

The Guns of Europe: Defence-industrial Challenges in a Time of War

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Defence planners and industrialists expend a lot of effort trying to avoid preparing for the last war. And yet, the uncomfortable truth emerging from the ongoing war on European soil is that European countries have barely prepared for war at all. Russia's war of aggression against Ukraine has revealed significant shortcomings in the capacity of European NATO governments to supply and arm a neighbouring partner, much less fight a major war themselves. The armed forces in European NATO and European Union member states are hollowed-out, plagued by unserviceable equipment and severely depleted ammunition stocks. Policymakers in many nations have responded by announcing significant increases in defence spending. The new money is intended to address long-standing capability shortfalls, support the modernisation of armed forces and in some cases their growth, replenish stocks, and fill gaps created by the transfer of equipment and munitions to Ukraine. As Morten Brandtzæg, CEO of the Norwegian defence company Nammo, has observed, 'it's a war about industrial capacity'.¹ Yet it has very quickly become apparent that Europe's defence-industrial base will struggle to meet this increased demand in the short term. This raises urgent questions about European industry's ability to continue supporting Ukraine militarily at scale and at speed, and its ability to recapitalise forces in NATO and the EU.

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The approximately 25 years of decline in European defence budgets between the end of the Cold War and Russia's annexation of Crimea in 2014 inevitably led to the downsizing of Europe's defence-industrial capacities. During the Cold War, European governments were willing to finance a degree of defence-industrial overcapacity to ensure reliable access to equipment and munitions at scale. When the Cold War ended, the emphasis changed from readiness to efficiency – to doing more with less. The defence industry had little choice but to take business decisions that reduced capacity. The war in Ukraine is prompting a rapid reassessment of priorities. The challenge now is to ramp up production quickly.²

Defining European defence-industrial capacity

Defence-industrial capacity consists of far more than factories and shipyards. It depends on a complex set of jigsaw pieces: factory buildings and shipyards, yes, but also tooling, systems and software; an extended network of factory facilities further down the supply chain; workers throughout the supply chain, often with highly specialised skills; and access to specialised materials and components. All these elements need to be in place for defence-industrial assets to work effectively. Facilities and people also need to be active. It is not easy to restart a factory or dockyard that has been mothballed, nor to recruit or move people from other business divisions on short notice.

Media reports have revealed serious defence-industrial capacity problems in both Europe and the United States, including difficulties in increasing or restarting production quickly. Lead times of two to three years are regularly cited for delivering more complex systems from live production facilities, as well as for restarting dormant production lines. For example, BAE Systems recently advised the US Department of Defense that it would take 30–36 months to restart M777 howitzer production.³ Rheinmetall CEO Armin Papperger said at the end of 2022 that specialised steel for tank armour would take between eight and 12 months to be delivered, and that lead times for certain electronic components for tank production can be up to 24 months.⁴ These increasingly long lead times are caused mainly by supply-chain issues and bottlenecks, which are in turn a function of the limited number of specialised suppliers in Europe.

Increasing production, even of relatively simple systems like artillery rounds, is also proving challenging, with chemicals for explosives and propellants, as well as metals and plastics for fuses and casings, reportedly in short supply.⁵ Jiří Hynek, head of the Association for Weapons and Defence Industry of the Czech Republic, explained that ‘most of the raw materials necessary for the production of military products are not mined or are minimally mined in EU countries today’, and that for some items in short supply ‘prices are astronomical’.⁶ A French parliamentary report suggested that the time from order to delivery of unguided 155-millimetre artillery shells was ten to 20 months, rising to 24 to 36 months for guided shells.⁷ Mike Ord, the chief executive of Chemring – which supplies explosive materials to ammunition producers – said some of his customers have asked for output increases of 100–200%.⁸

Russia and Ukraine have at times collectively fired some 200,000 artillery shells per week. Yet total US production of 155 mm rounds is currently running at approximately 20,000 per month, and will only reach 90,000 per month in 2024, after a recent \$2 billion US Army investment.⁹ According to media reports, war-gaming has shown that in a high-intensity conflict, the United Kingdom would exhaust its ammunition stocks in just eight days.¹⁰ German media suggested in 2022 that Bundeswehr stocks would last somewhere between a few hours and a few days in such a conflict.¹¹ The outlook is not much better when it comes to missiles. The French Ministry of Armed Forces has asked MBDA Missile Systems to increase production of the *Mistral* short-range air-defence missile system from 20 per year to a still underwhelming 40 per year by 2025.¹² Lockheed Martin’s *Javelin* anti-tank-weapon production is slated to increase almost 100% from a current 2,100 missiles per year to 4,000, yet the Ukrainian Armed Forces said they required some 500 *Javelins* per day during the early stages of the war.¹³

The causes of these capacity problems are deeply ingrained. For many systems in production, industrial capacity has been downsized to correspond to low demand levels in domestic and core export markets. Ramping up production involves both expanding facilities and recruiting additional skilled workers throughout the supply chain, which is both costly and slow. For products that are no longer being manufactured, restarting production

is often difficult and expensive, if it is possible at all. Lack of spare parts to repair and refurbish existing hardware is an especially pressing issue. *Leopard 1* and *Leopard 2* tanks in storage that are to be delivered to Ukraine need to be restored first. Some spare parts are no longer available, so certain components have to be repaired by hand, which can take up to six months.¹⁴ Any mothballed facilities and tooling are likely to need upgrading and refurbishment. Supply-chain constraints are only gradually becoming clear, with some suppliers having redeployed resources or even gone out of business altogether. Certain parts may be obsolete, requiring redesign. Yet new systems are often only in the early stages of their development life cycle and thus cannot be brought into service expeditiously.

The story of decline

Domestic demand for military hardware in Europe has declined steeply since the end of the Cold War, and defence-industrial capacities have commensurately diminished. Production runs have also dwindled as more sophisticated capabilities have led to fewer systems being required in national military inventories. As a result, Europe's defence-industrial capacities have been likened to artisan facilities, crafting small numbers of exquisite products.¹⁵ They are not readily susceptible to transformation into high-intensity production lines. Exports have been crucial for sustaining industrial capacities during lulls in domestic demand, but several governments have implemented increasingly restrictive export policies in recent years, making it difficult for industry to include exports in their production-capacity planning. Given that they perceived a high-intensity war as unlikely, most European governments no longer considered it politically justifiable to spend taxpayers' money on excess defence-industrial capacity. Moreover, procurements of high-profile platforms such as aircraft and ships are routinely prioritised over mundane kit such as basic ammunition, rockets or even ground-based air-defence missiles.

The end of the Cold War also saw a profound change in the types of armed conflicts that NATO forces engaged in, with large-scale, high-intensity warfare supplanted by smaller engagements against non-peer opponents. Armed forces became accustomed to fighting low-intensity wars, in which

the main threat came from ill-equipped, albeit innovative, enemies. Perhaps unsurprisingly, military doctrine and equipment acquisition increasingly reflected the assumption that NATO forces would routinely control the battlespace, enjoy technological superiority and confront primarily insurgent forces. Readjusting now to high-intensity warfare against an enemy able to contest, for example, the air domain or the electromagnetic spectrum will take not only time but also a cultural reset. A whole generation of soldiers, defence planners and procurement officers that has been socialised into their roles in an era of cutbacks and efficiency demands must now learn how to grow again and manage expansion rather than shrinkage. Defence-industrial capacities will similarly need to adjust because the war in Ukraine has exposed presumptively efficient 'just in time' delivery as in fact being 'not in time'.

Response options

Defence manufacturers are unsurprisingly reluctant to invest without contracts or firm commitments from customers, given that demand may again collapse when the war in Ukraine ends. Numerous European companies have expressed frustration at a dearth of contracts despite their governments' announcements of big budget increases and proclamations of the urgency of filling capability gaps. For example, the German armed forces are said to require ammunition orders worth some €20bn to replenish stocks of different weapons systems, yet estimates at the end of 2022 suggested that only about 10% of this demand would be contracted in the 2023–24 time frame.¹⁶ At this rate, closing the gap would take 20 years. Susanne Wiegand, CEO of Renk, which manufactures drive trains for tanks, stated in February 2023 that new orders were only trickling in.¹⁷

Private industry typically cannot afford to maintain production facilities unless there is clear forward visibility of demand. Due to the propensity of defence ministries to make cuts as circumstances arise, it is especially risky for defence contractors to expand production ahead of receiving contracts. Industry representatives have sometimes argued for framework contracts to cover ten to 15 years to reduce this risk. The war in Ukraine has exacerbated already severe economic pressures in Europe and doubts remain over whether

recently announced defence-spending increases will really materialise. On top of this, industry is under pressure to undertake major expansion at a time when the EU's burgeoning European Environmental, Social and Governance (ESG) agenda has made access to finance harder for defence companies, particularly smaller ones.¹⁸ Against this background, if the war were to end soon, governments would likely come under pressure to redirect scarce resources elsewhere. Without long-term commitments from them, industry is likely to remain hesitant to make large-scale investments in production facilities.

Nevertheless, robust corporate results and order books of late point to healthy prospects. The company that has been most forward-leaning in Europe in terms of ambitions for future growth and optimism that chal-

Industry is under pressure to expand

lenges can be overcome is Rheinmetall. CEO Papperger called 2022 'a record year' and suggested the company's order backlog would grow from €30bn at the end of 2022 to €40bn by the end of 2023.¹⁹ Rheinmetall has expanded production capacity at its site in Unterlues,

Germany, and is said to have invested some €700 million in 2022 while also hiring 2,000 additional staff and switching to multiple production shifts a day. It has also announced plans to build a new powder plant and a new factory in Hungary with the backing of its government to produce explosives for different types of ammunition. In addition, it is in the process of acquiring the Spanish munitions producer EXPAL to further increase capacity.²⁰ Papperger suggested that it might be feasible to establish production sites for main battle tanks, infantry fighting vehicles and ammunition in Ukraine, with appropriate air-defence assets.²¹ BAE Systems, Europe's largest defence company, received record-level new orders in 2022, to the tune of £37bn, lifting its backlog to just under £59bn. The company had the best-performing stock in the FTSE 100, which lists the 100 companies with the highest market capitalisation on the London Stock Exchange.²² In anticipation of future orders, BAE Systems has increased production shifts at its three primary UK munitions plants.

Other companies have stepped up as well, though perhaps less aggressively than Rheinmetall. In early 2023, KMW, another German land-systems

outfit, acquired a majority stake in FWH Stahlguss GmbH, a manufacturer of cast steel, to become less dependent on the international supply chain.²³ KMW also reportedly began talks with Greece-based Metka, which has supported tank-hull production and welding for KMW, to expand capacity.²⁴ Companies in Central and Eastern Europe see opportunities for growth as well. Poland's PGZ has announced it will double its planned investment over the next ten years to build new facilities and increase production capacities. Companies in the Czech Republic, Poland and Slovakia have production capacity for the Soviet-era artillery calibres that remain the mainstay of the Ukrainian armed forces, and experience in maintaining and overhauling Soviet-era equipment.²⁵

Not all of Europe's defence-industrial problems are structural; some are located at the corporate level, where the general priorities of the overall business might stand in the way of agile adjustments in a company's defence division. For example, Germany-based mtu provides engines for armoured vehicles including *Leopard 1* and *Leopard 2* main battle tanks, *Boxer* armoured fighting vehicles, *Marder* infantry fighting vehicles and *Panzerhaubitze 2000* self-propelled howitzers. The company is owned by Rolls-Royce. While mtu is seeking funds to drive investments to support expected future orders and plans to hire additional staff, Rolls-Royce has restricted all investment due to underperformance, primarily in its civilian divisions.²⁶

Short-termism is another problem, with some countries implementing annual rather than multiyear defence procurements. This makes it much harder for the defence industry to justify investing for the long term at the scale required to significantly increase capacity. Even commercially successful businesses can be overburdened if investment requirements double or triple within the space of a year or two. Government defence-procurement organisations also have limited bandwidth for managing the additional procurement now envisaged, and bureaucratic procedures tend to be geared to peacetime. One representative of German industry recently complained that despite the €100bn special fund announced in February 2022, 'the procurement system of the Bundeswehr is still in a deep sleep'.²⁷ One obvious response would be for European governments and defence ministries, as well as NATO and the EU, to take better account of the likelihood of a major

peer-on-peer conflict in their defence planning. Similarly, defence ministries could better integrate production capacities and ramp up times in contingency planning.

Defence-industrial capacity, however, is only one part of the preparedness equation. Defence ministries can also enhance military readiness for major war by building up stocks of equipment and ammunition to levels more appropriate to the risk. If such stocks existed at a level sufficient to prosecute a high-intensity conflict for, say, six months, that reserve would correspondingly reduce the additional defence-industrial capacity needed should war arise. At the same time, storing larger stocks is not cost-free as it requires infrastructure, and ammunition does have a shelf life after which it becomes unuseable. Managing such issues would need to become accepted as part of the necessary contingency cost of being properly prepared for the risk of war.

It would be logical for NATO to alter its defence-planning process to include targets for each Alliance member in terms of war stocks and defence-industrial capacity for key capabilities. Governments could likewise instigate reviews of their key defence-industrial capacities and set goals for maintaining them at levels that better accommodate the risk of high-intensity conflict. This could call for managing and scheduling procurements to smooth demand and thus avoid or minimise lulls in production. In addition, governments might implement more predictable approaches to export licencing, enabling the defence industry to factor exports into their industrial-capacity planning with greater confidence. Ministries of defence might streamline their procurement processes and better resource procurement teams. This would involve, among other things, overcoming the well-known tendency to 'gold-plate' requirements and insist on unique national variations, which inevitably add both cost and risk to products that are less efficient for combined military operations and hamper inter-operability.

Finally, the EU and national governments could formally designate strengthening defence-industrial capacity in Europe as an essential prerequisite to advancing ESG goals. The logic is clear: unless security can be assured on the European continent, ESG ambitions are likely to prove

very difficult to achieve. The governmentally recognised and endorsed linkage between those ambitions and industry-driven security would enhance the defence industry's access to competitive finance to drive industrial-capacity expansion.

More European cooperation?

One means of increasing European production would be to reduce duplication across the defence industry so that the remaining players each operate at higher throughput levels and produce more efficiently. However, this raises the perennial European problem of national preference. It is possible to imagine the consolidation of European defence-industrial facilities for each capability, with each operating at full capacity and supplying all European countries, as well as exporting outside of Europe. Such facilities would be distributed around Europe so that a significant number of countries had a share. Countries would then be interdependent and therefore would have a vested interest in keeping the system working well.

Traditionally, however, national governments have jealously guarded their right to decide which capabilities they need and whom to procure them from. For many countries, maintaining a national defence industry is a matter of sovereign reassurance that trumps both undeniable efficiencies of industrial integration and consolidation and, at least in some circumstances, the financial impediments that would otherwise make greater cooperation logical. An assessment referred to by the Lithuanian Ministry of National Defence suggested that there are at least 15 defence companies across 11 EU member states with the capability to produce 155 mm ammunition (see Map 1).²⁸ Some duplication of defence-industrial capacity across Europe is nevertheless likely to persist. Indeed, as defence analyst Francis Tusa has said, 'you will never end up with just one propellant plant in Europe but if ever there was a time to say, we should be co-operating on munitions, it is now'.²⁹

The EU has introduced multiple policies and instruments in recent years aimed at engendering more cooperation. Whether they will work is still unclear. The most significant current instrument, the European Defence Fund (EDF), is aimed at the research and development phases of

Map 1: Selected European producers and production sites for 155 mm and 152 mm artillery ammunition



Source: IISS

the product life cycle. Given the long development lead times required for complex defence capabilities, it will be many years before the EDF yields products manufactured at scale. However, the EU has recently tabled proposals for new instruments to incentivise cooperative procurement of EU-originated products: the European Defence Industry Reinforcement Through Common Procurement Act (EDIRPA) and the European Defence Investment Programme (EDIP). These could have far more influence on near-term procurement decisions than the EDF – if the cash incentives outweigh the additional complexities involved in cooperative procurement. In this context, the €500m budget proposed for the EDIRPA is likely to be far too

small a sum to have much impact, given the tens of billions spent annually on defence procurement in Europe. Indeed, the early evidence is that many EU countries are prioritising procuring off the shelf, often from outside the EU, rather than pursuing cooperative procurement with other member states or embarking on cooperative EU capability-development programmes.

At the same time, the war in Ukraine has provided momentum for joint procurement in other ways that could serve as precedent. In March and April 2023, some 24 governments (23 EU member states plus Norway) signed onto the Collaborative Procurement of Ammunition project, managed by EU institutions, to fast-track the procurement of 155 mm artillery munitions to aid Ukraine and for national purposes, and to create a framework for the collaborative procurement of munitions of various calibres to replenish national holdings.³⁰ Some €2bn has been earmarked to reimburse participating governments for rapid transfers of shells from their existing stocks to Ukraine and to finance joint procurement.³¹

A persistent concern with respect to EU defence-industrial instruments is that they all contain onerous rules for working with third-country entities or using technologies that are subject to third-country controls or restrictions. These rules tend to be particularly problematic for near-term procurements of existing products, since many incorporate controlled non-EU technology or involve non-EU partners. EU industry may therefore need to substitute technologies that are readily available from close NATO allies, which could add significant cost, complexity and time.

History shows that the most successful cooperative-development programmes have few partners and a clear leader. Two or three partners is the ideal, with complexity and inefficiency increasing markedly once four or more partners are involved. Yet EU defence-industrial instruments have been designed to inherently attract the widest possible participation in each project. For example, in the 2021 EDF work programme, each winning project consortium had, on average, 18 partner entities from eight different EU countries. Such unwieldy arrangements could lead to uncompetitive products that are unexportable. Some EDF actions may even collapse altogether before concluding, or one or more of the main players may have to pick up the pieces and independently fund the activity to conclusion.

Many European countries responded to Russia's invasion of Ukraine by significantly increasing their defence budgets and then committing to procure major capabilities, often from non-EU sources. New multinational European programmes have also been launched, such as the German-led European Sky Shield Initiative (ESSI), which is proposing the acquisition of various off-the-shelf capabilities predominantly from non-EU sources to address European requirements and has gained the participation of 17 countries. The standard supporting argument is that filling key gaps quickly is more important than arduously ensuring European cooperation in the longer term.³² Where does this leave the EU's ambitions to encourage more EU cooperative development? It is notable that significant EU countries like France and Italy have not signed up to the ESSI, arguing that Germany's intended approach fails to consider the impact of such a large programme on European missile-defence industrial capabilities. Both France and Italy have significant missile-development know-how and associated industrial capacity. But it is hard to envisage them leading a separate EU missile-defence development programme and achieving critical mass when 17 other European countries are signed up to the ESSI.

Similarly, the aim of developing a new European maritime-patrol aircraft looks questionable now that Germany appears set to further increase its fleet of American P-8 aircraft. Arguably, the EU could focus instead on developing the next generation of products that would eventually replace these 'gap-fillers'. But doubts would surely arise over the solidity of any such programme owing to the extra cost and complexity it would bring. Inertia is also a problem. For example, once the Luftwaffe has embedded P-8 technology, training and doctrine into its wider system, it will be more disruptive to switch to an entirely different system, ergo harder to justify.

These considerations suggest that existing EU initiatives are poorly calibrated. Some, at least, appear to be trying to be everything to everyone, with little sense of what the highest-priority defence capabilities are, how to ensure the delivery of competitive products, or how to keep the key European players on board.

Since the end of the Cold War, NATO, and more specifically the US defence shield, has lulled Europe into thinking it could take an enduring peace dividend. Once upon a time, some European leaders even believed that Russia was on a path towards European integration and was permanently diminished as a military actor, such that it could never credibly threaten NATO territory again. Germany, among other countries, deliberately adopted policies for deepening economic ties with and energy dependence on Russia in the belief – or maybe the hope – that doing so would link Russia so closely to Europe that the Kremlin would consider attacking a NATO country an act of self-harm. This now appears to have been wishful thinking, even if Russian attacks on NATO members have yet to transpire at levels that meet the calculatedly vague threshold for collective self-defence set by Article 5 of NATO's founding treaty.

Reassurance that the US would be there to protect Europe has perhaps inevitably allowed European governments to take their eyes off defence. This has led to decades of reduced budgets, smaller militaries and a far smaller defence-industrial base. Although the calls to arms in speeches and promises prompted by Russia's aggression in Ukraine are now beginning to crystallise into official policy, no major recapitalisation of armed forces or large-scale procurement to address capability gaps have yet materialised. There have still been more words than actions. This suggests that the war in Ukraine, despite being on NATO's borders, is not yet being seen by European governments as a realistic threat to NATO territory. Proclamations that Europe is shifting to a wartime economy seem premature, even far-fetched. In Western Europe at least, there is little evidence that governments are pulling out all the stops to prepare for war. They are not doubling defence spending, redeploying major resources, increasing army recruitment or requisitioning factories. The peacetime mindset in Europe may have become so deeply rooted that it will take more than a war of aggression in Europe to engender truly transformational thinking and policy action in European capitals, EU institutions and NATO.

If Europe needs another catalytic jolt, one may be on the way. China's rapidly growing military might and increasing assertiveness mean that the United States' long-signalled 'pivot to Asia' is likely to accelerate. Logic

would suggest that the US will want to correspondingly reduce its role in European defence and look to European nations to step up. With this spectre becoming increasingly clear on the horizon, Europe needs an epochal shift in political thinking, coupled with significantly higher defence spending and a determined effort to reset public perceptions of the need for strong defence. None of these requirements currently looks assured. Unless they are met, however, NATO's vaunted deterrent may falter. Russia may no longer perceive Europe as having credible defences and become tempted to attack a NATO member.

Moscow is probably right to believe that the West would never use nuclear weapons in response to a conventional Russian attack on NATO. That very assumption makes Europe's conventional defence the most crucial element of NATO's deterrent. Europe therefore has little choice but to increase its defence spending and overcome long-standing inefficiencies and impediments to effective defence collaboration. Its long-term challenge is to maintain this determination even in peacetime, alert to a primary lesson of history: maintaining a strong defence is the best way to avoid the next war.

Notes

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