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Dr Julia Muravska is a Visiting Senior Research Fellow at the Freeman Air and Space Institute focusing on Ukrainian defence capability topics, as well as an independent defence analyst and consultant. Since early 2022, Julia has also been working to help build a defence innovation ecosystem in Ukraine. She has previously worked in policy research and advisory, management consulting, academia, and the NGO sector, and has 14 years of experience leading research and analysis in the fields of defence industry, policy, and innovation. Julia holds a PhD and MSc in international relations from the London School of Economics and Political Science (LSE), as well as an Honours BA in international relations from the Trinity College, University of Toronto.

Introduction

The widespread destruction of Ukrainian homes, hospitals, schools, and power stations wrought by Russian missiles following its full-scale invasion has brought home the critical importance of integrated, layered, and fully operational air and missile defence to NATO members. At the 2022 NATO Summit in Madrid, Allies endorsed a new NATO Strategic Concept, in which they declared their collective intent to strengthen NATO integrated air and missile defence (NATO IAMD), enhance readiness and interoperability, and boost command integration while 'individually and collectively' delivering the 'full range' of capabilities needed to support these aims.[1]

During the Cold War, a surface-to-air missile barrier extended 'from Norway to Turkey' helped protect NATO members from air strikes by the Warsaw Pact. Today, a fundamental function of NATO remains to secure Allied airspace, territory, population centres, and armed forces against air and missile threats, which the Alliance seeks to achieve through the NATO IAMD framework. Therefore, IAMD is an enabler of the Allied 'deterrence by denial' posture, aimed at sapping an aggressor's confidence in achieving its goals.

However, individual NATO member states and their defence investment and capability development decisions drive the progress, extent, and strength of NATO IAMD. European NATO members continue to face challenges in meeting the Alliance's ambitions with concrete capability commitments despite investment, integration, and interoperability improvements.

Overcoming these challenges will require continued capability improvements and resolving more profound and persistent tensions among European Allies. This includes the strategic relationship between European NATO members and the United States, interdependence among the European Allies, and the impact of these factors on the industrial capability needed for IAMD development.

NATO IAMD Architecture

Although collaboration on air and missile defence exists in the EU context as well as bilateral and multilateral arrangements, this paper will focus on NATO due to its nature as a military alliance, its centrality in counteracting Russian aggression, and its primacy in ensuring the security of its members against military threats. The following section provides a brief overview of the NATO IAMD infrastructure to demonstrate how NATO structures and national roles and capabilities intersect in ensuring Allies' defence from and response to air and missile threats.

IAMD is a 'continuous' NATO mission, meaning it is a set of activities – underpinned by capabilities – that Allies undertake during peacetime, war-time, and crises. Within the NATO structure and doctrine, IAMD is a component of Allied Defensive Counter-Air (DCA) capability, in turn falling under NATO's Joint Air Power, implemented by the Joint Force Air Component (JFAC).

Regarding capabilities, IAMD tasks are carried out through the NATO Integrated Air and Missile Defence System (NATINAMDS) – a network connecting national and NATO weapons systems, sensors, and command and control (C2) assets. Overseen by the Supreme Allied Commander Europe (SACEUR), NATINAMDS is intended to function 'as one' to deter and diffuse the full spectrum of air and missile threats, including next-generation combat aircraft, ballistic missiles, cruise missiles, unmanned aerial vehicles (UAVs), and rocket and mortar fire. NATINAMDS includes two categories of assets and capabilities – Surface-Based Air and Missile Defence (SBAMD) and airborne. The former includes land and ship-based systems such as sensors, surface-to-air missile systems, and control and communications systems, while airborne capabilities encompass (air-to-air) combat and patrol aircraft. SBAMD will also be the focus of this paper as it includes the capabilities crucial to destroying enemy missiles.

SBAMD comprises national capabilities – meaning that the interceptors, radars, launchers, and other defence systems belong to individual NATO member states. Thus, all NATO members with SBAMD capabilities must maintain them in a combat-ready state. They must 'declare' their availability to the Alliance through the NATO Defence Planning Process (NDPP), which identifies all capability needs and coordinates their development and delivery. As part of IAMD, national SBAMD capabilities provide a layered defence against air and missile threats, capable of acting across different altitudes covering areas of various sizes. In theory, this is achieved not only through the interoperability of systems themselves but through interoperable and effective battle management, communications, and C2 structures, such as NATO's Air Command and Control System (ACCS) ensured by the NATO Communications and Information Agency (NCIA) and the Air C2 Information Services (AirC2IS).

In peacetime, when NATO is not in a state of war or engaged in a crisis operation, there are two strands of standing activities within IAMD – NATO Air Policing and NATO Ballistic Missile Defence (BMD). A permanent NATO mission since 2010, BMD falls within the IAMD framework and relies on the SBAMD capability pool. Within that framework, NATO BMD consists of 'voluntary national contributions' (e.g., individual nations' interceptors and sensors). Meanwhile, the BMD C2 systems needed to integrate them are jointly funded by NATO Allies through the NATO BMD Programme.[2]

Post-Cold War Developments

After the Cold War, NATO decommissioned its air defence barrier to protect Alliance members from a potential Warsaw Pact strike. This resulted in a deprioritisation of surface-to-air missiles and a hollowing out of collective SBAMD capabilities. By 2004, NATO had reduced its ongoing air and missile defence activities to air policing. Only following the 2010 Lisbon NATO Summit, did member states decide to expand theatre BMD (focused on protecting deployed forces) to territorial BMD, meant to also protect NATO populations and territory from 'increasing threats posed by proliferating ballistic missiles.'[3] Still, over the past two decades, air and missile defence systems have not occupied top positions on most NATO member states' defence investment priority lists (with the notable exception of the US). NATO BMD, in particular, has been slow to expand beyond its original purpose of defending southeast Europe against potential Iranian missile threats to also provide security to eastern and Baltic regions against possible Russian attacks.

Persistent Challenges

The Allies have expanded their air and missile defence systems throughout the past nine years, following Russia's illegal annexation of Crimea in 2014 and particularly in the aftermath of Russia's full-fledged invasion in 2022. At Madrid and the subsequent 2023 Vilnius NATO Summits, the Allies also reiterated their commitment to 'fully developing' NATO BMD, including putting the 'essential components' of NATO BMD C2 in place.[4] However, progress has not been sufficient in fielding capabilities to support ambitious policy language.

BMD capabilities

The table overleaf illustrates the national contributions that comprise the NATO BMD architecture and the deployments of short-medium range BMD systems implemented following Russia's full-scale invasion of Ukraine. It demonstrates that NATO members rely on US capabilities for upper-tier BMD to defend against long-range ballistic missiles outside Earth's atmosphere. The US centres its contribution to NATO BMD on the Aegis ballistic missile defence system, provided through the so-called European Phased Adaptive Approach (EPAA) of the Obama era. It includes ship- and land-based sensors, interceptors, and C2.[5] The BMD interceptor within Aegis is the Standard Missile-3 (SM-3), designed for exo-atmospheric interception of incoming missiles in the mid-course phase.[6] The US is the only NATO member with ballistic missile early warning radar systems (BMEWS) and early warning satellites for missile threat identification. However, one of the BMEWS sites is serviced by Royal Air Force (RAF) personnel and is located at the RAF Flyingdales base (the radar itself is maintained by the US). In addition to the EPAA-focused capabilities, several Allies operate shorter-range air and missile defence systems capable of neutralising tactical ballistic missiles, such as the US-made Patriot. While these have been theoretically available to NATO by virtue of alliance members having them in their inventories, it is unclear whether these were fully integrated into the NATO BMD structure.

Table 1: NATO Ballistic Missile Defence (BMD) – Main Elements and National Contributions Following Russian Invasion
(pre-February 2022 systems aimed at engaging tactical ballistic missiles and ships with potential for BMD capabilities are not shown)

System/Asset	Contributor	Operator/Host	Description
Aegis-equipped BMD-capable ships	United States	Spain – Rota	Starting in 2014, Spain has hosted **four** BMD-capable Aegis ships at its naval base in Rota as part of European Phased Adaptive Approach (EPAA).
Aegis Ashore land-based BMD site	United States	Romania – Deveselu	Operational since 2016, construction as part of EPAA.
Aegis Ashore land-based BMD site	United States	Poland – Redzikowo	Completion expected by the end of 2023 after nearly five-year delay; construction as part of EPAA.
AN/TPY-2 Radar	United States	Turkey – Kurecik	Deployed in Turkey since 2011 as part of EPAA, enables ballistic missile tracking and warning
Command and Control, Battle Management and Communication (C2BMC)	United States	Germany – Ramstein	Within EPAA, C2BMC System software package integrates U.S. Aegis BMD capabilities in Europe with the AN/TPY-2 radar in Turkey.
NATO BMD command centre	NATO	Germany – Ramstein	Headquarters Allied Air Command is located within the Ramstein US Air Force Base, and includes the Operations Centre for Air Policing, and BMD.
Allied deployments following the Russian full-scale invasion of Ukraine in 2022			
Patriot air and missile defence system *(2022–2023)*	Germany	Poland	Germany began deploying **three** Patriot batteries in January 2023 to the Polish-Ukrainian border to protect Polish territory and reinforce NATO's Eastern flank
Patriot air and missile defence system *(2022–2023)*	Germany	Slovakia	As part of the binational German-Dutch Air and Missile Defence Task Force (BAMDTF), Germany and the Netherlands deployed **two** and **one** Patriot batteries, respectively in spring 2022 to protect the Slovak territory and reinforce NATO's Eastern flank; BAMDTF deployment is German-led.
Patriot surface-based air and missile defence system *(2022–2023)*	Netherlands	Slovakia	
SAMP/T surface-based air and missile defence system (MAMBA)	France	Romania	Deployed in the spring of 2022, the system was intended to protect French and other NATO forces deployed to Romania as part of NATO's Enhanced Forward Presence Battle Groups.

Source: Author's analysis of open-source materials and press reports[7]

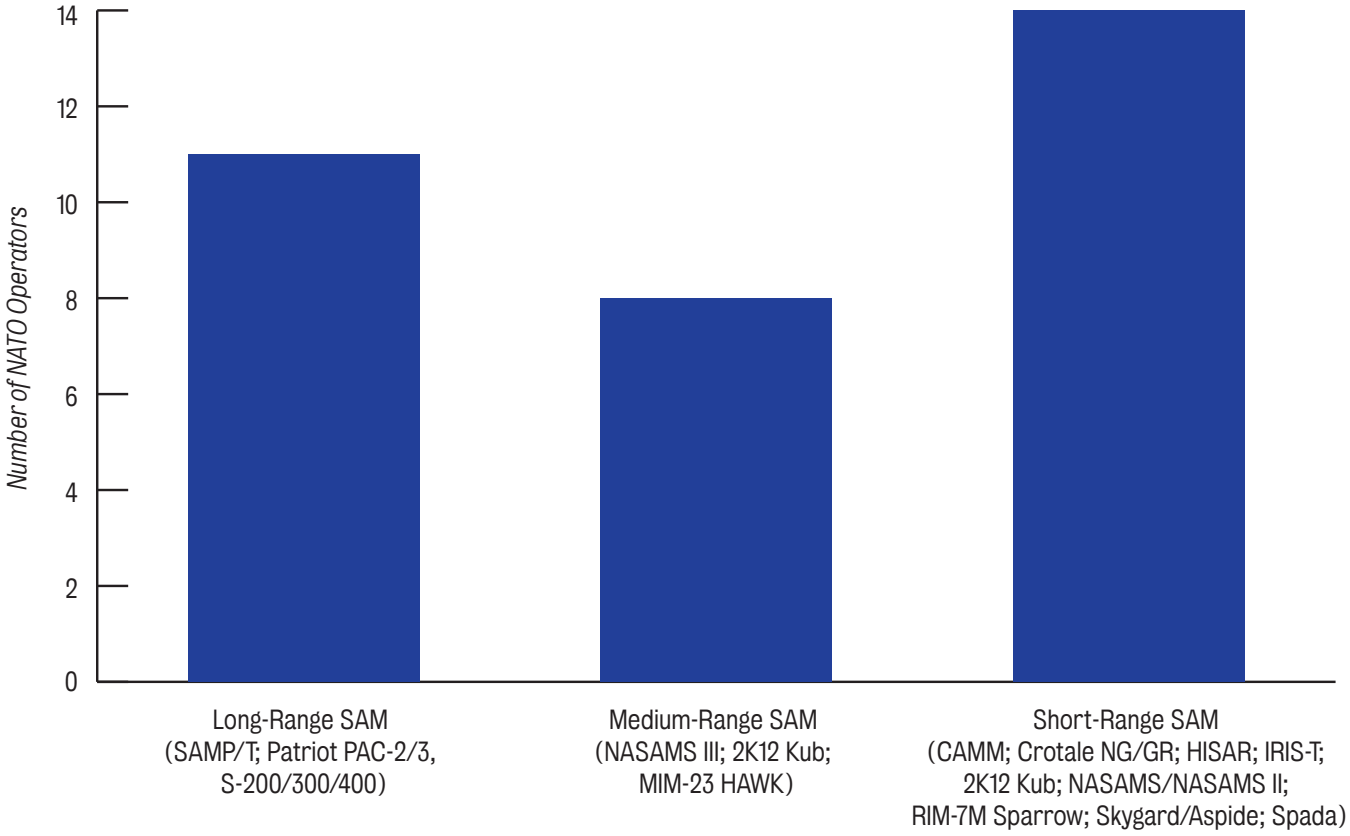
Following the 2015 Strategic Defence and Security Review (SDSR), the UK committed to acquiring and contributing a ground BMD radar for 'the protection of NATO'.[8] In doing so, the UK became the only NATO member, other than the US, to contribute to the upper layer (exo-atmospheric) BMD against long-range threats. Nevertheless, the UK has yet to commit to a procurement timeline, despite US approval of a foreign military sale (FMS), or government-to-government sale, of a US ballistic missile defence radar system in March 2022.

The centrality of US capabilities creates an inherent vulnerability should doubts grow about the future commitment of the US to European security. This concern was notably expressed in an article on Allied sea-based BMD in a 2018 Journal of the Joint Air Power Competence Centre (JAPCC) issue.[9] While Russia's full-scale invasion of Ukraine has rebalanced the US defence posture towards Russia as 'an immediate threat to the free and open international system,' the latest US National Security Strategy in October 2022 declared China the 'only [US] competitor with both the intent to reshape the international order' and a full suite of means to achieve it.[10] The Strategy thus characterised China as 'America's most consequential geopolitical challenge' and the Indo-Pacific as the region where that competition is 'most pronounced,' highlighting the secondary importance of the Euro-Atlantic theatre for long-term US strategic interest.[11]

Continuing capacity and capability gaps

The US is far from the only NATO member state to operate lower-tier BMD systems – e.g., the Patriot and SAMP/T, and short- and medium-range air and missile defence capabilities – to defend against cruise missiles, UAVs, and aircraft (see *Figure 1*). Just over half of NATO's European members have surface-to-air missile (SAM) systems capable of achieving this. Moreover, several member states have BMD-capable surface combatants that can support NATO IAMD. For example, the German Sachsen-class (F124) and the Dutch Zeven Provinciën-class destroyers have recently received radar system upgrades to enable the detection and tracking of ballistic missile threats. Danish Iver Huitfeldt frigates are also fitted with the SMART-L radar system that can be upgraded to a BMD sensor role.

Figure 1: Selected Ground/Land-Based Air and Missile Defence Holdings – European NATO members



Source: The Military Balance 2023 (MilBal+ online database) by the International Institute for Strategic Studies (IISS).[12]
Figures include Sweden and Turkey.

At the same time, the German and Dutch Patriot deployments to Poland and Slovakia are temporary, with the Slovak deployments concluding in July 2023. The Polish battery deployment may be extended until the end of the year. Still, the Polish government's request for this extension and the rotation of these systems among Allies in the first place reflects continued 'capacity' problems in the European missile defence capability. This limitation was underscored as early as 2017 by the outgoing US Army Europe commander, Lt. Gen. Ben Hodges.[13] Six years later, in 2023, there is still insufficiently integrated air and missile defence capability to protect critical national infrastructure, civilian sites, and military installations across the vast NATO territory. Moreover, as Douglas Barrie, Senior Fellow for Military Aerospace at the International Institute for Strategic Studies (IISS) highlighted, it is an open question if and how these numerous potential targets in need of protection map onto an integrated NATO approach, prioritisation, and planning.[14]

There are simply not enough surface-based systems in NATO. For example, the latest Military Advice report by the Norwegian Chief of Defence published in June underlined that the country's armed forces lack sufficient air defence to simultaneously protect military targets and functions within civil society and 'to provide protection against ballistic missiles.'[15] The Chief of Defence urged increasing 'the volume' of short- and medium-range air defence systems and investing in developing new long-range BMD-capable systems.[16] Additionally, the Russian invasion exposed Baltic states' lack of national layered air and missile defence capabilities, with only Lithuania operating a medium-range air defence system capable of destroying aircraft, UAVs, and cruise missiles (NASAMS III).[17] Meanwhile, Latvia and Estonia have until now relied on very short-range or point defence systems, which are shoulder-launched and unable to defend against missile threats. The situation left the Baltic region's critical infrastructure and major population centres unprotected.

Secondly, NATO militaries operate several different systems, particularly in the very short- and short-range categories (see *Figure 1*). Consequently, information sharing among them is not seamless. Furthermore, interoperability and integration of national capabilities into a multi-layered system remain a work in progress. Concurrently, Allies have recently taken significant steps to improve this situation, from regular exercises to advance IAMD interoperability to ensuring that the post-Russian invasion missile defence deployments for reinforcing the Eastern flank are integrated into the NIAMDS.

Nevertheless, Russia's aggression in Ukraine also underlines the importance of rapid and sustained production of interceptors in war-time when facing an adversary with extensive cruise and ballistic missile inventories. Although Kyiv's forces have successfully engaged a range of Russian threats, including the *Kinzhal* aero-ballistic missile, this has come at the cost of running down stockpiles of both Western and Soviet interceptors. Ukraine's NATO allies are focused on filling these gaps by providing additional launching stations and interceptors (i.e., missiles). However, ramping up production lines to enable this support has been slow. This should alert European capitals to the imperative of maintaining war-ready inventories if they are serious about comprehensive IAMD.

Recent acquisition developments and pursuing multinational cooperation

Since 2018, NATO members have strengthened their IAMD capabilities by investing in new defence systems, with several of them, including the Baltics, doing so after Russia's full-scale invasion of Ukraine *(Table 2)*. NATO defence establishments have also pursued various collaborative arrangements for IAMD capability improvement. These models can potentially make significant progress in filling capability gaps if interoperability, integration, and political alignment challenges can be addressed.

Some recent acquisition developments, when completed, will result in a significant long-range defence capability boost. Germany's upcoming acquisition of the Israeli Arrow 3 missile defence system, capable of upper-tier ballistic missile interception, would add a critical source of capability to US-provided Allied BMD. Poland recently secured US approval for a government-to-government sale of 48 Patriot missile launch stations and related equipment. In addition, Latvia and Estonia have opted for joint procurement of the German IRIS-T system, which will help them optimise investment and coverage while strengthening cooperation. Spain also deployed a NASAMS ground-based air defence system to Latvia in March 2023, moving it to Lithuania and deploying a second one to Estonia.[18] Finally, in March 2022, the UK announced it was deploying the Sky Sabre (Land Ceptor) ground-based short- to medium-range air defence system to Poland to help provide layered air defence.[19]

Table 2: Key Air and Missile Defence System Procurements, 2018–2023

Recipient	Equipment	Category	Contract Signed	Year
Sweden*	Patriot PAC-2, Patriot PAC-3	Long-Range Surface-to-Air Missile System	✓	2018
Poland	Patriot PAC-3	Long-Range Surface-to-Air Missile System	✓	2018
Norway	IRIS-T	Short-Range Self-Propelled Surface-to-Air Missile System	✓	2019
Hungary	NASAMS III	Short-Range Surface-to-Air Missile System	✓	2020
France, Italy	SAMP/T NG	Long-Range Self-Propelled Surface-to-Air Missile System	✓	2021
Czech Republic	Spyder-MR	Medium-Range Self-Propelled Surface-to-Air Missile System	✓	2021
Poland	CAMM (Narew)	Short-Range Surface-to-Air Missile System	✓	2022
Germany	IRIS-T SLM	Medium-Range Self-Propelled Surface-to-Air Missile System	✓	2023
Germany	Arrow 3	Ballistic Missile Defence Surface-to-Air Missile Launcher	Funds approved	2023
Finland	David's Sling	Medium-Range Surface-to-Air Missile System	Acquisition announced	2023
Estonia, Latvia	IRIS-T SLM	Medium-Range Surface-to-Air Missile System	Acquisition announced	2023
Poland	Patriot PAC-3	Long-Range Surface-to-Air Missile System	US government sale approval granted	2023

Source: Author's analysis of the International Institute for Strategic Studies (IISS) MilBal+ data and open-source materials

**Sweden is included despite not being a NATO member in 2018, under the assumption that it will attain full membership*

Nevertheless, examining NATO's recent air and missile defence acquisition reveals two significant challenges inherent in complex defence system procurement – time and cost. Urgent IAMD capability needs identified in 2022 will take several years to be delivered to the countries that require them, with the Arrow 3 launcher delivery to Germany expected in late 2025. The Patriot batteries ordered by Poland in 2018 reportedly only began arriving in the country in late 2022.[20] Meanwhile, although reported contract values are based on several unreported factors (e.g., training, spares, logistic support, and payment schedule), there is no getting around the fact that modern air and missile defence systems represent considerable cost outlays. Short- and medium-range systems like the IRIS-T and NASAMS run into hundreds of millions of USD. Long-range and ballistic missile defence capabilities have price tags in the billions (not counting the cost of the missiles used by these systems). With a long history of austerity, and with only four of NATO's 29 European members currently spending more than USD30 billion on defence per year, these are major commitments that few countries can individually afford to make at scale.

Such considerations have historically driven defence cooperation among states, and this rationale has also motivated cooperation in IAMD development. In addition, neighbouring European states tend to be vulnerable to the same missile threats. The joint Latvian-Estonian acquisition of IRIS-T is one of the latest examples. Historically, the SAMP/T system was jointly procured by France and Italy following development by a joint venture (JV) between missile specialist MBDA (involving French and Italian parts of the company) and French defence electronics leader Thales, which started in the late 1980s. The same JV, Eurosam, also developed a new version of the system, SAMP/T NG, with global production beginning this year. In the EU operational context, Germany and the Netherlands have strengthened their military cooperation around ground-based air and missile defence to combine doctrines and concepts, establish the joint Air and Missile Defence Task Force, and integrate air defence units and command structures.[21] In late 2022, Poland and the UK signed a memorandum of understanding (MOU) on industrial and government cooperation to support Narew, Poland's short-range air defence programme.[22]

The European Sky Shield Initiative

Perhaps the most ambitious IAMD cooperation effort in terms of participation is the European Sky Shield Initiative (ESSI). Proposed by Germany in August 2022 with itself in the lead, ESSI aims to construct a European air and missile defence architecture through joint acquisition of systems, with an apparent focus on off-the-shelf capabilities and their interoperability and integration.[23] Eighteen other countries have since signed the Letter of Intent (LoI) declaring their participation, including Baltic and central European states and the UK.[24]

The initiative is still in its infancy, and the participating states have yet to define its goals, scope, and mechanisms clearly. For instance, it is unclear whether ESSI will promote the joint development of new capabilities and the acquisition of existing systems, and if so, how it will balance the two approaches. Another open question is how the specific capability requirements will be agreed upon and coordinated among all the participating states. The ESSI architects intend to anchor it within NATO IAMD and leverage existing NATO processes and frameworks for cooperation.[25] These structures presumably include the NATO Defence Planning Process and Rapid Acquisition Track within NATO's Modular Ground-Based Air Defence High Visibility Project for multinational procurement. However, the NDPP is high-level, and it is unclear if the Fast Track mechanism is detailed enough for the ESSI.[26] These challenges are typical of multilateral armaments cooperation arrangements with common procurement ambitions. Still, they could be even more pronounced in the ESSI, given the high number of participants, increased interoperability, and training demands of air and missile capabilities and industrial interests.[27]

In addition, several key European countries–notably France, Italy, Spain and Poland–have not joined the initiative due to the intended procurement approach.[28] Berlin's reported aim is to get more air and missile defence systems into service as soon as possible, integrate them into NATO IAMD, and prompt the other participating countries to do the same under the ESSI umbrella. The objective is to fill capability gaps and benefit from economies of scale resulting from countries acquiring systems jointly.[29] Germany has already identified the systems it intends to procure and launched key acquisition processes (see *Table 2*). The capabilities include the short-medium-range IRIS-T SLM from German manufacturer Diehl. In addition, while the Bundeswehr (German armed forces) already operates US-made Patriots, Berlin plans to procure additional ammunition for the systems. Thus, although the ESSI partners are not legally required to commit to these systems, the initiative's rationale only works if common systems are selected, and procurement timelines are aligned among participating countries. Therefore, Germany is proposing the IRIS-T SLM and the Patriot as the 'official' ESSI systems to be procured within the ESSI framework.

Furthermore, Germany is acquiring the Arrow 3 BMD system from Israel's IAI, co-developed with the US. As highlighted above, there are currently no European alternatives to very long-range systems, such as Aegis and Arrow 3, capable of exo-atmospheric ballistic missile defence. Germany intends to integrate Arrow 3 into the ESSI framework and NATO.

Given that the ESSI's primary purpose is to deliver air and missile defence capabilities to European militaries in a multinational framework, inevitably, it does not suit those countries that already operate different systems in these categories or have already made their procurement decisions. This includes France and Italy with their SAMP/T systems, but also Poland, which has recently procured the CAMM short-range system from the UK, an alternative to IRIS-T.

More fundamentally, however, the preference for non-European capabilities over investing in a 'European alternative' angered Paris, as France has long advocated for European 'strategic autonomy' – a term with a rather vague meaning but clear implications for preference and support of the European defence industry.[30] President Macron also implied that reliance on 'third party' (that is, non-EU) systems leads to insufficient security of supply down the road due to uncertain 'priorities, timetables, ... and authorisations.'[31] The apparent French conception of prioritising European industry contrasts with the reported aims of ESSI. The language in the LoI emphasises 'pragmatic solutions' and 'swift progress.'[32] This logic favours deployable systems rather than diverting resources and time to long-running and costly development programmes. Whether the initiative can deliver on these aims remains to be seen. Acquiring military capabilities and introducing them into service at pace is a significant challenge for any defence establishment. It only increases when multiple national bureaucracies and interests are at play, such as in the ESSI. We can also anticipate potential interoperability and integration challenges regarding the Arrow 3, as NATO militaries do not operate it.

Conclusion: addressing fundamental tensions

Despite the issues the ESSI's architects still need to resolve, the initiative is a powerful signal of key European countries' intent to reinforce the ambitious rhetoric of NATO IAMD with tangible capabilities. However, the apparent Franco-German spat over Berlin's proposed systems for ESSI reflects deeper, long-standing tensions characterising collective European defence capability development. These tensions flow from those at the core of efforts to build a European defence industrial base. A common industrial base in defence involves rationalisation and specialisation at the EU level to remove duplication. This, by default, means privileging and creating demand for specific companies based in certain countries and not others. The logic of rationalisation and specialisation – where manufacturers are entitled to revenue deemed proportional to their contribution – also helps to explain why European defence collaboration initiatives have consistently struggled with efficient industrial work-share arrangements that were satisfactory to all participants.

Yet, for the European defence industrial base to overcome fragmentation along national lines and be sustainable in the long term, it must be underpinned by sustained demand. Creating this demand can mean privileging European industry over 'third parties' when making defence procurement decisions. This European preference, in turn, conflicts with many European NATO members' historic reliance on US capabilities, particularly in areas associated with power projection, such as aerospace and complex weapons (missiles). Procuring these capabilities allows the recipient countries to strengthen their security ties to the US, a strategic imperative for those on the 'Eastern flank' in particular. Russia's war in Ukraine has nevertheless demonstrated the consequences of countries' reliance on others' sensitive defence technology, with, for instance, European countries operating the F-16 combat aircraft requiring US approval to supply the platform to Ukraine. At the same time, genuine European strategic autonomy in air and missile defence would have necessitated long-term, sustained investment into the relevant development, manufacturing, and skills base, accompanied by prioritisation in acquisition decisions. As this paper has shown, this focus has not materialised.

Thus, efforts to build up integrated air and missile defence capabilities rapidly and efficiently, providing sufficient coverage to Europe after a protracted period of deprioritisation, are bound to face challenges. Some of these, such as interoperability and integration, are being overcome with sufficient time and focus. Others – such as ensuring that European capabilities do not atrophy and can be scaled up when needed – will require careful consideration and balancing of near-term requirements with shared long-term strategic goals.

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The Freeman Air and Space Institute is an inter-disciplinary initiative of the School of Security Studies, King's College London. The Freeman Institute is dedicated to generating original knowledge and understanding of air and space issues. The Freeman Institute seeks to inform scholarly, policy and doctrinal debates in a rapidly evolving strategic environment characterised by transformative technological change which is increasing the complexity of the air and space domains.

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