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Fit for war by 2030? European rearmament efforts vis-à-vis Russia

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Abstract

This report updates and expands the data-driven work of our initial study from September 2024, which concluded that Europe would only be fit for war in several decades. We show that the situation today is even more concerning if Europe aims to be fit for war by 2030.

First, Russia continues to outproduce four European countries across multiple weapon systems. We demonstrate that production must increase by a factor of around five to tilt the balance decisively in Europe's favour. Procurement needs to accelerate and be frontloaded, as delivery delays of three years or more persist.

Second, transatlantic tensions are weakening the strength of the U.S. security guarantee. Europe depends heavily on the U.S. not only for readily deployable troops but also for strategic enablers. While overall U.S. weapon imports are not excessive, reliance on American systems in critical modern capabilities remains a concern.

Third, military strategy and technology are evolving rapidly. Military planners must modernise weapons and strategy while simultaneously scaling existing and effective systems—a major challenge for often slow and bureaucratic procurement structures. Investment in European technology is essential for modernisation. European weapons tend to be expensive due to low production volumes in a fragmented market; a focus on cost-effectiveness is vital to ensure the EU's planned €800 billion defence spending is sufficient and fiscally sustainable.

JEL Codes: H41, H56, H60, L64, N44

Keywords: Defence, Armament, Weapon industry, Budget, Germany, Europe, Russia

Contents

List of abbreviations

AI	Artificial Intelligence
APC	Armoured Personnel Carrier
AEW&C	Airborne Early Warning and Control
BARS	Combat Army Reserve System
CCA	Collaborative Combat Aircraft
DCC	Drone Capability Coalition
EDIS	European Defence Industrial Strategy
EU	European Union
EUR	Euro
FCAS	Future Combat Air System
FMS	Foreign Military Sales
FPV	First-Person-View (Drone)
GBP	Great Britain Pound
GCAP	Global Combat Air Programme
GDP	Gross Domestic Product
GIUK	Greenland-Iceland-UK
IFU	International Fund for Ukraine
IFV	Infantry Fighting Vehicle
IfW	Kiel Institute for the World Economy
IISS	International Institute for Strategic Studies
IMF	International Monetary Fund
IMV	Infantry Mobility Vehicle
IRIS	Infrastructure for Resilience, Interconnectivity and Security
IRBM	Intermediate-Range Ballistic Missile
ISR	Intelligence, Surveillance and Reconnaissance
LEO	Low Earth Orbit
MBT	Main Battle Tank
MGCS	Main Ground Combat System
MLRS	Multiple Launch Rocket System
MUM-T	Manned-Unmanned Teaming System
NATO	North Atlantic Treaty Organization
ORBAT	Order of Battle
SATCEN	Satellite Centre
SHORAD	Short Range Air Defence
SIPRI	Stockholm International Peace Research Institute
SLBM	Submarine-Launched Ballistic Missiles
SP howitzer	Self-Propelled Howitzer
TOE	Tables of Organisation and Equipment
UAV	Unmanned Aerial Vehicles
UGV	Unmanned Ground Vehicles
UK	United Kingdom
US	United States
USD	United States Dollar
VKS	Russian Air and Space Forces
WWII	World War II

Executive Summary

European countries have increased their spending on defence from 1.4% of GDP to more than 2% of GDP, and these numbers are set to increase further. With rising defence spending, spending for military equipment more than doubled. This report focuses on assessing European rearmament efforts. We are the first to publicly capture a wide array of different dimensions of rearmament and make them publicly available, including by publishing an updated military procurement tracker for Germany, the UK, Poland and, with limitations, France. This comprehensive approach is necessary to understand Europe's relative position at a moment when (a) Russia continues to be aggressive, (b) the US position to European defence shifts, and (c) technological developments rapidly change modern warfare.

First, we estimate the quantitative increases in production for key weapon systems such as tanks, infantry fighting vehicles (IFV), artillery, drones, and advanced fighter jets in Russia. In our assessment, the Russian military has grown qualitatively and quantitatively significantly since 2022. Production has doubled across the board or increased even further, as in the case of tanks. Surprisingly, Russian spending is almost the same as that of the EU and UK measured in purchasing power parity.

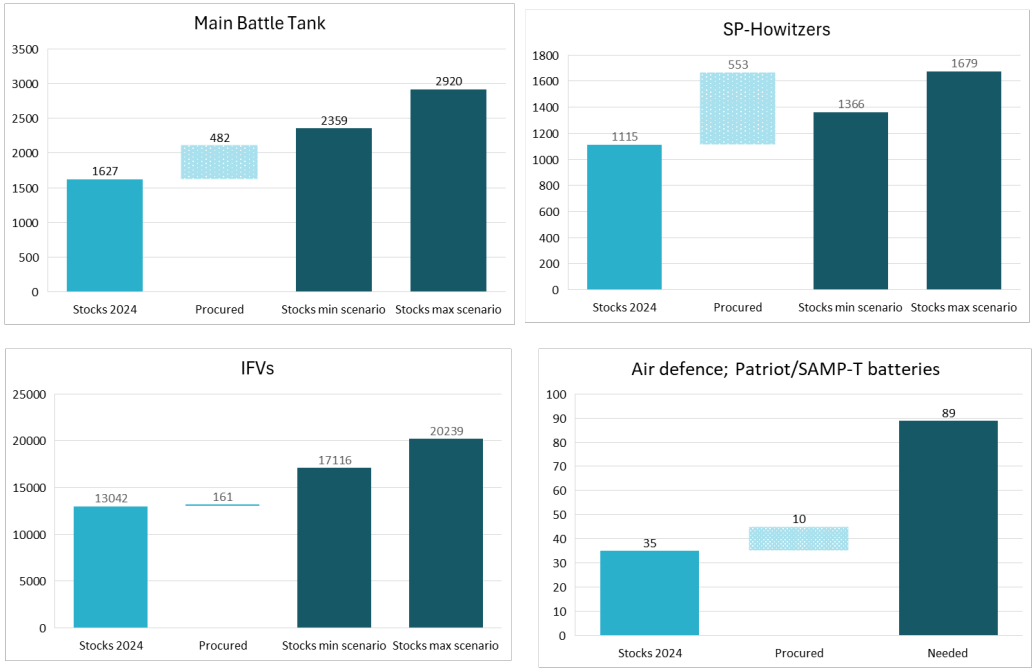
Second, we summarise military capacities in four key countries: Germany, France, the UK, and Poland. Equipment stocks across multiple weapon systems have fallen strongly since the end of the Cold War and recent rearmament efforts have not yet translated into larger stocks. Europe has also significant gaps when it comes to strategic enablers such as military satellites, with low numbers and very limited launch capacities.

Third, we analyse a newly compiled database for military procurement, which we make available. The Kiel Military Procurement Tracker database can be downloaded from `https://www.ifw-kiel.de/publications/kiel-military-procurement-tracker-33232/`. Procurement volumes have increased substantially in Germany, Poland and the UK. French data are less granular and therefore big trends are more difficult to assess. German procurement started to pick up speed only in late 2023. The numbers of procured equipment remain low compared to Cold War periods or Russian numbers. Gaps in equipment of German armed forces remain substantial and are persistent. France, Germany and the UK procure strongly from domestic producers while Polish procurement leans more heavily towards international suppliers at least for larger equipment, in particular the US and South Korea. Fourth, military procurement does not automatically translate into an increase in capacity. Time lags between procurement decision and estimated delivery are often three years or more. We document production increases in Europe. While production volumes for artillery shells

and howitzers have increased substantially and are close to meeting demand, production volumes for tanks, infantry fighting vehicles, missiles and fighter jets remain low. In terms of employment, the 10 largest European defence companies have increased their employment by 11% since 2021. European development and production of the most advanced systems such as rocket artillery, unmanned and autonomous systems, AI-integrated systems, 6th generation aircraft including Collaborative Combat Aircraft (CCA; drone wingman capability), strategic lift, integrated air defence, airborne early warning and control (AEW&C), satellites, long-range missiles for ground and sea attack, and hypersonic missiles remain limited at best and absent at worst. The import dependency on US producers is large for such modern systems. Current development times show that technological dependencies will last for at least a decade unless policy is focused on addressing this technological backwardness and dependency.

Fifth, we provide two rearmament scenarios of 25 and 50 additional brigades. The latter is often the benchmark in war game scenarios for US troops in Europe and is mentioned by the EU commissioner for defence. We thus consider the ambitious scenario to be particularly needed if (a) US support to Europe became more unreliable or (b) in case of a ceasefire in Ukraine, due to which Russia could rapidly continue its rearmament without any attrition. At least the less ambitious increase of land force capacity is necessary for Europe to withstand a possible Russian attack, for example in the Baltics. We estimate that production of land force systems must increase by a factor of around 3-6 if the aim is to substantially decrease the force advantage of Russia relative to European countries in the next five years (also see E.1 and E.2). Production of other systems such as air defence and other modern technology would need to increase even more.

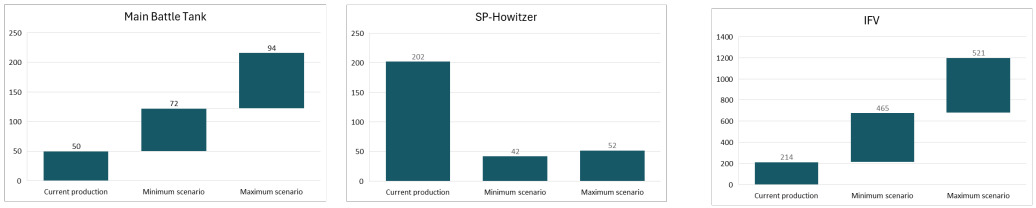
Figure E.1: Stocks and needed increases for selected equipment in two scenarios.



Note: Procured equipment refers to the equipment ordered yet to be delivered.

Source: authors' own elaboration.

Figure E.2: Additional production needed for main military equipment.



Source: authors' own elaboration.

Traditional land force systems need to be modernised to be able to operate in conditions of modern drone warfare and increasingly integrate autonomy and AI tools. At the start of the war, Russia and Ukraine produced thousands of drones and their current production targets are higher than 3 million units per year. Hence the capacity to produce large numbers of drones and unmanned and autonomous ground and sea vehicles is critical to modern warfare. Due to rapid technological change, it is important to invest in technological capabilities rather than in building stocks that are quickly outdated. A substantial investment into missile production capacities, including hypersonic missiles, and into air defence is indispensable for Europe to increase stocks needed for deterrence.

Our overall assessment is that while some progress has been made on procurement, neither numbers nor quality has substantively improved since we published our report last year. Europe thus remains highly vulnerable and dependent on the US. Besides missing quantities, modernisation is progressing slowly: production or even access to high-end capabilities and strategic enablers remain limited.

Unlocking significant financing at the European and national levels is welcome, but spending needs to translate into capabilities and sustained growth in European force generation, sustainment, and military modernisation. Put differently, Europe needs to shift its societal debate from fiscal numbers to actual military capabilities needed, i.e., how to purchase and produce what is actually needed to be successful on the modern battlefield and how to ensure timely delivery with concrete targets for closing critical capability gaps. For that, the effectiveness of military procurement is critical – a topic barely discussed as national defence ministries continue relying on existing and often inflexible national agencies.

Our bottom-up estimates of spending needs on selected weapon systems shows that the price differences between similar types of equipment are very large. In our estimates, the envisaged €800 billion under the EU's ReArm Europe/European Readiness 2030 programme will be too small, if equipment is bought at current high prices. Europe thus needs to focus on cost-effectiveness of procurement.

Finally, Europe investments in military R&D are limited compared to other major powers. In 2024, Europe invested €13 billion in military R&D[1] – but the latest figures for the US ($145 billion in 2023)[2] and China (€21 billion in 2024)[3] are significantly higher, and neither neglected and underfunded military R&D for a decade or more as most European countries did. A large increase in R&D spending will be critical for Europe to increase its strategic autonomy at a moment of uncertain transatlantic relations.

Overall, we highlight the feasibility of making substantial progress through 2030 but emphasise the urgent need to come up with a coherent European rearmament strategy that includes a modernisation strategy to reduce dependencies on the US, a strategy that brings down costs and sets concrete targets for production, procurement, and adoption to ensure funding is translated into European military readiness.

[1] https://eda.europa.eu/docs/default-source/brochures/1eda---defence-data-23-24---web---v3.pdf
[2] https://comptroller.defense.gov/portals/45/documents/defbudget/fy2024/fy24_green_book.pdf
[3] https://www.sipri.org/yearbook/2023

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1 Introduction

Europe's security situation continues to remain challenging. Compared to the autumn of 2024, when we published the first report on "European rearmament" (Wolff, Burilkov, Bushnell, and Kharitonov: 2024a) three major security developments have emerged that explain Europe's rising defence budgets and create the need to take stock of Europe's rearmament process with a new report.

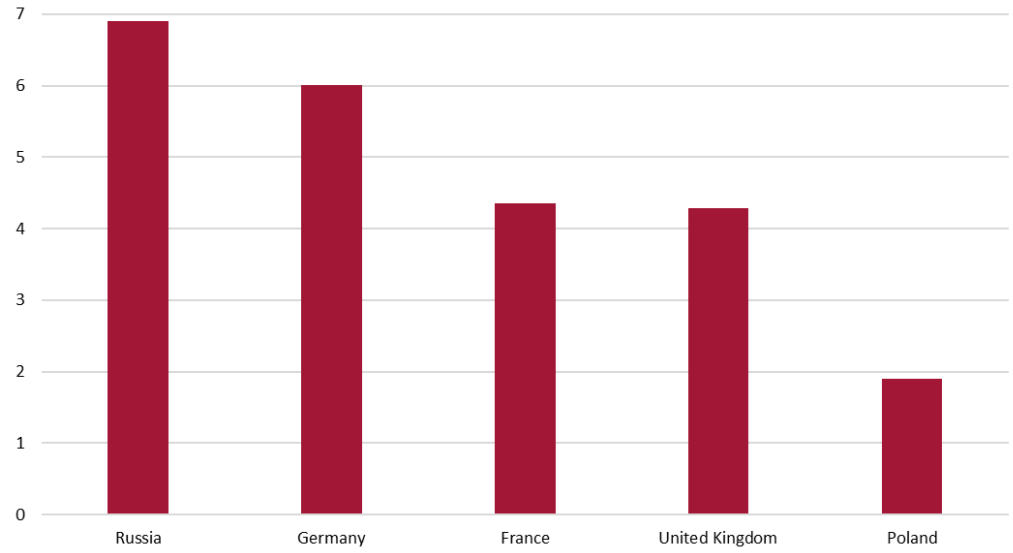
First, a new US administration has created substantial uncertainty among European countries as to the transatlantic security partnership. Among the triggers of the uncertainty was the changing US positioning at the Munich security conference, the direct US negotiations with Russia disregarding European countries, as well as the interruption of US intelligence sharing with Ukraine. The aggravating transatlantic trade relation further adds to the European worry: weak security capabilities constrain the EU's willingness to retaliate against unjustified tariffs. Meanwhile, the US has become the biggest source of geopolitical uncertainty, possibly triggering a global "Trump recession".

European countries are actively working on a European rearmament strategy that could, in the worst case, replace US forces in Europe. This would broadly require building substantial mass, i.e., being able to have sufficient trained personnel and material to fight a peer conflict if necessary, and it also requires acquiring strategic assets that currently none of the European countries has on its own – such as satellite-based intelligence and communication, strategic airlift capacities, air defence capabilities, missile capacities, and others. Even the question of nuclear deterrence capability is now firmly on the table (Gilli and Nicoli: 2025). The German decision to station a brigade in Lithuania shows just how difficult and long-lasting the effort is. So far, only some 400 soldiers have been stationed in Lithuania and equipment for the Panzer Brigade needs to be taken from other brigades in Germany.

Second, the war in Ukraine continues with its attritional and positional character and Russia's war economy is large compared to Europe and growing. The war consumes large amounts of military equipment on both sides and with heavy casualties. Russia's war economy has further increased the production of military goods and has been able to access Western advanced

technology despite sanctions (Hilgenstock et al.: 2025; Bilousova et al.: 2024). Russia remains the largest economy of Europe in purchasing power parity (see Figure 1.1) and has devoted substantial resources to its military production. Russia spends almost 7% of its GDP on its military and more than 35% of its federal budget. Meanwhile the comparison of military spending in PPP shows that Russia still is at least on par with European countries collectively. According to IISS, Europe spent less than Russia measured in PPP in 2024.[4]

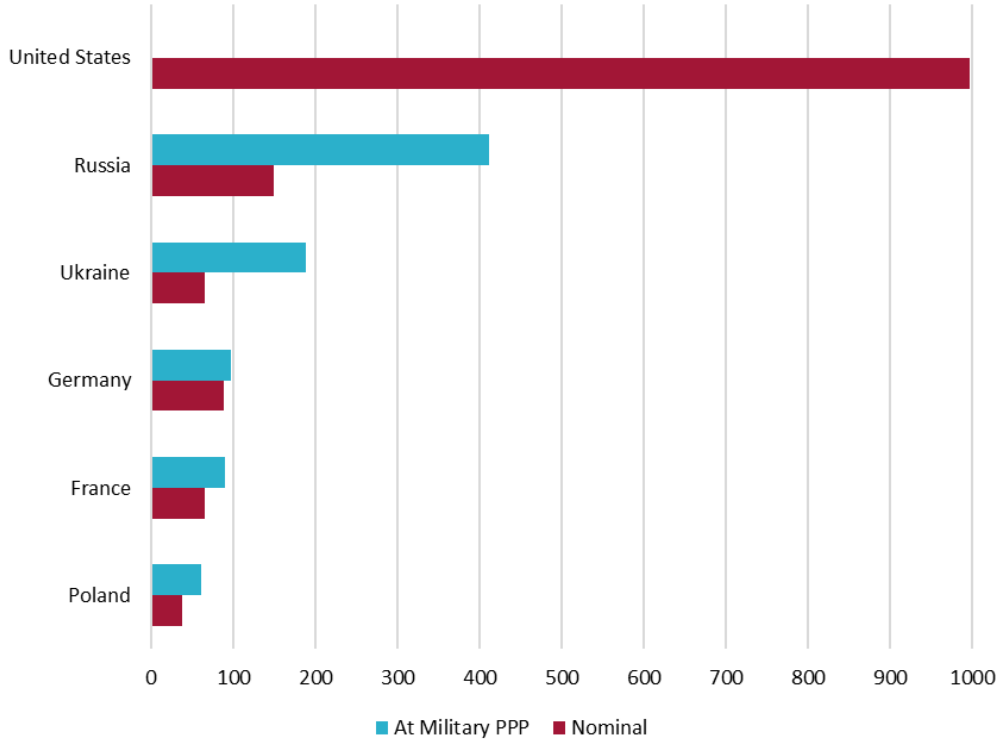
Figure 1.1: Gross domestic product in purchasing power parity (trillion USD).



Source: authors based on IMF, World Economic Outlook.

[4] https://www.politico.eu/article/russian-defense-spending-overtakes-europe-study-finds/

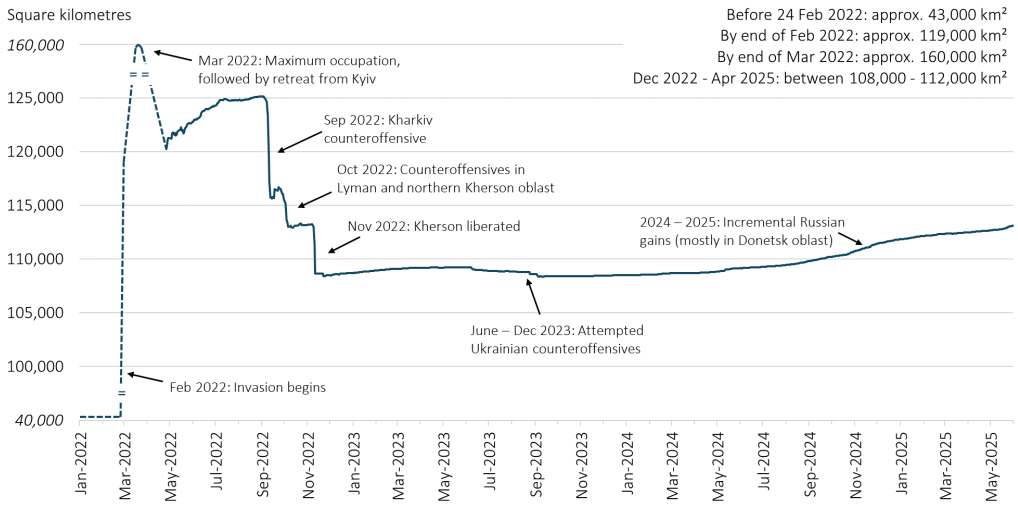
Figure 1.2: Defence spending in military PPP USD billion for main NATO countries, Ukraine and Russia in 2024.



Source: authors based on Robertson (2022).

Russia has made significant advances across much of the front, especially in the southern Donbass, but it has not managed to return to manoeuvre warfare and large-scale breakthroughs. Furthermore, while the Russians have been continually on the offensive since October 2023, the pace of territorial advances has slacked somewhat since February 2025. Figure 1.3 shows that Russia initially managed to occupy a large area of Ukrainian territory and after the liberation of parts of it, land gains of Russia have become gradual. Ukraine had seized parts of the Russian Kursk oblast in August 2024 in a lightning offensive. In a grinding battle resulting in high losses for both sides, the Russians (including regular troops, conscripts, various special forces, and North Korean auxiliaries) eventually expelled the Ukrainians (some of the best of Ukrainian military) from the bulk of Kursk by March 2025 – with Russian military successes particularly large in the week when US intelligence sharing with Ukraine was stopped.

Figure 1.3: Total area of Ukraine occupied by Russia, 2022–2025 (square kilometers)



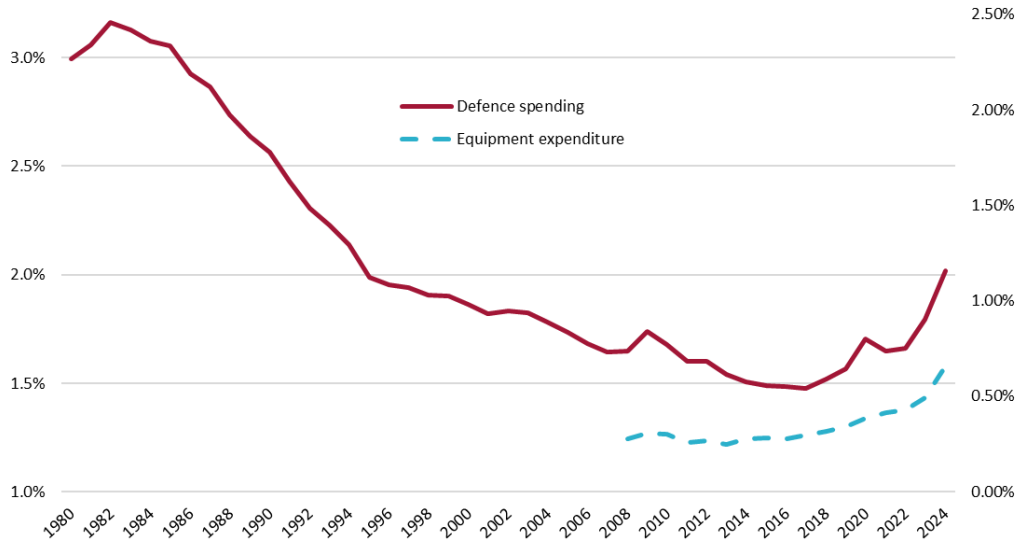
Note: Reliable data not found for February-March 2022. Ukrainian incursions into Russian territory are not accounted for. In the initial phase of the war, manoeuvre warfare was still possible for Russia, which explains why there have been rapid increase but also losses of territory. It also needs to be highlighted that territorial definitions of occupied territory are somewhat uncertain in the initial phase, therefore the data are "dashed".
Source: authors based on Deep State UA (2025).

Third, the technology and strategy of modern warfare is changing rapidly, requiring European rearmament efforts to focus not just on acquiring mass but also accelerating modernisation. Drone warfare has become extremely powerful in Ukraine's war of resistance against the Russian aggression. The Ukrainian capacity to attack airfields deep in Russian territory with truck-based drones highlights not only new approaches causing significant damages.[5] It also highlights how relatively cheap technology can be used effectively in audacious military operations. It also raises far-reaching questions on the protection and security of civilian and military infrastructure across Europe against state and non-state actors.

European defence budgets have gone up and are set to increase further. Military spending in Europe (including Russia) rose by 17% to $693 billion from 2023 to 2024 (SIPRI: 2025). In NATO Europe, defence spending has now reached 2% (see Figure 1.4). Among the European countries with rapidly rising defence budgets, it is worth highlighting the rising spending in the North-East of Europe. Poland's defence budget is now 4.7% of GDP. Germany's defence spending has increased to 2% and the new German chancellor succeeded in changing the constitutional debt break in Germany to allow funding further increases in the defence budget with deficits.

[5] see, for example: `https://www.ft.com/content/132e4327-11da-4412-b36b-7363604879e6`

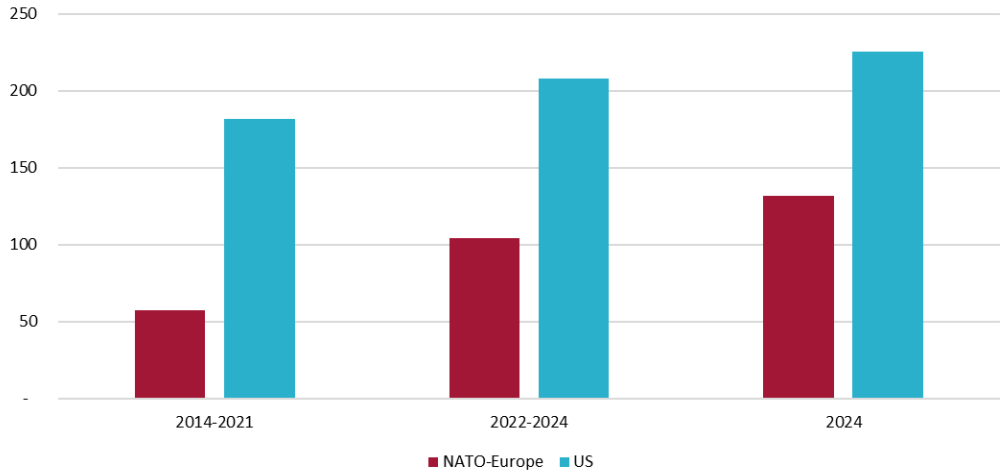
Figure 1.4: Defence spending in NATO Europe (left scale) and spending on military equipment (right scale) in percent of GDP.



Note: NATO Europe refers to all NATO Members except the US and Canada. Data between 1980 and 1989 does not include the Western Balkans, Bulgaria, Czechia, Slovakia and the Baltic countries, and some observations are estimates. Before 1989 the observation for German refers to the Federal Republic of Germany only.
Source: authors based on NATO, SIPRI and IMF.

With European defence budgets rising, spending for military equipment has been rising, reaching now 0.7% of GDP. European increases in defence budgets went disproportionally into equipment spending with the share of equipment spending in total defence spending rising from only 14% to now above 30%. Many European countries therefore now comfortably achieve the 20% NATO target of equipment spending relative to total defence spending (see Figure 1.4). Eventually, these proportions are likely to adjust again. In Poland, we find that more than 70% of the defence spending increases between 2022 and 2024 went to equipment spending. In Germany, the increase was almost exclusively spent on equipment. These effects are bound to change as personnel costs will tend to rise again as European militaries will need to attract troops. European equipment spending has therefore caught up substantially with US equipment spending but is still only half of US total spending (see Figure 1.5).

Figure 1.5: Average annual expenditure on military procurement. USD billion 2015 prices.



Source: authors based on NATO.

More military spending does not automatically and immediately translate into military capabilities, especially if the defence industrial base is strained. First, price increases for military equipment might absorb large parts of budget increases, which will be particularly the case if supply is constraint, i.e., the supply elasticity of equipment is low. The top US general in Europe recently stated that "this question of the elasticity of our defence industrial base, again, on both sides of the Atlantic, is one of the great strategic questions of the next 10, 15 years." [6] Burilkov et al. (2024) document that the US military defence industrial base is currently facing substantial strains as visible in delayed deliveries and relatively low production output. **Second**, spending and delivery do not automatically correspond as many complex products are paid for during several years until the final operational product becomes available. **Third**, the equipment spending might be focused on the wrong type of equipment. Modernisation needs challenge traditional procurement processes. For example, purchasing 3D printers for mass drone production might be more effective than developing advanced new weapon systems but will require breaking with traditions. **Fourth**, military spending in NATO definition does not automatically mean military capabilities, for example as spending on retired soldiers is included (McKinsey: 2025).[7] Specifically, the study excludes nuclear deterrents (in France and the United Kingdom), pensions from historic conflicts and other spending on retired personnel, donated material (for example, to Ukraine), and spending on community engagement

[6] General Cavoli, SACEUR, in a US senate hearing. https://www.armed-services.senate.gov/imo/media/doc/4325fulltranscript.pdf

[7] https://www.mckinsey.com/industries/aerospace-and-defense/our-insights/a-different-lens-on-europes-defense-budgets?utm_som

(such as museums). **Finally**, equipment spending might only just compensate for the depreciation of existing equipment stocks – after decades of under investment during which stocks rapidly depreciated and equipment spending did not suffice to sustain capacity levels.

When studying Europe's military industrial production, it is worthwhile to highlight that Ukraine is increasingly producing with its own defence industrial base. Mass production of drones – including very long-range models – cruise missiles, tanks, and artillery has compensated for fluctuations in Western arms deliveries. This "porcupine strategy" has done much to enable continued organised Ukrainian resistance. It also bodes well for post-war Ukraine's capability to resist any potential further Russian aggression, as well as the potential of Ukraine to become a major contributor to the broader European defence ecosystem. Kirkegaard (2025) highlights that the Ukrainian military industrial base has become a major supplier of weapons and could play a role for all of Europe. It is also increasingly integrated with Western producers that are opening production sites in Ukraine. **A European rearmament strategy needs to not only draw on Ukraine's experience in warfare but also increasingly on its industrial base.**

Dependency on foreign production and technology is a growing concern in Europe. Europe currently imports substantial amounts of weapons, with imports having increased from approximately $3.4 billion for the period 2019-2021 to $8.5 billion for 2022-2024 in EU countries according to trade statistics .[8] Yet, these increases have been less than the overall increases in equipment spending. We study import dependencies of various European countries and show that in general equipment spending tends to go to domestic producers or joint ventures. Dependency on foreign suppliers is thus overstated and not a general concern. However, our analysis suggests substantially larger dependency when it comes to the most advanced technologies. **Greater emphasis on advancing the European technological independence is critical.**

European rearmament efforts need to find the right mix between different weapon systems as well as new and "old" technologies. This report cannot offer a concrete rearmament strategy, a task that is the responsibility of military planners. Yet, we do assess how procurement priorities have shifted in the last years. We also discuss recent evidence that shows that new technologies such as unmanned systems, AI technology, and drones have to be incorporated into military strategy and procurement planning as they have become indispensable in modern warfare as observed in Ukraine. We also highlight Europe's needs to build satellite capacities as well as other strategic enablers currently exclusively provided and controlled by the US.

Europe's rearmament strategy has set itself a tight timeframe of five years given the high security concerns and might need to increase ambitions. European leaders have endorsed

[8] `https://comtradeplus.un.org/` , using HS Code 93 "Arms and ammunition; parts and accessories thereof", covering within others artillery weapons (e.g., howitzers), firearms, ammunition or rocket launchers.

the year 2030 as the year in which Europe needs to be able to defend itself in a peer conflict.[9] NATO findings suggested that Russia might be ready to attack in the next 4-5 years[10]. German defence minister Boris Pistorius has endorsed this warning[11]. Yet, the timeline might need to be compressed further. The negotiations between Russia, the US, and Ukraine might mean that hostilities may come to an end.[12] At that point, Russia will be able to regroup its substantial existing capacities – which could very quickly represent a direct threat to EU states. Moreover, Russia's war industry will likely build further capacities at a rapid pace based on its strong military industrial output. Achieving military readiness earlier than 2030 might therefore be warranted.

The aim of this report is to assess the state of progress in Europe's rearmament efforts. Section 2 assesses Russia's military production. We show that military production has increased further since the last publication of the report and has now likely plateaued. **Section 3 summarises existing military stocks across several European countries.** Military stocks in 2024 were not substantially different to those in 2021 before the full-scale invasion of Ukraine. Needs therefore remain very high and gaps substantial. **Section 4 assesses military procurement in four European countries based on a new database.** The Kiel military procurement tracker updates the **German** data of Wolff, Burilkov, Bushnell, and Kharitonov (2024b) to date. We have now added a new procurement tracker for the **UK** and **Poland**, and we summarise official information from France as well. **Section 5 studies where military procurements are made**: domestically, in European partner countries, in the US, and elsewhere. **Section 6** explores the evolution of **delivery delays**, the build-up of the industrial military capacity and the existing **technology gaps** in Europe. **Section 7 maps targets for European 2030 readiness into yearly procurement and production capacity and the final section assesses the needs of increased production and capacity.**

2 Tracking the Russian military build-up

This chapter continues the analysis presented in September 2024 in the IfW Kiel report "Fit for war in decades: Europe's and Germany's slow rearmament vis-à-vis Russia." That report's analysis ended in July 2024, while this new report extends the analysis to March 2025. Although the fundamental nature of the war as a grinding, attritional peer conflict (Vershinin: 2024) has not changed, this eight-month period has seen noteworthy developments.

[9] See for example: https://www.eeas.europa.eu/eeas/white-paper-for-european-defence-readiness-2030_en

[10] https://www.nato.int/cps/en/natohq/opinions_231348.htm

[11] https://www.politico.eu/article/vladimir-putin-russia-germany-boris-pistorius-nato/

[12] It has not, however, translated into a reduction of the intensity of the fighting. Until settlement, both combatants have very strong incentives to fight on all the harder until the end of hostilities, as the final outcome of territorial control is highly likely to freeze alongside the demarcation line at the conclusion of hostilities.

Conceptualising the Russian threat

The most likely scenario for Russian military coercion and aggression against Europe is through the massed power of its land forces. Scenarios typically invoke rapid breakthroughs by Russian ground units against the Baltic states, which are geographically vulnerable. The Suwalki Gap separating Kaliningrad from Belarus is a classic instance, but the eastern regions of Estonia, centring on the city of Narva, are even more vulnerable. The topography is more conducive to manoeuvre warfare and Russian supply lines would be substantially shorter. Such incursions would be absolutely contingent on speed of action, as the likelihood of a successful breakthrough decays rapidly within 30 days of combat.

What of coercion via airpower and precision missiles and drones? If anything, the war in Ukraine has shown the limitations of strategic bombing for achieving strategic and political goals, at least for a military like Russia's: powerful enough to be in the same category as China and the US, but whose air force (the VKS) is no match for the US Air Force. Russia has expended more than 10,000 precision munitions against Ukrainian strategic targets without achieving its political goals. Therefore, Russian missile stockpiles are likely to be most impactful if deployed tactically in conjunction with ground forces to enable rapid breakthroughs, rather than on strategic missions alone.

Finally, what of the Russian Strategic Rocket Forces? The Russian nuclear arsenal remains the largest on the planet and is highly sophisticated. It enjoys the full nuclear triad and continually modernising delivery vehicles, including multiple hypersonic systems. Notably, the nuclear-capable Zircon hypersonic cruise missiles have struck Kyiv, and the *Oreshnik* intermediate-range ballistic missile (IRBM), a conventional variant of the nuclear *Rubezh* IRBM, targeted a military industrial complex in Dnipropetrovsk. Russia also has a very diverse arsenal ranging from tactical to strategic, giving Moscow the full range of possible options in a nuclear escalation scenario, unlike Europe, which only has strategic nuclear weapons: the French and British nuclear submarine-launched ballistic missiles (SLBM). However, European possession of this credible submarine-based nuclear deterrent also makes crisis initiation directly through nuclear means highly risky for Russia.

Methodology for estimating Russian production

This chapter's methodology continues the approach from the September report. This is relevant as the nature of the fighting has not fundamentally changed, including continual Russian offensive action with tangible results. To briefly summarise, Russian units fighting in Ukraine are catalogued to get at the Russian order of battle (ORBAT). The composition of Russian forces, from brigades and regiments down to their constituent battalions and batteries, gives us the total number of such standardised units in theatre. Finally, taking these units' tables of organisation and equipment (TOE) gives us the "paper strength" of the Russian contingent in Ukraine: the total maximum

possible number of each system in theater.

The attrition rate of Russian forces corresponds to established benchmarks for conventional warfare. We estimate the monthly production rate needed to maintain the combat effectiveness of the Russian contingent in theater. Additionally, we close with a brief look at exports, which are deprioritised as compared to sustaining the troops in Ukraine and generating new forces for confronting NATO.

Weapons systems

Production has begun to plateau from Q1 2024 on. This is indicative of limits on maximum Russian force generation. Furthermore, depending on the weapons system category, production relies to a variable degree on retrofitting rather than entirely new systems. This is most pronounced for tanks, tracked artillery, and certain IFVs, and less so for other systems.

Approximately 75% of Russian land power is currently deployed to Ukraine, and sustaining this force is the ceiling on Russian production for the time being. Of note is the apparent decrease in Lancet production. This is likely a function of how we measure Lancet production, which is by counting confirmed Lancet strikes from video footage. The limitation of this approach is that it cannot directly account for potential stockpiling.

Table 2.1: Russian quarterly production of key weapons systems.

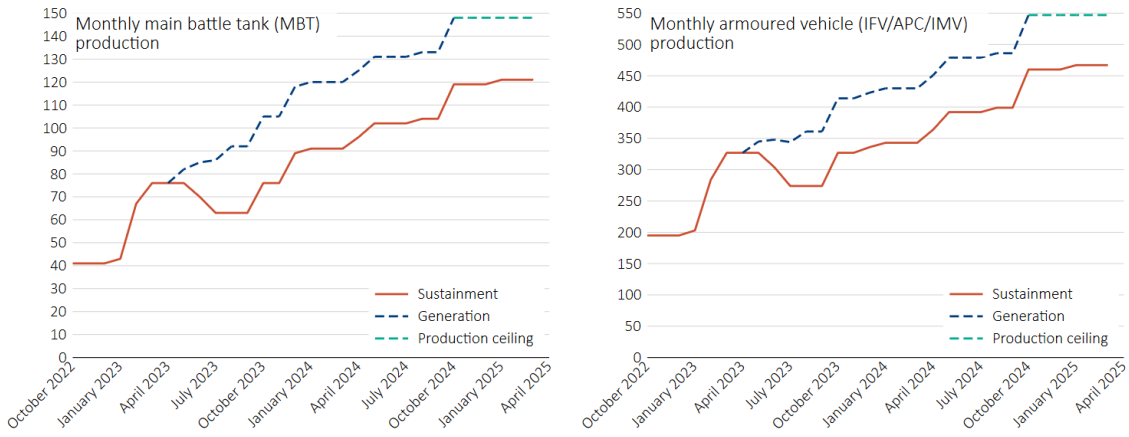
Quarter	Tank	IFV/IMV	Artillery	SHORAD	Lancet
Q4 2022	123	585	60	9	93
Q1 2025	444	1641	168	30	336
Total increase	260%	180%	180%	233%	261%
Increase 2024 only	23%	27%	21%	11%	-24%

Source: authors' own calculations.

Monthly production rates fluctuate significantly, increasing rapidly before eventually plateauing as Russian force generation slows. Each following graph shows three different lines summarising production. Sustainment shows what is needed for the forces currently fighting in Ukraine. Generation summarises the new materiel needed for the 25th Combined Arms Army and the 40th and 44th Army Corps, new formations intended to bulk up Russian mass and likely combat capable by October 2024. Finally, production ceiling shows the maximum possible production if Russia chooses to produce at the intensity needed to generate new units as well as sustain troops already in Ukraine.

Even as drones have shifted to become the main killer in Ukraine[13], frontline systems – tanks and other armoured vehicles – remain critical for supporting the infantry. Notably, ample provision of such systems is necessary to keep casualties down. For instance, both Ukrainian and Russian observers have praised the US-produced M2 Bradley as an excellent, resilient vehicle that has saved many times a squad of Ukrainian soldiers from Russian firepower. Armoured vehicles are also critical for casualty evacuation in environments saturated by air defence, which makes helicopter casualty evacuation highly risky.

Figure 2.1: Frontline systems: tanks (MBT) and other armoured vehicles (IFV/APC/IMV), estimated monthly production.



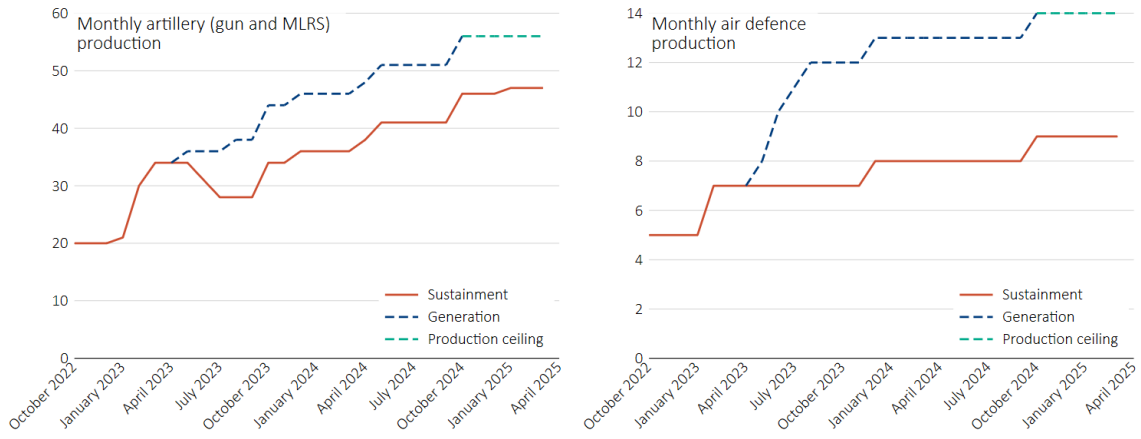
Source: authors' calculations.

Russian tank production has peaked at nearly 150 per month, while that of other armoured vehicles at 550 per month. The consequences of relying on retrofitting will be most keenly felt for tanks and IFVs, which will have to compete for limited numbers of hulls. Lighter systems, especially IMVs, face fewer constraints, but also provide more limited protection, especially from drones.

Rear systems production also surged before plateauing. Notably, air defence production remains higher than in Europe, although the rapid transformational advances in drone technology will also eventually lessen the importance of traditional, missile-based SHORAD as it shares the air defence space with gun-based air defence and even more consequentially with directed energy solutions.

[13] https://www.euronews.com/my-europe/2025/06/08/win-win-partnership-french-companies-to-manufacture-drones-in-ukraine

Figure 2.2: Frontline systems: artillery and air defence, estimated monthly production.



Source: authors' calculations.

There is a notable shift to wheeled artillery, which is lighter, far cheaper, and does not compete with tank production for hulls. While artillery has been eclipsed – for now – as the dominant killer on the battlefield by drones, it nonetheless retains a role in delivering massed firepower capable of suppressing entire units. Russian production of artillery of all types has reached 56 per month, but it is notable that corresponding Ukrainian production of the wheeled Bohdana howitzer has reached 20 per month. Taking into account European production, this indicates that while Russia has had a significant quantitative head start in artillery, its capabilities can be matched by combined Ukrainian and European production.

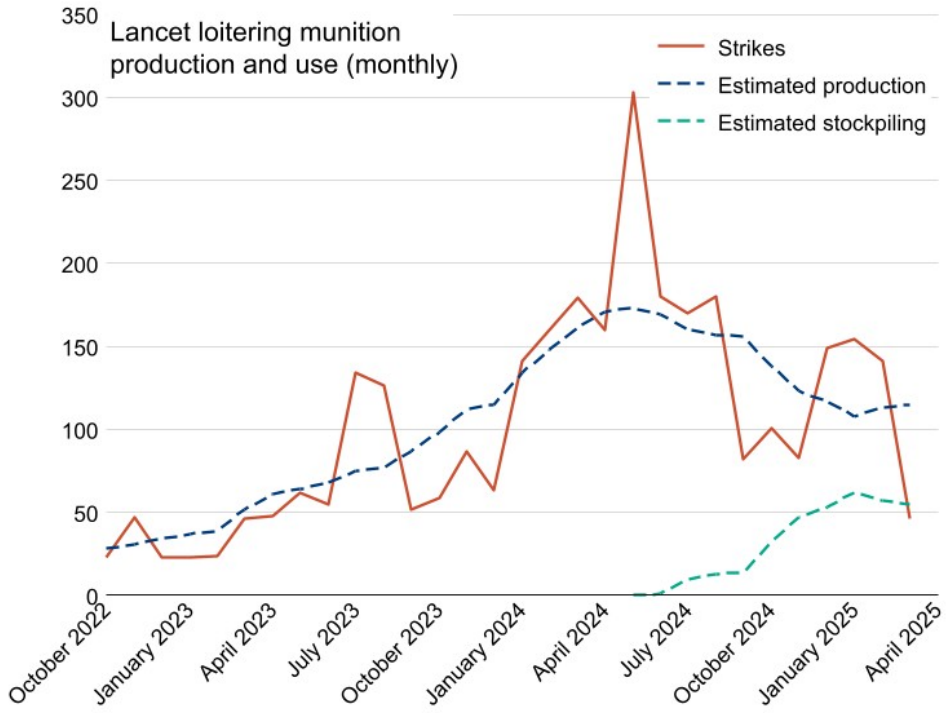
It should be noted that modern artillery tactics – both Ukrainian and Russian – have evolved to maintain a role for towed artillery. Unlike self-propelled artillery that must use "shoot and scoot" tactics, remaining mobile for survivability, towed artillery can remain stationary and concealed at long ranges for extended periods of time, as the systems are far smaller and lack the engine and sensor signatures of self-propelled artillery. Additionally, they can rely on smaller, distributed crews, increasing dispersion and therefore mitigating casualties. When using modern guns and guided munitions, towed artillery is no less deadly than its self-propelled counterpart. In the case of Russia, the available Giasint-B 152mm towed howitzer are relied upon. It is likely that such systems will continue to be integrated into the Russian military, further increasing the firepower of Russian units.

Munitions

The Lancet long-range loitering munition has played a key role on the battlefield since its introduction in large quantities. For instance, the saturation of the Kursk battlespace with Lancets in the first days of the August 2024 Ukrainian offensive was instrumental in blunting the Ukrainian spearheads,

eventually allowing Russian reinforcements to cordon off the area and return the fighting to positional, attritional warfare.

Figure 2.3: Lancet long-range loitering munition production and use.



Source: authors' own calculations.

Lancet production increased rapidly once its effectiveness became evident. Production and use appear to have peaked in the spring of 2024. Since then, use, and therefore production, took a downward trajectory that eventually stabilised at roughly 120 produced in January 2025. It is likely this stabilisation indicates the stockpiling of Lancets for other purposes than the direct fighting in Ukraine. This could include the training of new drone specialists, stockpiling for a future conflict, or the intention to export Lancets to interested parties.

Furthermore, Russia unveiled the export version, the Lancet-E, in late 2024. Openly, this system does not yet have clients. However, it merits observation whether it appears in conflict zones, especially in the Middle East. This would be a significant signal of excess production capacity. It is also a sign that Lancet drones might be used less frequently in Ukraine as their effectiveness has decreased due to a drop in effectiveness of the Orlan drones that provide targeting for them.

Future Russian military power

This section outlines scenarios for future Russian force generation. As outlined, Russia is likely to remain an adversary and to continue building up and modernising its military going forward. The Russian ground forces pose the most immediate and likely threat to Europe. However, the Navy and Air Force are strategic enablers for the ground forces, and that is their formal function first in Soviet then Russian doctrine. Therefore, a look at their near-future prospects is warranted.

Land forces

As previously outlined, Russian production relies to a variable degree on retrofits, reaching up to an estimated 80% for tanks and systems that rely on tank hulls, such as tracked self-propelled artillery (Watling and Somerville: 2024). These systems are taken out of storage and modernised to the current battlefield by the addition of improved armour, sensors, and electronic warfare capabilities. This is a finite resource, however, limited by what the Red Army left behind, and likely to constrain Russian ambitions from 2026 onwards. Nonetheless, the decision to increase the semi-annual conscription classes in 2025 to 160,000 strongly indicates that Moscow is contemplating post-conflict force generation.

In a post-conflict scenario, the reliance on retrofits will be balanced out by the lack of attrition, which currently causes very significant yearly losses on Russian stocks. The reliance on retrofits is variable. It is highest for tanks and IFVs, which rely on older hulls – although this problem is shared by Western armour production. The Kremlin has deliberately tried to address this for artillery by switching production over from the Msta and Koalitsiya-SV howitzers, which compete with tanks for limited hulls, over to the wheeled Malva howitzer. The Malva is undergoing trials to integrate the Koalitsiya-SV's advanced 152mm gun. This mirrors switches over to wheeled artillery in other militaries due to their higher mobility and lower cost, such as integrating the PzH2000's gun into the wheeled RCH 155. Finally, the IMVs that bulk out the vehicle contingents of motor rifle units rely on entirely new production and would therefore decrease less than other systems.

There are further constraints on future Russian force generation. Not all production can go to generation, even if the Kremlin wishes to radically increase land combat power. Some must be diverted to maintenance, exports, and force modernisation. Furthermore, personnel will become a serious constraint. While large cash payouts have secured substantial numbers of contract soldiers for the war, augmented by reservists, mercenaries, and volunteers, the financial burden will be difficult to sustain indefinitely. Without an active conflict, the nationalist motivation for enlisting will also gradually lose its appeal as wartime mobilisation fades.

Taking purely production into account, the maximum number of new motor rifle brigades that could be generated through 2030 is 32. This, however, would also translate into an additional 160,000

troops for these brigades alone, not accounting for the additional "tail" of support troops that would also be significant. In September 2024, Putin issued a decree to increase the number of active servicemembers in the Russian military by 180,000, from 1.32 million to 1.5 million.[14] Therefore, a more realistic assessment of Russian force generation through 2030 would range the number of new brigades between 12 and 16, with a significant reserve of materiel for sustained peer conflict. The availability of armour – tanks and IFVs – will remain a constraint and boundary condition on Russian offensive ambitions.

The Navy

In April 2025, the Kremlin announced major new funding for the Navy: €90 billion through 2050 for expansion and modernisation.[15] This includes tight integration of hypersonic missiles and unmanned systems into the fleet. New warship construction is to take place in the first decade of this program. As expected according to Soviet and Russian doctrinal tradition, the first focus will be on the strategic nuclear forces. This means modernising the "bastion defence" of Russian strategic ballistic missile submarines under the Arctic pack ice, in this case of continuing the expansion of the Borei class submarine fleet, and its gradual replacement by the Arcturus class from 2037 on.

Conventional capabilities will take a backburner to the strategic mission but are not to be neglected. This means prioritising the expansion of the fleet of nuclear-powered attack submarines of the Yasen class. This is a versatile platform intended both as hunter-killer and for carrying conventional hypersonic missiles for land- and sea attack missions. Furthermore, following the demonstrated success and value of unmanned systems in various theatres, there is to be a substantial increase in funding and integration into existing platforms.

The concentration of Russian maritime power has always been hampered by the disjointed, multi-theater strategic context of Russia. Each of its fleets – Northern, Baltic, Black Sea, Caspian, and Pacific – acts more or less independently of each other and in wildly different strategic environments. This means that for Europe, the main challenge from Russian maritime power will come from the Northern Fleet, as the Baltic and Black Sea fleets are less substantial, and in particular the Baltic Fleet must now operate in a "NATO lake."

The Northern Fleet commands 32 surface warships, whose main task is to defend the White Sea. It also commands 33 submarines. Of these, 7 are devoted to the nuclear deterrence mission, and the rest can be used in conventional attack missions. The most relevant would be maritime interdiction in the North Atlantic, with submarines and surface warships augmented by long-range

[14] https://www.reuters.com/world/europe/putin-orders-russian-army-grow-by-180000-soldiers-become-15-million-strong-2024-09-16/

[15] https://www.navaltoday.com/2025/04/16/russia-unveils-massive-financial-injection-for-naval-sector-100-8-billion-for-new-warships/

Russian naval aviation. Just as in the Cold War, the GIUK Gap (Greenland-Iceland-UK) is once again a key defensive line for Europe. In March 2025, NATO increased its presence in the GIUK Gap.[16] This will be a key area for maritime patrol in the future.

Unmanned maritime systems – surface and undersea – are set to become critical capabilities for navies. Such systems have seen success in the Black Sea in combat operations, and are essential for maritime patrol, especially undersea, at scale. The Kremlin understands this, and Russian unmanned capabilities will grow, including undersea capabilities to target vulnerable critical infrastructure. European unmanned capabilities should grow in kind, not only to patrol the North Atlantic, but to provide capabilities of reaching into the White Sea and proactively addressing the threat of the Russian Northern Fleet.

The Aerospace Forces (VKS)

Similarly to the Navy, the Aerospace Forces have grown qualitatively and quantitatively since 2022. Notably, production of the 5th generation Su-57 aircraft has doubled since 2022 with the addition of a second production line. The current production variant is the Su-57M1, an enhanced version that takes into account the lessons of the war, including a new and superior engine, AI integration, and the Su-70 stealth drone wingman for Collaborative Combat Aircraft (CCA; drone wingman) capability. Between 8-10 were delivered in 2023. Total numbers of Su-57 are likely to be between 30 and 40, making it a niche capability in the VKS. By 2030, the VKS would have between 80 and 115 Su-57, compared to over 400 5th generation F-35 variants in European air forces.

Following Soviet and Russian doctrine, Russia would compensate for a smaller air force through an oversized integrated air defence network and Russia's strategic depth, which allows distributing forces and shield key assets deep enough in Russian territory to be out of range of intruding aircraft and missiles. For instance, the Engels strategic bomber base is more than 1,400km from potential launch points in European airspace, while Orenburg, which likely houses the new Rubezh conventional medium-range ballistic missiles, is over 1,900km away. Production centres in the Volga Basin and the Urals are more than 1,400km and 2,000km away respectively.

Russian strategic depth provides enhanced defence against conventional means, but could not prevent the audacious June 1, 2025 Ukrainian covert operation that used drones smuggled deep into Russia to target the Russian strategic bomber fleet directly in their air bases. The attack struck 41 aircraft, likely destroying 12. There are several key lessons here. One is the vulnerability of large, fixed assets – like air bases, ports, and large industrial facilities like refineries – to asymmetric methods empowered by unmanned and autonomous systems and AI tools. Another is that such attacks and

[16] https://mc.nato.int/media-centre/news/2025/nato-naval-task-group-increases-presence-and-patrols-in-the-giuk-gap

methods are not exclusive to this conflict and are likely to be replicated elsewhere. Western air bases and aircraft on the ground are just as vulnerable as Russian ones.

However, the Su-57 has also found some success in the export market. Algeria has chosen to procure it and will receive 6 aircraft in 2025[17], with further orders likely. Russia will be pitching the Su-57 to Asian clients aggressively in 2025. India is a likely client, as its Rafales and MiG-29s suffered one-sided losses against Pakistan's modernised air force, boasting Chinese aircraft and long-range missiles. Additionally, Pakistan is likely set on expedited acquisition of China's 5th generation J-35, strongly increasing Indian incentives to acquire the Su-57 to prevent overmatch.

It should be noted that just as the US and China, the VKS has many niche capabilities that European air forces lack. These include the Tu-22M3 and Tu-160M strategic bombers, the Su-35 dedicated ground attack aircraft, and the high-speed MiG-31, which can carry either ultra-long range air-to-air missiles or Kinzhal hypersonic missiles. The Tu-22M3 can also act as a naval bomber carrying heavy anti-ship missiles, which is relevant for the Arctic and the North Sea.

Air-to-air combat at scale has been very scarce in Ukraine due to the size disparity of the air forces and Ukraine's defensive strategy relying on mobile ground-based air defence. This is coupled with comprehensive, real-time NATO intelligence and surveillance that enables missions by very small numbers of Ukrainian aircraft to evade Russian aircraft and air defence, while the Russians cannot target NATO assets without triggering a wider conflict. The Ukrainian air force has nonetheless suffered constant attrition in aircraft and skilled pilots, including several Western-provided F-16 lost in combat.

This scenario is atypical for modern warfare. A more standard scenario for large-scale aerial warfare played out in the May 2025 Indo-Pakistani clashes.[18] India's Operation Sindoor saw the largest clash of 4^{th} and 4.5^{th} generation aircraft, with 42 on the Pakistani and 72 on the Indian side. Pakistan's defensive posture and effective use of Chinese aircraft, long-range Chinese PL-15E air-to-air missiles, and Swedish SAAB Erieye airborne early warning and control (AEW&C) aircraft to target Indian aircraft and coordinate Pakistani units saw the engagement end with between 3 to 5 Indian aircraft losses to zero Pakistani, potentially including 3 French Rafales. Notably, Pakistani missiles outranged Indian ones, which proved a critical factor. However, Indian missiles and drones hit and damaged multiple targets in Pakistan. The Pakistani retaliation, launched from within Pakistani airspace, showed very limited effectiveness as India's Russian-provided air defence network largely neutralised it, with the S-400 air defence system showing excellent performance.[19]

[17] https://www.timesaerospace.aero/features/defence/algeria-confirms-acquisition-of-su-57

[18] https://nationalinterest.org/blog/buzz/how-chinese-missiles-routed-indias-air-force-over-pakistan

[19] https://warontherocks.com/2025/05/operation-sindoor-and-the-evolution-of-indias-strategy-against-pakistan/

What is emerging is that modern air operations are fought at ranges longer than ever before, with sensors, low-observability features, and increasingly AI playing critical roles in survivability and mission effectiveness. The air force of the future will increasingly integrate unmanned and autonomous systems at scale, exemplified by CCA capability fusing manned aircraft and their drone wingmen. This form of warfare is also one where industrial might and production rates are more critical than anywhere. Whereas land forces can find ways to compensate for inferior firepower and technology, the same is not the case for air forces. Unless there is a significant mismatch in technological level – for instance the Gulf War or the Kosovo War – production rates for missiles and aircraft are a key determinant of victory.

3 Existing stocks in European military capabilities

In this section we summarise the data of the military equipment stocks for the armies of Germany, France, the UK, and Poland. We firstly look at the stock levels for main military equipment between 1992 and 2024. Data are from the 'Military Balance', a report published by the International Institute for Strategic Studies (IISS). The report focuses on deployable, ready-to-use, weapons.[20]

While the IISS covers a high level of granular data for military stocks, the level of depreciation of the weapons is not included. Thus, the aggregate information should be interpreted with caution. Similarly, small differences with the actual official numbers can occur due to either the original assessment or changing in the stocks after the data compilation. For instance, latest French documents from the Defence Ministry indicate 6 TRF1 and 30 CAESAR Howitzers delivered to Ukraine in 2024, and only 12 CAESAR Howitzers delivered to France's military. The IISS only shows a decrease in 16 CAESAR Howitzers, however. So IISS data therefore only provide approximate estimates of stocks.

Being aware that possible discrepancies may exist, we proceed to analyse the evolution of the equipment stocks for the following equipment 1) main battle tanks (MBTs), 2) infantry fighting vehicles (IFVs), 3) other armoured vehicles (light tanks and armoured vehicles), 4) artillery (towed and self-propelled howitzers and MLRS), 5) anti-aircraft weapons (towed and self-propelled missile systems and guns), and 6) combat aircraft. Table 3.1 documents the decrease in the size of stocks since the early 1990s until 2021 as already documented by Wolff, Burilkov, Bushnell, and Kharitonov (2024a). Tables contained in Annex A1 offer a more granular level of information by equipment items and country. The message remains that compared to the beginning of the peace dividend years (1990s to 2014), European armies have substantially reduced sizes of equipment – with numbers falling by factors of 5-20. Put differently, European armies are far from having the masses that were considered critical during the Cold War.

The question is whether IISS data suggest any improvements in the last three years, i.e., from 2021-2024. For the four considered countries, the number of MBTs or IFVs is the same or even smaller than in 2021. In the case of Howitzers and MLRS, only Poland has increased its stocks with the acquisition of the South Korean K9 and Krab self-propelled Howitzer models and the MLRS Homar-K. In air defence, numbers have increased in Poland and Germany but not in France and the UK.

In the next section, we analyse procurement of new material. IISS data certainly suggest that some combination of (a) delayed or insufficient ordering, (a) long delivery times, and (c) equipment donations to Ukraine has meant that stocks of military equipment have not meaningfully changed in

[20]Following Wolff, Burilkov, Bushnell, and Kharitonov (2024a), we do not consider in this paper the weapons categorised as "in store", meaning "held away from front-line units", by the IISS.

the past few years.

Table 3.1: German, French, British, and Polish Arms Stocks 1992–2024.

	1992	2004	2013	2019	2020	2021	2024
Germany							
Main Battle Tanks	6648	2398	322	323	323	319	313
Light Tanks	118	343	128	175	175	175	180
Infantry Fighting Vehicles	3250	2122	395	651	710	674	680
Armoured Vehicles	12977	3646	2114	1933	2067	2067	2234
Howitzers	3214	978	130	121	121	121	109
Long-Range Anti Aircraft	300	0	14	30	30	30	70
Medium-Range Anti Aircraft	0	0	0	0	0	0	3
Short-Range Anti Aircraft	680	0	2	12	12	12	20
MLRS	237	100	55	41	41	41	38
Combat Aircraft	553	423	205	228	228	226	226
France							
Main Battle Tanks	2001	614	254	222	222	222	200
Light Tanks	171	28	28	0	0	0	0
Infantry Fighting Vehicles	0	0	530	625	605	706	622
Armoured Vehicles	6242	6185	5311	4075	4233	4317	4565
Howitzers	786	375	152	121	120	120	104
Long-Range Anti Aircraft	180	98	0	40	40	40	40
Medium-Range Anti Aircraft	69	26	0	0	0	0	0
Short-Range Anti Aircraft	150	331	0	24	24	24	26
MLRS	30	61	26	13	13	13	9
Combat Aircraft	215	222	238	227	227	228	235
United Kingdom							
Main Battle Tanks	1276	543	227	227	227	227	213
Light Tanks	627	464	200	176	176	176	59
Infantry Fighting Vehicles	605	575	350	388	388	388	388
Armoured Vehicles	5626	4054	2763	2586	2590	2579	2353
Howitzers	723	344	233	215	215	215	179
Long-Range Anti Aircraft	0	0	0	0	0	0	0
Medium-Range Anti Aircraft	0	0	0	0	0	0	0
Short-Range Anti Aircraft	200	192	74	74	74	74	50
MLRS	47	64	35	35	35	35	26
Combat Aircraft	274	510	285	162	162	167	169
Poland							
Main Battle Tanks	2800	947	893	637	808	797	662
Infantry Fighting Vehicles	1471	1281	1636	1611	1611	1611	1525
Armoured Vehicles	1437	468	436	733	828	828	675
Howitzers	2222	1014	401	427	394	410	451
Long-Range Anti Aircraft	250	125	1	1	1	1	16
Medium-Range Anti Aircraft	0	0	0	0	0	0	0
Short-Range Anti Aircraft	160	216	81	81	98	81	178
MLRS	261	249	180	180	179	179	199
Combat Aircraft	332	242	106	98	94	94	85

Note: This table shows the absolute number of weapons in selected categories. It does not distinguish between the quality of the weapons. The large increase in numbers of anti-aircraft is a result of IISS counting each launcher of a Patriot system separately.
Source: IISS (1992, 2004, 2014, 2020, 2021, 2022, 2025).

European satellite and space capacities limited

Next, we also document commercial (Figure 3.1) and military satellites stocks of European nations compared to the US, China and Russia (Figure 3.2). Some of the military satellites included in the graph serve dual purposes such as meteorological data collection, which may be used by both the military and other Government agencies. Given rising uncertainty of access to US intelligence, the two charts show a grim picture and highlight the necessity to advance Europe's various space programmes and current capabilities. **Europe lags substantially in satellite capacities compared to the great powers and even compared to Russia.**

Nevertheless, EU institutions have advanced programmes for European satellite capacities. The Infrastructure for Resilience, Interconnectivity and Security by Satellite (IRIS²), a European Commission project to provide connectivity services, is set to start its service in 2030[21] and will be an EU owned institution able to provide both civil and military services like connectivity or surveillance for defence or crises management. The IRIS² will complement the existent GOVSATCOM[22][23] programme, which currently uses national and private operators to provide these services as well as the Copernicus[24] and Galileo[25] programmes providing environmental and navigation information respectively. The scale of the programmes is however limited compared to Starlink, the American competitor, with already more than 7000 low earth satellites (LOE) satellites versus the less than 300 initially expected from IRIS². Moreover, the expansion of the space industry is ongoing worldwide[26], with projects in China aiming at having a constellation of 648 LEO satellites by the end of 2025 and "thousands" in 2030 (Alkire: 2025).

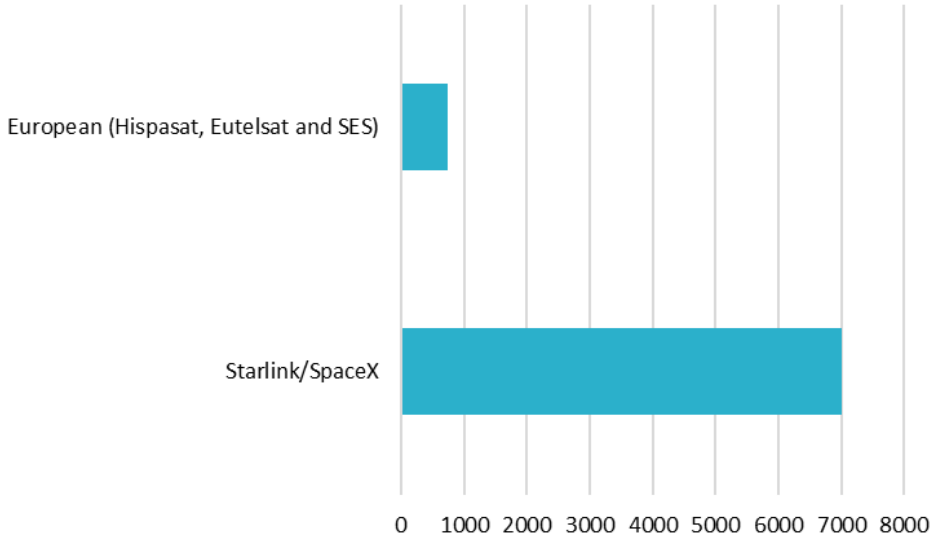
On the operational side at the European level, the EU Satellite Centre (SATCEN) provides spatial and aerial data services to the EU as well as support to member states in the fields of foreign and security policies.[27]

The need for technological advances and autonomy not only applies to satellites, but also to rocket launching technologies, for which the EU was still relying on Russia in 2022[28] to put in orbit satellites like those part of the Galileo programme. Arianespace[29], a European competitor, had the second launch of the Ariane 6 space rocket in April 2025, while Space X' Falcon 9 has completed to date almost 500 launches[30]. European private startups such as Isar Aerospace might still need some

[21] https://defence-industry-space.ec.europa.eu/eu-space/iris2-secure-connectivity_en
[22] https://defence-industry-space.ec.europa.eu/eu-space/govsatcom-satellite-communications/govsatcom-system-overview_en
[23] https://www.euspa.europa.eu/eu-space-programme/secure-satcom/govsatcom
[24] https://www.euspa.europa.eu/eu-space-programme/copernicus
[25] https://www.euspa.europa.eu/eu-space-programme/galileo
[26] https://www.ft.com/content/b635423f-e721-454c-b75c-98d0ad8fedf1
[27] https://www.satcen.europa.eu/
[28] https://www.space.com/russia-halts-soyuz-launches-french-guiana
[29] https://newsroom.arianespace.com/ariane-6-performs-first-commercial-flight-with-successful-launch-of-cso-3-satellite
[30] https://www.spacex.com/vehicles/falcon-9/

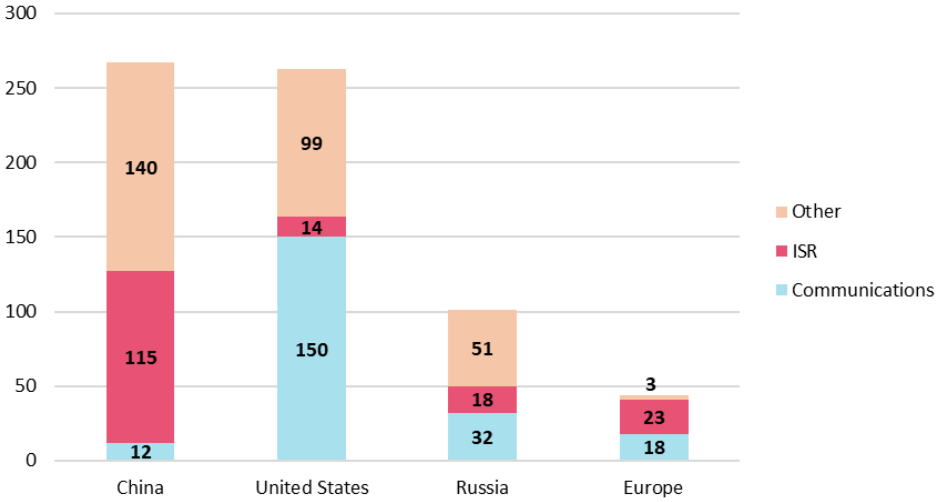
time until they can launch satellites.

Figure 3.1: Number of (commercial) satellites in low Earth orbit, Starlink vs main European competitors.



Source: authors based on FT and company data.

Figure 3.2: Number of military satellites deployed by country in 2024.

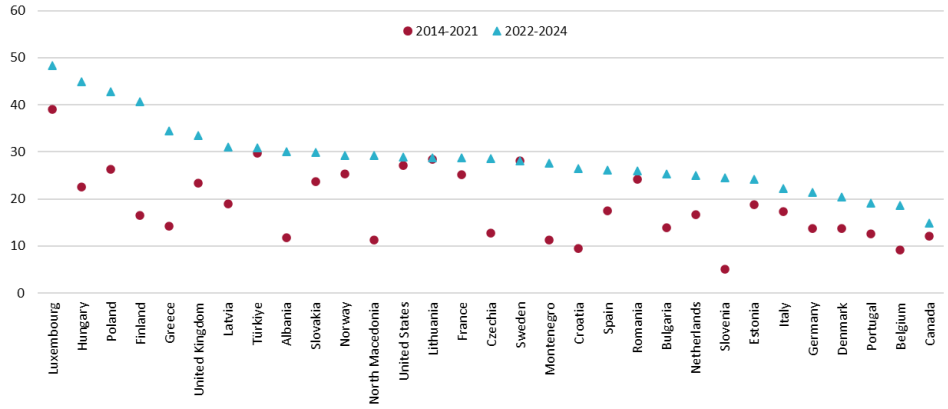


Note: Europe includes France, Germany, Italy, United Kingdom, Spain and Luxembourg. ISR stands for "intelligence, surveillance and reconnaissance".
Source: authors based on IISS (2025).

4 What do European nations order? The Kiel Military Procurement Tracker

Defence expenditure has constantly increased in the last years, with Europe as whole currently fulfilling the 2% NATO target. At the same time, the share of the defence expenditure dedicated to equipment has increased substantially across NATO countries, driven mainly by the increases within the European members (Figure 4.1). The collective equipment expenditure of the EU27 has almost doubled in real terms between 2018 and 2023.

Figure 4.1: Average share of defence equipment expenditure of total defence expenditure for NATO countries.



Source: authors on NATO data.

To better understand the weapons European governments have purchased in the last years, the military expenditures related to these weapons, and when these purchases were made, we have compiled a detailed procurement database, which is available for download via `https://www.ifw-kiel.de/publications/kiel-military-procurement-tracker-33232/`. The *Kiel Military Procurement Tracker* systematically and comparatively tracks the military procurement of key European countries. By taking official announcements and press releases from European countries' ministry of defence websites, we can record military orders. In the previous iteration of this report (Wolff, Burilkov, Bushnell, and Kharitonov: 2024a), we built the database for Germany.[31] Following this, it has been updated to April 2025. Moreover, it now features four countries in varying levels of detail given the data available: Germany, the United Kingdom, Poland and with much fewer details also France.

Our database tracks information on the item ordered, the company from which it is ordered, the

[31] The first country whose procurement we tracked was Germany, due to its central role in Europe and strong industrial base.

number of units ordered, the earliest and latest expected delivery dates, the monetary amount of the order, the budgetary vehicle providing funding, and whether the order is part of a framework agreement. It also records the country in which the headquarters of the company responsible for fulfilling the order is located as well as the physical production or manufacturing country of the order in cases where the information is available. To be as robust as possible, in cases where a domestic company taking an order is a foreign subsidiary, we count them as partnerships with the country of origin for the parent company.

We classify orders into 15 general item types: tanks, armoured vehicles, artillery, ammunition, air defence systems, missiles (further differentiated into land, naval, and air variants), drones, infantry, mines, helicopters, aircraft, naval, modernisation (refers to the improvement of the armed forces as a whole), and other. Each general item type has a subcategory for research and development in that category.

The database only includes items mentioned as military orders or expenses by official government news and press release pages. Orders for which an official source has not been found are excluded completely. Information from government sources forms the basis of the database and carries the most weight and authority in case of discrepancies with other sources. In cases where the government source omits important information pertaining to an order, unofficial news sources such as company webpages that specifically refer to the order and contain missing details may be used to supplement the official source and fill out the database as much as possible.

In this report, we extend the analysis beyond Germany by capturing procurement data for the United Kingdom and Poland with relatively high levels of detail and following a similar approach. For the original dataset see Wolff, Burilkov, Bushnell, Kharitonov, et al. (2025). We also present findings for France, though data are not as complete as the official government sources provide less information.

Germany has the most complete data, and we provide an update to the first release of the Kiel Military Procurement Tracker. According to German law, the Bundestag Budget Committee must approve any military procurement over €25 million. In all but a few cases, the date we associate with an order is the date the Budget Committee approved the order. For remaining cases, the date we associate with an order is the date of the official government announcement. Between January 2020 and April 2025, we capture 213 orders containing nearly 300 items with a total value of €170.5 billion.

The United Kingdom is introduced in the *Kiel Military Procurement Tracker* with a comparable level of information per order thanks to the regularity and detail of official procurement press releases. However, there are no equivalent rules to mandate parliamentary scrutiny of orders over a threshold

size, so we can only report on what the Ministry of Defence and the British Armed Forces voluntarily publishes. For almost all orders the date given is the date of announcement. Between January 2020 and April 2025, we capture 140 orders and 151 items with a total value of £59.5 billion. The UK also coordinates a number of multilateral funding mechanisms like the International Fund for Ukraine (IFU). For IFU orders where it can be shown that certain items were paid for wholly by the UK, these items have been split and included in the core UK data. Otherwise, IFU orders are shown separately Figure 4.2.5, with the understanding that the UK's share of funding is not fully known. There are 11 such orders worth £1 billion.

To track **Poland's** procurement for major military equipment, we follow the same procedure as with Germany and the UK, analysing official news announcements from the Polish Ministry of Defence website. We supplement our findings with data from the Ministry detailing Poland's Technical Modernisation Plan for 2021-2035, which is currently implemented[32] and foresees a budget of around €120 billion. To complement these official sources, we also gather pricing and more granular data like delivery dates from specialised press articles or press releases from the companies involved. To our knowledge, we cover the same level of granularity as for the German and British procurement. We cover purchases carried by the Polish Government since 2019, including the type of weapons, prices, and origin for most of the procurement identified. The aggregate monetary amount we identify adds up to €66 billion. Since 2021, this represents around 55 % of the total budget of the Technical Modernisation Plan, with the remaining likely covering the next 6 years of the plan.

For **France** we merely summarise the main orders of the French Ministry of Defence since 2020. These data are published every year in the annexes of the equipment budgets of the French military. Specifically, we look at the "Projet annuel de performances Annexe au projet de loi de finances pour [year]. Programme 146/147 Équipement des Forces". Using the items and quantities ordered mentioned in these budgets as a basis, we can then search for other sources and identify more granular data like the prices, companies involved, or delivery periods. The degree to which more details concerning an order are available is highly inconsistent, especially for details related to an order's monetary value, so we are unable to conduct the same level of analysis as we can with Germany, the UK, and Poland. We can, however, observe the overall patterns for orders over the period analysed in terms of type of equipment purchased.

[32] https://www.gov.pl/web/obrona-narodowa/modernizacja-techniczna-szrp

4.1 Germany

Spanning January 2020 to April 2025, the *Kiel Military Procurement Tracker* identifies 213 orders containing 291 items worth a total of €170.5 billion for Germany.Figure 4.1.1 and Figure 4.1.1a show the pattern of these orders. Five main results stand out:

Germany placed no substantial orders between July 2021 and April 2022. This period includes the lead-up to the federal election in September 2021 and the appointment of the new government in December 2021.

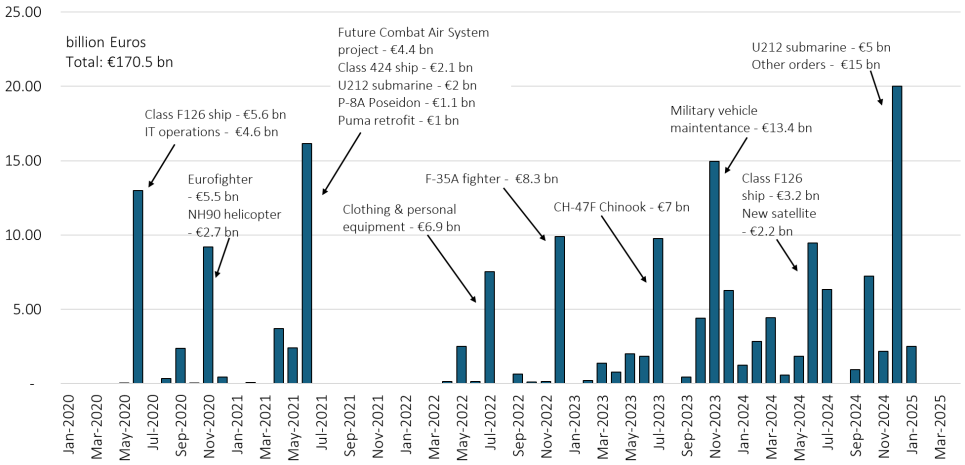
No noticeable increase in procurement activity occurred in the year and a half after the invasion began. On the contrary, order volume fell: between January 2020 and June 2021, Germany ordered €47.8 billion, whereas between January 2022 and June 2023, orders totalled €27.3 billion. Order volume in the twelve months following the invasion (€21.3 billion) was lower than either of the two years preceding the invasion (€25.5 and €22.3 billion respectively, illustrated in Figure 4.1.1a). The war therefore does not seem to have initiated a rapid increase in items ordered in its first year.

A substantial increase in order volume and frequency began in spring 2023. From March 2023 to February 2024, Germany made military purchases worth €45.9 billion, and this grew in the twelve months thereafter to €55.5 billion. In the whole period since the war started – from March 2022 to April 2025 – 148 orders containing 218 items were placed, for a total volume of €122.7 billion.

There is significant heterogeneity in monthly order volume. In some months there are substantial spikes, which are usually associated with purchases of expensive equipment such as ships or aircraft. The three largest specific items were a military vehicle maintenance contract in November 2023 (€13.4 billion), 35 F-35A fighters in December 2022 (€8.3 billion), and 60 CH-47F Chinook helicopters in July 2023 (€7 billion). Many orders contain multiple items without prices for individual items; the largest example was an order of just under 40 items in December 2024 totalling €20 billion. Of this, we were only able to accurately cost €5.8 billion, leaving €14.2 billion still bundled together.

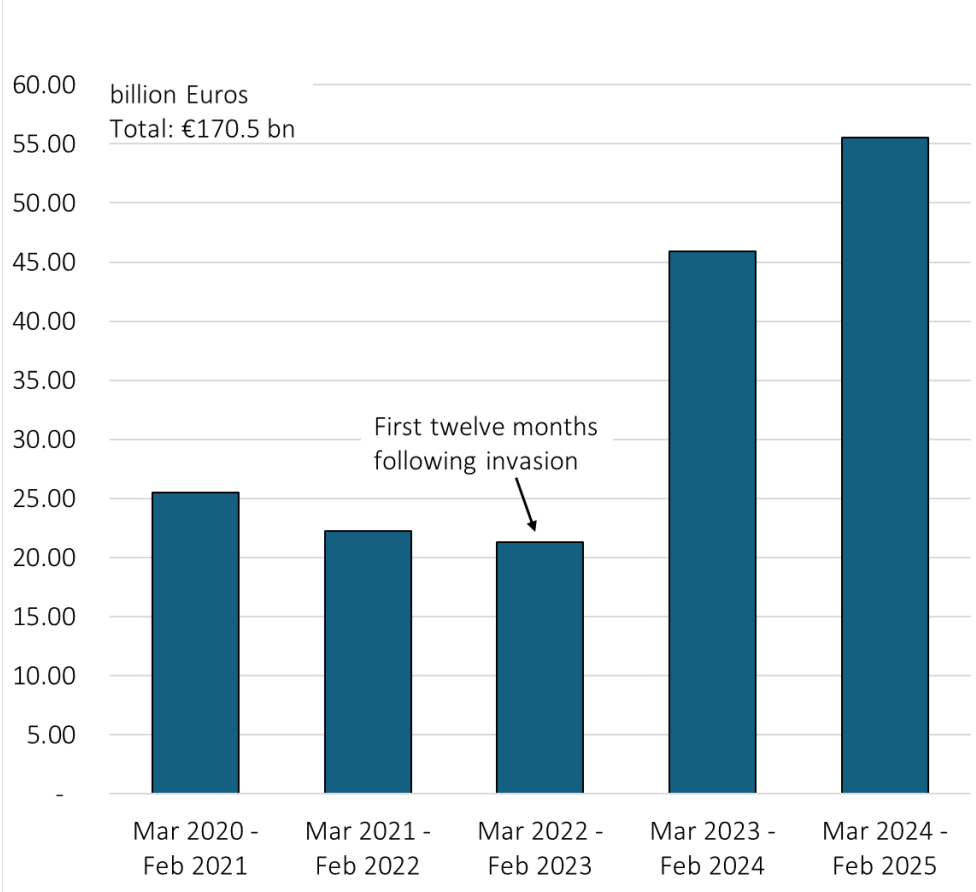
No items were ordered from February to April 2025. The federal election in February 2025 was followed by a government formation process completed only in May with the ascension of the new cabinet under Chancellor Merz. We reasonably expect a high volume of orders in the months following this report's publication as the Bundeswehr 'catches up' on missed months, assuming the trend of higher order volume since spring 2023 continues.

Figure 4.1.1: Germany total military orders, January 2020 - April 2025 (billion EUR).



Source: Kiel military procurement tracker – second release, Wolff et al. (2025).

Figure 4.1.1a: Germany total military orders, 2020 - 2025, twelve-month windows beginning in March (billion EUR).



Note: No orders are recorded in January and February 2020, nor in March and April 2025, meaning this chart includes 100% of total orders even though it does not span the entire period recorded.

Source: Kiel military procurement tracker – second release, Wolff et al. (2025).

Germany's orders are additionally broken down by category (land, sea, air, or other) in Figure 4.1.2, and these categories are aggregated pre- and post-invasion in Figure 4.1.3.

German investment in land capabilities was slow to pick up after the war began. Despite the immediate and pressing strategic needs of Ukraine and NATO's eastern front, the first major land orders were only made in the second half of 2023. Alongside Figure 4.1.2, these orders are shown in more detail in Annex A2, Figure A2.1. A significant share of land orders is in big-ticket items imported from the US; total post-invasion land spending is €38.9 billion. While it may appear that there have been no major land orders since July 2024, the remaining €14.2 billion of the €20.0 billion package ordered in December 2024 (categorised 'other') contains, among other items, NH-90

helicopters and Dingo 2 A4 armoured vehicles, as well as small arms.[33] Finally, we record no new ammunition frameworks or updates to existing frameworks since July 2024.

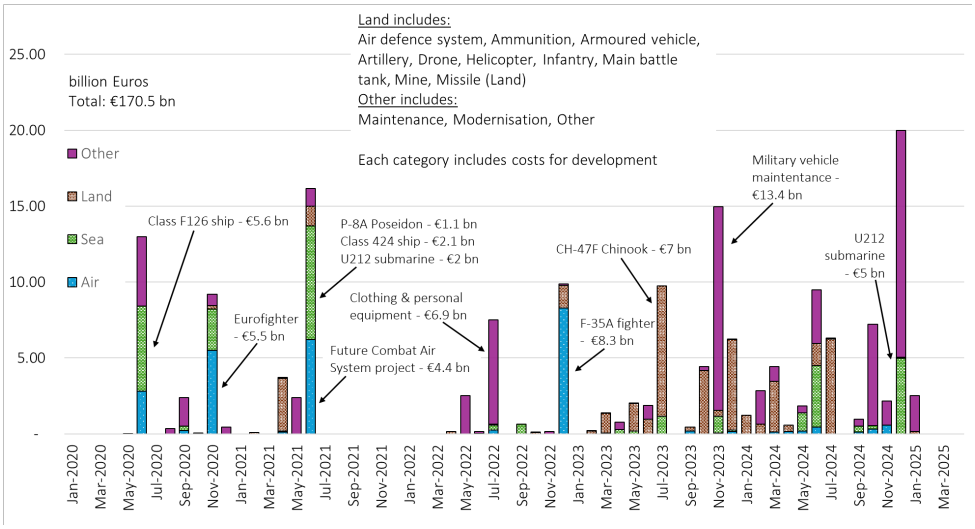
Investment in naval and air forces is high in average order volume but decreasing in order frequency. Since the first iteration of this report in July 2024, neither category has seen significant spending, save a €5 billion order for U212 submarines; the last large air order was the December 2022 purchase of 35 F-35A fighters for €8.3 billion. For comparison, two thirds of pre-invasion spending was in air and navy (65% combined).

There has been a shift in procurement priorities towards land forces post-invasion. We observe a clear overall reorientation towards land forces pre- and post-invasion (Figure 4.1.3). Land orders represent a third of overall orders between January 2022 and April 2025 (32%), up from 11% between January 2020 and December 2021. The fall in the share of air orders (31% to 9%) and naval orders (34% to 12%) reflects this. Compared to the first iteration of the *Kiel Military Procurement Tracker*, all three categories have fallen relative to 'other' orders. This is largely due to the aforementioned €14.2 billion package in December 2024 and €6.5 billion invested in IT system modernisation in October 2024. The largest item was €13.4 billion for military vehicle maintenance in November 2023.

A significant portion of German military procurement has only gone towards replacing weapon commitments to Ukraine and, accordingly, the increase in German capacities is less than the procurement data suggest. Figure 4.1.4 documents the estimated change in 2021 stocks as a result of new equipment orders that are expected to be delivered as well as weapon commitments to Ukraine. It should be noted that a significant quantity of ordered equipment has not yet been delivered. Likewise, a significant proportion of the weapons Germany committed to Ukraine, taken from the Ukraine Support Tracker, has also not yet been delivered. The key result from this chart is that the ordering activity of the last two and a half years has barely changed the stocks available to the German army. In most instances, they have merely been enough to replace the reduction in stocks due to commitments to Ukraine.

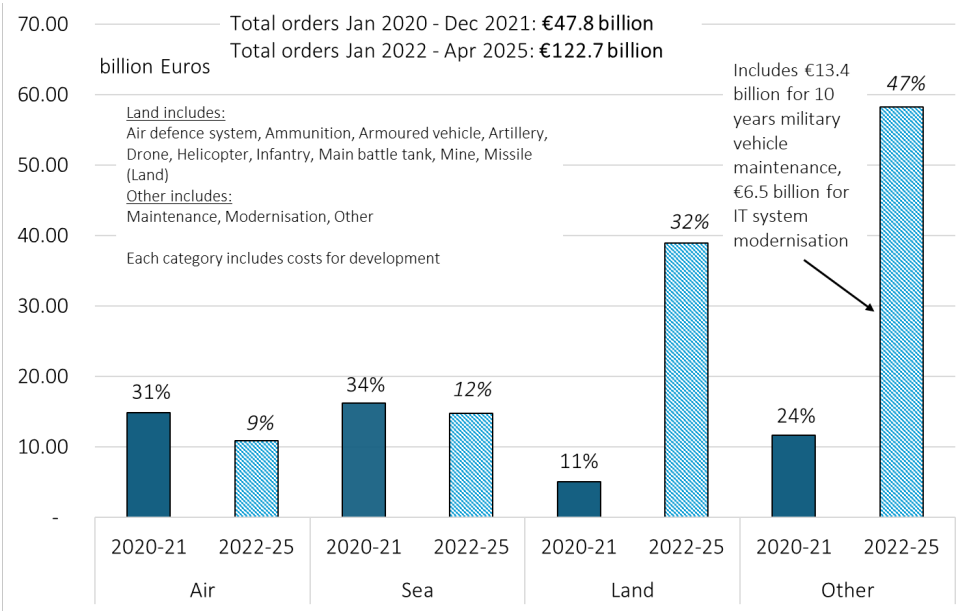
[33] The authors reached out to members of the Bundestag Budget Committee, and it was confirmed that full details of the remaining items in this package were not yet public.

Figure 4.1.2: Germany total military orders by weapon category, January 2020 - April 2025 (billion EUR).



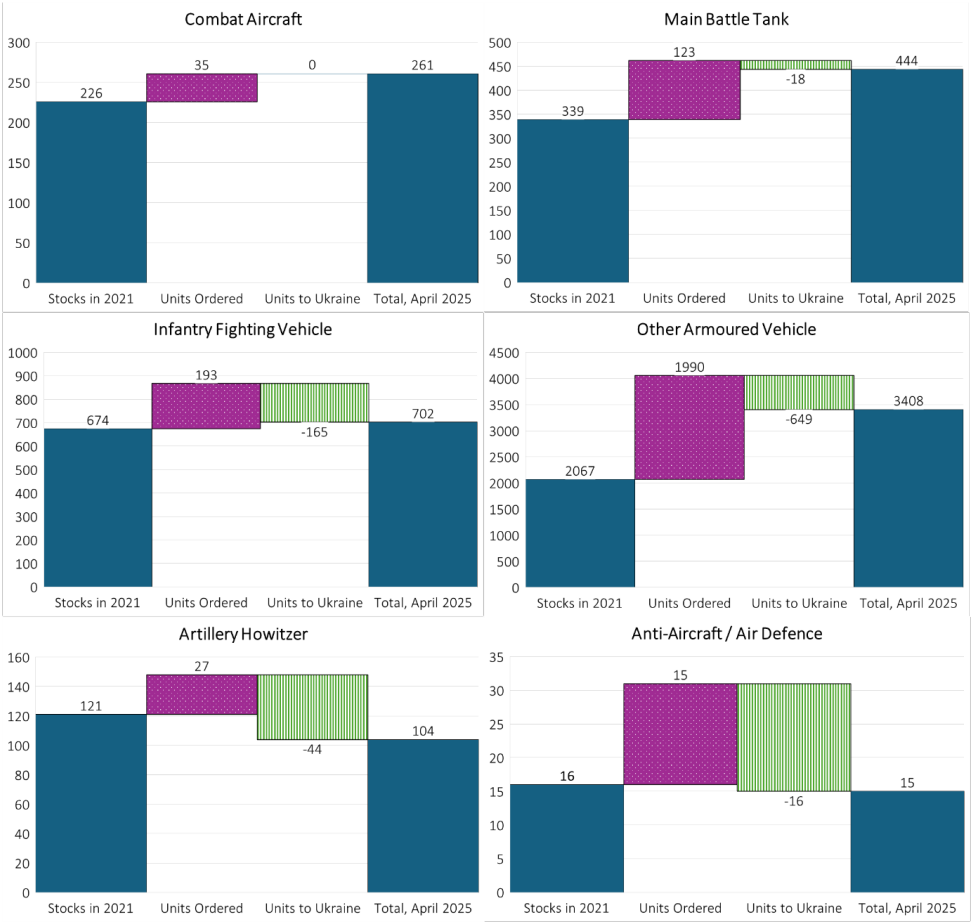
Source: Kiel military procurement tracker – second release, Wolff et al. (2025).

Figure 4.1.3: Germany shift in procurement priorities since the start of the Russia-Ukraine war.



Note: This figure compares the monetary amount Germany ordered in military procurements in each category (Air, Sea, Land, Other) in the periods from January 2020 to December 2021 and from January 2022 to April 2025. It also shows the percentage of total orders for each category for each time period.
Source: Kiel military procurement tracker – second release, Wolff et al. (2025).

Figure 4.1.4: Impact of orders of new weapons and commitments to Ukraine on the stock of six major weapon categories in Germany.

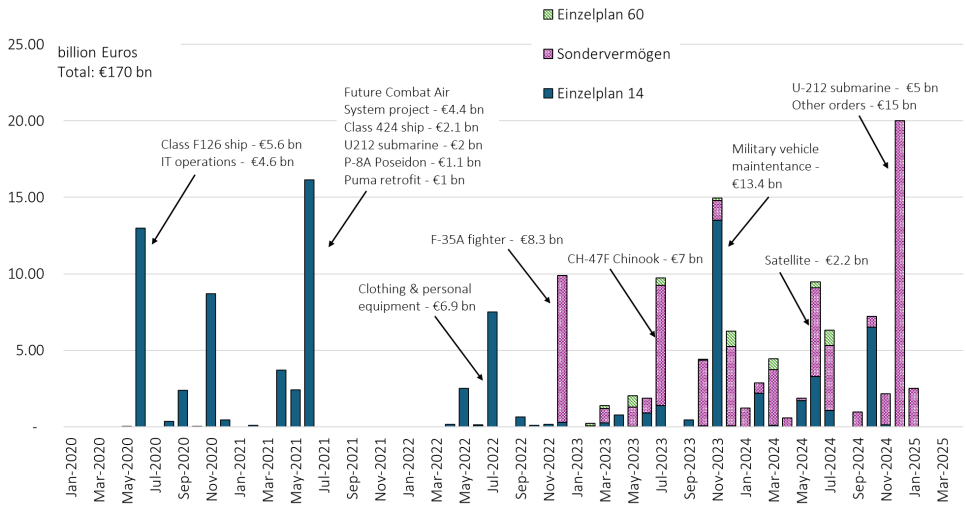


Note: This figure shows the comparison between German key weapon stocks in 2021; units ordered (February 2022 to April 2025); units promised to Ukraine (February 2022 to April 2025); and the remaining number available (or to be delivered) to the Bundeswehr as of April 2025. The key weapon categories are: (1) combat aircraft; (2) main battle tanks (MBTs); (3) infantry fighting vehicles (IFVs) (orders include both new vehicles and retrofits of existing vehicles); (4) other armoured vehicles (stocks and orders exclude infantry fighting vehicles, light and main battle tanks); (5) artillery howitzers; and (6) anti-aircraft, air defence weapons (stocks include long-range anti-aircraft systems, and orders include long- and medium-range systems). In this figure, we assume that providing units to Ukraine is the only outflow of German stocks.

Source: IISS (2025) and Trebesch et al. (2023), Wolff et al. (2025).

In terms of funding, Germany's small regular defence budget is supplemented by a special debt vehicle (the Sondervermögen) and a budget line for the support of third countries (Einzelplan 60). The current regular defence budget, Einzelplan 14, is only €53 billion, i.e., around 1.2% of GDP[34]. It is, however, supplemented by the Sondervermögen, a debt-funded fund of around €100 billion that is mostly used for purchasing new equipment. The special fund was created in 2022 through an amendment to the German constitution to allow a special debt vehicle outside of the German constitutional debt brake. Moreover, spending for purchases that benefit third countries, in particular Ukraine, comes from a third budget line, Einzelplan 60. Figure 4.1.5 separates the purchases into the three budget vehicles and shows that the Sondervermögen has become by far the dominant source of funding for military procurement.

Figure 4.1.5: Germany total military orders by budgetary fund, January 2020 - April 2025 (billion EUR).



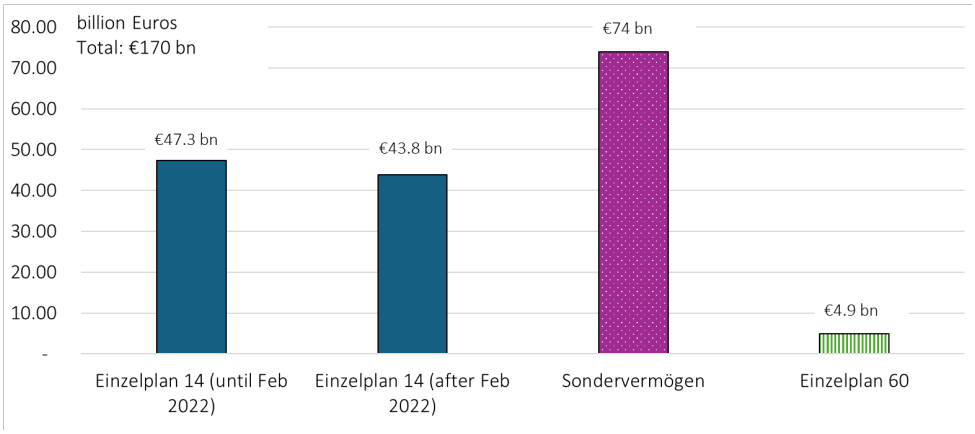
Note: €42.1 billion worth of orders is attributed to both the Sondervermögen and regular defence budget, Einzelplan 14. In the absence of further details, we assume that these orders are funded by the Sondervermögen until the fund is exhausted in 2027 and then any additional costs will be paid by the regular defence budget. In these cases, we attribute the value of the whole order to the Sondervermögen. Around €1 billion worth of orders is attributed to the Sondervermögen and Einzelplan 60. We count these orders as Einzelplan 60. Furthermore, in cases where the funding vehicle is not specified, we attribute the value of the order to the regular defence budget, Einzelplan 14.

Source: Kiel military procurement tracker – second release, Wolff et al. (2025).

[34] https://www.bundeshaushalt.de/static/daten/2025/soll/draft/epl14.pdf

Up to €74 billion of orders total has been paid for through the Sondervermögen so far, of which €31.9 billion includes no other budget lines, while spending using only the core defence budget has in fact decreased since February 2022. The majority of orders funded solely by the Sondervermögen are expensive items mostly from foreign suppliers. From the US this includes 35 F-35 fighters (€8.3 billion), 60 CH-57F Chinook helicopters (€7 billion), and 3 P-8A Poseidon aircraft (€1.1 billion); from Israel, the Arrow 3 air defence system and missiles (€4 billion). Procurements paid for with both Einzelplan 14 and the Sondervermögen amount to €42.1 billion, but in the absence of further details, we assume they are fully paid for by the Sondervermögen until its exhaustion. Finally, as shown in Figure 4.1.6, spending solely through Einzelplan 14 between January 2020 and February 2022 was €47.3 billion, but from March 2022 to April 2025 has been only €43.8 billion.

Figure 4.1.6: Germany total military orders by budgetary fund overview, January 2020 - April 2025 (billion EUR)



Note: €42.1 billion worth of orders is attributed to both the Sondervermögen and regular defence budget, Einzelplan 14. In the absence of further details, we assume that these orders are funded by the Sondervermögen until the fund is exhausted in 2027 and then any additional costs will be paid by the regular defence budget. In these cases, we attribute the value of the whole order to the Sondervermögen. Around €1 billion worth of orders is attributed to the Sondervermögen and Einzelplan 60. We count these orders as Einzelplan 60. Furthermore, in cases where the funding vehicle is not specified, we attribute the value of the order to the regular defence budget, Einzelplan 14.
Source: Kiel military procurement tracker – second release, Wolff et al. (2025).

The Sondervermögen will deplete around 2027 but does not necessarily need renewal due

to the amendment of debt rules. Fiscal rules around Bundeswehr spending are being significantly loosened to accommodate continued defence spending in excess of the 2% NATO target. Through an additional constitutional amendment agreed on in March 2025, defence spending above 1% of GDP will be exempted from the debt brake and borrowing limits. This should allow the sustainable and permanent financing of increased defence spending after the Sondervermögen runs out and is supplemented by additional rules to allow aid for Ukraine to also be exempted from borrowing limits.

4.2 United Kingdom

For the UK, the *Kiel Military Procurement Tracker* identifies 139 orders containing 151 items worth £59.5 billion total.[35] Figure 4.2.1 and Figure 4.2.1a show the pattern of these orders.

UK order frequency stays remarkably constant over the considered period. For years 2021 to 2024 inclusive, we record 29-30 items ordered each year, along with 14 in 2020 and 19 between January and April 2025. We record no orders for seven months in total. Unlike Germany, which experienced a number of 'droughts' in orders (especially from mid-2021 to early 2022), there are no cases for the UK where no orders are placed for two or more consecutive months.

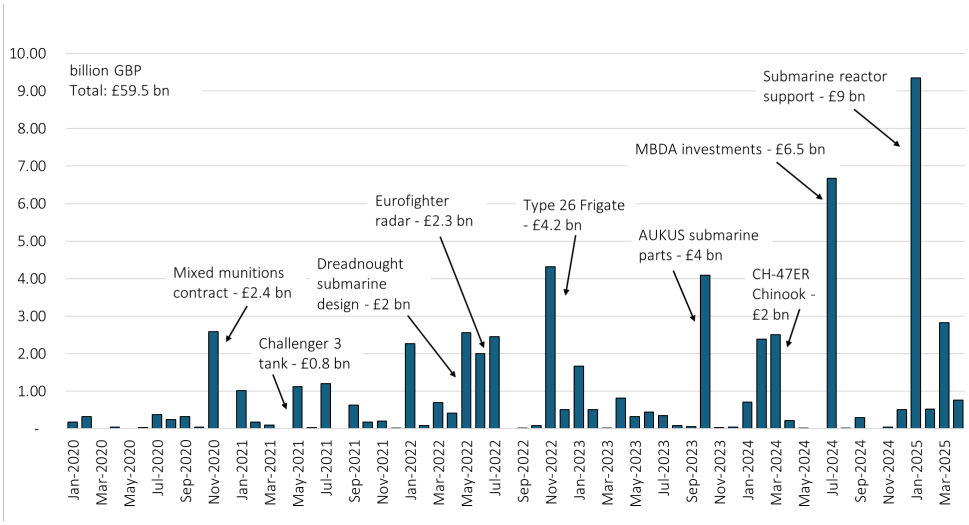
However, a noticeable and permanent increase in order volume is apparent after the invasion began in February 2022. As shown in Figure 4.2.1a, order volume grew from £5.8 billion in the twelve months preceding the invasion to £15.2 billion across March 2022 to February 2023. While this was followed by a fall to £9.4 billion in the twelve months thereafter (still much higher than pre-invasion), March 2024 to February 2025 saw over £20 billion of orders made. £3.6 billion of orders have been made in March and April 2025. **There is a very high degree of variance in order volumes across 2020 to 2025.** As Figure 4.2.1 shows, the regular flow of orders is interspersed with particularly expensive single item orders, which consistently grow in volume from 2020 to 2025. Indeed, while the average monthly order volume is £0.9 billion, four months see volume above £4 billion and an additional eight see more than £2 billion volume. The £20 billion ordered across March 2024 to February 2025 for example includes £9 billion for nuclear submarine reactors (January 2025), and a £6.5 billion investment in R&D (July 2024).

With a swift general election in 2024 and majority governments either side of it, there is nearly no mark on order activity from political mechanisms, unlike in Germany. As a rule, the six weeks prior to British general elections see government departments placed under 'heightened sensitivity', where departmental announcements and decisions are put on pause. We accordingly observe no orders in June 2024 during the lead-up to the July 2024 general election, but with seven

[35] Including orders from the UK-administered and partially funded International Fund for Ukraine ('IFU') and Drone Capability Coalition ('DCC') brings this to 150 orders containing 176 items worth a total of £60.5 billion. IFU/DCC orders are not included in UK data but are discussed at the end of this chapter.

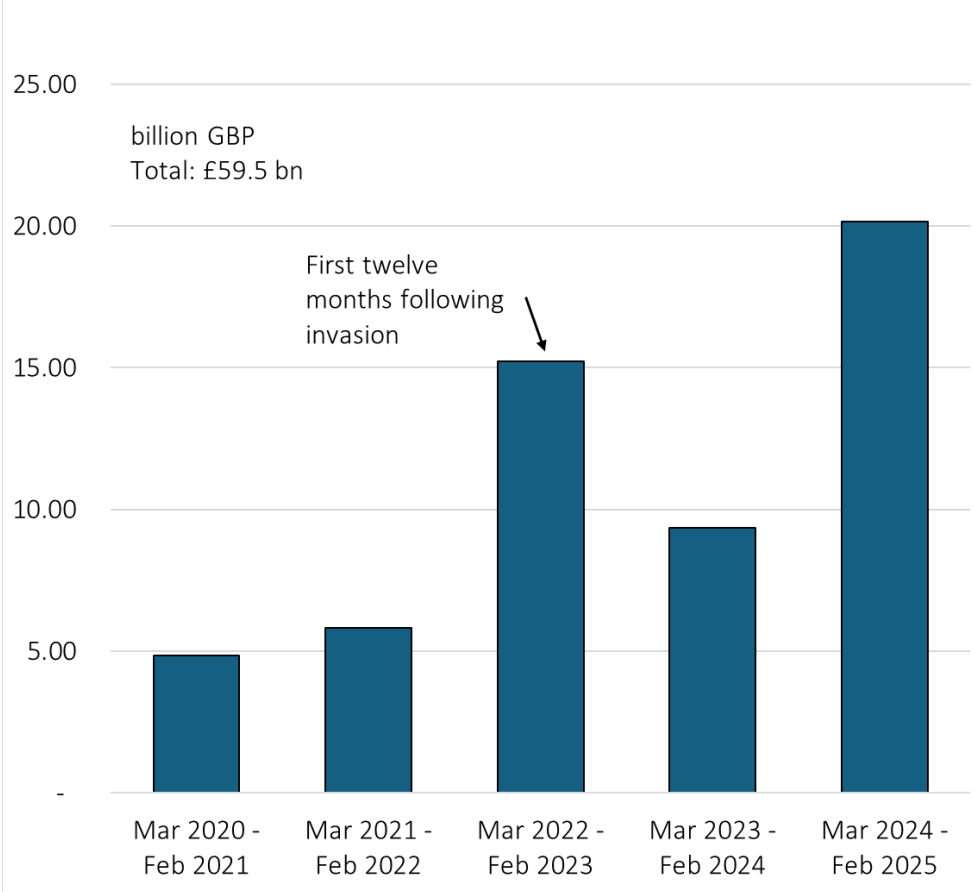
other months also recording no orders, it is not out of the ordinary. And while the two changes in government leadership in September and October 2022 happen to coincide with a lull in orders, these changes were internal party processes and in principle ought not to have affected the day-to-day work of government departments like the Ministry of Defence.

Figure 4.2.1: UK total military orders, January 2020 - April 2025 (billion GBP).



Source: Kiel military procurement tracker – second release, Wolff et al. (2025)

Figure 4.2.1a: UK total military orders, 2020 - 2025, twelve-month windows beginning in March (billion GBP)



Note: £0.5 billion of orders are recorded in January and February 2020, and £3.6 billion in March and April 2025, which are not included in this chart.

Source: Kiel military procurement tracker – second release, Wolff et al. (2025).

British orders are additionally broken down by category (land, sea, air, or other) in Figure 4.2.2, and these categories are aggregated pre- and post-invasion in Figure 4.2.3.

Sea power is by far the main priority in procurement, with nearly half of all recorded spending going towards the Royal Navy. The £26.7 billion total worth of naval orders, almost all from January 2022 onwards, are spread over multiple strategic directions (details shown in Annex A2 Figure A2.1). Orders relating to submarines make up the bulk of naval spending, including a number of high-profile orders like £9 billion for nuclear reactors and £1.9 billion for sonar and sensor support. Orders have been made for new attack submarines (as with £4 billion in October 2023 for AUKUS submarine parts, the class to replace the current Astute-class) and new ballistic nuclear missile submarines (as with £2 billion in May 2022 for Dreadnought-class design, replacing

the current Vanguard-class). The surface fleet also saw a number of orders, like £4.2 billion for Type 26 Frigates in November 2022, as did the auxiliary fleet, with a £1.6 billion order for solid support ships in January 2023.

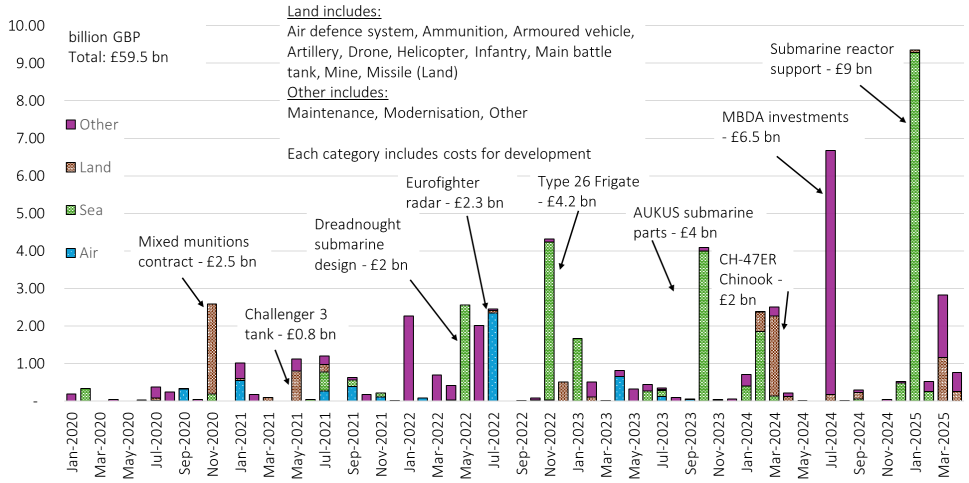
British investment in land capabilities is fair, yet still less than half of naval spending. £9 billion was invested in land forces across 2020 to April 2025 of which £3.6 billion was in 2020 and 2021, and £5.4 billion in 2022 onwards. The major land items appear to be a £2.4 billion munitions contract in November 2020, a £0.8 billion order for Challenger 3 tanks in May 2021, £2 billion for Chinook helicopters in March 2024, and £1.6 billion for Lightweight Multirole Missiles for Ukraine[36] (details shown in Annex 2 Figure A2.2). Aside from these, the land orders that we observe are small in volume and sporadic in frequency. Four additional packages worth £0.6 billion total were also ordered that contain mostly (or entirely) land items but are marked 'other' because they have items from multiple categories that cannot be split apart.

Air procurement is relatively insignificant both pre- and post-invasion. Growing from £1.6 billion in 2020 and 2021, to £3.3 billion in 2022 onwards, this number includes £2.4 billion for Eurofighter radar development and £0.8 billion for fighter jet design and development (the GCAP programme). Air defence procurement also remains patchy throughout the period, not filling the gaps in stocks.

Over £700 million was spent by the UK on orders for drones or drone development. Unilateral orders in these two categories are shown in Figure 4.2.4. From January 2020 to April 2025, not including multilateral orders with other countries, the UK ordered at least 16 Protector long-range strike drones worth a total of £260 million, 264 portable/packable surveillance drones worth £129 million, and unknown quantities of Altius loitering munitions drones and first-person-view (FPV) drones for Ukraine.

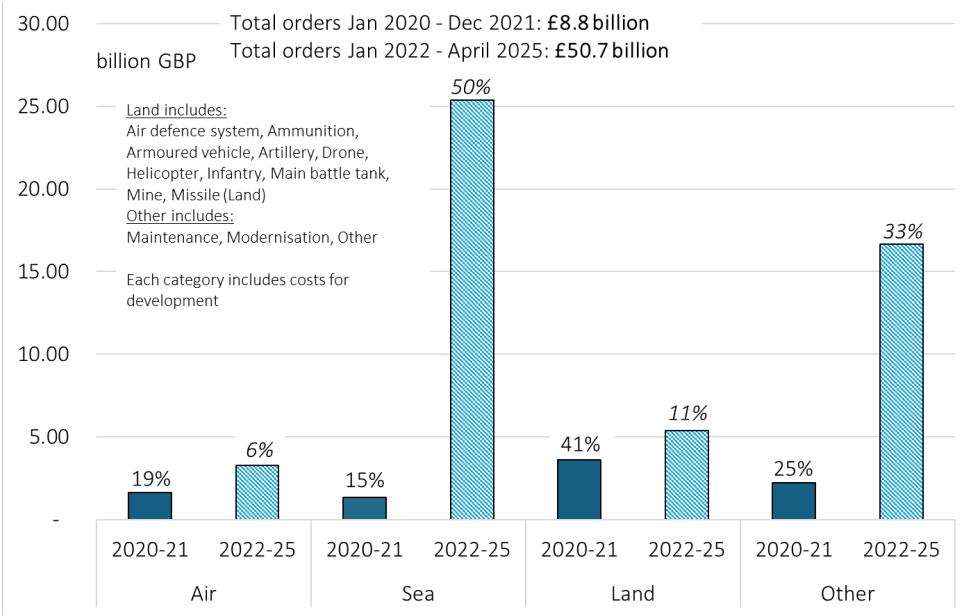
[36] Orders for multi-role missiles like these are recorded as 'land' because they were placed for Ukraine, who operates them only as surface-to-air or surface-to-surface missiles, even if the UK may use them as air-to-air or air-to-surface missiles as well.

Figure 4.2.2: UK total military orders by weapon category, January 2020 - April 2025 (billion GBP).



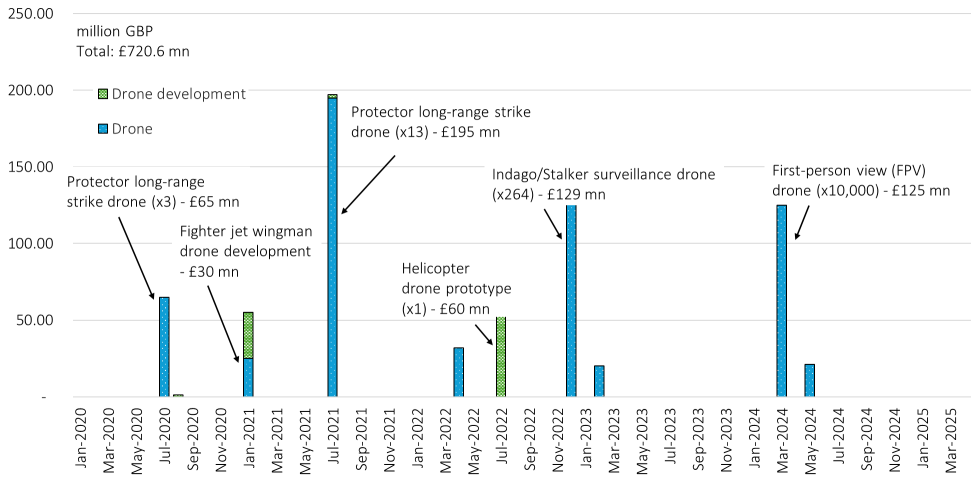
Source: Kiel military procurement tracker – second release, Wolff et al. (2025).

Figure 4.2.3: UK shift in procurement priorities since the start of the Russia Ukraine war.



Source: Kiel military procurement tracker – second release, Wolff et al. (2025).

Figure 4.2.4: UK military orders for drones by month, January 2020 - April 2025 (million GBP).



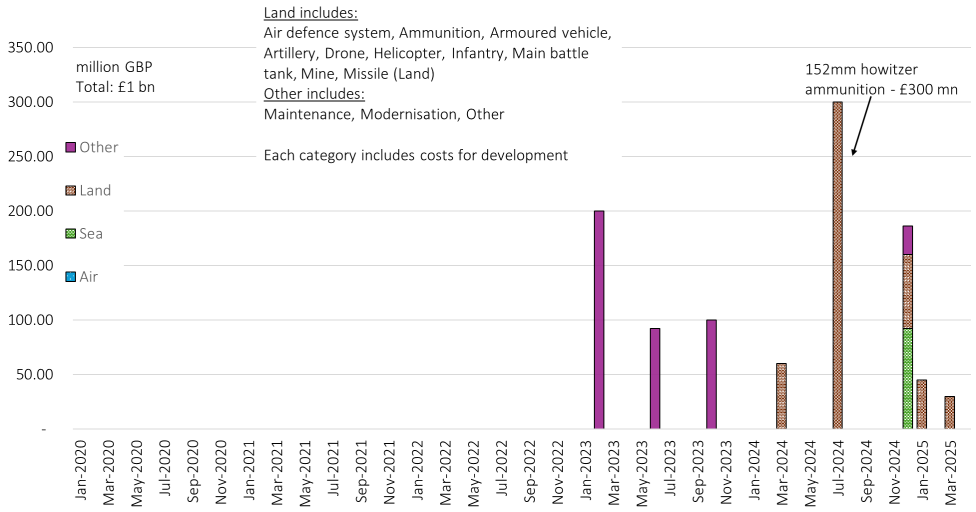
Note: Unilateral orders only.

Source: Kiel military procurement tracker – second release, Wolff et al. (2025).

The UK leads selected multilateral procurement mechanisms and funding vehicles through which over £1 billion worth of orders have been made. The main example is the International Fund for Ukraine (IFU), a funding mechanism administered by the UK on behalf of five partner countries and six additional donors, with a total reported size of approximately £1 billion. In cases where the UK has made an order through the IFU, and it is clearly marked as being paid for solely by the UK, we record it as a UK order and not an IFU order. Figure 4.2.5 illustrates the remaining £1 billion of orders placed through the IFU, as well as orders through the much smaller Drone Capability Coalition (DCC), a partnership with Latvia and other countries worth just under £0.05 billion total that focuses on drones.

These multilateral procurement mechanisms have a focus on the needs of the Ukrainian armed forces, especially drones. The largest individual item ordered with a published price was £300 million of 152mm howitzer rounds (120,000 in total) ordered in July 2024. At least 40,000 first person-view (FPV) drones have been ordered too through the IFU and DCC at a cost of £170 million, as well as a minimum of 150 surveillance drones for £40 million. Most orders are given as packages with multiple items in unknown quantities, and many such packages include additional orders for drones, air defence systems, missiles, and other items.

Figure 4.2.5: UK-administered International Fund for Ukraine total military orders by weapon category, January 2020 - April 2025 (million GBP).



Note: Multilateral orders only. It is unclear what the UK's exact contribution is in many of these orders. Also includes orders through the Drone Capability Coalition in partnership with Latvia and other countries.

Source: Kiel military procurement tracker – second release, Wolff et al. (2025).

4.3 Poland

In the case of Poland, we have identified a total of 97 orders for the period between January 2019 and May 2025, covering a monetary value of around €66 billion.

Polish stocks are likely to increase in the coming years (Figure 4.3.1). The substantial purchases carried out mainly since 2022 will start refilling Polish stocks from 2025 onwards until 2032, with some of the products being currently delivered and those others about being delivered in the coming years. This will particularly replace some of the equipment donated to Ukraine and that being erased during the last decades of underinvestment.

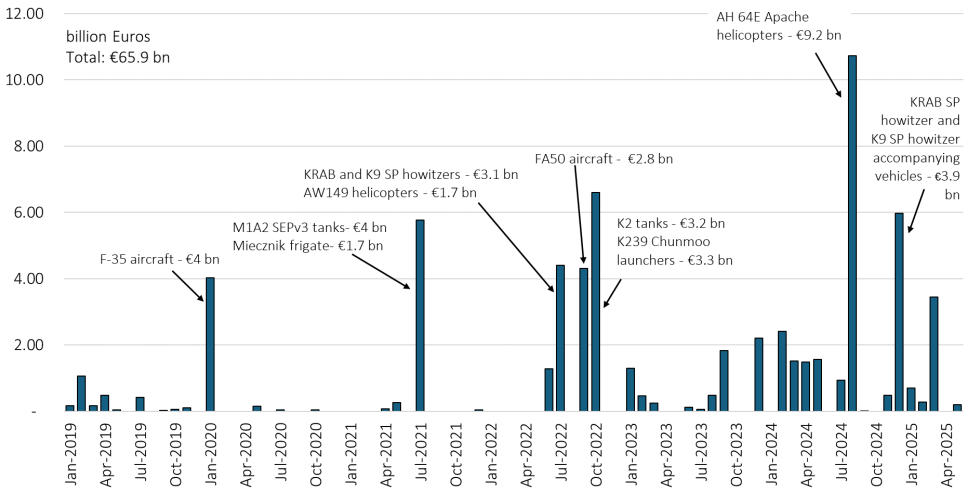
Russia's invasion of Ukraine has marked a turning point in Polish procurement (4.3.2). While we identify some significant purchases at the beginning of 2020 and mid-2021, the period before the war is marked by an overall lack of procurement. The vast majority of the Polish orders, around 80 %, has been carried after 2022 once the invasion started.

Investment in land capabilities is the main priority in the Polish procurement (Figure 4.3.3 and Figure 4.3.4). Procurement in other areas has remained relatively stable, with no significant increases. This is in stark contrast with the UK, where the procurement is dominated by naval orders, but comparable to Germany which also did enact a priority shift towards land forces.

Considerable investment in land capabilities across multiple systems is also prioritised, see Figure 4.3.3). We can highlight the purchase of MLRSs (around 300 HOMAR-Ks and a framework agreement for almost 500 units of HIMARS), MBTs (more than 300 Abrams, and 180 K2 tanks, with 800 more yet to be purchased as part of a framework agreement). The acquisition of South Korean howitzers is similarly remarkable, with more than 350 purchased between 2022 and 2024. For air defence, Poland has purchased 6 PATRIOT systems as part of the WISŁA air defence programme. Also remarkable is the purchase of 96 AH 64E Apache attack helicopters in 2024.

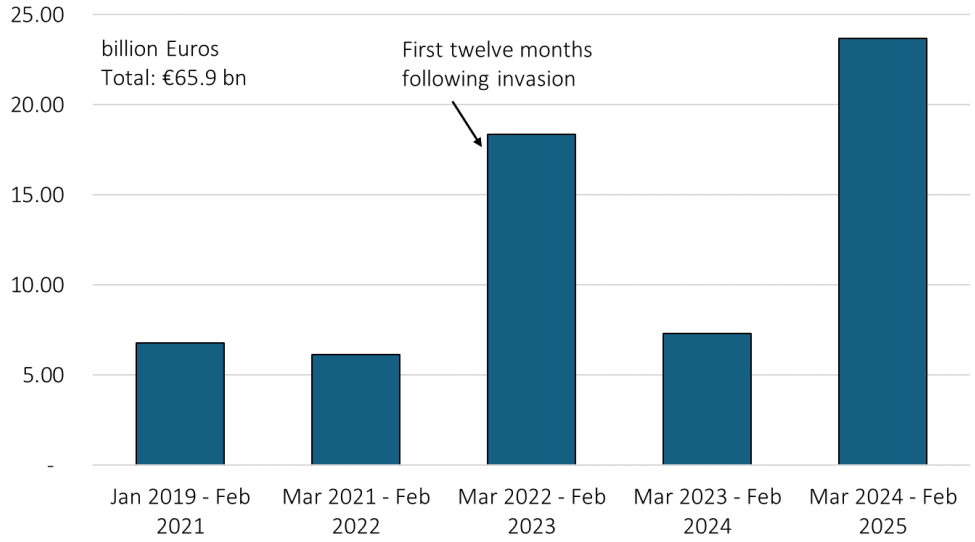
In the case of the air force, two major acquisitions stand out: the purchase of the 48 FA-50 South Korean aircraft in 2022 as well as the 32 F-35 aircraft purchase in 2020. **In the case of the sea forces**, 3 frigates and 2 naval missile units constitute the major investments. While further investment may be needed, we can expect major deliveries of equipment to Poland in the next 5 years, with considerable increases in MLRSs, MBTs or self-propelled howitzers. If other major European countries do not increase their stocks accordingly, this would place Poland as the first European army in size in terms of some major military equipment in the land forces.

Figure 4.3.1: Polish defence procurement by equipment category (billion EUR).



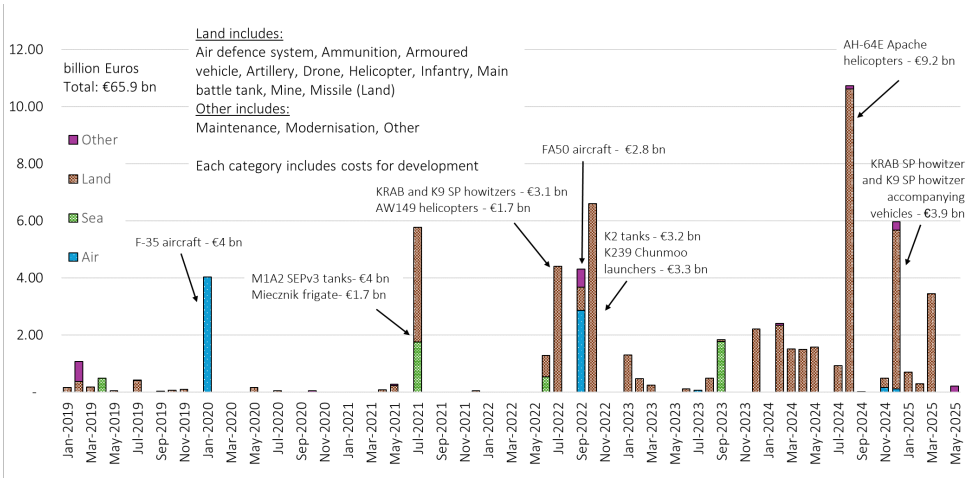
Source: Kiel military procurement tracker – second release, Wolff et al. (2025).

Figure 4.3.2: Polish total military orders, 2019 - 2025, twelve-month windows beginning in January 2019 (billion EUR).



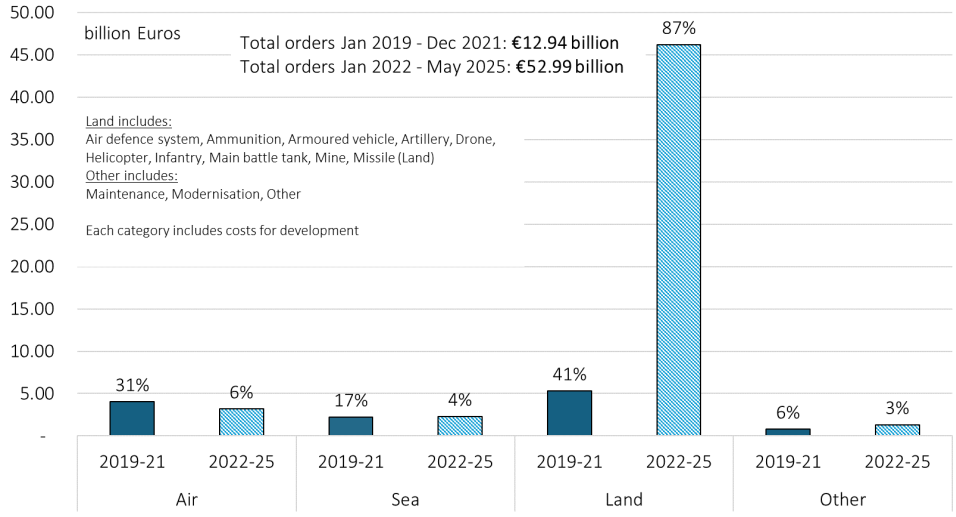
Source: Kiel military procurement tracker – second release, Wolff et al. (2025).

Figure 4.3.3: Total military orders by weapon category, January 2020 - May 2025 (billion EUR).



Source: Kiel military procurement tracker – second release, Wolff et al. (2025).

Figure 4.3.4: Poland shift in procurement priorities since the start of the Russia-Ukraine war



Source: Kiel military procurement tracker – second release, Wolff et al. (2025).

4.4 France

To our knowledge, in the case of the military procurement in France, there is no comparable level of transparency to that of Germany, the UK, or Poland. Specific budget allocations to the different purchases are not always made available. While we sometimes can track procurement orders for certain items using Ministry of Defence news announcements, in many cases the data is just not publicly available on a consistent basis. This is especially true for data for the monetary amounts of orders. What we can find however is an overview of the quantities of different military items ordered and delivered in a given year from the annexes of the military equipment budgets published by the French Ministry of Defence. We look at the period 2020-2025. Using these items and quantities as a basis, we can then search for and piece together more specific information about an order. However, the monetary value is missing for too many orders, so we cannot perform the same level of bottom-up analysis for France as we do for the other three European countries. The specific order and delivery data are detailed in the Kiel Military Procurement Tracker – second release, Wolff et al. (2025).

What we do find is that during the last 6 years, the French military conducted major orders in a number of weapon types. For the Air Force and Navy, France ordered several transport and surveillance aircraft like the A330 before the start of the Ukraine War, as well as a large order of Rafale fighter jets in 2023. Also notable is the number of orders for new armoured vehicles and Leclerc tank refurbishments for the Army – almost 2700 combined – and the regularity with which these orders were made. Finally, France ordered a large number of CAESAR 155mm howitzers and

800 missiles, over 300 of which are surface-to-air missiles. In all but one of these orders, one for 3 Hawkeye surveillance aircraft in 2020, France purchased from either French or trans-European companies with French participation.

Investment in the French military is dictated by the 'lois de programmation militaire' (LPM), or military programming laws, which are multi-annual budgetary commitments for a number of years to fulfil specific goals related to military investment and modernisation. These laws ensure that military equipment and infrastructure are continually serviced and replaced on a sustained basis[37]. The military programming law that overlaps the most with our period of analysis is the LPM 2019-2025, which allocates a total of €295 billion for military equipment spending over seven years [38]. The current military programming law, LPM 2024-2030, allocates a total of €413 billion until 2030 [39], which represents a 40% increase from the previous period. This increase demonstrates that, even though we cannot provide a detailed analysis of French military procurement, France is indeed responding to the urgency of the situation that Europe is facing and is taking decisive action to rearm its military (see also Table 4.4.1).

[37] https://www.info.gouv.fr/actualite/la-loi-de-programmation-militaire-quest-ce-que-cest

[38] https://www.defense.gouv.fr/ministere/loi-programmation-militaire-2019-2025/fiches-lpm-2019-2025-plan-bataille-concret-remontee-puissance

[39] https://www.defense.gouv.fr/ministere/politique-defense/loi-programmation-militaire-2024-2030

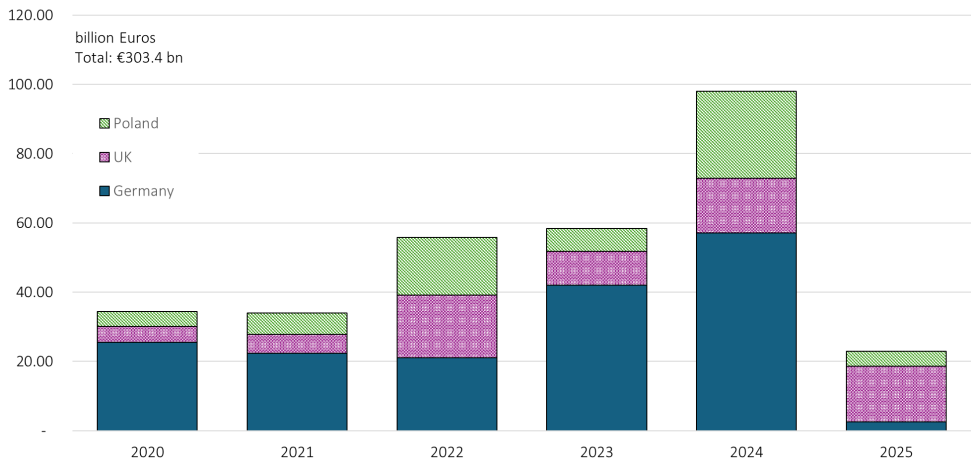
Table 4.4.1: France orders by weapon types from 2020 to 2025 (units).

Weapon Type	2020	2021	2022	2023	2024	2025	Total
Combat Aircraft	0	0	0	42	0	0	42
Other Aircraft	13	1	2	0	0	0	16
Main Battle Tank	0	50	50	0	100	0	200
Armoured Vehicle	677	120	564	442	515	120	2438
Artillery Howitzer	0	0	0	127	0	0	127
Missile	0	59	418	320	3	0	800

Note: This table shows the main orders ("principales commandes") of main weapon types by France from 2020 to 2025 contained in the annexes of the military equipment budgets published by the French Ministry of Defence and summarised by the Kiel military procurement tracker. 'Missile' relates to all types of missiles (Land, Air, Naval). All vehicles ('Main Battle Tank' and 'Armoured Vehicle') orders include both new purchases and refurbishments of existing vehicles. Other aircraft includes aircraft orders for both the Air Force and Navy. Source: Projet annuel de performances Annexe au projet de loi de finances pour 2020, 2021, 2022, 2023, 2024, 2025. Programme 146/147 Équipement des Forces; Kiel military procurement tracker, Wolff et al. (2025).

To conclude section 4, Figure 4.5 summarises the procurement efforts of Germany, Poland and the UK. We can clearly see the substantial and lasting increase in procurement activity in Germany and Poland but also the UK. France also increased its procurement activities with rising numbers, but we cannot fully track their monetary value.

Figure 4.5: Country summary procurement value from January 2020 to April 2025 (billion EUR).



Note: This figure shows the summary of the Kiel military procurement tracker for Germany, UK, and Poland for the years 2020-2025 in € billion. We exclude France because there is not enough monetary data available to make a comparable analysis with the other countries. For all countries, there is no way to verify how much military procurement spending we are missing, and we are not aware of a viable method of benchmarking the data. Hence, our results should be interpreted cautiously and as a lower bound.
Source: Kiel military procurement tracker, Wolff et al. (2025).

5 Understanding domestic and foreign purchases

Several reports have argued that Europe depends critically on foreign supplies of weapons. Maulny (2023) reports that 78% of defence acquisitions is being procured from outside the EU between February 2022 and June 23. The number was later also taken up by Draghi (2024). The European Commission also referenced this number in the European Defence Industrial Strategy (EDIS) communication, and the different targets set for European procurement are indirectly linked to this reference as they assume such existent reliance. These numbers however could not be replicated. Mejino-Lopez and Wolff (2024) look at trade statistics, the German public procurement from the Kiel military procurement tracker (Wolff et al.: 2025) , as well as other national governments' data and find that the current foreign imports from European countries are nowhere close to the 70% of total equipment purchases indicated above. The highest share of imports to defence equipment expenditure we find is for Poland. Schreer (2024) argues that in the period between February 2022

and September 2024, the number of procurements directed to European manufacturers was actually above 50%, since he notices that the number estimated by Maulny (2023) did not take account of the domestic purchases, and hence estimated an overreliance.

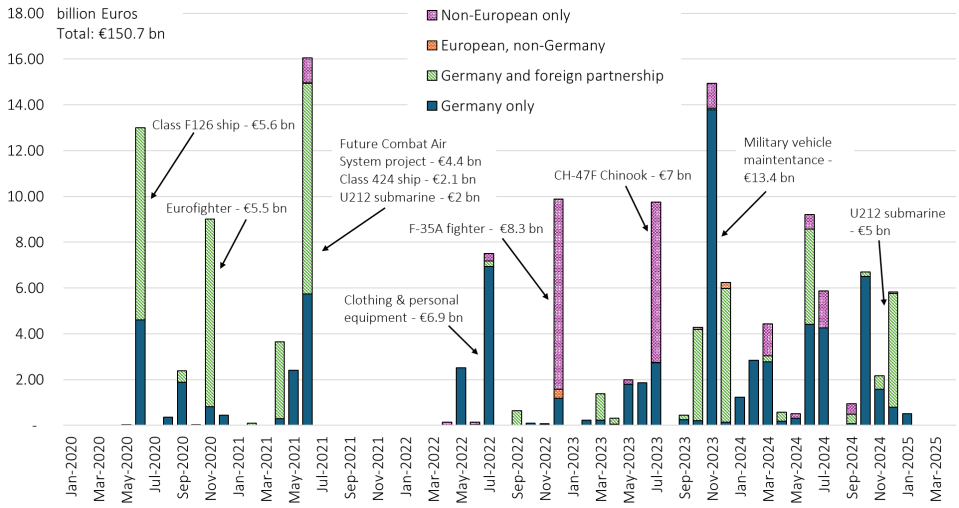
5.1 Insights from the *Kiel Military Procurement Tracker*

With the *Kiel Military Procurement Tracker*, we are able to identify whether the order is given to a domestic company, a company from another European country, a joint venture company or a foreign, non-European company. Concretely, while Rheinmetall producing in Germany would be fully Germany and Lockheed Martin producing in the US would be fully foreign, Raytheon production in Germany of Patriot missiles would be counted as "Germany and foreign partnership". For the UK, similar examples include BAE Systems (fully domestic), Thales Group (foreign, from France), and naval maintenance by subsidiary Thales UK counted as "UK and foreign partnership".

About half of procurement in Germany is from domestic German companies, while only a relatively small part of equipment spending, 16%, is from foreign producers without any German involvement in the production. Figure 5.1.1 and Figure 5.1.2 provide a breakdown of the geographical regions of companies from which Germany has placed orders in the period analysed. While some high-profile orders such as the F35 fighter jets come from a US producer, almost half (49%) of orders go to purely German companies, and some 35% from a consortium involving foreign and German producers. The US by itself is the source of 15% of orders. What is particularly noteworthy is the very low share of orders from other European countries without German involvement (0.5%). Finally, orders from the US have become much more substantial in the last two years compared to 2020 and 2021.

The German order flow goes to multiple companies, with ten companies involved in supplying two thirds (64%) of overall volume and no single company supplying more than 10% of total order volume. Among them are three federally owned companies which provide in-house services: BWI (9% of total order volume, highest overall), providing €15.8 billion worth of IT system modernisation; HIL (8%, second highest), provider of military vehicle maintenance services for which there was a single contract extension worth €13.4 billion; and BwBM (7%, fourth highest), supplier of €12.7 billion worth of soldier clothing and personal equipment. The top non-federally owned company is Rheinmetall, the main company for €13.3 billion of total orders (8%, third highest). In fifth place is Airbus Defence and Space (7%), followed by Boeing (6%), Damen Schelde Naval Shipbuilding (5%), Lockheed Martin (5%), Raytheon (4%) and ThyssenKrupp Marine Systems (4%). We cannot confirm the main company for around €21.1 billion worth of orders, 12% of the overall total order volume.

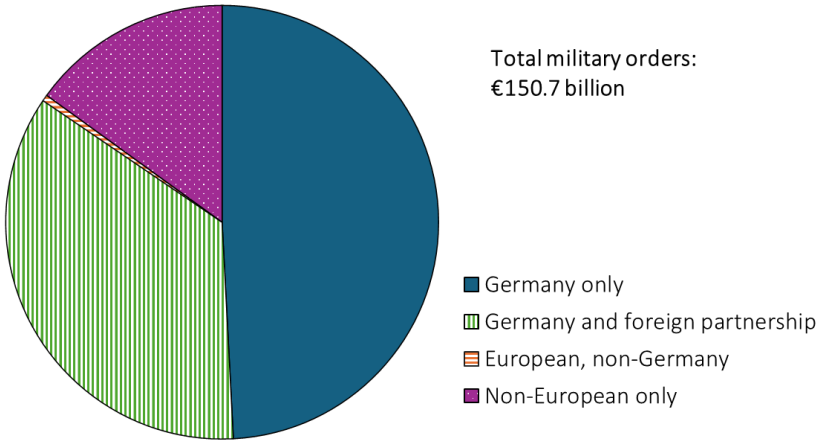
Figure 5.1.1: Germany total military orders by country of origin of the company which received the order, January 2020 – April 2025 (billion EUR)



Note: This figure refers to the country where the headquarters of the company that received the order is located. As such, the location of actual item production and manufacturing may differ. "Germany and foreign partnership" refers to cases where either (a) a German and non-German company jointly receive an order, i.e., they work together on developing and producing an item; or (b) a non-German company receives an order but the item is produced in Germany. We cannot confirm development country for around €19.8 billion worth of total orders.

Source: Kiel military procurement tracker – second release, Wolff et al. (2025).

Figure 5.1.2: Germany share of total military orders by country of origin of the company which received the order, January 2020 – April 2025 (billion EUR).



Note: This figure refers to the country where the headquarters of the company that received the order is located. As such, the location of actual item production and manufacturing may differ. "Germany and foreign partnership" refers to cases where either (a) a German and non-German company jointly receive an order, i.e., they work together on developing and producing an item, or (b) a non-German company receives an order but the item is produced in Germany. We cannot confirm development country for around €19.8 billion worth of total orders.

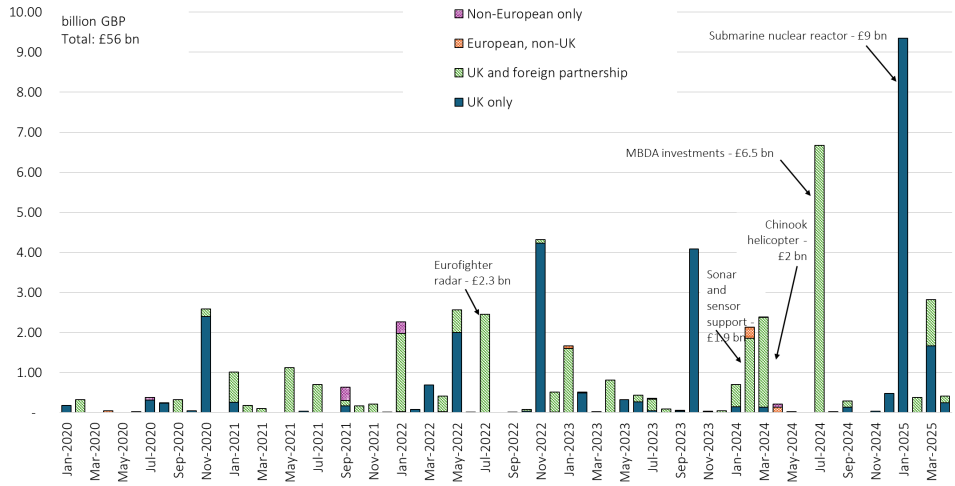
Source: Kiel military procurement tracker – second release, Wolff et al. (2025).

Procurement in the UK is even more clearly tilted towards domestic producers than in Germany. Around 50% of spending is to domestic companies in our sample and UK companies and foreign partnerships come second at 47%, with only a very small part of purchases coming straight from foreign producers (Figure 5.1.3 and Figure 5.1.4). There is a high representation of UK-based companies under foreign ownership like Thales UK (Thales Group, from France) and Leonardo UK (Leonardo, from Italy) which are developing, not just manufacturing, procurements. This is much more rarely the case in available German and Polish data. We count these orders as partnerships between UK and foreign companies even though they are not contracted to the parent companies per se. The largest single item under UK and foreign partnership was a £6.5 billion investment in R&D conducted by MBDA UK, the British arm of the European multinational MBDA.

The British procurement is more concentrated with four main companies representing two thirds of total order volumes and features no major government-owned companies. In many cases, major contracts are given to a main company with the expectation that they handle

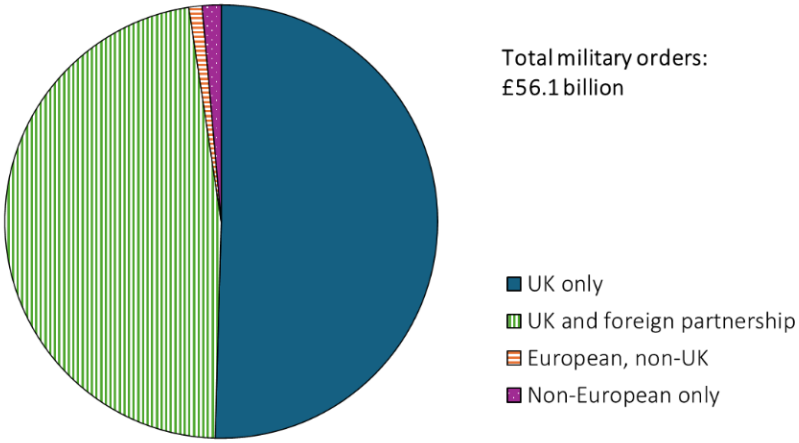
subcontracting and delegation to other firms. BAE Systems appears dominant, being the main company for £17.9 billion of orders (30% of total order volume). Rolls-Royce is next (£9.1 billion, 15%), followed by MBDA UK (£7.5 billion, 13%), Thales UK (£4.6 billion, 8%), Boeing (£2.3 billion, 4%), Babcock (£2.2 billion, 4%) and BMT (£1.6 billion, 3%). We cannot confirm the main company for around £3.4 billion worth of orders, 6% of the overall total order volume. Finally, we note the prevalence of foreign (often US) ownership of shares in domestic companies, though it is beyond the scope of this paper to explore these dynamics.

Figure 5.1.3: UK total military orders by country of origin of the company which received the order, January 2020 – February 2025 (billion GBP).



Note: This figure refers to the country where the headquarters of the company that received the order is located. As such, the location of actual item production and manufacturing may differ. "UK and foreign partnership" refers to cases where either (a) a British and non-British company jointly receive an order, i.e., they work together on developing and producing an item; or (b) a non-British company receives an order but the item is produced in the UK. We cannot confirm development country for around £3.3 billion worth of total orders Source: Kiel military procurement tracker – second release, Wolff et al. (2025).

Figure 5.1.4: UK share of total military orders by country of origin of the company which received the order, January 2020 – April 2025 (billion GBP).



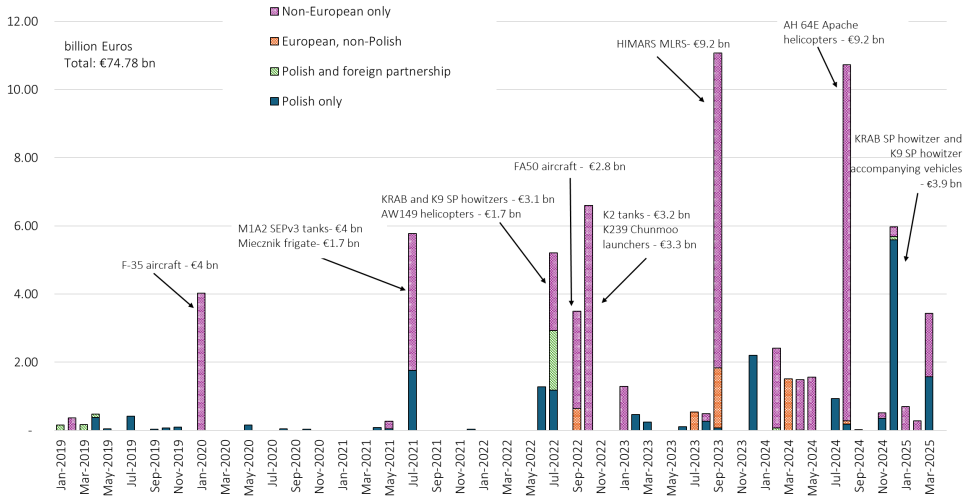
Note: This figure refers to the country where the headquarters of the company that received the order is located. As such, the location of actual item production and manufacturing may differ. "UK and foreign partnership" refers to cases where either (a) a British and non-British company jointly receive an order, i.e., they work together on developing and producing an item, or (b) a non-British company receives an order but the item is produced in the United Kingdom. We cannot confirm development country for around £3.4 billion worth of total orders.

Source: Kiel military procurement tracker – second release, Wolff et al. (2025).

Poland's military purchases stand in stark contrast to the UK and Germany: they were mainly directed to foreign providers, in particular to the US and South Korea. About 69% of all purchases were directed to foreign companies [40]. This included both land (MBTs, howitzers, transport and attack helicopters), as well as aircrafts (F-35 or FA050 aircrafts) or air defence systems (see Figure 5.1.5 and Figure 5.1.6). The production of some of these weapons is being manufactured in Poland, and by Polish companies in some of the cases. Around 70% of the non-European purchases from Poland are contracted with US companies and the remaining mainly with South Korean firms. Lockheed Martin and Boeing account for most of the US purchases, and Hanwha Aerospace and Hyundai Rotem for those from South Korea. The orders allocated to national companies refer mainly to either the public holding company PGZ or Huta Stalowa Wola, a subsidiary company of PGZ.

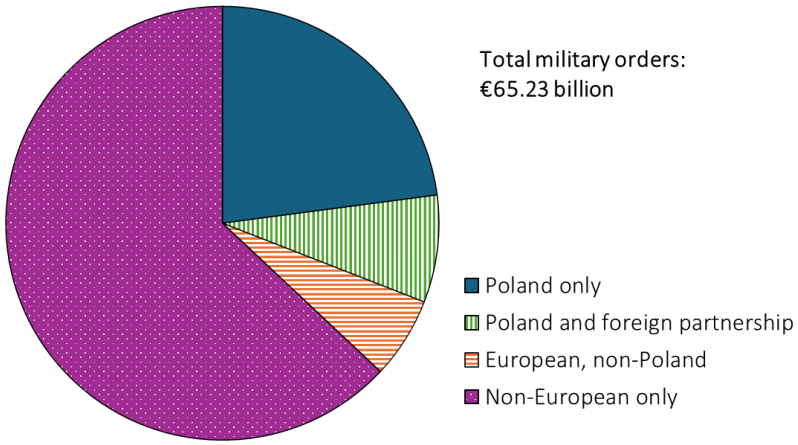
[40] This may not mean that the manufacturing occurs in a foreign country, however.

Figure 5.1.5: Poland total military orders by country of origin of the company which received the order, January 2019 – May 2025 (billion EUR).



Source: Kiel military procurement tracker – second release, Wolff et al. (2025).

Figure 5.1.6: Poland share of total military orders by country of origin of the company which received the order, January 2019 – May 2025 (billion EUR).



Source: Kiel military procurement tracker – second release, Wolff et al. (2025).

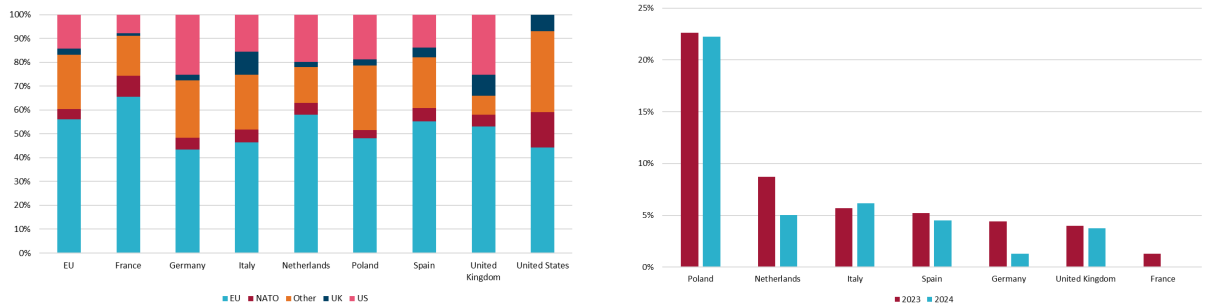
Finally, France shows almost no reliance on foreign, non-European partners. The majority of French procurement is contracted with French companies, or alternatively with European ones. The case of purchases for major equipment like transport aircrafts (A400M; Airbus), combat aircrafts (Rafale; Dassault), or self-propelled howitzer (CAESAR; Nexter) relate to equipment for which both development and manufacture are known to be done by French companies. While the granularity of

the data does not allow us to observe the origin of smaller equipment like ammunition, this is likely either locally produced or from European partners when considering imported equipment (see section 5.2). Having analysed the procurement data for these four countries, we now proceed to cross-check our findings with trade statistics and transfers of military equipment data.

5.2 Cross-checking import dependency with Comtrade, NATO and SIPRI data

To further understand the dependency on foreign suppliers, we next turn to trade data also covering other European countries. Figure 5.2.1 (left) shows the share of imported military equipment by country using UN Comtrade bilateral data for the period 2021 and 2024, with intra-EU imports often around 50% of the total imports for most of European countries. The level of imports to total equipment spending reflects low levels of reliance on third countries, and a high concentration of the military procurement on the national industries (Figure 5.2.1, right).

Figure 5.2.1: Share of military equipment imports by origin for different countries between 2021 and 2024 (left) and share of imports to total equipment spending (right).



Notes: Trade data for France in the year 2024 is not available and uses 2023 data instead. The left figure uses UN Comtrade Data. The right figure uses UN Comtrade data (HS Commodity Code 93) for imports (numerator) and equipment spending from NATO (denominator). Source: authors based on UN Comtrade and NATO data.

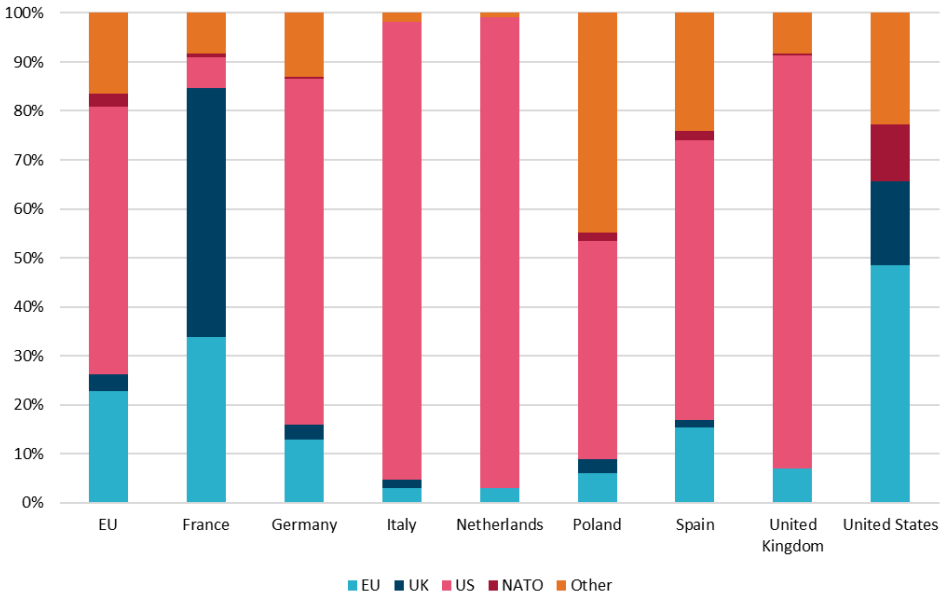
These trade data face limitations, however. In particular, we cannot differentiate between imports of final goods or intermediate goods. This could overestimate the level of imports for some countries using foreign intermediate military goods for production. And secondly, underreporting in the data may exist due to confidentiality applying to military purchases, which in turn would lead to an underestimation of the imports.

We therefore complement the analysis further by using the SIPRI database that covers international transfers of major conventional arms [41].

[41] These transfers are measured in TIV (see here), a unit of measure which aims at capturing the transfer of military resources rather than the financial value. While this means we cannot make direct financial comparisons, it is possible

The SIPRI data depicts an important role of the US within European *imports but does not relate imports to total equipment purchases*. Put differently, the data are useful to track origins of imports but not to assess whether European countries depend excessively on imports in the first place as domestic production is not included in the data. Figure 5.2.2 shows the origin of arms imports for the EU and selected European countries. The US is the main trading partner for military equipment both for the EU and the main European countries except for France. Overall, intra-European imports play a much smaller role, comparable to imports from third countries (e.g., South Korea).

Figure 5.2.2: Major conventional arms imports by origin 2021-2024, SIPRI data.



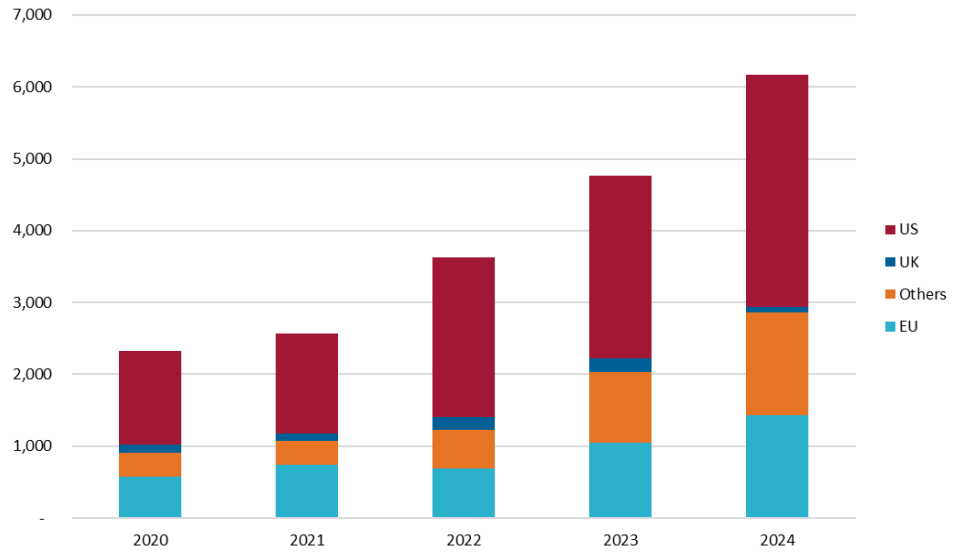
Source: authors based on SIPRI.

5.3 Digging further into the foreign purchases puzzle: how big is Europe's dependency on US imports?

The different data analysed so far do not point to an excessive reliance on foreign countries, with the exception of Poland. However, the volume of European imports in the EU has continuously grown since 2020 (Figure 5.3.1), with the US imports clearly leading the increase despite concerns over the US industrial capacity to provide sufficient weapons without major delays (Burilkov et al.: 2024).

to capture the intensity of imports from the different countries.

Figure 5.3.1: Arms imports measured in TIV million for the EU by origin.



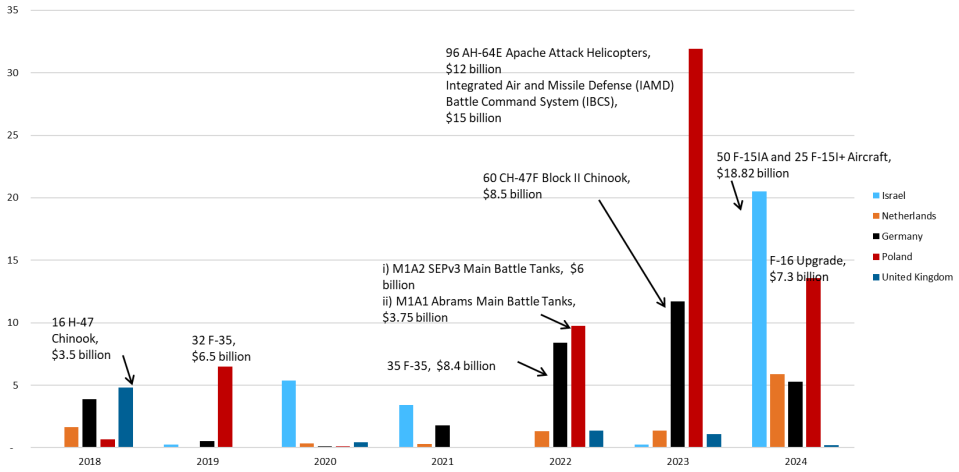
Note: The EU category here refers to intra EU trade.

Source: authors based on SIPRI.

Besides increasing worries about the reliability of the US as a political and military partner, a special focus on the US is warranted as the US is the leading global exporter of military equipment (SIPRI: 2025). Between the fiscal years (FY) 2017 and 2021, the Foreign Military Sales (FMS) portfolio for European allies of the US averaged $11 billion while in FY2024 reached $68 billion (Cavoli: 2025). While the US also transfers military equipment through other instruments than the FMS (see Annex A3 for an overview), the latter covers most of the transfers of major, strategic, military equipment. We thus focus on the exports via FMS so that we can assess (a) the type of equipment acquired, and (b) the financial scale of the equipment across time and how it compares to the other available data. We do so based on the US Foreign Military Sales (FMS) notifications which we have compiled from the US Department of Defense website and put into a new, readily accessible database – the Bruegel US foreign military sales database (Mejino-Lopez and Wolff: 2025). In line with Cavoli (2025), our FMS database shows a substantial increase in the US potential sales to main European countries, with the monetary value. Figure 5.3.2 does document that since 2022, several EU countries did reach agreements with the US for transfers of major defence equipment of high-value. It is important to highlight that the numbers capture notifications but not actual deliveries. Both Poland and Germany showcase that the potential sales captured in our database are likely to be concluded, as in the case of the F-35s or the M1A1 Abrams purchase of Germany and Poland respectively. In terms of the type of military equipment purchased, combat aircrafts, transport helicopters, and air defence systems seem to be the most demanded items by European

countries. In financial terms, since 2022 the aggregate potential notified sales to European countries accounted for almost €140 billion.

Figure 5.3.2: Value of FMS notified potential sales by country and year (billion USD).



Note: The items should be interpreted as main item of the specific potential sale and not unique item. Additional equipment and technical services are usually included within a potential sale notification.

Source: Bruegel database on US foreign military sales (FMS).

In this section, we have provided a detailed analysis of the amount and type of imported equipment from third countries and specifically the US. From the gathered evidence, we can make the following conclusions:

The reliance on the US for military equipment is overstated. Neither the procurement data nor the trade data corroborate any number close to the 80% that is commonly suggested as the percentage of total military equipment purchased in Europe that is imported from the US.

Demand for US military equipment has however increased substantially after Russia's invasion of Ukraine. The data from the US Foreign Military Sales database indicate significant demand for specific high-end equipment like combat aircrafts or air defence systems.

On the whole, domestic purchases do indeed dominate the European procurement with the exception of some countries such as Poland. However, for imports of specific major and high-end defence equipment, the US is the most significant partner while the intra-EU trade plays a rather minor role.

6 From procurement to effective capacities: assessing delivery delays, production capacity, and development times for new systems

Having studied what has been ordered, we now move to the crucial question of delivery and production capacities. In section 6.1, we report on the expected delivery estimates as we have been able to capture them in the *Kiel Military Procurement Tracker*. Section 6.2 provides some data on increased production capacities for key weapon systems. Section 6.3 focuses on the development of newer systems and the key technological gaps that Europe has.

6.1 Expected delivery dates in ordered equipment from the *Kiel Military Procurement Tracker*

Expected equipment delivery dates are recorded in the Kiel Military Procurement Tracker, in detail for Germany and the UK, and where possible, for Poland as well.

For German items with both an earliest and latest expected delivery date (42% of total), the average delivery time is around 3 years, and no official latest delivery date is provided for 50% of items. Average delivery time is shown in Figure 6.1.1, and a three-month moving average of the proportion of orders with no latest expected delivery date is shown in Figure 6.1.2. For the former, there is some variation over time but no systematic trend. For the latter, it appears that the share of orders with no latest expected delivery date has been increasing over time. This could well be an indication of increasing capacity constraints at a moment of rising military procurement activity, but other explanations might also be possible.

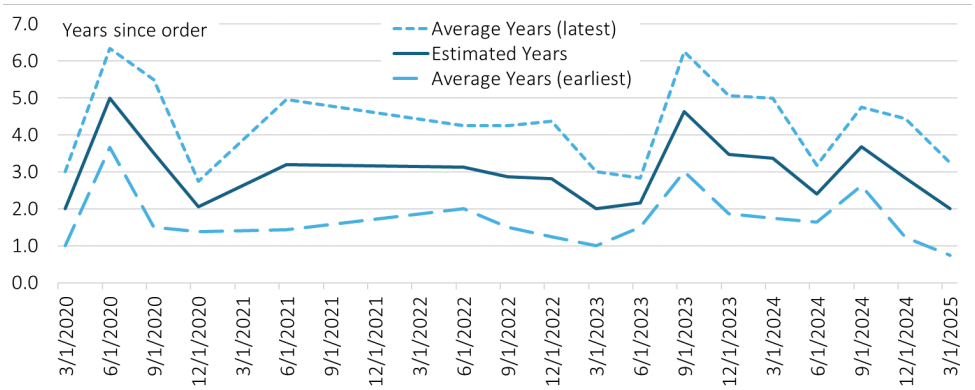
For British items with both an earliest and latest expected delivery date (36% of total), the average delivery time is around 3-4 years, and no official latest delivery date is provided for 53% of items. Average delivery time is shown in Figure 6.1.3, and a three-month moving average of the proportion of orders with no latest expected delivery date is shown in Figure 6.1.4. Average delivery time appears volatile, with spikes that can be attributed in part to the long timespan of naval orders and training contracts (some of which go as late as 2040). Still, for regular items, the average tends to be 3-4 years. The share of items with no latest expected delivery date appears to stay stable over time.

For Polish items, the average delivery time is around 3 years from when the equipment has been ordered. We note however that almost half of the orders we identify do not show an expected delivery time.

On the whole, the procurement data for all three countries offer an important message: if the 2030 timeline is to be met, procurement must occur in the next 2 years as otherwise

deliveries will be too late.

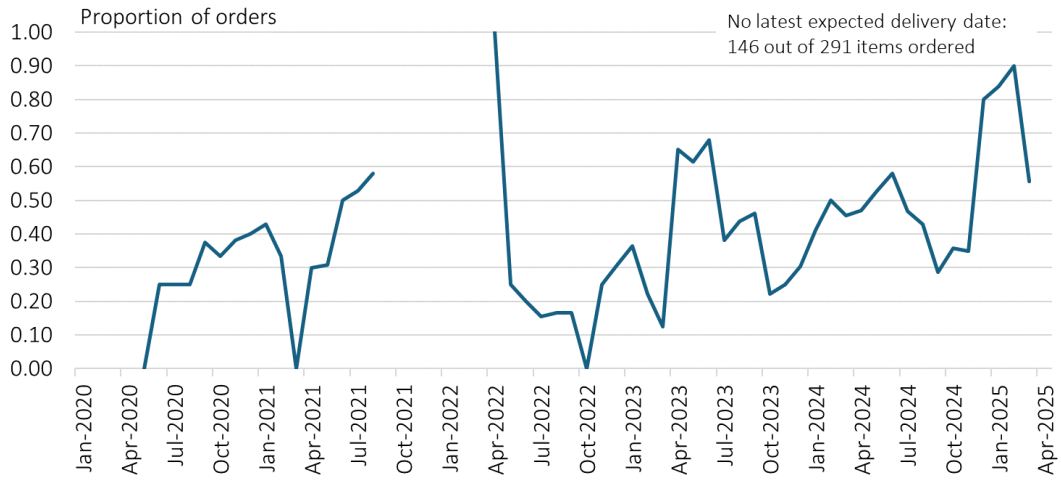
Figure 6.1.1: Germany quarterly estimate of the number of years needed to deliver the ordered equipment where available, January 2020 – April 2025.



Note: Out of the 291 ordered items recorded for the years 2020-2025, 122 have both an earliest and latest expected delivery date. In cases where the order is not an item to be delivered per se (e.g. a maintenance contract), the "delivery date" refers to the expected date where the contractor's obligation to provide a service to the Bundeswehr ends. This figure shows the estimated number of years it takes for an order to be fulfilled after it has been placed as a function of time. It shows the quarterly average years until an earliest expected delivery date and until a latest expected delivery date. We take a further average of these two quarterly values to estimate the average years it takes to fully deliver an item or fulfil an order.

Source: Kiel military procurement tracker – second release, Wolff et al. (2025).

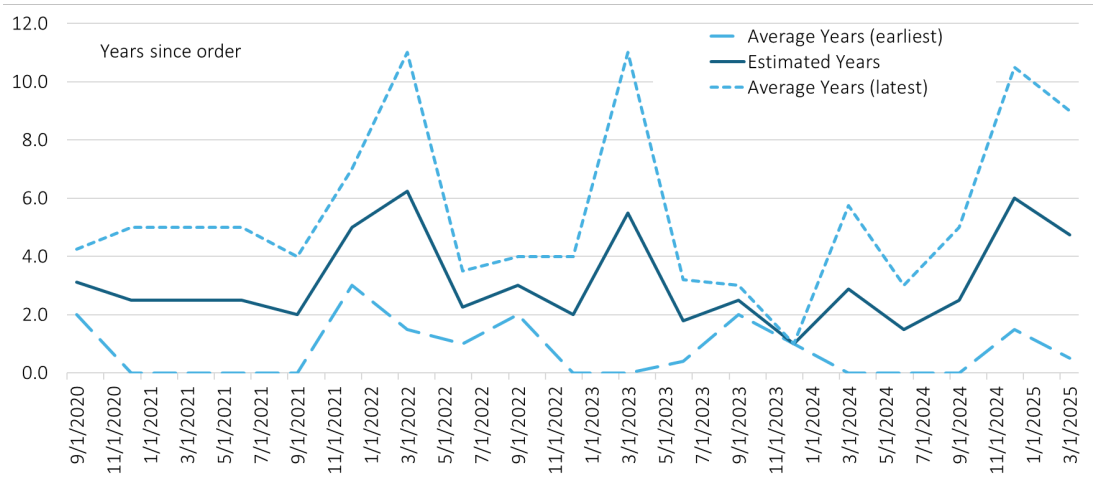
Figure 6.1.2: Germany proportion of ordered items without a latest expected delivery date, three-month moving window (January 2020 – April 2025).



Note: This figure shows the proportion of ordered items that do not have a latest expected delivery date within a three-month rolling window consisting of each month and the two months prior. These items have either (a) no expected delivery date, or (b) only an earliest expected delivery date. Altogether Germany has ordered 291 items of which 146 have no latest expected delivery date.

Kiel military procurement tracker – second release, Wolff et al. (2025)

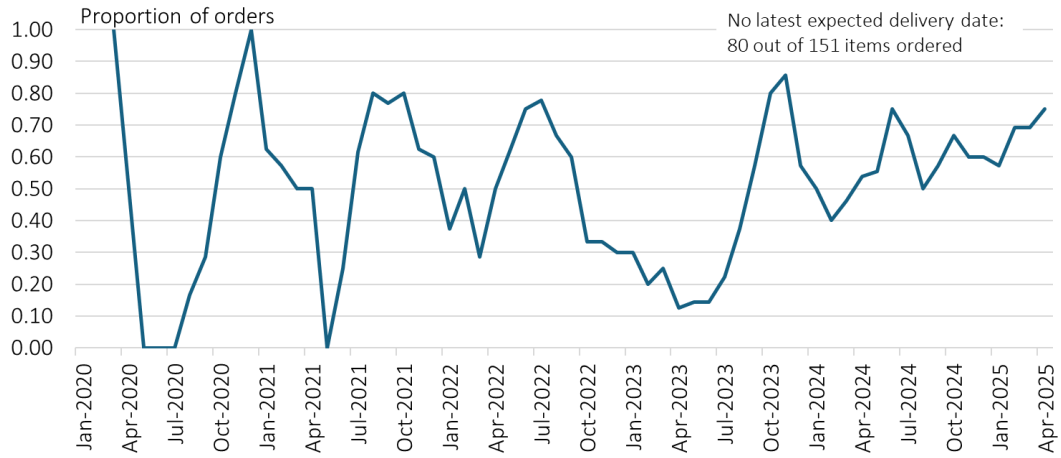
Figure 6.1.3: UK quarterly estimate of the number of years needed to deliver the ordered equipment where available, January 2020 – April 2025.



Note: Out of the 151 ordered items recorded for the years 2020-2025, 53 have both an earliest and latest expected delivery date. In cases where the order is not an item to be delivered per se (e.g. a maintenance contract), the "delivery date" refers to the expected date where the contractor's obligation to provide a service ends. This figure shows the estimated number of years it takes for an order to be fulfilled after it has been placed as a function of time. It shows the quarterly average years until an earliest expected delivery date and until a latest expected delivery date. We take a further average of these two quarterly values to estimate the average years it takes to fully deliver an item or fulfil an order.

Source: Kiel military procurement tracker – second release, Wolff et al. (2025).

Figure 6.1.4: UK proportion of ordered items without a latest expected delivery date, three-month moving window (January 2020 – April 2025).



Note: This figure shows the proportion of ordered items that do not have a latest expected delivery date (80 total) within a three-month rolling window consisting of each month and the two months prior. These items have either (a) no expected delivery date, or (b) only an earliest expected delivery date. Altogether the UK has ordered 151 items. Source: Kiel military procurement tracker – second release, Wolff et al. (2025).

6.2 Gradually growing production capacity

While the production of military equipment may be low in the near term, the literature shows that sharp production increases have historically been possible in actual war times (see short review in Wolff, Steinbach, et al. (2025)). According to Rapping (1965), the monthly aircraft production in Nazi Germany increased from 30 to 425 between 1933 and 1936, and in 1939 it further increased by 60% with respect to these levels. By the end of 1939, German production of tanks per month was placed around 70. Harrison (1990) finds similar patterns for the UK, with the output increasing by a factor of 4 between the first quarter of 1942 and the end of 1939. During the peak of production in 1944, the UK was producing more than 500 aircraft and 1.5 million artillery shells per week. Rapping (1965) studies American shipbuilding output during the Second World War as well, finding a productivity increase of 122%, and an annual increase in production of 40% between the end of 1941 and 1944, both possibly being explained by the effects of cumulative learning and adaptation.

The documented evidence, however, builds mostly on exceptional war time, and mainly on the Second World War – a situation different to today on many dimensions. We therefore compile production data for specific military equipment looking at the production rates before Ukraine's invasion and the production rates expected to occur before 2027. As Table 6.1 shows, the increase

in production capabilities since 2022 is substantial for all the items we look at. The most notable increase has occurred for artillery shells production. Artillery shell production in Europe is now substantially larger than that of the US but still somewhat smaller than the combined Russian-North Korean production. Moreover, self-propelled howitzer production has increased substantially with various European producers (including Ukraine) now producing 442 units per year (with the most expensive German system playing virtually no quantitative role). These numbers are now close to Russian production numbers.

Table 6.1: Increase in production of selected military equipment since 2022.

Equipment	Company	Production by 2022	Expected production (Year)	Increase %
Artillery shells				
Artillery shells	Rheinmetall	70,000	1,100,000 (2027)	1471%
Artillery shells	CSG	-	300,000 (2026)	-
Artillery shells	Nexter	-	400,000 (2027)	-
Artillery shells	Mesko	-	150,000 (2027)	-
Total European artillery shells production			***1,950,000***	
Self-propelled howitzers (SP howitzer)				
CAESAR, SP howitzer	KNDX	72	144 (2025)	100%
Zuzana-2, SP howitzer	Konstrukta	20	40 (2025)	100%
Archer, SP howitzer	BAE Systems AB	4	12 (2025)	200%
Panzerhaubitze 2000, SP howitzer	KNDS, Rheinmetall	-	6 (2025)	-
2S22 Bohdana, SP howitzer	Kramatorsk	72	240 (2025)	233%
Total European SP howitzer production			***202 (442 including Ukraine)***	
Main Battle Tanks (MBT)				
Leopard 2A8, MBT	KNDX	-	50	-
Total European MBT production			***50***	
Other systems				
Abrams M1A2, MBT	General Dynamics	57	135 (2025)	137%
Taurus missile	MBDA/SAAB	60	60 (2025)	-
PAC-3 missiles	Lockheed Martin	380	650 (2027)	71%
HIMARS, MLRS	Lockheed Martin	48	96 (2024)	100%
Javelin missiles	Lockheed Martin	2400	3,960 (2026)	65%

Note: Other manufacturers for artillery shell production exist in Europe such as BAE Systems or Nammo, however we could not gather numbers on the production data. Estimates should overall be interpreted with caution considering the existing uncertainty over the actual production capacities.

Sources: Authors based on company reports and specialised press. See Annex A4 for detailed sources.

When it comes to main battle tanks, European production is concentrated on the Leopard 2A8, with an annual expected production of 50. In the US, the reported production of Abrams tanks has increased substantially reaching 135 units per year. These numbers are substantially smaller than Russian production numbers. When it comes to fighter jets, no clear increase in production output is visible for the four most prominent Western combat aircraft (see Table 6.2).

Table 6.2: Deliveries and orders for military combat aircrafts/fighter jets, 2020–2024.

Deliveries & (Orders)	2020	2021	2022	2023	2024
Eurofighter	1 (38)	2 (0)	11 (20)	19 (0)	6 (25)
F-35	120 (102)	142 (16)	141 (256)	98 (126)	110 (145)
Rafale	13 (0)	25 (49)	14 (92)	13 (60)	21 (30)
Gripen	1 (0)	6 (0)	2 (0)	1 (4)	0 (4)

Source: Authors based on companies' annual reports and Bloomberg.

A different approach to gauge increases in military production capacities across Europe is to look at the increases in employment in key European defence companies. Table 6.3 shows that total employment among the top 19 companies has increased by 11% from 2021 to 2024. Industry association such as ASD report an industry level increase of employment of 14.5% in 2023 compared to pre-pandemic years [42].

[42] https://umbraco.asd-europe.org/media/amoenldy/asd_facts-figures-2024_1119.pdf?rmode=pad&v=1db3a84f57bffc0

Table 6.3: Employment numbers for major European companies in 2021–2024.

Company	Defence Employment 2021	Defence Employment 2024	Increase 2021–2024
Thales	41,291	41,291	0%
Leonardo	37,810	40,175	6%
Airbus	21,934	27,149	24%
Rheinmetall	16,005	22,743	42%
Safran	16,104	19,296	20%
Saab	16,033	19,239	20%
PGZ	15,712	18,028	15%
MBDA	12,859	14,837	15%
Naval Group	17,191	14,668	-15%
Indra	9,896	10,973	11%
Dassault Aviation Group	8,606	9,414	9%
KNDS	8,335	9,023	8%
Fincantieri	7,395	7,646	3%
Hensoldt	5,841	6,388	9%
CEA	7,312	7,519	3%
Diehl	4,156	4,550	9%
ThyssenKrupp	4,505	4,460	-1%
Navantia	2,795	3,456	24%
Total	**253,779**	**280,856**	**11%**

Note: The employment number is estimated through the defence revenue share for 2024. Data for the closest period of time is used when data for a specific year is not available.

Source: authors based on company annual accounts and official documents.

6.3 Developing new technologies to lead

Europe lacks some top military technologies and development times are often decades instead of few years. Table 6.4, taken from Wolff et al. (2025), provides estimates of current time horizons for the development of weapons, assuming continuity from the past. These estimates are based on standard planning horizons outside of major urgency.

Table 6.4: Time horizons for the development and production of weapon systems.

Equipment	Time horizon
Next generation of main battle tanks	2040
Sixth-generation aircraft	>2045
Air defence	2030–2035
Rocket artillery systems (like HIMARS)	~2045
Transport helicopters (like Chinook)	2030
Satellites (like IRIS^2 for communication)	2030
Europe has 10–44 military satellites, compared to 100s for the US[43]	2030–35[44]

Note: For the next generation of main battle tanks and the sixth-generation aircraft, the time horizon refers to first product deliveries. For other products, it refers to European autonomy.

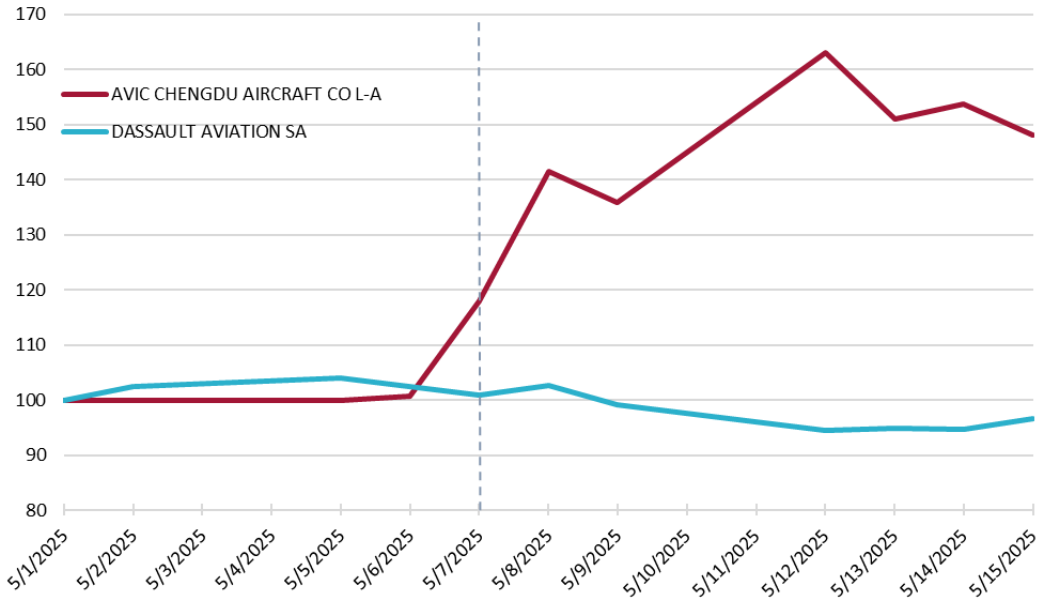
Source: Wolff et al. (2025) based on Kiel Institute, MGCS, and sources indicated in footnote.

A reduced or even completely missing technological lead in warfare is becoming an increasing concern across Western militaries and is particularly an issue for Europe. Both Russia and China have substantially advanced their production capacities as well as technological heft. For example, in a recent fight between Pakistan and India, the Chinese fighter jet J-10 reportedly downed a number of French Rafale jets on May 7. Despite the still sketchy evidence on the precise circumstances, the stock market prices of the two companies immediately reacted (see Figure 6.3.1).

[43] IIIS number: 44. According to French General Philippe Steininger, Europe has just 10 military satellites – five French and five Italian – compared to "hundreds" for the United States and China. France24, 'Europe's new Ariane 6 rocket successfully puts French spy satellite into orbit', 6 March 2025. https://www.france24.com/en/live-news/20250306-%F0%9F%94%B4european-rocket-ariane-6-launches-on-first-commercial-mission

[44] There are six annual launches of European Ariane rockets and the hope is to increase this number to 12. If there is one military satellite per launch, Europe would need 10 years to reach numbers closer to the US. But a smaller number may be sufficient if the focus is primarily Europe and its neighbourhood. In terms of rocket launches, Europe relied on Russia's Soyuz rocket until 2022, when Russia stopped its cooperation in response to economic sanctions. Europe has since relied on US launches. New European aerospace companies, such as Isar Aerospace, may soon allow commercial launches of satellites.

Figure 6.3.1: Stock price evolution of Dassault and Chengdu companies. May 1st = 100.



Source: authors based on Bloomberg.

Technology evolves rapidly, posing significant challenges in Europe's rearmament efforts. Defence technologies are evolving fast with totally new weapon systems playing an increasingly important role. The F35 fighter jet might still be the world's top fighter jet. Yet the usefulness of manned fighter jets is increasingly put into question. While drones cannot replace or stop fighter jets[45], they can serve as platforms from which air-to-air missiles can be fired, possibly reducing the military effectiveness of fighter jets. More effective air-based or ground-based anti-aircraft capacities will increasingly challenge the role of fighter jets, further eroding the technological lead of Western militaries. Unmanned systems will play an increasing role in all domains, land, sea, air, and cyber. Increasingly, these systems will also be autonomous or semi-autonomous. European armies (other than Ukraine) appear to be further behind on such developments compared to the US.

Increasing use of drones The use of drones in the invasion of Ukraine was rather modest at the beginning of the conflict, but it has steadily increased. The use of UAVs by Russia has increased by a factor of 8 between September 2023 and March 2025.[46]

To keep up with the extensive use, drone production has experienced sharp increases both in

[45] Elon Musk is arguing that swarms of drones can stop fighter jets.

[46] https://www.iiss.org/online-analysis/military-balance/2025/04/russia-doubles-down-on-the-shahed/#:~:text=Russia's%20commitment%20to%20the%20use,increase%20these%20numbers%20through%202025

Russia and Ukraine. For instance, the target for production of first-person-view (FPV) drones in Ukraine for 2025 is around 4.5 million while that for Russia is between 3 and 4 million[47] , with the levels of production at the beginning of the war being much more limited. Drones appear critical and according to reports are now responsible for 60-70% of damage currently caused to Russian equipment[48]. At the same time, military analysts in Ukraine stress the complementary nature of drones, artillery, and armoured vehicles.

Scale leading to lower prices With the increases in the manufacturing, the unit costs have fallen, with examples of production for these simple drones at negligible costs from Ukrainian manufacturers[49]. Similarly, the increase in competition can lead to lower margins for the companies and better prices (see footnote 5).

Drone manufacturing in Europe European start-ups in the field are emerging, and their production of more sophisticated drones is increasing[50] [51]. While growing, European start-ups still have a limited scale compared to American competitors (Wolff et al, 2025), and in the case of long-stablished firms, joint-ventures appear as a possibility to increase scale and market access[52]. Contrary to other military equipment like artillery shells or armoured vehicles, stockpiling for small FPV drones is of limited use. The technology is evolving rapidly so that drones of more than 6 months age may already have lost substantially in effectiveness relative to increasingly capable defensive capacities. It is therefore important to think of drones in terms of production capabilities. Europe must develop the capacity to be at the technological frontier and of course also the capacity for personnel training and integration of the technology into warfare strategy and exercise.

The overall very dynamic technological developments render military procurement planning extremely challenging. On the whole, a key question for military planners is thus how to balance the needs to fill large existing gaps when it comes to conventional weapon systems, with the needs to invest into existing high-end technologies such as F35 fighter jets and finally investing and also forecasting how new technologies might completely change the battlefield in the coming years, quickly rendering even some of the most sophisticated current military systems obsolete.

[47] https://www.forbes.com/sites/davidaxe/2025/03/12/45-million-drones-is-a-lot-of-drones-its-ukraines-new-production-target-for-2025/

[48] https://static.rusi.org/tactical-developments-third-year-russo-ukrainian-war-february-2205.pdf

[49] https://www.bloomberg.com/news/newsletters/2024-07-11/diy-bomb-carrying-drones-change-the-economics-of-war-big-take

[50] https://helsing.ai/newsroom/helsing-to-produce-6000-additional-strike-drones-for-ukraine

[51] https://www.ft.com/content/e085334b-8697-4824-80fe-a558b869ec5c

[52] https://www.ft.com/content/8f88276b-6194-4f43-80fd-71838b635700

7 European Readiness 2030: What is needed?

This section outlines core needs for European rearmament through 2030. The focus is on ground forces and their enablers, such as unmanned air and ground systems. The main scenarios for a Russian threat lie on the eastern flank and such scenarios primarily would be fought by ground troops. However, we also cover air defence, which as demonstrated by the Russian strategic bombing campaign in Ukraine, is a critical component of peer conflict.

Future-proofing European defence: the complementarity of mature capabilities and future technologies

An early inkling of the kind of force generation that might be needed came from Commissioner Kubilius, who suggested that European forces should increase by an additional 49 brigades (Kubilius: 2024). This would translate to anywhere between 250,000 and 300,000 new troops. Wolff, Steinbach, et al. (2025) suggested similar numbers by comparing the US presence in Europe that specific war simulation games had shown.

Why the focus on land warfare? If there is one key lesson of the war in Ukraine, it is that ultimately, peer conflict is likely to devolve into industrial warfare, where victory is decided by territorial control and production rates to sustain forces for attrition. While mature systems like tanks and artillery are still foundational to land warfare, they have been joined by new technologies like drones and AI.

Unmanned systems in general are now indispensable to all domains of war. In Ukraine, drones now cause more casualties than artillery. That is not to say artillery is now obsolete: the combination of drones, precision munitions, and artillery – especially guided munitions – is significantly more potent than all three capabilities individually. This is further enhanced by AI-assisted battlefield management systems that increase reaction speed and survivability. The same can be said for other facets of ground warfare. AI will become even more critical as agentic AI models are adopted that multiply the speed of action and breath of intelligence that commanders can access.

Mechanised infantry in Ukraine is increasingly augmented by unmanned ground systems (UGV) for additional firepower and logistics. Increasing the number and use of such UGVs not only enhances the traditional work of infantry mounted in IFVs or other armoured vehicles, but it also enhances the survivability of the infantry by replacing them in tasks by UGVs. The most common short-range drones used on the Ukrainian battlefield are significantly less effective against armoured vehicles than against unprotected infantry. This disparity will widen further as more effective counter-drone systems – such as directed energy weapons – become operational and are introduced at scale. Therefore, a future-proofed European rearmament strategy will have to find the right balance between investing into traditional "heavy metal" capabilities – tanks, IFVs, artillery – and training, research and

development, and will be have to be supported by a robust industrial capacity for new capabilities like unmanned systems, 6th generation aircraft, AI, directed-energy weapons for air defence, electromagnetic systems for the navy, and quantum computing.

The Russian threat on the eastern flank

The most serious threat posed by Russia to Europe is that of a breakthrough by Russian land forces managing to occupy and hold European territory. The Baltics are the obvious flashpoint. The Suwalki Gap scenario, of Russian forces operating out of Kaliningrad and Belarusian territory linking up to cut off the Baltic countries from the rest of NATO, is commonly invoked. However, there is also the Narva scenario, of Russian forces leveraging the Russian minority in eastern Estonia for an invasion and occupation. This scenario places the action even closer to Russian home bases, and without the need to rely on Belarusian compliance.

Russian mass, in number of units and in firepower, would be the key enabler of a breakthrough. The longer that coalition troops would be able to sustain the defence and prevent a breakthrough, the less likely it becomes, as breakthroughs are reliant on mass, speed of action, and surprise. This requires matching conventional Russian land capabilities with European ones. Experience in Ukraine shows that the new technologies of the battlefield, such as drones and AI, are highly complementary of these older capabilities, and if integrated together form a potent warfighting force fully capable of utilizing the Reconnaissance-Strike-Complex that defines modern warfare.

It is relevant to also consider the impact of the Sino-American rivalry. The 2027 scenario – a Chinese blockade or invasion of Taiwan – would place a very high load on American capabilities given China's dramatic qualitative and quantitative growth in military capabilities and the size and sophistication of its defence industrial base. Such a possibility would have two consequences. One is that the US, regardless of political will, would find it difficult to be able to commit to the European theatre. Second is that this would potentially create a window of opportunity for further Russian aggression on a shorter timeline than typically predicted. The Kremlin is nothing if not strategically opportunistic.

Fusing mature and future capabilities for survivability

Experience from Ukraine and the Middle East also shows that whenever infantry, which remains critical for actually holding ground, operates without the "heavy metal" of armour, it sustains severe casualties. Armoured vehicles are still the best protection for infantry, and if deployed in bulk, can significantly mitigate attrition. The European experience in low-intensity interventions such as Afghanistan has been of a gold standard of casualty evacuation by helicopter. For instance, France sustained 71 killed in action and 725 wounded in action, for a killed to wounded ratio of 1:10. Experience in Ukraine shows that the casualty ratio there, in a true peer conflict, is much closer to

1:3. The 1:3 ratio is also commonly accepted for conventional war, and matches US casualty ratios since 1990 in specific battles that were intense enough to approach peer conflict.

Another key lesson of the war in Ukraine is that casualty evacuation by helicopter near the frontline is nearly impossible in a contested airspace, where both sides have air forces and integrated air defence. Helicopters are particularly vulnerable to long-range anti-air missiles. In a hypothetical conflict with Russia, European forces are highly unlikely to have air superiority, especially in the opening stages of the conflict where the Russian Air Force and extensive air defence network are intact. Therefore, casualty evacuation by helicopter, as was the case in Afghanistan, will not be possible at scale. As is the case in Ukraine, casualty evacuation will fall on IFVs and other armoured vehicles, which is the standard practice for both Ukrainian and Russian forces. Such vehicles have the best combination of speed, protection, carrying capacity, and widespread availability.

Any measure that can reduce potential European casualties in a conflict must be fully pursued. Further development and procurement of UGVs is critical. Their ability to provide expendable firepower and logistical support that partially replaces troops in these roles is central to the Manned-Unmanned Teaming System (MUM-T) that is gradually being integrated in many militaries worldwide, including the US, Russia, Ukraine, China, and in Europe.

Additionally, experiments are already underway to fully automate existing weapons systems, starting with artillery. Therefore, it can be expected that "legacy" systems such as tanks and IFVs can eventually be fully or partially automated as well. This would further reduce casualties and provide an extended life for these systems as the number of crew for systems is reduced or even eliminated.

Finally, as outlined above, a Russian breakthrough is the most serious threat to Europe, but it also requires mass, speed of action, and surprise. It is highly likely that Moscow is aware of this, especially given its experience in Ukraine. Therefore, generating European forces to provide that mass on the eastern flank is a very powerful deterrent, because it directly reduces the likelihood of a successful Russian breakthrough, and therefore would factor into Moscow's strategic decision-making. It is European mass, and therefore the willingness and capability to fight an industrial war and sustain the attrition needed to win such a war, that would best deter the Kremlin's designs.

European vs. Russian future force generation If deterring the Kremlin and ensuring European security demands further force generation and sustainment, what could that look like? On the one hand, we have estimates of additional 250,000 troops for Europe in 50 brigade-equivalent units. On the other hand, our estimates show that Russian force generation through 2030 would likely add between 12 and 16 brigades to the already substantial number of Russian brigades.

As outlined, a future-proofed European force structure would fuse mature and future technologies. It does not need to match Russian capabilities one-to-one. However, in the interest of mass and

resilience, it will be necessary to supplement the development and fielding of future technologies like unmanned systems and AI with mature systems like tanks and artillery, and to maintain a ratio of such capabilities with Russia so that Europe is not overmatched on the Eastern flank.

Below we present two scenarios for European rearmament. In the minimum scenario, Europe procures sufficient materiel for an additional 25 brigade-equivalent units. This would be sufficient to match the growth of Russian forces and partly close the gap between Russian and European capabilities. In the maximum scenario, Europe commits to a full additional 50 brigade-equivalent units. This would nearly match Russian ground forces, and provide, in conjunction with Ukrainian forces, a very serious deterrent to Russian aggression.

We can think of the two scenarios as also representing different needs in different geopolitical contexts. The minimum scenario may represent a scenario in which the war in Ukraine continues and Russia does not have far reaching success on the battlefield while the US continues to remain engaged in Europe. In this scenario, Europe would gradually increase its contribution to European defence but would not be able to ensure its defence alone by 2030. The maximum scenario would involve a sharp acceleration in the rhythm of weapon acquisition and would also correspond to a substantial increase in troops so that US troops in Europe could be replaced and the US would substantially scale down its commitment to Europe.

The minimum scenario: 25 brigades

The table below takes 2024 stocks as its starting point. It compares stocks in the four European countries in the study – the UK, France, Germany, and Poland – to the estimated growth in Russian forces. As outlined in section 2, Russia intends to add 180,000 troops to reach 1.5 million active soldiers. The ground forces will receive the bulk of personnel, with an estimated 12 to 16 new brigade-equivalent units. In comparison, the minimum scenario for European rearmament envisions 25 new brigade-equivalent units.

The Ratio column shows how the ratio between Russian and European stocks would change over time. The Production Target column shows needed European production to achieve the scenario. This would close the relative gap vis-à-vis Russia, compared to 2024, by 10% for the weapons systems shown.

Table 7.1: Russian force generation and European production targets (25 brigades: minimum scenario).

Russian and European stocks in 2024									
	Russian stocks (tanks)	**Ratio to Europe**	**Europe stocks** (tanks)	**Russian stocks** (IFV/IMV)	**Ratio to Europe**	**Europe stocks** (IFV/IMV)	**Russian stocks** (artillery)	**Ratio to Europe**	**Europe stocks** (artillery)
2024	2730	1.7	1627	10693	0.82	13042	3415	3.06	1115
Estimated Russian force generation through 2030 and European production targets (annual average)									
	Russian prod. to new units (tanks)		**Needed European prod.** (tanks)	**Russian prod. to new units** (IFV/IMV)		**Needed European prod.** (IFV/IMV)	**Russian prod. to new units**(artillery)		**Needed European prod.** (artillery)
2025–2030	136		122	366		679	62		42
Outcome in 2030: 25 brigades									
	Russian stocks (tanks)	**Ratio to Europe in 2030**	**European stocks** (tanks)	**Russian stocks** (IFV/IMV)	**Ratio to Europe in 2030**	**Europe stocks** (IFV/IMV)	**Russian stocks** (artillery)	**Ratio to Europe in 2030**	**Europe stocks** (artillery)
2030	3580	1.52	2359	12887	0.75	17116	3789	2.77	1366

Note: The Ratio column shows (a) the ratio between Russian and European stocks in 2024, (b) how it would change if Europe increased production to close the gap, and (c) the projected ratio in 2030 assuming successful European production scaling.
Source: Authors' own calculations.

Gradual increases in European production would be able to match and even outpace Russian production, shrinking the gap between Russian mass and European resilience. A defensive fighting scenario, extensive training and preparation, and appropriate investment in new technologies and capabilities would do the rest and fully enable European defence and deterrence.

Note that if European procurement remains stagnant, the ratio with Russian capabilities will worsen through 2030, and will enable significant Russian mass that can be brought to bear on the eastern flank. Without growth in European production, the Russia-Europe ratios would reach 2.2 for tanks, 0.99 for IFV/IMV, and 3.4 for artillery. This begins to approach ratios in strength that would enable a Russian breakthrough, especially as with their experience in the war in Ukraine, it is highly unlikely the Russians will lag on drone warfare and its countermeasures.

It should be noted that European production here can increasingly focus on unmanned ground systems, whether adapted from existing systems or entirely new. This would fit the Manned-Unmanned Teaming System (MUM-T) that is increasingly adopted globally. Furthermore, this is particularly relevant for the IFV/IMV category. Decreasing reliance on manned systems for mechanised forces would reduce casualties in the branch of the service that is most vulnerable to casualties due to its frontline combat role. Increasing the proportion of unmanned systems – including those based on or inspired by existing armoured vehicles – would go a long way towards mitigating casualties in attritional warfare. *The maximum scenario: 50 brigades*

The table below replicates the approach of Table 7.1 but now envisages a maximalist outcome of 50 new European brigades, that would be required if the US scaled down commitment to Europe

and the war in Ukraine ended while Russia continued its rapid rearmament. The achievement of the production targets under this scenario would close the relative gap vis-à-vis Russia, compared to 2024, by 38% for tanks, 28% for IFV/IMV, and 34% for artillery. More specifically, Europe begins to reach Russian capabilities and would be able to even achieve overmatch over Russian forces, which would effectively remove the possibility of a Russian breakthrough on the eastern flank. European forces would have the mass and resilience to defend the European theatre, and if necessary, sustain and carry out attritional, industrial warfare – although the growth of European capabilities would likely form such an effective deterrent that no such worst-case scenario would actually take place.

Table 7.2: Russian force generation and European production targets (50 brigades: maximum scenario).

	Russian and European stocks in 2024								
	Russian stocks (tanks)	**Ratio to Europe in 2024**	**Europe stocks** (tanks)	**Russian stocks** (IFV/IMV)	**Ratio to Europe in 2024**	**Europe stocks** (IFV/IMV)	**Russian stocks** (artillery)	**Ratio to Europe in 2024**	**Europe stocks** (artillery)
2024	2730	1.7	1627	10693	0.82	13042	3415	3.06	1115
	Estimated Russian force generation through 2030 and European production targets (annual average)								
	Russian prod. to new units (tanks)		**Needed European prod.** (tanks)	**Russian prod. to new units** (IFV/IMV)		**Needed European prod.** (IFV/IMV)	**Russian prod. to new units** (artillery)		**Needed European prod.** (artillery)
2025–2030	136		216	366		1200	62		94
	Outcome in 2030: 50 brigades								
	Russian stocks (tanks)	**Ratio to Europe in 2030**	**Europe stocks** (tanks)	**Russian stocks** (IFV/IMV)	**Ratio to Europe in 2030**	**Europe stocks** (IFV/IMV)	**Russian stocks** (artillery)	**Ratio to Europe in 2030**	**Europe stocks** (artillery)
2030	3580	1.23	2920	12887	0.64	20239	3789	2.26	1679

Source: Authors' own calculations.

It should be noted that this scenario would rely even more than the minimum scenario on the tight integration of unmanned systems. The large increases of armoured vehicles would ideally and to a large extent flow to vastly increasing the proportion of unmanned ground systems in mechanised forces following the Manned-Unmanned Teaming (MUM-T) concept. This would increase the survivability and reduce potential casualties even as European forces grow substantially.

The personnel question

The limiting factor is likely to remain personnel, not production. Induction rates of troops would need to ramp up significantly. Training soldiers to a high standard is highly time-intensive for the complex skill set necessary for modern warfare. Extensive and lengthy training is also imperative for reducing casualties and for creating a pool of reservists. Twelve months for infantry and longer for specialists are the likely targets. This is especially relevant for unmanned systems specialists, which have to master a complex skill set. Training for operational brigades would also need to remain constant to maintain combat effectiveness and adapt to new developments and innovations in warfighting.

Plans to reintroduce conscription should be mindful of training requirements for modern combat effectiveness. Conscripts, even with a full year of training, are likely to be best suited for rear

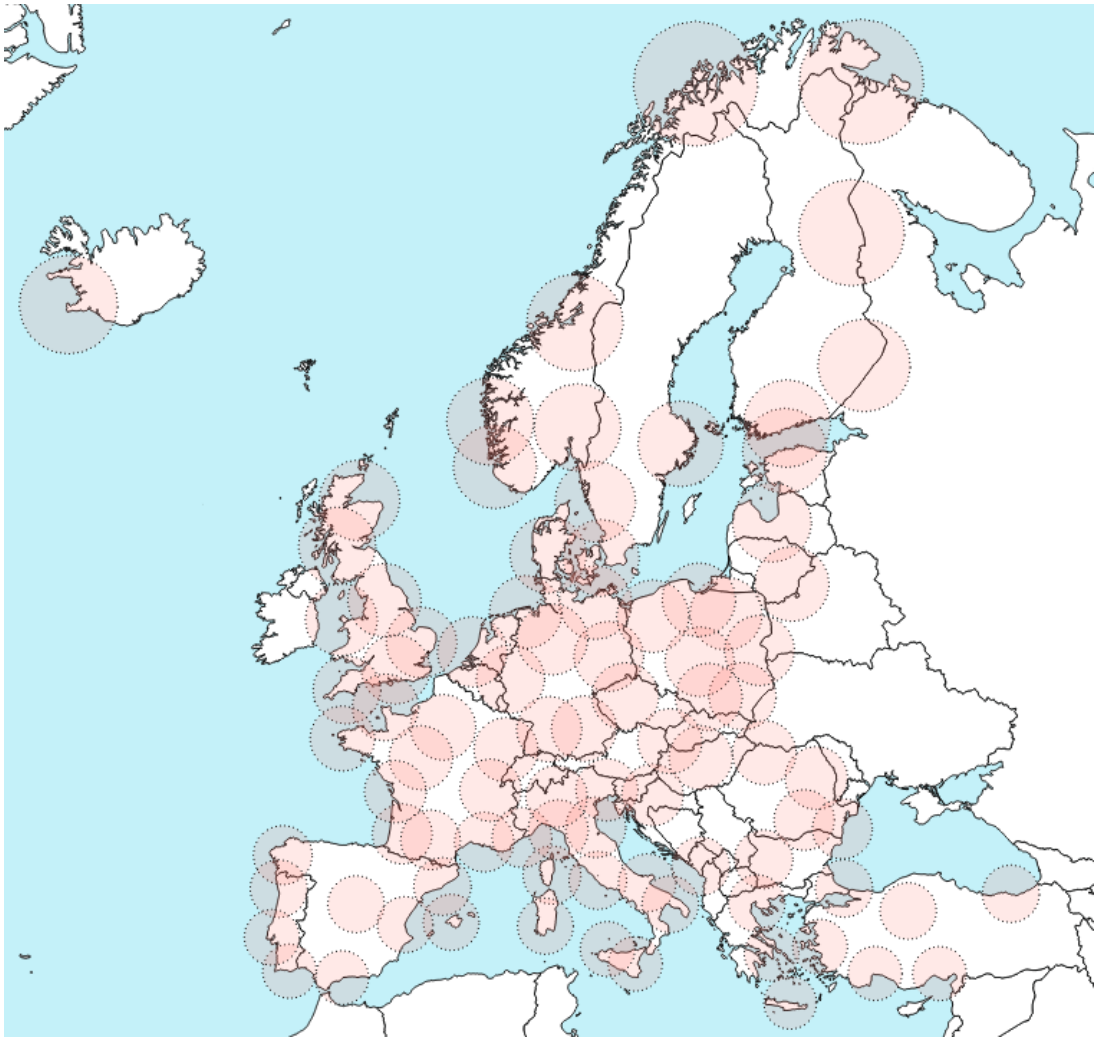
echelon duty such as logistics. Conversely, retaining professional troops by expanding the reserves is imperative. Experience in Ukraine shows this clearly. For instance, the Russian BARS (Combat Army Reserve System) that retains professional soldiers as reservists after their contract ends has proven highly effective. BARS units are some of the most skilled and motivated troops in the Russian military. A possible strategy might therefore be to increase the attractiveness of professional careers in the military, including with higher salaries and better working conditions, and open the career track to European citizens regardless of passport status.

Integrating modern capabilities is critically important In addition to these traditional warfare capabilities, Europe needs a reliable strategy for drone warfare. Drone technology changes rapidly – so building large stocks of drones is not a useful strategy as stocks will quickly be outdated. Yet it is critical that European militaries train their troops across all domains in drone warfare. Moreover, maintaining industrial capacities for the development and production of drones is of central importance. A concrete approach is to provide Ukraine with sufficient funding to procure drones not only from domestic Ukrainian producers but also from companies in EU countries. This would allow building production capacity as well as advancing European technological capabilities. Finally, it will also force European producers to become more cost effective, which is a key aspect of the success of drones: using them in large numbers and at low costs per unit.

European nations will also need to invest in critical strategic enablers. First, European nations will need to decide if and how they want to build capabilities that are now largely in the hands of the US in the context of NATO. Wolff et al (2025) suggest that critical capabilities such as satellites should be procured, controlled, and owned by a European defence mechanism. A critical problem, however, is the lack of some of these technologies in the Europe defence industrial base and the current long development and production times. The scale of current production is not encouraging, particularly when it comes to expensive strategic enablers. For example, in 2023, there were 19 Eurofighter deliveries and 13 Rafale deliveries, both fighter jets of the fourth generation, while there were 98 deliveries worldwide of US F-35s (a fifth-generation fighter)[53]. Moreover, long development cycles suggest that Europe might take decades to develop some of the top technology products (see Table 6.4). This suggests that the reliance on US manufacturers may be difficult to overcome. Yet, development cycles can accelerate substantially in moments of dramatic increases in defence spending and re-prioritisation of defence, while production costs should fall substantially. The most important recent example is the increase in production capacity, including of effective drones, is the Ukrainian military industrial base.

[53]Based on the 2023 annual reports of Dassault, Lockheed Martin and Airbus.

Figure 7.1: Possible configuration of 160km air defence systems across strategic sites in European NATO countries.



Note: Map shows one possible configuration of 160km-ranged air defence systems based on naval and air force bases in France, Germany, Italy, Poland, and the UK, as well as major seaports and airports. We attempt to remove redundancies maximising coverage with the smallest number of units, giving priority to military infrastructure if it overlaps with civilian infrastructure. Finally, we attempt to include a contiguous line of small airports on NATO's eastern border. Before removing redundancies, there are a total of 214 sites, spanning 94 military bases, 112 major seaports and airports, and 8 smaller airports on NATO's eastern border. There are 89 batteries shown.

Source: authors' own calculations, map: Runfola et al. (2020)

Air defence: a case study

Europe has taken serious measures to address the complex question of air defence with the European Sky Shield Initiative. Considering the specificities of the Russian threat, European air defence is a complex problem. While ground-based ballistic missiles like the Iskander have shorter ranges, there are air-launched and sea-launched missiles in the Russian arsenal capable of reaching deep into Europe. This is especially true for sea-launched cruise, ballistic, and hypersonic missiles from the Borei and Yasen class submarines. There are also conventional versions of ballistic nuclear missiles, like the Oreshnik missile, that have extreme range and payload.

In Figure 7.1 we show one quick calculation for broad coverage of the continent using long-range SAM such as Patriot or SAMP-T. Such air defence would be augmented by air-to-air missiles from aircraft, but ground-based air defence remains critical. As the number of batteries shown – 89 – indicates, this would be a costly endeavour: more than €220 billion in batteries, and tens of billions of euros in interceptors at current prices[54].

Furthermore, relying on missile-based interceptors alone is suboptimal from the perspective of future-proofing European air defence. Ukrainian interception data shows that for the more advanced classes of Russian missiles, such as the Kh-101 stealthy cruise missile, the air-launched Kinzhal ballistic missile, the anti-ship Oniks missile, and the hypersonic Zircon missile, interception rates, even using multiple interceptors, are below 25%. This means that even theoretically covering Europe with more than 100 batteries of strategic air defence would be insufficient for preventing Russian strategic bombardment. Experience from the Middle East also shows that Iranian and Houthi cruise and hypersonic missiles have been able to penetrate Israel's air defence, including its THAAD and Arrow-3 ballistic missile defence systems.

Aside from strategic bombardment, drones are a concern. Saturation of the frontline battlespace by drones can overwhelm combat units. Saturation of the airspace with long-range drones of the Geran type can facilitate strikes by more advanced cruise and ballistic missiles. Experience from Ukraine and the Middle East shows that combating swarms of cheap drones with interceptor missiles is costly and unsustainable. Gun-based systems like the German Gepard are one mature, proven solution.

However, even more promising are rapid advances in directed-energy weapons, which could in the near-future allow the neutralisation of entire drone swarms at close range for next to no cost. The British Dragonfire system is one example in an advanced stage of development[55]. Such systems could eventually be mounted on aircraft to dramatically increase the range and mobility of air defense.

[54] In trying various configurations to maximise coverage and minimize batteries, we found that coverage begins to be seriously compromised when going below around 80 batteries.

[55] https://ukdefencejournal.org.uk/britain-plans-240m-two-unit-dragonfire-laser-weapon-buy/

Information from China's 6th generation J-36 aircraft shows that it is highly likely that directed-energy air defense modules will be integrated into the J-36. European 6th generation programs – the GCAP and FCAS – should follow suit.

Finally, as outlined interception rates for advanced missiles are low with contemporary technology. Arguably, the best defence would be deterrence via the acquisition of a European hypersonic arsenal. This would reduce the asymmetry of firepower between Europe and Russia and enable hard to counter strikes deep into Russian territory to neutralise strategic assets like air bases, and logistics nodes, thereby degrading the capacity of the Russian strategic arsenal to strike into Europe with impunity. We consider major investments into the European hypersonic arsenal therefore as a critical part of European rearmament.

8 Conclusions

Russian military capabilities have grown quantitatively and qualitatively since 2022. In light of the threat, European countries have increased their spending on defence from 1.4% of GDP to more than 2% of GDP, numbers that are set to increase further. With rising defence spending, spending for military equipment more than doubled. This report focused on assessing European rearmament efforts.

We showed that procurement volumes have increased substantially in Germany, the UK, and Poland since 2020. Substantial increases in orders for land forces have been recorded in Germany and Poland while the UK has mainly focused its spending increases on its sea forces. France, Germany, and the UK procure strongly from domestic producers while Polish procurement is dominated by international suppliers, in particular US and South Korean suppliers. Dependency on US producers is, however, larger for more modern systems across the board.

Our overall assessment is that while progress has been made, substantial gaps remain that will have to be addressed. While unlocking significant financing at the European and national levels is positive and welcome, **the key step will be translating spending into real capabilities and sustained growth in European force generation, sustainment, and military modernisation.** Put differently, Europe needs to shift its political debate from fiscal numbers to actual military capabilities purchased and delivered in the coming years. For military procurement to truly be effective, it is critical that European industry develops the capacity to produce and deliver items quickly and that equipment prices are decreased and kept low.

Modernisation is another key point, as access to high-end capabilities and strategic enablers is the best path for Europe to become autonomous with regards to defence and reduce dependencies on the US. This would also stabilise and future-proof the transatlantic relationship. This is crucial as both the current US administration and any future administrations, regardless of who holds the presidency, will operate under a strategic context where American attention will primarily be focused on the Indo-Pacific due to the increasingly rapid qualitative and quantitative growth in Chinese military capabilities and the potential for a 2027 scenario of a Chinese blockade or invasion of Taiwan. Additionally, should such a scenario materialize, Europe would be effectively left on its own, regardless of political will in Washington, as a Sino-American conflict would consume all of the US' military capabilities.

Capabilities in the land domain are a key step to countering the threat of further Russian aggression. Achieving mass in European defence by 2030 is possible and highly desirable. The required increases in production numbers for the essential systems in ground combat – tanks, armoured vehicles, and artillery – are within achievable ranges. This is especially accurate in the context of likely scenarios for further Russian force generation, which anticipate an additional 12-16 new brigades by 2030, for a force ceiling of 1.5 million active soldiers in the Russian military. Europe has already reached minimum and maximum production targets for artillery. When it comes to armoured vehicles and tanks, production numbers are, however, still insufficient and would need to increase by a factor of between 2 and 6 depending on scenarios. Procurement numbers are also far below numbers to fulfil NATO targets except for tanks in the minimum scenario and howitzers in both scenarios (see Table 8.1). Further production of armoured vehicles such as tanks and IFV should stress the integration of unmanned ground vehicles to enable Manned-Unmanned Teaming (MUM-T). This would significantly reduce casualties in a potential conflict and additionally reduce the stress of finding large numbers of new personnel for European armed forces.

Table 8.1: Comparison between current production, procurement, and production needed for main traditional military equipment.

Equipment	Current annual production (Russia)	Current annual production (Europe)	European annual procurement	Annual production needed (Minimum scenario)	Annual production needed (Maximum scenario)
Main Battle Tank	1776	50	153	122	216
SP Howitzer	672	202	124	42	94
IFV	6564	214	30	679	1200

Note: European annual procurement refers here to the four countries studied, i.e., Germany, France, Poland and the UK.

Source: authors' own calculations.

Nevertheless, we are cautiously optimistic that the gaps for these "traditional" systems can be filled with political will. Historical evidence as well as European technological capacities, for example in car production, suggests that production numbers can be increased fairly rapidly – so that 2030 armament goals can realistically be reached. **Given current delivery times of around 3 years after procurement, procurement quantities will have to increase in the next two years to achieve targets.** Time lags in the procurement process itself also need to be substantially shortened. Preventing an increase in corruption and misuse in this phase of military build-up is critical.

Military modernisation and access to European strategic enablers will be critical. These include a variety of systems that European militaries either have in limited numbers compared to the US or Russia, or not at all. These include rocket artillery such as HIMARS which can also fire ballistic missiles (highly effective in Ukraine), 6th generation aircraft including Collaborative Combat Aircraft (CCA; drone wingman capability), strategic lift[56], integrated air and missile defence, airborne early warning and control (AEW&C), satellites, long-range missiles for ground and sea attack, and an integrated command and control structure.

Reducing dependency on US systems and the overstretched US defence industrial base will be a challenge. For instance, the German Navy's new white paper indicates a strong focus on the Baltic and includes the purchase of substantial quantities of American Tomahawk long-range cruise missiles (up to 2,000km). Such procurement is highly topical given the ever-increasing ranges at which modern warfare is fought. However, the Navy's choice of the Tomahawk also indicates that the Navy does not feel it can rely on the European defence industrial base to provide such

[56]For the USAF, moving a single Patriot battery from the Indo-Pacific to the Middle East required 73 C-17 flights.

a capability in the near term, despite the existence of the European Long-Range Strike Approach (ELSA) program for producing a European long-range missile. Given that the Tomahawk is mature technology – a subsonic cruise missile with extended range – this demonstrates the challenges ahead in Europe developing domestic strategic enabler capabilities. Longer-range missiles will be essential for restoring a degree of strategic parity with Russia. This includes the development of hypersonic missiles, which are very difficult to intercept with current technology, and would provide a strong conventional deterrence capability on land and at sea. When it comes to short-range missiles, Europe does have a production capacity. Current stocks of Taurus and Storm Shadow are, however, too low for a large-scale, sustained air campaign. **A substantial investment into missile production capacities is indispensable for Europe.**

For Europe to reduce its still very high technological dependency on the US defence industrial base for key technologies, major investments into research and development efforts will be needed. In fact, European R&D investment into defence substantially lags that of the US. The DoD allocated $148.3 billion to defence R&D for FY2024[57]. In Europe, it was only €11 billion in 2023[58]. A major recommendation is therefore to increase public R&D spending in defence. For example, a European DARPA could usefully complement corporate investments. At the national level, innovation agencies such as the German Agentur für Sprunginnovation are scheduled to move into the space of defence innovation[59]. Defence R&D spending can also have positive growth effects (Antolin-Diaz and Surico: 2025) on the wider economy and could therefore help ease fiscal sustainability concerns of the European rearmament efforts.

European rearmament will be expensive and cost effectiveness is critical for achieving military targets. The European institutions aim to mobilise €800 billion via the "Rearm Europe" strategy. NATO leaders speak of the 3.5% target in defence spending, which would mean an annual increase in spending compared to today in the order of magnitude of some €300 billion. These top-down numbers, however, do not allow an understanding of how and on what funds will be spent. Moreover, they include all defence spending, including on personnel and non-arms related spending.

Bottom-up estimates of spending needs on selected weapon systems for the European Union under different scenarios show the importance of price effectiveness. Table 8.2 shows the range of estimates based on a minimum and a maximum rearmament scenario for selected

[57] https://www.defense.gov/news/releases/release/article/3326875/department-of-defense-releases-the-presidents-fiscal-year-2024-defense-budget/

[58] https://eda.europa.eu/docs/default-source/brochures/1eda---defence-data-23-24---web---v3.pdf

[59] https://www.spd.de/fileadmin/Dokumente/Koalitionsvertrag2025_bf.pdf line 129

systems, based on current low and high prices for these respective types of arms. Estimates range between €50 and €200 billion for the purchases of tanks, artillery howitzers, and infantry fighting vehicles alone. If we add the cost of air defence, costs increase by another €200-300 billion. Missile capabilities, the modernisation of forces, as well as investments into air and see would further increase the numbers substantially, showing that the €800 billion number used by the European institutions may be too low. Importantly, Table 8.2 reveals that **price differences between existing weapons are the major driver of the price range** – high quantities at lower prices will constitute a smaller fiscal burden than low quantities at high prices.

Table 8.2: Bottom-up estimation for the cost of additional tank, SP howitzers and IFV equipment. Production targets in units of equipment, cost estimates in EUR billion.

Equipment	Price range (EUR m.)	Lower production target	Cost range (EUR bn.)	Higher production target	Cost range (EUR bn.)
Tanks	17.9–29	732	13.1–21.2	1293	23.1–37.5
SP howitzers	1.6–17	251	0.4–4.3	564	0.9–9.6
IFV	8.6–21.7	4074	35–88.4	7197	61.9–156.2
Cost; MBT, SP howitzers, IFV			**48.5–113.9**		**85.9–203.3**
Cost; air defence			**300**		**300**

Source: Authors' own calculations based on estimated European production targets and estimated prices of military equipment for developed economies.

Beyond the possibility that technical differences between various weapons explain a part of the price difference, the numbers suggest that European procurement lacks cost effectiveness linked to economic nationalism and market fragmentation (Wolff et al, 2025)[60] . If Europe reformed its fragmented market structure in defence production, it could reap economies of scale that should lower unit prices.

Overall, we highlight the feasibility of making substantial progress through 2030, while remaining mindful of the challenges. Funding is there and is likely to remain stable and high as the Russian threat is evident and consensus exists. However, translating funding into concrete capabilities, and doing so with a systematic, forward-looking strategic, and operational plan, will be the real challenge. Defence spending in Europe must operate towards concrete goals and timelines for increasing European readiness through force generation, sustainment, and military modernisation. This process must also closely hew to developments in Russia, including force generation and military

[60] The production and cost of military equipment deserves attention. One example is a light infantry fighting vehicle, the German Caracal. It can cost almost €600 thousand according to our estimates, while the price for an American ISV model is closer to €200 thousand. The cost of Russian similar models (e.g. Sarmat-3) seems to be similar to the ISV. Around 1500 Caracal vehicles ordered by Germany in 2023 and 1700 ISV on current order.

modernisation. A European rearmament strategy is urgently needed to move from broad fiscal numbers to clear operational procurement goals and a strategy to increase cost-effectiveness through deeper integration of military production capacities. Deeper military integration would further allow to increase the effectiveness of deterrence.

Beyond bringing European forces back to a state of readiness, where they are capable of repelling any potential incursion into European territory, **looms the greater challenge of increasing autonomy and reducing dependency on US forces.** This would not only secure Europe but also mitigate discord in the transatlantic relationship as the US becomes increasingly capable to focus on other theatres, first and foremost the Indo-Pacific. Ramping up R&D spending is the first step, as it is far lower than comparable military powers. Beyond generating mass in land forces, Europe must urgently acquire capabilities in key strategic enablers. Ramping up the various European space programmes is, for example, critical. This would enhance European security and restore deterrence with Russia. After all, increased deterrence capabilities are critical to prevent war.

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Annex A1: European stocks of key weapon systems over time

Table A1.1: Germany's stocks of key weapon systems over time.

Germany	1992	2004	2013	2019	2020	2021	2024
Main Battle Tanks	6684	2398	322	323	323	339	313
Leopard 1	2084	670	0	0	0	0	0
Leopard 2	2083	1782	322	323	323	339	313
Soviet Tanks	1868	0	0	0	0	0	0
Other	649	0	0	0	0	0	0
Light Tanks	118	343	128	175	175	175	180
Wiesel	118	343	128	175	175	175	180
Infantry Fighting Vehicles	3250	2122	395	651	710	674	680
Marder	2100	2122	390	383	376	324	330
Puma	0	0	5	268	334	350	350
BMP-1/BMP-2	1150	0	0	0	0	0	0
Armoured Vehicles	12977	3646	2114	1933	2067	2067	2234
M-113	2902	2067	296	162	37	37	37
Fuchs, Eagle IV/V	0	1023	950	1012	1004	1004	1046
Soviet BTRs and BRDMs	7695	0	0	0	0	0	0
Other	2380	556	868	759	1026	1026	1151
Howitzers	3214	978	130	121	121	121	109
PzH2000	0	165	130	121	121	121	109
M-109	573	499	0	0	0	0	0
FH-77D	216	196	0	0	0	0	0
M-110	221	0	0	0	0	0	0
Soviet Howitzers (2S1, 2S3, M-30, M-46, D-20 etc)	1844	0	0	0	0	0	0
Other	360	118	0	0	0	0	0
Long Range Anti Aircraft	300	0	14	30	30	30	70
Patriot launchers	288	NA	14	30	30	30	70
S-200/VEGA	12	0	0	0	0	0	0
Medium Range Anti Aircraft	0	0	0	0	0	0	3
IRIS-T SLM	0	0	0	0	0	0	3
Short Range Anti Aircraft	680	0	2	12	12	12	20
Mantis	0	0	2	12	12	12	0
Roland	238	0	0	0	0	0	0
Soviet SAM launchers (KUB/Sterla)	226	0	0	0	0	0	0
MIM-23 HAWK	216	0	0	0	0	0	0
ASRAD Ozelot	0	0	0	0	0	0	20
Anti Aircraft Guns	3295	1509	0	0	0	0	0
Gepard	432	354	0	0	0	0	0
Rh 202	1989	1155	0	0	0	0	0
Soviet ZU/ZSU	426	0	0	0	0	0	0
Other	448	0	0	0	0	0	0
MLRS	237	200	55	41	41	41	38
M270	0	0	0	41	41	41	38
unknown MLRS	33	150	55	0	0	0	0
LARS	204	50	0	0	0	0	0
Combat Aircraft	553	423	205	228	228	226	226
Eurofighter Typhoon	0	8	101	140	140	138	138
Tornado	161	262	104	88	88	88	88
Phantom II	223	152	0	0	0	0	0
Other	169	1	0	0	0	0	70

Source: IISS: 1992, 2004, 2014, 2020, 2021, 2025

Table A1.2: France's stocks of key weapon systems over time.

France	1992	2004	2013	2019	2020	2021	2024
Main Battle Tanks	2001	614	254	222	222	222	200
Leclerc	0	370	254	222	222	222	200
AMX-30	2001	244	0	0	0	0	0
Light Tanks	171	28	28	0	0	0	0
VCBC-90	28	28	28	0	0	0	0
AMX-13	143	0	0	0	0	0	0
Infantry Fighting Vehicles	0	0	530	625	605	706	622
VBCI	0	0	530	625	605	706	622
Armoured Vehicles	6242	6185	5311	4075	4233	4317	4565
VAB	3840	3700	3126	2255	2248	2208	1740
VBL	240	1442	1594	1424	1418	1416	1677
Panhard AML	709	0	0	0	0	0	0
AMX-10RC	1141	701	256	247	245	245	192
Other	312	342	335	149	322	448	956
Howitzers	786	375	152	121	120	120	104
AMX-GCT/AU-F1	253	273	32	32	32	32	32
CAESAR	0	5	77	77	76	76	60
OB-155-50 BF	206	0	0	0	0	0	0
Other	327	97	43	12	12	12	12
Long Range Anti Aircraft	180	98	0	40	40	40	40
Roland	180	98	0	0	0	0	0
SAMP/T	0	0	0	40	40	40	40
Medium Range Anti Aircraft	69	26	0	0	0	0	0
MIM-23 HAWK	69	26	0	0	0	0	0
Short Range Anti Aircraft	150	331	0	24	24	24	26
Mistral	150	331	0	0	0	0	0
VL/MICA	0	0	0	0	0	0	6
Crotale NG	0	0	0	24	24	24	20
MLRS	30	61	26	13	13	13	9
M270	0	0	0	13	13	13	9
unknown MLRS	30	61	26	0	0	0	0
Combat Aircraft	215	222	238	227	227	228	235
Mirage-2000	0	158	153	107	107	122	94
Mirage F-1	173	54	5	0	0	0	0
Rafale	0	10	80	120	120	116	141
Other	42	0	0	0	0	0	0

Source: IISS: 1992, 2004, 2014, 2020, 2021, 2025

Table A1.3: United Kingdom's stocks of key weapon systems over time.

United Kingdom	1992	2004	2013	2019	2020	2021	2024
Main Battle Tanks	1276	543	227	227	227	227	213
Challenger 1	426	386	277	277	277	277	213
Challenger 2	0	156	0	0	0	0	0
Chieftain	850	1	0	0	0	0	0
Light Tanks	627	464	200	176	176	176	59
Scimitar	315	327	200	176	176	176	0
FV101 Scorpion	312	0	0	0	0	0	0
Sabre	0	137	0	0	0	0	0
Ajax (intest)	0	0	0	0	0	0	59
Infantry Fighting Vehicles	605	575	350	388	388	388	388
MCV-80 Warrior	605	575	350	0	0	0	0
FVS 10 Warrior	0	0	0	388	388	388	388
Armoured Vehicles	5626	4054	2763	2586	2590	2579	2353
AIFV	0	1675	0	0	0	0	0
FV103 Spartan	525	597	275	252	252	252	97
FV432	2013	1121	0	0	0	0	0
Saxon	1138	649	0	0	0	0	0
BvS-10 Viking	0	0	18	99	99	99	99
FV4 30 Bulldog	0	0	880	409	409	409	409
Mastiff	0	0	420	396	396	396	256
Foxhound	0	0	330	399	399	399	398
Other	1950	12	840	1031	1035	1024	1094
Howitzers	723	344	233	215	215	215	179
AS90	8	178	89	89	89	89	39
L118 Light gun	212	166	144	126	126	126	126
FV433 Abbot	200	0	0	0	0	0	0
M-109	111	0	0	0	0	0	0
Archer	0	0	0	0	0	0	14
Other	192	0	0	0	0	0	0
Short Range Anti Aircraft	200	192	74	74	74	74	50
FV4333 Stormer with Starstreak	0	135	60	60	60	60	38
CAMM (Land Ceptor)	0	0	0	0	0	0	12
Rapier	200	57	14	14	14	14	0
MLRS	47	63	35	35	35	35	26
M270	0	0	35	35	35	35	26
unknown MLRS	47	0	0	0	0	0	0
Combat Aircraft	274	510	285	162	162	167	169
Typhoon/Tornado	198	254	220	144	144	144	137
Jaguar	53	62	0	0	0	0	0
Harrier	0	79	62	0	0	0	0
Hawk	0	115	0	0	0	0	0
Buccaneer	23	0	0	0	0	0	0
F-35B	0	0	3	18	18	23	32

Source: IISS: 1992, 2004, 2014, 2020, 2021, 2025

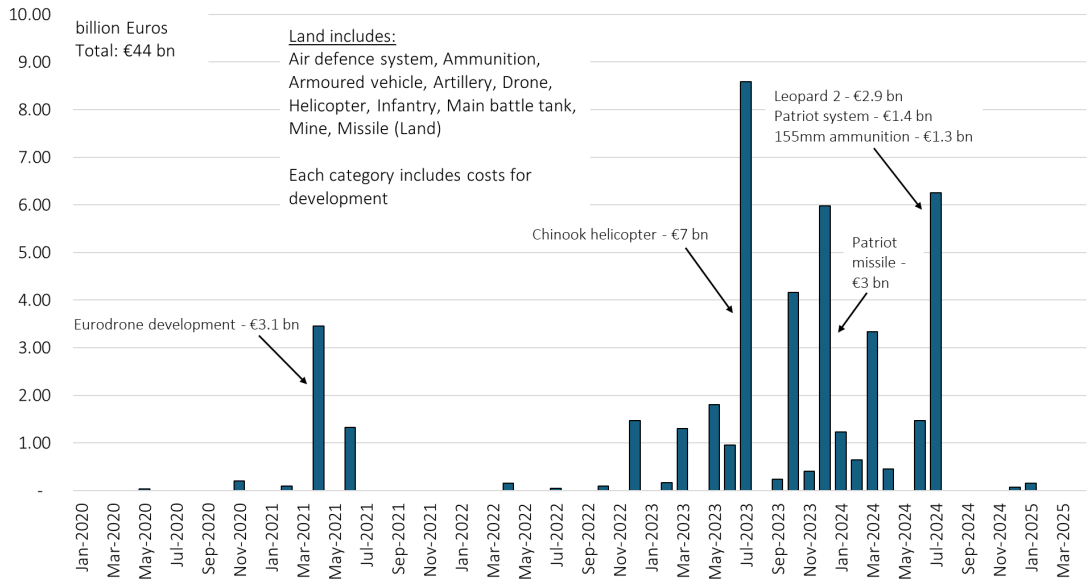
Table A1.4: Poland's stocks of key weapon systems over time.

Poland	1992	2004	2013	2018	2020	2021	2024
Main Battle Tanks	2880	947	893	637	808	797	662
T-72	785	586	533	158	329	318	78
T-55 and PT-76	2095	0	0	0	0	0	0
PT-91 Twardy	0	233	232	232	232	232	206
Leopard 2A4	0	128	128	142	142	142	22
Leopard 2A5	0	0	0	105	105	105	105
Leopard 2PL	0	0	0	0	0	0	64
K2	0	0	0	0	0	0	71
M1A1 Abrams	0	0	0	0	0	0	116
Infantry Fighting Vehicles	1471	1281	1867	1636	1611	1611	1525
BMP-1	1409	1248	1297	1277	1252	1252	916
BMP-2	62	0	0	0	0	0	0
Rosomak IFV	0	0	570	359	359	359	605
BRM-1	0	33	0	0	0	0	0
Borsuk	0	0	0	0	0	0	4
Armoured Vehicles	1437	468	436	733	828	828	675
BRDM-2	685	435	237	369	369	369	220
BRDM-2 R5	0	0	0	0	0	0	90
BWR-1D/S	0	0	0	0	0	0	38
Rosomak APC	0	0	0	211	300	300	0
Other	752	33	199	153	159	159	327
Howitzers	2222	1014	401	427	394	410	451
2S1 Gvozdika	0	533	290	292	227	227	206
M-77 Dana	111	111	111	111	111	111	108
Dana-M	0	0	0	0	0	0	3
Krab	0	0	0	24	56	72	26
K9A1	0	0	0	0	0	0	108
Other (Soviet)	2111	370	0	0	0	0	0
Long Range Anti Aircraft	250	125	1	1	1	1	16
2K11 Krug	0	75	0	0	0	0	0
S-200C Vega	0	50	1	1	1	1	0
S-125/S-200	250	0	0	0	0	0	0
M903 Patriot PAC03 MSE	0	0	0	0	0	0	16
Short Range Anti Aircraft	160	316	81	81	98	81	178
SA-9 Gaskin	0	232	0	0	0	0	0
9K33 Osa-AK (SA-8 Gecko)	0	64	64	64	64	64	57
S-125 Neva	0	20	17	17	34	17	14
GROM Poprad	0	0	0	0	0	0	79
CAMM (Narew)	0	0	0	0	0	0	6
2K12 Kub (RS-SA-6 Gainful)	0	0	0	0	0	0	20
ZSU-23-4	0	0	0	0	0	0	2
unspecified soviet SAM system	160	0	0	0	0	0	0
MLRS	262	249	180	180	179	179	199
BM-21	232	219	75	75	75	75	27
RM-70	30	30	30	30	29	29	29
WR-40 Langusta	0	0	75	75	75	75	75
m142 HIMARS	0	0	0	0	0	0	18
K239 Chunmoo (Homa-K)	0	0	0	0	0	0	50
Combat Aircraft	332	242	106	98	94	94	85
MiG-21	254	99	0	0	0	0	0
MiG-23	37	0	0	0	0	0	0
MiG-29	9	45	32	32	28	28	14
MiG-17	24	0	0	0	0	0	0
Su-20	8	0	0	0	0	0	0
Su-22	0	98	26	18	18	18	11
FA-50 Fighting Eagle	0	0	0	0	0	0	12
F-16	0	0	48	48	48	48	48

Source: IISS: 1992, 2004, 2014, 2020, 2021, 2025

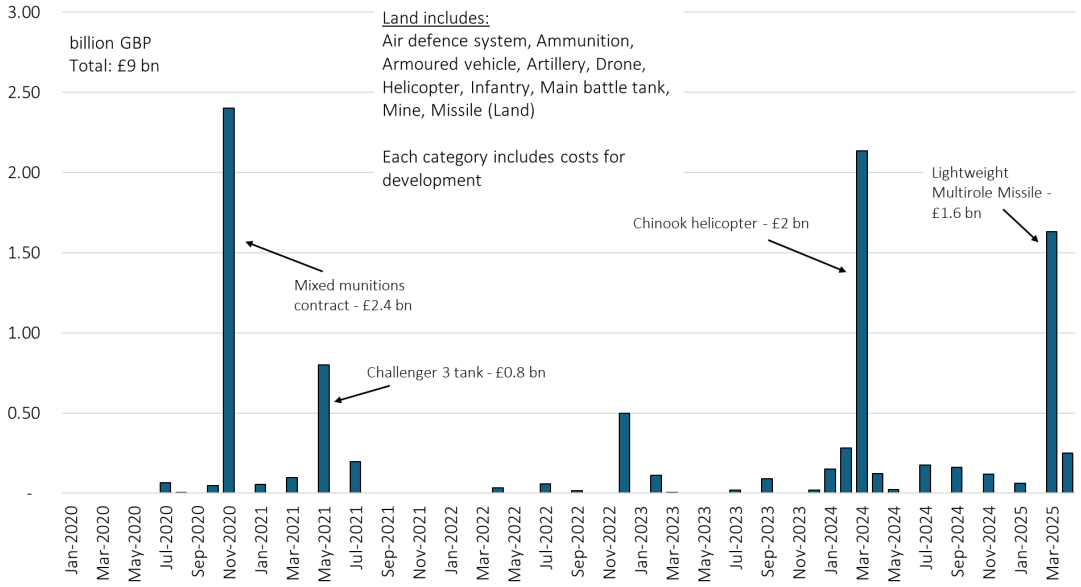
Annex A2: *Kiel Military Procurement Tracker* orders for land or naval forces and country summary of procurement of weapons

Figure A2.1: Germany military orders for land forces by month, January 2020 - April 2025 (billion Euros).



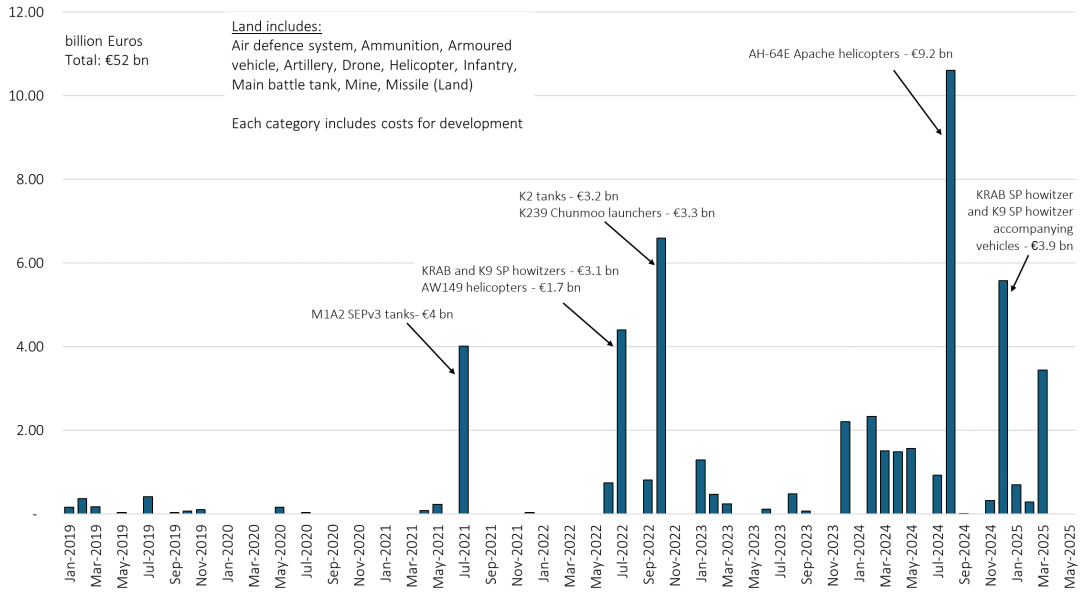
Source: Kiel military procurement tracker – second release, Wolff et al. (2025).

Figure A2.2: UK military orders for land forces by month, January 2020 - April 2025 (billion GBP).



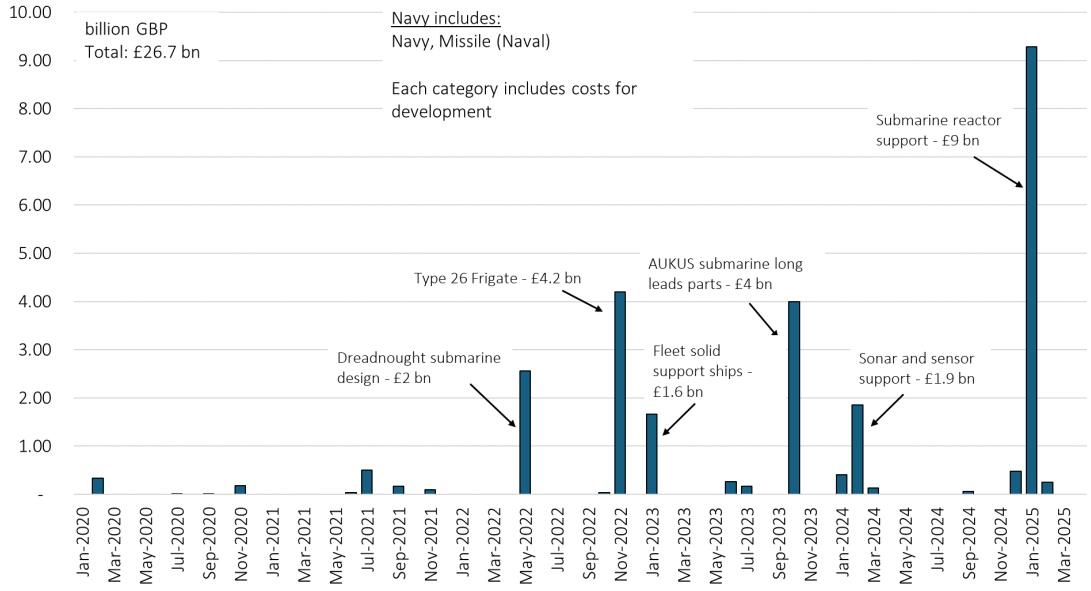
Source: Kiel military procurement tracker – second release, Wolff et al. (2025).

Figure A2.3: Poland military orders for land forces by month, January 2019 - May 2025 (billion EUR).



Source: Kiel military procurement tracker – second release, Wolff et al. (2025).

Figure A2.4: UK military orders for the navy by month, January 2020 - April 2025 (billion GBP).



Source: Kiel military procurement tracker – second release, Wolff et al. (2025).

Table A2.5: Country summary of procurement of weapon systems from 2020 to 2025 (units)

Year	2020	2021	2022	2023	2024	2025	Total
Germany							
Combat Aircraft	38	0	35	0	0	0	73
Main Battle Tank	0	0	0	18	105	0	123
Infantry Fighting Vehicle	0	154	143	50	0	0	347
Other Armoured Vehicle	0	16	140	1785	65	0	2006
Artillery Howitzer	0	0	0	22	5	0	27
Anti-Aircraft / Air Defence	0	0	0	7	8	0	15
United Kingdom							
Combat Aircraft	0	0	0	0	0	0	0
Main Battle Tank	0	148	0	0	0	0	148
Infantry Fighting Vehicle	0	0	0	0	0	0	0
Other Armoured Vehicle	0	0	60	70	500	50	680
Artillery Howitzer	0	0	0	14	0	0	14
Anti-Aircraft / Air Defence	0	0	0	0	0	15	15
Poland							
Combat Aircraft	32	0	48	0	0	0	80
Main Battle Tank	0	250	180	116	0	0	546
Infantry Fighting Vehicle	0	0	0	0	111	0	111
Other Armoured Vehicle	40	0	70	400	452	96	1058
Artillery Howitzer	20	0	468	638	418	0	1544
Anti-Aircraft / Air Defence	0	0	0	6	0	0	6
France							
Combat Aircraft	0	0	0	42	0	0	42
Main Battle Tank	0	50	50	0	100	0	200
Infantry Fighting Vehicle	0	0	0	0	0	0	0
Other Armoured Vehicle	677	120	564	442	515	120	2438
Artillery Howitzer	0	0	0	127	0	0	127
Anti-Aircraft / Air Defence	0	0	0	0	8	0	8
Total Four Countries							
Combat Aircraft	70	0	83	42	0	0	195
Main Battle Tank	0	448	230	134	205	0	1017
Infantry Fighting Vehicle	0	154	143	50		111	458
Other Armoured Vehicle	717	136	834	2697	1532	266	6182
Artillery Howitzer	20	0	468	801	423	0	1711
Anti-Aircraft / Air Defence	0	0	0	13	16	15	44

Note: This table shows the summary of the Kiel military procurement tracker for Germany, UK, Poland, and France for the years 2020-2025 in units of various weapon systems. Data for Poland goes to May 2025 instead of April 2025. Orders for new items and refurbishments of existing items are counted equally.

Source: Kiel military procurement tracker – second release, Wolff, Burilkov, Bushnell, Kharitonov, et al. (2025).

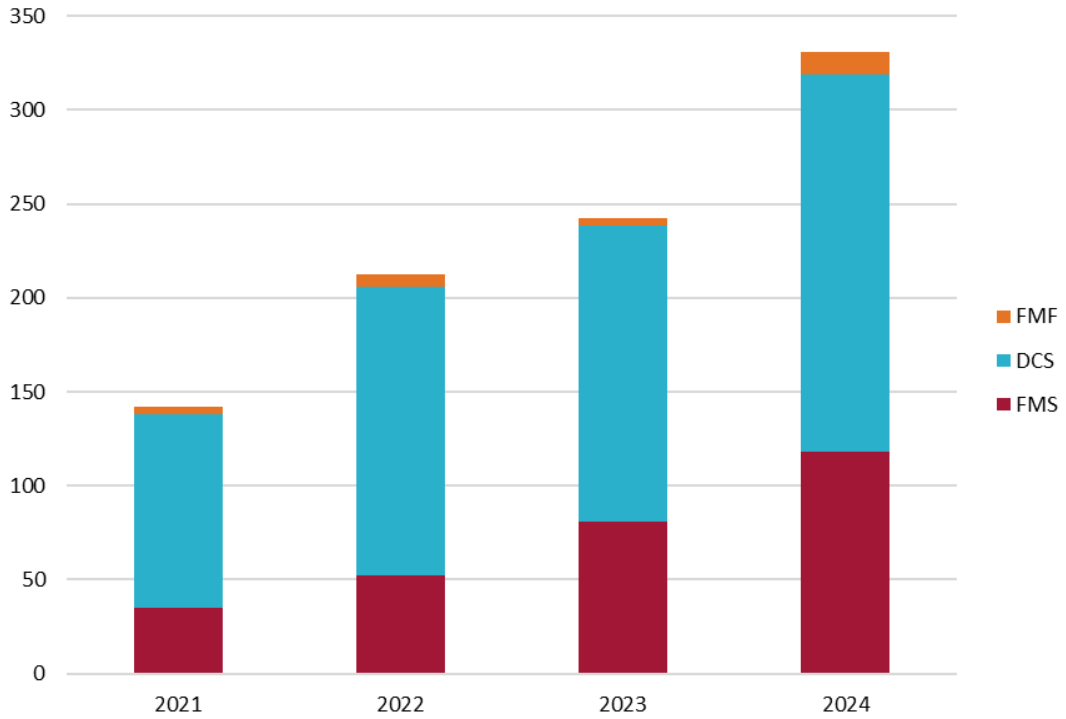
Annex A3: European military equipment imports from the US

In this annex, we further analyse the data on European imports of military equipment, specifically focusing on the U.S. exports to Europe. There exist three main instruments that the U.S. uses to export arms to third countries. These are:

1. Direct Commercial Sales (DCS): Foreign governments can buy directly from U.S. firms with the corresponding license.
2. Foreign Military Sales (FMS): The U.S. Government procures military equipment in an intermediary condition for the foreign purchaser with the U.S. defence company.
3. Foreign Military Financing (FMF): Military financing provided by the U.S. through loans or grants to foreign governments procuring U.S. arms.

The exports conducted through these three instruments have considerably grown between 2021 and 2024 (Figure A3.1), in particular those from the DCS and the FMS.

Figure A3.1: Value of US arms transferred by exporting programme and year. USD billion.

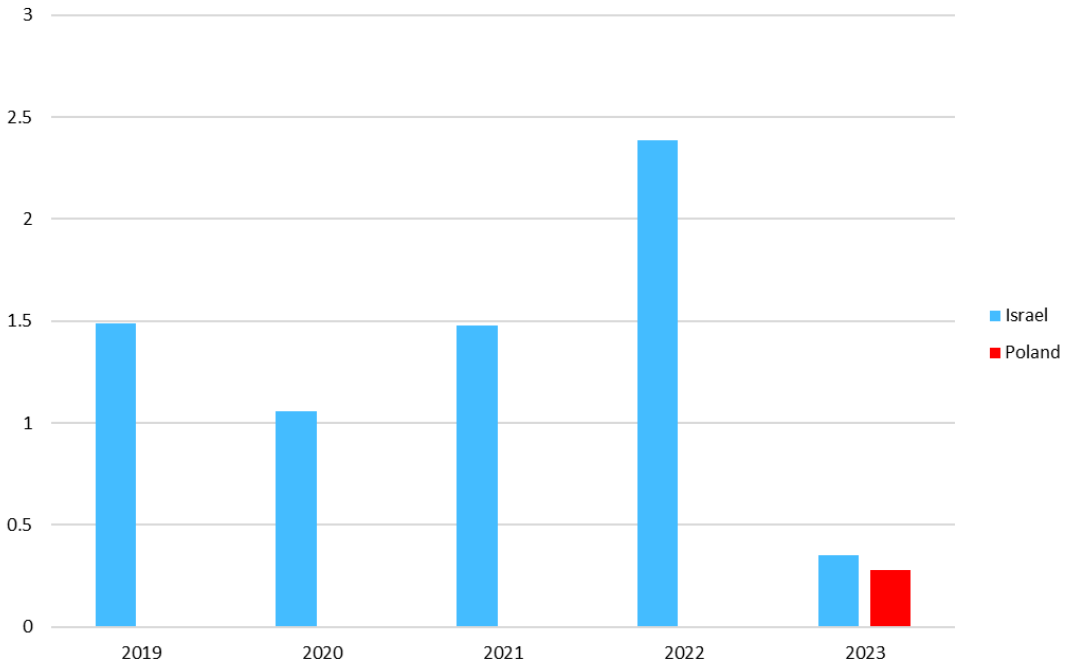


Notes: Direct Commercial Sales (DCS), Foreign Military Sales (FMS), Foreign Military Financing (FMF).

Sources: authors based on US Department of State.

Data on the DCS is sketchier and typically does not cover major military equipment and technological systems exports. In the case of the FMF, the programme has been mainly used to export military equipment to Israel during the last years, and to a much lower extent to Poland in 2023 (Figure A3.2).

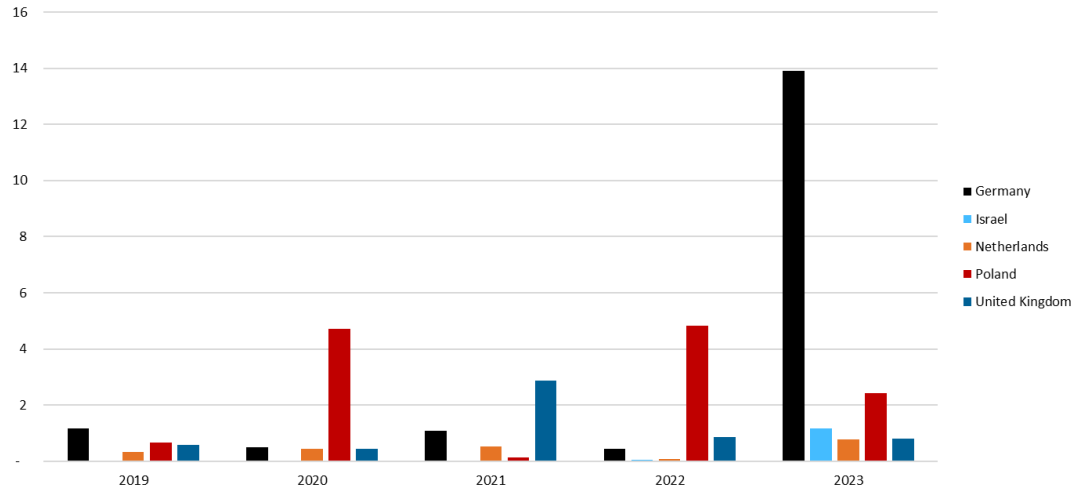
Figure A3.2: Value of military equipment transferred through FMF program in Poland and Israel. USD billion.



Source: authors based on Historical Sales Book, Defence Security Cooperation Agency (DSCA).

Figure A3.3 shows the aggregated value of arms transferred through the FMS programme by country. Overall, only Germany and Poland show significant transfers of weapons, with Germany in particular showing a $14 billion transfer in 2023. The magnitude of this number suggests it might be grouping different purchases, as no other available data seems to explain such transfer of equipment. Considering the military equipment expenditure for Germany in 2023, this would imply that almost 100% would have been spent in equipment transferred via the FMS. For Poland, the data suggests a similar issue, with the FMS purchases surpassing the total defence equipment expenditure of the country for 2020 and 2022.

Figure A3.3: Value of military equipment transferred through FMS program by country. USD billion.

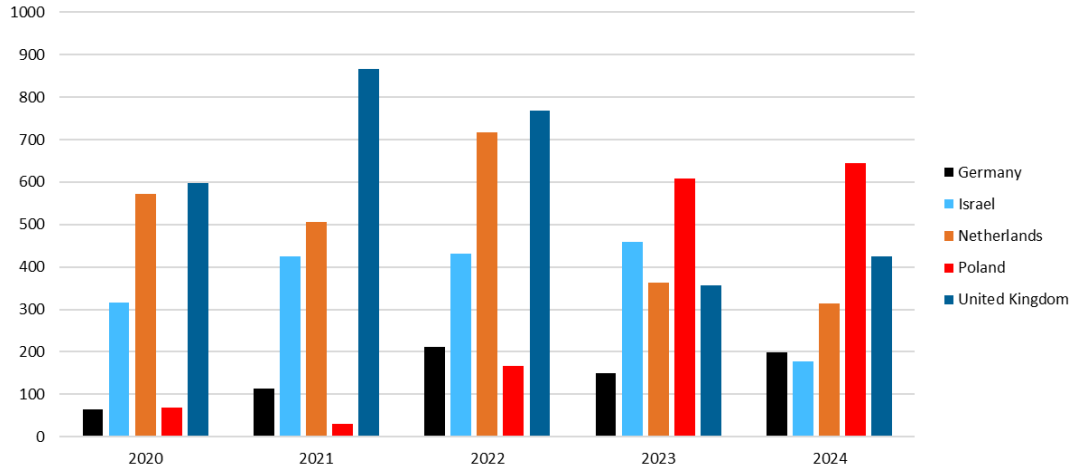


Source: authors based on Historical Sales Book, Defence Security Cooperation Agency (DSCA).

Figure A3.4 shows the arms imports from the US using now the SIPRI dataset. While the data does capture certain trends in the increase in imports, for example in Poland or Israel, it does not show a similar picture for countries like Germany or the Netherlands. One possible reason behind this disparity might be related to the transfers of US equipment via DCS rather than FMS or FMF. This difference should however be small as the SIPRI data covers major weapons[61] for which most would lie under the FMS purchase programme. While we do not have disaggregated yearly data for the total value of transfers via DCS, we can estimate the share of Germany in the total authorised sales under the DCS for a given year. In the case of Germany, this would translate into less than 1% of the US sales authorizations for 2023, that is around $1 billion in value. In other words, a way lower amount than the one observed for the FMS transfers to Germany reaching almost $14 billion for the same year.

[61] https://www.sipri.org/databases/armstransfers/sources-and-methods

Figure A3.4: Arms imports from the US. TIV million.



Source: authors based on SIPRI.

Overall, the analysis on European imports of military equipment confirms the considerable increase in foreign purchases since the invasion of Ukraine in 2022, specifically in equipment areas like air defence or combat aircrafts. It however does not confirm the claims of excessive reliance on foreign countries for the overall procurement of military equipment. Similarly, US overall exports of military equipment have more than doubled in nominal terms between 2021 and 2024.

Finally, the analysis also shows the importance that transparency in procurement plays to assess possible dependencies. Similarly, as most of the procurement is often a multi-year programme and the lifespan of the investment lasts decades, any assessment on the matter should take a complete approach assessing both (i) sufficiently long time frames and (ii) different databases to account for existing differences in the accounting.

Annex A4: Increase in defence production, data sources

Table A4.1: Increase in production per year of military equipment since 2022, data sources.

Equipment	Company	Source
Artillery shells	Rheinmetall	Rheinmetall, Bloomberg
Artillery shells	CSG	Reuters
Artillery shells	Nexter	Defense Post
Artillery shells	Mesko	Defence 24
CAESAR, SP howitzer	KNDX	Army Recognition
Zuzana-2, SP howitzer	Konstrukta	CEPA
Archer, SP howitzer	BAE Systems AB	Defense Express
Panzerhaubitze 2000, SP howitzer	KNDS, Rheinmetall	Kiel Institute
2S22 Bohdana, SP howitzer	Kramatorsk	The Economist
Leopard 2A8, MBT	KNDX	RBC-Ukraine
Abrams M1A2, MBT	General Dynamics	Defense Express
Taurus missile	MBDA/SAAB	Defense Express
PAC-3 missiles	Lockheed Martin	Lockheed Martin
HIMARS, MLRS	Lockheed Martin	Lockheed Martin
Javelin missiles	Lockheed Martin	Lockheed Martin

Source: Source: authors' own elaboration.

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