NIDS Research & Analysis 10

Navigating the New Era of Defense Industrial Strategies

National Priorities and Global Collaboration

NIDS International Symposium on Security Affairs
December 10, 2025, Tokyo

NIDS
Tokyo Japan
防衛研究所

Cover Photo: Acquisition, Technology and Logistics Agency prototype vehicle equipped with a high-power laser demonstration device to deal with small unmanned aerial vehicles (drones), exhibited at the defense equipment exhibition “DSEI Japan 2025,” Chiba City (Jiji)

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Chairperson's Summary of the FY2025 International Symposium on Security Affairs

On December 10, 2025, the National Institute for Defense Studies (NIDS) held the International Symposium on Security Affairs on the theme of "Navigating the New Era of Defense Industrial Strategies: National Priorities and Global Collaboration." This symposium aimed to contribute to security dialogues, enhance the quality of research, revitalize people-to-people exchanges, foster mutual understanding internationally, and inform security policies.

The symposium was divided into four parts: the keynote speech and sessions 1 to 3. Session 1 focused on "Megatrends in the Global Defense Industry," Session 2 discussed "Defense Industrial Partnerships" and Session 3 was a wrap-up discussion chaired by Prof. IIDA Masafumi, Director of the Security Studies Department at NIDS. Below is the Chairperson's Summary of the symposium.

The keynote speech, titled "Strengthening Japan's Defense Industry: From Systems to the Implementation of Defense Technologies," was delivered by Dr. WATANABE Hideaki, Chairman of the Defense Technology Foundation. In light of the historic turning point in Japan's security environment, he proposed five policy measures for rebuilding Japan's defense industrial base: (1) introducing advanced technologies, (2) international cooperation and defense equipment transfers, (3) strengthening supply chains, (4) enhancing industrial cybersecurity, and (5) securing and developing human resources.

Regarding the introduction of advanced technologies, Dr. Watanabe stated that it is necessary to establish research, development, and demonstration frameworks centered on the creation of a "Defense Technology Demonstration Special Zone" in order to effectively implement more advanced technologies. He also noted the need for strategic sourcing of technologies through people-to-people exchanges and investment in research and development.

Regarding international cooperation and the transfer of defense equipment technologies, Dr. Watanabe stated that Japan should actively enter international markets in order to break free from its high-cost structure. To that end, he noted the necessity of the establishment of a project management office to centrally manage international business promotion, the standardization of technologies, deeper integration with the U.S. defense industrial base, and the promotion of cooperation with various countries in the Indo-Pacific region.

With regard to strengthening supply chains, Dr. Watanabe noted that lessons from the war in Ukraine highlight the urgent need to secure stockpiles of ammunition and other materials as well as the capacity for rapid surge production. He also discussed the need for supply-chain visibility, diversification of supply sources, the standardization and modularization of technologies, and the management of technical


Prof. Iida, Chairperson

information.

In addition, Dr. Watanabe stated that aligning cybersecurity measures with U.S. initiatives is necessary to enhance the credibility of Japanese companies and facilitate their entry into overseas markets. Furthermore, he noted the urgent need to address the decline in skilled technicians and the shortage of digital talent, and explained the importance of public-private personnel exchanges, reskilling initiatives, and improved employee compensation, as well as considering measures such as carving out defense divisions and establishing joint ventures from the perspective of reputational risk.

In Session 1, themed "Megatrends in the Global Defense Industry," presentations were delivered by Dr. Christine Michienzi (Non-Resident Senior Associate, Center for Strategic and International Studies (CSIS), United States) and Dr. Luis Simón (Director, Centre for Security, Diplomacy and Strategy (CSDS), Vrije Universiteit Brussel (VUB), Brussels). The presenters were joined in discussion by Dr. HWANG Inbin (Associate Research Fellow, Korea Institute for Defense Analyses (KIDA), Republic of Korea (ROK)) and Ms. KOSHINO Yuka (Principal, Ferocity Capital; Former Research Fellow, International Institute for Strategic Studies (IISS)).

First, Dr. Michienzi delivered a presentation titled "A Comparison of Allied National Defense Industrial Strategies," outlining the respective characteristics of the defense industrial strategies of the United States, the European Union (EU), Japan, and Australia. She summarized their commonalities and differences and discussed trends toward deepening international cooperation.

The main points of her presentation were as follows: the United States is working with allies and partner countries to strengthen supply-chain resilience; the EU is pursuing a paradigm shift from emergency response to defense readiness while promoting transformation across the entire industrial structure; Japan is seeking to move beyond constraints rooted in its traditional pacifism and domestically oriented approach, while promoting the introduction of advanced technologies and strengthening supply chains through international cooperation; and Australia's distinguishing feature lies in procurement process reform, prioritizing the speed of acquisition rather than the pursuit of "perfect" equipment.

Next, Dr. Michienzi further identified several commonalities, including responses to rising geopolitical tensions such as China's rise and Russia's invasion of Ukraine, adaptation to emerging technologies such as AI, strengthening supply chains, and improving integration and interoperability with allies and partner countries. She also noted differences in the scale of defense industries and the scope of their strategies, historical and political constraints, and the balance between self-sufficiency and interdependence.

Next, Dr. Simón presented "Opportunities and Constraints for Cross-Theater Defense Industrial

Cooperation." He argued that ideally, defense industrial cooperation between the Euro-Atlantic and Indo-Pacific regions should shift from arrangements emphasizing quantity to a mutually complementary model that balances both quality and quantity through precise coordination, while also outlining the limits of such cooperation and realistic approaches to addressing them.

The main points of his presentation were that both regions face the shared challenge of needing to respond not only to threats from nuclear-armed major powers but also to wars of attrition involving conventional weapons. Given the uncertainty as to whether the United States can maintain the capability to deter and respond simultaneously in both the Euro-Atlantic and Indo-Pacific theaters, he emphasized the need to discuss how and to what extent cooperation between the two regions should be deepened.

Regarding the current state of the European defense industry, Dr. Simón explained that while it is technologically advanced, it faces structural problems in its insufficient capacity to produce large quantities of consumable items such as ammunition and missiles. As a result, Europe faces a dilemma between pursuing autonomy and independence or prioritizing interdependence in light of the need for rapid responses to emergencies.

Dr. Simón also emphasized that it is important for the two regions to recognize the differences in their respective strategic environments as well as the characteristics and challenges of their defense industries, to select optimal methods of cooperation and levels of standardization according to the nature of each technology, and to properly determine the appropriate prioritization of policy measures.

During the discussion in Session 1, Ms. Koshino first summarized the key points of the two presentations and clarified the focus of the discussion. Dr. Hwang then posed questions to the two presenters.

Dr. Hwang asked Dr. Michienzi about the effectiveness of strategic documents, and asked Dr. Simón whether the fundamental direction of Europe's defense industrial strategy lies in autonomy, cooperation, or integration.

Dr. Michienzi responded that the fundamental thinking underlying U.S. defense policy has not changed significantly over the past 30 years, and that approaches to defense industrial policy have been broadly shared across government agencies. However, she noted that the recent change in administration has created uncertainty about the future. She explained that with the change in leadership, some differences of opinion have emerged within the Department of Defense regarding defense industrial strategy, and debates have also arisen in Congress. Nevertheless, she noted that the policy of prioritizing cooperation and coordination with allies and partner countries remains consistent, and that upcoming policy reviews will garner attention.

Dr. Simón responded that Europe's direction will depend on developments in the U.S. administration. He explained that in response to the current U.S. administration's view that responsibility for guaranteeing European regional security should rest with European countries themselves, Europe is currently emphasizing autonomy and independence. However, he added that while there is a tendency toward independence at the operational level, cooperation is important at the industrial and technological levels, and that this should be understood across different layers.

In response to the presenters' answers, Dr. Hwang asked whether allies and partner countries in Europe and the Indo-Pacific region would be able to keep pace with advanced technological development in the United States. In connection with this question, Ms. Koshino also asked how traditional prime contractors perceive the growing presence of startup companies in technological development.

Dr. Michienzi noted that in the United States, a paradigm shift is already underway in which civilian technologies, including those developed by startup companies, are being directly incorporated into military equipment. She added that it is also true that some traditional prime contractors have struggled to keep up with this shift, and that adapting will take time.

Dr. Simón stated that Europe's defense industry has not been able to match the speed of technological development in the United States. As contributing factors, he pointed to the highly fragmented nature of the European defense industry, which remains divided both across sectors and along national lines. Under such conditions, the ecosystem has not expanded sufficiently, and system integrators have not been able to function. As a result, he predicted that rather than developing, producing, and implementing cutting-edge technologies entirely within Europe, joint development and production with the United States will likely remain the primary approach going forward.

Session 2 was held under the theme "Defense Industrial Partnerships." Presentations were delivered by Dr. Trevor Taylor (Professorial Research Fellow, Royal United Services Institute (RUSI), United Kingdom), Dr. Peter Dean (Professor, Australian National University), and Mr. Thomas Corben (Research Fellow, United States Studies Centre, University of Sydney). The presenters were joined in discussion by Dr. Laxman Behera (Associate Professor, Special Centre for National Security Studies (SCNSS), Jawaharlal Nehru University (JNU), India) and Mr. KIYOOKA Katsuyoshi (Research Fellow, Society and Economy Division, Security Studies Department, National Institute for Defense Studies).

In his presentation titled "Analysis of British Defence Industry," Dr. Taylor took an economic perspective, arguing that with civil-commercial technologies now accounting for more than 90 percent of defense technologies, the defense industry and defense technologies as a whole can no longer be understood solely through the logic of defense policy.

His main points were that the characteristics of the UK defense industry lie in the long-standing continuity of defense companies since the nineteenth century, defense budgets that fluctuate annually, and the doubling of development and production costs for next-generation technologies. In addition, the United Kingdom's open capital market environment has facilitated mergers and acquisitions (M&A) among defense companies. At the same time, firms possessing core competencies have continued to survive even when their names have changed through such processes. Furthermore, because foreign companies manufacture at production sites within the United Kingdom, the UK defense industry maintains the capacity to conduct the entire process domestically, from technology development and production to implementation and manufacturing.

On the other hand, the pursuit of economic efficiency under the open capital market environment has

also created negative effects, including tensions between defense companies and defense authorities. In terms of a possible solution, Dr. Taylor noted the need to establish and share value-based criteria alongside economic efficiency. In this context, he expressed expectations for sector-specific strategies and a defense industrial strategy to serve as frameworks for coordinating these elements comprehensively.

Dr. Taylor also emphasized that establishing an organization with authority for oversight and coordination is important in international joint programs. In this regard, he highly praised the Global Combat Air Programme (GCAP) International Government Organisation (GIGO), the organization that manages the joint GCAP initiative of the United Kingdom, Japan, and Italy. He concluded his presentation by noting that political considerations are influencing the United Kingdom's moves to promote defense equipment exports, and that it will be important to observe whether the UK defense industry shifts from a self-sufficiency-oriented model to one focused on competitiveness.

Dr. Dean and Mr. Corben then gave their presentation titled "Australia's Evolving Defence Industrial Strategy." They explained that Australia's defense industry development strategy has evolved in response to higher-level strategies formulated to address recent changes in the security environment, and that its approach to international cooperation has likewise continued to evolve.

The main points of the presentation included the fact that Australia's defense industry is small and composed largely of small and medium-sized enterprises. Australia's defense industry relied heavily on the United States until the 2010s, under a security strategy focused on responding to low-level threats based on the assumption that large-scale threats would not directly affect the country. Within this context, efforts were also made to advance cooperation with European companies in order to reduce excessive dependence on the United States.

In addition, as a new direction emerging in the 2020s, Dr. Dean and Mr. Corben explained that the 2023 *Defence Strategic Review* (DSR), which reflects changes in the Indo-Pacific security environment driven by strategic competition between the United States and China, set out a policy of mobilizing national power to prepare for the risk of large-scale conflict, thereby initiating plans to restructure the defense industry. In particular, the 2024 *National Defence Strategy* (NDS), formulated on the basis of the DSR, calls for elevating innovation capabilities within the defense ecosystem. The *Defence Industry Development Strategy* (DIDS) was subsequently formulated as a strategy to achieve the objectives set out in the DSR and NDS.

Dr. Dean and Mr. Corben also explained that under the DIDS, efforts are being made to deepen cooperation with allies and partner countries. These efforts include bilateral cooperation with the United States, new capability partnerships with Japan and the ROK, several small-scale defense industry partnerships, and the latest developments related to AUKUS.

During the discussion in Session 2, Mr. Kiyooka first summarized the key points by the three presenters and clarified the focus of the discussion. Dr. Behera then posed questions to the presenters.

Dr. Behera asked Dr. Taylor about the issue of integrating UK-manufactured subsystems into U.S. military equipment within the framework of the UK-U.S. partnership. He also asked Dr. Dean and Mr.

Corben about the challenge faced by Australia's defense industry, which is composed largely of small and medium-sized enterprises, where financial constraints can become a bottleneck even when efforts are made to enhance maintenance, repair, overhaul, and upgrade (MRO) capabilities. In this context, he asked about the issue of balancing such efforts with expenditures related to AUKUS.

Dr. Taylor responded that in joint development and production with the United States, there have been both areas that progressed smoothly and others that have stalled, and that establishing an appropriate level of tolerance for the risk of failure is important when undertaking joint projects. He further pointed out that a major driver of innovation in the United Kingdom has in fact been foreign capital entering the country from abroad. However, because the researchers and employees involved are British and the innovation itself occurs within the United Kingdom, he argued that the country's strength lies in its highly skilled human resources.

Dr. Dean stated that the greatest problem has been the failure to adequately cultivate the defense industry, and that it remains uncertain whether the DSR will function as intended. He explained that the current priority is strengthening supply chain resilience. Even for equipment developed and produced for the military or for export, Australia's domestic production capacity remains limited, and in international joint projects, the country often takes responsibility for only a portion of the work.

Mr. Corben responded that Australia's objective is not simply to grow its defense industry, but rather to enhance its strategic position by improving the capabilities of the overall industry. In this regard, he noted that the government needs to design an appropriate portfolio of capabilities. In particular, he emphasized that the government places strong importance on MRO capabilities in order to increase Australia's value to the United States. He also stated that in defense partnerships with Japan and the ROK, it is necessary for Australia to provide forms of cooperation that carry high strategic value.

Session 3 (Wrap-Up Discussion) was held under the theme "Towards Effective Defense Industrial Collaboration," with Professor Iida serving as chairperson. Participants from Sessions 1 and 2 joined the panel to engage in discussion.

At the outset, the chairperson summarized the key points emerging from the first two sessions. He noted that the discussions could be distilled into two common observations: first, that each country or region faces its own unique challenges in strengthening its defense production and technology base; and second, that all countries and regions place emphasis on international cooperation. On this basis, he posed a common question to the panelists regarding the factors they consider most important in driving efforts to strengthen the defense production and technology base.

Dr. Michienzi responded that successive administrations in the United States have shared the objective of making the defense industrial base secure and resilient. She explained that both the first Trump administration and the Biden administration emphasized onshoring investment, while the second Trump administration has focused on increasing the speed and scale of policy implementation, with the use of civilian technologies as a key approach.

Dr. Simón noted that the primary factors differ from country to country within Europe and began by categorizing European states. He identified the first-tier countries—the United Kingdom, France, and Germany—as those possessing large-scale development and production capabilities as well as system integration functions. Second-tier countries—Italy, Sweden, the Netherlands, Poland, and Spain—have established domestic defense production bases but are not able to serve as system integrators. Finally, third-tier countries lack an established defense industrial base and must purchase military equipment from abroad. He then pointed to two factors common across Europe: the threat posed by Russia and the reliability of the United States (the level of its commitment to Europe).

Dr. Taylor stated that many European countries would actually prefer to restrain defense spending and also scale back operations. However, he explained that when increasing defense investment in response to the threat from Russia, it was important to establish mechanisms that would also contribute to overall economic growth. Specifically, he noted that this meant industrializing the defense sector so that it could achieve sustainable growth. At the same time, he pointed out that pressure from the Trump administration has also influenced the recent increase in defense spending. There are concerns that if a change in administration were to reduce such pressure, momentum for increased defense investment in Europe could also decline.

Dr. Dean responded that in Australia, the underlying factors driving efforts to strengthen the defense industrial base are not openly debated, but there is a shared recognition that the rise of China is changing the security order. He added that some observers also express concern about the possibility of a return to a Cold War–style environment in relation to developments in the United States. In response to the risks posed by uncertainty, Australia is reviewing the portfolio of its defense planning.

Mr. Corben stated that from the perspective that the defense technology base underpins responses to the security environment, Australia's insufficient innovation capacity and its inability to keep pace with technological change constitute a defense risk. He emphasized that responding to the threat posed by China will require cooperation with allies and partner countries, and that it is a top priority to strengthen Australia's own defense production and technology base, which serves as the foundation for such cooperation.

Dr. Behera answered that the primary driver behind efforts to strengthen India's defense industrial base is the pursuit of strategic autonomy and enhanced defense capabilities. He also identified several challenges currently facing policymakers, including determining which sectors should be developed in terms of research, development, and production from the standpoint of autonomy; how to manage and regulate the market; the issue of Chinese capital entering the Indian market; and differing levels of political commitment across industrial sectors.

Dr. Hwang stated that for the ROK, which must face North Korea, the importance of national defense is widely shared among the population. He explained that the ROK has been working to strengthen its defense industrial base since the 1970s and has now evolved to the point where it can domestically supply most of its defense equipment, while also maintaining the capacity for rapid surge production in times of emergency. He further noted that, with the expansion of defense exports, the contribution of the defense

industry to economic growth and employment has increased, and it is now positioned as a key national industry.

Keynote Speech

Chapter 1

Pursuing Structural Autonomy: A Path to Elevating the Defense Industry into a Pillar of National Infrastructure

A Comprehensive Approach Integrating Hybrid Warfare, International Collaboration, and Procurement Reform

WATANABE Hideaki and IKEGAMI Atsushi

Introduction

Toward Structural Autonomy of Japan's Defense Industry and Its Establishment as a Pillar of National Infrastructure

Japan's security environment can be said to be at the greatest historical turning point since the end of World War II. Japan's defense industry has long developed with two driving forces: reliance on domestically oriented government demand under constraints such as the Three Principles on Arms Exports, and a "spin-on" model in which advanced civilian technologies are applied to defense. Particularly in the 1980s, the rise of consumer electronics supported the implementation of AESA radar and composite-material technologies in the F-2 fighter aircraft. However, amid Japan's economic stagnation, shifts in industrial structure, and the advance of globalization, this traditional model of success is increasingly becoming dysfunctional.

In addition, Russia's invasion of Ukraine has transformed the character of modern warfare. Sustainability in attritional warfare, the rise of asymmetric weapons such as drones, and the risk of disruption to global supply chains have underscored that the defense industry is not merely a supplier of equipment but a form of "national infrastructure" that safeguards the lives and property of citizens. While recent government and public–private efforts, such as the strong performance of Japanese companies in Australia's next-generation naval vessel selection process, have offered signs of hope, structural issues remain serious across the industry. These include a high-cost structure, dependence on overseas sources for critical component materials, cybersecurity measures, and rigid corporate organizational frameworks.

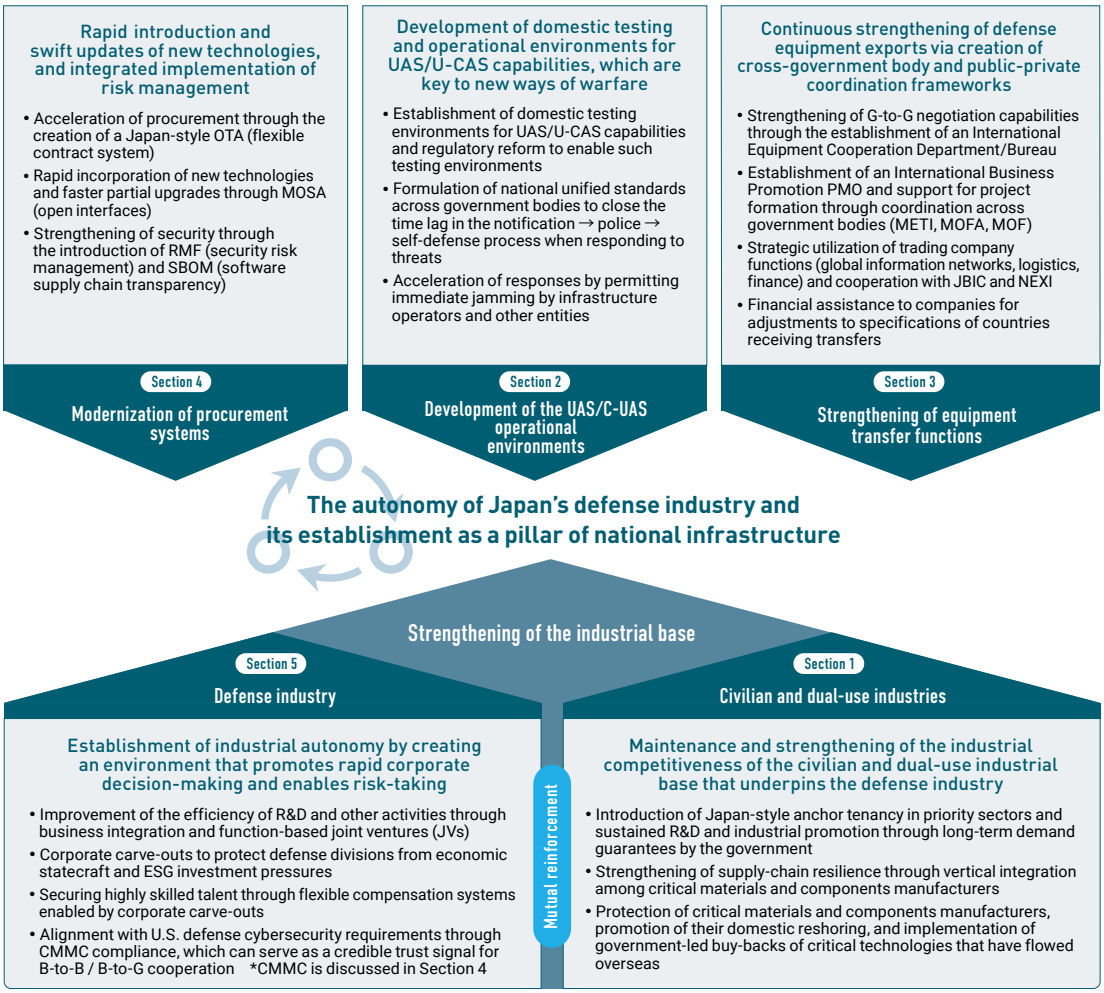
Based on this recognition of current conditions, this paper presents comprehensive policy options aimed at establishing Japan's defense industry as a true "pillar of national infrastructure" and restoring its autonomy.

Section 1 takes the perspective of economic security to focus on often overlooked "general-purpose items" and securing supply chains for foundational dual-use technologies. It offers concrete policy

recommendations, including anchor tenancy and similar measures on how the national government can sustain not only advanced technologies but also the manufacturing base that underpins them. Section 2 addresses hybrid warfare, which blurs the boundary between peacetime and contingency. It examines the formulation of unified national standards for counter-unmanned aerial systems (C-UAS) and the establishment of a real-environment evaluation framework (testbeds) to support them.

Section 3 positions equipment transfers as an active "national strategy" and presents proposals for reforming implementation frameworks and governance to accelerate international expansion. These include upgrading the organizational status of the Acquisition, Technology & Logistics Agency (ATLA) and leveraging trading company functions. Section 4 deals with the modernization of procurement processes. In response to equipment that is increasingly becoming software-driven due to advances such as AI, it proposes introducing the Risk Management Framework (RMF) and the Modular Open Systems Approach (MOSA), thereby renewing contractual and technical foundations to rapidly and securely incorporate innovative technologies from startups.

Finally, Section 5 examines the nature of the companies responsible for implementing the above. It



raises the need for organizational restructuring (spin-offs and integration) to avoid the "burial" of defense divisions within conglomerates, a characteristic of Japan's defense industry, and the resulting inefficiencies in investment, thereby enabling autonomous growth and risk-taking. Undertaking these multilayered reforms across technologies, systems, and organizations is considered the path to further strengthening Japan's deterrence capability and creating a desirable security environment.

1 Securing Supply Chains for Foundational Dual-Use Technologies

Policy Recommendations for Maintaining Economic Security and National Autonomy

1. Introduction

Taking the perspective of maintaining Japan's economic security and national autonomy, this section proposes a policy framework for "foundational dual-use technologies" that are indispensable to both civilian and defense sectors. Rather than being limited to support for research and development alone, the framework calls for the national government to plan systematically for the maintenance and renewal of supply capacity across the entire supply chain, encompassing quantity, quality, continuity, and substitutability. Analysis of recent geopolitical trends suggests that the focus of competition among states is shifting from technological sophistication to control over supply networks.[1] China in particular is said to have built enormous production capacity in sectors such as drones and their supply chains, batteries, and legacy semiconductors through industrial policies including Made in China 2025.[2] While this structure contributes to the global economy in peacetime through the provision of low-cost products, it also entails the risk that supply restrictions themselves could function as leverage over other countries' industries and security during contingencies or periods of diplomatic tension.[3]

This section also analyzes how similar structural pressures are intensifying even in sectors where Japan has traditionally excelled, including power semiconductors, high-reliability fine ceramics, and carbon composite materials. It then argues for the

Dr. Watanabe, keynote speaker

Mr. Ikegami

necessity of proactively sustaining supply networks not by relying solely on market principles, but by leveraging government "anchor tenancy" functions and fundamentally restructuring industrial structure, including the vertical integration of supply chains.

2. Background: The Crisis of Advanced Materials Processing Manufacturers and the Role of General-Purpose Products

2.1 The Shift Toward Supply-Chain Dominance and Japan's Position

Within supply chains in foundational sectors, it is thought that trends in "general-purpose products"—which achieve high cost-effectiveness through economies of scale—tend to shape the trajectory of entire industries. If a particular country expands its global share of general-purpose products on the back of domestic demand and subsidies, competing countries may be forced to scale back capital investment due to deteriorating profits.[4]

In the manufacturing industry, the "learning effects" gained through the mass production of general-purpose products are widely regarded as forming the foundation for improvements in production technologies and the development of human resources.[5] Accordingly, losing markets for general-purpose products can be thought of as being tantamount over the long term to the weakening of domestic manufacturing equipment, skilled technical capabilities, and quality-assurance systems.

2.2 General-Purpose Products as the "Bread and Butter": The Economic Foundation for Sustaining Technology

An often overlooked but important reality is that the business models of Japan's highly regarded advanced processing manufacturers (spanning materials, components, and processing industries) are difficult to sustain through the small-lot production of high-end products alone.[6] It is believed that many processing manufacturers also undertake the processing of mass-produced general-purpose products, using these orders to maintain factory utilization rates (operating rates), recover fixed costs, and secure an earnings base (their "bread and butter"). In that sense, the earnings and shop-floor data generated through this mass production of general-purpose products are thought to support the introduction of expensive inspection equipment, the employment of skilled technicians, and research and development for customized high-performance, high-function products. The concern is that Japanese processing manufacturers may lose their earnings base if they are defeated in price competition in the general-purpose market, leading to business withdrawal or closure. As a result, even if manufacturing remains technically feasible, factories may become economically unsustainable to maintain, creating the risk that the capacity to supply customized products essential to defense and critical infrastructure could be lost in a chain reaction.[7] In this sense, the loss of general-purpose products may be understood as fundamentally undermining national autonomy.

3. Relationship with Japan's Growth Strategy and Economic Security Policies, and the Positioning of This Proposal

The Japanese government has designated semiconductors, storage batteries, and aircraft components (such as large forgings, carbon fiber, and CMC/SiC fibers) as specified critical products under the Act on the Promotion of Ensuring National Security Through Integrated Implementation of Economic Measures. In addition, the materials sector has been prioritized in industrial policies such as the Materials Innovation Strategy.[8] However, existing strategies tend to focus on market creation through innovation and on cutting-edge semiconductors, suggesting that the perspective of maintaining the general-purpose and legacy domains that underpin the existing industrial base still leaves room for further strengthening.

Foundational dual-use technologies can be regarded not only as investment targets within individual sectors but also as a common foundation supporting implementation across multiple fields. Accordingly, given that current Growth Strategy discussions are largely organized around advanced and sector-specific areas, there is a risk that mechanisms for cross-cutting implementation that integrate supply capacity (resilience)—including continuity of supply, quality assurance, and the securing of alternatives—are not sufficiently covered. This proposal complements the Growth Strategy and provides measures to strengthen the foundation for enhancing the likelihood of its effective implementation.

4. Structural Vulnerabilities in Priority Areas and Security Concerns

This section examines foundational sectors that influence Japan's autonomy using the following six sectors as examples to analyze both the importance of their applications and the structural "crises" inherent in their supply chains.

4.1 Drones (Unmanned Aerial Vehicles): Supply-Chain Dominance and Backdoor Risks

- **Strategic significance:** Drones are regarded as game changers that create asymmetric advantages in both defense (e.g., ISR and loitering munitions) and civilian domains (infrastructure inspection and logistics).
- **Structural vulnerability:** It is said that a certain country accounts for more than 70% of the global market share, and dependence on that country exceeds 80% for key components such as batteries.[9] This concentration of supply chains not only means that supply restrictions in contingencies would immediately deal a fatal blow to force sustainment, but also make it impossible to eliminate the risks of information leakage through backdoors and remote manipulation.[10] There are concerns that a dependence structure at the component level cannot be resolved simply by reshoring final assembly.

4.2 Batteries (Lithium-Ion Batteries): Vulnerability as "Energy Ammunition"

- **Strategic significance:** Lithium-ion batteries are considered central to energy security, forming the core of submarine propulsion, "silent watch" capabilities, civilian electric vehicles (EVs), and more.
- **Structural vulnerability:** Dependence on a certain country for the refining of anode materials (graphite) exceeds 90%, which is believed to constitute a clear choke point within the supply chain.[11] As evidenced by tightened export controls in 2023, this dependency presents an emerging risk of being used as leverage for diplomatic or strategic purposes, and supply disruptions could directly result in the suspension of equipment operations.

4.3 Legacy Semiconductors (28nm and Above; Analog): Hollowing-Out of the Industrial Base

- **Strategic significance:** In areas requiring extremely high reliability—such as missile guidance systems, fighter radar, and automotive control—proven legacy processes, rather than cutting-edge technologies, are said to be indispensable.[12]
- **Structural vulnerability:** Massive investment and oversupply by a certain country are projected to enable it to capture nearly half of the new production capacity for legacy semiconductors in the coming years.[13] The influx of low-cost foreign products is putting pressure on the profitability of Japan's midstream and back-end manufacturers, where the country holds strengths, raising concerns that "trusted foundry" capabilities could disappear domestically.

4.4 Power Semiconductors (SiC, GaN, etc.): Loss of Advantage Due to Materials Dependence

- **Strategic significance:** Power semiconductors are key devices supporting enhanced output for AESA radar, electronic warfare (EW) capabilities, and improved EV efficiency, and Japanese firms are regarded as possessing strong technological capabilities in this field.
- **Structural vulnerability:** Although Japan holds an advantage in device manufacturing technologies, primary production of gallium (the substrate material) is believed to be dominated by a certain country with a 98% share.[14] Supply instability in upstream processes (materials) could dampen investment incentives and competitiveness among domestic manufacturers, creating the risk that technological advantages may be undermined at a fundamental level in the long term.

4.5 High-Reliability Fine Ceramics: Technological Loss Due to Decline in General-Purpose Markets

- **Strategic significance:** High-reliability fine ceramics are believed to determine performance

under extreme conditions, such as in missile radomes (electromagnetic wave-transparent windows) and heat-resistant components for jet engines.

- **Structural vulnerability:** Sustaining advanced technological capabilities is believed to depend on securing revenue from general-purpose markets, including semiconductor manufacturing equipment components.[15] Defeat in price competition for general-purpose products could quickly make it difficult to maintain factories, potentially triggering the cascading loss of the very manufacturing base required for defense-related customized products.

4.6 Carbon Composite Materials (Carbon Fiber): Competition for Supremacy in Lightweight Materials

- **Strategic significance:** Carbon composites are considered a decisive underlying technology that extends the endurance and range of aircraft and missiles.
- **Structural vulnerability:** While Japan remains strong in aerospace-oriented high-end applications, it reportedly faces intense competition from other countries in general-purpose areas such as wind power (large-tow carbon fiber).[16] As the history of materials industries suggests, those who dominate general-purpose markets tend to lead technological innovation (disruptive innovation), raising concerns that Japan's advantage in high-end markets could also erode.

5. Policy Directions for Sustaining Strategic Supply Chains: Anchor Tenancy and a Proactive Strategy

To make economic security effective, it may be necessary to complement approaches that rely solely on conventional market principles by establishing a policy framework through which the government proactively maintains and strengthens supply capabilities in terms of quantity, quality, and continuity.

5.1 Considering a "Japan-Style Anchor Tenancy" to Ensure Demand Predictability

- **Complementing market principles and improving the investment environment:** To secure the stable supply of critical materials, it may be effective for the government to function as an anchor tenant, thereby enhancing predictability for companies.[17] Specifically, it would be desirable to develop an environment in which companies can undertake capital investment and human resource development from a long-term perspective through measures such as multi-year procurement contracts that extend beyond single-year budget cycles and guarantees of minimum purchase volumes.
- **Appropriate evaluation of security-related costs:** The costs incurred in maintaining resilient domestic supply chains, including the use of domestically sourced materials, could be assessed as a "security premium," and the introduction of mechanisms to appropriately pass these costs on to

procurement prices may merit consideration.[18] This may help design incentives enabling companies to select reliable supply sources without undermining economic rationality.

5.2 Building Up Technological Openness and Proactive Interdependence

- **Alignment with international standards and ensuring substitutability:** To avoid excessive dependence (lock-in) on specific companies or technologies, it is important to promote conformity with international standards and open architecture such as a Modular Open Systems Approach (MOSA).[19] This would enable flexible system upgrades, enhance interoperability with Japan's ally and other partners, and facilitate alternative procurement (second sourcing) in contingencies.
- **Achieving strategic indispensability centered on advanced processing technologies:** Beyond strengthening defensive supply-chain resilience, consideration should also be given to a proactive strategy that leverages Japan's strengths in advanced processing technologies. Specifically, this approach involves applying Japan's distinctive precision processing and specialized treatments to general-purpose base materials to create high-function intermediate goods that are difficult for other countries to replicate, positioning them as choke points within global supply chains. By supplying such high-value-added products to the equipment and critical infrastructure of Japan's ally and other partners through standardized interfaces, it is expected that both the sustainability of Japan's industrial base and its strategic indispensability within the international community can be secured.[20]

5.3 Resetting the Industrial Structure: Vertical Integration and Reorganization

- **Promoting "prime integration" of materials and component manufacturers:** Despite possessing advanced technologies, materials and component manufacturers (Tier 2 and below) often lack the financial and political capabilities to operate independently and have consequently become targets for acquisition by foreign capital,[21] indicating a need for corrective measures. The Japanese government should consider establishing legal and financial frameworks to integrate such companies possessing critical technologies under the umbrella of core defense companies (system integrators, etc.) through vertical integration. By fully incorporating materials capabilities into system-level structures, this approach would help stabilize business foundations while centralizing technology management under the stringent security standards of prime companies.
- **Buying back "national interests" that have flowed overseas:** For critical technologies and production bases already under foreign capital influence, the time has come to consider a state-led capital buy-back rather than remaining passive observers. For example, public funds, including those of the Japan Investment Corporation (JIC) and the Development Bank of Japan (DBJ), could be utilized to repurchase foreign-held shares and subsequently transfer and integrate them into domestic prime companies and the like. Through such measures, distorted ownership structures

could be "reset," enabling a fresh start as wholly domestic supply chains, which should be positioned as a national security priority.

6. Conclusion

Once the supply chains for foundational dual-use technologies are lost, rebuilding them would require enormous time and cost. In particular, the advanced technologies of Japan's world-class materials manufacturers are not readily replaceable. While increasing dependence on overseas suppliers for general-purpose products may offer short-term cost advantages, it risks depriving domestic companies of their "bread and butter" and causing a "quiet contingency" eroding national autonomy over the medium to long term. Positioning general-purpose products as a core policy target in terms of supply capacity, guaranteeing markets through anchor tenancy, and decisively resetting the industrial base via vertical integration into core companies together represent an effective path toward simultaneously strengthening Japan's industrial competitiveness and national security.

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2 Building a National C-UAS (Counter-Drone) Strategy for Hybrid Warfare

Establishing Unified Standards Across Government Bodies and Creating an Integrated Real-Environment Evaluation Framework to Ensure Effectiveness

1. Introduction: The Drone Threat in Hybrid Warfare and the Limits of Vertical Bureaucratic Silos

(1) Nature of the Threat: The Disappearance of Boundaries Between Peacetime and Contingencies

In today's security environment, attacks using drones (UAVs) have become a core means of hybrid warfare, seamlessly linking intrusions into critical facilities during peacetime with asymmetric attacks during contingencies.[1,2] Attackers deliberately blur the boundary between military sabotage and socially disruptive acts (terrorism), adopting tactics that exploit institutional gaps (the so-called "gray zone") between defense and law-enforcement authorities.[3]

(2) Japan's Structural Vulnerabilities

At present, Japan's response framework is based on a division of roles in which the Ministry of Defense (MOD) protects "defense facilities," while the police and the Japan Coast Guard safeguard "critical infrastructure, etc."[4] However, drone attacks can unfold within seconds to minutes. Existing processes, such as police responding after receiving a report or the process of transitioning from police authority to exercising the right of self-defense, have difficulty keeping pace with attacks that progress on a second-by-second tempo. As a result, there is a high risk that areas surrounding critical infrastructure could become "defensive gaps."[5] To bridge these time-based and organizational gaps, it is essential to formulate unified national response standards, rather than fragmented responses by individual government bodies.

2. Pillars of the Solution: Establishing National Unified Standards Across Government Bodies

To overcome the divide between defense and public security, unified standards and operational procedures for C-UAS should be developed to create an environment in which frontline personnel can respond without hesitation.

(1) Standardization of Response Criteria

National unified standards should be established for drone detection, identification, and neutralization (e.g., jamming) that can be commonly referenced by the MOD, the police, and critical infrastructure operators. In the latest U.S. Department of Defense (DoD) strategy, there is emphasis on the integration of the technological base and the strengthening of cross-agency coordination.[6]

- **Standardizing threat levels:** Standardization of the criteria used to determine what types of behavior constitute an "attack."
- **Ensuring interoperability:** Standardization of data formats and communication protocols so that information obtained by police sensors can be immediately shared with the Self-Defense Forces (SDF) and infrastructure operators. It would be desirable to achieve alignment with international standards, including NATO's C-UAS interoperability framework SAPIENT.[7]

(2) Granting Authority Through Certification

The Japanese government should grant official certification to equipment that meets unified standards and whose safety in surrounding environments has been verified. For example, the EU's COURAGEOUS project has established unified testing scenarios for airports and critical infrastructure, thereby creating objective criteria for equipment selection.[8,9] Going a step further with this way of thinking, it may be necessary to design a system limited to certified equipment and that legally permits critical infrastructure operators who have undergone specified training to undertake self-defense measures (such as jamming) without waiting for the police to arrive (including through special provisions under the Radio Act). This would enable an on-site immediate response capability.

3. Top Priority: Establishing an "Integrated Real-Environment Test and Evaluation (T&E) Framework"

To ensure the effectiveness of the aforementioned unified standards and certification system, it is urgent and imperative to establish a supporting test site (testbed). Rather than being merely a testing facility, this would be a core national capability required to address hybrid warfare.

(1) Why a Test Site Is Essential

- **Scientific verification of safety (overcoming regulatory constraints):** Countermeasures such as jamming carry the risk of interfering with surrounding cellular networks and aviation radio communications. To comply with existing legal regulations (such as the Radio Act), it is necessary to emit radio waves in real-world environments and demonstrate through empirical data that output levels do not interfere with nearby infrastructure.[10] The test site serves as the venue for this "proof of safety."
- **Overcoming the limits of "catalog specifications" and ensuring operational effectiveness:** There are cases of even equipment considered to offer a 99% detection rate under static peacetime testing that fail in real environments with wind gusts caused by buildings in urban areas, rainfall, and reflection effects caused by complex terrain. According to a report from the RAND Corporation in the United States, equipment that has not undergone T&E under complex operational conditions is highly likely to reveal vulnerabilities in real-world operations, including urban environments.[11]

(2) Functions Required of the Test Site

- **Certification authority function:** Possess the authority to assess compliance with unified standards and grant operational approval.
- **Permanent red team (adversary simulation):** In addition to the SDF, invite private-sector and international experts with advanced commercial technologies and swarm-control capabilities to serve as an "attacking force" (red team), thereby constantly training defenders against the latest threats.[12]
- **Open architecture for public-private use:** Rather than restricting the test site to military use, provide an environment accessible to private companies to foster domestic technological development and accelerate implementation.

4. International Trends: The World Is Moving Toward Integration and Validation

Countries around the world are positioning C-UAS as a central pillar in addressing hybrid warfare and are rapidly advancing the development of standards and the establishment of test sites.

- **United States (collaboration with the private sector):** Centered on the Department of Homeland Security (DHS), testing and evaluation of C-UAS technologies are being advanced in collaboration with universities and private companies. In particular, the Transportation Security Administration (TSA) is conducting technology evaluations at airports and other sites through its test bed program, while the DHS Science and Technology Directorate (S&T) is also evaluation C-UAS technologies in real-world environments.[10]
- **European Union (development of unified standards):** As noted above, the COURAGEOUS project is working to establish C-UAS evaluation criteria (a common benchmark) for law enforcement and airports.[8]
- **Belgium (permanent test hub):** At DronePort, a permanent validation environment has been created in coordination with the civil drone traffic management company SkeyDrone, forming an ecosystem that includes participation from private companies.[13]
- **Republic of Korea (national testbed):** In response to the North Korean threat, the Uiseong Drone Flight Test Center has been designated as a national counter-drone training site, enabling evaluation and demonstration to be completed domestically.[14]

5. Conclusion and Recommendations

To protect Japan's critical infrastructure from the threats posed by hybrid warfare, it is necessary to move beyond the current state of "legal non-armament." To this end, the following measures are strongly recommended:

1. **Establishment of a task force across government bodies:** The MOD; National Police Agency; Ministry of Internal Affairs and Communications; Ministry of Land, Infrastructure, Transport and Tourism; and other relevant bodies should collaborate to develop national unified standards and operational guidelines for C-UAS.
2. **Early establishment of a nationally designated C-UAS test site:** A dedicated facility should be created to validate domestic and international technologies in real-world environments and to certify their safety and performance.
3. **Strengthening cooperation with the private sector and Japan's ally:** Avoiding insular, self-reliant approaches, Japan should build an open-innovation framework that rapidly incorporates private-sector technological advances while ensuring compatibility with U.S. and NATO standards. The establishment of both standards and test sites represents the only viable path to closing defensive gaps and enhancing national resilience.

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3 Equipment Transfers and Multidimensional International Cooperation

Strengthening the Industrial Base as a National Strategy and Fundamental Reform of Implementation Systems

1. Introduction: The Positioning of Equipment Transfer in the National Defense Strategy

In the National Security Strategy[1] formulated in 2022, defense equipment transfer can be seen as having shifted from a passive positioning framed as a contribution to peace to an active policy instrument aimed at deterring unilateral attempts to change the status quo by force and creating a desirable security environment. For Japan's defense industry,[2] which faces the challenge of a limited domestic market, international business development through equipment transfer (exports) and MRO (maintenance, repair, and operations) is indispensable for transforming the industry into a sustainable pillar of national infrastructure. Strengthening cooperation with like-minded countries not only contributes to enhancing supply chain resilience but also holds the potential to solidify Japan's presence in the international community. This section proposes concrete measures to enhance the effectiveness of equipment transfer from three perspectives: regulation, organizational structure, and public–private collaboration.

2. Evolution of the Regulatory Framework and Harmonization of Practice

2.1 Revision of the Three Principles and Clarification of Their Implementation

From December 2023 to March 2024, the Japanese government revised the Three Principles on Transfer of Defense Equipment and Technology and their Implementation Guidelines, thereby permitting third-country transfer of internationally co-developed equipment (GCAP, etc.) as well as the transfer of licensed products to the original licensor country.[3] In addition, the review of the definition of "parts," which in principle allows their transfer to countries with which Japan maintains security cooperation relationships, is expected to serve as an important foothold for Japanese companies seeking to participate in global supply chains (GSC).

2.2 Optimization of Practical Use of the Foreign Exchange and Foreign Trade Act and Ensuring Predictability

Meanwhile, challenges appear to remain at the operational level. Equipment transfer falls under export controls pursuant to the Foreign Exchange and Foreign Trade Act, and the traditional screening process is stringent, with some pointing out that it undermines predictability for companies.[4] While strict controls to prevent technology leakage from the perspective of economic security must be maintained, it may be desirable to simplify and expedite (fast track) practical procedures—such as through the use of comprehensive licenses and shorter screening periods—for projects involving cooperating countries that were newly permitted under the revised Three Principles. Bridging the gap between policy-level liberalization and on-the-ground regulatory implementation will be key to stimulating industry investment incentives.

3. Fundamental Strengthening of the Promotion Framework: Organizational Upgrading

3.1 Elevating the "International Cooperation Division" to an "International Cooperation Department"

The success of equipment transfer is said to depend not only on corporate efforts but also on a government-to-government (G-to-G) approach in which the government itself takes the lead in trade promotion and negotiations.[5] However, the current gateway for international cooperation within the ATLA is the International Cooperation Division under the Department of Equipment Policy. When dealing with foreign countries represented by director-general or department-head level officials, this structure may suffer from a structural lack of authority and resources as an effective counterpart. Accordingly, in order to address the growing number of international joint development and equipment transfer projects, it is expected that consideration will be given to dissolving and upgrading the current International Cooperation Division into either an independent International Equipment Cooperation Department (provisional name) or an International Equipment Cooperation Bureau reporting directly to the Commissioner. Such a reorganization would aim to accelerate decision-making and strengthen external negotiating capacity, requiring establishment of a system capable of sustained engagement with partner governments.

3.2 Establishment of an International Business Promotion Project Management Office (PMO) and Laying the Groundwork for "Japanese-Style Foreign Military Sales" (FMS)

Alongside organizational upgrading, establishing an International Business Promotion PMO to provide centralized support for individual transfer projects would be an effective measure.[6] While centered on ATLA, this PMO should ideally function as an "All-Japan" task force incorporating secondees from the Ministry of Economy, Trade and Industry (for industrial policy), the Ministry of Foreign Affairs (for diplomacy), and the Ministry of Finance (for finance). Looking further ahead, and with a view to developing a system similar to the United States' FMS—in which the Japanese government would act as the contracting party and guarantee quality and performance in "Japanese-style FMS"—the PMO would be expected to play an interim role in coordinating risk-sharing between the public and private sectors.

4. Multidimensional International Cooperation and Leveraging Trading Company Functions

4.1 Integration Functions of General Trading Companies

Japanese defense manufacturers often lack practical experience in overseas market development and the execution of offset agreements (countertrade).[7] In this context, the key to effective utilization may lie in the functions of the general trading company, a business model unique to Japan. The global information networks, logistics capabilities, and financial functions held by trading companies (including cooperation with the Japan Bank for International Cooperation (JBIC) and Nippon Export and Investment Insurance (NEXI)) are said to possess the potential to dramatically enhance both the project formation capability and

sustainability of equipment transfer initiatives. For trading companies that remain cautious about participation due to reputational risk, it will be important to design incentives that appropriately recognize their contribution to national security. At the same time, there is a need to establish flexible schemes to incorporate their expertise into government structures, including by inviting specialized personnel from trading companies to the aforementioned PMO or the proposed International Equipment Cooperation Department through personnel exchanges.

4.2 Financial Support under the Act on Enhancing Defense Production and Technology Bases

It is desirable to expand subsidies—utilizing funds such as those established under the Act on Enhancing Defense Production and Technology Bases—to cover design costs arising from specification changes and expenses associated with obtaining partner-country-specific certifications.[8] By providing national government support for these initial costs, which often constitute a "valley of death" for companies, Japan can encourage entry into international markets. This would consequently promote a virtuous cycle in which such efforts feed back into the maintenance and strengthening of the domestic production and technological base (spin-on effects), becoming a path that serves the national interest.

5. Conclusion

Equipment transfer can be regarded as a strategic instrument that goes beyond the business of individual companies, serving to strengthen national alliance networks and contribute to peace. To achieve this objective, it is urgently needed not only to optimize regulatory frameworks but also to fundamentally reinforce implementation structures—including upgrading the present organization within the ATLA to an "International Equipment Cooperation Department"—and to establish a public-private comprehensive collaborative framework that leverages the functions of trading companies.

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4 Modernization of Defense Procurement

1. Introduction

In recent years, the rapid transformation of the security environment has led to increasingly sophisticated and complex technical requirements for defense equipment. Unlike the hardware-centric equipment architectures of the past, modern defense systems are now extremely dependent on software, and their relative superiority has a direct impact on operational capability. Against this backdrop, cyber risks that cannot be fully addressed through traditional border-based security measures are growing, making the introduction of a Risk Management Framework (RMF) (based on U.S. NIST standards)[1] an indispensable prerequisite for ensuring the reliability of defense equipment through lifecycle-wide risk management. Japan has amended the Ministry of Defense Directive on Information Assurance in FY2023, applying RMF across the entire lifecycle of MOD and SDF information systems.

Moreover, in an increasing number of fields, the pace of advancement in civilian technologies is surpassing that of defense technologies, making the incorporation of advanced technologies such as AI and drone systems an urgent priority. As a result, rather than being limited to traditional defense prime contractors, participation by startups possessing outstanding technologies is now seen as playing a critical role in enhancing equipment capabilities.

Furthermore, as international cooperation and joint development of equipment gain importance, ensuring interoperability with Japan's ally the United States as well as safeguarding supply-chain security have emerged as a key challenge. In particular, responding to the Cybersecurity Maturity Model Certification (CMMC),[2] which the U.S. DoD is advancing to ensure the security integrity of the entire supply chain, is a necessary measure for Japan's defense industry to gain international trust and establish itself as a credible partner in joint development and other activities with the United States and other countries.

In light of this background, this section explains the modernization of the procurement system from the following perspectives: security assurance through RMF, flexibility in technology introduction enabled by the Modular Open Systems Approach (MOSA), contract systems that harness the dynamism of startups, and adaptation to the CMMC.

2. Expanding the Application of RMF and Ensuring Transparency through a Software Bill of Materials (SBOM)

As equipment becomes increasingly software-driven, the first item on the agenda in modernizing the procurement system should be a fundamental review of the security evaluation process itself. While the application of RMF is currently being advanced in the MOD and SDF information system, it is necessary to establish RMF not merely as a matter of regulatory compliance but as a dynamic process that continuously identifies and remedies system vulnerabilities.

Accordingly, in order to make RMF effective in practice, the development of an SBOM represents a useful measure. In fact, supply chain risk management is also emphasized in NIST SP 800-53 Rev.5, and

NIST's SBOM-related guidance indicates that the development and utilization of SBOMs contribute to improving vulnerability response and strengthening supply chain management.[3]

As an example of the benefits of SBOM introduction, when cybersecurity vulnerabilities such as Log4j[4] were discovered in December 2021 and became a global issue, companies that had implemented SBOMs were reportedly able to identify the scope of impact at an early stage and take appropriate remedial measures. In addition, developments such as Europe's Cyber Resilience Act[5] suggest that SBOM adoption is becoming a qualification requirement for participation in international supply chains.[6] Incorporating SBOMs as a standard requirement within Japan's procurement system[7] could therefore contribute to enhancing both the safety of equipment and international competitiveness.

3. Leveraging MOSA to Maintain Technological Flexibility

In order to rapidly and flexibly incorporate innovative technologies possessed by startups and others into defense equipment, it is necessary to also reconsider the nature of system architecture itself. In this context, the design concept known as the Modular Open Systems Approach (MOSA), promoted by the U.S. DoD, is of particular importance.[8]

MOSA standardizes interfaces between modules, thereby preventing lock-in to specific companies and facilitating partial upgrades of equipment. Such developments are not limited to the United States. Within NATO, similar concepts have been formalized through standards such as NVGA for land systems[9] and ECOA in the aviation domain, contributing to the growing adoption of "plug-and-play" functionality that enables systems from different companies to be connected and made operational immediately.

However, in order to realize this "plug-and-play" capability, it is not sufficient that interfaces simply connect; it is a fundamental prerequisite that the modules being connected are secure. NATO maintains a rigorous security certification process similar to the U.S. RMF (including directives such as AC/35), under which all modules connected to networks are apparently expected to comply with common security standards. In this sense, conformity with RMF-equivalent standards can be said to function as a kind of "passport" for participation in plug-and-play networks.

Examples of systems already developed as of now include the following.

(1) Sky Sabre – United Kingdom

Overview: The latest medium-range air defense system deployed by the British Army.[10]

Features: The three core components are all produced by manufacturers from different countries but are integrated through an open architecture.

Radar: Giraffe, produced by Saab (Sweden)

Command system: MIC4AD, produced by Rafael (Israel)

Missiles: CAMM, produced by MBDA (Europe)

These components are modularized, allowing the system to be designed so that any single element can be easily replaced with a next-generation version in the future.

(2) IRIS-T SLM – Germany

Overview: An air defense system developed by Germany that has reportedly demonstrated operational effectiveness, including in support to Ukraine.[11]

Features: The system explicitly emphasizes a modular design and open systems architecture, enabling flexible configuration in accordance with customer requirements, such as combining third-party company radars (e.g., Australia's CEAFAR or Germany's HENSOLDT) and command systems.

In addition, the adoption of MOSA can also contribute to improving the operational efficiency of RMF. As noted earlier, RMF entails continuous monitoring of security, identification of system vulnerabilities, and implementation of corrective measures. In this process, it may be necessary to replace a portion of the system (modules, etc.). In particular, in conventional architectures where individual components are strongly integrated with the overall system, even partial changes require extensive verification of their impact on other parts, which can impose a significant burden in terms of reassessment and reconfirmation of RMF certification. In this regard, if MOSA standardizes interfaces between components and localizes the scope of change impacts, it can be expected to help reduce the time and cost associated with RMF implementation. Given that the MOD and SDF have already introduced RMF to its information system, the significance of MOSA is by no means negligible from this perspective as well.

By contrast, when open architectures such as MOSA are applied and modules have obtained prior security certification, recertification procedures can in some cases be simplified. Also from the standpoint of accelerating procurement and optimizing costs, the adoption of international architectural frameworks such as MOSA and NATO standards may therefore be regarded as an approach worthy of consideration.

4. Flexible Contract Systems to Promote Startup Participation (Consideration of a Japanese-Style OTA) and the Process of Technology Integration

As noted above, the technological capabilities of startups have become indispensable to the advancement of defense equipment. However, it cannot be denied that conventional procurement processes and contract systems, which are rigid and cumbersome, have functioned as barriers to entry for such emerging firms. In our current era marked by rapid technological obsolescence, lengthy contracting procedures risk diminishing the value of the technologies themselves.

To rapidly incorporate the new capabilities held by startups, particularly advanced technologies such as AI and drones, into existing equipment architectures, it is critically important to enable "retrofit" and "partial upgrade" approaches to existing equipment. The technical enabler for this is MOSA, as discussed in the previous section. By adopting MOSA, startups can enter the defense industry at the level of specific modules (functions) in which they possess strengths, without having to develop an entire system.

Nevertheless, interface compatibility alone is insufficient for operational deployment as actual defense equipment. What is essential is a sequence of procedures involving the application of an SBOM,

the acquisition of formal security certification, and integration into existing systems already governed by the RMF. Only when startup technologies achieve transparency through SBOM, undergo appropriate security certification, and are safely incorporated into the dynamic risk-management loop of RMF—and when this technical and institutional pathway is clearly established—can such technologies evolve beyond "laboratory demonstrations" into deployable equipment capabilities.

Accordingly, the modernization of procurement systems requires flexible contract mechanisms that do not hinder this process of technological integration. In the United States, flexible contracting authorities known as Other Transaction Authority (OTA) have been utilized, enabling emerging defense companies such as Palantir, Anduril Industries, and Shield AI to grow through rapid prototyping and repeated experimentation.[12] In Japan as well, drawing on these examples, there remains scope for deeper discussion on introducing contractual schemes that enable more agile experimentation and smoother integration into RMF environments—in other words, a mechanism akin to a "Japanese-style OTA."

5. International Deployment Leveraging RMF Achievements and CMMC as an "Engine"

In discussing the modernization of procurement systems, alignment with international standards is an unavoidable element. In particular, for Japan's defense industry to participate in the U.S. defense supply chain and advance joint development smoothly, responding to the CMMC being introduced by the U.S. DoD carries critical importance.

What merits particular attention here is the fact that Japan has already introduced RMF in MOD and SDF information system.[13] The control measures applied under RMF (NIST SP 800-53) cover a broader scope and are more comprehensive than those underpinning NIST SP 800-171, which is referenced in the CMCC standards.[14]

In other words, Japan's defense-related companies can be said to already possess the technological capabilities and processes necessary to develop and manufacture advanced products conforming to RMF. Given that these firms can meet the more demanding SP 800-53 standards, adapting to CMMC, which corresponds to a subset of those requirements (SP 800-171), should not constitute an insurmountable barrier.

Going forward, the focus will be on how to extend the advanced security management know-how developed for RMF-compliant products to corporate internal networks (office automation (OA) environments). If this internal application can be realized, Japanese companies will move closer to a globally competitive "full-spectrum security posture," characterized by robust RMF-compliant products and organizational environments safeguarded through CMMC.

The establishment of such a framework would not merely represent compliance with U.S. standards but could serve as a powerful engine accelerating collaboration with overseas companies. Prime contractors in Europe and the United States are most concerned about technology leakage from partners in joint development, and obtaining CMMC functions as a "passport of trust" that can alleviate such concerns.[15] As

a result, it is expected that Japanese companies reduce the burden of security audits and participate more easily not as subcontractors but as "technology partners" in U.S. defense supply chains and international joint development projects involving U.S. and European companies.

By strategically leveraging these achievements, Japan could also secure a leading position in negotiations toward CMMC reciprocity. Harnessing the existing strength represented by RMF as leverage and reframing adaptation to CMMC from a mere compliance cost into a source of international competitiveness is precisely the perspective required for contemporary procurement systems.

6. Conclusion

The series of measures outlined in this paper, including dynamic security assurance through RMF and SBOM, flexibility in technology adoption enabled by MOSA, new contract systems that incorporate the dynamism of startups, and adaptation to CMMC, should not be regarded as independent challenges but rather as representing the reconstruction of a mutually reinforcing "procurement ecosystem."

In particular, translating disruptive innovations such as AI and drones possessed by startups and the like, from mere experiments into tangible defense capabilities requires a dual approach encompassing both technology and systems. In this regard, new technologies introduced through MOSA as an entry point are made transparent through SBOM, undergo appropriate security certification, and are safely incorporated within the robust protective framework of RMF. Once this coherent process is established, flexible contract systems (such as a Japanese-style OTA) that incorporate advanced technologies from startups and others will be able to demonstrate their full value.

In addition, the development of such a domestic foundation carries significant implications from an international perspective. Building on Japan's achievements with recent RMF introduction and extending them horizontally to corporate organizational management through CMMC has the potential to serve as a powerful engine enabling Japan's defense industry to move beyond a mere subcontractor role and establish itself as an equal technology partner alongside Western countries.

As procurement shifts from the hardware focus of the past toward modern equipment architectures in which software and data constitute the core sources of value, systems themselves also require agile transformation. Advancing these initiatives in an integrated manner and fostering close public–private collaboration to build an internationally competitive procurement foundation will ultimately contribute to strengthening Japan's long-term security and technological base.

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5 Optimization of Defense-Industrial Organizations and the Promotion of Restructuring and Integration

The Limits of the Conglomerate Model and the Shift Toward "Autonomous Business"

1. Introduction

Since the revision of the National Security Strategy in 2022, Japan's defense industry has benefited from favorable tailwinds such as increased defense spending and the enactment of the Act on Enhancing Defense Production and Technology Bases.[1] Defense business, once derided as "unprofitable divisions" or a "burden," is now being reassessed as a key pillar of corporate earnings. However, behind this apparent improvement in the earnings environment, the industrial base itself is confronting structural limitations that cannot be adequately addressed by conventional business models. This section analyzes the dilemmas faced by conglomerates, including Japan's comprehensive electronics and heavy-industry manufacturers, that have long dominated the country's defense industry. It argues for the necessity of organizational restructuring, including spin-offs, joint ventures (JVs), and integration, in order to overcome challenges such as responding to geopolitical risks, hollowing-out of human resources, and improving investment efficiency.

2. The "Three Structural Crises" of the Conglomerate Model

Whereas Western defense industries are primarily centered on specialized "pure-play" manufacturers, Japan's defense industry has persisted in the form of divisions within conglomerates whose core focuses lie in civilian businesses.[2] While this structure has offered advantages such as technological spillover effects

(spin-off and spin-on effects), under the current security environment it is exacerbating the following three crises.

2.1 Geopolitical Risk and the Suppression of Growth Ambitions (Keeping a "Low Profile")

Even if the profitability of defense business improves, management decisions for conglomerates as a whole do not necessarily shift to defense. For companies globally engaged in civilian business, expansion of defense business can expose them to risks such as economic statecraft from specific countries or retaliatory measures affecting their supply chains.[3] In particular, the policy announced by China's Ministry of Commerce on January 6, 2026 to strengthen export controls toward Japan could seriously affect the business in China of civilian divisions. In addition, ESG-driven divestment trends that avoid defense-related investments constitute a non-negligible pressure for publicly listed firms that prioritize shareholder value.[4] As a result, management is often compelled to adopt a deliberate "low-profile" strategy for defense business. This, in turn, structurally constrains proactive growth investments, including overseas exports and the technological transfer of capabilities to offensive weapons.

2.2 The "Gap Period" and the Collapse of the Human Resource Base Due to Wage Structures

The prolonged period of declining procurement, which can be referred to as a "gap period," has led to a pronounced shortage of experienced personnel who should form the operational core of the defense industry, raising concerns about a disruption in the transfer of technical expertise.[5] An even more serious issue is the rigid wage structure. As long as defense divisions remain within conglomerates, their wage systems are frequently bound by company-wide salary regulations. Specialized personnel responsible for cybersecurity, AI, and advanced systems integration are being actively recruited by foreign consulting firms and the IT sector with better compensation packages, making it difficult to attract and retain top talent under existing pay scales.[6] Preferential treatment for mid-career hires also risks friction with long-serving employees hired as fresh college graduates,[7] and talent management within organizations is increasingly reaching its limits.

2.3 Overlapping Investment and Lost Economies of Scale

As defense equipment becomes increasingly sophisticated and complex, there is a large investment burden associated with specialized technologies and facilities, including testing equipment and production lines. However, within a structure where multiple companies share a limited domestic demand, each company tends to undertake overlapping capital investments, significantly reducing overall investment efficiency across the industry.[8] While supply-chain resilience (ensuring redundancy) for security purposes is essential, excessive fragmentation generates "lost economies of scale." Unless a clear distinction is made between competitive and cooperative domains (such as shared testing facilities and standardized infrastructure) and investment resources are optimally allocated, it will be difficult to develop products with international competitiveness.

3. Directions for Organizational Restructuring to Overcome the "Crises"

The challenges outlined above stem not merely from insufficient budgets but from dysfunction within the conglomerate model itself. Accordingly, the solution lies in transforming organizational structures—namely through restructuring and integration.

3.1 Risk Isolation and Institutional Reform Through Carve-Outs

When the risks associated with defense business exceed the risk tolerance of a conglomerate, legally separating the defense division through a carve-out becomes an effective option. First, this enables the isolation of geopolitical risk (a firewall). By establishing defense business as a separate legal entity, spillover risks to the parent company's civilian businesses (such as reputational damage or sanctions exposure) can be structurally contained, allowing for autonomous investment decision-making as a dedicated defense enterprise. Second, it facilitates the reform of personnel systems. Independence from the parent company's wage structure makes it easier to introduce flexible, market-based compensation schemes and allowances, such as those for personnel holding security clearances.[9] Such reforms are essential for creating a competitive environment comparable to that of the U.S. defense industry, where engineers are treated well with highly competitive remuneration.

3.2 Project-Based JVs and Business Integration

To address shortages in both human resources and capital, inter-firm collaboration is indispensable.

- **Function-based JVs (consortia):** In areas such as the development of specific equipment or maintenance, repair, and overhaul (MRO), establishing JVs that pool engineers and project managers from multiple companies can help compensate for talent shortages while preventing the fragmentation of expertise.
- **Pursuing scale through business integration:** As demonstrated by the European example of MBDA in missile systems,[10] integration that transcends corporate and national boundaries can expand business scale, enabling the mobilization of R&D funding and securing price competitiveness in global markets.

4. A Policy Package to Facilitate Industrial Restructuring

To support corporate restructuring efforts, the Japanese government should strengthen the following policy measures.

1. **Investment in human capital and incentive design:** Based on the Act on Enhancing Defense Production and Technology Bases, fiscal support should be expanded for workforce development, the transfer of technical expertise, and the establishment of security frameworks associated with restructuring. In particular, additional measures, such as tax incentives and higher subsidy rates,

should be taken for companies that consolidate facilities through integration.

2. **Seamless business succession:** Special measures should be introduced to ensure that in cases of carve-outs or business transfers, manufacturing licenses for equipment, ISO certifications, security clearances, and the like are transferred to the new entity without any "gap period." Operational disruptions caused by the need to reacquire certifications are among the most significant factors discouraging firms from pursuing restructuring decisions.
3. **Utilization of the government-owned, contractor-operated (GOCO) model:** For large-scale testing facilities and specialized production lines with high maintenance costs, the GOCO model, under which the government retains ownership while private firms operate the facilities, should be adopted to reduce companies' fixed-cost risks.[11]

5. Conclusion: Shift From "Obligation" to "Business"

The challenges facing Japan's defense industry stem from a mismatch between the defensive structure of conglomerates and a rapidly changing security environment. Organizational restructuring, such as carve-outs and integration, is not merely a cost-cutting measure. Rather, it constitutes structural reform aimed at transforming defense business from divisions constrained by the parent company's sensitivities into business units that assume risk and pursue autonomous growth. Only when appropriate government-led framework development aligns with decisive corporate management decisions will Japan's defense industrial base be able to achieve sustainable strength.

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Conclusion

Toward the Transformation of Japan's Defense Industry into Autonomous "National Infrastructure"

This paper has examined the historic turning point confronting Japan's defense industry and its structural challenges from multiple perspectives, including supply chains, responses to hybrid warfare, international expansion, procurement modernization, and the nature of industrial organization. What emerges from this series of discussions is the need to redefine Japan's defense industry from being positioned merely as a "contract equipment manufacturer" to serving as an indispensable pillar of national infrastructure that protects the lives and property of the Japanese people.

As discussed in Section 1, the securing of foundational dual-use technologies, together with the response to drone threats examined in Section 2, suggests that in our modern era where the boundary between peacetime and contingency is increasingly blurred, the resilience of the industrial base directly translates into national deterrence capability. Moreover, as noted in Section 3 on international expansion and Section 4 on procurement modernization, adaptation to global standards and the incorporation of startup technologies encourage a departure from a closed, self-reliant approach and may serve as a key to enabling Japanese industry to rejoin global currents of innovation.

Furthermore, the organizational restructuring of conglomerates proposed in Section 5 can be seen as a painful yet unavoidable reform necessary to transform defense business from having a defensive approach into autonomously growing business.

The resolution of these wide-ranging challenges will not be achieved overnight. However, when institutional catalysts provided by the government, such as anchor tenancy and testbeds, align with managerial decisions by industry involving both organizational restructuring and risk-taking, it may become possible for the first time to build an autonomous and sustainable defense production and technology base.

The increasingly severe security environment, including the situation in Ukraine, appears to afford us little time for delay. It is hoped that the proposals presented in this paper will deepen public-private dialogue and help Japan's defense industry establish "structural autonomy," thereby contributing to its transformation into a trusted partner that supports peace and stability in the international community.

Part I

Megatrends in the Defense Industry

Chapter 2

A Comparison of Allied National Defense Industrial Strategies

Chris Michienzi

The United States (U.S.) and many of its closest allies and partners – namely the European Union (EU), Japan, and Australia – have recently developed national defense industrial strategies.[1,2,3,4]

There are many similarities and common themes within these strategies, including:

- Response to geopolitical urgency
- Technological focus
- Supply chain resilience
- Alliance integration

However, there are also some key differences between these strategies, including:

- Scale and reach
- Historical/political constraints
- Self-sufficiency vs. interdependence

1 U.S.

For the U.S. National Defense Industrial Strategy (NDIS), the main focus areas are:

- Resilient supply chains
- Workforce readiness
- Flexible acquisition – new acquisition transformation
- Economic deterrence

For resilient supply chains, there are multiple sub-categories, including engaging with partners and allies to expand global defense production and increase supply chain resilience.

The U.S. also likes to use the term "Production Diplomacy",[5] referring to multilateral collaboration

lessons from the response in the wake of Russia's unprovoked aggression towards Ukraine. The U.S. led the international community to rally to Ukraine's defense, organizing recurring engagements of the heads of ministries of defense, through the Ukraine Defense Contact Group (UDCG),[6] and of the National Armaments Directors[7] to coordinate support efforts. These engagements have jump-started initiatives to expand ammunition production, establish an international support fund, and organize the delivery and sustainment of critical capabilities.

There are opportunities to similarly convene the leadership of allied and partner nations within the Indo-Pacific, through efforts such as Partnership for Indo-Pacific Industrial Resilience (PIPIR),[8] and to deepen multilateral collaboration on regional industrial base and manufacturing production challenges. Rather than wait for emergency circumstances, investing in these relationships now will yield fruit, should we collectively face a crisis in coming years.

The U.S. must also strengthen international defense production relationships by working with allies and partners through both multilateral and bilateral agreements to boost defense production, innovation, and overall capability.

Lastly, the U.S. needs to build production strengths via multiple international collaboration mechanisms by:

- Aggregating and amplifying demand signals for common munitions and weapons systems
- Minimizing customized solutions where appropriate and standardizing exportability
- Investing in materiel solutions ahead of foreign demand
- Licensing production of U.S. systems
- Expanding foreign defense company production in the U.S.
- Placing an emphasis on interoperability, interchangeability, and material standardization, thereby making all the defense industrial bases mutually reinforcing

Fundamentally, the U.S. views partner and ally collaboration this way: it is important for the U.S. to have the capability to produce its own weapons and platforms; however, the U.S. has never had and will never have a completely domestic industrial base — it can't, and it shouldn't.[9] For certain key critical capabilities, it is necessary for there to be domestic supply, but that is not the case for everything, and in fact there are many situations where this is not the case, such as:

- The U.S. Department of War's (DoW) demand, while large compared to some other countries, is still not enough to sustain even a single supplier for some capabilities.
    - Example: Chemicals production for munitions – most chemical manufacturers in the U.S. cannot make a business case to produce such small quantities, so it's helpful if we can find a supplier in an allied or partner nation that is producing for multiple customers, so the total quantities make that business sustainable.

- There may be better technologies in partner and allied nations that would provide us with better capabilities for our warfighters, so we would be remiss in not taking advantage of that.
- It may be advantageous from a logistics perspective to have production capability near/in theater.


Dr. Michienzi

There are four main ways for the U.S. to collaborate with partners and allies on manufacturing, including:

- Co-development and/or co-production; examples include:
  - F-35 is the exemplar – eight countries provide parts and manufacturing (nine before Turkey was removed)[10]
  - ESSM is also a good example – 12 countries form an international consortium to provide parts and manufacturing[11]
  - SM-3 Block IIA is an example of a bilateral agreement – the U.S. and Japan co-developed and co-produce it[12]
- Licensed production – General Dynamics' F-16 aircraft is produced under license in South Korea[13]
- Leveraging capability to mitigate U.S. issues and shortfalls – the U.S. imports carbon/rayon fibers from Japan that are used for hypersonic missile glide bodies[14]

However, the focus is often times, but should not be, solely on co-development and/or co-production, where there are fewer opportunities, and where it is the most difficult to execute, and sometimes the least helpful. For instance, it is much easier to get agreement on technology transfer for a material or component than for an entire system. Additionally, U.S. industry often views international co-development and coproduction of new systems as more expensive than indigenous production and may be hesitant to pursue opportunities absent government incentives and encouragement.[15] There are also many instances where other countries could use partner and allied materials and components to mitigate a shortfall within their own industrial bases, which should create many more potential opportunities.

Unfortunately, there are many barriers to partner and allied collaboration with the U.S.[16] These include export controls (the International Traffic in Arms Regulation (ITAR)) and other limits to technology transfer. The U.S. also tends to over-classify its documentation – defaulting to No Foreign (NOFORN), which limits distribution.

There can also be cultural or policy barriers within partner and allied nations. For instance, the EU Defence Industrial Strategy calls for increasing capability inside the EU, potentially leading to less collaboration, while Japan revised its principles for the transfer of defense equipment and technology,

potentially leading to increased collaboration.

In addition, planning and funding cycles between the various countries are very often unsynchronized, leading to difficulties in commitments and funding availability.

There are many collaborative agreements that do exist, some more successfully than others, such as:

- The National Technology and Industrial Base (NTIB) – AU, CA, UK, US[17]
- AUKUS – AU, UK, US[18]
- QUAD – AU, IN, JP, US[19]

Lastly, we all need to be careful who we are partnering with; countries that are partners and allies today may not be tomorrow.

The following is a brief summary of the defense industrial strategies of the EU, Japan, and Australia.

2 EU

The main objective of the European Defence Industrial Strategy (EDIS), which is non-binding, is to undergo a "paradigm shift from emergency response to defense readiness." It is not just about financing, but also an industrial organization program. It also aims to ensure the European governments buy more European military kit and purchase armaments jointly to make spending more effective. The main themes of the EDIS are:

- Streamlining procurement (harmonize procurement procedures)
- Making it easier to sell arms (like Foreign Military Sales (FMS))
- More funding for joint procurement (funding capabilities that will benefit more than one EU country)
- Keeping production high (through subsidies when demand is low – something the U.S. does not do)

The EU hopes to accomplish this by making changes in its European Defence and Technological Industrial Base (EDTIB) to include making sure it is more closely integrated with the wider, non-defense European technological and industrial base. This is very similar to the U.S.'s new acquisition transformation goals. It also aims to have less European dependence on non-European sources for key defense technologies. The idea is not to create a Fortress Europe, but to recognize the problem of accessing the U.S. defense market, and of establishing balanced technology exchange across the Atlantic. There is an understanding that it will be natural and necessary for Europeans to cooperate more closely to ensure the future of their own DTIB.

Europe has retained a defense industrial base since the end of the Cold War, but it is not competitive enough. A European Commission official told reporters, "It's there, but we're not able to produce on time and in volume." The European defense industry is undersized and struggles to cope with the sudden and considerable increase in equipment demand linked to massive transfer of equipment and supplies to Ukraine as along with the urgent need to replenish national stockpiles and inventories. Both of these attributes are similar within the U.S. defense industrial base.

3 Japan

Japan's Strategy on Defense Production and Technological Bases represents a major transformation – shifting from a traditionally pacifist and domestically-focused approach to a more robust, internationally collaborative, and technologically advanced posture.

A key component of the strategy includes strengthening the domestic industrial base by providing financial support for companies to upgrade manufacturing, enhance cybersecurity, and secure supply chains. In addition, it describes expanding international cooperation through alliances with the U.S. and friendly nations by participating in dialogues on joint operations and supply chain cooperation; export promotion, where the focus is on revitalizing defense exports and where revisions have been made to the principles on transfer of defense equipment and technology; and security assistance through providing defense equipment and infrastructure aid to like-minded countries in the Indo-Pacific region.

Other key components are investing in new and emerging technologies like artificial intelligence (AI) and unmanned systems; workforce development; and overcoming historical challenges through addressing inefficiency and high costs that have plagued the Japanese defense industry, and reviving competitiveness by making the defense industry more competitive in the international marketplace.

4 Australia

Australia's Defence Industry Development Strategy (DIDS) establishes a framework and principles for a resilient and competitive sovereign defense industrial base to meet the nation's security requirements.

Key initiatives include efforts such as reforms to procurement processes – shifting from managing project risk to managing strategic risk and focusing on delivering minimum viable capabilities faster rather than pursuing "perfect" solutions. This is very similar to a key strategy of the new U.S. acquisition transformation effort. In addition, the Australian strategy includes workforce development and enhanced security for the defense industrial base.

It also highlights a need for innovation – specifically, accelerating the development and integration of innovative solutions and asymmetric technologies, as well as industry engagement – improving

communication between the government and the defense industrial base. And lastly, international partnerships through close collaboration with trusted international partners through AUKUS Pillar I (nuclear-powered submarines) and Pillar II (advanced capabilities), and building strategic and resilient supply chains.

All four strategies share some specific common themes, which include:

- Response to geopolitical urgency – all strategies are driven by a challenging security environment (China's rise, Russia's actions) and a shared sense of urgency.
- Technological focus – there is a universal prioritization of emerging and disruptive technologies (AI, unmanned systems, hypersonics).
- Supply chain resilience – there is a shared emphasis on securing supply chains through "friend-shoring" and reducing reliance on adversarial nations.
- Alliance integration – all four countries recognize the need for deeper integration of their defense industrial bases with allies and partners (especially with the U.S. alliance network) to pool resources and enhance interoperability.

There are also some key differences between the strategies, which include:

- The scale and reach of the efforts – the U.S. has a global industrial base and reach, while Japan, the EU, and Australia have regional focuses and aspire to build more sovereign, but internationally linked, capabilities.
- Historical/political constraints – Japan is emerging from decades of strict pacifist constraints on military spending and exports, which the others do not face to the same extent; the EU faces internal political and bureaucratic hurdles in harmonizing its members' defense industries.
- The desire for self-sufficiency vs. interdependence – the U.S. aims for supremacy and self-reliance, while Australia, Japan, and the EU acknowledge a greater degree of interdependence and rely heavily on partnerships for critical capabilities like nuclear submarines (Australia) or next-gen fighters (Japan/EU/UK).

If you look within the different focus areas within the four strategies, it is interesting to compare them with each other. Starting with the primary goal, the U.S. wants to maintain global military and technological supremacy and support a vast global posture, while Japan desires to fundamentally reinforce self-defense capabilities and secure supply chains. The EU wants to achieve "strategic autonomy" while complementing NATO and consolidate fragmented national industries, and Australia wishes to achieve "deterrence by denial" in its region, focusing on sovereign capabilities and regional resilience.

When looking at the industrial bases of the four regions, the U.S. has a massive, established defense industry, but faces challenges with production bottlenecks and acquisition flexibility, while Japan's defense

industry has been traditionally niche, pacifist, and domestically focused, and also faces profitability/export challenges. The EU defense industry is highly advanced but fragmented across member states, and often hampered by national interests and bureaucracy, while Australia has a smaller defense industry that is dependent on imports, and heavily reliant on key alliances (U.S., UK) for major capabilities (e.g., AUKUS submarines).

With regards to international cooperation, the U.S. is interested in "friend-shoring" and deep integration with allies like AUKUS partners (Australia, UK), and to share the burden with collective and resilient supply chains. Japan's international cooperation efforts are rapidly expanding, shifting from an isolationist policy to joint development through efforts such as the Global Combat Air Programme (GCAP) and AUKUS Pillar II potential, as well as equipment transfers. The EU strives for internal collaboration but is often hindered by national politics, and it seeks a balanced transatlantic partnership with the U.S. Central to Australia's strategy is leveraging partnerships to gain access to advanced technology and to share costs through efforts such as AUKUS and the QLD cooperation with Japan and the U.S.

The key focus areas for the four regions show some similarities and differences. The U.S. is focused on AI, hypersonics, unmanned systems, cyber, and space, and emphasizes speed and scale of production, while Japan prioritizes counterstrike capabilities (long-range missiles), integrated air and missile defense (IAMD), and unmanned systems. The EU is developing common platforms, increasing R&D, and reducing reliance on non-EU suppliers, while Australia is interested in long-range strike, persistent awareness, and building infrastructure resilience.

Lastly, with regards to export control and technology transfer, the U.S. has stringent controls (e.g., ITAR) that can complicate allied cooperation, but there is a recent push to streamline processes for allies as part of the U.S's new acquisition transformation and the recent National Security Strategy.[20] Japan has historically been very restrictive, but has enacted major reforms to allow the export of jointly developed systems (like the GCAP fighter) and licensed parts.[21] The EU has a complex system involving both EU and national-level regulations, which can make things confusing and more difficult, but it aims to facilitate intra-EU trade.[22] Australia has aligned itself with AUKUS partners to facilitate technology sharing and co-production.[23]

In conclusion, the leadership of all four regions – U.S., EU, Japan, Australia – have made increased industrial strength and resiliency a priority and have included international efforts as a key part of their strategies. While all four defense industrial strategies have their differences, which are many times rooted in past history and decision-making, there are enough similarities to provide hope for increased international industrial collaboration and cooperation. As these regions are faced with increasingly strong adversaries, it is imperative that any industrial strategy includes partners and allies, since no one region or country can address these challenges alone.

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Chapter 3

Opportunities and Pitfalls of Cross-Theatre Defence-Industrial Cooperation

Europe and the Indo-Pacific Allies in an Age of Precise Mass and Protracted Competition

Luis Simón

Introduction

The Euro-Atlantic and Indo-Pacific regions are often treated as separate strategic theatres, each with its own geography, operational demands, and threat environment. NATO's emphasis on deterring a Russian attack on Europe has led to a fixation with land warfare and air superiority. In turn, as the United States and its Indo-Pacific allies focus on thwarting China's bid for regional primacy, they have prioritised the maritime and air domains.

Beneath these differences, however, lies a growing convergence. U.S. allies across both regions actually face a remarkably similar operational problem: how to implement deterrence by denial against nuclear-armed great-power challengers intent on constraining U.S. access, achieving local escalation dominance, and reshaping regional orders to their advantage. This emerging symmetry is not simply conceptual but is reshaping force planning, operational concepts, and defence-industrial priorities.

Lessons from the war in Ukraine, the use of autonomous systems across the Middle East, and the rapid evolution of Chinese and Russian A2/AD networks are accelerating a shift away from reliance on small numbers of exquisite, high-end systems toward a model in which precision must be paired with mass.[1] Operational concepts such as "hellscape" in the Indo-Pacific,[2] and initiatives such as Replicator in the United States,[3] similarly reflect a recognition that attritability, volume, speed of production, and autonomous behaviour are becoming core features of modern warfare.

At the same time, the return of Donald Trump to the White House, Washington's prioritisation of the Indo-Pacific, and the growing stresses on U.S. defence-industrial capacity have revived longstanding questions about burden-sharing and the ability of the United States to deter or fight two major regional

1 Michael C. Horowitz, "Battles of Precise Mass: Technology Is Remaking War – and America Must Adapt", *Foreign Affairs*, November/December 2024.
2 Naval News, "Breaking Down the U.S. Navy's 'Hellscape' in Detail", 16 June 2024.
3 Lauren Kahn, "Scaling the Future: How Replicator Aims to Fast-Track U.S. Defense Capability", War on the Rocks, 20 September 2023.

conflicts simultaneously.[4] The 2026 U.S. National Defense Strategy frames this as a "simultaneity problem", whereby allied capacity—not only U.S. military power—must underpin credible deterrence across multiple theatres.[5] Against this backdrop, U.S. allies and adversaries alike increasingly assume that, in a crisis, Washington may struggle to fully resource two theatres at once. How U.S. allies prepare for this simultaneity problem—and how they structure their defence-industrial cooperation accordingly—may prove decisive for the future of deterrence in both the Euro-Atlantic and Indo-Pacific.

The challenge today is not merely whether Euro-Atlantic and Indo-Pacific allies should cooperate more deeply in the defence-industrial domain, but where such cooperation makes sense, how far it should go, and what form it should take. Although geography and adversaries differ, the fundamental requirements of denial—long-range strike, air and missile defence, autonomous systems, ammunition depth, resilient networks, and surge capacity—are increasingly shared. This creates real opportunities for cross-theatre cooperation, but also reveals structural pitfalls that must be carefully managed.

This article argues that meaningful defence-industrial alignment across the Euro-Atlantic and Indo-Pacific is both possible and desirable, but must be selective rather than indiscriminate. Certain capabilities lend themselves more naturally to cooperation or even integration, especially those that benefit from economies of scale and shared standards. Others are so sensitive, region-specific, or technologically complex that cooperation may be difficult, counterproductive, or politically untenable. A nuanced approach—one that distinguishes between areas requiring customisation and those that can be standardised—is thus essential.

1 Converging Operational Demands: From Boutique Precision to Precise Mass

The wars of the 2020s have exposed the limits of Western militaries' two-decade reliance on high-end, low-volume systems optimised for permissive environments. In Ukraine, both sides expend artillery and drones at staggering rates, and missile barrages number in the thousands.[6] Israel's recent campaigns have demonstrated the growing value of autonomous and semi-autonomous systems in dense, high-tempo urban operations. Meanwhile, Indo-Pacific scenarios increasingly assume attrition levels far exceeding previous planning assumptions. In this vein, the "hellscape" concept in the Indo-Pacific refers to the deliberate saturation of contested spaces with large numbers of attritable, autonomous, and networked systems

4 Luis Simón and Daniel Fiott, "Hanging Together or Hanging Separately? Europe and the Indo-Pacific in United States-China Rivalry", *CSDS In Depth* 2025/15.

5 Department of War, *National Defense Strategy: Restoring Peace Through Strength for a New Golden Age of America*, Washington, D.C., January 2026.

6 See Benjamin Jensen, Yasir Atalan, and Erik Tiersten-Nyman, "The New Salvo War", Centre for Strategic and International Studies, 31 July 2025.

designed to impose overwhelming complexity and cost on an adversary from the outset of a conflict.[7] Rather than relying on a small number of exquisite platforms, the aim is to flood the battlespace with distributed sensors, shooters, and decoys that degrade, confuse, and exhaust enemy forces. This approach reflects a broader shift toward deterrence by denial through volume, resilience, and sustained attrition rather than technological superiority alone.[8]


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These experiences underscore a broader shift toward "precise mass", where precision remains essential but is no longer sufficient in isolation. Modern warfare now demands a blend of scalable, attritable capabilities; flexible software-driven architectures; resilient multi-layered networks; and the industrial capacity to sustain operations over time, reflecting a broader shift toward industrial mobilisation and surge production as central elements of deterrence. Whether in the Baltic region or the First Island Chain, denial strategies hinge on the ability to rapidly impose costs, complicate adversary planning, and blunt early offensives.[9]

Across both theatres, long-range fires, air and missile defence, and autonomous systems stand at the forefront of this shift. Countries in Europe are investing in deep precision strike at an unprecedented scale, while Indo-Pacific allies focus on anti-ship, anti-air, and anti-access capabilities.[10] Both are also accelerating the adoption of drones, unmanned maritime platforms, electronic warfare tools, and software-defined battle networks. The result is a striking alignment in the kinds of capabilities that denial requires, even as operational environments differ.

This convergence lays the groundwork for deeper industrial cooperation between the United States and its Indo-Pacific and Euro-Atlantic allies. Yet the ability to produce these capabilities at scale is lagging behind demand, particularly in Europe, where decades of deindustrialisation and just-in-time production have left governments scrambling to rebuild lost capacity. This industrial challenge is now one of the central factors binding the Euro-Atlantic and Indo-Pacific theatres together.

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7 Jack Watling, Oleksandr V. Danylyuk, and Nick Reynolds, "Preliminary Lessons from Ukraine's Offensive Operations, 2022–23", The Royal United Services Institute, 18 July 2024; Josh Rogin, "The U.S. military plans a 'Hellscape' to deter China from attacking Taiwan", *The Washington Post*, 10 June 2024.

8 Evan Montgomery, Travis Sharp, and Tyler Hacker, "Quality Has a Quality All Its Own: The Virtual Attrition Value of Superior-Performance Weapons", War on the Rocks, 19 June 2024.

9 Elbridge A. Colby, *The Strategy of Denial: American Defense in an Age of Great Power Conflict* (New Haven, CT: Yale University Press, 2021).

10 Jonathan D. Caverley and Ethan B. Kapstein, "The Atlantic Alliance: Diverging Interests, Converging Policies", *Survival* 67:6, December 2025–January 2026, pp. 1–32.

2 Europe's Defence-Industrial Awakening—and Its Persistent Limits

Europe's rapid rearmament in response to Russia's war against Ukraine has revealed both impressive momentum and significant structural weaknesses. Perhaps the most consequential shift concerns long-range strike, which has moved from a niche capability to a central element of European deterrence.[11] Yet efforts to field such systems have been hindered by long-standing industrial constraints. Missile manufacturers have historically produced in small batches, often shutting down production lines for years at a time, while key technologies—such as turbofan engines for extended-range cruise missiles—remain dependent on U.S. suppliers. Even collaborative European projects are unlikely to deliver new capabilities in the short or medium term.

At the policy level, governments face a dilemma. The urgency of deterrence pushes them toward rapid procurement from U.S. and non-European suppliers, while strategic aspirations push them toward greater industrial autonomy.[12] Recent shifts in procurement policy illustrate this tension. Some states have publicly prioritised European or national origin for major defence purchases, yet continue to buy from abroad when speed is paramount. A similar pattern is unfolding along Europe's eastern flank, where countries have turned to South Korean suppliers for rapid deliveries of critical systems.

Europe's ammunition and missile production capacity has begun to scale, but remains insufficient for a protracted high-intensity conflict. EU initiatives, new financial instruments, expanded framework contracts, and efforts to attract new entrants represent important steps toward rebuilding defence-industrial depth. In parallel, European policymakers are exploring ways to integrate Ukrainian know-how—particularly in low-cost drones and rapid adaptation—into their emerging industrial architecture. Yet there remains a risk of overcorrecting toward cheap unmanned systems at the expense of the high-end capabilities necessary for deterrence against Russia.

The broader challenge for Europe is to combine its growing political will and financial investments with structural reforms that enable sustained production at scale. Without these reforms, its ambitions for autonomy will remain limited, and its ability to contribute meaningfully to cross-theatre burden-sharing will fall short.

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11 See, e.g., Lotje Boswinkel, "Europe, Deterrence and Long-Range Strike", War on the Rocks, 20 March 2025; Fabian Hoffmann, "Denial Won't Do: Europe Needs a Punishment-based Conventional Counterstrike Strategy", War on the Rocks, 8 September 2025.

12 Daniel Fiott, "Ties That Truly Bind? The Potential for Defence Industrial Cooperation between South Korea, NATO and the European Union", *CSDS In Depth* 18/2025.

3 Differentiated Strengths Across the Euro-Atlantic and Indo-Pacific

While both theatres face similar operational demands, their defence industries possess different strengths that can create opportunities for meaningful cross-theatre synergy. Europe is rapidly becoming a global leader in the production of artillery, ammunition, and certain classes of mid-tier missiles.[13] Its ability to repurpose civilian industrial capacity—particularly in the automotive sector—has enabled a rapid increase in shell and rocket production. Some European firms now outproduce their U.S. counterparts in key munitions.

By contrast, the United States maintains a significant lead in advanced missile systems, propulsion technologies, sensing, software, and networked command and control. Meanwhile, Indo-Pacific allies—especially Japan and South Korea—possess world-class shipbuilding capacity, high-quality maritime missile programs, and advanced electronics and dual-use technologies.

These differentiated strengths suggest that cross-theatre cooperation need not involve identical contributions. Instead, the most effective approach may be a division of labour in which Europe specialises in scalable production of ammunition and mid-tier missiles, the Indo-Pacific anchors shipbuilding and maritime strike, and the United States concentrates on the high-end enabling systems that bind these networks together. This kind of specialisation is far more realistic than attempts to create a single, monolithic industrial ecosystem in which all allies produce the same capabilities. This logic increasingly mirrors U.S. strategic thinking, which assumes that allies will take primary responsibility for regional defence while American forces provide selective enabling capabilities rather than acting as the default backbone of every theatre.[14]

4 Three Models for Structuring Cross-Theatre Cooperation

As allies consider how to reconcile region-specific demands with shared strategic challenges, three conceptual models help illuminate possible approaches.[15]

The first is bifurcation, a model in which the Euro-Atlantic and Indo-Pacific theatres are treated as distinct, with separate industrial strategies, separate threat hierarchies, and minimal cross-regional cooperation. This approach has the advantage of clarity and regional focus, but amplifies vulnerabilities elsewhere. It risks replicating production lines, missing economies of scale, and exacerbating the challenge the United States faces in supporting two theatres simultaneously. It is also inconsistent with the operational convergence described earlier.

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13 Caverley and Kapstein, "The Atlantic Alliance".
14 Department of War, *2026 National Defense Strategy*.
15 Luis Simón, "Three Alternative Approaches to Deterrence in Europe and the Indo-Pacific", War on the Rocks, 19 June 2025.

A second, more flexible model is cooperation, which views the two theatres as regionally distinct but strategically intertwined. Under this approach, each region focuses on its primary challenges—Europe on Russia, the Indo-Pacific on China—while pursuing deeper industrial and technological cooperation to exploit synergies and mitigate the United States' simultaneity problem. This could take the form of co-development and co-production projects, cross-licensing agreements, harmonised standards, and shared stockpiles for fungible capabilities. Maritime and aerospace programs such as AUKUS Pillar II or multinational air-combat initiatives illustrate elements of this logic. It strikes a balance between autonomy and interdependence and is politically less demanding than full integration.

The third model is integration, i.e., treating the Euro-Atlantic and Indo-Pacific as a single strategic theatre. This would involve shared operational concepts, unified standards, integrated industrial planning, and more structured and permanent cooperation in emerging technologies. The industrial goal would be a genuinely cross-theatre deterrence ecosystem, with interoperable architectures and interchangeable munitions and systems. While the technological incentives for such integration are strong—particularly for autonomous systems, open architectures, and AI-enabled C2—the political, legal, and institutional barriers remain formidable.

5 Customisation, Standardisation, and the Logic of Selective Cooperation

A crucial factor in determining which capabilities lend themselves to cross-theatre cooperation is the degree to which they require customisation for regional conditions versus the degree to which they can be standardised across multiple environments. Long-range anti-ship missiles designed for the Western Pacific's maritime geography, for example, must account for vastly different operational requirements than land-attack missiles optimised for European terrain. Similarly, air and missile defence systems may require integration with theatre-specific sensor networks, political constraints, or rules of engagement. The more denial strategies are shaped by specific geographic conditions—whether the Baltic approaches, the High North, or the First Island Chain—the greater the premium on customised operational design even as industrial standardisation remains attractive.

By contrast, mid-tier missile systems, artillery, drones, software-defined radios, and open-architecture battle networks generally require far less regional customisation. Their fundamental design principles are broadly applicable across theatres, and their operational utility is sufficiently generic to allow for common specifications. This makes them ideal candidates for standardisation and joint production. Ammunition exemplifies the same logic: a 155mm round used in the Baltics is functionally identical to one used in the Western Pacific, and therefore benefits enormously from pooled production.

Understanding this distinction between capabilities requiring high levels of customisation and those amenable to standardisation is essential for avoiding failed cooperation efforts. It allows policymakers to

prioritise industrial collaboration where it is both feasible and strategically valuable, rather than pursuing cooperation for its own sake.

6 Toward a Cross-Theatre Deterrence Ecosystem

The converging operational demands facing Euro-Atlantic and Indo-Pacific allies, combined with their differentiated industrial strengths, point toward the emergence of an interconnected, cross-theatre deterrence ecosystem. This ecosystem need not be fully integrated to be effective. What matters is the creation of shared standards for key enablers; flexible, modular architectures that allow allies to plug in capabilities; and coordinated industrial planning for systems that benefit most from economies of scale. Joint research on emerging technologies—especially artificial intelligence, missile defence, and space-based sensing—can bind the two theatres' innovation pipelines together. And cross-licensing, co-development, and shared surge capacity can create redundancy and resilience.

Such an ecosystem mitigates the simultaneity problem: the risk that, in a major crisis in one theatre, the United States might struggle to adequately resource the other. It also allows allies to exploit their complementary industrial strengths while reinforcing their region-specific strategies. By focusing on fungible capabilities—mid-tier missiles, ammunition, autonomous systems, and software-defined enablers—it creates the foundation for credible denial in both regions.

The alternative—a fragmented industrial landscape, mismatched standards, and insufficient production capacity—would impose costs on deterrence and leave U.S. allies vulnerable to shocks and supply-chain disruptions. In an era of protracted, attritional, and technologically dynamic warfare, the ability to produce together may increasingly determine the ability to deter together.

Conclusion

The Euro-Atlantic and Indo-Pacific theatres are entering an era in which defence-industrial policy is as central to deterrence by denial as force posture or readiness. Allies face a shared operational problem, and the wars of the present decade have made clear that denial requires not just capability but mass, not just innovation but scale, not just exquisite systems but adaptable and affordable ones. The convergence of strategic requirements across Europe and Asia creates meaningful opportunities for cross-theatre collaboration—but only if pursued selectively and recognising the existence of differences in each operational environment.

A balanced approach, rooted in the recognition that not all systems warrant the same degree of cooperation, offers the most effective way forward. By focusing on those capabilities that benefit from standardisation and economies of scale—while allowing for customisation where regional geography

demands it—the United States and its European and Indo-Pacific allies can build an industrial foundation for deterrence that is both resilient and politically feasible.

In a world where the United States may be stretched thin and adversaries increasingly coordinate across regions, the ability of allies to reinforce each other through industrial cooperation will matter more than ever. Deterrence by denial will depend not only on strategy and force design, but on whether Euro-Atlantic and Indo-Pacific partners can produce the right capabilities, at the right scale, at the right time. The future of both theatres may hinge as much on what happens in factories and supply chains as on what happens on the battlefield.

Part II

Dynamism of Each Country's Defense Industry

Chapter 4

British Defence Industry: Past, Present and Possible Futures

Trevor Taylor

> 'We've got some …. proud British defence firms with a long history of world class reputations, and we'll work closely with them. I also want to hear from beyond these established businesses: from tech firms in the civilian sectors, from startup entrepreneurs, from trade unions, from exporters that want more government muscle behind them, and also from investors. Investors who recognize the central importance of security as well as stability and market value.'
> 'The nation's armed forces are only as strong as the industry that stands behind them.'
> —UK Secretary of State for Defence John Healey[1]

1 Conceptualising the Defence Industrial Sector

The concept of a defence industry can be simply defined as those enterprises that supply and thus enable the armed forces of a country. But defence ministries buy a large range of products and services. Some of them, such as artillery shells, are of use only to the military sector. At the other end of the spectrum are things with an essential civil use but that are nonetheless needed by armed forces: this is where diesel fuel, some diesel engines, and office stationery can be found. However, the blurred boundaries of the defence industrial domain are not static, as new technologies and products emerge which are of military value. Increasingly, such technologies are coming from the civil, commercial sector, which now accounts for the great majority of global R&D spending.[2] This means that companies seeking to serve defence markets also have to be experts in the application of civil origin technology to meet defence needs.

Any country's businesses that significantly serve defence are shaped not only by how they perform and their visions for the future, but also by their government's stance towards them, including how important it sees them in terms of the national interest.

Thus, this paper deals both with the background and current characteristics of the UK defence industrial sector and governmental policies towards defence and its suppliers.

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1 Defence Secretary at the London Defence Conference - GOV.UK, May 2025.
2 Mark Bromley & Giovanni Maletta, 'The Militarization of Technology: Preventing Diversion and Misuse Through Export Controls, SIPRI Research Paper, November 2025, https://www.sipri.org/sites/default/files/2025-11/rpp_2025_11_miltech.pdf.

2 Continuity

A notable feature of the UK defence industry is its relative continuity, reflecting the importance (and qualified success) of its military. Unlike Germany, Italy and Japan, the UK has not lost a war which resulted in a forced dismantlement of its defence industrial assets. The UK's largest defence firm, BAE Systems, can trace its ancestry back hundreds of years in terms of the enterprises that it has absorbed. The same is true of Rolls-Royce and some smaller specialist entities including Martin-Baker, a company that makes ejector seats. Given that industrial capabilities require a knowledgeable and skilled staff who are not easily regenerated once they have been dispersed, this continuity has been an asset for some enterprises.

However, the UK has two prominent cases where a self-inflicted lack of continuity resulted in major delivery problems reflecting losses of workforce knowledge and skills.

The first was in nuclear submarines, when the lack of orders after the completion of the four Vanguard ballistic missile submarines meant a reduction in the workforce at the key site in Barrow from 14,000 to less than 4,000. The consequence was that, when orders were later placed for seven Astute class submarines, deliveries were late and over budget.[3] By late 2025, a better situation had been created with 16,000 working at the yard. Work was proceeding on completing Astute orders and the Dreadnought bomber programme plus establishing the Astute successor SSN AUKUS programme. But the first two decades of the 21st century had been problematic for the British submarine industry and the region where it was centred.

The second was the Scout/Ajax family of tracked armoured vehicles. When the Ministry of Defence (MoD) placed an order for these in 2014, it had not ordered a tracked combat vehicle since the contracts for the Challenger 2 tank in 1991 and 1994. The last of such tanks, from the northeast of England, were delivered in 2002. Twelve years later, that factory had been sold and the Ajax contract was with General Dynamics UK (GDUK). This firm had no experience of armoured vehicle development and production in the UK, and it opted to import hulls and drive systems from GD's European business in Spain. Its commitment was to assemble the platforms in the infrastructure it had bought in Wales, integrating novel complex electronics and sensor systems plus a turret-mounted 40 mm cannon. Delivery proved very problematic and late. The costs to the company have not been revealed, but the contract was for a firm price, and so they are probably very significant. After multiple complaints about crew damage from noise and vibration, the first vehicles were delivered to the Army in 2025, some eight years later than originally planned. However, the MoD then discovered new additional problems with the system

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3 The Defence Nuclear Enterprise: a landscape review.

so delivery was again suspended.

Building defence industrial development, testing and production capabilities from a low base is now recognised in the UK as difficult and risky: the value of a regular drumbeat of orders is widely recognised.

3 The Government Customer

Continuity of the existence of the defence sector has not meant continuity of national spending.

In defence, the home government is usually the key customer, but the MoD has periodically posed major problems for the private sector. In real terms, the UK defence budget is currently slightly higher than its 1989 level, but in the 35 years since then, the real unit costs of platforms have risen significantly.[4] The UK Government took a substantial peace dividend after the end of the Cold War, with the defence share of GDP falling from 5.5% at the height of the Cold War in 1984 to 2.1% in 2021 and 2022.[5] In the light of growing threats, notably from Russia, it is currently at 2.3%, with defence ministers intending that it should rise further to 3% of GDP by the end of the next Parliament (likely in 2034).[6] It should be noted, though, that in the UK, departmental spending totals are controlled annually by the Chancellor (finance minister) and the Prime Minister.

Also, from the late 1980s, the Conservative Governments exposed British defence businesses to international competition in the belief that it would drive them to greater efficiency. In practice, the main consequence of this was to drive many defence businesses out of the sector or into being taken over by either another British firm (usually BAE Systems) or a US or European enterprise. At the time, the UK opted to acquire numerous platforms from US factories in particular, although this is likely to be changing (see below).

4 Continuity Has Not Meant Stasis

Continuity has also not meant industrial stasis: major industrial restructuring has occurred both periodically, notably after the end of major wars or confrontations, and regularly as governmental priorities and technologies advanced. While some new British firms have entered the defence market, the most prominent trend has been consolidation as firms have either left the sector or opted to be taken over by others. The UK, however, has no equivalent of the Japanese keiretsu.

To get a sense of the scale of change, in 1987–1988, excluding fuel suppliers, the MoD listed 34 UK

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4 See, for instance, Keith Hartley, 'Augustine, Costs and Defence Industries', *Economics of Peace & Security Journal*, Vol.17, No. 1, 2022, pp.30–36.

5 https://data.worldbank.org/indicator/MS.MIL.XPND.GD.ZS?locations=GB.

6 Healey expects UK to spend 3% of GDP on defence by 2034 - BBC News.

firms as its top suppliers in terms of value.[7] Of its top six firms then, just two remain with the same or similar identity (BAE Systems and Rolls-Royce). In the next tranche of nine firms, Babcock International is the sole survivor. In the third tier of 13 firms, British Telecom and the Atomic Weapons Establishment are the only ones still around with their own identity. This is not a solely British phenomenon, with similar consolidation being a feature of many NATO states. Rising development costs and lower procurement numbers for air, sea and land platforms have had an impact. Today, the UK MoD has some key monopoly providers with the capacity to design and develop big systems as well as sole-source possibilities for key subsystems.

Selected Sole Source of Supply in the UK

Equipment type	Company
Combat aircraft	BAE Systems, with shares traded on the London Stock Exchange, and the UK Government owning a golden share
Gas turbine engines	Rolls-Royce, with shares traded on the London Stock Exchange, and the UK Government owning a golden share
Submarine nuclear power & propulsion	Rolls-Royce, with shares traded on the London Stock Exchange, and the UK Government owning a golden share
Nuclear submarine development & production	BAE Systems
Nuclear weapons	Atomic Weapons Establishment (AWE), UK state-owned and directed
Airborne radars	Leonardo UK, Italian with Italian government part shareholding
Helicopters	Leonardo, Italian with Italian government part shareholding
Specified list of land munitions	BAE Systems, with shares traded on the London Stock Exchange, and the UK Government owning a golden share
Submarine sonars	Thales UK: French and with a significant French Government share
Aircraft flares/defensive aids	Chemring Group: British, although with significant shareholding for private capital investors
Missile test range management	QinetiQ

Source: The author.

7 Table 2.10, *Statement on the Defence Estimates 1989*, Vol.2 Statistics, London, HMSO, p.15.

5 Foreign Direct Investment

Successive British Governments have been open to foreign direct investment in the defence and high-technology sectors. Most commonly, this has meant the takeover of established enterprises rather than setting up completely new businesses. Most foreign defence enterprises have their beneficial ownership in either continental Europe or the US, but when Fujitsu bought an 80% share in the British computer company ICL in 1990, it took over a firm with extensive defence work in communications.

In most cases, foreign owners have nurtured and developed the expertise in their UK subsidiaries and have not stripped out intellectual and physical assets. Thus, many foreign-owned firms working in defence have research and development, production and support capabilities in their businesses. Such subsidiaries generate UK intellectual property.

6 Continental Europeans

Some foreign firms and sites have a long history. The Dutch electronics firm Philips had investments from the 1940s in the UK that had defence applications. When it elected to sell them after the end of the Cold War, the main buyer was what is now Thales of France, which also bought other British firms, including Pilkington Optronics, and the missile business of Short Brothers. Today, Thales has 7,000 employees across 16 UK sites.[8]

Firms have their individual stories and trajectories. Airbus built diverse interests in the UK, partly by the acquisition of large-aircraft wing design and manufacture from BAE Systems. It has bought and built up cyber and cryptographic capability in Wales and around the UK. It acquired the Astrium space business in 2013[9] including a small satellite specialist, Surrey Satellites, in 2009. These firms are central to the implementation of the 2021 Government's National Space Strategy.[10] In February 2025, Airbus is building both Synthetic Aperture Radar and optical satellites for the UK MoD.[11] It also has a helicopter support base near Oxford with the potential for military as well as civil work.[12]

More recent entrants into the British economy include Rheinmetall, which entered into a joint venture with BAE Systems (RBSL) to build the Boxer suite of wheeled armoured vehicles and to develop and build the Challenger 3 tank programme. Rheinmetall has also decided to build a UK gun barrel factory at Telford in the English Midlands. Krauss Maffei (now KNDS) bought WFEL, a military bridging company near

8 Thales website, https://www.thalesgroup.com/en/countries/europe/united-kingdom/about-thales-uk.
9 Earnings Call Shows Why Astrium Is Being Merged into Airbus Defence & Space - SpaceNews.
10 National space strategy - GOV.UK.
11 Airbus awarded Oberon satellites contract by UK MOD - Airbus; UK Awards Surrey Satellite Military Earth-Imaging Spacecraft Contract - Aviation Week Network; UK MOD Taps Airbus to Build £127M Spy Satellite Constellation - European Spaceflight.
12 The impact of Airbus on the UK economy - Oxford Economics - March 2022.pdf.

Manchester, in 2012.[13] It too is producing Boxers for and in the UK in 2025.

A very significant case is MBDA, which is a joint venture of the former BAE Dynamics, Matra and Alenia. Formally it is owned today by BAE Systems (37.5%), Airbus (37.5%) and Leonardo (30%), but it also has shares in businesses in Germany, Spain and even the US. How it works in practice is not easy for an outsider to appreciate. There are regular tensions among the national partners, but the fundamental point is that the venture has generated a series of effective missiles that include Storm Shadow, ASRAAM, Meteor and Sea Viper. The UK Government has a specific agreement with MDBA, which is addressed later in this paper.

This is not an exhaustive list of European companies investing in the UK defence market. For instance, the Swedish Saab website reports:

> Across eight UK sites, Saab employs over 600 people working on a diverse range of capabilities including radar, underwater robotics, software engineering, and armed forces training. We partner closely with customers and industry to deliver innovative, cost-effective solutions to complex challenges, while supporting thousands of British jobs through a robust supply chain.[14]

7 American Businesses in the UK

US firms also have sought and been allowed to make significant investments in the British industrial sector.

Raytheon (now RTX), which invested in the British IFF/radar firm Cossor not long after the Second World War, today also produces Paveway IV smart bombs in Scotland and provides elements of other US weapons that are operated by the UK.[15]

General Dynamics UK has three main sites in Britain. Two are in South Wales and have been developed from scratch by the company to deliver major defence projects that had been won in competitions. One is the Bowman tactical communications system and the other the Ajax family of tracked armoured vehicles. It also does avionics work in England.

Lockheed Martin UK reports having operated in the UK for 80 years and has more than 1,900 employees across more than 20 sites. While it does not have a major UK prime contract, it is a major contributor at the state-owned nuclear weapons establishment (the Atomic Weapons Establishment).

L3-Harris is involved in a wide range of defence electronics and communications technologies in the UK across 11 sites. Their claim is that:

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13 Krauss-Maffei Wegmann on its acquisition of WFEL - Steen Associates; MoD awards £150M contract to provide 'technically advanced' military bridges - New Civil Engineer; Tactical Military Bridges | WFEL | Concept Design To Manufacturing.

14 https://www.saab.com/markets/united-kingdom.

15 Weapons - Raytheon UK.

In the UK, we engineer, produce and maintain capabilities ranging from cybersecurity and encryption to intelligence, surveillance and reconnaissance; ship automation and control systems; software-defined radios; multi-mission robots and autonomous surface vessels.[16]

Northrop Grumman also has a significant UK presence, with much of its work in the national security/cyber security business. General Electric employs more than 600 aerospace engineers in the civil and defence sectors, having taken over the Dowty business that focused on aircraft propellers.

The purchase of UK suppliers has been a matter of some contention, particularly when the purchases have been made by private capital institutions. GKN aerostructures, Cobham (an air-to-air refuelling expert) and Ultra are cases in point.

8 Recognition of a Sample Being Acknowledged

The companies mentioned above are just a sample that are foreign-owned but busy in the UK. This text does, however, mention nine of the UK's ten main suppliers to the MoD in 2023–4.[17] The omitted exception is Boeing, which has extensive work in the platform support area, reflecting UK acquisition of large Boeing aircraft and Apache helicopters.

Acquisition history has generated what some might consider strange cases: for instance, the lead of the consortium delivering the landing systems on the Typhoon aircraft is Safran UK, a French company that is today's owner of what was once Dowty.

The consequence of the degree and range of foreign investment in defence companies in the UK means that it is not easy to define a 'British-based company'. To illustrate, Draken is a UK-registered company with 800 staff that provides flying training services to the MoD. It uses Czech airframes among its fleet and is owned by Blackstone, a US private capital management fund. This is a matter yet to be specified in the UK or another interested party, the European Union.

9 A Growing Number of Suppliers and Interested Companies

While the UK has a decreasing number of Tier 1 and even Tier 2 companies in defence, there is a large pool of lower-tier suppliers and a growing number of firms seeking defence business in the light of the prospect of increased defence spending. Many of these firms are in aerospace, shipbuilding and, predictably, drone technology. The industrial body that focuses on smaller businesses (MAKE UK Defence) has a growing

16 United Kingdom - L3Harris® Fast. Forward.
17 MOD trade, industry and contracts: 2024 - GOV.UK.

membership of more than 600 as of late 2025. The largest industrial association, Aerospace, Defence and Security (ADS), has more than 1,500 members, of which more than 1,000 are SMEs.[18]

10 Current UK Government Approaches to the Defence Industry

The 2012 National Security Through Technology white paper said that the default position would be for the UK to buy on a competitive basis from the international market.

Partly to meet the particular needs of the campaign in Afghanistan and partly because of a real readiness to rely on industry in the US, the UK bought a significant number of US systems with little or no benefit for industry in the UK. Purchases included a large number of mine-resistant wheeled vehicles (for Afghanistan), the Reaper/Predator drones, Rivet Joint electronic intelligence aircraft, Apache helicopters, Chinook helicopters, F.35 combat aircraft, the Wedgetail airborne early warning and command aircraft, and the P.8 maritime patrol aircraft. The UK does not publish data on the scale of its defence imports, which come mainly from the US, but they have certainly been much higher than those of any other NATO member. According to official US data, whose publication ceased in 2021, UK imports fell somewhat after the end of the Afghan war.[19] But a comparison of two more recent MoD figures (MoD spending with British industry in 2023/24 at £28.8 billion[20] and total MoD spending with external bodies at £37.7 billion[21]) suggests imports are still running at a significant level.

Particularly since 2015, the emphasis on competitive tendering has decreased, and purchases from US factories have become less prominent as governments have emphasised the aspiration for UK operational independence, assurance of supply and economic benefits from defence, all of which have positive implications for the defence industry in the UK.

In some areas, the MoD, indeed the government, has put in place formal programmes to ensure continuity of industrial work.

In 2008, BAE Systems, which 20 years earlier had been the buyer of the state-owned Royal Ordnance Factories, was given a 15-year contract (‘Munitions Acquisition, the Support Solution’ (MASS)) to modernise production and manufacture small-arms ammunition and shells.[22] The ‘Next Generation Munitions Solution’ (NGMS) was the 15-year renewal contract in 2020, but has since been expanded in scope as a consequence of the Ukraine war.[23]

In 2005, the MoD was aware that, under the then plans, its spending with its main missile supplier,

18 https://www.adsgroup.org.uk/facts2025/.
19 https://2017-2021.state.gov/world-military-expenditures-and-arms-transfers-2019/.
20 MOD regional expenditure with industry 2023/24 - GOV.UK.
21 MOD trade, industry and contracts: 2024 - GOV.UK.
22 https://hansard.parliament.uk/%E2%80%8CCommons/2008-09-15/debates/0809154000010/ProjectMASS#:~:text=I%20am%20pleased%20to%20announce,a%20minimum%20of%2015%20years.
23 BAE Systems awarded £2.4 billion munitions contract to equip UK Armed Forces | Newsroom; UK Ministry of Defence invests £20m in small arms ammunition; UK Ministry of Defence raises frontline battlefield munitions order to £410m.

MBDA, was about to fall significantly. Such a fall would have had major negative implications for the firm's long-term capabilities. Unusually, given the cultural preference for competitive tendering, the Government decided that it should protect MBDA as its preferred supplier. MoD-company discussions took place on the best way forward, and a Complex Weapons Portfolio and a long-term agreement were put in place. The arrangement has worked well, with the company delivering high-performing missiles for the national and collaborative markets and winning export orders. The Portfolio Management Agreement worth £6.5 billion extended the company-government relationship in 2024 for another decade.

Also, there have been several sector-focused industrial strategies dealing with combat air, shipbuilding, land systems, space and artificial intelligence. The space and shipbuilding documents in particular deal with both military and civil businesses.

Sitting on top of all these was the Conservative Party's Defence and Security Industrial Strategy of 2021[24] and the Labour Government's Defence Industrial Strategy paper of 2025.[25] These are lengthy documents that are not easy to summarise, but a few themes emerge.

The first is that there is little mention of the virtues of formal competitive tendering, but much emphasis on the need for partnering between the MoD and the private sector. Quite what partnering was to involve was less clear, but it certainly meant a cooperative rather than an adversarial relationship between the two sides. It was perhaps clearest in the Team Tempest construct dealing with what is now GCAP, where the MoD, the RAF and four companies worked together to specify the way forward.

Whereas the RAF could work with the partnering approach on GCAP from an early stage, the Royal Navy appears to struggle to move away from its tradition that its staff would work out a performance requirement and then get an industrial construct to deliver it. Its internally dominated handling of the T.45 destroyer replacement, usually referred to as the Type 83, illustrates this. Industry has periodically been told about the Type 83,[26] despite the Type 83 having similar attributes to GCAP as the core platforms for a wider capability architecture (Future Combat Air System in the case of GCAP and Future Air Defence System (FADS) for the Type 83).

A second feature of current government industrial policy is the declared faith in the ability of smaller and newer firms to generate innovative solutions to military problems. This was a theme of the previous government, but the Labour Government is going further, setting targets for the promotion of defence work and contracts to go to small- and medium-sized enterprises (SMEs). These are seen as more agile and responsive than the major prime contractors were likely to be. As a consequence, the current government is establishing organisations to make it easier for SMEs to get directly into defence with government contracts. The government is aware of several of the hurdles that need adjustments, including accepting higher technical risk when dealing with bright but inexperienced bidders and making it easier for companies

24 https://assets.publishing.service.gov.uk/media/60590e988fa8f545d879f0aa/Defence_and_Security_Industrial_Strategy_-_FINAL.pdf.
25 https://assets.publishing.service.gov.uk/media/68bea3fc223d92d088f01d69/Defence_Industrial_Strategy_2025_-_Making_Defence_an_Engine_for_Growth.pdf.
26 Royal Navy details ambitions for FADS programme, Type 83 destroyer - Naval News.

to get their staffs and infrastructure cleared to receive and hold classified information.

The barriers for SMEs are less when their offerings involve stand-alone systems that interact only in limited ways with their wider environment. A soldier-controlled UAV or an uncrewed but remotely controlled vehicle delivering logistics would be examples of such things (although in both cases, the electro-magnetic spectrum needs to be managed). But navies and air forces move entirely on platforms. In most cases, this also applies to the army. Integrating new capabilities onto already complex platforms can be a multifaceted business that must involve a prime contractor/design authority. For one reason or another, it has not yet proved possible to get either Meteor onto the UK's F.35s or Brimstone onto the Apache attack helicopters bought by the UK.

In short, the MoD's ambition to take advantage of SMEs will need to be linked to cooperation with and support from the primes.

11 Collaboration

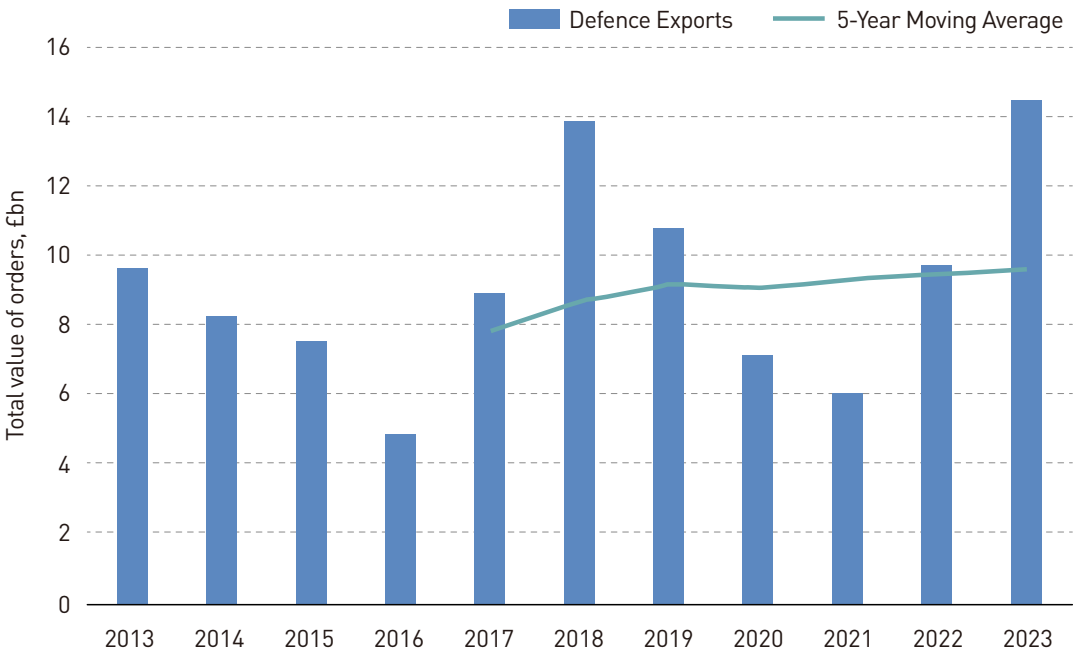
It is important that many British firms, including the most prominent, have been steered by government choices to become experienced in setting up collaborative projects and making them work. For decades, collaborative projects have been central to the UK combat air, strategic airlift, missile and helicopter sectors. With GCAP, the UK is working with Italy on a third generation of combat aircraft. Many MBDA products have been developed in collaboration with others. Collaborative projects do not involve solely prime and Tier One suppliers, but mean that many smaller contributors are involved with development and delivery.

12 Exports

Defence sales often have a strong political dimension. Historically, the UK Government has not sought to define UK requirements in terms of what would sell also in overseas markets, although its policy stances now include this criterion.

Britain's most valuable sales of aircraft and their weapons have been mainly in the Middle East, but MBDA's UK business has been successful in a wider range of countries. Britain has a track record of selling retired Royal Navy vessels into Chile and Brazil, and the shipbuilding sector has been boosted by sales of the T.26 frigate to Australia, Canada and more recently Norway. The Type 31 general-purpose frigate has been sold to Poland and Indonesia, with other sales prospects in Northern Europe, including Denmark. The table below reproduces the British Government figures on defence exports contracted (rather than deliveries made). Thus, it is the upward movement of the five-year rolling average which best signals the improving export performance of UK defence goods. The central point here is that the UK and its industries have considerable experience in securing defence exports.

Value of UK Defence Export Orders from 2013 to 2023 and 5-Year Moving Average



Source: https://www.gov.uk/government/statistics/uk-defence-export-statistics-2023/uk-defence-export-statistics-2023.

13 Conclusion and Looking Forward

To oversimplify, for much of the 1950s to the 1970s, the UK defence industry was not particularly efficient: NATO's massive-retaliation and then flexible-response doctrines, both stressing that there was not to be any capability for a sustained war, meant the industry was not of strategic importance. A lot of the sector was state-owned and over-staffed. Moreover, the managerial challenges to be efficient were substantial when orders and production levels had shrunk from the huge demands of the Second World War to much lower levels. Finally, state-controlled bodies often struggled for investment capital in the face of some Treasury staff who were keen to minimise expenditure.

From the mid-1980s, with the government privatising many bodies and exposing them to international competition, things began to change. Today, there are several companies with very strong technological and managerial capabilities, and no sense of complacency in most firms. The most prominent, clearly 'UK-badged' companies, such as BAE Systems, Rolls-Royce, QinetiQ and Babcock, have given themselves a 'multi-domestic' nature by establishing overseas branches with their own capabilities. Thales, Leonardo and Airbus are among those firms that have done something similar in the UK.

So, while it is necessary to scrutinise the effectiveness of UK defence firms, it is also necessary to consider the characteristics of the MoD as their dominant customer. It is not too difficult to find reasons to be critical. For too long, the MoD associated value with low price alone, was reluctant to take risks by using

new suppliers, and was slow in reaching decisions about requirements and their priority, choices of procurement strategies, and the selection of winners. It generally saw competition as the only way to motivate good supplier behaviour and also had only a limited understanding of company needs and operations.

All this is changing with high-level recognition of the defence industry as a national strategic asset and an important contributor to economic prosperity. In word and in some cases in practice, the government now recognises that defence contractors need to be seen as its partners rather than its adversaries. Among other changes, the regulations on single-source contracting, which allowed only profit levels unappealing to venture capital funds, are being amended.

Finally it must be noted that, in the spring of 2026, UK defence procurement and industry are significantly stalled. Historically the UK MoD has published a 10-year plan for equipment purchases and support. The 2024 Labour Government decided to widen its scope and to rename it the Defence Investment Plan (DIP). While these plans did not guarantee annual spending levels, they gave industry and the armed forces confidence about what they could plan for. Though months overdue, the DIP had not been released by the time of writing: reportedly the MoD's proposals were rejected as unaffordable by the Prime Minister and the Chancellor of the Exchequer. Since the MoD has struggled to agree internally on the reductions to be made. The Government has experienced criticism for its protracted handling of this problem which is closely linked to the much greater level of spending on social protection which public opinion does not want to see reduced.

In today's complex world, this author would suggest that the UK defence industry should be viewed as significantly resilient, having absorbed shocks of changing defence budgets, the end of the Cold War, and technological advances, particularly in electronics, computing, and data mining. For more than 30 years, survival for the remaining big UK firms should be viewed as an achievement in itself.

The future is uncertain, and this paper will not offer firm predictions when many credible scenarios can be generated. Suffice it to note that the UK industrial sector has not, in this author's memory, enjoyed the confidence and political support from the government which is apparent today.

Chapter 5

Australia's Evolving Defence Industrial Strategy

Peter J. Dean and Tom Corben

Introduction

Australia's 2023 Defence Strategic Review (DSR) and 2024 National Defence Strategy (NDS) identified the end of the long-standing concept of a 10-year strategic warning time in the Indo-Pacific, placing a new premium on outfitting the Australian Defence Force (ADF) for conventional deterrence at speed. Successive governments have thus placed a new premium on greater defence funding, accelerated procurement, and rapidly developing and transitioning advanced capabilities into service, objectives which permeated the government's 2024 Defence Industrial Development Strategy (DIDS). However, given limitations within the country's own industrial base, Australian governments have also sought to expand and deepen Australia's international defence industrial and technology partnerships with familiar allies like the United States and the United Kingdom as well as new partners in Europe and Northeast Asia. As it formulates its 2026 NDS and DIDS, Australia must grapple with how to balance self-sufficiency with international cooperation, as well as adequately resourcing defence procurement projects under fiscal constraints.

1 The Concepts and Drivers of Australian Defence Industrial Policy

Australia's approach to defence industrial strategy is built on several key strategic concepts and drivers: a complex interplay between strategy, local industry promotion, the desire for the highest-quality cutting-edge technology, US alliance politics, strategic geography, and the national defence budget.

At the macro level, the principal drivers for Australia's strategic settings have been its alliance with the United States and the broader strategic environment in the Indo-Pacific, factors which have strongly informed Australian strategic doctrine since the end of World War II. From the early 1970s until relatively recently, Australian defence policy settings have been oriented around what is known as the 'Defence of Australia' (DoA) doctrine. That approach was aimed at protecting the nation from potential threats emanating across the so-called 'air-sea gap' to Australia's north, and responding to potential low-level threats from smaller or middle powers in Australia's immediate region. With the risk of a direct threat to

Australia deemed low, the ADF was built around the concept of a 'balanced force,' with roughly equal weighting in size and funding between each of the three military services. It was also designed with the assumption that it would be capable of conducting most operations in support of the DoA doctrine without relying on US combat forces. Only in the advent of a war with a major power in Asia would Australia fall back on its alliance relationship. These design principles were, however, flexible enough to allow force packages – usually single service in their composition – to be embedded with their US counterparts on expeditionary operations outside of DoA, such as in the Gulf War, the Iraq War, and the war in Afghanistan.

To support this force design, guaranteed access to US military equipment and technology was deemed essential to grant Australia a military capability edge over any prospective regional threats emanating from Southeast Asia, and to foster high levels of interoperability with US forces. Beginning in the 1950s, this preference for American military capabilities over other alternatives – even Australian capabilities – has largely continued with respect to high-end military aircraft, land forces, munitions, and enabling systems for command and control, among other categories. The need to maintain a regional military capability edge also drove the development of a world-class, but relatively small, defence research and development sector within Australia, with particular strengths in specific areas like electronic warfare, advanced radar systems, and undersea capabilities to complement American platforms in Australian service. However, in order to offset any potential over-reliance on the US defence industrial complex, Australian governments and the ADF also regularly partnered with European countries or defence companies. This included several major purchases in the 1970s and 1980s, including French Mirage fighter aircraft, German Leopard tanks, and British Oberon-class submarines (later on, Australia also partnered with a Swedish defence company to design and build its current fleet of Collins-class submarines).[1] This mixed sourcing approach lasted well into the first decade of the 21st century.

Many of these capability decisions around European designs, partnerships, or purchases were also driven by successive Australian governments' desire to maintain a vibrant Australian defence industry through maximising Australian defence industry content in capability projects. In the case of the Navy and some parts of the Army, this included collaboration with European partners for the construction or assembly in Australia of major platforms such as German MEKO frigates, Spanish air warfare destroyers, and German Combat Reconnaissance Vehicles.[2] European designs were often viewed as better scaled and competitively priced for the ADF compared with US capabilities, while European partners were also seen

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1 See: Aviation Heritage Centre, "Dassault Mirage IIIO," Royal Australian Air Force, https://www.airforce.gov.au/sites/default/files/2023-07/Mirage%20A3-41.pdf; Royal Australian Navy, "Oberon-class submarines," Government of Australia, January 1, 1963, https://www.navy.gov.au/about-navy/history/history-milestones/oberon-class-submarines; Royal Australian Navy, "Collins-class submarine acquisition," Government of Australia, January 1, 1982, https://www.navy.gov.au/about-navy/history/history-milestones/collins-class-submarine-acquisition.

2 For examples, see: Royal Australian Navy, "HMAS Perth (III)," Government of Australia, https://www.navy.gov.au/capabilities/ships-boats-and-submarines/hmas-perth-iii; Royal Australian Navy, "HMAS Hobart (III)," Government of Australia, https://www.navy.gov.au/capabilities/ships-boats-and-submarines/hmas-hobart-iii; Australian Department of Defence, "Combat Reconnaissance Vehicle," Government of Australia, February, 2024, https://www.defence.gov.au/defence-activities/projects/combat-reconnaissance-vehicle.

as more flexible in their approach to local construction and maintenance opportunities, as well as conditions around technology sharing. However, these platforms were rarely straight 'off the shelf' purchases: many platforms, particularly Army and Navy capabilities, were adjusted to accommodate US combat systems and sensors as well as locally produced and designed add-ons, such as electronic warfare capabilities, sensors, or combat interfaces.

Dr. Dean

Mr. Corben

In diversifying the sources of Australian military capability and technology, the government's aim was to develop and maintain a level of Australian defence industry that could support the DoA doctrine. Though the US defence industrial base was regarded as a major source of additional capacity if circumstances required, the 1986 Review of Australia's defence capabilities produced by Professor Paul Dibb (known as 'the Dibb Review') nevertheless noted that 'diversification of our overseas supply sources…is an added element of insurance… [especially] in circumstances in which the United States would be unwilling or unable to supply materials in the quantities and time-frames we require.'[3]

In terms of local construction, Australian defence industrial capacity has often followed a seeming 'boom-and-bust' cycle of development, driven in some part by the small size of the ADF. For instance, often a factory would be built and a workforce developed to produce a specific platform for the ADF, but after a short production run, the factory would go into abeyance and the workforce would dissipate, with the cycle only to be repeated several years later for a different platform. This approach produced frequent cost overruns and production delays for key capabilities, making locally produced defence capabilities much more expensive than foreign military sales and limiting export opportunities to international partners. During the period between the 1990s and early 2010s, this approach was exacerbated by a focus in public policy on economic rationalisation and a 'just in time' approach to critical supply lines. This approach, combined with the relatively benign post-Cold War strategic environment in Asia, raised serious questions about the nature and purpose of Australian defence industry production. As a result, much of Australia's defence industrial base was subsequently oriented

3 Paul Dibb, *Review of Australia's defence capabilities* (Canberra, Australia: The Parliament of the Commonwealth of Australia, 1986), https://catalogue.nla.gov.au/catalog/2242156.

towards the maintenance and sustainment of in-service capabilities – often purchased from overseas – rather than local defence manufacturing, in order to maximise both profitability and to secure long-term government contracts.

In sum, the small size of the ADF, its force design principles, and changes in industrial and economic policy after the Cold War produced an Australian defence industrial landscape composed of a preponderance of smaller local companies mixed with a small number of large overseas 'prime' defence companies. This remains the case today. Overall, this approach meant that the Australian defence industry has remained relatively small and highly mixed in terms of its origin source, reflective of the ADF's range of mixed-source equipment with different capabilities generating a significant maintenance and sustainment burden, though this trend differs between the military services. To illustrate, the Royal Australian Navy currently operates a fleet of ships with little, if any, common industrial origin or consistency across chief features and systems.[4]

- Spanish-designed, Australian-modified and built air warfare destroyers with a US Aegis combat system, US Mk41 VLS weapons, and Norwegian Kongsberg naval strike missiles.
- German MEKO Frigates, modified and built in Australia with a SAAB combat system interface, US Mk41 VLS system, Kongsberg naval strike missiles, and Australian CEA radars (to be replaced with 'off the shelf' Japanese Mogami Frigates).
- Swedish-designed, Australian-modified and built diesel-electric submarines with a US combat system, US Mk41 torpedos, and Australian Thales sonar system and sensors.
- Anti-submarine warfare frigates based on a UK Type 26 design, highly modified in Australia with a US Aegis air warfare system and Australian CEA Radars.
- German-designed and Australian-modified and built offshore patrol vessels, and Australian-designed and built patrol boats.

By contrast, since the 1980s, the Royal Australian Air Force (RAAF) has consolidated its fleet of aircraft of all types based almost entirely around US platforms.[5]

- F/A-18F Super Hornet.
- EA-18G Growler electronic warfare aircraft (Australia being the only country outside the US to operate this capability).
- F-35A Joint Strike Fighter.
- AP-8A Poseidon maritime patrol aircraft.
- E-7A Wedgetail airborne early warning and control aircraft (designed for the RAAF).

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4 See: Royal Australian Navy, "Ships, boats and submarines," Government of Australia, https://www.navy.gov.au/capabilities/ships-boats-and-submarines.

5 See: Royal Australian Air Force, "Aircraft," Government of Australia, https://www.airforce.gov.au/aircraft.

- MQ-4C Triton unmanned aerial surveillance drone.
- C-130J Super Hercules transport aircraft.
- C-17 Globemaster transport aircraft.

The only aircraft the RAAF operates that is not of US origin is the Italian C-27J Spartan transport aircraft.[6] This aircraft was purchased in 2012 based in part on the employment of its airframe in the US Air Force beginning in 2008 and Australian expectations that it would remain in service over the long term. However, the program was cut by the US government in 2013.[7]

2 Mapping the Australian Defence Industry

Overall, these trends have created a contemporary Australian defence industry that is overwhelmingly built around small to medium enterprises (SMEs), with an emphasis on small. For instance, the Australian Bureau of Statistics defines a small business as an organisation with 5 to 19 employees and a medium enterprise as having 20 to 199 employees. In the Australian defence industry, the average supplier employs

Australian Defence Industry Direct Employment Headcount

Industry	2023–24	2022–23
Professional/technical services	24,400	21,400
Construction	13,300	13,400
Manufacturing	11,400	10,800
Transport/warehousing	4,100	3,900
Administrative services	2,900	2,700
Training	2,800	2,700
Information/telecommunications	1,200	1,000
Rental/real estate services	900	1,300
Utilities	700	600
Financial/insurance services	300	200
Other services	200	100
Total	**69,400**	**63,600**

Source: ABS.

6 Australian Department of Defence, "C-27J Spartan Light Tactical Fixed Wing Airlift," Government of Australia, February 2024, https://www.defence.gov.au/defence-activities/projects/c-27j-spartan-light-tactical-fixed-wing-airlift.

7 Robert F. Dorr, 'Unwanted Air Force C-27J Spartans' Future Will Be Decided Soon,' Defense Media Network, November 8, 2013, https://www.defensemedianetwork.com/stories/unwanted-air-force-c-27j-spartans-future-will-be-decided-soon/.

only 13 people and achieves net annual sales of about $2.2 million AUD.[8] Overall, there are 69,400 people employed at 5,539 private businesses across the Australian defence industry, mostly in the professional, scientific, or services sectors.[9] By comparison, there are no truly Australian large ('prime') defence companies, with almost all such companies in Australia functioning as local subsidiaries of major US, European, or Northeast Asian defence companies such as Lockheed Martin, Raytheon (RTX), Northrop Grumman, BAE Systems, Thales, Hanwha Defence Australia, and Mitsubishi Heavy Industries.

Australian SMEs are not without their value. Indeed, many of these entities have produced world-leading capabilities that have been adopted into service by Australia and other key partners like the United States. The war in Ukraine has also demonstrated the flexibility and innovation that SMEs can provide, given the volume of companies that have made outsized contributions to Ukraine's military firepower through rapid development of drone technology.[10] It is no coincidence that these sorts of companies are also the focus of Australian initiatives like the Advanced Strategic Capabilities Accelerator (ASCA), established in May 2023 to facilitate the rapid identification, development, and entry into service of disruptive and emerging technologies and capabilities to meet urgent operational requirements.[11]

Examples of preeminent Australian SMEs include CEA Technologies, a company that produces world-class phased array radars that equip the RAN's ships and ground-based radars for ISR and air defence. The company was seen as so important to the ADF that in July 2023, the Australian government acquired an ownership stake in the company.[12] Another key company is Austal Defence Australia. Started in Western Australia in 1988, it is now a global ship builder with modern shipyards located in Western Australia, the United States of America, Vietnam, and the Philippines. Under the new 2025 Commonwealth Government Strategic Shipbuilding Agreement, Austal is now the Australian government's principal shipbuilder and will, in partnership with external designers, deliver 18 Landing Craft Medium and eight Landing Craft Heavy for the Australian Army, as well as Mogami-class frigates for the RAN in partnership with Mitsubishi Heavy Industries.[13]

The defence industry in Australia is undergoing somewhat of a renaissance under the current Labor government of Anthony Albanese. Driven by rapidly changing strategic circumstances in the Indo-Pacific,

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8 David Uren, "You call that a defence industry?" The Strategist, June 12, 2025, https://www.aspistrategist.org.au/you-call-that-a-defence-industry/.

9 See: Australian Bureau of Statistics, "Australian Defence Industry Account, experimental estimates: Estimates of the defence industry's direct contribution to the Australian economy," Government of Australia, April 16, 2025, https://www.abs.gov.au/statistics/economy/national-accounts/australian-defence-industry-account-experimental-estimates/latest-release#changes-in-this-issue.

10 Uren, "You call that a defence industry?"

11 Defence Science and Technology Group, "The Establishment of the Advanced Strategic Capabilities Accelerator," Australian Department of Defence, May 1, 2023, https://www.dst.defence.gov.au/news/2023/05/01/establishment-advanced-strategic-capabilities-accelerator.

12 Australian Department of Defence, "Albanese Government to secure leading edge Defence capability ," Government of Australia, April 27, 2023, https://www.minister.defence.gov.au/media-releases/2023-04-27/albanese-government-secure-leading-edge-defence-capability.

13 Australian Department of Defence, "Strategic Shipbuilding Agreement," Government of Australia, August 28, 2025, https://www.defence.gov.au/business-industry/industry-capability-programs/continuous-naval-shipbuilding-sustainment-enterprise/strategic-shipbuilding-agreement.

the Labor Party has brought a new energy and a reform agenda to defence industry policy. As a consequence, the Australian defence industry is in the midst of a period of steady growth. In 2022–23, the Department of Defence awarded over $38 billion in contracts, accounting for almost 52 per cent of the value of all Commonwealth procurement contracts. Beyond SMEs, these funding flows are contributing to positive shifts in the health and viability of medium and larger businesses. In 2022–23, there was an 8.8 per cent increase in the number of medium businesses and an 8.0 per cent increase in the number of large businesses from the previous year.[14] In 2023–24, the Australian defence industry contributed $11.9b (0.47%) to Australia's gross value added, up 12.4% from the previous year, and the industry's employment was up 9.1%.[15] In that respect, Australia's defence industry is increasingly capable of helping the nation respond to its evolving strategic circumstances, though not without the help of international partners (as discussed below).

3 A New Direction of Australian Defence Industry Strategy: Contemporary Policy Changes

A primary driver of this recent growth in the Australian defence industry has been a fundamental reappraisal of the nation's strategic circumstances. While Australia has grappled with the implications of the rise of China since at least 2009,[16] it was only with the 2023 Defence Strategic Review (DSR) that the basis for Australian industrial and military strategy was fundamentally updated. The DSR formally ended the DoA era, proposing a concept of 'National Defence' in its place. 'National Defence' ended the concept of 10 years of strategic warning time of major conflict – that is, the time which the nation's military would have to prepare to fight a major war – as a basis for Australian defence planning, updated the primary threats to Australian security from low level conflicts to major power war, and placed strategic competition between China and the United States (along with its chief allies) as the central factors that animate Australian defence planning.[17] Importantly, 'National Defence' also called for a 'whole-of-government' and 'whole-of-nation' approach, emphasising the need to harness all elements of national power to manage the growing risk of near-term major war in the Indo-Pacific.

It is these concepts which have reshaped the contours of Australian defence industry planning. Both the DSR and the subsequent 2024 National Defence Strategy posited the defence industry as a critical

14 Australian Department of Defence, *Defence Industry Development Strategy* (Canberra, Australia: Government of Australia, 2024), https://www.defence.gov.au/sites/default/files/2024-02/Defence-Industry-Development-Strategy.pdf.

15 Australian Bureau of Statistics, "Australian Defence Industry Account."

16 See: Australian Department of Defence, *Defending Australia in the 21st Century: Force 2030 - Defence White Paper 2009* (Canberra, Australia: Government of Australia, 2009), https://www.defence.gov.au/sites/default/files/2021-08/defence_white_paper_2009.pdf.

17 Australian Department of Defence, *National Defence: Defence Strategic Review 2023* (Canberra, Australia: Government of Australia, 2023), https://www.defence.gov.au/about/reviews-inquiries/defence-strategic-review.

enabler of, and requirement for, Australia's national security.[18] Through these two documents, the Australian government has formally recognised the vulnerabilities of its defence industry capability, including: its limited size; a need for greater innovation, procurement, and contracting reform; limited export opportunities; sub-par government engagement with industry; and local skills and workforce limitations. Thus, these documents articulated a desire to support, grow, and enable innovation and capacity within the Australian defence ecosystem. Innovation and research and development are central to that agenda, with the government pursuing the creation of new mechanisms to support AUKUS Pillar II, including the establishment of an Advanced Strategic Capabilities Accelerator (ASCA). The DSR and NDS also emphasised the need to accelerate and streamline defence acquisition processes and expand sovereign capacity in critical areas including shipbuilding, the fuel industry, and critical science and technology industries. The DSR also explicitly connected economic security with national security, highlighting the need to recruit, train, and skill more Australians for jobs in defence and defence-adjacent industries to enhance national resilience. Critical to enabling this approach has been the establishment of a National Support Division in Defence to connect industry to defence needs in time of war or conflict, and the establishment of Guided Weapons and Explosive Ordnance Group (GWEO) to grow missile and weapons manufacturing in Australia in 2023–2025.

Out of the DSR and NDS came the 2024 Defence Industry Development Strategy (DIDS),[19] a document which the government presented at its launch as defining "the strategic rationale for a sovereign defence industrial base" and highlighting "pathways for maximising support for Australian industry and its critical contribution to national security."[20] The DIDS identified seven Sovereign Defence Industrial Priorities that the government would pursue in those efforts:

1. Maintenance, repair, overhaul, and upgrade (MRO&U) of ADF aircraft.
2. Continuous naval shipbuilding and sustainment.
3. Sustainment and enhancement of the combined-arms land system.
4. Domestic manufacture of guided weapons, explosive ordnance, and munitions.
5. Development and integration of autonomous systems.
6. Integration and enhancement of battlespace awareness and management systems.
7. Test and evaluation, certification, and systems assurance.[21]

More recently, in December 2025, the Australian government also announced the creation of a new

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18 Ibid; Australian Department of Defence, *2024 National Defence Strategy* (Canberra, Australia: Government of Australia, 2024), https://www.defence.gov.au/about/strategic-planning/2024-national-defence-strategy-2024-integrated-investment-program.

19 Australian Department of Defence, Defence Industry Development Strategy.

20 Australian Department of Defence, "Landmark strategy to maximise support for Defence industry," Government of Australia, February 29, 2024, https://www.minister.defence.gov.au/media-releases/2024-02-29/landmark-strategy-maximise-support-defence-industry.

21 Australian Department of Defence, Defence Industry Development Strategy.

Defence Acquisition Agency (DAA) under a Director of National Armaments.[22] The DAA is designed to address the trouble-plagued Australian defence acquisition process, which the present government has consistently noted was implementing "28 different projects running a combined 97 years over time" when it first came to office in 2022,[23] though at the time of writing it remains unclear exactly how this new agency will address these problems.

4 International Partnerships

Though much of the above focusses on sovereign defence capability and domestic economics, the emphasis in the NDS on allies and partners, the need for collective deterrence, and the immediacy of Australia's capability requirements have meant that contemporary Australian defence industry strategy continues to lean heavily on international partnerships. Central to these efforts have been deepening bilateral defence industrial cooperation with the United States and exploring new capability partnerships with Japan and South Korea, as well as pursuing several minilateral defence industrial partnerships focussed on capability and technology development and supply chain integration, most notably AUKUS.

Bilateral Relationships

The United States

Australia has sought to expand the aperture of alliance defence industrial and technology cooperation beyond procuring and maintaining US-made weapons systems for the ADF. These efforts are guided by Australia's perception of changes in its regional strategic circumstances, where US military dominance in Asia has ended and its unfettered access to and across the region in a conflict is no longer guaranteed.[24] As such, Australia has sought to situate defence industrial cooperation as the key enabler both of a more capable ADF and of the alliance's broader full-spectrum defence agenda.

Firstly, Australia has sought to expand its maintenance, repair, and overhaul (MRO) capacity for alliance forces across all domains. This has chiefly involved expanding the capacity of US primes in Australia's defence industrial marketplace to conduct deep maintenance and regular sustainment of US rotational forces and, by extension, to provide similar services to the ADF. In recent years, these companies have been certified to carry out more extensive maintenance on US origin aircraft, including the P-8A

22 Australian Department of Defence, "Reforming Defence capability development and delivery," Government of Australia, December 1, 2025, https://www.minister.defence.gov.au/media-releases/2025-12-01/reforming-defence-capability-development-delivery.

23 Australian Department of Defence, "Quality of Defence spending top priority for Albanese Government," Government of Australia, October 10, 2022, https://www.minister.defence.gov.au/media-releases/2022-10-10/quality-defence-spending-top-priority-albanese-government.

24 Australian Department of Defence, *2024 National Defence Strategy.*

maritime patrol aircraft, MH-60R naval helicopters, and F-35 Joint Strike Fighters.[25] Australian companies will also be certified to maintain and sustain forward-positioned US Army capabilities under a September 2024 bilateral military logistics agreement.[26] These initiatives directly support upgrades to Australia's northern bases to support higher tempo operations by combined forces, including US aircraft "of all types."[27]

Secondly, Australia has sought to deepen alliance supply chain integration for precision munitions, leveraging US assistance to support its Guided Weapons and Explosive Ordnance (GWEO) initiative.[28] This effort has initially focussed on co-assembly arrangements, upscaling production capacity for essential components like rocket motors, and the transfer of US technology and technical data to streamline production and sustainment for specific land-focussed systems including 155mm artillery rounds and guided multiple launch rocket systems.[29] However, cooperation is expanding to more sophisticated weapons like the Precision Strike Missile (PrSM), the Mk-48 torpedo, SM-2 missile interceptor, and other priority weapons for both countries.[30]

Thirdly, Australia has also sought to expand alliance technology cooperation through a combination of enhanced access to US technologies, new cooperative programs, and co-development projects for emerging technologies. For instance, in late 2020, Australia and the United States upgraded cooperation on air-breathing hypersonic weapons through the Southern Cross Integrated Flight Research Experiment (SCIFiRE) allied prototyping program,[31] an initiative linked to the US Hypersonic Attack Cruise Missile

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25 Australian Defence Magazine, "Boeing commences first P-8A deeper maintenance in Australia," August 5, 2022, https://www.australiandefence.com.au/defence/air/boeing-commences-first-p-8a-deeper-maintenance-in-australia; Emma Taylor, "Work on US Navy helicopter breaks ground," Australian Department of Defence, June 27, 2023, https://www.defence.gov.au/news-events/news/2023-06-27/work-us-navy-helicopter-breaks-ground; Michael Rogers, "Hands-on aids boost F-35A maintenance," Australian Department of Defence, June 20, 2025, https://www.defence.gov.au/news-events/news/2025-06-20/hands-aids-boost-f-35a-maintenance.

26 Australian Defence Magazine, "Maintenance responsibilities for US Army equipment in Australia formalised," July 2, 2024, https://www.australiandefence.com.au/defence/land/maintenance-responsibilities-for-us-army-equipment-in-australia-formalised.

27 See: Australian Department of Defence, "$1.6 billion to upgrade RAAF Base Tindal to protect Australians and create jobs," Government of Australia, February 21, 2020, https://www.minister.defence.gov.au/media-releases/2020-02-21/16-billion-upgrade-raaf-base-tindal-protect-australians-create-jobs; Australian Department of Foreign Affairs and Trade, Joint Statement Australia-U.S. Ministerial Consultations (AUSMIN) 2021, Government of Australia, September 16, 2021, https://www.dfat.gov.au/geo/united-states-of-america/ausmin/joint-statement-australia-us-ministerial-consultations-ausmin-2021; Australian Department of Defence, "Construction commenced on RAAF Base Darwin Mid-Term Refresh Project," Government of Australia, May 1, 2025, https://www.defence.gov.au/news-events/releases/2025-05-01/construction-commenced-raaf-base-darwin-mid-term-refresh-project.

28 Alice Nason and Tom Corben, "GWEO rockets up the US alliance agenda, but Australia isn't close to self-sufficiency," The Strategist, September 3, 2024, https://www.aspistrategist.org.au/gweo-rockets-up-the-us-alliance-agenda-but-australia-isnt-close-to-self-sufficiency/.

29 United States Department of Defense, "Fact Sheet: 2023 Australia – U.S. Ministerial Consultations (AUSMIN)," Government of the United States, July 29, 2023, https://www.war.gov/News/Releases/Release/Article/3476036/fact-sheet-2023-australia-us-ministerial-consultations-ausmin/.

30 United States Department of Defense, "Fact Sheet: 2023 Australia – U.S. Ministerial Consultations (AUSMIN)," Government of the United States, July 29, 2023, https://www.war.gov/News/Releases/Release/Article/3476036/fact-sheet-2023-australia-us-ministerial-consultations-ausmin/; United States Department of Defense, "Fact Sheet: 2024 Australia-U.S. Ministerial Consultations (AUSMIN)," Government of the United States, August 6, 2024, https://www.war.gov/News/Releases/Release/Article/3863763/fact-sheet-2024-australia-us-ministerial-consultations-ausmin/.

31 Australian Department of Defence, "Australia collaborates with the US to develop and test high speed long-range hypersonic weapons," Government of Australia, December 1, 2020, https://www.minister.defence.gov.au/media-releases/2020-12-01/australia-collaborates-us-develop-test-high-speed-long-range-hypersonic-weapons.

(HACM) program that will see Australian fighter aircraft both test and ultimately deploy these weapons.[32]

Japan and South Korea

Australia has also sought new defence industrial and technology partnerships with Japan and South Korea to meet immediate capability requirements and to foster a larger, longer-term presence of both countries' defence companies in Australia's defence industrial base. Both the Korean and Japanese cases reflect a cultural shift across the Australian defence industrial policy spectrum away from an absolute preference for Western military capabilities towards a greater appetite for alternative (albeit interoperable) suppliers.

With Japan, Australia's selection of the Mogami-class Frigate to fulfill its Tier 2 surface combatant requirement has been heralded as a watershed moment both for Australian defence policy and for the bilateral special strategic partnership.[33] The Mogami frigate clearly met Australia's immediate capability and delivery requirements, but its selection also adds a missing industrial and technology component to the rapidly growing bilateral defence agenda. Specifically, the agreement will initially see Australia procure three Mogami-class Frigates 'off the shelf' before building the remaining eight vessels in Western Australia, creating both local production capacity and a means to support visiting Japanese naval forces, along with potential regional export opportunities.[34] Crucially, it will also see Mitsubishi Heavy Industries and an array of supporting Japanese companies establish a regular presence in the Australian defence market. With South Korea, Australia has awarded contracts to Hanwha Defence Australia to deliver new self-propelled howitzers and infantry fighting vehicles to the Australian Army, deals which included competitive local production, export, and technology transfer conditions,[35] though the contracts for these platforms were reduced as part of the overall rebalancing of Australian force structure following the 2023 Defence Strategic Review and 2024 National Defence Strategy.[36]

European Partners

Australia's historical preference for European partners to supplement US capabilities and industrial capacity appears to be shifting. True, the UK's BAE and Spain's Navantia continue to support Australia's naval surface fleet requirements; Thales Australia remains custodian of much of the country's national defence infrastructure; and Germany's Rheinmetall continues to locally produce some land capabilities for

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32 Ben Felton, "Hypersonic Attack Cruise Missile to be integrated on RAAF Super Hornets," Australian Defence Magazine, July 11, 2024, https://www.australiandefence.com.au/defence/air/hypersonic-attack-cruise-missile-to-be-integrated-on-raaf-super-hornets.

33 Australian Department of Defence, "Mogami-class frigate selected for the Navy's new general purpose frigates," Government of Australia,August5,2025,https://www.minister.defence.gov.au/media-releases/2025-08-05/mogami-class-frigate-selected-navys-new-general-purpose-frigates.

34 Ibid.

35 Australian Department of Defence, "$1 billion defence contract, sovereign defence manufacturing facility in Geelong announced," Government of Australia, December 13, 2021, https://www.minister.defence.gov.au/media-releases/2021-12-13/1-billion-defence contract-sovereign-defence-manufacturing-facility-geelong-announced; Australian Department of Defence, "Contracts signed for Infantry Fighting Vehicles," Government of Australia, December 8, 2023, https://www.minister.defence.gov.au/media-releases/2023-12-08/contracts-signed-infantry-fighting-vehicles.

36 Tom Corben, *Before the window closes: Australia-South Korea defence cooperation in a new strategic era* (Sydney, Australia: United States Studies Centre, 2023), https://www.ussc.edu.au/before-the-window-closes.

the ADF and for export.[37] Yet recent years have seen plans to acquire French submarines scrapped and the early retirement of European-designed helicopters, while Australia has selected Northeast Asian suppliers over European competitors for several recent major Army and Navy contracts.[38]

One notable exception to this trend has been the emergence of Norway's Kongsberg as a leading contributor to Australia's GWEO enterprise. Under an August 2024 agreement worth AUD$850 million, the Australian government has worked with Kongsberg Defence Australia both to procure Naval Strike Missiles (NSM) and Joint Strike Missiles (JSM) to meet Australia's immediate long-range strike capability requirements, and to develop local manufacturing and maintenance facilities for those systems.[39] In addition, this cooperation has already produced over $80 million in export contracts from Kongsberg Defence Australia to European buyers.[40]

Minilateral Partnerships

To complement work at the national and bilateral level, Australia has sought to advance its defence industrial and technology strategy through a number of bespoke minilateral partnerships at the nexus of MRO, supply chain resilience, technology co-development, force posture, and joint operations.

AUKUS

Most prominently, Australia deepened trilateral defence industrial and technology cooperation with the United States and the United Kingdom through AUKUS. This work is intended to drive Australia's further integration with the defence industrial bases of both countries through cooperation on workforce development, technology sharing, supply chain resilience, and capability delivery. Much as with the US alliance, AUKUS effectively connects efforts to build a more vibrant Australian defence industrial base with underwriting effective force posture initiatives and joint regional operations with allies and partners and the development of a more resilient and self-sufficient ADF, and supporting an enduring US military presence in Asia through larger and more direct contributions to key defence capability, supply chain, and technological initiatives of specific relevance to Australian strategic requirements.[41]

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37 Navantia Australia, "Hobart Class Destroyer (DDG)," https://navantia.com.au/capabilities/hobart-class-destroyers/; Australian Department of Defence, "Landmark production contract signed for Boxer Heavy Weapon Carrier vehicle export to Germany," Government of Australia, April 10, 2024, https://www.defence.gov.au/news-events/releases/2024-04-10/landmark-production-contract-signed-boxer-heavy-weapon-carrier-vehicle-export-germany.

38 Stephen Dziedzic, "Australia picks Japan to build $10b frigates after fierce contest," ABC News, August 5, 2025, https://www.abc.net.au/news/2025-08-05/australia-japan-navy-frigates/105613688.

39 Australian Department of Defence, *The Australian Guided Weapons and Explosive Ordnance Plan* (Canberra, Australia: Government of Australia, 2024), https://www.defence.gov.au/about/strategic-planning/australian-guided-weapons-explosive-ordnance-plan.

40 Australian Department of Defence, "Defence export success for South Australian missile manufacturer," Government of Australia, August 14, 2025, https://www.minister.defence.gov.au/media-releases/2025-08-14/defence-export-success-south-australian-missile-manufacturer.

41 Tom Corben and Sophie Mayo, *Federation is deterrence: The US defence industrial and technology integration agenda in the Indo-Pacific* (Sydney, Australia: United States Studies Centre, 2025), https://www.ussc.edu.au/federation-is-deterrence-the-us defence-industrial-and-technology-integration-agenda-in-the-indo-pacific.

Through Pillar I, Australia has pursued a range of measures to prepare for the delivery of its own nuclear-propelled attack submarine fleet beginning in the 2030s, as part of the three-phase Optimal Pathway announced in March 2023.[42] During Phase 1, Australia has sought to expand and upskill its national defence and defence industrial workforce to "safely operate, maintain and regulate naval nuclear propulsion technology,"[43] including through bespoke technology transfer arrangements, increasingly sophisticated MRO engagements on US Virginia-class submarines at Submarine Rotational Force-West (SRF-West), sending Australian officers and engineers for education in the United States, and co-crewing arrangements aboard US submarines.[44] This preparatory groundwork will enable Australia to take delivery of between three to five US Virginia-class submarines beginning in the 2030s under Phase 2 of the Optimal Pathway, and to prepare for the co-development and co-production of the future 'SSN-AUKUS' submarine under Phase 3. Australia has also made significant direct investments in all three nations' submarine industrial bases to support both near- and long-term submarine production requirements for all three countries.[45]

On Pillar II, Australia has pursued a suite of advanced capability projects through a range of trilateral research, development, testing, and evaluation (RDT&E) activities. In broad terms, these activities have focussed on maximising the interoperability and efficiency of advanced capabilities already in service; identifying and coordinating on 'best-of-breed' technology adoption; enhanced information-sharing across multiple domains at the tactical, operational and strategic levels; and regulatory and policy harmonisation to streamline further cooperation, including ambitious reforms to export controls in all three countries to streamline defence trade and co-development. These activities have supported the development of Australia's defence industrial base through spotlighting Australian technological solutions – including those available in the commercial and dual-use sectors – for national and/or trilateral adoption, and galvanising Australian capital and technology to support defence priorities, sharing an evident synergy

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42 Australian Department of Defence, "AUKUS nuclear-powered submarine pathway," Government of Australia, March 14, 2023, https://www.minister.defence.gov.au/media-releases/2023-03-14/aukus-nuclear-powered-submarine-pathway.

43 Australian Submarine Agency, "Optimal Pathway," Australian Department of Defence, June 20, 2025, https://www.asa.gov.au/aukus/optimal-pathway.

44 For instance, see: Australian Submarine Agency, *Agreement among the United Kingdom of Great Britain and Northern Ireland, Australia, and the United States of America for Cooperation related to Naval Nuclear Propulsion* (Canberra, Australia: Government of Australia, 2024), https://www.asa.gov.au/sites/default/files/documents/2024-10/Agreement%20among%20the%20Governments%20of%20Australia%20UK%20and%20US%20for%20cooperation%20related%20to%20naval%20nuclear%20propulsion%20v2.pdf; Australian Department of Defence, "Seven Royal Australian Navy enlisted Sailors graduate Nuclear Power School in an AUKUS first," October 14, 2025, https://www.defence.gov.au/news-events/releases/2024-10-14/seven-royal-australian-navy-enlisted-sailors-graduate-nuclear-power-school-aukus-first; Mark Tesoriero, "Aussie torpedoman takes on US attack subs," Australian Department of Defence, November 27, 2025, https://www.defence.gov.au/news-events/news/2025-11-27/aussie-torpedoman-takes-us-attack-subs; Australian Submarine Agency, "USS Vermont departs following successful maintenance period," Australian Department of Defence, November 28, 2025, https://www.asa.gov.au/news/uss-vermont-departs-following-successful-maintenance-period.

45 Australian Submarine Agency, "Joint Leaders Statement to Mark the Third Anniversary of AUKUS," Australian Department of Defence, September 18, 2024, https://www.asa.gov.au/news/all-news/2024-09-18/joint-leaders-statement-mark-third-anniversary-aukus; Colin Clark, "Australia pays US another $525 million to bolster AUKUS industrial base," Breaking Defense, July 23, 2025, https://breakingdefense.com/2025/07/australia-pays-us-another-525-million-to-bolster-aukus-industrial-base/; Reuters, "Australia to invest $8 billion in nuclear submarine shipyard," September 14, 2025, https://www.reuters.com/business/aerospace-defense/australia-invest-8-billion-nuclear-submarine-shipyard-2025-09-13/.

with the scope and objectives of ASCA.[46]

Australia-Japan-United States (AJUS)

Australia has also pursued greater trilateral defence industrial and technology cooperation with Japan and the US (AJUS), consistent with their shared view of one another as the 'core' of a collective regional defence strategy.[47] Much as with their operational cooperation, these efforts have largely centred on trilateralising different bilateral activities.[48] For example, the three countries are exploring opportunities for jointly testing and producing the US-developed Tomahawk Land Attack Missile (TLAM), as a means to network Australia-US cooperation through GWEO with US-Japan collaboration on Tokyo's counterstrike capability development.[49] Under a new RDT&E agreement, AJUS have also pursued cooperation on collaborative combat aircraft (CCA), including developing a Trilateral Human Machine Teaming and joint research on composite aerospace materials,[50] while Japan has also participated in AUKUS Pillar II activities focussed on maritime autonomy and undersea warfare.[51]

Conclusion: Challenges for the Next NDS and DIDS

Overall, Australia's emerging defence industrial strategy represents a concerted effort to more comprehensively situate this national capability within Australia's larger defence strategy, marking a step change in how policymakers conceive of the roles and requirements of national defence production and innovation. Though this includes a renewed emphasis on building domestic capabilities across the full spectrum of defence industrial and technology issues, Australia also continues to lean heavily on an expanding array of international partnerships to meet these objectives. While Australia's alliance relationship with the United States remains central to Australia's defence industrial strategy, growing relationships with Japan and South Korea and a cluster of minilateral defence partnerships, including AUKUS, increasingly provide Australia with a wider range of partnership options.

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46 Defence Science and Technology Group, "The Establishment of the Advanced Strategic Capabilities Accelerator," Australian Department of Defence, May 1, 2023, https://www.dst.defence.gov.au/news/2023/05/01/establishment-advanced-strategic-capabilities-accelerator.

47 Tom Corben (ed.), Christopher Johnstone, Peter Dean and Tetsuo Kotani, *A partnership for the AJUS: Operationalising Australia-Japan-United States defence cooperation* (Sydney, Australia: United States Studies Centre, 2025), https://www.ussc.edu.au/a-partnership-for-the-ajus-operationalising-australia-japan-united-states-defence-cooperation.

48 Tom Corben, *On its own two feet: Advancing the Australia-Japan defence agenda* (Perth, Western Australia: Defence and Security Institute, 2024), https://defenceuwa.com.au/wp-content/uploads/2024/12/Black-Swan-Strategy-Paper-13_Tom-Corben-1.pdf.

49 Australian Department of Defence, "Trilateral Defence Consultations Ministerial Meeting Joint Statement on Efforts to Deepen Our Defence Cooperation," Government of Australia, May 31, 2025, https://www.minister.defence.gov.au/statements/2025-05-31/trilateral-defence-consultations-ministerial-meeting-joint-statement-efforts-deepen-our-defence-cooperation.

50 Ibid.

51 Australian Department of Defence, "AUKUS partners make waves in acoustic communication testing," Government of Australia, July 2023, 2025, https://www.defence.gov.au/news-events/releases/2025-07-23/aukus-partners-make-waves-acoustic-communication-testing.

Notwithstanding these advancements, however, forthcoming updates to the NDS and the DIDS due in 2026 will have to grapple with at least two major challenges to realising those objectives: a tension between swift procurement and local industry development, and a mismatch between Australia's ambitious defence procurement agenda and its current budget settings.

Speed to Capability Versus Defence Industrial Development

Perhaps the single biggest challenge for Australia going forward will be reconciling a seeming major contradiction at the heart of its defence industrial policy: an emphasis on minimum viable capability in the shortest possible time, versus enhancing Australia's own capacity to produce and maintain a wider array of defence capabilities. The government is attempting to grapple with this challenge by breaking down defence programming and spending commitments into epochs: 2023–2025, 2026–2031, and 2031.[52] In each epoch, the balance between off-the-shelf purchases and local innovation and content may change, but the key challenge for Defence will consistently be how to balance its investments into industry versus offshore sources, regardless of how it decides to distribute its procurement schedules and dollars. These challenges are already producing significant pressure across the defence budget, with a large percentage of the 2024 Integrated Investment Program currently consumed by big capability items like nuclear-powered submarines and frigates – most of which will take many years yet to come to fruition. These factors will constrain the bandwidth available to policymakers to make new flexible investments in other capabilities, issues that could become all the more apparent in the event of a regional crisis.

Funding: Will AUKUS Eat the Defence Budget?

Additionally, Australia must grapple with how to properly resource its defence industrial strategy in an uncertain economic environment. Perhaps more than alliance burden-sharing demands, internal Australian debates over defence spending are increasingly driven by concerns that, without further stimulus, the national defence budget will be predominantly consumed with the cost of delivering Australia's nuclear-powered submarine capability under AUKUS. Australia's top military officer from 2005–2011 and co-lead of the 2023 *Defense Strategic Review*, Sir Angus Houston, warned in November 2024 that AUKUS would 'cannibalize' other capability priorities without a substantial increase in Australian defence spending above 3%,[53] one that is unlikely in the near-term. How, where, and on what timescale Australia allocates additional money in support of its full suite of defence projects – not just AUKUS – will be crucial for the development of both a more vibrant Australian defence industry and a more capable ADF.

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52 Australian Department of Defence, *2024 Integrated Investment Program* (Canberra, Australia: Government of Australia, 2024), https://www.defence.gov.au/about/strategic-planning/2024-national-defence-strategy-2024-integrated-investment-program.

53 Colin Clark, "AUKUS will 'cannibalize' other programs with no budget boost: Former top Aussie general," Breaking Defense, November 20, 2024, https://breakingdefense.com/2024/11/former-top-aussie-general-warns-aukus-will-cannibalize-other-programs-with-no-defense-boost/.

Chapter 6

India's Defence Industrial Renaissance

Laxman Kumar Behera

Operation Sindoor, launched in early May 2025 to avenge the Pahalgam terror attack in Jammu and Kashmir was more than a turning point for India's anti-terror policy. For the first time in India's independent history, domestically produced state-of-the-art defence items played a key role in a major military conflict, showcasing what can be termed as the coming of age of the Indian defence industry. While offensive weapons such as Brahmos cruise missiles and Sky Striker kamikaze drones were instrumental in decimating Pakistan's terror and military infrastructure, defensive weapons such as the Akash missile system, Akashteer, Integrated Air Command and Control System (IACCS), and Drone-Detect, Deter and Destroy (D4) system played a pivotal role in defending India's land and skies from the Pakistani missile and drone attacks.[1]

The demonstration of India's military hardware prowess is indicative of the success of years of efforts by successive Indian governments to build and nurture a domestic arms production base, the range and depth of which has undergone a visible change over the years. The domestic industry's growing success is also evident from its volume of production and exports, which have grown significantly over the years, reaching INR 1,506 billion and INR 236 billion, respectively, in 2024–25. Encouraged by the industry's growing prowess, the Indian Ministry of Defence (MoD) has set even higher targets—INR 3 trillion in production and INR 500 billion in exports—for the industry to achieve by 2029. Is the industry geared to fulfil the MoD's ambitions, and what are the key challenges they are likely to face in their further progress?

This paper maps the progress of India's arms production and, in so doing, looks at various reform measures that the successive Indian governments have taken to create a vibrant defence industrial base. A particular emphasis is laid on reforms undertaken under the broad ambit of the Make in India initiative that was launched in 2014. The paper then examines whether defence industrial success can be sustained for a prolonged period to propel the country to the rank of major arms producer. The paper begins with a broad survey of India's arms production with a special focus on key players and their performance.

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1 Laxman Kumar Behera, "Operation Sindoor: A Coming of Age for India's Defence Industry", *ORF Expert Speak*, June 16, 2025, https://www.orfonline.org/expert-speak/operation-sindoor-a-coming-of-age-for-india-s-defence-industry.

1 India's Arms Industry

Over the years, India has established an impressive defence industrial base that now counts a vast number of entities responsible for design, development, and/or production of a wide range of systems spanning from small arms and ammunition to electronics, missiles, fighter aircraft, and nuclear submarines.[2]

Owing to its historical legacy, India's defence industry is largely segregated into two distinct compartments of research and development (R&D) and production. The Defence Research and Development Organisation (DRDO), which functions under the administrative control of the MoD, is the principal agency for defence R&D. Its R&D activities span across disciplines of military technologies: aeronautics, electronics, armaments, engineering systems, combat vehicles, missiles, advanced computing and simulation, naval systems, special materials, life sciences, and information systems, among others. Established in 1958, the DRDO has grown from 10-odd labs to more than 50 labs and other establishments with 21,731 personnel (as of August 2023).[3] Presently, the organisation, with a budget of INR 268 billion in 2025–26, is involved in 292 projects worth more than INR 1,171.62 billion.[4] Some of the DRDO's key armament programmes are mentioned in Table 1.

The arms production is undertaken by both public and private sector entities. The public sector, especially the Defence Public Sector Undertakings (DPSUs) which are directly controlled by the MoD,

Table 1. DRDO's Key Armament Programmes

Inducted / Approved for Procurement	Under Developmental / User Trials	Under Development
'Astra' Beyond Visual Range Air-to-Air Missiles	Quick Reaction Surface-to-Air Missile (UT)	Advanced Medium Combat Aircraft (AMCA)
'Akash' Surface-to-Air Missiles	Advanced Light Weight Torpedo	Hypersonic Glide Vehicle
Anti-Tank 'Nag' Missile	Long Range Anti-Ship Missile	Long Range Surface-to-Air Missile
Medium Range Anti-Ship Missile (MRAshM)	High Endurance Autonomous Underwater Vehicle	Long Range Radar
UAV Launched Precision Guided Munitions (ULPGM)	Air-to-Air Missile 'Astra' Mk-2	Electronic Intelligence System
Long Range Land Attack Cruise Missiles (Nirbhay)	Indian Light Tank	Airborne Early Warning & Control Mark-2 System
Air Defence Tactical and Fire Control Radars	Very Short-Range Air Defence System	Future Infantry Combat Vehicle

Source: Standing Committee on Defence, *Demands for Grants (2025-26)*, 7th Report (Lok Sabha Secretariat: New Delhi, 2025), pp. 67–68.

2 For a detailed review of India's defence industry, see Laxman Kumar Behera, *Indian Defence Industry: An Agenda for Making in India* (Pentagon Press: New Delhi, 2016).

3 Of the total personnel, about 6,700 are scientists and engineers. See Standing Committee on Defence, "A review of the working of the defence research and development organisation", 42nd Report (Lok Sabha Secretariat: New Delhi, 2023), p. 13.

4 Standing Committee on Defence, *Demands for Grants (2025-26)*, 7th Report (Lok Sabha Secretariat: New Delhi, 2025), p. 66.

Table 2. India's Defence Production

Year	Old DPSUs (INR Billion)	New DPSUs (INR Billion)	Other Public Sector Undertakings/ Joint Ventures (INR Billion)	Private Sector (INR Billion)	Total Production (INR Billion)	Share of Private Sector (%)
2016–2017	404.27	148.25	46.98	141.04	740.54	19
2017–2018	434.64	148.29	51.80	153.47	788.20	19
2018–2019	453.87	128.16	55.67	173.50	811.20	21
2019–2020	476.55	92.27	62.95	158.94	790.71	20
2020–2021	467.11	146.35	60.29	172.68	846.43	20
2021–2022	557.90	119.13	72.22	199.20	948.45	21
2022–2023	634.66	169.98	71.37	210.83	1,086.84	19
2023–2024	744.34	195.51	67.74	266.75	1,274.34	21
2024–2025	866.02	218.21	81.88	339.79	1,505.90	23

Source: Department of Defence Production, Ministry of Defence, https://ddpdashboard.gov.in/defence-production.

however, dominate India's defence production.[5] The DPSUs are supported by several other Public Sector Undertakings (PSUs) (which are administered by other central government ministries) and, increasingly, the private players. The public and private entities together produced defence items worth INR 1.5 trillion ($17.8 billion) in 2024–25 (see Table 2), with the government setting a target of INR 1.90 trillion for 2025–26 and INR 3.0 trillion by 2029.[6]

Of the 16 DPSUs that function under the administrative control of the MoD, seven are newer ones which came to their present structure in 2021 when the government converted the erstwhile departmentally-run 39 ordnance factories (OFs) into seven distinct corporate entities.[7] The remaining nine—known as the old DPSUs[8]—function across six different verticals of the defence industry: aeronautics, electronics, missiles, earthmoving equipment, materials, and shipbuilding (see Table 3 for key facts of DPSUs).

Hindustan Aeronautics Ltd (HAL) is the largest DPSU with a turnover of INR 301.05 billion (representing 20 per cent of India's total defence production or 26 per cent of total public sector defence production) in 2024–25. It manufactures military aircraft and associated equipment. HAL is followed by Bharat Electronics Ltd (BEL), whose turnover totalled INR 230.24 billion in 2024–25.[9] India has four dedicated shipyards under the control of the MoD, of which Mazagon Dock Shipbuilders Ltd (MDL) is the

5 Laxman Kumar Behera, "The State of India's Public Sector Defence Industry", ORF Occasional Paper No. 419, October 2023, https://www.orfonline.org/research/the-state-of-indias-public-sector-defence-industry.

6 Department of Defence Production, Ministry of Defence, "DDP Dashboard", https://ddpdashboard.gov.in/.

7 These new DPSUs are: Munitions India Ltd (MIL), Armoured Vehicles Nigam Ltd (AVNL), Advanced Weapons and Equipment India Ltd (AWEIL), Yanta India Ltd (YIL), Gliders India Ltd (GIL), India Optel Ltd (IOL), and Troop Comforts Ltd (TCL).

8 These nine DPSUs are: Hindustan Aeronautics Ltd (HAL), Bharat Electronics Ltd, Bharat Dynamics Ltd (BDL), BEML, Mishra Dhatu Nigam Ltd (MIDHANI), Mazagon Dock Shipbuilders Ltd (MDL), Garden Reach Shipbuilders and Engineers Ltd (GRSE), Goa Shipyard Ltd (GSL), and Hindustan Shipyard Ltd (HSL).

9 Bharat Electronics Ltd, *Integrated Annual Report 2024-25*, p. 1.

Table 3. Key Facts of DPSUs, 2024–25

DPSU	Domain	Turnover (INR Bn)	Exports (INR Bn)	No. of Employees	R&D Expenditure (INR Bn)
HAL	Aircraft	301.05	4.00	23,999	24.82
BEL	Electronics	230.24	8.92	8,844	14.72
BDL	Missiles	33.45	12.70	2,269	2.23
BEML	Earth-moving equipment	40.22	2.99	4,761	1.01
MIDHANI	Special metals and alloys	10.74	0.94	786	0.24
MDL	Shipbuilding	114.32	0.00	6,039	1.18
GRSE	Shipbuilding	50.76	0.74	1,649	0.29
GSL	Shipbuilding	28.51	0.82	1,386	0.19
HSL	Shipbuilding	14.71	0.03	624	0.00
MIL	Munitions	82.14	30.81	21,856	0.60
AVNL	Armoured vehicles	49.84	0.00	10,358	0.66
AWEIL	Weapons and equipment	25.31	0.61	12,014	0.38
YIL	Specialised components	31.09	3.22	10,361	0.15
GIL	Parachutes	1.88	0.09	974	0.06
IOL	Optoelectronics	15.41	0.05	2,300	0.29
TCL	Troop comfort items	5.54	0.02	4,726	0.04

Source: Author's database.

largest, and the only one in the country that has expertise in construction of conventional submarines. Three DPSUs—HAL, BEL, and MDL—figure in SIPRI's top-100 defence companies in 2024.[10]

Compared to the DPSUs, private companies are relatively new players. Their entry was made possible by the 2001 defence industry liberalisation which allowed private participation in defence production, albeit through a system of industrial licensing. As of late 2025, the government has issued 788 industrial licenses to 462 companies.[11]

Within a short span of nearly 25 years, the private sector has made a mark in India's defence production, with its share in the country's defence production reaching nearly a quarter of the total by 2024–25 (see Table 2). Its share is likely to grow further going forward as several companies have accumulated huge orders over the past several years. As per the rating agency Crisil Ratings, the combined order book of 25 private companies, which together account for about half of India's defence production by the private sector, was estimated at INR 550 billion in 2024–25, up from INR 400 billion in the previous year.[12]

10 Lorenzo Scarazzato et al, "The SIPRI Top 100 Arms-producing and Military Services Companies, 2024", SIPRI Fact Sheet, December 2025.

11 Press Information Bureau, "Defence Atmanirbharta: Record Production and Exports", November 20, 2025.

12 CRISIL rating, "Private defence companies to continue double-digit growth", September 23, 2025, https://www.crisilratings.com/en/home/newsroom/press-releases/2025/09/private-defence-companies-to-continue-double-digit-growth.html.

2 Reform Push

Self-reliance in defence production has been a broad policy objective that has prompted the successive Indian governments to focus on reforming India's arms industry, which has historically been known for inefficiency and lack of innovation, resulting in India's huge dependence on external sources for critical needs.

A major reform was undertaken in 2001 when the defence industry was opened up for private players, thus eliminating the monopoly of the government-owned entities. The real momentum of reform, however, came post-2014 with the coming of the Modi government to power. In the last 11 years or so, the defence industry has witnessed a plethora of reforms under the broad Make in India initiative. The reform measures cover almost all aspects of India's defence industry, ranging from improving the ease of doing business (especially for the private sector) to creating greater scope for the Indian industry in the procurement process, reducing the structural barriers between the industry and its principal customer (armed forces), and improving the functioning of the DPSUs.

Under the rubric of ease of doing business measures, the government has simplified the industrial licensing process to facilitate easy entry of the private companies in defence, enhanced the defence foreign direct investment (FDI) cap from the previous 26 per cent to 74 per cent under the automatic route, published a standard operating procedure (SOP) to facilitate defence exports, and allowed the private companies to use the government-owned infrastructure to test their wares.

With an eye to deepen Indian companies' greater involvement in defence procurement, the government has streamlined its capital acquisition manual. The revised manual in vogue—known as Defence Acquisition Procedure 2020 (DAP 2020)—reinforces priority given to domestic industry over the foreign players in procurement by laying even greater emphasis on in-house design, development, and higher indigenisation. The DAP 2020 is currently under review by a committee that is tasked to further deepen the role of the domestic industry in capital acquisitions.[13]


Dr. Behera

In a major policy announcement in 2019, the government announced the appointment of the Chief of Defence Staff (CDS) and the creation of a new Department of Military Affairs (DMS) under him. Though the CDS/DMA is intended to improve synergy among the armed forces and establish joint/theatre

13 Press Information Bureau, "MoD Initiates Comprehensive Review of Defence Acquisition Procedure 2020 to Align with National Reforms", June 19, 2025.

commands, it has a vital mandate to promote indigenisation.[14] Historically, the relationship between the users (armed forces) and the developers/producers was one of mistrust and mutual suspicion, with a deleterious effect on domestic armament programmes.[15] The new tri-service chief, with an official mandate to promote the domestic industry's interests, is a long overdue measure to bridge this mistrust.

Subsequent to the CDS's appointment in 2020, the DMA has identified more than 500 items that are reserved for production by Indian companies. In other words, these items will not be directly imported. Covering small arms and ammunition to bigger systems like missiles, tanks, and even fighters, the list is a major confidence boost for the domestic industry.

To support the industry, the government has also progressively earmarked an increasing share of its capital budget for acquisition from the domestic players. In 2021–22, 58 per cent of the MoD's capital procurement was reserved for procurement from domestic sources; the share has gone up to 75 per cent in 2025–26.

Taking the reform measures to the DPSUs, the traditional and dominant players in India's armament industry, the government has listed several old DPSUs on the stock exchanges and corporatised the erstwhile ordnance factories. These measures are meant to bring in greater accountability on the part of the state-owned entities. At the same time, the government has also urged them to intensify indigenisation by reducing dependency on external sources for parts, components, and sub-systems. The MoD has hosted a dedicated website—Srijan Portal—in which the DPSUs have been asked to list their imported items that can be indigenised through the involvement of the domestic industry.

3 India's Arms Production: Measuring the Success

The cumulative impact of all the policy reforms undertaken by the government over the years, particularly since 2014, has started showing results. The industry, which was a laggard not so long ago, is now in a much better position to meet the increasing requirements of not only domestic users but also those of global customers. In the last nine years (2016–17 to 2024–25), India's total defence production has more than doubled to reach INR 1,505 billion.

In the same time period, exports have grown by a factor of 16 from INR 15 billion to INR 236 billion ($2.76 billion) (see Table 4). India's export destinations now include about 100 countries, including the US, France, and Armenia, which were the top three destinations in 2023–24.[16] Though much of India's export basket constitutes low-tech parts, components, and sub-systems, there are several complex items, including helicopters, rocket launchers, and artillery gun systems. The biggest exported item so far is the Brahmos

14 Press Information Bureau, "Cabinet approves creation of the post of Chief of Defence Staff in the rank of four star General", December 24, 2019.

15 Laxman Kumar Behera, "Indian Defence Industry: A Reform Agenda", in Gurmeet Kanwal and Neha Kohli (ed), *Defence Reforms: A National Imperative* (Pentagon Press: New Delhi, 2018), p. 189.

16 Rajat Pandit, "US, France & Armenia top three buyers of Indian defence", *The Times of India*, October 28, 2024.

Table 4. India's Defence Exports

Year	Export Authorizations to Private Companies (INR Billion)	SCOMET Issued by DGFT (INR Billion)	Contract Value and Other Export by DPSU (INR Billion)	Total Exports (INR Billion)	Private Sector's Share (%)
2016–17	1.94	0.00	13.28	15.22	13
2017–18	31.63	0.00	15.19	46.82	68
2018–19	98.13	0.00	9.33	107.46	91
2019–20	80.08	2.03	9.05	91.16	88
2020–21	72.71	1.79	9.85	84.35	86
2021–22	59.65	0.07	68.43	128.15	47
2022–23	90.51	3.51	65.16	159.18	57
2023–24	131.19	20.90	58.74	210.83	62
2024–25	139.68	12.64	83.89	236.22	59

Source: Department of Defence Production, *DDP Dashboard*, https://ddpdashboard.gov.in/defence-exports.

Table 5. Indian Defence Industry's Contribution to Procurement

Year	Total Procurement Expenditure (INR Billion)*	Defence Production (INR Billion)	Exports (INR Billion)	Production Available for Indian Users (INR Billion)	Production Available for Indian Users as % of Procurement Expenditure
1	2	3	4	5 (3–4)	6 ($\frac{5}{2}$ ×100)
2020–21	1,456	846	84	762	52
2021–22	1,422	948	128	820	58
2022–23	1,498	1,087	159	928	62
2023–24	1,693	1,274	211	1,064	63
2024–25	1,696	1,506	236	1,270	75

Note: For items marked with an asterisk, total procurement consists of both revenue and capital procurement.
Source: Author's database.

supersonic cruise missile, which was sold to the Philippines in a deal worth $375 million.[17]

From the perspective of India's self-reliance, a noteworthy achievement of the domestic industry has been its growing contribution to the MoD's procurement expenditure. As Table 5 shows, India's defence production (post exports) available for meeting both revenue and capital procurements has increased from 52 per cent in 2020–21 to 75 per cent in 2024–25, meaning that direct import to meet India's procurement requirements has declined from 48 per cent to 25 per cent. If the MoD's projected defence production target for the coming years is achieved, then the share is likely to grow even further.

17 Laxman Kumar Behera, "Made in India: An Aspiring brand in global arms bazaar", *Defense & Security Analysis*, Vol. 38, No. 3, pp. 336–348.

Rise of the Indian Private Sector

One significant achievement of the MoD's various policy reforms has been the rise and growth of the Indian private sector. It has grown to comprise big industrial houses, a large number (approximately 16,000[18]) of micro, small, and medium enterprises (MSMEs), and a growing ecosystem of startups, numbering more than a thousand by 2024.[19] In the short span of about 25 years since its official entry into the defence sector, its contribution to defence production has grown quite noticeably, reaching 23 per cent in 2024–25. Although DPSUs still dominate the manufacturing of advanced defence technologies, the private sector is slowly catching up; it has already bagged orders for several complex systems such as transport planes, howitzers, rocket launchers, close-in weapon systems, and high-powered radars, to name a few. Several companies are also involved in the strategic weapons programmes; L&T, Tata Power, and Walchandnagar Industries, for instance, are majorly involved in India's nuclear submarine construction.[20] With such large orders, several private companies have grown into big entities, employing a sizeable workforce and earning more than 10 billion rupees in annual defence revenues (see Table 6).

With the rising capability, several private companies are now in a position to challenge the monopoly of big DPSUs. The ongoing contest for developing India's 5th-generation combat aircraft under the Advanced Medium Combat Aircraft (AMCA) developmental programme is the biggest testimony of the private players' growing ambition to delve into complex and advanced weapons platforms. HAL's

Table 6. Select Indian Private Defence and Aerospace Companies

Company	Turnover (INR Billion)	Employees
L&T Precision Engineering & Systems	61.85	NA
Tata Advanced System Ltd	51.80	1,087
Dynamatic Technologies	14.70	840
Kalyani Strategic System Ltd	12.70	409
Solar Defence and Aerospace Ltd	11.50	2,097
Astra Microwave Products Ltd	10.70	1,700
Zen Technologies	10.32	395
AXISCADES	10.31	2,891
Data Patterns	7.55	2,608
Paras Defence and Space Technologies	3.73	239

Source: Company Reports and Tracxn.

18 Press Information Bureau, "Make in India Powers Defence Growth", March 29, 2025.

19 Shantanu Nandan Sharma and Apoorva Mittal, "In In five years, over 1,000 defence startups have emerged in India. Can they grow and meet modern battlefield demands", *The Economic Times*, September 29, 2024, https://economictimes.indiatimes.com/news/defence/in-five-years-over-1000-defence-startups-have-emerged-in-india-can-they-grow-and-meet-modern-battlefield-demands/printarticle/113771530.cms

20 Jyoti Malhotra, "How India's pride INS Arihant was built", *Business Standard*, August 19, 2013, https://www.business-standard.com/article/specials/how-india-s-pride-ins-arihant-was-built-113081100745_1.html.

pre-eminence in manufacturing fighter aircraft is for the first time being challenged by at least four major private companies—L&T, Tatas, Bharat Forge, and Adani Defence—which have submitted bids, either on their own or in partnership with others, for the INR 1,500 billion AMCA prototype development.[21]

Besides challenging the big DPSUs, the private sector, especially startups, has emerged as a dominant player in emerging technologies. In the last 10 years or so, a large number of startups have ventured into defence, exhibiting the technological prowess of their products and technologies. Several drone startups proved their mettle on the battlefield when the Indian armed forces co-opted them during Operation Sindoor to support Indian military action against Pakistan.[22] Realising the growing importance of drones and anti-drones, several startups have also ramped up their R&D and production capacity. Noticeably, several startups have expanded their business by raising money from investors, indicating the growing confidence of the financial market in their capabilities.

One area where the private sector has completely overtaken the public sector is in the domain of exports (see Table 4). Significantly, some Indian companies have ventured into the international market even before selling first to the Indian armed forces, indicating their appetite to grow business outside the domestic market—something that is nearly absent in the DPSUS's business development plan. Bharat Forge, for example, bagged a $155-million export order in 2022 from Armenia for its Advanced Towed Artillery Gun Systems (ATAGS)—three years before the Indian MoD awarded it a contract for the same.[23] Apart from direct exports, some Indian companies have also taken their manufacturing base to other markets. Tata Advanced System Ltd (TASL) became the first Indian company to set up a production facility in Africa when it opened a plant in Morocco in September 2025 to manufacture Wheeled Armoured Platform (WhAP).[24]

It is noteworthy to mention that some of the Indian companies' export orders constitute a significant portion of their total defence orderbook. Solar Industries, a big private company with defence business cutting across loitering munitions, bombs, and high-energy materials, has an order book of Rs 150 billion (2024–25), of which about 40 per cent of orders are from international customers.[25] Given the rising prowess of the Indian private sector, it is not surprising that the Indian MoD has actively urged it to ramp up production to meet at least 50 per cent of India's defence production.[26]

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21 Manu Pubby, "Adani, Tata and 5 other domestic firms throw hat in ring to develop fifth-gen fighter jets", *The Economic Times*, October 01, 2025.

22 Raphe mPhibr and IG Drones were among the drone players.

23 Ravi Shankar, "CCS Approves ₹7,000 Crore Deal for Indigenous ATAGS Howitzers for Indian Army", Bharat Shakti, March 20, 2025; Press Information Bureau, "Aatmanirbhar Bharat: MoD inks Rs 6,900 crore contracts for 155mm/52 Calibre Advanced Towed Artillery Gun Systems & High Mobility Vehicle 6x6 Gun Towing Vehicles to enhance Indian Army's operational readiness", March 26, 2025.

24 "Tata Group arm sets up India's first overseas defence manufacturing unit in Africa", *The Economic Times*, September 23, 2025.

25 Solar Industries India Ltd, *Annual Report 2024-25*, p. 1.

26 Press Information Bureau, "Effective use of Made-in-India equipment during Operation Sindoor bolstered India's reputation both regionally & internationally: Raksha Mantri", October 27, 2025; Press Information Bureau, "India is entering a golden era of defence innovation", November 25, 2025.

4 Sustaining the Momentum

The momentum for the domestic industry is likely to be sustained for the foreseeable future. In the short to medium term, it will be driven by several mega contracts that have either been signed or are likely to be awarded to the domestic industry in the coming few years. In 2024–25, the government signed a record 193 contracts worth INR 2,090.5 billion, of which 177 contracts worth INR 1,689.22 billion were signed with domestic players.[27] In 2024 (up to November), the MoD procurement agencies approved 40 procurement projects worth INR 4.2 trillion for initiation of procurement processes. Of the total proposal, about 94 per cent (in value terms) was meant to be procured from domestic sources. The proposed procurements and contracts awarded mean that in the coming six to seven years, the domestic industry will have a huge workload that will not only sustain the domestic industry's production, but also provide a further boost to its business.

Operation Sindoor has played its part to further galvanise the self-reliance ambitions, with the top political leadership urging the domestic industry to intensify innovation and indigenisation.[28] Recognising that advanced and emerging technologies would be pivotal in the future war, the government has made an attempt to fast-track key programmes relating to drones and counter-drones, surveillance, and long-range attack. Given the criticality of space-based surveillance for real-time decision-making during Operation Sindoor, the government has reportedly expedited the $3 billion project to launch 52 dedicated military satellites, 31 of which are to be manufactured by three private companies—Ananth Technologies, Centum Electronics, and Alpha Design Technologies.[29]

Building on the LCA programme further, the government has approved the AMCA programme to build India's own fifth-generation combat aircraft. In late May 2025, the Indian defence minister approved the AMCA execution model, paving the way for shortlisting the potential players that would work with the Aeronautical Development Agency (ADA) for development of five prototypes at a cost of INR 150 billion.[30] Simultaneously, the government is also keen to develop a jet engine—the capability of which has long eluded the Indian R&D agency—to power the AMCA. Safran of France is considered to be the frontrunner to partner with the DRDO for the aeroengine; it has reportedly agreed to a full transfer of technology, including the hot section of the engine, to the Indian collaborator.[31]

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27 Press Information Bureau, "Defence Atmanirbharta: Record Production and Exports", November 20, 2025.

28 "PM Modi calls for greater jointness, self-reliance, innovation in Armed Forces at Combined Commanders' Conference", *DD News, September* 15,2025,https://ddnews.gov.in/en/pm-modi-calls-for-greater-jointness-self-reliance-innovation-in-armed-forces-at-combined-commanders-conference/.

29 "Operation Sindoor triggers India's space shield push with 52 defence satellites by 2029", *The Economic Times*, June 30, 2025; "$3 billion push: India ramps up efforts to enhance satellite-based surveillance tech after Operation Sindoor", *Moneycontrol*, May 12, 2025, https://www.moneycontrol.com/news/india/3-billion-push-india-ramps-up-efforts-to-enhance-satellite-based-surveillance-tech-after-operation-sindoor-13021073.html.

30 Press Information Bureau, "Aatmanirbhar Bharat: Raksha Mantri approves Advanced Medium Combat Aircraft Programme Execution Model through industry partnership", May 27, 2025; "India to develop 5 AMCA stealth fighter prototypes: Defence Minister", *News on Air*, May 30, 2025, https://www.newsonair.gov.in/india-to-develop-5-amca-stealth-fighter-prototypes-defence-minister/.

31 Arindam Majumdar, "Safran agrees for full technology transfer for fighter jet engine to India", *The Economic Times*, November 26, 2025.

The signature initiative announced post-Operation Sindoor that would define the Indian defence industry and self-reliance in the times to come is Mission Sudarshan Charka. Announced by Prime Minister Modi on August 15, 2025 on the occasion of India's 79th Independence Day, the Mission intended to "create a powerful weapon system to thwart any attempt by enemies to attack us".[32] Though the contours of the Mission are still under the ideation phase, it is believed to be a "multi-layered air & missile shield integrated with offensive weapons"[33] that will act as the "mother of all air defence systems combined together".[34]

5 Challenges

Even though the Indian defence industry has made rapid progress over the past decade or so and the progress thus far is likely to be sustained for the foreseeable future, it still encounters a number of hurdles that prevent it from becoming a frontline defence manufacturing country with a sizeable presence in the export market.

A key challenge to India's defence industry comes from the government's inability to allocate more resources to defence, particularly for procurement and innovation. India's defence expenditure, measured as a percentage of the gross domestic product (GDP), is estimated at 1.9 per cent in 2025–26—a marked decline from the high of 2.8 per cent in 2009–10. Given that India has a huge standing army and a vast pool of defence pensioners,[35] a large sum (over 50 per cent) of the defence budget is spent on direct personnel costs. This has resulted in a smaller share for both procurement and R&D. In 2025–26, the share of capital procurement in the defence budget was 22 per cent, compared to 29 per cent for salary and 24 per cent for defence pensions.

For the domestic industry to execute in a time-bound manner all the contracts that have either been signed in the recent past or are likely to be signed in the near future, it will require more resources. This would be possible only if the Indian government hikes the procurement budget to keep pace with the execution by the industry.

In addition to increasing the procurement budget, the defence R&D budget also needs a substantial hike. At present, the R&D budget as accounted for by the DRDO stands at 4 per cent of the MoD's total budget. (In comparison, South Korea spends about 17–18 per cent of its defence budget on R&D.[36]) The

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32 Press Information Bureau, "PM Modi's 79th I-Day Address: A Vision for a Viksit Bharat 2047", August 15, 2025.

33 Rajat Pandit, "Mission Sudarshan Chakra: Multi-layered air & missile shield integrated with offensive weapons", *The Times of India*, August 16, 2025.

34 "Sudarshan Chakra 'Mother of All Air Defence Systems Combined Together': Top Military Official", *NDTV*, September 23, 2025, https://www.ndtv.com/india-news/sudarshan-chakra-mother-of-all-air-defence-systems-combined-together-top-military-official-9331453.

35 As of June 2025, out of total 6.87 million central government pensioners, about 50 per cent (or 3.4 million) were defence pensioners. Department of Pension & Pensioners' Welfare, Ministry of Personnel, Public Grievances & Pensions, "Performance Dashboard", https://pensionersportal.gov.in/dashboard/.

36 "Meet the world's hottest upstart weapons dealers", *The Economist*, August 31, 2025.

DRDO's meagre share in the defence budget, together with negligible R&D spending by production agencies, has been a large obstacle for development of technologies. Realising this deficiency, the MoD has exhorted the DSPUs to double their R&D efforts in the coming five years.[37] Translating the proposed R&D plan to concrete products will be key to higher indigenisation.

While dealing with resources and innovation, the Indian industry must also grapple with the frenetic technological advancements in other parts of the world. China's military technological advancement, in particular, will pose a major challenge, not just because China is India's biggest strategic rival but also due to Beijing's supplies of increasingly advanced weapons to Pakistan.[38] China's technological advancement in autonomous weapons systems, drones, missiles, electronic warfare systems, and fighter aircraft will be some of the key domains that the Indian industry must find an answer to. However, to keep pace with China would be a herculean task for India and its defence industry, especially when India's military spending pales compared to China's.

Like on the technology front, Indian industry's global ambitions will be challenged not just by the established arms exporters in the US, Europe, and Russia, but also by several "upstart arms suppliers". Even though the Indian defence industry has made significant progress in exports, this progress remains small compared to exports by a new class of suppliers, particularly Turkey and South Korea. In comparison to India's less than $3 billion arms exports in 2024–25, Turkey and South Korea reported defence exports worth $7 billion and $9.5 billion, respectively, in 2024. (Turkey's arms exports grew from $2 billion to $7 billion in the five-year period ending in 2024. South Korea's exports reached a high of $17.3 billion in 2022, and its exports are expected to have reached $23 billion in 2025.[39]) Significantly, the export items of these countries, such as armoured vehicles, artillery guns, rocket launchers, drones, warships, and combat aircraft, are the very items for which Indian companies are vying for a global share. The entry of the new players into a market, which is still dominated by the advanced defence manufacturing countries, makes the international arms market more crowded and competitive. It would be a huge challenge for Indian companies to gain a foothold in such a market.

Conclusion

The Indian defence industry, which was a laggard earlier, has come of age and is now a force to be reckoned with. It is now not only meeting a rising share of domestic requirements but increasingly also catering to

37 In a review meeting undertaken by Indian defence minister Rajnath Singh in November 2025, the DPSUs committed to spend a cumulative INR 327.66 billion (compared to INR 309.52 billion in the previous 10 years). Of the total proposed investment, the new DPSUs are expected to invest INR 30 billion and the defence shipyard INR 13 billion. See Press Information Bureau, "Raksha Mantri to review performance of 16 DPSUs in New Delhi", November 08, 2025.

38 In the May 2025 conflict, Pakistan used advanced Chinese weapons including J-10 combat aircraft and PL-15 air-to-air missiles. China was also believed to have supplied "early warning and real-time targeting data". See "Crash course", *The Economist*, July 16, 2025; "Top gun", *The Economist*, May 15, 2025.

39 "The world's hottest upstart weapons dealers", *The Economist*, August 31, 2025.

global demand. The major credit for the defence industry's growing success can only be attributed to the sustained reforms carried out by the successive Indian governments over the years, especially since 2014. With the Indian government doubling down on self-reliance through various industry-enabling reforms, greater focus on procurement from the domestic industry, and the announcement of a big-ticket armament programme, the Indian defence industry is poised to grow even further. To sustain the momentum, however, the government needs to speed up the procurement process, allocate higher resources for acquisition, and devote more resources to domestic innovation.

Chapter 7

Korea's Defense Industry Policy: Overview and Implications

HWANG Inbin

1 History of the Defense Industry Policy Document

Korea has continuously established its policy documents for defense industry development over a long period. In its early stages, Korea's defense industry strategy was formulated as an annex to the Defense Acquisition and Development Plan of the Ministry of National Defense (MND). At that time, it functioned primarily as a supplementary reference rather than an independent strategic framework. With the establishment of **the Defense Acquisition Program Administration (DAPA)** in 2006 and the enactment of the Defense Acquisition Act, the plan gained full autonomy and was rebranded as the Defense Industry Promotion Master Plan. This marked the beginning of a more systematic and targeted policy approach toward nurturing the defense industry, implemented across three strategic cycles: 2008–2012, 2013–2017, and 2018–2022.

A major turning point occurred in 2021 with the enactment of the Defense Industry Promotion and Support Act, which elevated the policy significance of the defense industry as a national strategic sector. Under this new legal foundation, the plan was renamed **the Defense Industry Development Master Plan**, signifying an expanded vision that encompassed not only industrial competitiveness but also national security resilience and global market leadership. This evolution reflected Korea's ambition to develop a robust and technologically advanced defense industrial ecosystem, capable of responding proactively to shifting geopolitical conditions, rapid technological change, and heightened competition in the international defense market.

Each subsequent iteration of the plan has increasingly emphasized value-chain strengthening, indigenous research and development capacity, export diversification, and public-private innovation partnerships. Through these efforts, Korea has demonstrated a clear intent to transition from a procurement-dependent defense structure to an autonomous and globally competitive defense industrial power, reinforcing both strategic autonomy and international defense cooperation capabilities.

2 2023–2027 Defense Industry Development Master Plan

(1) Governance Framework for Planning and Implementation of the Master Plan

The Defense Industry Development Master Plan is the highest-level policy document outlining the Korean government's vision, goals, and policy directions to ensure the sustained growth of the defense industry over a five-year period, considering domestic and international economic and security conditions as well as national defense policy priorities. Since effective development of the defense industry requires coordinated efforts among relevant ministries and agencies, the plan is designed to identify and systematically improve medium- to long-term challenges across laws, policies, and institutional frameworks.

In addition, the Master Plan provides strategic milestones for strengthening advanced defense technologies and contributing to national economic development. Based on this plan, an annual **Defense Industry Development Implementation Plan** is formulated to ensure practical policy execution. Through yearly reviews of implementation status, the Master Plan or the Implementation Plan can be adjusted or supplemented to respond promptly to shifts in the strategic environment and market conditions. This flexible governance structure ensures adaptability and relevance over time.

The Defense Industry Policy Division, under **the Defense Industry Promotion Bureau** in DAPA, oversees both the formulation and execution of the defense industry policy. Therefore, the division serves as the lead unit responsible for drafting and administering both the Master Plan and the Implementation Plan. Before formulating the Master Plan, the division commissions a preliminary research study from an external research institute.

For the 2023–2027 Master Plan, the preliminary study was conducted by the Korea Institute for Industrial Economics and Trade (KIET) over an eight-month period (December 2021 to August 2022). During this process, KIET reviewed national security and defense industry policy documents, domestic and international literature, and major global defense market databases such as SIPRI, Janes, and Forecast International. The institute also held discussions with officials from DAPA and the Ministry of Trade, Industry and Resources to examine mid- to long-term development directions for the defense industry sector. In addition, opinions were collected from various related organizations, including KIDA, the Agency for Defense Development (ADD), the Defense Agency for Technology and Quality (DTaQ), the Korea Research Institute for Defense Technology (KRIT), Korea Defense Industry Association (KDIA), and the Defense Venture Center. KIET also organized three rounds of internal workshops and two rounds of public consultations to review and refine the policy direction and validate key elements of the plan. Based on the results of this preliminary study, the DAPA Defense Industry Policy Division ultimately finalized the Master Plan.

(2) Structure of the Master Plan

The 2023–2027 Defense Industry Development Master Plan, released in July 2023, is composed of seven chapters. **The first chapter** provides an overview of the plan and explains its legal basis and relationship

with other national policy documents. The Master Plan is a statutory document grounded in the Defense Industry Promotion and Support Act, and it aligns with key policy frameworks such as the National Defense Strategy and Defense Innovation 4.0 Master Plan. It also outlines the core policies of the Defense Science and Technology Innovation Master Plan to ensure coherence and consistency with the research and development (R&D) policy directions of the defense sector.

The second chapter presents the current status and outlook of the defense industry in Korea. As the Master Plan was issued in July 2023, this section reviews the domestic and international defense industrial environment from 2022 through the first half of 2023. Globally, intensifying strategic competition among major powers has led to a significant rise in defense expenditures, resulting in the rapid expansion of the global defense market. Domestically, the section highlights ongoing security challenges such as North Korea's nuclear and WMD threats, missile provocations, and the growing use of unmanned systems, alongside complex crises stemming from economic stagnation and prolonged instability. Despite these challenges, it notes the continued growth of Korea's defense industry, driven by increasing defense exports and industrial resilience.

The third chapter presents the evaluation and performance analysis of the 2018–2022 Master Plan. The previous Master Plan was formulated under the vision of establishing the defense industry as a core foundation of national defense, with the goals of securing advanced weapon development capabilities and enhancing global competitiveness. To achieve these objectives, the plan set forth four policy directions: (1) building an advanced and sustainable industrial ecosystem, (2) strengthening national defense R&D capabilities, (3) fostering promising small and medium enterprises (SMEs) and venture companies, and (4) transforming the industrial structure toward export-oriented growth and quality job creation.


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This chapter provides a brief summary of achievements during the 2018–2022 period, noting that the defense industry made steady progress in terms of policy, institutional, and organizational development over the five years. It also states that defense exports exceeded the initial target of USD 5 billion, demonstrating remarkable growth. However, domestic defense sales and workforce expansion fell short of the planned objectives. The evaluation also emphasized the need for qualitative growth of the defense industry ecosystem, more strategic investment in defense R&D, and institutional improvements for rapid technology acquisition and adaptive policy implementation.

The fourth chapter outlines the key findings from the evaluation of the 2018–2022 Master Plan and identifies areas that should be reflected in the 2023–2027 Master Plan to improve Korea's defense industry. Based on the achievements identified in the third chapter, four major insights requiring policy reflection

were derived. First, it was noted that the defense industry must accelerate its development through more rapid acquisition and innovation. Although an evolutionary development approach was introduced in 2019 and the rapid acquisition program was introduced in 2020, the rigid and sequential nature of the defense acquisition process has limited the ability to pursue fast and efficient defense acquisition reform. To address these issues, the Master Plan adopts 'Establishing an innovative defense acquisition framework to build a technology-driven military' as its first policy direction for the 2023–2027 Master Plan. It emphasizes the need to move beyond the constraints of the existing system, strengthen the flexibility of acquisition processes, streamline procedural requirements, and relax excessive liability rules to enable timely responses to technological change. DAPA also stated that it will work to enhance the effectiveness of existing rapid acquisition procedures and explore new institutional models.

Second, strengthening the defense industry's technological base is essential for driving advanced industrialization. Although Korea has continuously expanded defense R&D to support domestic development, particularly in emerging technology areas such as AI, robotics, lasers, and space, its research capabilities still lag behind those of major competitors including the United States, China, Japan, and the EU. More collaboration between the defense and civilian sectors is also needed. Furthermore, sustained efforts are required to improve the competitiveness of the parts and components industry, which remains a structural challenge. To resolve these issues, the Master Plan establishes 'Innovation/development/integration-driven defense R&D system construction' as its second policy direction. It calls for the establishment of a more agile and challenge-driven R&D framework, including the introduction of evaluation mechanisms that assess not only research outputs but also the processes and strategies used to achieve them. The plan also aims to create a streamlined system that better links core technology development with support for the defense components industry, ensuring that domestic R&D can more effectively contribute to weapons programs.

Third, the plan highlights the need to support the defense industry so that it can achieve sustainable growth. Although government support and budget allocations for defense venture companies have expanded, there remain challenges such as the lack of focused support measures for emerging technologies, insufficient production capacity among large and mid-sized firms, aging manufacturing facilities, and growing labor shortages. To address these issues, the third policy direction of the 2023–2027 Master Plan focuses on strengthening support for sustainable growth of the defense industry. This includes sustained support policies for SMEs and venture firms, as well as efforts to cultivate a specialized workforce. It also emphasizes the need to enhance linkage and collaboration between regional defense clusters so that local defense companies can continue to grow.

Fourth, a strategy is required to achieve the continued expansion of defense exports. DAPA noted the necessity of strengthening defense industrial cooperation between Korea and the United States so that the relationship can evolve into a comprehensive economic and security partnership. It also emphasized expanding support for Korean defense companies entering overseas markets and strengthening government-wide export assistance, including support from relevant ministries and agencies. To this end, the fourth

policy direction of the 2023–2027 Master Plan aims to create conditions for sustained export growth by supporting domestic companies' overseas expansion and enhancing the export competitiveness of the defense industry. The government intends to pursue streamlined end-to-end support for export expansion and improve package assistance through interagency cooperation. It also plans to enhance cooperation with foreign military organizations to provide tailored services for major export destination countries.

The fifth chapter outlines the overall direction of the 2023–2027 Master Plan. This chapter presents the vision and objectives of the Master Plan, and introduces the policy directions, key actions, and detailed action tasks established to achieve these goals. **The sixth chapter** provides a detailed description of the implementation tasks included in the 2023–2027 Master Plan, offering a structured explanation of each detailed action task. As these two chapters constitute the core content of the Master Plan, they will be discussed in detail in the following sub-chapter of this paper.

The seventh chapter presents a vision of the Korean defense industry five years into the future. This chapter outlines the quantitative targets that are expected to be achieved by 2027 in terms of rapid defense requirements, defense technology levels, and defense industry sales. In terms of rapid defense requirements, the acquisition period for advanced weapon systems is expected to be reduced from the current 12 years to within 9 years. For general weapon systems, the R&D period is projected to fall from 12–15 years to 8–9 years, while the procurement period is expected to be reduced from 9–10 years to 6 years. For defense technology, Korea aims to improve its global ranking from 9th to 7th by 2027. According to the Defense Science and Technology Innovation Master Plan, Korea will concentrate investment in 30 core defense technologies across the top 10 priority domains to generate meaningful outcomes. Regarding defense industry sales, the government anticipates that domestic defense sales will reach 30 trillion KRW by 2027, and expects that the annual overseas project acquisition target will be increased to USD 10 billion, raising total defense sales from 17.9 trillion KRW to 40 trillion KRW.

(3) Vision, Objectives, and Policy Directions of the Master Plan

The 2023–2027 Master Plan establishes the vision of fostering **Korea's defense industry into a global leader** through the construction of a speedy and cutting-edge defense capability. It also sets forth the objectives for Korea to rank **7th globally in defense science and technology (S&T)** and **4th in defense exports**. To achieve these goals, the plan identifies **four policy directions** and specifies **fourteen key actions**.

The Master Plan sets its vision around three principles—**Speedy Acquisition, State-of-the-Art, and Sustainable Growth (3S)**—to guide the future development of Korea's defense industry. Speedy Acquisition refers to creating an acquisition system that enables the rapid application of defense requirements and accelerates the transition of cutting-edge technologies into weapon systems. State-of-the-Art focuses on building an R&D environment that supports innovative and creative approaches, along with a process-oriented evaluation system that encourages experimentation without excessive penalties for failure. Sustainable Growth aims to advance the defense industry through technological innovation and export

expansion, ensuring that the industry can grow in a stable and continuous manner. Reflecting these principles, the vision is to create a dynamic R&D environment that enables the rapid fielding of advanced weapon systems suitable for an AI-driven, S&T-based military force. By exporting these systems, the plan seeks to achieve economies of scale, enhance product competitiveness, and establish a virtuous cycle in which force modernization and defense capability improvements reinforce one another.

DAPA set the objective to become 7th globally in defense S&T. To accomplish this, the plan emphasizes the need for challenging R&D efforts, along with innovation in the defense acquisition framework. According to international comparisons, Korea's defense S&T level ranked 9th in the world as of 2021, behind the United States, Russia, France, Germany, the United Kingdom, China, Israel, and Japan. The plan highlights the need for the rapid transition of advanced civil technologies into military applications, intensive support for specialized defense space enterprises, and the formation of an innovative and open defense R&D environment. If such reforms are successfully implemented, the plan anticipates substantial progress toward the objective of ranking 7th in defense S&T.

DAPA also aims to achieve the objective of becoming 4th globally in defense exports by strengthening the defense industry ecosystem and promoting defense exports to support both quantitative and qualitative growth of the sector. While each of the top three countries in the global market (the United States, Russia, and France) secure more than USD 10 billion in annual defense export contracts and thus maintain a solid position, the countries ranked 4th to 7th (China, Germany, Italy, and the United Kingdom) conclude an average of USD 5 to 7 billion in export contracts each year. DAPA assessed that if Korea can secure more than USD 10 billion in annual defense export orders, it would be able to enter the group of the top four global defense exporters, and therefore set this as its target.

The plan introduces the following four policy directions. First, DAPA will establish an **innovative defense acquisition framework** to build a technology-driven military. There are three key actions in this first policy direction. 1) DAPA will introduce a new acquisition process by creating the Rapid Requirements Program, ensuring that acquisition decisions are driven by operational needs. It will also supplement and expand the Rapid Demonstration Program to foster innovative operational requirements. 2) DAPA will enhance the efficiency of the existing acquisition framework. It will integrate preliminary research with requirements validation and improve the feasibility assessment process to optimize analytical and verification stages. In addition, the weapons systems test and evaluation regime will be upgraded. 3) DAPA will strengthen the quality and data management of advanced weapon systems. To nurture a technology-driven defense industry and improve product quality, a comprehensive big-data system will be established.

Second, DAPA will construct an **innovation/development/integration-driven defense R&D system**. There are three key actions in the second policy direction. 1) DAPA will concentrate its investment on advanced technology development. It will introduce a staged-transition assessment system that formally recognizes the early completion of innovative research, and shift to a technology-driven, capability-focused planning framework, thereby directing concentrated investment toward advanced technology development. 2) DAPA will promote an open defense R&D environment. In core technology areas, it will adopt an open

civilian-led planning framework, strengthen national defense R&D infrastructure so that it can be jointly used by both the public and private sectors, and seek to transition ownership of national defense R&D outcomes to a more flexible mechanism. 3) DAPA will establish an integrated environment for defense material, component, and equipment development. It will introduce competitive R&D programs for proactive component development, and reform R&D processes to support domestic production of materials, components, and equipment.

Third, DAPA will support **sustainable growth of the defense industry**. There are four key actions in this third policy direction. 1) DAPA will foster a defense industry for advanced weapon systems. It will support the innovative growth of space-related defense firms, and promote new defense industry areas by nurturing SMEs and ventures through the Innovative Defense Companies 100 Project and tailored support packages aligned with growth stages. 2) DAPA will establish a cooperative industrial ecosystem between large, medium, and small enterprises. It will expand specialized regional clusters linked to local anchor industries and strengthen connectivity among clusters, thereby creating an ecosystem where large, medium, and small defense companies can grow together. 3) DAPA will stimulate company-led R&D investment. To create a more challenging and entrepreneurial R&D environment, DAPA plans to introduce a dedicated contract law for defense acquisition and enhance financial support mechanisms for the defense industry, thereby encouraging firms to increase R&D investment. 4) DAPA will strengthen a stable foundation for the defense industry. To strengthen the stability of the defense industry, it will improve supply-chain transparency by conducting supply-chain surveys annually, and develop defense industry information systems.

Fourth, DAPA aims to create conditions for sustained **export growth** by supporting domestic companies' overseas expansion and enhancing the export competitiveness of the defense industry. 1) DAPA will expand defense industry cooperation with the U.S. through the conclusion of the Korea–U.S. reciprocal defense procurement agreement (RDP-A). Prior to signing the agreement, DAPA will assess its potential impact on the defense industry, establish an internal response organization, and use the agreement as an opportunity to revitalize defense exports. It also plans to strengthen support programs for Korean firms' entry into global supply chains. 2) DAPA will enhance tailored export support. It will provide proactive, customized market analysis services aligned with individual export cases, institutionalize an export-oriented industrial support system, and streamline reporting procedures. 3) DAPA will reinforce inter-agency support for defense exports. It will advance an integrated government-wide export assistance system, strengthen the Team Korea approach, and develop coordinated response mechanisms to address diverse country-specific issues.

3 Defense Industry Policy Orientation of the Current Administration

Due to an unexpected political event at the end of 2024, Korea's change of administration occurred earlier than scheduled, and a new government was inaugurated on June 4, 2025. In August 2025, the new administration announced **123 national policy tasks**. One of those tasks is **to become 4th in the global defense industry through the development of the K-defense industry and innovation of the defense acquisition system**. This task sets the objective to achieve the top-four position in the defense industry by providing intensive support to defense export companies as well as SMEs and venture businesses, innovate the advanced force acquisition system, and stabilize the supply chain of defense materials and components. Through this effort, the administration aims to nurture the defense industry as a pillar of national security and economic growth, secure sustainable growth capacity for the defense sector, and strengthen preparedness for future battlefields.

The new administration identified five main lines of effort under this policy task. The first line of effort is **defense exports**. It stated that it would significantly reinforce package support for defense exports including industrial cooperation and fiscal, financial, and tax measures, and establish a defense export control tower to provide whole-of-government support. The second is **nurturing SMEs and venture firms**. The government announced that it would foster SMEs and venture companies in the defense sector by providing stage-specific support tailored to each firm's growth, offering comprehensive assistance for defense materials, components, and equipment, and cultivating global "super tier-two" suppliers through the transfer of civilian technologies.

The third line of effort is **innovation of the acquisition system**. The administration pledged to reform the systems for weapons imports and R&D, strengthen fairness and integrity in defense acquisition, and thereby enhance both the competitiveness of the defense industry and the efficiency of building military capabilities. The fourth is **building an advanced-technology industrial base**. To foster Korean big-tech companies, the government stated that it would expand R&D and infrastructure investment in areas such as AI, semiconductors, aerospace, drones, and robotics. The fifth is to **stabilize supply chains**. The government announced that it would build a database-driven supply chain map for materials and components used in the 100 major weapon systems currently operated by the armed forces, and strengthen the stability and self-reliance of these supply chains through localization, stockpiling, and international cooperation on key materials and parts.

4 Challenges and Future Prospects

Korea's defense industry has developed rapidly on the basis of strong government support, corporate efforts, and public confidence. The 2023–2027 Defense Industry Development Master Plan, which is

currently in force, serves as the highest-level policy document guiding Korea's defense industry and continues to play an essential role in shaping its development. Although the previous administration introduced this Master Plan, the basic direction of defense industry policy is not expected to change significantly from the current plan.

At present, the Master Plan outlines four policy directions: innovation in the acquisition system, improvement of the defense R&D environment, advancement of the defense industrial ecosystem, and support for export growth. When these policy directions are compared with the four directions of the 2018–2022 Master Plan, it becomes clear that the current approach largely aligns with the previous plan. The development of the defense industry continues to build on earlier efforts to strengthen the defense industry ecosystem and support promising SMEs and venture companies, while the establishment of an R&D environment and export support measures also remain broadly consistent with past policies. While the 2023–2027 Master Plan includes more detailed content on acquisition reform than the 2018–2022 Master Plan, the earlier plan also incorporated considerable material on improving the acquisition process.

Furthermore, the current government's national policy task emphasizes innovation in the acquisition system, building an industrial base of advanced technologies, supply chain stabilization, nurturing SMEs and venture firms, and strengthening export competitiveness. Many of these priorities overlap with the core strategies of the 2023–2027 Master Plan. Therefore, although the current Master Plan was formulated under the previous administration, its policy directions remain largely aligned with what the current government seeks to pursue in the future.

However, recent developments in defense industry policies across major countries suggest that Korea may also need to refine aspects of its current policy. Since 2024, major countries and regions in the defense industry, such as the U.S., the EU, Australia, the U.K., Germany, and the Netherlands, have each announced new defense industry strategies. A review of these strategies indicates that, similar to Korea, they place strong emphasis on defense innovation and acquisition reform, industrial base enhancement and supply-chain stabilization, workforce development, international cooperation, and export support.

Drawing insights from these global trends could help inform the strategic direction of Korea's next Master Plan. For example, in the areas of industrial base and supply-chain management, Korea may need to expand large-scale facility support and strengthen stable supply-chain oversight centered on defense. In terms of workforce development, it may be necessary to enhance professional education and retraining programs and link them more closely with the personnel needs of the defense manufacturing sector. With regard to defense innovation and acquisition reform, Korea may benchmark measures such as emergency-level acquisition procedures tailored to operational requirements or policies encouraging greater participation of innovative private-sector companies in defense R&D. For international cooperation and export support, Korea could strengthen cross-border collaboration aimed at enhancing industrial competitiveness and pursue targeted defense-industrial cooperation projects while expanding participation in global supply chains.

Furthermore, Korea may consider drawing lessons from the EU's practical industrial support and

funding mechanisms, as well as the United Kingdom's approach to accountability frameworks and performance-oriented program design. These international cases could serve as key reference points in shaping Korea's next Master Plan. As the drafting process moves forward, it will be important to continuously review the defense industry strategies of major countries and compile reference materials that can inform and support the development of the new Master Plan.

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Mr. Thomas (Tom) Corben is a Research Fellow in the Foreign Policy and Defence Program at the United States Studies Centre (USSC) at the University of Sydney, where he works on US Indo-Pacific Strategy, regional strategic dynamics, defense industry and technology issues, and alliance modernization trends. He was previously a resident Lloyd and Lilian Vasey Fellow with the Pacific Forum in Hawaii, where he focused on Japanese and Korean politics and foreign policies, and Australia's engagement with Northeast Asia. He has published and commented widely on these issues for a range of platforms, including War on the Rocks, *Nikkei Asia*, the *Australian Financial Review*, and *The Diplomat*.

Dr. Laxman Kumar Behera

Dr. Laxman Behera is an Associate Professor at the Special Centre for National Security Studies (SCNSS) of Jawaharlal Nehru University (JNU), and has been eligible for promotion to Professor since 2023. His areas of interest include external security, defense policy and planning, arms procurement, offsets, arms production, military expenditure, and civil-military relations. He has more than 20 years of research experience and has worked as a member and/or co-coordinator of committees, task forces, and study groups set up by the Indian Ministry of Defence and other government agencies. He has received awards for his achievements, including the Manohar Parrikar Institute for Defence Studies and Analyses (MP-IDSA) President's Award 2011. He has also had notable achievements abroad. In 2013, he held the prestigious ICCR Chair, India Studies, at Fundacao Getulio Vargas (FGV), Rio de Janeiro, Brazil. His publications include *India's Defence Economy: Planning, Budgeting, Industry and Procurement* (Routledge, 2021) and *Indian Defence Industry: An Agenda for Making in India* (Pentagon, 2016), among others.

Dr. HWANG Inbin

Dr. HWANG Inbin is an Associate Research Fellow at the Center for Defense Resource Management of the

Korea Institute for Defense Analyses (KIDA). His area of expertise is defense science and technology policy. He joined KIDA in 2018, where he has been engaged in research on the Korean defense industry from multiple perspectives, such as strategic corporate management, national economic and technological capabilities, and international relations. His publications include *Annual Analysis of Defense S&T (Science and Technology) Policy and Defense Industry 2022*, Research Abstracts 58 (KIDA, 2023); *Promoting Evolutionary Performance Improvement of Weapons Systems Based on Contract Engagement*, Research Abstracts 55 (KIDA, 2023); and *Performance Management for Defense Science and Technology Policy*, KIDA Brief, no. 2020-3, 2020. He received a Ph.D. from the Korea Advanced Institute for Science and Technology (KAIST).

Program

NIDS International Symposium on Security Affairs
Navigating the New Era of Defense Industrial Strategies: National Priorities and Global Collaboration
Wednesday, December 10, 2025

9:30–9:38 | Opening Remarks

Mr. WAKABAYASHI Yohei (Parliamentary Vice-Minister of Defense)

9:40–10:10 | Keynote Speech

Dr. WATANABE Hideaki
(Chairman of the Defense Technology Foundation; the first Commissioner of the Acquisition, Technology and Logistics Agency (ATLA))

10:30–12:00 | Session 1: Megatrends in the Global Defense Industry

Chair:
Prof. TOMIKAWA Hideo
(Chief of the Security and Economy Division at the National Institute for Defense Studies)
Speakers:
Dr. Christine Michienzi
(Non-Resident Senior Associate at the Center for Strategic and International Studies (CSIS))
Dr. Luis Simón
(Director of the Centre for Security, Diplomacy and Strategy (CSDS) at Vrije Universiteit Brussel (VUB))
Discussants:
Dr. HWANG Inbin
(Associate Research Fellow at the Center for Defense Resource Management of the Korea Institute for Defense Analyses (KIDA))
Ms. KOSHINO Yuka
(Principal at Ferocity Capital)

13:15–14:45 | Session 2: Defense Industrial Partnerships

Chair:
Prof. TOMIKAWA Hideo
(Chief of the Security and Economy Division at the National Institute for Defense Studies)
Speakers:
Dr. Trevor Taylor (Professorial Research Fellow at the Royal United Services Institute for Defence and Security Studies (RUSI))
Dr. Peter J. Dean
(Professor of Strategic Studies in the College of Asia and the Pacific at the Australian National University)

Mr. Thomas Corben
(Research Fellow at the United States Studies Centre (USSC) of the University of Sydney)
Discussants:
Dr. Laxman Kumar Behera
(Associate Professor at the Special Centre for National Security Studies (SCNSS) of Jawaharlal Nehru University)
Mr. KIYOOKA Katsuyoshi
(Research Fellow at the Security and Economy Division of the National Institute for Defense Studies)

15:20–16:50 | Session 3: Towards Effective Defense Industrial Collaboration

Chair:
Prof. IIDA Masafumi
(Director of the Security Studies Department at the National Institute for Defense Studies)

16:35–16:40 | Closing Remarks

Mr. IMAKYUREI Manabu
(President of the National Institute for Defense Studies)

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