ Other European states not party to the agreement also made unilateral decisions to retire missiles within the proscribed range bracket. In Western Europe, West Germany unilaterally decided to remove its US-supplied MGM-31A *Pershing* medium-range ballistic missiles (MRBMs) to the US, where they were subsequently destroyed.⁷ Similarly, France and the United Kingdom destroyed their respective INF-proscribed systems and other shorter-range

Then Soviet leader Mikhail Gorbachev and then US president Ronald Reagan sign the INF Treaty in the White House, Washington DC, 8 December 1987



(Corbis via Getty Images)

missiles despite not being signatories to the treaty. France retained a nuclear-armed surface-to-surface intermediate-range ballistic missile (IRBM) known as the S3, as well as the nuclear-armed *Hadès* short-range ballistic missile (SRBM), until it decided to unilaterally dismantle them to better align with Paris's principle of strict sufficiency in the late 1990s.⁸ The UK had retired its US-supplied MGM-52 *Lance* SRBMs by 1993.⁹ This pattern of dismantlement was repeated in other parts of Europe. In Eastern Europe, several former Warsaw Pact states, including Bulgaria, the Czech Republic and Slovakia, eliminated their Soviet-supplied 9K714 OTR-23 *Oka* (RS-SS-23 *Spider*) SRBMs (although via protracted processes in some cases).¹⁰

Because many states across Europe had dismantled their missile arsenals amidst a rapprochement between NATO and Russia, European concerns about missile possession generally subsided in the 1990s and 2000s. While the missile threat had not disappeared altogether – given the growing proliferation of missiles in other parts of the world (especially in Asia and the Middle East) and the persistence of Russia's significant number of air- and sea-launched dual-capable delivery systems that were outside of the INF Treaty's restrictions – disarmament and detente initiatives between Russia and the West obviated a direct need for NATO to prioritise Integrated Air and Missile Defence (IAMD) and Ballistic Missile Defence (BMD) policies for high-intensity-warfare scenarios. Reflecting this lack of concern, Russia was even specifically excluded from the scope of the NATO BMD policy in the 2012 NATO Chicago Summit Declaration, which stated that 'NATO missile defence is not directed against Russia and will not undermine Russia's strategic deterrence capabilities. NATO missile defence is intended to defend against potential threats emanating from outside the Euro-Atlantic area.'¹¹ However, this benign environment soon faded with US allegations that Russia was violating the INF Treaty – and the agreement's subsequent collapse.

The Collapse of the European Arms-control Order

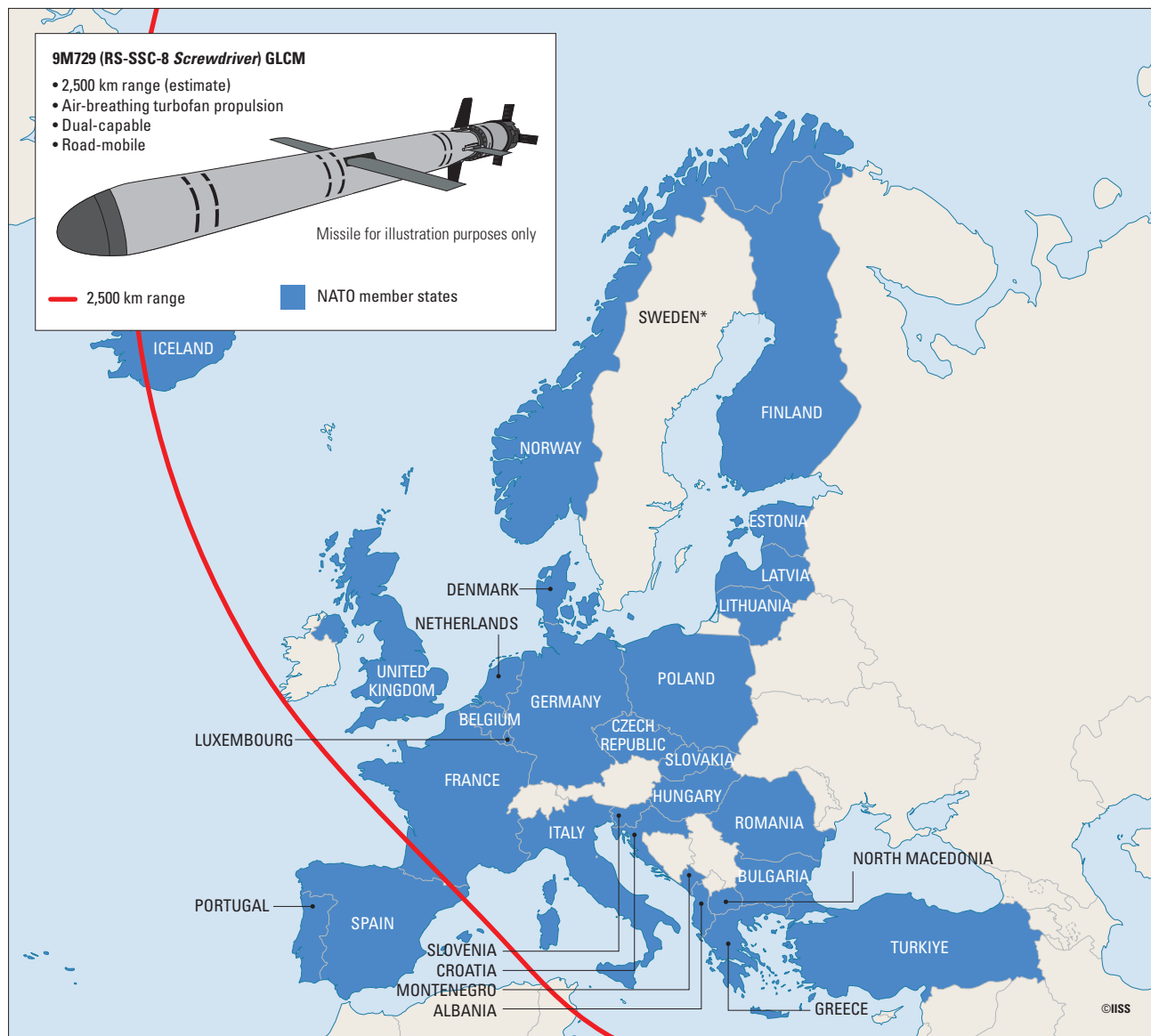
Both Russia and the US raised the possibility of withdrawing from the INF Treaty in the early 2000s. However, US officials appear to have been less invested in this idea than their Russian counterparts.¹² In a

2007 speech, Putin stated that the agreement placed unequal restrictions on Russia and the US while other countries were free to develop and deploy these systems. Other senior Russian officials, including then defence minister Sergei Ivanov, also questioned the wisdom of the treaty.¹³ Russia apparently acted on its resentment of the agreement; by May 2013, US government officials were flagging concerns to their Russian counterparts regarding Russia's suspected development and testing of a ground-launched cruise missile (GLCM) that was not compliant with the INF Treaty.¹⁴ After privately raising concerns with Russia, the US State Department publicly confirmed the alleged violation in its 2014 annual compliance report.¹⁵ The missile in question was later identified as the 9M729 (RS-SSC-8 *Screwdriver*) GLCM.¹⁶ It has an alleged range of up to 2,500 km and uses a road-mobile launcher that closely resembles the 9P78-1 transporter erector launcher (TEL) of the INF-compliant 9M728 (RS-SSC-7 *Southpaw*) GLCM and 9K720 *Iskander-M* (RS-SS-26 *Stone*) SRBM (see Map 1).¹⁷

In response to Russia's development of the 9M729, the US convened several meetings of the INF Treaty's Special Verification Commission (SVC) – the agreement's implementation body – with the support of NATO allies, but to no avail. Russia began deploying the 9M729 in 2017, prompting the US to respond with INF-Treaty-compliant research and development efforts.¹⁸ Between 2013 and 2019, the US State Department sought to engage Russian officials at multiple levels to discuss Russia's violation, through over 30 high-level engagements and six expert-level meetings, including two sessions of the SVC and four bilateral meetings of technical experts.¹⁹ The meetings provided Washington with an opportunity to share its non-compliance concerns with Moscow and urge Russia to return to full compliance. However, Russia dismissed the United States' claims, asserting that the missiles of concern were modernisations of compliant missiles.²⁰ As a result, the US announced that it intended to withdraw from the treaty in February 2019, citing Russia's violation.²¹

Prior to Washington's formal withdrawal, however, Moscow attempted to obfuscate the debate and potentially forestall US actions through a controlled public display of what the Russian defence ministry claimed

Map 1: **Characteristics and range of the 9M729 (RS-SSC-8 *Screwdriver*) GLCM**



*Membership subject to ratification.

Source: US Air Force National Air and Space Intelligence Center (NASIC)

to be the 9M729 missile canister and TEL.²² During this exhibition, Russian defence officials argued that the 9M729 was a modernisation of the existing 9M728 GLCM and featured a larger warhead and an improved guidance package that increased the missile's length (and the length of the associated TEL) but not the system's range.²³ This explanation proved unconvincing, given US intelligence findings, the limited nature of Russia's transparency effort and Moscow's failure to allow a proper verification inspection through the SVC.

The 9M729's deployment in 2017 and the ensuing collapse of the INF Treaty in 2019 marked the end of

an era. Shortly after the GLCM's deployment, Putin announced in 2018 the development of a series of new missiles and delivery vehicles in his annual Presidential Address to the Federal Assembly, demonstrating Russia's resolve to develop new types of novel strategic systems and long-range dual-capable weaponry. In his speech, Putin unveiled several systems that had been designed to evade and penetrate US missile defences, including the *Burevestnik* (RS-SSC-X-9 *Skyfall*), a ground-launched, nuclear-powered and nuclear-armed cruise missile; *Poseidon* (*Kanyon*), a nuclear-powered and nuclear-armed uninhabited underwater vehicle; *Sarmat* (RS-SS-X-29), a silo-based three-stage

Russian officials hold a press briefing on the 9M729's alleged capabilities, Moscow, 23 January 2019



(Vasily Maximov/AFP via Getty Images)

liquid-fuel intercontinental ballistic missile (ICBM) to replace Russia's RS-20 (RS-SS-18 *Satan*) ICBM; *Avangard* (RS-SS-19 *Stiletto* Mod 4), a nuclear-armed hypersonic boost-glide vehicle (HGV); *Kinzhal* (RS-AS-24 *Killjoy*), a dual-capable air-launched ballistic missile (ALBM); and the 3M22 *Tsirkon* sea- and potentially ground-launched dual-capable missile (RS-SS-N-X-33).²⁴ These systems, some of which fall under the 2010 New Strategic Arms Reduction Treaty (New START), are unlikely to shift fundamentally the US–Russia strategic nuclear balance as Moscow will likely deploy them only in small numbers. Furthermore, the Russian Strategic Rocket Forces (RVSN) already fulfils its purpose of providing Moscow

with a strategic deterrent and a credible second-strike capability, despite the publicly stated Russian concerns over the development of US ballistic-missile defences since its 2002 withdrawal from the 1972 Anti-Ballistic Missile Treaty (ABM Treaty).

Nevertheless, Russia's investment in new types of capabilities and the RVSN's modernisation – alongside missile developments in other parts of the world, notably in Asia and the Middle East – is arguably partly responsible for creating a new arms race in Europe. Western states have reacted to Russia's advancements by developing and procuring precision-strike systems and enhanced missile-defence capabilities.

2. Deterrence in a New Era

Addressing the Lessons of Russian Missile and Nuclear Modernisation

Russia's 2022 invasion of Ukraine and its purposeful undermining of Europe's security architecture suggest a need to reinvestigate the nature and depth of Russia's conventional- and nuclear-missile modernisation programmes. At first glance, these upgrades could be read as part of the expected modernisation cycle of Russia's strategic arsenal following decades of dependence on equipment mostly developed in the Soviet era. However, these technological developments are of greater significance, and some key elements need highlighting. Firstly, Russia's substantial investment in new types of missile technologies points towards Moscow's growing reliance on its missile and nuclear forces in place of its conventional capabilities. Russia has identified missile and nuclear capabilities as one of its few relative advantages vis-à-vis the US and NATO.²⁵ Alliance members' concerns over what some in the West characterise as Russia's so-called anti-access/area-denial (A2/AD) capabilities – provided through its possession of numerous types of surface-to-air missiles (SAMs) and anti-ship missiles – demonstrate the utility of this strategy for Moscow, in terms of the potential to create dilemmas for NATO's reinforcement strategy by contesting the air and sea domains.²⁶ Secondly, Russia's investment in advanced and difficult-to-counter capabilities, including HGVs, ALBMs and aero-ballistic missiles, is similarly intended to gain an edge over Western states that have historically underinvested in air and missile defences to counter these threats and have, for the most part, forgone the development of analogous systems.²⁷

Lessons from Ukraine

Linked to Russia's missile and nuclear modernisation – and Moscow's increasing reliance on these capabilities to deter and coerce its adversaries – the invasion of Ukraine is being waged under a nuclear shadow. Russian officials have used nuclear signalling as an integral part of their efforts to deter the West from directly

engaging in the conflict and to coerce Western governments from providing greater military support to Kyiv. A recent study by the German Institute for International and Security Affairs (SWP) surveyed 204 Russian government statements that feature examples of this nuclear rhetoric, highlighting the unmistakable nuclear dimension of the crisis and calling attention to the unprecedented use of such language since the Cold War.²⁸

To support its deterrence and coercive messaging, Russia has used various types of missiles in the war in Ukraine alongside large numbers of uninhabited aerial vehicles (UAVs) and direct-attack munitions. Contrary to wars waged by the West since the 1990s – and despite Russia's overwhelming advantage in the air domain – Moscow has been unable to establish clear air superiority over Ukraine, let alone air dominance.²⁹ In this context, Russia has used long-range missiles and UAVs to deliver effects often provided by air-to-ground capabilities. One takeaway from the conflict is that Russia has used the war as an opportunity to test many of its missile capabilities, even when the tactical or strategic reasons for doing so are marginal. This opportunism is partly to be expected, given that the Russian military

Fragments of an Iranian-designed *Shahed* 136 UAV (named 'Geran 2' in Russian service) displayed in Kyiv, 23 August 2023



(Aleksandr Gusev/SOPA Images/LightRocket via Getty Images)

similarly used its involvement in other external conflicts to test new missile technologies and demonstrate its ability to use these capabilities (for example, its arguably unnecessary launch of sea-launched cruise missiles from the Caspian Sea during Russia's 2015 intervention

in Syria).³⁰ The extensive use of UAVS – for targeting and as weapons-delivery platforms – continues a notable trend in war fighting. Together, these developments have contributed to renewed interest in counter-air and missile-defence capabilities of all ranges.

3. Developing New Options for NATO Deterrence and Defence

The apparent takeaways from Russia's 2022 invasion of Ukraine and NATO's deteriorating relationship with Russia have created a radically transformed security environment for the Alliance. Consequently, NATO will need to rethink its deterrence and defence requirements across all domains, ranging from its conventional and nuclear capabilities to its IAMD. This new environment imposes upon NATO allies an imperative to address capability shortfalls. They must also develop credible plans and capabilities that will bolster NATO's deterrence and defence posture – with the ultimate aim of preserving peace in Europe and preventing further escalation risks in the long term.





















Conventional Capabilities

In response to Russia's war against Ukraine and in recognition of the increased risk of a major conflict involving Alliance forces in Europe, NATO allies are investing in the largest modernisation and expansion of European war-fighting capabilities since the end of the Cold War. The militaries of many European states were hollowed out in the post-Cold War era and, in some cases, are equipped with limited and ageing equipment stockpiles.³¹ NATO's 2022 Strategic Concept envisages pursuing multiple tasks simultaneously, with particular emphasis on improving the readiness of NATO forces in Europe – through regular joint training and multinational exercises – and rebuilding the Alliance's ability to fight a high-intensity conflict in Europe against Russia following decades of focus on expeditionary warfare.³² Member states are also rebuilding stockpiles of ammunition and spare parts, reinvesting in logistics and rethinking their defence-industrial requirements and strategies, among other tasks. As the use of major land forces (including heavy armoured formations) in Ukraine demonstrates, regenerating mass is an important task for the Alliance, especially as many European NATO allies lack depth in multiple equipment categories, such as artillery, armour, air and missile defences, and

surface-to-surface missiles.³³ European NATO allies must also learn some of the technological lessons of the war in Ukraine – especially the value of disruptive capabilities, such as uninhabited systems and resilient communication systems – and invest accordingly.

NATO member states' existing conventional precision-strike capabilities also play an important role in this context (see Table 1). The ability to hold high-value targets at risk was identified as a critical capability by NATO even before Russia invaded Ukraine, as it provides operators with useful offensive options to counter the development of analogue Russian capabilities, such as the *Iskander-M* SRBM, and offset some of Russia's long-range-fire advantages. NATO's existing precision-strike capabilities will be complemented in the future by additional operators and the introduction of more capable systems. Multiple member states on the eastern flank, such as Estonia, Latvia and Lithuania, plan to introduce stand-off weaponry capabilities (via the M57 Army Tactical Missile System – ATACMS) that will allow them to hold high-value targets at risk over long ranges. Other countries have expressed interest in acquiring longer-range systems (see Table 2). Poland discussed acquiring the UGM-109 *Tomahawk* land-attack cruise missile (LACM) as early as 2015 for its future *Orka* submarine programme and has stated more recently that it wishes to acquire systems capable of conducting strikes deep inside hostile territory.³⁴ Similarly, the Dutch navy intends to arm the replacement for its *Walrus*-class conventionally powered attack submarine with a deep-strike capability – likely in the form of the *Tomahawk* LACM.³⁵ These developments are significant: previously, only France, the UK and the US possessed sea-launched cruise missiles with ranges greater than 1,000 km.³⁶

Some European countries are also investing heavily in very-high-speed missile technologies for deterrence. In June 2023, France tested an experimental HGV, the *Véhicule Manœuvrant Expérimental* (V-MaX), which may be used for conventional missions.³⁷ The UK is also

Table 1: Selected NATO members' long-range conventional precision-strike capabilities						
Country	Equipment	Classification	Range (kilometres)	Warhead (kilograms)	Platform	Initial operating capability
 Finland	AGM-158A Joint Air-to-Surface Standoff Missile (JASSM)	LACM	370	454	F/A-18C/D Hornet FGA	2011
 France	SCALP EG	LACM	500 (estimate)	450	Mirage 2000D, Rafale FGA	2004
 France	Missile de Croisière Naval (MdCN)	LACM	1,000+	c. 300	Aquitaine-class FREMM frigate; Suffren-class SSN	2008
 Germany	KEPD-350 Taurus	LACM	500+	481	Tornado IDS; Eurofighter FGA	2006
 Greece	SCALP EG	LACM	500 (estimate)	450	Mirage 2000-5 FGA	2007
 Greece	MGM-140A Army Tactical Missile System (ATACMS)	SRBM	165	560 (APAM bomblets)	M270 MLRS	1996
 Italy	Storm Shadow	LACM	500 (estimate)	450	Tornado IDS; Typhoon FGA	2007
 Poland	AGM-158A JASSM	LACM	370	454	F-16 FGA	2017
 Romania	MGM-168 ATACMS	SRBM	300	227	M142 HIMARS MLRS	2022
 Spain	KEPD-350 Taurus	LACM	500+	481	F/A-18A Hornet FGA	2008
 Türkiye	Bora	SRBM	280+	470	MBRL	c. 2019
 Türkiye	J-600T Yildirim	SRBM	150–300	Unknown	F-600T TEL	From 2007
 Türkiye	MGM-140A ATACMS	SRBM	165	560 (APAM bomblets)	M270 MLRS	1996
 UK	Storm Shadow	LACM	500 (estimate)	450	Typhoon FGA	2002
 UK	UGM-109 Tomahawk	LACM	1,600	454	Trafalgar-class, Astute-class SSN	1998
 US	AGM-158A JASSM	LACM	370	454	B-1B Lancer, B-2A Spirit, B-52H Stratofortress bomber; F-16C/D Fighting Falcon, F-15E Strike Eagle, F-35A Lightning II FGA	2005
 US	AGM-158B JASSM-ER (JASSM-Extended Range)	LACM	930	454		2014
 US	AGM-86C/D	LACM	1,100	544–907	B-52H Stratofortress bomber	1991
 US	MGM-140A/B, MGM-168 ATACMS	SRBM	165–300	162–560	M270/M270A1/ M270A2/M142 HIMARS MLRS	From 1990
 US	U/RGM-109 Tomahawk	LACM	1,600	454	Ohio-class SSGN; Los Angeles-class Flight I/II/III, Virginia-class Flight II/III, Sea Wolf-class SSN; Ticonderoga-class, Zumwalt-class CGHM; Arleigh Burke Flight I/II-class DDGM; Arleigh Burke-class Flight IIA DDGDM	1984





























APAM anti-personnel and anti-materiel; CGHM cruiser with surface-to-surface missile, hangar, and surface-to-air missile; DDGDM destroyer with surface-to-surface missile, hangar, and surface-to-air missile; DDGM destroyer with surface-to-surface missile and surface-to-air missile; FGA fighter ground attack; FREMM Frigate Européenne Multi-Mission (European multi-purpose frigate); HIMARS High Mobility Artillery Rocket System; IDS interdictor/strike; LACM land-attack cruise missile; MBRL multi-barrel rocket launcher; MLRS Multiple Launch Rocket System; SRBM short-range ballistic missile; SSGN nuclear-powered submarine with dedicated launch tubes for guided missiles; SSN nuclear-powered general-purpose attack submarine; TEL transporter erector launcher.

Source: IISS, *The Military Balance* 2023

determined to acquire very-high-speed technologies; London's Hypersonic Technologies and Capability Development Framework lays out a GBP1 billion (USD1.26bn) framework for the UK to acquire HGV and hypersonic-cruise-missile technology.³⁸

Connecting existing and future stand-off weaponry to intelligence, surveillance and reconnaissance (ISR) capabilities is another area identified by NATO as requiring further improvement – especially as the Alliance's posture relies on its ability to detect a potential strike in a timely manner and promptly retaliate against attacking forces. As most of NATO's ISR capabilities are of US origin, it has been suggested that European NATO members could do more, either nationally or in coordination, to bolster regional ISR capabilities.³⁹

Although NATO allies appear to agree that they need to modernise their conventional capabilities, there is less consensus on how these forces should be postured. One of the most divisive debates among member states concerns the appropriate level of forces to deploy on the Alliance's eastern flank and the similarities and differences between the present security environment and that of the Cold War. NATO's posture – in the form of Enhanced Forward Presence battle groups – has been strengthened and expanded with the adoption of the 2022 Strategic Concept and three new regional plans that replace the Graduated Response Plans. However, this effort remains limited in volume because the Alliance continues to prioritise its ability to reinforce at the speed of relevance (through its most important

Table 2: Selected NATO members' air-, ground- and sea-launched long-range conventional precision-strike capability plans*						
Country	Equipment	Classification	Range (kilometres)	Warhead (kilograms)	Possible platform**	Planned initial operating capability
 Estonia	M57 Army Tactical Missile System (ATACMS)	SRBM	300	225	M142 HIMARS MLRS	From 2024
 France	<i>Véhicule Manœuvrant Expérimental (V-MaX)***</i>	HGV	Unknown	Unknown	Unknown	Unknown
 France	Future Cruise/Anti-Ship Weapon (FC/ASW)	LACM/AshM	500+	Unknown	Possibly: <i>Aquitaine</i> -class, <i>Forbin</i> -class DDGHM; <i>Aquitaine</i> -class, <i>La Fayette</i> -class FFGHM; <i>Suffren</i> -class SSN; <i>Rafale</i> FGA	Mid 2030s
 Germany	AGM-158B Joint Air-to-Surface Standoff Missile-Extended Range (JASSM-ER)	LACM	1,000	450	F-35 <i>Lightning</i> II FGA	Late 2020s
 Germany	Joint Fire Support Missile (JFS-M)	GLCM	499	Less than 200	M270 MLRS	2030
 Italy	FC/ASW	LACM/AshM	500+	Unknown	Eurofighter <i>Typhoon</i> , F-35 <i>Lightning</i> II, Global Combat Air Programme (GCAP) FGA	Early 2030s
 Latvia	M57 ATACMS	SRBM	300	225	M142 HIMARS MLRS	From 2024
 Lithuania	M57 ATACMS	SRBM	300	225	M142 HIMARS MLRS	From 2024
 Netherlands	R/UGM-109 <i>Tomahawk</i> Block V (unknown sub-variant)	LACM	1,600	450	<i>De Zeven Provinciën</i> -class and Future Air Defender DDGHM; <i>Walrus</i> -class and next-generation SSK	Late 2020s
 Netherlands	AGM-158B JASSM-ER	LACM	1,000	450	F-35 <i>Lightning</i> II FGA	2027
 Norway	Joint Strike Missile (JSM)	LACM/AshM	275+	120	F-35 <i>Lightning</i> II, F-16 <i>Fighting Falcon</i> FGA	2025
 Poland	M57 ATACMS	SRBM	300	225	M142 HIMARS MLRS	From 2023
 Poland	UGM-109 <i>Tomahawk</i> Block V (unknown sub-variant)	LACM	1,600	450	<i>Orka</i> -class SSK	Unknown
 Türkiye	<i>Cenk</i>	MRBM	1,000+	Unknown	Unknown TEL	Unknown
 Türkiye	<i>Gezgin</i>	LACM	600+	c. 200+	New sub-surface platform	Late 2020s
 Türkiye	Stand-Off Missile (SOM)-A/B1/B2	LACM	250+	230	F-4E <i>Phantom</i> 2020, F-16 <i>Fighting Falcon</i> C/D FGA	Unknown
 Türkiye	<i>Tayfun</i>	SRBM	500+	Unknown	Unknown TEL	Unknown
 UK	Precision Strike Missile (PrSM), Block I	SRBM	499	Unknown	M270A2 MLRS	From 2024
 UK	FC/ASW	LACM/AshM	Unknown	Unknown	Eurofighter <i>Typhoon</i> , F-35 <i>Lightning</i> II FGA	From 2028 (AshM) Unknown (LACM)
 UK	Hypersonic Attack Cruise Missile (HACM)	HCM	1,000	Unknown	Likely F-35 <i>Lightning</i> II FGA	From 2027
 US	AGM-158B-2/B-3/D JASSM-ER	LACM	c. 1,000	c. 450	B-1B <i>Lancer</i> , B-2A <i>Spirit</i> , B-52H <i>Stratofortress</i> , B-21 <i>Raider</i> bomber; F-16C/D <i>Fighting Falcon</i> , F-15E <i>Strike Eagle</i> , F-15 EX <i>Eagle</i> II, F-35A <i>Lightning</i> II FGA	From 2024
 US	Conventional Prompt Strike (CPS)	HGV	2,775+	Unknown	<i>Virginia</i> -Class SSGN; <i>Zumwalt</i> -class CGHM	2028
 US	HACM	LACM	1,000	Unknown	Likely F-35 <i>Lightning</i> II FGA	From 2027
 US	Long Range Hypersonic Weapons (LRHW)	HGV	2,775+	Unknown	M983A4/M870 tractor/trailer	2023
 US	PrSM Increment I	SRBM	499	Unknown	M270A2 MLRS; M142 HIMARS MLRS	From 2024
 US	PrSM Increment IV	SRBM/MRBM	c. 1,000	Unknown	M270A2 MLRS; M142 HIMARS MLRS	Unknown
 US	RGM/UGM-109 E <i>Tomahawk</i> Block V	GLCM	1,600	454	M983A4 MEL	2023
 US	Standard-Missile 6	SSM	250+	50+	M983A4 MEL	2023

AshM anti-ship missile; CGHM cruiser with surface-to-surface missile, hanger; DDGHM destroyer with surface-to-surface missile, hanger, SAM; FGA fighter, ground attack; FFGHM frigate with surface-to-surface missile, hanger, SAM; GLCM ground-launched cruise missile; HCM hypersonic cruise missile; HGV hypersonic glide vehicle; HIMARS High Mobility Artillery Rocket System; LACM land-attack cruise missile; MEL mobile erector launcher; MLRS Multiple Launch Rocket System; MRBM medium-range ballistic missile; SRBM short-range ballistic missile; SSGN nuclear-powered submarine with dedicated launch tubes for guided missiles; SSK conventionally-powered attack submarine; TEL transporter erector launcher.

*Plans refers to systems under development, orders that have been placed with domestic and foreign suppliers, and expressions of interest.

**Based on current and under-development platforms.

***Unknown if warhead will be nuclear or conventional.

Source: Compiled by IISS from multiple sources

planning effort in decades, and a renewed focus on readiness).⁴⁰ While some NATO allies – particularly frontline states on NATO's eastern flank – argue that a robust, quasi-Cold War posture is necessary to prevent Russia from exploiting weak spots, other states argue that the personnel and equipment losses Russia has suffered in Ukraine (and the resultant erosion of Moscow's conventional capabilities) remove this requirement. Instead, these states advocate improving NATO's ability to rapidly reinforce a limited forward presence in Eastern Europe in the event of a crisis. It would, however, be misleading to compare NATO's future posture with its posture during the Cold War; the Alliance recognises that Russia today does not compare to the Soviet Union or the Warsaw Pact, even before taking into account its substantial losses in Ukraine.

Other Relevant Missile Developments in NATO

Alongside potential improvements to its conventional and nuclear capabilities, it remains possible that the Alliance will agree to deploy formerly non-INF-Treaty-compliant missiles to Europe in order to provide NATO with systems analogous to those Russia has developed and deployed within the last decade.

Since the US withdrew from the INF Treaty in 2019, Washington has been developing a conventionally armed ground-launched version of the RGM-109 *Tomahawk* LACM. It plans to deliver the missile to the US Army and Marine Corps by 2023 and 2030, respectively.⁴¹ The US Army is also developing a conventionally armed ground-launched HGV with a range in excess of 2,775 km, known as the Long-Range Hypersonic Weapon (LRHW).⁴² Washington is yet to announce whether either system will be deployed outside of the US – and any such deployment would require an agreement with the host state. Currently, there are no indications that the ground-launched *Tomahawk* or the LRHW will be fielded in Europe as they seem to be designed primarily for the Indo-Pacific theatre. Nonetheless, the development of these capabilities provides NATO with a latent option, if deployed, that could potentially complement the Alliance's existing and under-development sea- and air-launched precision-strike capabilities.

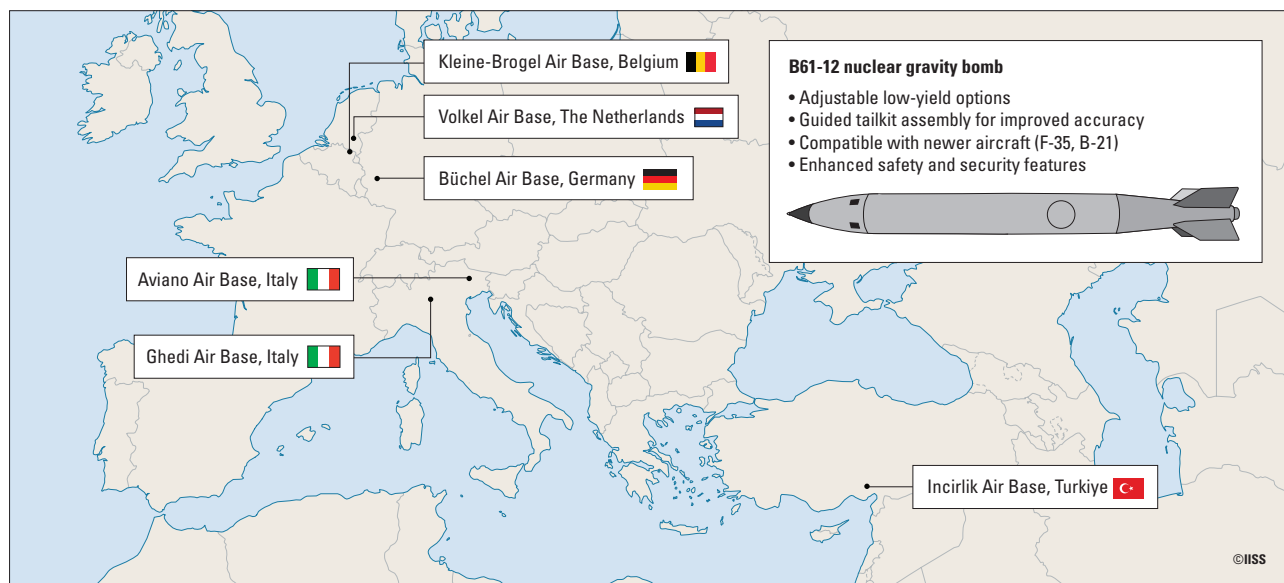
Together, these developments suggest an evolving missile landscape in NATO in terms of capabilities and military thought. Although so far the Alliance has not engaged in an arms race with Russia, multiple member states are now adding new capabilities to their armed forces. They are also not ruling out procuring longer-range systems previously deemed unnecessary while the INF Treaty was in place. These deliberations have not yet morphed into a discussion about whether NATO (and the US in particular) should develop and deploy new types of nuclear-armed systems to Europe, as many member states continue to assess that the Alliance's current posture sufficiently deters Russia and that a new 'Double-Track'-style debate might prove divisive. To date, NATO's approach is instead focused on strengthening asymmetrical and multilayered responses – in combination with preserving its nuclear deterrent – and developing more capable conventional forces, including by acquiring long-range precision-strike capabilities and expanding significantly its air- and missile-defence capabilities.

Nuclear Forces: Time to Revise NATO's Nuclear Posture?

Alongside conventional forces, nuclear weapons are a core component of NATO's capabilities to deter external aggression. Compared to the sharp reductions in NATO's nuclear force structure beginning in the 1990s, the Alliance's nuclear posture has only marginally evolved. However, Russia's invasion of Ukraine has acted as a catalyst for some member states to advocate for changes to the Alliance's nuclear-sharing arrangement and opened a debate about whether its current and planned posture is sufficient to credibly deter Russia.⁴³

NATO is firmly committed to maintaining a credible and effective deterrent. Following years of benign neglect, it has renewed emphasis on improving the readiness and training of its designated dual-capable aircraft (DCA) assigned to nuclear-weapons delivery.⁴⁴ NATO has also made its annual nuclear-deterrence exercises – known as *Steadfast Noon* – public again and is working to improve the readiness and resilience of its nuclear posture through improved training and exercising.

Map 2: Capabilities and deployment locations of the B61 nuclear gravity bomb



Source: National Nuclear Security Administration, US Department of Energy

The core element of NATO's nuclear structure remains the forward deployment of a limited number of B61 gravity bombs. Around 100 B61 bombs are reported to be deployed across six air bases in Belgium, Germany, Italy, the Netherlands and Türkiye (see Map 2).⁴⁵ The B61 is undergoing a life-extension programme to enhance its safety, security and effectiveness, the most notable improvement being the incorporation of a tailkit assembly that improves the bomb's accuracy.⁴⁶ The new B61-12 gravity bomb will consolidate and replace three variants of the B61 currently in service. It will be integrated onto certain US aircraft and certified European DCA from the Belgian, Dutch, German, Italian and Turkish air forces. The combination of the

B61 weapon upgrade and the progressive deployment of the F-35 *Lightning II* DCA in the aforementioned air forces (excluding Türkiye's) will significantly improve NATO's nuclear posture, which has become increasingly reliant on an ageing DCA fleet, resulting in low readiness levels and poor operational credibility.⁴⁷

The strategic forces of France, the UK and the US provide another critical element of NATO's nuclear posture. Although these countries operate different nuclear force structures, all three have embarked on ambitious modernisation programmes to upgrade their respective nuclear-weapons-delivery vehicles, nuclear warheads and associated launch platforms. However, these modernisation cycles will require committing to major

Germany will replace its ageing *Tornado* aircraft (right) with the F-35 *Lightning II* (left) as its designated dual-capable aircraft assigned to nuclear-weapons delivery



(Michele Tantussi via Getty Images)

investments over the next decades and conclude after the bulk of Russia and China's modernisation cycles.

Despite the developments in Russia's nuclear posture – including Moscow's announcements that it will deploy gravity bombs and nuclear-armed SRBMs to Belarus – NATO has so far resisted suggestions that it adapt its nuclear force posture and structure, including suggestions by some allies that it reconsider the types and numbers of weapons assigned to Europe or which states operate DCA and participate in the nuclear mission.⁴⁸ Some of the most vocal suggestions to alter the current nuclear-sharing arrangement have come from the Alliance's eastern flank, and from Poland in particular, whose leadership has repeatedly stated an interest in joining the DCA mission.⁴⁹ Poland already actively participates in the Alliance's Nuclear Planning Group and its Support of Nuclear Operations with Conventional Air Tactics (SNOWCAT) mission and will host an important *Aegis Ashore* BMD site. Neither the US nor NATO has reacted positively to Warsaw's overtures for expanded DCA membership – both prefer the status quo when it comes to nuclear roles within the Alliance. Nevertheless, Poland's repeated messages – and the complex US–Turkiye relationship regarding nuclear sharing – suggest that the delicate balance of the nuclear-sharing arrangements within NATO will continue to be debated and potentially adjusted.

A massive transformation of NATO's nuclear posture is unlikely at present as the Alliance has chosen to condemn rather than reciprocate Russia's nuclear rhetoric.⁵⁰ Putting aside the financial and political costs of

Polish F-16 fighter jets take part in NATO's *Air Shielding* exercise near Lask in central Poland, 12 October 2022



(Radoslaw Jozwiak/AFP Via Getty Images)

expanding the number of DCA-operating countries or forward deploying of new US ground-based nuclear missiles in Europe, there is no consensus within the Alliance to fundamentally alter its nuclear posture. It would probably take further significant downgrading of the security environment to open a broader debate on nuclear-sharing arrangements or the United States' forward-deployment policy in Europe. In the short term, while Poland is the only country to state its readiness to be more engaged in the nuclear mission, other NATO members, such as Romania, may also express an interest. Short of actively participating in the DCA mission or hosting nuclear-weapons facilities, members could play a more active supporting role in the Alliance's nuclear-burden-sharing arrangements, including through greater participation in the SNOWCAT programme, in which allied aircraft escort dual-capable aircraft.

4. The New Missile-defence Debate

Against the backdrop of the extensive use of missiles and UAVs in the war in Ukraine, European states are engaged in a renewed debate about air and missile defence – at the strategic level and in terms of capability – and how best to address the relative capability gap with Russia. Acquiring greater numbers of (and more capable) air- and missile-defence systems has become an increasingly important goal of European NATO members, not only because of Russia's aggression against Ukraine but also because many Western states have not substantially invested in air- and missile-defence capabilities for two decades. During Western military operations within this time frame, Western air forces have typically managed to achieve air superiority within a short time, either because their adversaries lacked substantial air power or possessed very limited SAM capabilities. Consequently, missile defence was not considered to be priority and was mostly neglected by many European states (although debates continued within Washington – with occasional echoes in NATO – in response to advances in Iran's or North Korea's ballistic-missile capabilities).

Competing French and German Missile-defence Visions

Russia has used its inventory of modern precision-strike capabilities and older legacy equipment to target Ukrainian military forces and infrastructure as well as urban areas and other civilian critical national infrastructure. The Russian armed forces have also made extensive use of Iranian-supplied UAVs – particularly direct-attack munitions – in an attempt to overwhelm or exhaust Ukrainian air and missile defences (and to substitute for Moscow's depleted munition stockpiles). Developments in Russia's missile campaign have resulted in both sides adapting their tactics to better counter and overcome threats. For instance, Ukraine's armed forces have relied on their existing air-defence arsenal alongside equipment donated by the West, while Russia has modified LACMs to act as decoys.⁵¹

French President Emmanuel Macron delivers closing remarks during the conference on European air and missile defence on the sidelines of the Paris Air Show, 19 June 2023



(Stephanie Lecocq/POOL/AFP Via Getty Images)

Ukraine's skilful use of missile defences has achieved remarkable results – even against modern Russian missiles – reinforcing Europe's interest in acquiring such capabilities and leading NATO members to table multiple initiatives.

In an August 2022 speech, German Chancellor Olaf Scholz launched what was to become the European Sky Shield Initiative (ESSI), a project aimed at aggregating demand around Germany to strengthen Europe's air defence.⁵² French President Emmanuel Macron offered a competing vision in February 2023, inviting Europeans to think about the strategic implications of future procurements and collectively reflect on Europe's priorities, means and potential responses in light of the rapidly changing security environment.⁵³ Macron's speech implicitly criticised ESSI for relying too heavily on non-European suppliers, as Germany's proposed framework would include significant equipment procurements from Israel and the US. At a subsequent speech on the margins of the Paris Air Show in June 2023, Macron reiterated his view that European NATO members should use their industrial resources to develop Europe's air defence.⁵⁴ The high-level engagement at the airshow (with more than 20 European ministers attending, together with NATO and European Union leaders) and the willingness of many key

European NATO members to participate (including Germany, Italy and the UK) demonstrated the interest in a strategic dialogue around air and missile defence. Several countries that have offered to host follow-up events may further pursue this effort.

























Given the tension between Berlin and Paris over how to address air and missile defence, NATO will need to

decide what insights to draw from the ongoing debate focused on the strategic level, to inform its efforts to identify capability priorities at the beginning of the next modernisation cycle. The Alliance and the EU could explore a number of avenues, including the lessons learned from the conflict in Ukraine, to shed light on their internal debates on these issues and help identify procurement initiatives that justify European investment. This approach would require a much deeper debate than that resulting from the current series of uncoordinated initiatives.

In the post-INF Treaty context, and drawing on lessons from the conflict in Ukraine, NATO has set increasingly demanding capability targets for member states to reconstitute their ageing and sometimes obsolete air defences within the framework of collective defence planning (see Table 3). This effort accompanies additional calls to modernise other related capabilities – by improving the integration and interoperability of Air Command and Control (AirC2), including through the entry into service and further modernisation of the long-awaited NATO Air Command and Control System (ACCS); enhancing the Alliance’s ISR capabilities; and upgrading member states’ fighter aircraft and supporting air platforms to better defend NATO’s collective airspace. While these are welcome developments, they have mostly been initiated without sufficient consideration of several essential strategic debates.

First and foremost, NATO needs to consider the balance it wants to strike between reinforcing defensive capabilities and reinforcing offensive capabilities, including those contributing to its nuclear deterrent. This long-standing debate between the sword and the shield dates back to the 1960s and the deployment of the first nuclear-tipped anti-ballistic interceptors. It is about identifying the right balance between a defence that will never be watertight and the need to remind both potential adversaries and allies that deterrence makes an essential contribution to countering the missile threat and preventing nuclear escalation. This articulation, which assumes a form of accepted vulnerability, needs to be reconsidered in a new context. Within NATO, the debate is beginning to address the question of the optimal threshold to have a sufficient military effect to reduce an adversary’s advantage without engaging in a

Table 3: European NATO members’ land-based medium- and long-range surface-to-air missile (SAM) systems

Country	Equipment	Classification	Inventory
 Bulgaria	S-300 (SA-10 <i>Grumble</i>)	Long-Range Self-Propelled SAM system	Unknown
 Bulgaria	S-200 (SA-5 <i>Gammon</i>)	Long-range static SAM system	12
 Czech Republic	2K12 Kub (SA-6 <i>Gainful</i>)	Medium-range self-propelled SAM system	Unknown
 France	SAMP/T	Long-range SAM system	40
 Germany	M902 <i>Patriot</i> PAC-3	Long-range towed SAM system	30
 Greece	M901 <i>Patriot</i> PAC-2	Long-range towed SAM system	36
 Greece	S-300 PMU-1 (SA-10C <i>Grumble</i>)	Long-range towed SAM system	12
 Greece	MIM-23B I-HAWK	Medium-range towed SAM system	42
 Italy	SAMP/T	Long-range towed SAM system	20
 Lithuania	NASAMS III	Medium-range towed SAM system	6
 Netherlands	M902 <i>Patriot</i> PAC-3	Long-range towed SAM system	18
 Netherlands	M902 <i>Patriot</i> PAC-3	Long-range towed SAM system	6
 Norway	NASAMS III	Medium-range SAM system	Unknown
 Norway	NASAMS III	Medium-range towed SAM system	Unknown
 Poland	S-200C Vega (SA-5 <i>Gammon</i>)	Long-range static SAM system	1
 Poland	M903 <i>Patriot</i> PAC-3 MSE	Long-range towed SAM system	Unknown
 Romania	M903 <i>Patriot</i> PAC-3 MSE	Long-range towed SAM system	8
 Romania	MIM-23 HAWK PIP III	Medium-range towed SAM system	8
 Romania	S-75M3 Volkhov (SA-2 <i>Guideline</i>)	Medium-range towed SAM system	5
 Spain	M901 <i>Patriot</i> PAC-2	Long-range towed SAM system	18
 Spain	MIM-23B I-HAWK Phase III	Medium-range towed SAM system	40
 Türkiye	S-400 (SA-21 <i>Growler</i>)	Long-range self-propelled SAM system	32
 Türkiye	MIM-14 <i>Nike Hercules</i>	Long-range static SAM system	Unknown
 Türkiye	MIM-23 HAWK	Medium-range towed SAM system	Unknown

Source: IISS, *The Military Balance 2023*

costly arms race that only offers the illusion of a protection that will never be absolute. At this stage, this debate remains counterintuitive for most NATO allies.

Further debate is required on the balance between the different means contributing to the IAMD mission. The focus on surface-to-air interceptors leads to an emphasis on active defences alone, neglecting the essential roles of passive defences (target hardening, detection and warning systems), ISR capabilities, and deep-strike capabilities aimed at destroying adversary capabilities in the event of a conflict. Once again, the balance point has not yet been identified and deserves a genuine strategic and military debate.

NATO members must also re-examine the highly political debate that has surrounded the Alliance's efforts to define the air and missile threat. The compromise reached at NATO's 2012 Chicago Summit, which distinguishes between two separate missions, remains the agreed language within the Alliance. NATO BMD has an architecture focused on countering ballistic threats from outside the Euro-Atlantic space (particularly from Iran) – it is expressly not directed against Russia's missile capabilities.⁵⁵ Conversely, NATO IAMD is aimed at protecting European airspace via a 360° approach and takes into account all air and missile threats, including those posed by Russia.⁵⁶ Politically more challenging to explain today, the subtle distinction between the two missions was also an attempt by NATO to signal its commitment to Moscow not to undermine Russia's strategic deterrent. However, despite multiple reassurances from NATO, it has failed to convince Moscow of the non-threatening nature of the Alliance's BMD architecture. Further internal clarification from the Alliance on this politically sensitive point among allies should be expected in the coming years – perhaps as early as the 2024 NATO Washington DC Summit.

Finally, absorbing the lessons learned from the war in Ukraine – which has demonstrated the importance of air defences, early warning and command-and-control (C2) systems – will be an essential step towards improving the integration of NATO's defensive capabilities. The increase in computing power, enabling more effective missile-trajectory calculations, and the potential breakthroughs offered by artificial intelligence suggest that considerable progress can be made in intercepting

The MIM-104 Patriot (centre) and Arrow 3 (right) missile defences are central to Germany's European Sky Shield Initiative (ESSI)



(Gil Cohen-Magen/AFP via Getty Images)

incoming threats and targeting adversary capabilities. As the mass usage of low-cost-enabled UAVs has proven a popular tactic in the conflict, NATO should also examine their role.

Europeans will need to lead this conversation: the US now sees the Asia-Pacific as its primary IAMD focus and currently has no plans to deploy significant additional capabilities to Europe beyond its ongoing deployment of new SM-3 missile defences in Poland as part of the European Phased Adaptive Approach (EPAA).

In the context of these strategic challenges, capacity responses are proving a major issue given the evident shortcomings of European forces. Land-based, long-range SAM systems are primarily sourced from the US (with the Franco-Italian *Système Sol-Air Moyenne-Portée/Terrestre* (SAMP/T) being one notable exception). At the shorter end of the spectrum, however, there are a larger number of European-designed short-range and point defences. Considering the dominance of external suppliers of long-range systems and the probable increased demand for these systems in the future, the European market will likely expand significantly in the coming years. However, it will be hampered by a constrained industrial supply on both sides of the Atlantic due to the lack of suitable production capabilities and multiple competing demands.

To overcome these constraints, ESSI aims to address Europe's immediate needs and position Germany at the centre of the coordinated acquisition of already developed multilayered air- and missile-defence capabilities. ESSI's layered approach will utilise several short-

medium- and long-range missile-defence systems using the German-designed IRIS-T, the US MIM-104 *Patriot* and the Israeli-US-developed *Arrow 3*. ESSI de facto aims to standardise NATO missile defences around common systems, particularly *Patriot*, which is already deployed in Germany, the Netherlands and Spain and is on order by Poland, Romania and Sweden.⁵⁷ The initiative further encourages NATO member states to purchase existing technologies that Ukraine has used successfully.

ESSI has already brought together 19 countries, but other cooperation initiatives are also underway. Examples include the Franco-Italian-British cooperation and joint procurement of equipment from the ASTER SAMP/T family, the British-Polish cooperation on the CAMM-ER system, the joint procurement of *Mistral* short-range air-defence missiles by Belgium, Cyprus, Estonia, France and Hungary, and the latest Estonian-Latvian decision to jointly purchase IRIS-T. Other European systems, such as the Norwegian NASAMS, are also on the interceptor market.

The EU plays a growing role in the technology and capability debate, most notably through the Timely Warning and Interception with Space-based TheatER surveillance (TWISTER) project. Focusing on hypersonic threats, the project sits under the framework of the Permanent Structured Cooperation under the auspices of the European Defence Agency. The European Defence Fund (EDF) has received substantial funding from the European Commission for the European Hypersonic Defence Interceptor. Another EDF project proposal, the Hypersonic Defence Interceptor Study, is under review. Both converging initiatives are the first of their kind for the EU, which has thus far not engaged in developing advanced missile-defence technologies.

While the topic of interceptor missiles garners significant attention, C2, ISR capabilities and

deep-precision-strike tools remain equally important. Notably, NATO has through its ACCS procured an integrated and interoperable C2 capability, developed through a Franco-US partnership between Thales and Raytheon.

The initiative proposed by Macron at the Paris Air Show seeks to consolidate a previously fragmented debate about capability by elevating it to the political and strategic level. Previous discussions were primarily focused on political-military conversations within NATO, transatlantic and intra-European industrial competition, and emerging and fragmented technological initiatives driven by the EU. There is currently an opening to reframe the conversation and encourage structured and efficient cooperation amongst Europeans. Several steps could support this ambition: a systematic, lessons-learned analysis of the conflict in Ukraine and the evolving nature of the Russian threat; a holistic assessment of the entire inventory of air- and missile-defence assets for Europe (beyond just interceptors); a mapping of all the ongoing initiatives; a better definition of the respective roles of NATO and the EU; the identification of capability and technological opportunities justifying a European investment; and, finally, an honest transatlantic dialogue on the appropriate extent of the United States' role in Europe's air-defence domain.

This debate will take place in numerous formats – primarily at NATO on the strategy and the capability requirements – but also at the EU, as the European Commission invests in the development of relevant technologies. There is also room for a more informal conversation amongst Europeans in multilateral and bilateral formats that aims to assess shared requirements, tighten cooperation and deconflict projects to the greatest possible extent.

5. A Role for Arms Control?

Europe's current political and security environment is not conducive to major arms-control initiatives. Negotiations between NATO and Russia seem unlikely to succeed against the backdrop of the collapse of the Cold War's arms-control architecture, a profound level of distrust between NATO member states and Russia, an ongoing de facto arms race in multiple domains and the return of large-scale warfare in Europe. Nevertheless, this assessment should not prevent policymakers from considering the possible terms of a future regime – to be negotiated when the conditions for discussion are met. An end to Russian military operations in Ukraine and the partial restoration of relations between Russia and European states are two such conditions; achieving these steps will require a profound transformation of the current political and security environment.

Despite this sombre prognosis, it is important to remember that the process leading to the transformative INF Treaty of 1987 began after a decade of renewed East–West rivalry that saw the mutual deployment by the Soviet Union and the US of destabilising theatre-range, nuclear-armed missiles in Europe, as well as the Soviet invasion of Afghanistan. In a speech to the International Institute for Strategic Studies on 28 October 1977, then chancellor of West Germany Helmut Schmidt observed that Europe's concerns about the strategic nuclear parity between the Soviet Union and US had reduced the credibility of US extended deterrence, thereby creating the need for NATO to address imbalances through arms-control or military measures.⁵⁸ Schmidt's remarks paved the way for the Double-Track Decision of 1979, in which NATO allies decided to pursue an arms-control process with the Soviet Union while at the same time reciprocally deploying US nuclear-armed cruise missiles and MRBMs to Europe should negotiations fail.⁵⁹ When in 1981 the then US president Ronald Reagan proposed to cancel the deployment of these missiles if the Soviet Union withdrew its systems deployed in Eastern Europe – the so-called 'Zero Option' – it was initially dismissed by critics as unrealistic and the deployment

of US MRBMs and Soviet IRBMs proceeded.⁶⁰ Within six years of negotiations and deployments, however, Reagan's proposal had become a central component of the resultant INF Treaty. The Euromissile-crisis precedent demonstrates how – with decisive leadership – a situation can quickly evolve from a confrontational stalemate into a major achievement in the field of arms control. However, it is important to recognise the major differences between the political and security environment of the late 1970s and early 1980s and that of today.

A Different Arms-control Environment

Attempting to return to the arms-control status quo ante is not a viable option. The INF format, with its focus on the verified destruction of certain types of GLCMs, MRBMs and IRBMs, is impossible to reproduce due to Europe's altered geopolitical realities and because Russia's violation of the agreement created distrust between Washington and Moscow. Instead, policymakers should consider creating new frameworks – although doing so will require overcoming certain challenges.

Firstly, when considering how best to revitalise the European security framework, policymakers should acknowledge that while the security and arms-control dynamics of the past were primarily Eurocentric, the

Three Pershing II MRBMs in Heilbronn (West Germany), 30 August 1984. The Pershing II's deployment to Europe was part of NATO's response to Soviet MRBM and IRBM deployments in Eastern Europe



(Régis Bossu/Sygma via Getty Images)

The Aegis Ashore site in Deveselu, Romania, 12 May 2016. The site has been a source of Russian grievances with US missile defences in Europe



(Daniel Mihailescu/AFP via Getty Images)

rising geopolitical rivalry between China and the US is increasingly driving decision-making in Washington. Although Asia played an important role in the 1980s INF negotiation, as Japan insisted that Soviet missiles deployed in Siberia were addressed co-equally with European-based missiles, the treaty ultimately provided greater benefits to Europe's security. Today, China possesses the greatest number of MRBMs and IRBMs in the world; the United States' concerns with the INF Treaty were arguably as much motivated by Russia's violation as they were by the constraints the agreement placed on Washington's ability to counter Beijing's growing capabilities. Therefore, any future European regime will have to take these constraints into account, as China has declared it is uninterested in joining such a regime.⁶¹ Tellingly, neither the Russian-US joint proposal of October 2007 to multilateralise the INF Treaty, nor France's suggestion of a new treaty banning globally intermediate-range ground-launched missiles, gained sufficient traction in the international arena, principally due to the opposition of multiple countries possessing missiles within this category, most notably China.⁶²

A second major impediment when considering prospective arms-control options is the West's transmuted relationship with Russia, which makes direct arms-control negotiations almost impossible while the war in Ukraine continues. NATO states do not perceive Putin to be a reliable interlocutor, and many members of the Alliance would see any effort to engage Russia on arms control as a sign of weakness. Even before Russia's full-scale invasion of Ukraine, Macron's seeming readiness

to discuss Russia's 2019 proposed moratorium on deployments of missiles in Europe generated severe criticism from France's NATO allies, especially those in Eastern Europe.⁶³

Options for an Arms-control Agenda in Europe

The conditions to engage in a meaningful arms-control dialogue with Russia are simply not present today. The proposals described below therefore require a radical transformation of the security situation that sees Russia halting its military operations against Ukraine, renouncing its territorial ambitions and returning to engage candidly and constructively with the West regarding peace and stability in Europe. Should these conditions be met at some point in the coming decade, a range of possibilities could be tabled.

The minimum objective of any arms-control regime should be to preserve stability and prevent war. The arms-control and transparency architecture of the Cold War was devised to ensure that war became, if not impossible, then improbable. Halting and reversing this architecture's unravelling is therefore essential for future peacebuilding efforts. Rebuilding a transparency regime focused on missiles could be a reasonable first step towards this goal and pave the way for more robust arms-control regimes. Given the potential difficulty of conducting on-site inspections in both sides' national territories, utilising other verification methods, such as intelligence and national technical means, would play a key role in giving credibility to such a regime.

A European-specific regime intending to prohibit an agreed category of delivery systems would be the second step towards restoring a stable security environment. Informed by the demise of the INF Treaty, such an agreement would need to be accompanied by a robust verification regime – based on the principle ‘distrust and verify’ – that would leave no room for violation (rather than assuming implementation through a verification regime limited in scope or duration). The lessons learned from the INF Treaty are again relevant from this perspective, as the agreement established the most robust verification regime ever negotiated. Just as in 1979, the fact that Russia possesses missiles without equivalents in NATO’s inventory should not impede prohibition efforts that would ultimately benefit the entire continent. However, as shown by the INF debates of the 1980s, achieving consensus on a European-specific regime would be extremely difficult. Such an agreement would also be extremely hard to monitor and likely concern US allies in the Asia-Pacific who would otherwise benefit from improved US missile capabilities.

Arms-control Issues to Consider When Scoping a Future Negotiation

A more complex issue to consider is the scope of the negotiation, specifically which capabilities to include and which ones to omit. This decision is not always obvious or straightforward, given the different priorities of negotiating parties and their respective perceived security concerns. For example, Russia expressed long-standing concerns about the deployment of exo-atmospheric missile-defence systems to Europe as part of the EPAA. Moscow stated that these deployments would undermine its strategic deterrent. It also alleged that they would violate the then in-force INF Treaty by claiming that these sites were capable of launching offensive weapons, despite repeated US reassurances that this was not possible. Although Russia’s claims were partially dishonest and served to highlight its leadership’s suspicions, these fears should not be discounted altogether.

This dispute captures the uncertainty and difficulties encountered in discussing and trying to agree on the types of capabilities that should be included under a transparency, verification, control, restraint, or

destruction regime. The advancement of many types of military technologies and the uncertainty surrounding some dual-use goods also means that the categories defined in previous agreements, such as the INF and CFE treaties, fall short of addressing new types of delivery systems. Increasingly, UAVs or progressively longer-range rocket-artillery systems can deliver long-range precision strikes, while the distinction between strategic and theatre missiles is blurred between some systems – in the same way that the dividing line between tactical, theatre and longer-range missile-defence systems is increasingly contentious.⁶⁴ Beyond the types of weapons, the arms-control geography of the 1980s needs updating due to changes in the accuracy, range, fuel types, targeting capabilities, warhead effects and mobility of missiles and associated platforms.⁶⁵ Key conventional-arms-control concepts – such as the CFE’s so-called ‘flank regime’, or the notion of what a theatre-range weapon system is – also need to be revisited. Finally, given the war in Ukraine, a post-war arms-control regime could be an element of a lasting peace by preventing the massing of troops in specific areas or limiting the volume of specific offensive systems.

Key Tenets and Principles for a Renewed Approach to Arms Control

To successfully reintroduce arms control into a European security conversation – and to alleviate the legitimate concerns of sceptics who point to Russia’s multiple breaches of treaties – any future agreement must operate under a series of robust principles to ensure its value and win over detractors.

Firstly, policymakers should recognise that arms control is not an end in itself but a means to improve security. Any suggested measure should ultimately serve that purpose and be judged against alternative paths, such as investing in additional capabilities or developing new systems. A good starting point to evaluate any future arms-control idea is to benchmark the proposed initiative against a series of simple questions:

- Does the agreement improve national/regional security regardless of the other side’s interest?
- Is there another, unilateral way to achieve this level of security through other means, such as

through the development and/or deployment of new military capabilities?

- What is the relationship between these two proposals (for example, an arms-control proposal or a proposal for a new deployment) and can a negotiated bargain be agreed that will provide a better outcome?

Policymakers should also recognise that arms-control and transparency measures do not require mutual trust and confidence to be successfully negotiated. Rather, they are a means to create compliance and build predictability among parties that distrust each other – with the possibility of creating trust and confidence in the longer term. Therefore, robust verification regimes to ensure compliance with agreements are essential.

Arms-control measures are about preserving stability and preventing conflict by focusing on the most destabilising systems and testing whether the other side is willing to abjure such capabilities through dialogue, or whether it will seek advantage regardless.

Policymakers should also consider the dynamics between regional (European) and global security, as disassociating them has become increasingly difficult. Again, the INF Treaty provides a useful precedent, as it became obvious during negotiations that there was no practical way to separate the missile threat posed

by Soviet missiles deployed in Asia from that of those deployed in Europe. Efforts to separate regional security from global security seem bound to fail as technically impracticable and politically difficult.

Against this backdrop and keeping these principles in mind, improving regional security should therefore be at the forefront of any potential future negotiation or treaty. In the missile domain, policymakers should place particular emphasis on restricting the development and deployment of intermediate-range nuclear systems. These capabilities pose the most immediate threat to European (as well as Asian and Middle Eastern) security because of their short flight times and potential to cause further escalation that could lead to a strategic exchange. This also means eliminating systems that are inconsistent with maintaining a minimum-credible-deterrent posture. As this framework also implies a degree of accepted mutual vulnerability among negotiating parties, it is imperative that parties' discussions include a doctrinal dimension. Any future agreement must also include a robust verification regime. Otherwise, it will be difficult to ensure signatories' compliance. In the case of the INF Treaty, true verifiability required the elimination of borderline systems, such as the 9K714 (RS-SS-23 *Spider*), to remove any possibility of doubt among signatories. Ultimately, a robust verification mechanism should benefit all parties.

6. Conclusion: From Arms Racing to Arms Controlling?

In this new era, improving NATO's defence and deterrence requirements is of paramount importance to demonstrate to Russia that it can gain no advantages by undertaking niche arms races focused on NATO's shortfalls. The modernisation of NATO's conventional and nuclear forces, the upgrading of its IAMD capabilities and the deployment of new long-range precision-strike capabilities all play a role in this regard and could well be necessary to opening a new chapter in arms control.

NATO allies need to formalise a coherent strategy that could build upon the 1979 Double-Track Decision precedent. As the proponents of such an approach have noted, a new Double-Track-style decision does not need to replicate the 1979 decision and could be multilayered.⁶⁶ In the short term, NATO could rely upon its existing conventional advantages, such as those in the air and maritime domains, while simultaneously striking the right balance of strengthening its conventional precision-strike capabilities and IAMD posture. Furthermore, the Alliance should not rule out the possibility of the United States' forward deploying intermediate-range land-based assets, or European NATO allies acquiring such capabilities, retaining these measures

as latent options. These combined efforts should demonstrate to Moscow the inanity of its efforts to gain a strategic advantage over NATO through a missile arms race and indicate the Alliance's readiness to counter or match such attempts in every domain. In parallel to enhancing its capabilities, NATO could express to Russia its readiness to engage in dialogue with Moscow on limiting the most destabilising systems and restoring proper transparency and verification measures once the war in Ukraine is resolved. While Western expectations of Russia should be clear, the West should not start this potential negotiation by setting self-limitations. It is for Russia to put its demands forward and for NATO allies to discuss them, first among themselves and then with Moscow.

Many analysts (the author included) would argue that for NATO to re-engage with Russia on arms control, Moscow must first demonstrate a profound change in attitude. Its defeat in Ukraine would likely be another prerequisite. It is, however, important to recognise that Russia does not have to become a friendly like-minded democracy, as arms control is a rational and sensible measure to ensure coexistence alongside a potential adversary.

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