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From Decline to Surge: The Defense Industry in the Era of Excess Demand

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Foreword

In December 2023, the Institute of Geoeconomics published the first report of its International Security Order Group, titled “Comparative Study of Defense Industries —Autonomy, Priority, and Sustainability.” That report identified the structural challenges confronting Japan’s defense industry by comparing it with overseas counterparts, and emphasized the need for transformative policies to overhaul an industrial structure that had long been in decline. By introducing a framework of international comparison into the analysis of defense industries, the report attracted broad attention from policymakers, researchers, and other stakeholders.

However, the first report’s analysis was premised on the long-standing trend of contraction within Japan’s defense industry. In recent years, the rapid deterioration of the international security environment has triggered a sharp global increase in defense demand. This surge represents not only a significant opportunity for growth and revitalization among defense companies but also an expanded potential for collaboration with foreign firms and emerging startups.

At the same time, production systems built on the assumption of sustained contraction have proven unable to accommodate this sharp increase in demand, bringing new challenges, including the need for capital investment and workforce expansion. Moreover, institutional arrangements—including the Ministry of Defense’s contracting procedures—remain complex and time-consuming, having been shaped under an era of constrained defense budgets, hindering the ability to respond swiftly to operational needs in the field. Overcoming such institutional rigidities and pursuing reforms suited to a new era constitute urgent national tasks that must be addressed not only by industry but by the government as a whole. Without such reforms, efforts to strengthen Japan’s defense industrial base–and by extension, its overall defense capability–risk remaining purely rhetorical.

Against this backdrop of structural transition “from decline to surge,” the International Security Order Group launched its second study focusing on “The Defense Industry in the Era of Excess Demand.” Led by Senior Research Fellow, Hirohito Ogi, an expert in defense policy, and Research Associate, Rintaro Inoue, the team conducted extensive interviews and discussions with executives from major defense firms to examine the core issues facing the industry. In seeking policy recommendations, this study, as in the first report, draws upon advanced initiatives in the United States and Europe to formulate concrete policy recommendations.

We hope that this report will contribute to ongoing efforts toward institutional reforms and the strengthening of Japan’s defense industrial base in an era of rapidly expanding defense demand.

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Executive Summary

Since the 2000s, Japan's defense industry has experienced sluggish growth. From the Junichiro Koizumi administration to the era of Democratic Party of Japan (DPJ) governments, fiscal austerity extended beyond domestic policy into defense policy. It was only with the second Shinzo Abe cabinet and subsequent LDP–Komeito coalition governments that this trend was reversed, leading to an expansion of the defense budget after a decade of continuous decline. Yet, even as defense spending has steadily risen since 2013, a growing share of the defense budget has been directed towards purchasing cutting-edge weapons imported from the United States, meaning Japan's domestic industry has not necessarily benefited significantly from this budgetary increase.

What fundamentally changed this situation was the release of three strategic documents in 2022—the National Security Strategy, the National Defense Strategy, and the Defense Buildup Program. While spending on imports has continued to rise, the broader expansion of the budget for defense procurement has resulted in more contracts for domestic firms. In addition, long-sought improvements in profit margins for defense contracts, together with financial support for strengthening defense supply chains under the Defense Production Base Reinforcement Act of 2023, have raised expectations—both within the industry and among external stakeholders—regarding the role of defense firms.

One of those challenges is a shortage of defense production capacity. After two decades of slow growth, the Japanese defense industry has not been prepared to expand output in response to a sudden surge in demand. This problem has been compounded by the protracted war in Ukraine and intensifying U.S.–China strategic competition, both of which have driven up global demand for defense equipment. As a result, the United States and other allies and partners have begun to place greater expectations on Japan's defense production capacity.

In this era of "excess defense demand," in what ways is Japan's defense industry responding, and how should it respond better in the future? What measures can the government take to encourage an expansion of production capacity? To address these questions, this report focuses on the issue of surplus production capacity—a subject often overlooked in Japanese security studies. This report will highlight the challenges facing defense companies, drawing on first-hand, anonymous interviews with major defense contractors that comprise Japan's defense industry, as well as on analysis of their responses. In addition, it will examine the experiences of the U.S. and European defense industries, which face similar problems, as well as the measures their governments have adopted in response. Building on these findings, this report will seek to present concrete policy recommendations that can be implemented immediately to address these challenges.

The core finding and argument of this report is a sense of alarm that the business practices of defense companies—shaped by two decades of decline—are ill-suited to the current

era of "excess defense demand", which is underpinned by the deterioration of the international security environment. These practices risk becoming a major bottleneck in efforts to strengthen Japan's defense capabilities. In particular, many companies remain hesitant to make the upfront investments needed to respond swiftly and smoothly to future demand, even though shortages of skilled personnel and production facilities are already evident. Moreover, unlike many Western defense firms, some Japanese companies continue to refrain from pursuing in-house research before having government contracts and funding. These practices are deeply rooted in Japan's strategic culture, worsening the gap between defense industrial capacity and the evolving security environment. To break this trend, the government must present a medium-term outlook for future defense demand and provide incentives that encourage firms to make upfront investments. It is also essential to foster in-house research and link it to defense innovation through the application of advanced technologies.

In light of these challenges, this report presents ten policy recommendations outlined below. Each is closely relevant to the issues identified and offers a high degree of specificity as a policy tool. For the reasons laid out in this report, the authors hope that the government and the defense industry will promptly begin deliberations on their implementation.

1. The government should promptly begin revising the Defense Buildup Program for fiscal year 2027 and beyond to enhance predictability for defense firms and encourage the formulation of medium-term investment plans.

2. The Ministry of Defense should amend the Defense Production Base Reinforcement Act to encourage upfront investment decisions by companies and expand their production base by:

（1）Enabling the government to provide financial support (subsidies) to defense companies for expanding their production capacity, public loans on terms more favorable than market loans, as well as equity investment by public-private investment funds such as the Japan Investment Corporation (JIC). In addition, a system that allows the government or government-related funds to hold "golden shares" in defense companies to prevent foreign acquisitions should be studied based on its pros and cons and the precedents of other countries.

（2）Broadening the scope of eligibility for support under the Defense Equipment Transfer Facilitation Fund so that part of the costs for production facilities and related requirements for defense exports can be covered. In addition, enable the Japan Bank for International Cooperation (JBIC) to provide public finance —such as low-interest, long-term loans or government guarantees—for commercially viable international projects.

3. To encourage companies to strengthen their surplus production capacity, the Ministry of Defense should revise the corporate evaluation criteria used as the basis for determining profit margins in individual defense contracts to include firms' efforts related to capital investment and securing human resources. This would provide companies with contractual incentives for upfront investments by increasing their profit margins.

4. To promote companies' proactive in-house research, the Ministry of Defense should consider revising the contracting system to:
(1) Allow companies to include part of the related costs of in-house research—research that indirectly supports the fulfillment of defense contracts—in the cost estimates for procurement contracts; and
(2) Set profit margins for contracts involving highly challenging research and development above the current maximum of 10 percent.

5. The Cabinet Office, the Ministry of Education, Culture, Sports, Science and Technology, the Ministry of Economy, Trade and Industry (METI), and the Ministry of Defense should increase budget allocations for projects that fall between grant programs supporting advanced dual-use technology research and development (R&D) and full-scale defense equipment R&D that involves producing prototypes.

6. The Ministry of Defense, in coordination with METI and the Japan Organization for Metals and Energy Security (JOGMEC), should stockpile specific materials and components essential for defense equipment production to mitigate supply chain risks. For components that incorporate materials subject to concentrated global demand, the Ministry of Defense should also work closely with METI and other relevant ministries to ensure that the needs of defense companies are adequately reflected in broader economic security promotion initiatives.

7. Defense companies should consider reallocating personnel and equipment from their civilian divisions, as well as repurposing surplus production bases and workforce from other industries—such as the automotive sector—through cross-industry dialogue. The Ministry of Defense should support these efforts, for example, by acquiring factories from other industries scheduled for closure and entrusting them to defense companies as government-owned, contractor-operated (GOCO) facilities. At the same time, defense companies should advance the introduction of automation and robotics technologies in manufacturing, utilizing the financial support under the Defense Production Base Reinforcement Act to streamline production processes. In design and development, it is also

essential to adopt approaches that could anticipate automation at the mass-production stage.

8. To address the persistent shortage of skilled personnel, defense companies should consider employing foreign workers, particularly those with relevant technical expertise. In turn, the Ministry of Defense and other relevant ministries should support and encourage such initiatives by providing guidance on strengthening information security measures.

9. To ensure the sustainability of defense business in peacetime and to secure surplus production capacity in times of crisis, the Ministry of Defense and defense companies should actively pursue joint production of weapons used by the Self-Defense Forces with foreign partners, as well as local production overseas. To facilitate the transfer of technologies necessary for local production with partners, the Ministry of Defense should clarify and communicate to companies the procedures for handling intellectual property owned by and classified information designated by the Ministry. Furthermore, the Ministry should strengthen its advisory functions for companies by providing guidance on appropriate methods of technology and information security tailored to the characteristics of each project, thereby ensuring the effective protection of sensitive information.

10. The Ministry of Foreign Affairs should work to expand the scale of Official Security Assistance (OSA) projects in order to enhance the effectiveness of security aid to partner countries. At the same time, OSA should be implemented in ways that create synergies with defense exports, including coverage of costs associated with procuring spare parts and maintenance support of the products that accompany commercial exports by defense companies.

The international security environment has remained highly uncertain even after the government formulated the three strategic documents in 2022. Since defense production relies on private-sector participation, expanding its industrial base inevitably takes time. Yet changes in the international security environment will not wait for such preparations. That is why both the government and industry must immediately take the necessary actions.

What is required first is a transformation in the mindset and culture surrounding defense production. This means shifting from policies and business practices based on continued decline or merely maintaining the status quo during peacetime to a mindset oriented toward expanding production in preparation for contingencies. Such a transformation of strategic culture is now required for Japan’s defense industrial policy.

Introduction

Hirohito Ogi

Section 1 The Issues

Since the 2000s, Japan's defense industry has experienced sluggish growth. When the Junichiro Koizumi Cabinet was inaugurated in 2001, the wave of fiscal austerity extended beyond domestic areas such as public works and local governance to include the defense sector as well. During this period, as the role of the Self-Defense Forces expanded to encompass international peacekeeping operations and ballistic missile defense (BMD) in the post-Cold War era, Prime Minister Junichiro Koizumi was reported to have declared that he would "absolutely not allow any increase in defense spending."[1] The subsequent Democratic Party administration, which was inherited from the Liberal Democratic Party, sought to increase defense expenditures, but this effort was unsuccessful, partly due to the administration's limited political influence within the Prime Minister's Office.[2] Overcoming the Ministry of Finance's demands for spending cuts required strong political backing–something that was ultimately lacking.

It was the Liberal Democratic Party-Komeito coalition government under Prime Minister Shinzo Abe's second administration that provided the necessary political strength to reverse the decade-long decline in defense spending. However, even as defense expenditures continued to rise after 2013, the share of high-performance imported equipment from the United States increased, meaning that Japan's domestic defense industry did not necessarily reap substantial benefits from the overall budget expansion[3]. For example, from fiscal year 2018 to 2020, the total value of imported equipment in major "central procurement" contracts—handled by the Acquisition, Technology & Logistics Agency (ATLA)—consistently exceeded domestically produced equipment among the top ten contractors for the Ground, Maritime, and Air Self-Defense Forces.[4] Furthermore, even after the adoption of the Three Principles on Transfer of Defense Equipment and Technology, Japan's overseas defense exports did not fully take off. Aside from Mitsubishi Electric's 2020 contract to supply ground-based radar systems to the Philippines, there have been no large-scale exports of domestically manufactured complete defense systems.

What fundamentally transformed this situation was the release of the three key national security documents in 2022—the National Security Strategy, the National Defense Strategy, and the Defense Buildup Program. While the value of imports has continued to grow significantly, the overall increase in the defense procurement budget has led to a corresponding rise in contract values with domestic firms

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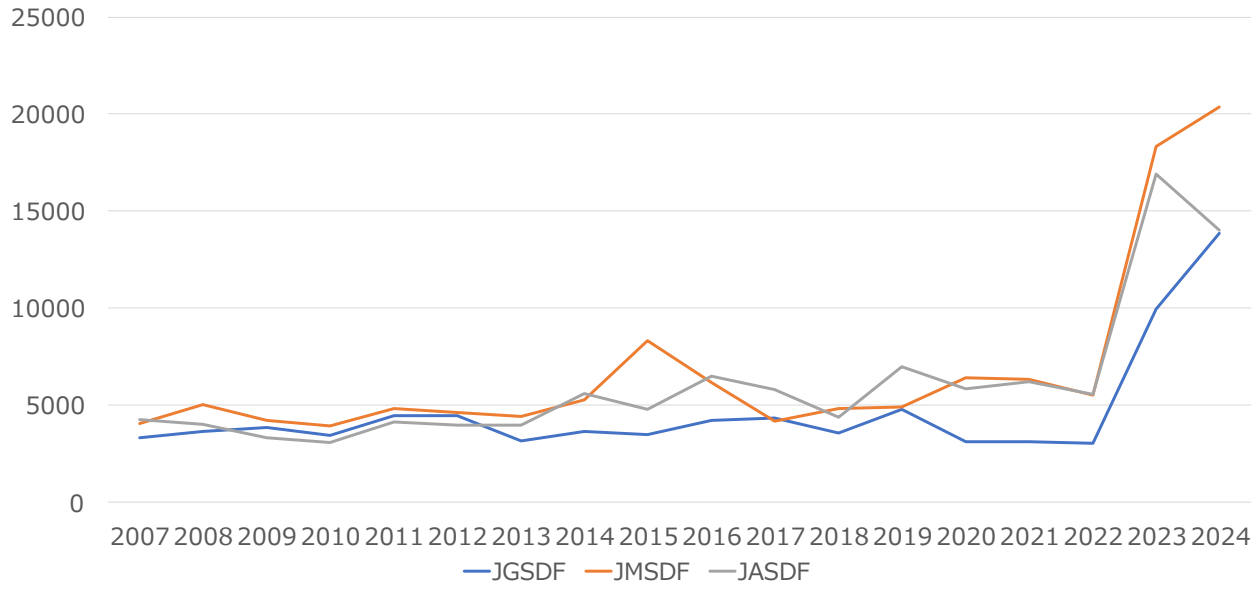
[1] Koji Sugimoto, *Nippon no bôei seisaku reisengo no 30 nen to genzai [Japan's Defense Policy: Thirty Years After the Cold-War and the Present]* (Sakuhinsha, 2025), 44-61.
[2] Ibid., 71
[3] Hirohito Ogi, *Nippon sentaku naki tōshi no kansei [The Pitfall of Investment without Prioritization]*, in Sadamasa Oue, Hirohito Ogi, Rintaro Inoue, *Kakkoku bōei sangyō no hikaku kenkyū jiritsusei, sentaku, soshite jizoku kanōsei [Comparative Studies on Defense Industries]*, Chapter 1 (The Institute of Geoeconomics, 2023), https://instituteofgeoeconomics.org/research/2023103051307/.
[4] Ibid., 27.

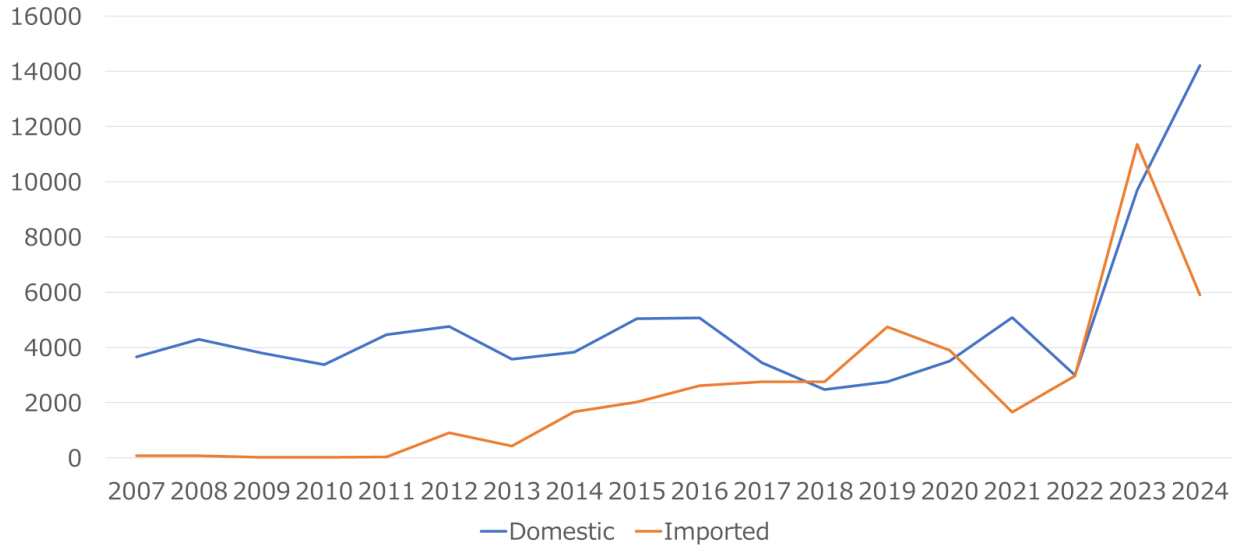
(Figures 0-1 and 0-2). Moreover, improvements to profit margins in defense procurement contracts—long requested by the defense industry—and the financial support measures introduced under the Act on Strengthening the Foundations for the Development and Production of Equipment Procured by the Ministry of Defense (commonly referred to as the Defense Production Base Reinforcement Act), enacted in 2023 to bolster supply chain resilience, have heightened expectations both within and outside the defense sector toward Japan's defense companies.

Figure 0-1: Trends in Central Procurement Expenditures of the Ministry of Defense (by Service)



Source: Compiled by the author based on annual central procurement data published by the Acquisition, Technology & Logistics Agency (ATLA), Ministry of Defense. Figures are in nominal terms (hundred million yen). ATLA, "Central Procurement Information," https://www.mod.go.jp/atla/souhon/supply/jisseki/index.html. Archived data were obtained from the National Diet Library Web Archiving Project (WARP), https://warp.ndl.go.jp/.

Figure 0-2: Trends in Contract Values of Major Defense Equipment in Central Procurement (Domestic vs. Imported)



Source: Compiled by the author based on data on major procurement items (based on top 10 contracts for the respective Ground, Maritime, and Air Self-Defense Forces) published in the annual central procurement statistics of the Acquisition, Technology & Logistics Agency (ATLA). Items are classified as either domestically produced or imported; contracts in which Japanese trading companies act as intermediaries for foreign-manufactured equipment are also counted as imports. Figures are in nominal terms (hundred million yen). ATLA, "Central Procurement Information," https://www.mod.go.jp/atla/souhon/supply/jisseki/index.html . Archived data were obtained from the National Diet Library Web Archiving Project (WARP), https://warp.ndl.go.jp/.

However, as Japan's defense budget has grown and domestic defense demand has expanded, new and increasingly serious challenges have emerged, most notably a shortage of surplus production capacity. After two decades of sluggish growth, Japan's defense industry is ill-prepared to scale up production in response to a sudden surge in demand. At the same time, the protracted war in Ukraine and the intensifying U.S.–China strategic rivalry have driven up global defense demand, placing additional strain on supply chains. As a result, Japan's allies and partners, most prominently the United States, have begun to place growing expectations on Japan's defense production capabilities. One clear example is the United States, whose declining shipbuilding capacity has led it to look to Japan's shipbuilding industry for potential support.[5] Yet, many Japanese defense firms, including the shipbuilding sector, are struggling to meet even the expanding domestic production requirements, leaving them unable to respond swiftly to overseas demand.[6] This has created a noticeable gap between the Japanese government, which seeks to fulfill the expectations of its allies and partners, and the defense companies themselves, which remain preoccupied with addressing immediate domestic production challenges.

In this new era of "excess demand," how has Japan's defense industry responded—and how should it respond going forward? What actions can the government take to encourage the expansion of industrial production capacity?

These questions have long been overlooked by the government, industry, and media, all of which have become accustomed to managing the challenges of a "deflationary economy" premised on shrinking demand - including in the defense sector. For example, while the Defense Production Base Reinforcement Act, enacted by the government in 2023, provides financial support to sustain existing supply chains, it is not designed to assist major defense firms in expanding their production capacity. Similarly, many of Japan's primary defense contractors themselves remain hesitant to make large-scale, forward-leaning investments to expand their industrial bases. At the same time, the share prices of prime defense contractors have surged in the stock market amid growing expectations of rising defense demand, yet few economists have paid attention to the structural limitations imposed by insufficient production capacity. Furthermore, within the field of international relations and security studies, discussions surrounding Japan's defense buildup—driven by a deteriorating regional security environment and by U.S. demands for greater burden-sharing during the Trump

[5] Matthew P. Funaiole, Brian Hart, and Aidan Powers-Riggs, "Ship Wars: Confronting China's Dual-Use Shipbuilding Empire" (Washington, D.C.: Center for Strategic and International Studies, 2025), https://csis-website-prod.s3.amazonaws.com/s3fs-public/2025-03/250311_Funaiole_Ship_Wars.pdf?VersionId=rr_4IH5jXertgzLdS.ke07oFmgWTHnIM.

[6] "Beikoku zōsen shien, Usui kedo mo odoranu Nippon Kankoku wa 22 chō en tōshi [U.S. Shipbuilding Support: Japan Remains Unmoved While South Korea Invests 22 Trillion Yen]," *The Nikkei*. August 19, 2025. https://www.nikkei.com/article/DGXZQOUC136E60T10C25A8000000/.

administration—have largely taken such a buildup as a given, without considering the critical industrial foundations required to make it a reality.

These circumstances present a profound challenge. Without an expansion of defense firms' production capacity, no increase in defense spending—regardless of scale—can effectively translate into a corresponding enhancement of Japan's defense capabilities, as the industrial bottleneck would remain unresolved. In the past, even if Japan's domestic defense industry faced limitations, the nation could compensate by relying on imports, primarily from the United States. However, as armed conflicts unfold simultaneously in Europe and the Middle East, and as China's military threat intensifies in the Indo-Pacific, both the United States and European nations have come to depend increasingly on their own defense industries to strengthen their national defense capabilities.

As analyzed in detail in Chapter 2, this means Japan may no longer be able to rely on U.S. and European defense imports that match its specific needs in both timing and substance. If that is the case, the only viable path toward strengthening Japan's defense posture is to expand its own production base. Unless this fundamental point is fully recognized, any discussion of defense buildup beyond fiscal year 2027—after the current *Defense Buildup Program* concludes its estimated expenditure framework in fiscal 2027—will remain little more than an illusion.[7]

At the same time, drawing lessons from the combat dynamics observed in the war in Ukraine, not only Japan but also Western nations have intensified efforts to develop AI-enabled equipment and drones. In the United States, new defense startups such as Palantir and Anduril have emerged, actively seeking global expansion. In this context, simply procuring advanced, high-tech defense systems from foreign firms risks stifling innovation within Japan's domestic defense industry.

Against this backdrop, the central finding and argument of this report is a sense of urgency: the management practices of Japan's defense companies—shaped by two decades of stagnation—are poorly suited to the emerging "excess demand" era in defense, brought about by a deteriorating international security environment. These legacy business practices can be regarded as part of Japan's broader strategic culture. To overcome this, the government must not only present a medium-term outlook for future defense demand but also provide incentives that encourage defense firms to make proactive, large-scale investments. In addition, promoting in-house research and development within companies will be essential to foster defense innovation, leveraging advanced technologies.

Based on these concerns, this report focuses on an issue often overlooked in Japanese security studies—the problem of insufficient

[7] The Takaichi government declared its intention to review the three strategic documents including the DBP by the end of 2026, one year earlier than the original plan.

surplus production capacity. Specifically, through interviews and analysis involving major corporations that constitute Japan's defense industrial base, it seeks to illuminate the challenges faced by defense firms. Furthermore, it examines whether similar challenges exist in Western defense industries that have rapidly expanded their production capacity in response to the war in Ukraine and other global developments, and it reviews how their respective governments have addressed them. Building on these findings, the report aims to present concrete policy recommendations that can be implemented immediately to address these challenges.

Section 2 Methodology and Structure

In preparing this report, the authors conducted interviews with eleven major defense contractors that have direct procurement relationships with Japan's Ministry of Defense (the so-called "defense primes"), as well as with relevant industry associations (see Appendix 1 for a list of interviewees).[8] These interviews were conducted on a non-attributable ("on background") basis, using a common set of questions (see Appendix 2 for the list of questions), under the condition that the responses provided would not be linked to or used to identify any specific company or individual. In the report, any passages based on interview content are clearly indicated in the footnotes, distinguishing them from statements derived from the authors' own analysis or from publicly available information.

In addition to the introduction, this report consists of three chapters. Chapter 1 summarizes the findings from the aforementioned interviews with domestic defense firms and related organizations. Chapter 2 analyzes, based on open-source information, the challenges and measures observed in the United States and Europe—regions where expanding surplus production capacity has also become an urgent task—and identifies potential policies that could be applied to Japan's situation. Building upon the challenges identified in both Japan and the Western cases, Chapter 3 presents policy recommendations aimed at expanding Japan's defense production base.

[8] Furthermore, interviews were conducted with startup firms contemplating entry into the defense industry.

Chapter 1

Japan's Rapidly Shifting Defense Industry

Hirohito Ogi

Section 1: Transformations in the Environment Surrounding the Defense Industry

Before moving on to the detailed analysis in the following sections, it is worth outlining the recent changes in the environment surrounding Japan's defense industry. Since the publication of the three strategic documents in 2022, defense procurement has expanded significantly over the past three years. The "central procurement" contracted by ATLA surged from 1.8 trillion yen in FY2021 to 5.6 trillion yen in FY2023—an increase of threefold. Similarly, the value of contracts with Mitsubishi Heavy Industries, ATLA's largest contractor, rose from 460 billion yen in FY2021 to 1.7 trillion yen in FY2023, more than tripling.[1]

As defense procurement contracts have grown, expectations for defense companies have also risen. Comparing the period at the end of 2022—when the strategic documents were released—with May 2025, Mitsubishi Heavy Industries' stock price has increased sevenfold; the stock prices of Kawasaki Heavy Industries, NEC, and IHI have roughly tripled; and Mitsubishi Electric's stock price has doubled. These gains are driven by expectations of expanding revenues and improved profit margins.

In addition, the share of defense-related business in total corporate sales has expanded, raising expectations and attention from senior management. Traditionally, Japanese defense companies have not been dedicated defense manufacturers; civilian products accounted for most of their revenue, and even at major prime contractors, defense sales made up only around 10% of total sales. As a result—combined with low profit margins—executives showed limited interest in their defense divisions, with some companies even describing their involvement as being "for the good of the country," or almost a form of "volunteer work." [2] Moreover, the deteriorating business environment—particularly for aircraft suppliers—led to a wave of withdrawals from the market, creating challenges in maintaining a stable supply chain.[3]

The broader environment surrounding Japan's defense sector is undergoing a notable shift. While several civilian businesses—such as commercial aircraft manufacturing—have experienced stagnation or contraction, defense-related operations are increasingly viewed as a growth area. At Mitsubishi Heavy Industries, for example, sales from the defense segment rose significantly, accounting for nearly 20 percent (16 percent) of total corporate revenue in fiscal year 2024, and as much as 28 percent on an order-intake basis.[4]

However, despite rising government demand and heightened expectations from both

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[1] Acquisition, Technology & Logistics Agency, "Chūō chōtatsu niokeru chōtatsu jisseki [Procurement Record of Central Procurement]," https://www.mod.go.jp/atla/souhon/supply/jisseki/index.html. The archived materials were obtained from the National Diet Library's Web Archiving Project (WARP), https://warp.ndl.go.jp/.

[2] Interviews with defense companies conducted by the author, April 23, 2025.

[3] Hirohito Ogi, *"Nihon: Sentaku naki tōshi no kansei [The Pitfall of Investment without Prioritization],"* in Sadamasa Oue, Hirohito Ogi, Rintaro Inoue, *Kakkoku bōei sangyō no hikaku kenkyū jiritsusei, sentaku, soshite jizoku kanōsei [Comparative Studies on Defense Industries]*, Chapter 1, (The Institute of Geoeconomics, 2023), https://instituteofgeoeconomics.org/research/2023103051307/.

[4] Mitsubishi Heavy Industries, Ltd., "FY2024 Financial Results," May 2025, https://www.mhi.com/jp/finance/library/result/pdf/fy20244q/presentation.pdf.

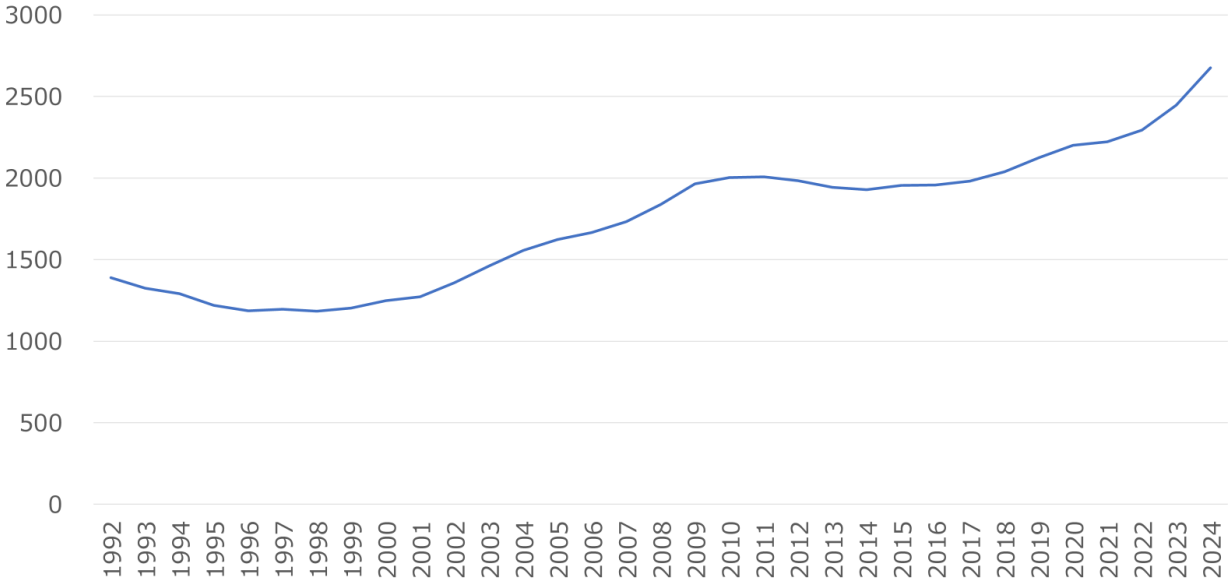
internal and external stakeholders, new challenges are becoming apparent—chief among them the need to expand production capacity. After roughly two decades of remaining flat or slightly declining, Japan's defense businesses lack the organizational and industrial structures necessary to scale up production rapidly, whether in terms of workforce or manufacturing infrastructure. Reflecting the growing difficulty of this challenge, then–Mitsubishi Heavy Industries President Seiji Izumisawa remarked in December 2024 that the company's key task for 2025 would be "to build an organizational structure capable of executing on the large backlog of orders."[5] The outlook suggests that defense demand is highly unlikely to decline in the foreseeable future. On the contrary, given Japan's deteriorating security environment and the Trump administration's renewed calls for greater allied defense efforts, the scale of production required under the next defense buildup plan—beginning in FY2028—is likely to increase further. In this context, the fact that many firms are not yet positioned to handle even their current order backlogs underscores that substantially greater efforts will be necessary to meet future increases in defense spending.

The challenge of insufficient surplus production capacity is not unique to Japan; it is increasingly shared across the international community. According to the Stockholm International Peace Research Institute (SIPRI), global military expenditures in 2024 grew by 9.4 percent year-on-year—the highest rate of increase since 1988—and reached their largest level on record (Figure 1-1).[6] The primary driver of this surge is Europe's military buildup in response to the war in Ukraine, followed by the Middle East, where the Gaza conflict continues. While overall growth in Asia appears more moderate, defense spending in East Asia has risen sharply. Taken together, these trends illustrate a world facing simultaneous military tensions in three theaters—Europe, the Middle East, and East Asia—with all three deteriorating at the same time. Reflecting this environment, the total volume of international arms transfers has also reached its highest level since the end of the Cold War (Figure 1-2).

[5] "'Bōei' shinchō e jinzai kakutoku Mitsubishijūkō, setsubi fukume taisei seibi [Mitsubishi Heavy Industries Strengthens Its Framework — Securing Talent and Explaining Facilities as Its "Defense" Business Grows]," *The Nikkan Kogyo Shimbun*, December 12, 2024, https://newswitch.jp/p/43963.

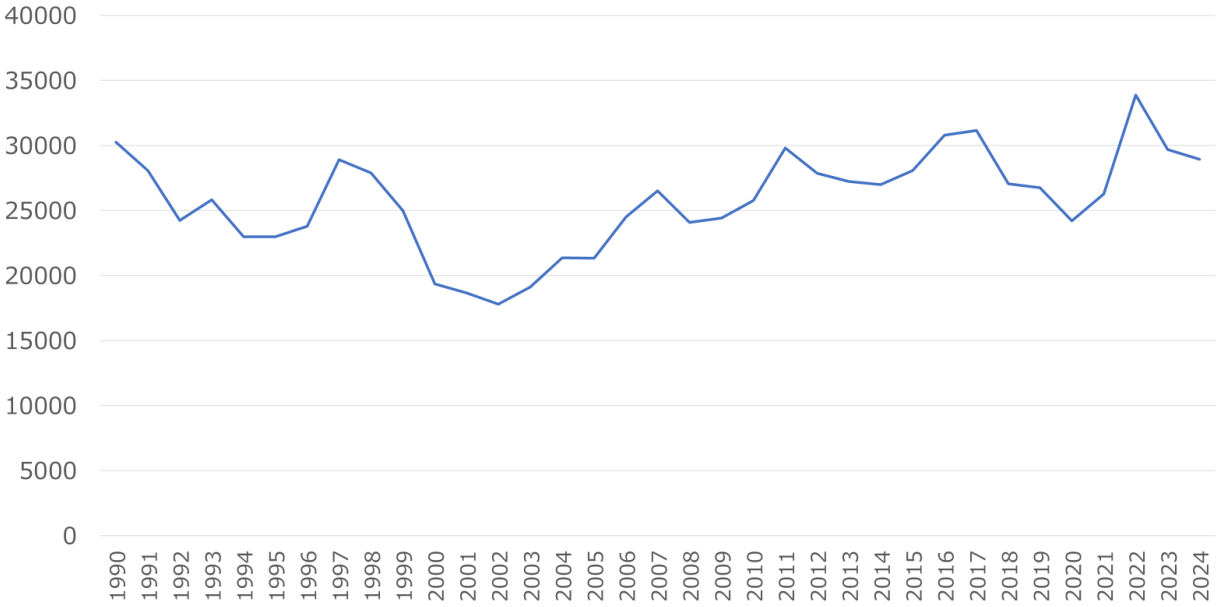
[6] Mathew George, et al., "Trends in International Arms Transfer, 2024," SIPRI Fact Sheet, SIPRI, March 2025, https://www.sipri.org/publications/2025/sipri-fact-sheets/trends-international-arms-transfers-2024.

Figure 1-1: Trends in Global Military Expenditure (1992–2024)



Source: Compiled by the author based on SIPRI, Military Expenditure Database, https://www.sipri.org/databases/milex. Figures are computed in constant 2023 US dollars (billion USD), adjusted for inflation and exchange rates. For 2024, values are expressed in constant 2024 US dollars.

Figure 1-2: Trends in International Arms Transfers (1990–2024)



Source: The data represent SIPRI's Trend Indicator Values (TIV), which measure the volume of international transfers of major conventional weapons. SIPRI, Arms Transfers Database, https://www.sipri.org/databases/armstransfers.

Against this backdrop, many countries are struggling to rapidly scale up their defense production capacities. The United States, for example, has reportedly provided $66.5 billion in military assistance to Ukraine under the Biden administration.[1] However, the rapid surge in demand led to a shortage of excess production capacity for anti-tank and air-defense missiles, as well as artillery shells. Consequently, a significant portion of the supplemental budget

[1] US Department of Defense, "Fact Sheet on US Security Assistance to Ukraine," January 2025, https://media.defense.gov/2025/Jan/09/2003626080/-1/-1/1/UKRAINE-FACT-SHEET-JAN-9-2025.PDF.

for aid to Ukraine was allocated to expanding the production infrastructure for missiles and shells.[2] In addition, the rationalization of defense procurement that began in the late Cold War period, along with post-Cold War consolidation and restructuring of the defense industry, led to the downsizing and streamlining of factory facilities. Furthermore, the adoption of "just-in-time" production practices, aimed at efficiently meeting peacetime demand, is said to have undermined the resilience and redundancy of defense production.[3]

The rapid resurgence of defense demand has also posed challenges in securing the necessary workforce. Against the backdrop of a broader decline in U.S. manufacturing, the U.S. Department of Defense recognized the recruitment of highly skilled workers and engineers as a major challenge in its 2024 "Defense Industrial Strategy."[4] Some defense firms have even begun rehiring retired engineers to support the increased production of legacy missiles.[5]

Similarly, in European countries directly exposed to the threats posed by the war in Ukraine, expanding the defense production base has become an urgent priority. While current political debates in Europe are largely focused on how to increase defense spending, the region's defense industrial base—which has maintained a path of downsizing and equilibrium, similar to Japan—faces significant challenges in efforts to rebuild capacity. For instance, in December 2024, the German government released its "National Security and Defense Industry Strategy," which identifies the expansion of domestic production capabilities, the securing of skilled labor, and the procurement of raw materials as key challenges. [6] The UK government likewise highlighted similar challenges in its "Defense Industry Strategy," published in September 2025.[7]

In response to this situation, the United States and Europe have sought to expand their domestic production capacities while also beginning to rely on allied and friendly countries to fill gaps in supply. Both have turned to

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[2] The funding was allocated in the FY2022 and FY2023 supplementary budgets. US House of Representatives Appropriations Committee Democrats, "Ukraine Supplemental Appropriations Act, 2022," summary, https://democrats-appropriations.house.gov/sites/evo-subsites/democrats-appropriations.house.gov/files/Additional%20Ukraine%20Suplemental%20Appropriations%20Act%20Summary.pdf; US Senate Appropriations Committee, "Ukraine Supplemental," summary of the FY2023 Ukraine Supplemental Appropriations Act, https://www.appropriations.senate.gov/imo/media/doc/FY23%20BILL%20HIGHLIGHTS_UKRAINE.pdf.

[3] US Department of Defense, "The National Defense Industrial Strategy," January 2024, https://www.businessdefense.gov/docs/ndis/2023-NDIS.pdf.

[4] Although the second Trump administration signed an executive order in September 2025 to rename the Department of Defense as the "Department of War," the change has not been approved by Congress as of the time of writing. Therefore, this paper continues to refer to the organization as the "Department of Defense."

[5] "Raytheon Calls in Retirees to Help Restart Stinger Missile Production," *Defense One*, June 28, 2023, https://www.defenseone.com/business/2023/06/raytheon-calls-retirees-help-restart-stinger-missile-production/388067/?oref=d1-author-river.

[6] German Federal Ministry of Defence, "National Security and Defence Industry Strategy," January 2025, https://www.bmvg.de/resource/blob/5873628/138fddf8112609dfdc3ea44a52ba9195/dl-national-security-and-defence-industry-strategy-data.pdf.

[7] UK Ministry of Defence, "Defence Industrial Strategy 2025: Making Defence an Engine for Growth," September 8, 2025, https://assets.publishing.service.gov.uk/media/68bea3fc223d92d088f01d69/Defence_Industrial_Strategy_2025_-_Making_Defence_an_Engine_for_Growth.pdf.

industrialized nations in the Indo-Pacific region, such as Japan and South Korea, as key sources of support.

In 2024, Japan and the United States launched the Defense Industry Cooperation, Acquisition, and Sustainment Regular Dialogue (DICAS), through which Japan sought to expand maintenance and sustainment for forward-deployed U.S. naval vessels and aircraft[8]. Joint production between Japan and the U.S. is also planned for U.S.-made systems, including Patriot surface-to-air missiles and AIM-120 (AMRAAM) air-to-air missiles.[9] Media reports indicate that the U.S. has requested Japanese investment in the joint construction of dual-use naval vessels and in the U.S. shipbuilding industry.[10] Among various measures agreed upon between Japan and the U.S. in July 2025 regarding U.S. tariff actions, shipbuilding is specifically identified as a sector for Japanese investment.[11] Leveraging its competitive shipbuilding industry, South Korea is similarly advancing expanded maintenance of U.S. vessels domestically, investing in the U.S. shipbuilding sector, and promoting technology and workforce cooperation.[12] In addition, in 2024, the U.S. Department of Defense established the "Partnership for Industrial Base Resilience in the Indo-Pacific" (PIPIR) under its defense industrial cooperation framework, marking the beginning of efforts to explore multilateral collaboration in the defense industry.

In its relations with Europe, South Korea had already established a presence through defense exports to countries such as Poland, and it has recently shown increasing interest in cooperation with Japan. In April 2025, NATO Secretary General Mark Rutte visited Japan, where defense industrial cooperation emerged as a key item on the Japan–NATO agenda. During his stay, Secretary General Rutte toured Mitsubishi Electric and the destroyer Mogami, reportedly expressing strong interest in collaboration on air defense systems and space-related initiatives.[13]

The backdrop to this trend lies in changes to the security environment and relations with the United States. Traditionally, European countries have designed their defense around the presence

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[8] Ministry of Defense, "Readout of Under Secretary of Defense Dr. William LaPlante's Visit to Japan", June 2024, https://www.mod.go.jp/j/approach/anpo/2024/0609a_usa-j.html.

[9] Ministry of Defense, Press release of the 2nd DICAS meeting (Oct, 2024), October 2024, https://www.mod.go.jp/j/approach/anpo/2024/1007_usa-j.html; Ministry of Defense, The 3rd Defense Industrial Cooperation, Acquisition, and Sustainment (DICAS) Forum, December 2024, https://www.mod.go.jp/j/approach/anpo/2024/1212a_usa-j.html.

[10] "Trump seiken, Nippon ni gunmin ryōyō no zōsen yōsei e Bei kaigun chōkan [Trump Administration to Request Japan's Engagement in Dual-Use Shipbuilding, Says U.S. Navy Secretary]," *The Nikkei Shimbun*, April 28, 2025, https://www.nikkei.com/article/DGXZQOGN260U60W5A420C2000000/.

[11] Cabinet Secretariat, "Beikoku no kanzei sochi nikansuru Nichi Bei kyōgi Nichi Beikan no gōi gaiyō [Japan-U.S. Consultations on U.S. Tariff Measures: Summary of the Bilateral Agreement]," July 25, 2025, https://www.cas.go.jp/jp/seisaku/tariff_measures/dai6/250725siryou1.pdf.

[12] Hanwha Japan "Hanwha ga Philly zōsensho o baishū, sekai no zōsen to kaigun shisutemu no tenkai niokeru ashiba o kakudai [Hanwha Acquires Philly shipyard, Expanding Its Footprint in Global Shipbuilding and Naval Systems]," June 25, 2024, https://www.hanwha-japan.com/news/news-letter/2024/20240625/; "Hyundai jūkō, Bei HII to zōsen gijutsu de oboegaki. toranpu seisaku shiya ni teikei kakudai [Hyundai Heavy Industries Signs Memorandum on Shipbuilding Technology with U.S. HII, Eyes Expanded Collaboration under Trump Administration Policies]," *The Japan Maritime Daily*, April 14, 2025, https://www.jmd.co.jp/article.php?no=304538.

[13] "Naze? Nato jimu sōchō ga rainichi bōei bun'ya nado renkei kyōka nerau haikei wa [Why? NATO Secretary General Visits Japan — The Background Behind Efforts to Strengthen Cooperation in the Defense Sector], *NHK NEWS WEB*, April 10, 2025, https://www3.nhk.or.jp/news/html/20250410/k10014775371000.html.

of U.S. forces in Europe and U.S. nuclear capabilities, incorporating the U.S. military as a central element of their force planning. However, the Trump administration's calls for Europe to strengthen its own defense efforts, combined with discussions of a partial reduction of U.S. forces in Europe, have compelled European countries to reconsider the types of weapons they seek to acquire from other nations. Conventionally, countries such as Poland, Romania, Estonia, and Finland have strengthened territorial defense on the Eastern Front by procuring land systems—including tanks and self-propelled artillery—manufactured in South Korea.[14] However, concerns over the production capacity of U.S.-made air defense missiles, coupled with wavering confidence in the United States, have created a demand for alternative suppliers in such a system as well. In addition, as European countries find it increasingly necessary to independently develop strategic defense capabilities, demand is expected to rise for assets such as space systems and long-range missiles. These shifts in demand are likely a major factor driving its increased interest in Japan's defense production. Furthermore, in August 2025, Australia selected an enhanced version of Japan's Mogami-class destroyer as its next-generation general-purpose frigate, marking it a high-profile export project.

The key question is whether Japan possesses the capacity to meet such demand from the U.S., Europe, and other partners. As noted earlier, Japan's defense industry is already at a stage where it must expand production capabilities to accommodate past defense enhancement initiatives and anticipated high-level demand beyond fiscal year 2027. If it is also expected to respond to overseas demand, quantitative constraints and time gaps between production and delivery are inevitably likely to emerge. Efforts are therefore required to rapidly develop the production base while balancing competing domestic and international demands.

How Japanese defense companies perceive these challenges and the measures they are undertaking to address them is the focus of the following sections.

Section 2 The Japanese Defense Industry's Reactions to Government Policies

In its National Security Strategy, the government has considered the defense industry as, in effect, an integral component of the country's defense capabilities and has advanced various measures to enhance it.[15] Japanese defense prime contractors generally view these government initiatives positively, while also identifying areas where further improvements are needed.

1. Effects of Increased Defense Expenditures

In particular, the increase in defense spending—and the resulting rise in procurement

[14] Hirohito Ogi "South Korea: The Gap-Filler of Defense Supply and Demand", *Comparative Studies on Defense Industries*, Chapter 5.
[15] Cabinet decision, "National Security Strategy," December 2022, https://www.cas.go.jp/jp/siryou/221216anzenhoshou/nss-j.pdf.

contracts—has been received most positively.[16] This is not only because it directly contributes to corporate revenues, but also because cost elements such as rising manufacturing expenses and material prices, which had not always been fully reflected during the budget planning process, are now being assessed by the Ministry of Defense and the Ministry of Finance when presented with a reasonable justification, thereby helping to maintain reasonable profit margins.[17] Moreover, perceptions of the defense business have changed both inside and outside companies. Previously regarded as a business division that did not significantly contribute to profit growth, the defense segment has begun to attract attention from top management, including company presidents, as a growth sector. It is also now viewed more favorably by outside directors and shareholders, which has made it easier for firms to advance their defense-related activities.[18] Underpinning this shift is a change in the longstanding view that defense divisions should not draw external attention; defense manufacturers are only now beginning to be evaluated in a positive and legitimate light.[19]

Some companies noted that a major driver behind these changes has been growing attention from the stock market, particularly from overseas investors.[20] As executives are "asked about the defense business at every shareholders' meeting," senior management, including the CEO, have naturally come to feel a greater need to maintain a firm understanding of their company's defense operations.[21] Furthermore, the decline in revenues from civilian sectors—such as commercial aircraft—due to the COVID-19 pandemic since 2020 has increased the relative prominence of defense divisions. At the same time, there appears to be a perceptible gap between the rising expectations of senior management and external stakeholders on the one hand, and the outlook of frontline defense business units on the other. Some expressed concern that the trend of increased defense spending through FY2027 might prove temporary, and uncertainty remains as to whether it will continue beyond FY2027.[22] After operating a chronically low-revenue business for many years, it is possible that, in some firms, defense divisions are more cautious about future prospects than corporate leadership.

2. Impact of the Defense Production Base Reinforcement Act

Under the Defense Production Base Reinforcement Act enacted in 2023, the Ministry of Defense may approve company plans—referred to as "Stable Equipment Production and Supply Assurance Plans"—designed to strengthen corporate foundations through measures such as (1) enhancing supply chain

[16] Interviews with defense companies conducted by the author, December 20, 2024.
[17] Ibid., January 23, 2025.
[18] Ibid., January 23, 2025; February 5, 2025; April 21, 2025.
[19] Ibid., January 23, 2025.
[20] Ibid., February 5, 2025.
[21] Ibid.
[22] Ibid., December 20, 2024; May 28, 2025.

resilience (including diversification of supply sources), improving manufacturing efficiency, strengthening cybersecurity, and ensuring business continuity through succession planning. Once approved, companies become eligible for financial support covering the costs associated with these initiatives. The Act also establishes (2) a mechanism under which, if no alternative option exists when a company withdraws from the defense business, the government may assume ownership of equipment production facilities and outsource their management to another company—a so-called government-owned, contractor-operated (GOCO) facility solution; and (3) measures to facilitate overseas transfers of defense equipment, including financial assistance through a dedicated fund based on approved plans.

Although no GOCO facilities have been designated to date, some companies have applied for (1) Stable Equipment Production and Supply Assurance Plans and, after receiving approval, have become eligible for financial support. Views on this financial assistance were divided: some companies regarded it positively, while others argued that the system and its implementation remain insufficient. Unsurprisingly, the positive assessments came from firms that had submitted plans—such as those focused on improving manufacturing efficiency or securing business continuity—and had successfully obtained approval from the government.[23]

On the other hand, those who viewed the system as insufficient frequently cited the narrow scope of plans eligible for financial support. In practice, many approved plans fall under categories such as improving manufacturing efficiency; however, companies noted that the simple replacement of aging equipment is not accepted unless it directly contributes to cost reductions in manufacturing.[24] Some firms reported that even when they proposed plans incorporating new technologies intended to enhance efficiency, these forward-leaning proposals were rejected due to what they perceived as an insufficient understanding within the government of actual manufacturing processes.[25]

Companies also expressed dissatisfaction with what they view as strict and inflexible aspects of the system's implementation. For example, if machinery procured with financial support is used for non-defense purposes, firms are required to reimburse the corresponding portion of the subsidy. But support is not available for the construction of facilities that have dual-use or general-purpose functions. Moreover, because financial assistance is disbursed only after the contracted equipment associated with the subsidy has been manufactured and delivered, there is no cash-flow benefit for companies.[26] A further concern

[23] Ibid., February 5, 2025; February 26, 2025; April 21, 2025; April 23, 2025.
[24] Ibid., January 23, 2025; May 28, 2025.
[25] Ibid., November 6, 2024.
[26] Ibid., November 6, 2024; April 21, 2025.

is that the financial support cannot be used for capital investment undertaken directly for the purpose of increasing production capacity. [27] Some companies criticized the measures as piecemeal and argued that a comprehensive strategy for strengthening the defense production base remains lacking.[28]

Additionally, regarding the aforementioned (3) Defense Equipment Transfer Facilitation Fund, it was pointed out that its current scope is far too narrow, as it can only be used for limited purposes such as modifying performance or specifications to match the needs of the recipient country. [29] Although there is strong demand for support covering facility investments and other costs required for overseas exports of defense equipment, the fund cannot be used for such production-expanding purposes. As a result, actual use cases of the fund have remained very limited.

3. Initiatives to Improve Profitability

The Ministry of Defense, aiming to improve the profit margins of defense procurement contracts—which the business community has long perceived as unprofitable—and to strengthen the competitiveness of defense production, introduced a new profit-margin designation method in 2023. Under this method, each company undergoes an overall evaluation of quality, cost, delivery, and other factors (QCD evaluation), and profit margins are allocated based on the results of that evaluation. [30] Separately, in light of the frequent cases in which companies' profits were squeezed because they were bound to the original cost agreed at the time of contract—despite sharp increases in costs for materials and components over the contract period—a cost-variation adjustment rate was introduced. This rate is added according to the length of the contract to serve as a buffer against inflation (for example, a 5% addition for a contract spanning five years).

Regarding this initiative, some respondents expressed positive views, noting that evaluations conducted through dialogue with the government side have made it easier to understand what the government expects from companies, and that they feel the evaluation criteria are meaningful. On the other hand, perceptions were divided concerning the profit margins linked to the corporate evaluations. [31] This is because some companies believe their profit margins have improved compared to before, while others feel they have worsened. There were also opinions that it would be helpful if ATLA clearly indicated the direction in which companies should make efforts to improve future

[27] Ibid., April 23, 2025.
[28] Ibid., November 6, 2024.
[29] Ibid., February 5, 2025; April 21, 2025.
[30] Cost Management Director of ATLA, "Yotei kakaku santei kijun kunrei no kaisei ni tomonai sadameru dō kunrei dai 70 jō no kitei oyobi kaishaku un'yō tsūtatsu dai 23 kō no kitei ni motozuku bōei daijin shōnin jikō no gaiyō [Overview of Matters Approved by the Minister of Defense Based on Article 70 of the Instruction on Standard Price Calculation, as Revised, and Article 23 of the Interpretation and Operational Guidelines]," https://www.mod.go.jp/atla/souhon/pdf/yotei_santeikijun_r05.pdf.
[31] Interviews with defense companies conducted by the author. December 20, 2024; January 23, 2025; February 5, 2025; February 26, 2025; April 21, 2025; April 23, 2025.

QCD evaluations.[32] In addition, whereas the uniformly applied profit margin in the past was 7–8%, the new profit margin range is set between 5–10%. Some view this range as too narrow to have any real impact.[33] According to this view, the upper limit of the profit margin should be further raised.

Moreover, although the introduction of the cost-variation adjustment rate has partially mitigated the effects of rising prices, the inflation rate has exceeded the adjustment rate in practice, meaning that the measure has not fully offset the impact.[34]

Section 3 Companies' Efforts and Challenges in Responding to Rising Demand

Each company is making efforts to increase its workforce and invest in equipment in order to respond to the sharp rise in defense demand. For example, based on publicly available information, Mitsubishi Heavy Industries has announced plans to increase its workforce and production capacity by 40% and 30% respectively, by fiscal year 2026. IHI has similarly stated that it will increase its workforce by 50%.[35] Mitsubishi Electric announced in 2023 that it would invest approximately 70 billion yen in facilities and strengthen its workforce by around 1,000 personnel.[36] NEC has revealed plans not only to construct a new plant with an investment of about 20 billion yen but also to increase its workforce by around 1,000 employees by fiscal year 2026.[37]

While companies strongly welcome the growth in defense demand itself, they also acknowledge that their responses are, to some extent, driven by the need to react to rapidly changing circumstances.

1. Securing Workforce

In particular, increasing personnel is not easy, and nearly all companies regard it as a major challenge.[38] Additional staff are either reassigned from other internal divisions or hired externally as mid-career professionals who can serve as immediate contributors.[39] However, it is difficult to adjust personnel allocation between divisions through a bottom-up approach, and coordination at the executive level is often required.[40] Moreover, even when staff are

[32] Ibid., April 7, 2025; April 21, 2025.
[33] Ibid., May 28, 2025.
[34] Ibid., November 6, 2024; April 7, 2025.
[35] "Jūkō 3 sha no bōei uriage 25 zō 25 nen 3 tsukiki kadai wa kyōkyūmō saisei [Defense Sales of Three Heavy Industries Rise 25% in FY2025 Ending March; Supply Chain Revitalization Remains a Challenge]," *The Nikkei Shimbun*, November 11, 2024, https://www.nikkei.com/article/DGXZQOUC07DPP0X01C24A1000000/.
[36] "Nippon no bōei sangyō o dō tsuyoku suru ka, paneru dhisukasshon "anzen hoshō" chūkaku ni renkei kakudai o symposium "Nippon wo tsuyoku suru bōei sangyō" repo-toka [How to Strengthen Japan's Defense Industry: Panel Discussion — Expanding Collaboration with "Security" at the Core, Report from the Symposium "Strengthening Japan's Defense Industry" (Part 2)]," *The Sankei Shimbun*, July 12, 2025, https://www.sankei.com/article/20250712-QUF2THJ5HJKAFKF53LKCR542E4/.
[37] "NEC, bōei jigyō de 200 oku en tōji shin kōjō 1000 nin zōin [NEC Invests 20 Billion Yen in Defense Business, To Open New Factory, Add 1,000 Employees]," *The Nikkei Shimbun*, November 30, 2023, https://www.nikkei.com/article/DGXZQOUC3052B0Q3A131C2000000/.
[38] Interviews with defense companies conducted by the author, November 6, 2024.
[39] Ibid., November 6, 2024; December 20, 2024; January 23, 2025; February 5, 2025; February 26, 2025;April 7, 2025; April 21, 2025; April 23, 2025.
[40] Ibid., December 20, 2024.

reassigned from other divisions, defense operations require a high level of specialization. Compliance with information security protocols and adaptation to different quality control standards in manufacturing mean that reassigned personnel cannot always be deployed as immediate contributors.[41] Competition for talent also arises not only within the same company but among other manufacturing firms in the same economic region.[42] In addition, defense work often imposes restrictions on working styles—such as limited opportunities for remote work—due to information security requirements, which further constrains personnel flexibility.[43] Furthermore, given the highly specialized nature of manufacturing, companies may be unable to expand their workforce unless future demand is predictable. From a management perspective, some firms consider it optimal to maintain a slightly limited resource pool rather than risk overextending staff.[44]

On the other hand, some companies noted that the inherent appeal of defense operations makes these divisions relatively attractive for internal transfers and mid-career hires, and that personnel allocation becomes easier when strong leadership is exercised by executives such as the company president.[45] Furthermore, some firms indicated that, in the future, they should consider introducing foreign personnel depending on the nature of specific production processes.[46]

Moreover, there were only a limited number of companies that reported increasing their workforce in anticipation of future demand; nearly all firms are currently expanding personnel solely to fulfill existing (increasing) contract volumes.[47] In addition, while it is relatively easier for prime defense contractors to attract talent due to factors such as higher salary levels, their subcontractors cannot offer comparable employment conditions, making it significantly more difficult for them to secure workers.[48] Some companies also noted that, compared to highly skilled engineers, the shortage is even more severe among workers engaged in labor-intensive processes.[49] In particular, subcontractor groups often face aging technical staff, and in some sectors, labor shortages have rapidly intensified following the retirement of the baby-boomer workforce.[50]

2. Capital Investment

Manufacturing facilities such as factories are also in short supply, and many companies are working to expand capital investment. Nearly all firms reported increasing the number of factories or production buildings.[51] Similar to workforce reallocation, some companies have begun

[41] Ibid., January 23, 2025; April 23, 2025.
[42] Ibid., February 26, 2025.
[43] Ibid., February 5, 2025.
[44] Once workers are assigned, it is reportedly difficult to reassign them through transfers. Ibid., January 23, 2025; April 7, 2025.
[45] Ibid., February 5, 2025.
[46] Ibid., February 5, 2025; April 7, 2025.
[47] Ibid., December 24, 2024; February 5, 2025.
[48] Ibid., April 21, 2025; May 28, 2025.
[49] Ibid.
[50] Ibid., January 23, 2025; May 28, 2025.
[51] Ibid., November 6, 2024; December 20, 2024; February 5, 2025; February 5, 2025; February 26, 2025; April 21, 2025.

repurposing multiple facilities from their civilian-product divisions—where demand has declined—for defense-related use.[52]

As would be expected, firms that manufacture large platforms face greater challenges in securing land and facilities, whereas companies producing relatively small equipment or systems generally do not face significant spatial constraints. Moreover, although conditions differ by product and industry, factories located in densely populated areas are physically unable to expand, and some struggle even to rebuild aging plants due to the lack of alternative facilities and space.[53] In addition, when rebuilding factories within existing sites, the Factory Location Act requires that green space be designated, resulting in a reduction of usable area after reconstruction—a challenge that has been widely acknowledged.[54] Beyond national law, additional regulatory requirements may also be imposed under municipal ordinances when upgrading facilities.

Expanding manufacturing facilities in densely populated areas is difficult due to these constraints; however, acquiring new facilities in suburban locations creates a trade-off, as it becomes harder to secure workforce because employees would then face relocation or long commutes.[55] Moreover, when production sites are dispersed, logistical challenges arise in terms of both cost and time, thereby necessitating the development of a production system that takes into account readjustment of the entire supply chain.[56] It is also important to note that, similar to workforce issues, when a prime contractor does not hold equity ties with its subcontractors and is only connected through contractual relationships, it has no legitimate basis for ordering subcontractors to expand their production capacity or for voluntarily providing financial support to strengthen their manufacturing base within the supply chain.[57]

Section 4 Companies' Responses to Overseas Export

Since the establishment of Japan's Three Principles on the Overseas Transfer of Defense Equipment and Technology in 2014, the government has relaxed export restrictions on defense equipment and encouraged domestic defense companies to engage in defense exports. Nevertheless, the export of fully assembled defense products had remained limited to a single case—the 2020 contract under which Mitsubishi Electric exported ground-based radar systems to the Philippines. However, as perceptions of the strategic environment have hardened worldwide in response to the war in Ukraine, which escalated in 2022, as well as China's increasing military pressure over Taiwan and in the South China Sea, transactions in the global defense market have reached their highest levels since the

[52] Ibid., February 26, 2025.
[53] Ibid., January 23, 2025.
[54] Ibid., January 23, 2025; April 23, 2025.
[55] Ibid., February 5, 2025.
[56] Ibid., April 21, 2025.
[57] Ibid., April 7, 2025.

late Cold War. Against this backdrop of shifting international conditions, new large-scale export deals have begun to emerge, such as missile exports to the United States (including PAC-3s and AMRAAMs) and the sale to Australia of the upgraded Mogami-class frigates, referred to as the new FFMs.

Reflecting the changing international security environment described above, only a minority of Japanese defense firms now view the reputational risks associated with overseas exports as a primary concern. This trend is particularly notable among companies in which defense sales account for a substantial share of total revenue, firms engaged in the production of highly lethal systems, and those whose transactions are conducted primarily with other corporate or governmental clients (B-to-B or B-to-G rather than consumer markets). For such companies, exposure to reputational risk is structurally limited.[58] Moreover, when senior management expresses interest in expanding overseas business, firms tend to become more proactive at the organizational level.[59]

At the same time, new challenges are emerging. The first involves a general lack of know-how in international defense transactions. Governments that engage in negotiations with Japanese firms often place high priority on fostering their own domestic defense industries, and therefore frequently request local production. Japanese defense firms are not opposed to arrangements that include local manufacturing; however, such deals raise a broad range of complex issues that require careful consideration. These include frameworks for licensing technologies associated with technology transfers, mechanisms to control and manage transferred technologies in recipient countries in consultation with Japan's Ministry of Defense, and programs for training local technical personnel.[60]

Second, as Japan's domestic defense demand continues to expand, several companies reported that they are strengthening their production base according to this increase while responding to export opportunities at the limits of their available capacity.[61] In addition to production constraints, overseas projects require substantial effort to coordinate and negotiate with foreign governments. As a result, some firms are attempting to concentrate resources only on large-scale, high-impact deals.[62] Beyond production lines, several companies also pointed to shortages of engineers and workers who can be assigned to overseas business activities as a major bottleneck.[63]

Third, unlike domestic transactions

[58] See also Naoki Hasegawa, "Bōei sōbi iten no bōei sangyō kiban kyōka nitaisuru seisaku kōka nikansuru kenkyū seisaku taiō ga kigyō no reputation ishiki ni ataeta eikyō to wa [A Study on the Policy Effects of Defense Equipment Transfer on the Strengthening of the Defense Industry Base: How Policy Measures Affect Companies' Awareness of Reputation]," Master's Thesis, Graduate School, Waseda University, 2023, Reprinted from the Ground Self-Defense Force Education and Training Research Headquarters, https://www.mod.go.jp/gsdf/tercom/img/file2626.pdf.
[59] Ibid., November 6, 2024; January 23, 2025; February 5, 2025; February 26, 2025; April 21, 2025; April 21, 2025; April 23, 2025.
[60] Ibid., December 20, 2024; February 5, 2025.
[61] Ibid., January 23, 2025.
[62] Ibid., February 5, 2025; February 26, 2025.
[63] Ibid., May 28, 2025.

conducted with the Ministry of Defense, international defense exports frequently require upfront investment—such as new capital equipment—and are heavily influenced by the policies and preferences of foreign governments, making such ventures inherently riskier than domestic deals. [64] Companies that view these risks as significant argue that, without clear predictability, entry into overseas markets remains difficult. Conversely, some firms do not share this cautious interpretation and view these risks as manageable.

Section 5 Companies' Future Investment Plans and Their Expectations for the Government

1. Prospective Investment Plans

Some defense companies have articulated medium- to long-term growth objectives. For example, Mitsubishi Heavy Industries has stated that from fiscal year 2027 onward, it aims to achieve annual defense-related revenue of over one trillion yen, accompanied by active investment in research and development.[65] Similarly, IHI has set a goal of increasing its defense business revenue to eight hundred billion yen in fiscal year 2030 and further to one trillion yen in fiscal year 2040.[66] Mitsubishi Electric has also announced that from fiscal year 2030 onward, it seeks to generate six hundred billion yen in defense-related revenue while maintaining a profit margin exceeding ten percent.[67]

In the area of research and development, a notable number of firms indicated that they are pursuing proactive initiatives, including a focus on dual-use technologies and collaboration with startup companies.[68] Among them are firms that have applied for, or are already receiving support through, research funding programs administered by the Cabinet Office, the Ministry of Education, Culture, Sports, Science and Technology, and the Ministry of Economy, Trade and Industry. Through the cultivation of dual-use technologies, these firms aim to expand business opportunities that may ultimately lead to contract arrangements with the Ministry of Defense.

On the other hand, not all companies are willing to make the upfront investments—such as capital investments or independent research—required to build production capacity from the bottom up in a manner not directly tied to government budgets. In particular, with respect to anticipatory investment targeting demand beyond fiscal year 2028, for which the 2022 Defense Buildup Program does not provide explicit budgetary backing, many firms, with only limited exceptions, have refrained from

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[64] Ibid., January 23, 2025; May 28, 2025.
[65] Mitsubishi Heavy Industries Ltd., "Bōei jigyō setsumeikai [Defense Business Briefing]," November 22, 2023, https://www.mhi.com/jp/finance/library/business/pdf/defense2023.pdf.
[66] IHI, "Jigyō ryōiki setsumeikai kōkū uchū bōei jigyō ryōiki [Business Area Briefing: Aerospace and Defense Sectors]," October 23, 2024, https://www.ihi.co.jp/ir/event/business_briefing/_cms_conf01/__icsFiles/afieldfile/2024/11/11/FY24_Business_Area_Briefing_JP.pdf.
[67] Mitsubishi Electric, "Bōei jigyō setsumeikai [Defense Business Briefing]," March 12, 2025, https://www.mitsubishielectric.co.jp/ja/pr/2025/pdf/0312-1.pdf.
[68] Interviews with defense companies conducted by the author. December 20, 2025; February 5, 2025; February 5, 2025; February 26, 2025; April 21, 2025; May 28, 2025.

taking a proactive stance, citing insufficient predictability.[69] Furthermore, although some startup companies are attempting to enter the defense sector, these firms likewise identify as a challenge the cash-flow gap that emerges between the costly manufacturing phase and the point at which returns can be realized.[70]

2. Government Policy Measures Expected by Industry

The requests that companies make to the government regarding future defense-related business can be summarized in the following six key points.

First, the issue which is ranked as the highest priority by defense firms is the early presentation of a clear outlook for the defense budget after fiscal year 2027.[71] Although procurement levels are expected to remain elevated following the budget increases scheduled through fiscal year 2027, companies—having faced stagnant defense demand over the past two decades—continue to maintain a highly cautious stance toward upfront investment. As a result, some firms indicated that even if the government were to call for rapid expansion in production, they would not be able to respond immediately.[72]

Second, many companies expressed a strong desire for measures that would mitigate financial risks through adjustments to defense procurement contracts. Although the cost fluctuation adjustment rate has helped offset cost increases that occur after initial estimates, it does not fully compensate for all rising costs and their impact on contract profit margins. In particular, high-priced materials such as nickel and titanium, as well as certain specialized components, are experiencing global supply shortages, resulting in significant price volatility.[73] Consequently, some firms suggested that, in addition to existing measures, it would be effective for the government to procure these high-cost materials and provide them to companies directly as a means of managing cost escalation risk. Furthermore, concentrated demand for specific materials and components often leads to supply delays, making schedule management difficult for individual companies. Nevertheless, delays in the delivery of final products caused by such supply issues are subject to penalties under contracts with the Ministry of Defense. Because these penalties can adversely affect a company's financial performance, there were calls for a reassessment of the conditions governing such penalties.[74]

Third, companies have also called for support and subsidies for the construction of factories and buildings, which are highly compatible with civilian manufacturing operations but have not traditionally been fully covered under defense procurement contracts.

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[69] Ibid., December 20, 2024; February 5, 2025; February 26, 2025; April 21, 2025; April 21, 2025; April 23, 2025.
[70] Interviews with startup companies conducted by the author, July 1, 2025.
[71] Interviews with defense companies conducted by the authors, December 20, 2024; January 23, 2025; April 7, 2025; April 21, 2025; April 21, 2025; April 23, 2025; May 28, 2025.
[72] Ibid., April 21, 2025.
[73] Ibid., November 6, 2024; January 23, 2025.
[74] Ibid., December 20, 2024.

Such support is viewed as essential for expanding production capacity.[75]

Fourth, with respect to the Equipment Transfer Facilitation measures under the Defense Production Base Reinforcement Act, some companies have argued that the scope of support should be expanded. Currently, these measures are limited to costs associated with specification changes and other modifications required when defense equipment originally intended for the Self-Defense Forces is exported to foreign governments.[76] Companies perceive that there remains significant demand for financial support for overseas transfer projects, including capital investment, which fall outside the scope of these measures. In addition, there is concern that the budget size of the Official Security Assistance programs (OSA) led by the Ministry of Foreign Affairs (MOFA) for developing-country militaries are too small to cover the procurement of major equipment that defense firms are capable of providing.[77] Consequently, it has been suggested that, given the current scale of funding and programs, it may be more appropriate to focus on covering the costs of maintenance, training, and other services in combination with commercial export projects rather than on the acquisition of the separate equipment itself.

Fifth, while funding frameworks for emerging technologies, including dual-use technologies, have been strengthened, contracts for the research and development of defense equipment itself do not currently provide bold contractual incentives for technologically-challenging projects. This highlights the need for a contract framework that better reflects the complexity and risk inherent in R&D projects through more appropriate compensation.[78] There is also recognition of a gap in research and development projects between basic research and full-scale defense equipment development—commonly referred to as the "valley of death." In particular, some companies have observed that, except for support programs for basic research such as the Security Technology Research Promotion Program, projects under the Ministry of Defense's research and development framework are less likely to be adopted if they have applicability to civilian products even if it is marginal. This has led to calls for broadening the scope of eligible projects.[79]

Sixth, in line with the broader vision for defense capability development, companies have emphasized the need for clearer articulation of equipment requirements and their underlying operational concepts of the Self-Defense Forces.[80] This stems from the frequent occurrence, in past development projects involving prototypes, of additional specifications being requested by the Self-Defense Forces, which in turn causes cost increases and delivery

[75] Ibid., December 20, 2024; January 23, 2025; February 5, 2025.
[76] Ibid., February 5, 2025.
[77] Ibid., February 5, 2025; April 7, 2025.
[78] Ibid., December 20, 2024; April 7, 2025.
[79] Ibid., February 5, 2025; April 7, 2025.
[80] Ibid., February 5, 2025; February 26, 2025; April 21, 2025.

delays. Accordingly, it is recommended that, prior to embarking on full-scale development projects involving prototypes, the government and private sector engage in intensive discussions—potentially formalized through contracts—focused on systems integration to clarify operational concepts. Companies recognize this as essential for mitigating cost escalation and delivery delays, while for the Self-Defense Forces, it represents a critical step in clarifying the concepts underpinning their operational concepts.

In addition to these six key points, companies also expressed interest in earlier payment schedules in contracts (improving cash flow), further increasing profit margins, and adopting non-competitive project allocation approaches among companies that prioritize the maintenance of production capacity rather than relying solely on competitive bidding to select contractors.[81]

Section 6 Analysis and Discussion

The most striking insight from interviews with companies would be that, due to the prolonged period of subdued business conditions, many remain skeptical about the ongoing upward trend in defense spending. As a result, these companies continue to seek medium-term predictability regarding contract volumes, and various government subsidies and support measures have so far been insufficient to alter this cautious stance.

As a result, many companies have been hesitant to make upfront investments in anticipation of demand beyond fiscal year 2027. This is influenced not only by the subdued business environment over the past two decades but also by factors unique to defense procurement. Specifically, because there is generally no comparable market price for most defense equipment, the ATLA determines a contract price basis by taking into account a company's cost estimates (including direct material costs, processing costs, and direct expenses) and adding general and selling costs, and a predetermined profit margin to the cost of production. In this context, defense production requires specialized manufacturing equipment, such as dedicated machines, as well as initial investments to set up production lines. For prototype contracts in development projects or initial production contracts, these costs are basically covered by the government (Ministry of Defense). While it would be reasonable that the government cover the costs necessary for defense production, this practice reduces incentives for companies to make independent investments in dedicated production facilities. Consequently, it has contributed to a culture that can work against companies during periods of production expansion. The historical restraint on overseas exports, which left almost all revenue sources domestic, has further dampened companies' willingness to undertake proactive capital investment.

[81] Interviews with defense companies conducted by the author. November 6, 2024; December 20, 2024; April 21, 2025; April 23, 2025.

At the same time, even in the absence of government projections beyond fiscal year 2027, there are companies that actively engage in upfront investments. These can be categorized into two types. The first, "technology-driven" companies, pursue research and development with an eye toward potential future operational concepts. The second, "market-driven" companies, anticipate future demand deductively by factoring in deteriorating international security conditions and expected overseas demand, and make proactive investments accordingly. If the assessments of these two types of companies prove accurate, there is significant potential for structural changes in Japan's defense industry, which has long been characterized by fixed players and stable market shares among prime contractors.

That being said, not all companies are proactive in making upfront investments. Thus, the government needs to devise various measures that can incentivize companies and induce changes in business practices. The defense market is not a perfectly competitive market governed by the "invisible hand"; rather, it is a monopsony, where the government is the sole buyer. [82] Efforts to secure the necessary workforce and facilities continue, but there can be a mismatch between the timing when the government requires industrial capacity and when the budget allows it. This limitation in production capacity effectively becomes a bottleneck for Japan's defense capability, defining its upper bound. Defense capabilities are determined by the total aggregation of the Self-Defense Forces' material and non-material capacities, and cannot be created by strategic documents alone. It is crucial to once again recognize that industry—companies themselves—constitutes a decisive component of these defense capabilities.

Chapter 3 presents concrete policy recommendations based on this observation, drawing insights from similar efforts in the United States and Europe as analyzed in Chapter 2.

[82] Antonio Calcara, *European Defence Decision-Making: Dilemmas of Collaborative Arms Procurement* (Routledge, 2021), 2–3.

Chapter 2

The Trajectory of the U.S. and European Defense Industries: From Post-Cold War Decline to Demand Expansion

Rintaro Inoue

Shortfalls in defense industrial capacity are not unique to Japan; similar challenges are evident across the United States and Europe. This chapter begins by examining how the U.S. and European defense industries reached their current state of constrained supply and provides an overview of their present conditions. It then analyzes the policy responses underway in these countries, with particular attention to shortages in skilled labor and limitations in manufacturing facilities— two critical barriers also observed in Japan's case.

Section 1 Changes in the Environment Surrounding the U.S. and European Defense Industries

Defense industrial capacity in both the United States and Europe has historically expanded or contracted in line with shifts in the strategic environment, reflected through changing military requirements and associated budget decisions. During the Cold War, governments sustained a large and resilient manufacturing base to maintain strong conventional forces to deter the Soviet Union, while also retaining surplus capacity to enable rapid mobilization if war erupted. In the United States—long described as the "Arsenal of Democracy"—this capacity supported both peacetime exports to allies and production surges during conflict. Given expectations of high attrition rates and rapid consumption of munitions and spare parts in a potential war with the Warsaw Pact, surge capacity was considered indispensable for sustaining combat power and reinforcing deterrence.[1]

On the contrary, maintaining surplus production capacity was economically unattractive for U.S. defense firms, and over time such excess capacity came to be viewed as something to reduce. From the 1970s onward, defense companies increasingly adopted commercial-sector management practices, reinforcing a shift toward prioritizing shareholder value over the preferences of the Department of Defense.[2] Even so, significant surplus capacity persisted throughout the Cold War, and the U.S. defense industrial base remained unmatched in scale. This endurance was ultimately sustained by the strategic environment and the size of U.S. defense spending. While demand dipped at certain points—such as in the period immediately following the Vietnam War—it remained high overall, driven by the United States' involvement in multiple conflicts and the large-scale rearmament program of the 1980s aimed at strengthening deterrence against the Soviet Union. European defense industries followed a similar trajectory. Although production capacity was smaller than in the United States, most European governments maintained sufficient domestic demand to support and preserve their national defense industries over an extended period.[3]

The improved security environment after

[1] James R. Golden, "NATO Industrial Preparedness," Lee O. Olvey, Henry A. Leonard, Bruce E. Arlinghaus ed., *Industrial Capacity and Defense Planning: Sustained Conflict and Surge Capability in the 1980s*, (Lexington: Lexington Books, 1983), 35-63.
[2] Barry D. Watts, "The US Defense Industrial Base Past, Present and Future," Center for Strategic and Budgetary Assessments, 2008, 2-3.
[3] Golden, "NATO Industrial Preparedness," 40-49.

the Cold War prompted substantial reductions in defense spending. This shift encouraged not only private defense firms, but also the Department of Defense, to prioritize efficiency over readiness for large-scale contingencies. At the same time, advances in military technology further undermined the perceived need to maintain surplus manufacturing capacity. The widespread adoption of precision-guided munitions fostered the belief that fewer, more capable weapons could achieve greater battlefield effects than traditional mass-produced munitions, diminishing the incentive to maintain large stockpiles or high-volume ammunition production. [4] Reflecting these trends, the Department of Defense ultimately chose—except in limited areas—not to invest in maintaining excess capacity for emergency surge production. [5] This environment paved the way for rapid consolidation of the U.S. defense industrial base, accelerated by the Pentagon's 1993 "Last Supper" meeting. As a result, the number of major defense firms contracted from 51 to just 5. Although consolidation alone does not automatically translate into reduced production capacity, its combination with a sharp decline in demand forced the industry's overall production index to drop by roughly 35 percent during the 1990s.[6]

Defense demand in the post–Cold War era was marked not only by contraction but also by unpredictability. After 1991, the United States fought two major wars in the Middle East, each requiring large quantities of munitions. Demand for unguided gravity bombs surged at the outset of these conflicts but proved short-lived, typically increasing for only two to three years before declining as operations ended. [7] Meanwhile, although the wars on terror temporarily boosted production for ground equipment, demand for air and naval platforms continued to fall. This uneven and short-lived demand profile provided little incentive for firms in those sectors to invest in expanded production capacity.

The stability of defense demand was influenced not only by the strategic environment but also by domestic political dynamics. In 2011, the U.S. Congress passed the Budget Control Act to avert a federal debt-ceiling crisis, resulting in an effective cut of roughly 10 percent in defense spending. This significantly weakened the predictability that defense firms rely on to plan future investments and production.[8] As partisan divisions intensified, Congress struggled to pass appropriations bills on time under strict spending caps. As a result, the government resorted almost annually to continuing resolutions, which simply

[4] Larry Lewis and Don Boroughs, "Wrong War, Right Weapons: Lessons for the Next Conflict," Center for Naval Analyses, February 10, 2021, https://www.cna.org/our-media/indepth/2021/02/wrong-war-right-weapons.
[5] Watts, "The US Defense Industrial Base Past, Present and Future," 54-55.
[6] Luke A. Nicastro, "The U.S. Defense Industrial Base: Background and Issues for Congress," Congressional Research Service, September 23, 2024, 5, https://www.congress.gov/crs_external_products/R/PDF/R47751/R47751.5.pdf.
[7] Cynthia R. Cook and Kester Abbott, "Partnering for Forward Deterrence in the Indo-Pacific: Overcoming Barriers to US-Australia Cooperation on Australia's GWEO Enterprise," United States Studies Centre, July 7, 2025, https://www.ussc.edu.au/partnering-for-forward-deterrence-in-the-indo-pacific-overcoming-barriers-to-us-australia-cooperation-on-australia-s-gweo-enterprise.
[8] John Hoehn and Paul Cormarie, "Defense Budgeting and the Dilemma of Lost Time," RAND Corporation, August 16, 2023, https://www.rand.org/pubs/commentary/2023/08/defense-budgeting-and-the-dilemma-of-lost-time.html.

extend funding at previous-year levels until new legislation is approved. These stopgap measures lock spending into outdated priorities and delay the start of new programs.[9] Although such volatility is especially acute in the United States, broader budgetary pressures in many countries have made appropriations processes more complex and unpredictable, further complicating long-term planning for defense industry stakeholders.

In Europe, the effects of the post–Cold War "peace dividend" similarly placed significant pressure on defense industries. During the Cold War, robust national defense budgets allowed many countries to sustain multiple domestic manufacturers. As spending declined, however, consolidation accelerated—particularly in the United Kingdom and France—while firms in Germany, Spain, and parts of the French sector were restructured into multinational groups such as Airbus Defence and Space and MBDA.

However, despite consolidation, European governments did not fully integrate defense development programs, largely due national industrial priorities.[10] As a result, defense procurement remained highly fragmented, with European countries collectively fielding far more distinct equipment types than the United States—estimated at five to six times as many. This fragmentation entrenched a model of low-volume, high-variety production, limiting economies of scale and continuing to constrain the growth of Europe's defense industrial capacity.[11]

Moreover, as defense budgets continued to shrink, many European governments increasingly turned to U.S. defense firms for major equipment purchases. Between 2007 and 2016, an estimated 60 percent of European defense procurement spending went to non-European suppliers.[12] This shift further weakened Europe's domestic defense industrial base, accelerating its marginalization and contributing to the gradual erosion of regional production capacity.

Declining demand also led to a significant loss of skilled labor across the defense sector. Once considered a stable and attractive field during the Cold War, the industry came to be seen as volatile and uncertain, making it increasingly difficult to recruit new talent.[13] At

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[9] Maiya Clark and Caitlyn Wetzel, "How Congressional Continuing Resolutions Hurt Defense Industrial Base," The Heritage Foundation, November 9, 2022, https://www.heritage.org/defense/commentary/how-congressional-continuing-resolutions-hurt-defense-industrial-base.

[10] Golden, "NATO Industrial Preparedness," 40-49.

[11] Niall McCarthy, "Europe Has Six Times as Many Weapon Systems as The U.S. [Infographic]," *Forbes*, February 19, 2018, https://www.forbes.com/sites/niallmccarthy/2018/02/19/europe-has-six-times-as-many-weapon-systems-as-the-u-s-infographic/; Paula Alvarez-Couceiro Fernandez, "Europe at a Strategic Disadvantage: A Fragmented Defense Industry," *War on the Rocks*, April 18, 2023, https://warontherocks.com/2023/04/europe-at-a-strategic-disadvantage-a-fragmented-defense-industry/.

[12] European Commission and the High Representative of the Union for Foreign Affairs and Security Policy, "Joint Communication to the European Parliament, the European Council, the Council, the European Economic and Social Committee and the Committee of the Regions on the Defence Investment Gaps Analysis and Way Forward," JOIN(2022) 24 final, European Commission, May 18, 2022, https://commission.europa.eu/system/files/2022-05/join_2022_24_2_en_act_part1_v3_1.pdf.

[13] U.S. Department of Defense, Office of the Under Secretary of Defense for Acquisition and Sustainment, "State of Competition within the Defense Industrial Base," February 2022, 17, https://media.defense.gov/2022/feb/15/2002939087/-1/-1/1/state-of-competition-within-the-defense-industrial-base.pdf.

the same time, the workforce continued to age, and the retirement of experienced personnel contributed to a steady erosion of specialized technical expertise. This challenge persists today. In the United States, for example, roughly one-quarter of the aerospace and defense workforce is at or beyond retirement age, raising concerns about whether critical skills can be transferred to the next generation.[14] Employment levels have also fallen sharply, decreasing from approximately three million workers in 1985 to just 1.1 million in 2021.[15]

Russia's annexation of Crimea in 2014 marked a turning point for European security, prompting governments to reverse years of defense reductions and begin rebuilding military capabilities. This shift gradually enabled Europe's downsized defense industries to start recovering. A more decisive inflection point, however, came after 2020, when three major developments forced the United States and European governments to refocus attention on the defense industrial base. The first catalyst was the COVID-19 pandemic. Beginning in early 2020, the pandemic exposed critical vulnerabilities in defense supply chains and underscored the absence of meaningful surge production capacity across both defense and civilian industries. Defense manufacturers faced reduced factory operations, delays in acquiring key components from single-source suppliers, and increased financial pressure on small and medium-sized enterprises.[16] According to the National Defense Industrial Association (NDIA), supply chain disruptions caused surge capacity in the United States to fall by 15 points in 2021 compared to pre-pandemic levels.[17] Between 2017 and 2022, a total of 17,045 companies exited the defense sector—illustrating the severity of the shock.[18] Similar difficulties emerged in Europe, where rising material and transportation costs, combined with the limited financial resilience of smaller firms, forced many companies to suspend operations.[19] These experiences heightened awareness of deep structural weaknesses, particularly within supply chains. Reflecting this shift in priorities, the U.S. government's National Defense Industrial Strategy designated the creation of "resilient supply chains" as a central objective.[20]

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[14] Derrick Ryskamp, "Aerospace and Defense Industry's Demand for Talent Outpaces Supply," ACARA Solutions, January 13, 2025, https://acarasolutions.com/blog/recruiting-trends/aerospace-and-defense-industrys-demand-for-talent-outpaces-supply/.
[15] National Defense Industrial Association, "Vital Signs 2023: Posturing the U.S. Defense Industrial Base for Great Power Competition," February 2023, 5, https://www.ndia.org/-/media/sites/ndia/policy/vital-signs/2023/ndia_vitalsigns2023_final_v3.pdf.
[16] Nayantara D. Hensel, "The Impact of COVID-19 on the U.S. Defense Industrial Base," *PRISM*, Vol. 9, No, 4 (2022): 52–76, https://ndupress.ndu.edu/Media/News/News-Article-View/Article/2897323/the-impact-of-covid-19-on-the-us-defense-industrial-base/; Aaron Mehta and Valerie Insinna, "Chaos, Cash and COVID-19: How the Defense Industry Survived — and Thrived — During the Pandemic," *Defense News*, March 15, 2021, https://www.defensenews.com/industry/2021/03/15/chaos-cash-and-covid-19-how-the-defense-industry-survived-and-thrived-during-the-pandemic.
[17] National Defense Industrial Association, "Vital Signs 2022: The Health and Readiness of the Defense Industrial Base," February 2022, 42, https://www.ndia.org/-/media/sites/ndia/policy/vital-signs/2022/vital-signs_2022_final.pdf?download=1.
[18] National Defense Industrial Association, "Vital Signs 2023," 5.
[19] Vivienne Machi, "Europe's Defense Firms Feel the Squeeze of Shortages, Sanctions," *Defense News*, April 11, 2022, https://www.defensenews.com/industry/2022/04/11/europes-defense-firms-feel-the-squeeze-of-shortages-sanctions; Jean-Pierre Maulny, "Covid-19 and the French Defence Technological and Industrial Base: Impact and Policy Responses," ARES Group Report no. 58, June 2020, https://www.iris-france.org/wp-content/uploads/2020/06/ARES_2020_06_58_Covid_France_Comment.pdf.
[20] U.S. Department of Defense, "National Defense Industrial Strategy 2023," November 16, 2023, 13, https://www.businessdefense.gov/docs/ndis/2023-NDIS.pdf.

Two years later, Russia's full-scale invasion of Ukraine ignited the largest and most sustained conflict in Europe in more than 75 years, fundamentally reshaping the strategic landscape facing the U.S. and European defense sectors. Governments were forced not only to supply Ukraine with military equipment but also to rapidly rebuild their own capabilities, leading to a sharp increase in defense demand. In 2023, for example, Europe's defense industry recorded strong growth: sales rose by 16 percent year-on-year in the aerospace sector and by 17.7 percent in both land and maritime systems.[21] Despite this surge in demand, the industrial base has struggled to respond. Production lead times have lengthened, and many manufacturers have been unable to meet planned output targets.[22] As these constraints have become more apparent, a broad consensus has formed across both sides of the Atlantic that existing defense industrial capacity is insufficient to meet current and future strategic requirements.

This recognition has been reinforced by the continued deterioration of the strategic environment in both the United States and Europe, where sustained high demand for defense equipment is now expected even if a ceasefire is eventually reached in Ukraine. In the United States, concern over a potential conflict involving Taiwan has grown markedly, accompanied by a broadening consensus that such a contingency would require unprecedented volumes of equipment and munitions. Whereas early assessments tended to assume a short and decisive conflict, the possibility of a protracted war has increasingly come to the forefront of strategic planning.[23] The scale of potential wartime consumption was illustrated starkly in a tabletop exercise conducted by the Center for Strategic and International Studies (CSIS), published in January 2023. The study estimated that, in a U.S.–China conflict triggered by a Chinese invasion of Taiwan, roughly 5,000 missiles could be expended and hundreds of aircraft and dozens of naval vessels lost within the first several days of fighting.[24]

As awareness grew that modern warfare still depends on large quantities of equipment and ammunition, debates on strengthening the defense industrial base intensified. Two weeks after the release of the aforementioned assessment, CSIS published a follow-on report calling for the significant expansion of ammunition stockpiles during peacetime.[25] This

[21] Aerospace and Defence Industries Association of Europe (ASD), "Facts and Figures 2024," November 19, 2024, https://umbraco.asd-europe.org/media/amoenldy/asd_facts-figures-2024_1119.pdf.
[22] Alistair MacDonald, Doug Cameron, and Dasl Yoon, "The West Badly Needs More Missiles—but the Wait to Buy Them Is Years Long," *Wall Street Journal*, August 27, 2023, https://www.wsj.com/politics/national-security/missiles-demand-threats-wait-to-buy-them-is-years-long-3332c151.
[23] Andrew Krepinevich Jr., "Protracted Great-Power War: A Preliminary Assessment," Center for a New American Security, February 5, 2020, https://www.cnas.org/publications/reports/protracted-great-power-war; Hal Brands, "Getting Ready for a Long War with China: Dynamics of Protracted Conflict in the Western Pacific," American Enterprise Institute, July 25, 2022, https://www.aei.org/research-products/report/getting-ready-for-a-long-war-with-china-dynamics-of-protracted-conflict-in-the-western-pacific; Andrew Metrick, "Rolling the Iron Dice: The Increasing Chance of Conflict Protraction," Center for a New American Security, November 9, 2023, https://www.cnas.org/publications/reports/rolling-the-iron-dice.
[24] Mark F. Cancian, Matthew Cancian, and Eric Heginbotham, "The First Battle of the Next War: Wargaming a Chinese Invasion of Taiwan," Center for Strategic and International Studies, January 9, 2023, https://csis-website-prod.s3.amazonaws.com/s3fs-public/publication/230109_Cancian_FirstBattle_NextWar.pdf.
[25] Seth G. Jones, "Empty Bins in a Wartime Environment: The Challenge to the U.S. Defense Industrial Base," Center for Strategic and International Studies, January 2023, https://csis-website-prod.s3.amazonaws.com/s3fs-public/2023-

helped galvanize broader policy discussion in Washington—particularly around surge capacity—and contributed to a series of hearings held by the House Armed Services Committee.[26] Momentum increased further in mid-2023, marked by the publication of additional influential analyses, including a widely circulated paper by a U.S. Air Force logistics officer titled "You Go to War With the Industrial Base You Have, Not the Industrial Base You Want."[27] By the spring of 2025, concerns had expanded beyond munitions to include naval shipbuilding, with growing consensus that U.S. production capacity lagged significantly behind China's and required urgent strengthening.[28]

In Europe, the inauguration of the second Trump administration in the United States generated renewed uncertainty about the durability of U.S. security commitments, prompting governments to accelerate defense modernization and capability expansion. At the NATO summit in June 2025, member states agreed to raise defense spending to 3.5 percent of GDP and total defense-related expenditures to 5 percent—commitments that represented an unprecedented level of budget-backed demand. As a result, both U.S. and European defense industries entered a period in which expanding production capacity was no longer treated as a periodic adjustment but as a persistent challenge.

Section 2 Current Challenges Facing the U.S. and European Defense Industries

Logically, a surge in defense demand driven by deteriorating strategic conditions would be expected to trigger a corresponding expansion in industrial supply capacity. Yet despite ongoing efforts in the United States and Europe to increase production, rebuilding the defense industrial base remains a significant challenge. The decades-long contraction that followed the post–Cold War "peace dividend" left deep structural constraints, making rapid recovery exceedingly difficult. While the nature and severity of these challenges vary by country, a common set of obstacles has emerged. The following section examines how the U.S. and European defense industries confront obstacles similar to those currently facing Japan's defense industrial base, focusing on three core areas: human resources, production infrastructure, and research and development.

1. Labor Shortages

Arguably, the most critical challenge in expanding the U.S. and European defense industries is the shortage of skilled personnel. Even outside the defense sector, the lack of mid- and high-skilled workers in manufacturing represents a persistent challenge across the

01/230119_Jones_Empty_Bins.pdf.

[26] U.S. House Armed Services Committee, Full Committee Hearing, "State of the Defense Industrial Base," February 8, 2023, https://armedservices.house.gov/hearings/full-committee-hearing-state-defense-industrial-base.

[27] John Barrett, "You Go to War With the Industrial Base You Have, Not the Industrial Base You Want," *War on the Rocks*, August 16, 2023, https://warontherocks.com/2023/08/you-go-to-war-with-the-industrial-base-you-have-not-the-industrial-base-you-want.

[28] Matthew P. Funaiole, Brian Hart, and Aidan Powers-Riggs, "Ship Wars: Confronting China's Dual-Use Shipbuilding Empire," Center for Strategic and International Studies, March 2025, https://csis-website-prod.s3.amazonaws.com/s3fs-public/2025-03/250311_Funaiole_Ship_Wars.pdf.

United States and Europe. For example, as of 2023, the U.S. manufacturing sector had over 800,000 unfilled job openings, and it is projected that more than 4 million additional workers will need to be secured over the next decade.[29] Failure to recruit and develop a workforce capable of meeting these demands could result in potential GDP losses of up to $1 trillion by 2030.[30]

The decline in manufacturing-sector employment represents a long-term structural trend. In the United States, employment in manufacturing, which accounted for 34 percent of total employment in 1950, has declined to roughly 9 percent today. A closer look reveals that the forging industry has seen the number of firms halved since 2002, the casting industry has similarly halved since 1984, and the machine tool sector, which once held a 28 percent share of the global market in 1968, had contracted to just 5 percent by 2019.[31]

Unsurprisingly, the defense industry, which relies heavily on manufacturing, has not been immune to these broader trends. Labor shortages in the U.S. and European defense sectors mirror those seen across the wider manufacturing industry, with engineers and production workers in particular in short supply. In an effort to address this shortfall, the three largest U.S. defense contractors—Lockheed Martin, Northrop Grumman, and General Dynamics—have collectively planned approximately 6,000 new hires. Across the top ten defense firms, some 37,000 new positions are expected, equivalent to roughly 10 percent of their current workforce. Similar trends are observed in Europe: Thales aims to hire over 8,000 new employees, Leonardo plans 6,000, and Rheinmetall targets 5,000 for 2024, each representing about 10 percent of their 2023 workforces. In response to rising ammunition demand, European missile giant MBDA intends to recruit 2,600 new employees in 2024, equivalent to 17 percent of its current workforce.[32]

As the digitization of defense equipment advances, the demand for engineers has expanded beyond mechanical physics experts to include AI specialists, cyber experts, data and information processing professionals, and software developers.[33] However, attracting such talent remains challenging. In the United States, 75 percent of aerospace and defense companies are unable to secure personnel with the necessary skills.[34] A key factor is intense competition with other industries: sectors that can offer more attractive compensation often draw away skilled workers, leaving defense firms unable to

[29] The Manufacturing Institute, "General Overview," July 2021, https://www.themanufacturinginstitute.org/wp-content/uploads/2021/07/MI-General-Overview_v06.pdf.
[30] Ibid.
[31] Barrett, "You Go to War With the Industrial Base You Have, Not the Industrial Base You Want."
[32] Sylvia Pfeifer, Clara Murray, Arjun Neil Alim, and Sarah White, "Global defence groups hiring at fastest rate in decades amid record orders," *Financial Times*, June 17, 2024, https://www.ft.com/content/9625dbaa-5d36-4bee-8610-f16ab7ad6b1d.
[33] Paula Soler, "'Skilled workers wanted': The EU's defence industry struggles to find the right talent," *Euronews*, February 26, 2025, https://www.euronews.com/my-europe/2025/02/26/skilled-workers-wanted-the-eus-defence-industry-struggles-to-find-the-right-talent.
[34] Derrick Ryskamp, "Aerospace and Defense Industry's Demand for Talent Outpaces Supply," Acara Solutions, January 13, 2025, https://acarasolutions.com/blog/recruiting-trends/aerospace-and-defense-industrys-demand-for-talent-outpaces-supply.

consistently attract the talent they require.[35]

U.S. defense companies also face shortages of workers responsible for machining, welding, and assembly, reflecting broader trends across the country's manufacturing sector.[36] According to the American Welding Society, the U.S. manufacturing industry will require 330,000 new welders by 2028, necessitating an average of 82,500 welding-related hires per year between 2024 and 2028.[37] This demand is driven by increased activity in construction, automotive, energy, and infrastructure sectors, coupled with an aging workforce and declining entry of younger workers into skilled trades.[38] The average age of welders in the U.S. is 55, and with many approaching retirement over the next decade, significant gaps in skilled labor are expected.[39] Ideally, younger workers would fill this gap; however, despite wages being comparable to the service sector, the physically demanding work conditions present a high barrier to entry.[40]

Shipyards in particular face acute labor shortages, especially among welders, due to the physically demanding nature of the work. To meet submarine construction requirements over the next decade, an additional 140,000 skilled workers—including machinists, welders, pipefitters, and electricians—will be required on top of the current workforce.[41] However, although the shipbuilding industry has increased new hiring, it continues to suffer from exceptionally high turnover, with 20–30 percent of workers leaving each year.[42] This rate is roughly twice as high as the 13 percent turnover observed across the defense industry as a whole, and five to eight times higher than the U.S. national average of 3.8 percent.[43]

A similar problem has emerged in Europe. In the United Kingdom, for example, an aging domestic labor force has resulted in a shortage of welders estimated in the thousands. The scarcity is particularly acute for workers capable of welding specialized steel used in submarines, to the extent that wages as high as £80 per hour (approximately ¥16,000) are now being

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[35] Transform 42, "Navigating the Defense Industry's Biggest Challenge: Finding and Keeping Top Talent," November 16, 2024, https://www.transform42inc.com/blog/navigating-the-defense-industry-s-biggest-challenge-finding-and-keeping-top-talent.
[36] U.S. Department of Defense, "DoD Is Taking Steps to Shore Up Industrial Workforce," U.S. Department of Defense News, October 17, 2023, https://www.war.gov/News/News-Stories/Article/Article/3540407/dod-is-taking-steps-to-shore-up-industrial-workforce.
[37] Novarc Technologies, "Addressing the Skilled Trade Shortage: A Focus on Welders," Novarc Blog, December 30, 2024, https://www.novarctech.com/resources/blog/welding/addressing-the-skilled-trade-shortage-a-focus-on-welders.
[38] Ibid.
[39] Ibid.
[40] Josh Luckenbaugh, "SPECIAL REPORT: Navy, Industry Try to Reverse Course on Workforce Woes (UPDATED)," *National Defense Magazine*, March 31, 2025, https://www.nationaldefensemagazine.org/articles/2025/3/31/navy-industry-try-to-reverse-course-on-workforce-woes.
[41] Jake Sullivan, "Remarks by APNSA Jake Sullivan on Fortifying the U.S. Defense Industrial Base," The White House, December 4, 2024, https://bidenwhitehouse.archives.gov/briefing-room/speeches-remarks/2024/12/04/remarks-by-apnsa-jake-sullivan-on-fortifying-the-u-s-defense-industrial-base.
[42] Luckenbaugh, "Navy, Industry Try to Reverse Course on Workforce Woes;" Laura Heckmann, "SPECIAL REPORT: Unions Say Retention, Not Hiring, Is Shipbuilders' Biggest Problem," *National Defense Magazine*, April 1, 2025, https://www.nationaldefensemagazine.org/articles/2025/4/1/unions-say-retention-not-hiring-is-shipbuilders-biggest-problem.
[43] Eric Brothers, "High Turnover Rate Keeps Growing for A&D Workforce," Aerospace Manufacturing and Design, October 9, 2024, updated October 21, 2024, https://www.aerospacemanufacturinganddesign.com/article/high-turnover-rate-keeps-growing-for-ad-workforce.

offered.[44] While such skilled labor remains insufficient in the U.K. and Western European countries, it is still relatively abundant in Eastern Europe, leading British firms to hire welders and other workers from Poland and Bulgaria.[45] Poland, in particular, has accumulated a large pool of engineers and skilled workers familiar with advanced military technologies as a result of its recent defense modernization efforts. Consequently, German defense companies have also begun seeking Polish engineers.[46] Despite this trend, acute labor shortages persist. In the U.K., although roughly 160,000 workers are currently employed in the defense industry, an estimated 10,000 positions remain unfilled.[47]

The difficulty of resolving these challenges is further compounded by the barrier posed by security clearances. In the aerospace and defense sector, the number of positions requiring security clearances has increased tenfold since 2014, yet the number of applicants has grown by only 10 percent.[48] According to the NDIA's annual report, while 64 percent of U.S. defense companies cite a shortage of skilled workers as a primary issue, as many as 75 percent point to a shortage of personnel holding security clearances.[49] The problem is especially acute for large firms. Whereas 35 percent of small and medium-sized enterprises report that long clearance processing times hinder recruitment, this figure rises to 51 percent among major defense corporations.[50]

2. Production Infrastructure

The issue of production facilities is also common to both the United States and Europe, and its severity was exposed when demand surged following the outbreak of the war in Ukraine. This problem is particularly evident in the production of ammunition and missiles, most notably 155mm artillery shells.

In the United States, production of 155mm shells had been limited prior to the war in Ukraine, not only due to budgetary constraints but also because of repeated shutdowns of production lines caused by manufacturing defects and violations of safety regulations. For example, in 2021, cracks were found in the shells, resulting in the nation's production capacity being cut in half for several months.[51] Consequently, when ammunition support for Ukraine began in 2022, U.S. output stood at only about 14,000 shells per month—roughly 170,000

[44] Joe Duggan, "UK needs thousands more engineers and welders to reach new defence target," *The i Paper*, April 4, 2025, https://inews.co.uk/news/engineers-welders-defence-target-3572438?srsltid=AfmBOopG5dj1YPTdSvZBi5G-CalEzSjT4WnyBlZ0C35jkoWvawjGxK4b.
[45] Ibid.
[46] Personal Polen, "Shortage of skilled labour in the defence industry," April 4, 2025, https://personal-polen.de/en/2025/04/04/skills-shortage-in-the-defence-industry-challenges-solutions-and-strategies.
[47] The Engineer, "Protecting our critical national asset: the defence workforce," October 2, 2024, https://www.theengineer.co.uk/content/in-depth/protecting-the-defence-sector-workforce.
[48] Ryskamp, "Aerospace and Defense Industry's Demand for Talent Outpaces Supply."
[49] John A. Tirpak, "New Report: Defense Industrial Readiness 'Going in the Wrong Direction'," *Air & Space Forces Magazine*, February 9, 2023, https://www.airandspaceforces.com/new-report-defense-industrial-readiness-going-in-the-wrong-direction.
[50] National Defense Industrial Association, "Vital Signs 2025: The Health and Readiness of the Defense Industrial Base," February 2025, 60, https://www.ndia.org/-/media/sites/ndia/policy/vital-signs/2025/vitalsign_2025_final.pdf.
[51] Stephen Gery John Shiffman, Allison Martell, "Years of miscalculations by U.S., NATO led to dire shell shortage in Ukraine," *Reuters*, July 19, 2024, https://www.reuters.com/investigates/special-report/ukraine-crisis-artillery.

per year. [52] The situation in Europe was not substantially different: as of early 2023, production capacity on the continent amounted to only around 300,000 shells annually.[53]

Following the outbreak of the war in Ukraine, efforts to expand production capacity for artillery shells began, and the situation has gradually improved. Initiatives to increase manufacturing efficiency are also underway. The U.S. Army, together with companies operating government-owned, contractor-operated (GOCO) plants, has introduced new manufacturing techniques, successfully increasing production speed.[54] In addition, the U.S. Army has launched a plan to invest approximately $600 million to build a new facility capable of producing 36,000 shells per month, in cooperation with a subsidiary of a Czech defense manufacturer.[55] This plant is expected to incorporate cutting-edge automation systems and be designed with the flexibility to operate cost-effectively even under significant demand fluctuations.[56] However, progress has not been entirely smooth. As of summer 2025, U.S. production reached 40,000 shells per month (480,000 annually), yet reports indicate that it will still take time to achieve the target of 100,000 shells per month (1.2 million annually).[57]

In terms of expanding production capacity, Europe has achieved greater progress than the United States. European countries have increased their annual output of artillery shells sixfold in just two years, and they are expected to establish production capacity of two million rounds per year by the end of 2025.[58] BAE Systems is also planning to expand its facilities by adding a new shell manufacturing plant by the summer of 2025, aiming to increase output to sixteen times the level prior to the outbreak of the war in Ukraine.[59]

One of the major challenges in expanding artillery shell production lies in the supply chain. When procurement from overseas suppliers requires long lead times, problems tend to worsen in a snowball effect. In the United States, domestic production of TNT—the primary explosive ingredient used in shells—was discontinued in 1986, and after the end of the Cold War the United States began importing it from Russia and Ukraine. Although imports from Russia had already ceased, Ukraine's production

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[52] Ibid.
[53] Joseph Ataman and Clare Sebastian, "Ukraine is firing shells faster than can be supplied. Can Europe catch up?" *CNN*, September 17, 2023, https://edition.cnn.com/2023/09/17/europe/ukraine-shell-supplies-intl/index.html.
[54] Josh Luckenbaugh, "Army Falls Short of 155mm Production Goal," *National Defense Magazine*, August 14, 2025, https://www.nationaldefensemagazine.org/articles/2025/8/14/army-falls-short-of-155mm-production-goal.
[55] Dominic Minadeo, "New $635 million GOCO facility to scale up 155mm munitions production," *Inside Defense*, September 15, 2025, https://insidedefense.com/insider/new-635-million-goco-facility-scale-155mm-munitions-production.
[56] Michael Chambers, "Army invests $635M in cutting-edge artillery ammunition production facility," U.S. Army, August 20, 2025, https://www.army.mil/article/287950/army_invests_635m_in_cutting_edge_artillery_ammunition_production_facility.
[57] Luckenbaugh, "Army Falls Short of 155mm Production Goal."
[58] Kateryna Denisova, "Europe boosts artillery ammunition production sixfold in 2 years, NATO chief says," *The Kyiv Independent*, September 28, 2025, https://kyivindependent.com/europe-boosts-ammunition-production-sixfold-in-2-years-nato-chief-says/.
[59] George Allison, "BAE unveils new tech to boost UK ammo output sixteen-fold," *UK Defense Journal*, April 21, 2025, https://ukdefencejournal.org.uk/bae-unveils-new-tech-to-boost-uk-ammo-output-sixteen-fold/#:~:text=BAE%20Systems%20has%20announced%20a,the%20ongoing%20war%20in%20Ukraine.

facilities were destroyed shortly after the war began, forcing the U.S. to rely on imports from Poland, Australia, South America, and Asia.[60] Northern European countries had similarly depended on China for nitrocellulose, a critical material for propellants used in artillery shells; when the supply was suddenly cut off, they were compelled to scramble for alternative sources.[61] Against this backdrop, BAE Systems began developing a new explosive manufacturing method in 2020, prior to the war in Ukraine. This approach eliminates the use of nitrocellulose and enables cheaper and safer production.[62]

The production system for missiles faces similar challenges. The number of missiles procured by the U.S. military has surged; for example, between fiscal years 2022 and 2024, the U.S. Navy's missile procurement budget grew by a factor of 1.7. However, expanding production lines remain constrained, and supply continues to lag behind demand.[63] To address these conditions, major defense companies are investing in facility expansion, workforce recruitment and training, and modernization of manufacturing processes. For instance, Lockheed Martin opened a new missile production facility in June 2022, introducing a fully automated painting line to accelerate and scale up output.[64] Northrop Grumman has also announced that its new missile plant will incorporate digital manufacturing practices, including smart equipment, paperless operations, and modular automated work cells.[65]

However, the production speed of missiles cannot improve unless suppliers can quickly provide critical components such as rocket motors and electronic systems. To address bottlenecks across the supply chain, the U.S. Navy introduced multi-year procurement contracts starting in fiscal year 2024, enabling stable funding.[66] In parallel, the Navy has moved to address structural limitations in the supplier base, where production has historically been concentrated among a small number of firms. To this end, it has begun contracting with additional small and medium-sized manufacturers and sharing technical know-how related to rocket motor production, with the aim of expanding the pool of certified suppliers capable of supporting prime contractors.[67]

Electronic components have also become a production choke point. For example, in the Patriot surface-to-air missile system, the seeker produced by Boeing has constrained increases in

[60] Luckenbaugh, "Army Falls Short of 155mm Production Goal."
[61] "Europe battles powder shortage to supply shells for Ukraine," *France 24*, March 2, 2024, https://www.france24.com/en/live-news/20240302-europe-battles-powder-shortage-to-supply-shells-for-ukraine.
[62] Tom Barton, "BAE Systems announces advances in ammunition supply chain," *Janes*, April 22, 2025, https://www.janes.com/osint-insights/defence-news/weapons/bae-systems-announces-advances-in-ammunition-supply-chain.
[63] Megan Eckstein, "Supplier bottlenecks threaten US Navy effort to grow arms stockpiles," *Defense News*, February 6, 2024, https://www.defensenews.com/naval/2024/02/06/supplier-bottlenecks-threaten-us-navy-effort-to-grow-arms-stockpiles/.
[64] Ibid.
[65] Kenneth Kesner, "New Factory to Launch New Era in Missile Production," Northrup Grumman, accessed October 7, 2025, https://www.northropgrumman.com/what-we-do/advanced-weapons/new-factory-to-launch-new-era-in-missile-production.
[66] Ibid.
[67] Ibid.

output.[68] As a result, the U.S. Army has begun efforts to secure new suppliers.[69]

The issue of electronics is particularly acute for equipment that has not been procured for long periods. In the case of the Stinger missile, U.S. procurement ceased in 2002, leaving many of its electronic components no longer in production. Restarting manufacturing has therefore required significant redesign efforts rather than simple reactivation of existing production lines.[70] A similar problem has been seen in Europe. When the UK Ministry of Defence signed a four-year production contract with Saab in 2022 for several thousand NLAW man-portable anti-tank systems, the same challenge emerged.[71]

A key factor behind supplier bottlenecks is the financial fragility of small and medium-sized enterprises. Without a clear view of long-term demand, these companies are inevitably reluctant to invest in new production capacity. Moreover, because demand has historically been low, supplier consolidation has progressed, creating a situation in which multiple prime contractors compete for a limited number of suppliers when demand surges.[72]

As one solution to expanding production capacity, cross-border cooperation has been increasing. Major U.S. defense companies are seeking to deepen collaboration with allied firms, particularly in Europe. For example, RTX (formerly Raytheon Technologies) is attempting to address challenges in rocket motor production by increasing the number of overseas partners.[73] Lockheed Martin is also aiming to secure European partners for the production of Patriot missiles, having already begun factory construction in Germany in cooperation with MBDA and RTX.[74] Additionally, plans are underway to produce subcomponents of GMLRS in the UK and conduct final assembly in Poland.[75] In Poland, production of the Javelin missile has begun for the first time outside the United States, and the UK has also indicated intentions to manufacture the missile.[76] Beyond Europe, collaboration is expanding: joint production of GMLRS is progressing with Australia, and plans are in place with Japan for

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[68] Nobuhiro Kubo and Tim Kelly, "Exclusive: US-Japan Patriot missile production plan hits Boeing component roadblock," *Reuters*, July 22, 2024, https://www.reuters.com/business/aerospace-defense/us-japan-patriot-missile-production-plan-hits-boeing-component-roadblock-2024-07-20/.
[69] Michael Marrow, "Lockheed seeks European partners for missile production crunch," *Breaking Defense*, June 19, 2025, https://breakingdefense.com/2025/06/lockheed-seeks-european-partners-for-missile-production-crunch/.
[70] Howard Altman, "Raytheon Is Unable To Make Stinger Anti-Aircraft Missiles Quickly Enough," *The War Zone*, April 26, 2022, https://www.twz.com/raytheon-is-unable-to-make-stinger-anti-aircraft-missiles-quickly-enough.
[71] Jonty Bloom, "Defence firms 'need reassuring' that big orders will be long-term," *BBC*, August 26, 2024, https://www.bbc.com/news/articles/c5y832nyl2po.
[72] Jan Pie, "Challenges of ramping-up defence production capacity," Aerospace, Security and Defence Industries Association of Europe, August 21, 2023, https://www.asd-europe.org/industry/resources/asd-position-papers/challenges-of-ramping-up-defence-production-capacity/.
[73] "Raytheon Reports Ongoing Rocket Motor Shortages Impacting Missile Production Capacity," *DEFCROS News*, June 24, 2025, https://news.defcros.com/raytheon-reports-ongoing-rocket-motor/.
[74] Marrow, "Lockheed seeks European partners for missile production crunch."
Matthew Burke, "First Patriot missile facility outside US starts up in Germany" *Stars and Stripes*, December 2, 2024, https://www.stripes.com/theaters/europe/2024-12-02/construction-begins-patriot-facility-germany-16032845.html.
[75] Jaroslaw Adamowski, "Lockheed offers Polish industry a seat at its rocket launcher table," *Defense News*, June 12, 2024, https://www.defensenews.com/industry/2024/06/11/lockheed-offers-polish-industry-a-seat-at-its-rocket-launcher-table/.
[76] Marrow, "Lockheed seeks European partners for missile production crunch."

the co-production of AMRAAM.[77] The U.S.-led multilateral forum PIPIR, established to strengthen the industrial base in the Indo-Pacific, is also a part of these efforts to promote such initiatives.[78]

Efforts to expand production capacity are progressing, with tangible results already emerging. In the United States, Boeing has constructed a new factory building of approximately 3,200 square meters to support increased production of seeker components for Patriot missiles, and installation of manufacturing equipment is currently in progress.[79] Northrop Grumman is also reported to be building a new missile manufacturing facility with a total floor area of roughly 10,000 square meters.[80] In Europe, industrial land owned by defense companies has expanded rapidly, reaching nearly three times the level recorded before the war in Ukraine.[81] A *Financial Times* investigation tracking 37 companies and 150 sites involved in ammunition and missile production revealed that an additional 7 million square meters of industrial land has been developed.[82] The largest expansion identified was at an ammunition production site in western Hungary, where a joint venture between Hungary's state-owned defense company and German defense company Rheinmetall is underway. The site is scheduled to produce ammunition for infantry fighting vehicles, 155mm artillery shells, and tank ammunition.[83]

Rheinmetall is planning further capital investments and is advancing a concept to repurpose a Volkswagen plant scheduled for closure to manufacture tanks, at a time when Germany's automotive industry is in decline.[84] The company's ability to invest aggressively is supported by a surge in its stock price, which is reported to have increased twentyfold since the onset of the war in Ukraine.[85] Notably, the idea of converting automobile factories for defense production is also being considered in Italy.[86]

Start-up companies are likewise planning significant expansions of production capacity. Anduril has identified the overwhelming lack of surge production capacity in the U.S. during

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[77] Damien Cave, "Why More American Weapons Will Soon Be Made Outside America," *The New York Times*, March 1, 2024, https://www.nytimes.com/2024/03/01/world/australia/us-weapons-production.html.
[78] U.S. Department of Defense, "FACT SHEET: Partnership for Indo-Pacific Industrial Resilience (PIPIR)," June 1, 2025, https://media.defense.gov/2025/Jun/02/2003730341/-1/-1/1/FACT-SHEET-PARTNERSHIP-FOR-INDO-PACIFIC-INDUSTRIAL-RESILIENCE.PDF.
[79] Drew FitzGerald and Lara Seligman, "Pentagon Pushes to Double Missile Production for Potential China Conflict," *Wall Street Journal*, September 29, 2025, https://www.wsj.com/politics/national-security/pentagon-pushes-to-double-missile-production-for-potential-china-conflict-ee153ad3?mod=Searchresults&pos=1&page=1.
[80] Kesner, "New Factory to Launch New Era in Missile Production."
[81] Laura Dubois and Chris Cook, "Europe builds for war as arms factories expand at triple speed," *Financial Times*, August 12, 2025, https://www.ft.com/content/ce617187-43ed-4bec-aebf-b1b346c4cfb1.
[82] Ibid.
[83] Ibid.
[84] Eurometal, "Rheinmetall may use Volkswagen plant to produce tanks," March 18, 2025, https://eurometal.net/rheinmetall-may-use-volkswagen-plant-to-produce-tanks/.
[85] Mark Hallam, "Germany: Rheinmetall opens new artillery ammunition factory," *DW*, August 27, 2025, https://www.dw.com/en/germany-rheinmetall-opens-new-artillery-ammunition-factory/a-73785438.
[86] Gianluca Brambilla, "Da fabbriche di auto a fabbriche di armi, il piano del governo Meloni per la conversione industriale: «Incentivi a chi diversifica»," *Open*, March 17, 2025, https://www.open.online/2025/03/17/conversione-fabbriche-auto-armi-piano-governo-meloni/.

crises as a critical issue and positioned itself as the solution. As part of this initiative, in January 2025, the company announced plans to construct a large-scale factory in Ohio.[87] This facility aims to produce large quantities of unmanned systems on a "hyperscale," and Anduril intends to allocate approximately $1.5 billion in investment to fund its construction.[88]

3. Research and Development

As discussed in Chapter 1, many Japanese defense companies tend to be relatively cautious in making investments including research and development, even amid expanding demand. By contrast, the U.S. and European defense industries have consistently adopted a more proactive posture, and this trend long predates the outbreak of the war in Ukraine. Even during periods of comparatively low demand, these companies have already invested substantial amounts of internal R&D funding. For example, Lockheed Martin maintained its internally funded R&D expenditure at roughly 2% of total revenue between 2019 and 2024.[89] Northrop Grumman exhibits a similar trend.[90] In the UK, BAE Systems' R&D expenditures as a percentage of revenue are not particularly high, increasing only modestly from 1.2% in 2019 to 1.3% in 2024. However, the share of R&D funded internally rose steadily from approximately 16% in 2019 to around 18% in 2024, indicating that a certain level of forward investment has been sustained.[91] Among these, Germany's Rheinmetall is particularly notable, having doubled its internal R&D expenditures over the same period, bringing the proportion of internally funded R&D relative to total revenue to 5%.[92]

There are multiple factors behind the strong emphasis U.S. and European companies place on research and development. In addition to viewing R&D as an investment in corporate growth, these companies face intense international competition as exporters. In fact, 74% of BAE Systems' 2024 revenue came from markets outside the UK, with 44% of that amount

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[87] Jobs Ohio, "Anduril in Ohio," accessed September 15, 2025, https://www.jobsohio.com/andurilinohio.
[88] Anduril, "Arsenal-1," accessed September 15, 2025, https://www.rebuildthearsenal.com/.
[89] Lockheed Martin, "Lockheed Martin Corporation, 2019 Annual Report," February 7, 2020, 67, https://www.lockheedmartin.com/content/dam/lockheed-martin/eo/documents/annual-reports/lockheed-martin-annual-report-2019.pdf; Lockheed Martin, "Lockheed Martin Corporation, 2024 Annual Report," March 1, 2025, 66, https://investors.lockheedmartin.com/static-files/850a403e-158b-41f2-bbfa-576f0375d6f1.
[90] Northrop Grumman, "Annual Report 2019," March 1, 2020, 24, https://cdn.northropgrumman.com/-/media/wp-content/uploads/2019-Annual-Report-Northrop-Grumman.pdf?v=1.0.0; Northrop Grumman, Annual report 2024, March 1, 2025, 56, https://cdn.northropgrumman.com/-/media/Project/Northrop-Grumman/ngc/who-we-are/corporate-responsibility/NOC---12312024---Annual-Report---FINAL.pdf?rev=61a869bcfe0c49a2a6832b141846ca1d&_gl=1%2A14o42vy%2A_gcl_au%2AMTA1NjUwMTc5NS4xNzM4NzgxMTQ3%2A_ga%2AMjYxNTkxMDEuMTczODc4MTE0Nw..%2A_ga_7YV3CDX0R2%2AMTc0MzgwNTQxMy44LjEuMTc0MzgwNTQ1NC4xOS4wLjA
[91] BAE Systems, "Annual Report 2019 BAE Systems plc," March 18, 2020, 42, https://www.baesystems.com/home/dam/jcr:f0ff2c66-ccfc-4253-8e05-5e3606fe4d9a/BAESystemsAnnualReport2019.pdf; BAE Systems, "Annual Report 2024 BAE Systems plc," February 25, 2025, 7, https://www.baesystems.com/dam/jcr:f57706a5-0a28-441a-8829-0e0c213436c1/BAE-Systems-Annual-Report-2024.pdf.
[92] Rheinmetall, "Annual Report Rheinmetall Group 2019," April 7, 2020, 67, https://www.annualreports.com/HostedData/AnnualReportArchive/r/rheinmetall_2019.pdf; Rheinmetall, "Annual Report 2024," March 12, 2025, 34-35, https://ir.rheinmetall.com/media/document/0138f185-ccd4-4521-837b-e49cb68730b5/assets/DE0007030009-JA-2024-EQ-E-00.pdf.

generated in the highly competitive U.S. market.[93] Furthermore, tax incentives for R&D have supported internal investment, and each company's annual reports to investors highlight the tax savings benefits associated with their R&D expenditures.[94]

Section 3 Policy Measures of U.S. and European Defense Authorities

Efforts to expand production capacity following the outbreak of the war in Ukraine have, as demonstrated in the cases of Lockheed Martin, RTX, Rheinmetall, and BAE Systems, largely been pursued independently by individual firms. However, the pace of such expansion has not always met with the timelines or scale required by governments. As a result, both the United States and European countries have introduced a range of policy measures designed to narrow this gap.

The first priority for governments after demand surged was to provide financial support through subsidies and additional investments. For example, the European Commission adopted the Act in Support of Ammunition Production (ASAP) in July 2023, which provides direct financial support to defense firms. The policy establishes a framework designed to accelerate support for Ukraine and expand ammunition and missile production capacity, using €500 million from the EU budget to complement investments from member states and industry and thereby strengthen Europe's overall defense industrial base. With expected co-financing from industry, total investment under the initiative is projected to exceed €1.5 billion.[95] Europe's ability to increase ammunition production at a faster pace than the United States appears to be due in large part to this policy.

Even as demand rose sharply due to the deteriorating strategic environment—affecting not only ammunition but a wide range of defense equipment, several governments were unable to secure additional budgetary resources immediately, owing to fiscal constraints and domestic political considerations. In response, the European Commission has proposed a €150 billion lending scheme known as Security Action for Europe (SAFE), which would support borrowing by member states beginning in 2025, using the EU budget as collateral. Additionally, efforts are underway to establish a Defense, Security, and Resilience Bank (DSRB), which aims to raise €127 billion in order to meet urgent military needs while avoiding a sharp increase in government debt.[96]

To address not only rising demand but also the structural challenge of small-lot, multi-variant production within the European defense industrial base, the consolidation of procurement requirements has become essential. As part of this effort, the European Commission introduced

[93] BAE systems, "Annual Report 2024 BAE Systems plc," 4.
[94] Northrop Gruman, "Annual Report 2019," 61; Lockheed Martin, "Annual Report 2024," 79; BAE systems, "Annual Report 2024 BAE Systems plc," 148.
[95] European Commission, Defence Industry and Space, "ASAP | Boosting defence production," accessed September 15, 2025, https://defence-industry-space.ec.europa.eu/eu-defence-industry/asap-boosting-defence-production_en.
[96] Defence, Security & Resilience Bank Development Group, "The DSR Bank: Collectively investing in collective security," accessed October 7, 2025, https://www.dsrb.org/why-a-dsr-bank.

the European Defence Industry Reinforcement Through Common Procurement Act (EDIRPA) in 2023. This framework is designed to promote joint procurement of urgently needed defense capabilities and products by EU member states.[97]

Meanwhile, in the United States, the Defense Production Act (DPA) has allowed the president to regulate domestic industries in order to secure materials and services essential for national defense, with subsidies allocated under Title III of the Act. The scale of these subsidies has expanded markedly: from approximately US$950 million over the ten-year period between 2010 and 2019 to an estimated US$4.4 billion during the five years from 2020 to 2025, representing roughly a 4.5-fold increase.[98] Since 2022, the scope of DPA application has also broadened to include solid rocket motors, semiconductors, hypersonic weapons, and rare-earth processing.

The second area of action taken in response to increased demand has been policies specifically aimed at securing human resources. Unlike Europe, where such efforts are largely left to corporate initiatives, the United States has been characterized by a government-led approach.[99] On the legal side, the Defense Workforce Integration Act has been introduced in 2025, and Congress is considering a framework that would allow individuals medically disqualified from military service to transition into the defense industrial workforce.[100] Institutionally, a national vocational program known as Accelerated Training in Defense Manufacturing (ATDM) was established in 2021. The program provides tuition-free training in defense-relevant skill sets, including shipbuilding, and approximately 90 percent of graduates enter defense-sector employment.[101] Its curriculum covers a wide range of fields, such as additive manufacturing, computer numerical control (CNC), nondestructive inspection, quality control, and welding.[102] Over the past five years, ATDM has produced just under 800 graduates, and with the addition of a new shipbuilding-focused facility, the institution now aims to train approximately 1,000 individuals annually.[103] The training of shipbuilding personnel has drawn attention not only from the Biden administration but also from the second Trump administration. While the Biden administration has promoted training for Virginia-class submarine workers through the Defense Production Act, the Trump

[97] European Commission, Defence Industry and Space, "EU Defence Industry Reinforcement Through Common Procurement Act (EDIRPA)," accessed September 15, 2025, https://commission.europa.eu/strategy-and-policy/eu-budget/performance-and-reporting/programme-performance-statements/eu-defence-industry-reinforcement-through-common-procurement-act-edirpa_en.
[98] U.S. House Committee on Financial Services, "Hearing Entitled: Evaluating the Defense Production Act," June 12, 2025, https://financialservices.house.gov/calendar/eventsingle.aspx?EventID=409744.
[99] Aerospace, Security and Defence Industries Association of Europe, "Euronews on "intense search" for skilled workers by defence industry," February 28, 2025, https://www.asd-europe.org/news-media/news-events/news/intense-search-skilled-workers-europe-defence-industry-demand-talent-shortage/.
[100] U.S. Congress, House, Defense Workforce Integration Act of 2025, H.R. 3241, 119th Cong., 1st sess., introduced May 7, 2025, https://www.congress.gov/bill/119th-congress/house-bill/3241.
[101] U.S. Navy, "Forging the Future: Training Center Opens to Train Next Generation of Defense Manufacturers," January 24, 2025, https://www.navy.mil/DesktopModules/ArticleCS/Print.aspx?PortalId=1&ModuleId=523&Article=4040073.
[102] Accelerated Training in Defense manufacturing, "About ATDM," accessed September 15, 2025, https://atdm.org/about-atdm.
[103] U.S. Navy, "Forging the Future."

administration has allocated funding for workforce development within the One Big Beautiful Bill.[104]

The third policy measure involves increasing the predictability of demand. Although short-term demand is virtually guaranteed due to the war in Ukraine, what matters is whether this demand can be sustained over the long term. For this reason, the United States has been promoting multi-year procurement contracts for ammunition and missiles. Specifically, 17 type of missiles are included under these arrangements, such as 860,000 rounds of 155 mm artillery shells, 100,000 GMLRS guided rockets, 3,850 PAC-3 MSE air defense missiles, 5,100 AMRAAM air-to-air missiles, and 3,100 JASSM air-to-surface missiles. [105] However, even with multi-year contracts, their duration is limited to a maximum of five years, so their effectiveness in stabilizing demand beyond that period remains limited.

To demonstrate their commitment to longer-term expansion of production capacity, the governments of the United States and European countries have introduced defense industrial strategies. To date, at least the United States, the European Commission, Germany, the Netherlands, Sweden, and the United Kingdom have formulated their own defense industrial strategies. These documents outline measures for scaling up production, including subsidies and additional investments to promote capital expenditures, the development of environments conducive to securing human resources, and efforts to increase the predictability of demand.

The defense industrial strategy announced by the United Kingdom in September 2025 underscores the need for reforms in production facilities, human resources, and contracting practices. Regarding production facilities, the strategy calls for the establishment of manufacturing lines that can flexibly adjust production capacity, while simultaneously creating continuously operating production lines to respond to sudden surges in demand.[106] In terms of human resources, the strategy proposes the creation of a new reserve force aimed at highly skilled personnel in fields such as advanced manufacturing and software engineering.[107] It also clarifies plans to establish labor supply channels that support rapid increases in defense production by working in coordination with defense-related firms and adjacent industries.[108] On the institutional side,

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[104] U.S. Department of Defense, "Defense Production Act Title III Presidential Determinations for Submarine Industrial Base Production Capacity Essential to the Virginia Class Attack Submarine Program," December 22, 2021, https://www.war.gov/News/Releases/Release/Article/2882805/defense-production-act-title-iii-presidential-determinations-for-submarine-indu/; Evan Beebe, "Can New Legislation Reverse Navy Shipbuilding Failures?" International Quality & Productivity Center, July 16, 2025, https://www.idga.org/maritime-security/articles/can-new-legislation-reverse-navy-shipbuilding-failures.

[105] Ronald O'Rourke, "Multiyear Procurement (MYP) and Block Buy Contracting in Defense Acquisition: Background and Issues for Congress," Congressional Research Service, updated September 12, 2025, 13, https://www.congress.gov/crs_external_products/R/PDF/R41909/R41909.144.pdf.

[106] UK Ministry of Defence, "Defence Industrial Strategy 2025: Making Defence an Engine for Growth," September 8, 2025, 75-76, https://assets.publishing.service.gov.uk/media/68bea3fc223d92d088f01d69/Defence_Industrial_Strategy_2025_-_Making_Defence_an_Engine_for_Growth.pdf.

[107] Ibid.

[108] Ibid.

the strategy seeks to promote deregulation to reduce burdens associated with defense standards and regulatory requirements, thereby creating an environment conducive to scaling up production. At the same time, the government intends to provide guidance and monitoring to ensure that suppliers can reliably conduct assessments and provide the necessary information regarding production expansion and business continuity.[109] Furthermore, the strategy outlines plan to introduce an "inventory management clause" within defense procurement contracts and to conduct tabletop exercises that incorporate the defense industry.[110]

The U.S. defense industrial strategy formulated in January 2024 tends to emphasize institutional reforms. The strategy recommends to Congress that incentives such as additional funding for contracts, tax benefits, regulatory easing, and long-term contracts should be considered to build and maintain surge production capacity. [111] It also urges the Department of Defense to establish frameworks for risk-sharing and technology sharing to jointly fund, develop, and secure surge production capabilities. Furthermore, it directs the establishment of a supervisory system to plan, develop, and maintain the necessary surge capacity with assured oversight.[112]

However, the most critical factor in enhancing predictability is the existence of a budget that underpins the strategy.[113] Defense firms, including BAE Systems, have indicated that they are capable of expanding production capacity provided that governments guarantee elevated levels of defense spending over the long term. [114] In the United States, however, budgetary uncertainty has constrained progress. For instance, despite widely acknowledged demand for submarines, inadequate funding has hindered efforts to strengthen the shipbuilding industrial base. [115] Regarding surface combatants, the first Trump administration advocated for a "350-ship force," but the budget required to substantially increase the number of vessels was not secured.[116] Furthermore, under the second Trump administration, the enactment of the aforementioned One Big Beautiful Bill increased the defense budget by a total of $156.2 billion over five years through fiscal year 2029, though concerns remain that the impact may be only temporary.[117]

Ironically, it is European defense industries, rather than those in the United States,

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[109] Ibid.
[110] Ibid.
[111] U.S. Department of Defense, "National Defense Industrial Strategy 2023," 17.
[112] Ibid.
[113] FitzGerald, "Pentagon Pushes to Double Missile Production for Potential China Conflict."
[114] Paule Sandle, "UK's BAE Systems: We can meet defence demand if Europe gives the signal," *Reuters*, February 20, 2025, https://www.reuters.com/business/aerospace-defense/uk-defence-company-bae-systems-reports-14-rise-earnings-2025-02-19/.
[115] David Larter, "Trump called for a 350-ship fleet, but his budget falls short of even Obama-era goals," *Defense News*, February 26, 2020, https://www.defensenews.com/naval/2020/02/25/trump-called-for-a-350-ship-fleet-but-his-budget-would-fall-short-of-even-obama-era-goals/.
[116] Ibid.
[117] Erin D. Dumbacher, Michael C. Horowitz, and Lauren Kahn, "Will Trump's 'Big Beautiful' Defense Spending Last?" Council on Foreign Relations, July 9, 2025, https://www.cfr.org/expert-brief/will-trumps-big-beautiful-defense-spending-last.

that are now positioned to acquire surplus production capacity supported by budget-backed strategies as a result of U.S. government policies. Coupled with pressure from the second Trump administration on European countries, national defense strategies across Europe have increasingly come with clear budgetary backing. For instance, in July 2025 the German Friedrich Merz administration announced plans to procure 1,000 Leopard 2 tanks and 2,500 armored vehicles; notably, this followed Germany's decision at the NATO summit in May 2025 to raise defense spending to 3.5 percent of GDP. This alignment between procurement requirements and durable budget commitments increases the likelihood that production lines will remain active even if the war in Ukraine concludes within the next several years, thereby improving industrial predictability and strengthening incentives for capital investment.[118] Against this backdrop, German tank manufacturer Rheinmetall has continued its aggressive investment in facilities, as noted above.

Section 4 Analysis and Discussion

Chapter 1 highlighted that, in Japan, a skeptical stance among defense companies toward increasing defense spending has acted as a brake on capital investment and related initiatives. Throughout this chapter, it has been shown that similar challenges are evident in the United States and Europe. Faced with a sudden deterioration of the strategic environment, defense authorities in these countries sought to strengthen deterrence by enhancing military readiness and expanding force levels. As a result, demand for equipment and ammunition surged. However, having experienced post–Cold War contraction and periods of instability, defense companies remained pessimistic, expecting demand to decline rather than remain high. Consequently, while they pursued short-term improvements in production speed, they were cautious about large-scale investments such as expanding production lines, leaving a persistent gap between demand and supply.[119] Although budgetary measures to underpin defense strategies have begun to be implemented, gradually improving corporate outlooks, significant challenges remain, including workforce shortages and the need for capital investment.

In response to this issue, United States and European governments have clearly signaled—through the release of national defense industrial strategies and NATO summits—that large-scale demand is not temporary and will continue, thereby creating an environment in which companies are not hesitant to make their own investments. In addition, the establishment of new defense procurement funds and the introduction of multi-year contracts have ensured that high demand will persist, at least,

[118] George Allison, "Germany considering purchase of 1,000 tanks and 2,500 IFVs," *UK Defense Journal*, July 5, 2025, https://ukdefencejournal.org.uk/germany-considering-purchase-of-1000-tanks-and-2500-ifvs/.
[119] Sean Carberry, "Wall Street Wants Bigger, Predictable Defense Budgets," *National Defense Magazine*, November 26, 2024, https://www.nationaldefensemagazine.org/articles/2024/11/26/budget-matters-wall-street-wants-bigger-predictable-defense-budgets.

over the next several years. These measures have finally set the stage for the defense industry to transition toward a long-term, expanded production posture.

Furthermore, governments themselves are bearing the costs of expanding excess production capacity. In particular, large-scale support measures have been introduced for munitions production, as seen in Europe's ASAP initiative. In the United States, in order to cope with sharp fluctuations in demand for munitions, some factories are operated under a GOCO model, and new manufacturing technologies are being introduced to enable more efficient production under fluctuating demand conditions. In addition, efforts are underway to secure funding at the contracting stage to maintain surge production lines, thereby ensuring that the defense industry retains the capacity to rapidly expand output when required.

What merits particular attention in the approaches taken by the United States and Europe is that, while defense authorities are working to expand production capacity, they are simultaneously preparing for the eventual decline in demand and for future remobilization. To address the vulnerabilities associated with workforce development and supply-chain reconstruction—both of which require considerable time during remobilization—the United States and the United Kingdom have strengthened countermeasures. As discussed in this chapter, the United Kingdom is developing mechanisms to mobilize engineers and skilled workers in times of emergency, while the United States is pursuing automation and unmanned production in munitions factories to mitigate labor shortages. At the same time, however, policy measures concerning supply chains remain largely limited to monitoring, and effective solutions remain constrained. Ultimately, for the United States and Europe to truly overcome challenges related to production capacity, the key will lie in establishing frameworks in advance that enable the rapid reconstitution of supply chains when the strategic environment once again deteriorates.

Chapter 3

Policy Recommendations

Hirohito Ogi

Section 1 Ten Recommendations

Building on the analysis in the previous two chapters, this chapter presents ten policy recommendations as follows.

1. Signaling through the Revision of the Defense Buildup Program

Even if the government seeks to increase defense acquisitions, a rapid increase in production capacity cannot be achieved if companies have not made sufficient and prompt capital investments or secured the necessary workforce. Therefore, the government should promptly begin revising the Defense Buildup Program (DBP) for fiscal year 2028 (2027)[1] onward in order to increase predictability for defense firms and encourage medium-term investment planning. Providing a clear signal to the private sector by initiating this review should be the government's first step toward enhancing predictability for corporate investment decisions. The scale of the budget allocated for defense procurement far exceeds funding for government support measures such as subsidies. The government should leverage its position as a major "buyer" and use this influence to guide corporate behavior accordingly.

2. Expansion of the Defense Industrial Base through Amendments to the Defense Production Base Reinforcement Act

In addition to initiating an early review of the DBP, it is also important for the government to support capital expenditure by defense firms, thereby providing incentives for companies to undertake upfront investments.

At present, production facilities deemed necessary and sufficient for manufacturing specific defense equipment are covered within individual procurement contracts. However, there is no mechanism through which the government bears the cost of capital investment made by firms in anticipation of future demand. Moreover, although the Defense Production Base Reinforcement Act, enacted in 2023 enables government financial support for supply-chain strengthening, the underlying premise of the Act is to stop the decline of the defense industry and maintain its current state, rather than to further expand production capacity. For example, Article 1 of the Act states that its objective is "to stipulate measures to ensure the stable manufacturing of defense equipment by defense equipment manufacturers…," clearly focusing on maintaining the existing industrial base. Furthermore, under Article 4, paragraph 1, the "Plan for Ensuring Stable Manufacturing of Defense Equipment," which companies must prepare and have approved by the Minister of Defense in order to receive financial support, is limited to initiatives related to diversification of raw material supply sources, improvements in manufacturing efficiency, enhancement of cybersecurity, and business succession.[2] Consequently, advance investment aimed at increasing production cannot be supported as a direct justification for such financial assistance. Although the Act also created a long-term

[1] The Takaichi government declared its intention to review the three strategic documents including the DBP by the end of 2026, one year earlier than the original plan.
[2] "Act on Enhancing Defense Production and Technology Bases," Act No.54 of 2023, https://laws.e-gov.go.jp/law/505AC0000000054.

financing scheme through the Japan Finance Corporation for small and medium-sized enterprises, this framework is not intended to incentivize production expansion by prime contractors.[3]

To incentivize firms to make upfront investment decisions, the government should amend the Act to explicitly provide financial support for expanding production capacity, including for prime contractors. In addition, it should establish a public loan program offering more favorable terms than those available through market-based financing.

In considering additional funding for scaling up production and supporting research and development, investment through equity participation—alongside contracts and policy-based loans—can also be an effective option to provide funding to companies. Equity financing is particularly well-suited for startups engaged in the development of emerging technologies that are expected to be commercially viable in the future. This approach has already been adopted in government support for Rapidus, a company involved in next-generation semiconductor manufacturing.[4] Drawing on such precedents, an amendment to the Act could explicitly allow government-backed equity investment, for example, by utilizing public–private investment vehicles accredited by the Ministry of Economy, Trade and Industry (METI), such as the Japan Investment Corporation (JIC), which finances innovation-related ventures. Building on this framework, the JIC should be authorized to invest in defense and dual-use technologies, while incorporating mechanisms to reflect the technical and capability requirements of the Self-Defense Forces. Although the management of "public–private investment funds," which leverage fiscal investment and private capital, has been the subject of public scrutiny,[5] equity investment in firms developing emerging technologies would constitute an effective and strategic use of government financial resources. Moreover, if startups seeking entry into the defense sector could secure funding, it would widen the industrial base and expand production capacity. Most importantly, investment in firms that develop advanced technologies with both defense and commercial applications offers a pathway to realizing the "defense dividend"—a concept articulated by U.K. Defence Secretary John Healey in the foreword to the Defence Industrial Strategy published in September 2025[6]—where military strength and economic growth are expected to mutually reinforce with each other.

In Europe, by contrast, there are cases in which governments maintain mechanisms to prevent foreign acquisitions while holding a certain share of stock in major defense firms—

[3] ATLA, "Sōbihin seizōtō kiban kyōka shikin (tokubetsu kashitsuke seido) [Funds for Strengthening the Production Base of Equipment, etc. (Special Loan Program)]," https://www.mod.go.jp/atla/kimishikaoran/index.html.
[4] Ministry of Economy, Trade and Industry, "" Jōhōshori no sokushin nikansuru hōritsu oyobi tokubetsu kaikei nikansuru hōritsu no ichibu o kaiseisuru hōritsuan" ga kakugi ketteisaremashita [Cabinet Decision on the Bill for the Act for Partially Amending the Act on Facilitation of Information Processing and the Act on Special Accounts]," February 7, 2025, https://www.meti.go.jp/press/2024/02/20250207002/20250207002.html.
[5] For example, "Kanmin fund, 6 wari ruiseki akaji sarani 3 sen oku en fukuramu osore, kensain shiteki [Public-Private Fund Shows 60% Cumulative Deficit; May Swell by Another 300 Billion Yen, Board of Audit Warns]," *The Asahi Shimbun*, May 16, 2025, https://www.asahi.com/articles/AST5H2GY0T5HUTIL020M.html.
[6] UK Ministry of Defence, "Defence Industrial Strategy 2025: Making Defence an Engine for Growth," September 8, 2025, 5-7, https://assets.publishing.service.gov.uk/media/68bea3fc223d92d088f01d69/Defence_Industrial_Strategy_2025_-_Making_Defence_an_Engine_for_Growth.pdf.

for example, in France and Italy.[7] The relationship between governments and defense companies varies significantly across countries due to differing historical trajectories, and it is not necessarily desirable to adopt all such approaches as they are. Nevertheless, given the current expansion of defense business revenues among defense firms and the need to safeguard critical technologies, it would be prudent to consider measures to allow the government or government-backed entities to hold so-called "golden shares" in defense companies—while remaining mindful of the potential drawbacks, including constraints on firms' activities in capital markets. These measures could be explicitly stipulated in the Act.

Furthermore, it is necessary to establish measures that provide financial support for the overseas business of defense companies. Without a stable domestic market and adequate excess production capacity, firms have diminished incentives to take the risks associated with entering foreign markets proactively. To address this issue, Article 9, Paragraph 1 of the Act should be amended so that the scope of support available under the Defense Equipment Transfer Facilitation Fund is broadened beyond its current limitation—namely, support only for modifying the specifications or performance of equipment originally developed for the Self-Defense Forces for transfer to foreign recipients. Although the Fund, with a total budget of 120 billion yen, has been criticized in the past for its limited execution records,[8] the core issue lies in its highly restrictive and rigid scope, not in the absence of potential demand for investment in production capacity. Therefore, the government should revise the Act to enable the Fund to subsidize part of the costs associated with additional production facilities and related investments required for domestic manufacturing for exports or local production abroad.

That said, promotion of defense equipment transfers, like support for advanced domestic technologies, encompasses both a national security dimension and a business dimension tied to corporate economic activities. Accordingly, insofar as transfer projects can be commercially viable, not all government support must take the form of non-repayable subsidies. For highly profitable projects, the government should also consider providing public financing—such as long-term, low-interest loans or government guarantees—that offers more favorable conditions than market financing. Specifically, such projects should be eligible for support by the Japan Bank for International Cooperation (JBIC) as undertakings that contribute to "maintaining and strengthening the international competitiveness of Japanese industry" (Article 1 of the Japan Bank for International Cooperation Act).[9] One possible approach would be to revise Article 26 of the

[7] Antonio Calcara, *European Defence Decision-Making: Dilemmas of Collaborative Arms Procurement* (Routledge, 2021), chap. 3.
[8] "Bōei kikin 800 oku en, shiyō 15 oku en soredemo rainendo 400 oku en tsuika e [Defense Fund at 80 Billion Yen Used – Yet Another 40 Billion Yen to Be Added Next Fiscal Year]," *The Asahi Shimbun*, January 29, 2025, https://www.asahi.com/articles/AST1X41QBT1XULFA001M.html.
[9] "Kabushikigaisha kokusai kyōryoku ginkōhō [Japan Bank for International Cooperation Act]," Act No.39 of 2011, https://laws.e-

Defense Industrial Base Reinforcement Act to include provisions that acknowledge and facilitate the applicability of JBIC financing to defense industrial projects.

3. Contractual Framework Providing Incentives for Upfront Investments

A contract scheme that rewards upfront investments is also required. In this regard, contract values for defense equipment have traditionally been determined based on the ATLA's cost accounting system, under which manufacturing costs are supplemented with profit and general and administrative expenses. Historically, profit margins in this system have been calculated by multiplying the average profit rate for the manufacturing sector by a "business-specific adjustment factor." This adjustment factor was adopted to provide incentives for companies to maintain large production facilities, reflecting the tendency of the defense industry to possess sizable assets and, as a result, suffer from low capital turnover. In essence, the low capital turnover caused by maintaining large equipment assets is offset through compensation via a higher profit margin.[10] The roots of this method trace back to pricing practices introduced by the prewar Imperial Army after the outbreak of the Second Sino-Japanese War, when the government sought to promote expanded production to meet wartime demand. It is also said to have played a role in restoring Japan's industrial base during the postwar period after 1945.[11]

On the other hand, from fiscal year 2023 onwards, as noted in Chapter 1, profit margins have been designated in the range of 5–10% in linkage with the Ministry of Defense's QCD (Quality, Cost, Delivery) evaluations of companies. As a result, the method intended to provide companies with incentives for maintaining production facilities (assets) through profit margins has substantially disappeared.[12] The mechanism linking QCD evaluations to profit margins has merit in that differentiated profit margins encourage companies to improve QCD performance. However, because the evaluation criteria are limited to QCD-related

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gov.go.jp/law/423AC0000000039.

[10] "Chōtatsubutsu hintō no yotei kakaku no santei kijun nikansuru kunrei [Directive on the Criteria for Calculating the Estimated Prices of Procured Goods and Services]," Defense Agency Directive No.35 of 1962, Article 76 (version prior to the 2023 amendment); Ministry of Finance, "Zaisei seidotō shingikai zaisei seido bunkakai haifu shiryō bōei [Material Distributed at the Fiscal System Subcommittee of the Fiscal System Council: Defense]," October 24, 2018, 55, https://warp.ndl.go.jp/info:ndljp/pid/11551246/www.mof.go.jp/about_mof/councils/fiscal_system_council/sub-of_fiscal_system/proceedings/material/zaiseia301024/03.pdf.

[11] Masato Homma, "Gunjuhin to genka keisan: Gunjuhin no chōtatsu kakaku keisan ni mochiirareta genka keisan no hatten katei [Munition and Cost Accounting: The Development of Cost Accounting Used in Calculating Procurement Prices for Munitions]," PhD Dissertation, Saitama University, 2014, 30-33, 282-286.

[12] "Chōtatsubutsu hintō no yotei kakaku no santei kijun nikansuru kunrei [Directive on the Criteria for Calculating the Estimated Prices of Procured Goods and Services]," Defense Agency Directive No.35 of 1962, Article 65 (revision as of June 30, 2023), http://www.clearing.mod.go.jp/kunrei_data/j_fd/1962/jx19620525_00035_000.pdf; ATLA, "Reiwa 8 nendo niokeru "chōtatsubutsu hintō no yotei kakaku no santei kijun nikansuru kunrei" (ika" kunrei" to iu.) dai 70 jō no kitei oyobi" chōtatsubutsu hintō no yotei kakaku no santei kijun nikansuru kunrei no kaishaku oyobi un'yō nitsuite" dai 23 kō no kitei ni motozuku riekiritsu ni kakaru bōei daijin shōnin jikō no gaiyō [Overview of Matters Related to Profit Margins Approved by the Minister of Defense in FY2026, Based on Article 70 of the "Directive on the Criteria for Calculating the Estimated Prices of Procured Goods and Services" (hereinafter, the "Directive") and Article 23 of the "Interpretation and Operational Guidelines for the Directive on the Criteria for Calculating the Estimated Prices of Procured Goods and Services"]," July 2025, https://www.mod.go.jp/atla/souhon/pdf/yotei_r08santeikijun_keihi_r070701.pdf.

factors, they do not include items assessing upfront investments for increased production. In light of this, the government should expand the criteria of corporate evaluations underlying profit margin determination to incorporate efforts related to capital investment and workforce acquisition, thereby restoring the incentives for expanded production that the traditional profit margin determination method originally intended. Such a system would align with overseas initiatives, such as the inventory management clauses under consideration in UK defense procurement contracts. As discussed in Chapter 2, the assurance of surge production capacity is a demand from the government side. In that case, it is essential that the state bear a certain portion of the costs associated with it.

Within such a comprehensive evaluation framework, a method that creates incentives for capital investment would be superior to the previous adjustments using the business characteristic coefficient. This is because mechanical adjustments based on capital turnover cannot distinguish between investments in facilities for increased production and low capital turnover caused merely by inefficiencies in production, which could give rise to moral hazards. Evaluating asset ownership based on the specific circumstances of each company helps prevent such moral hazards while still providing meaningful incentives to firms.

4. Contractual Frameworks Providing Incentives for Independent Research and Development

The efforts of companies to proactively engage in advanced research and development without waiting for government's requirements must also be recognized. Achieving this within the contractual framework is not straightforward, as research and development for defense equipment is basically funded through government contracts related to research on component technology and prototype development. While it is true that many companies conduct a certain amount of independent research in order to compete for these contracts, there are virtually no mechanisms to financially reward such efforts outside of contract awards. Expenses for design, testing, and development associated with research and development are incorporated as "direct costs" into the relevant contracts and are thus covered, but only to the extent that they directly contribute to the contract. [13] Additionally, while independent research costs of companies may be marginally included in general costs applied as a percentage of manufacturing costs, this amount is far too small to serve as a meaningful incentive. [14] The reluctance to engage in proactive independent research stands in stark contrast to the proactive efforts observed among major Western defense companies, as discussed in Chapter 2. Technological capability forms the core of the defense industry, making it essential to foster an

[13] "Directive on the Criteria for Calculating the Estimated Prices of Procured Goods and Services," Articles 46-55.
[14] Ibid., Articles 59-60; Interviews with defense companies conducted by the author, April 7, 2025.

environment in which companies are encouraged to actively pursue independent research.

To improve this within the contractual framework, two potential approaches can be considered: firstly, allowing a portion of the costs incurred for company's independent research that indirectly enables a given defense procurement contract to be included in the estimation of "direct costs" for contract pricing, and/or secondly, setting the profit margin for contracts involving highly challenging research and development projects above the current 10% cap—for example, providing an additional 5% upon successful development (raising the total to 15%). Which approach—or combination thereof—is most appropriate should be assessed based on practical feasibility. Regarding the first option, each case would require judgment on the allowable scope of costs, leaving room for arbitrary decisions by the cost-estimating authority; a related concern is the potential increase in administrative workload for companies in submitting supporting documentation. In contrast, the second option is simpler on an administrative level, but presents challenges in establishing criteria for additional profit rates based on technological difficulty and in determining whether the development is successful.

In any case, while each of the potential approaches carries its own significant challenges, the idea of retrospectively evaluating and compensating proactive in-house research is highly meaningful and deserves serious consideration.

5. Formation of Programs Supporting Advanced Research and Development

As noted above, providing incentives for proactive research and development solely through the contracting system has its limitations. Therefore, it is also important to structure programs through budgetary measures that bridge the gap between dual-use technology research funding provided by the Ministry of Defense and other relevant ministries, and full-scale development projects. The government shares this awareness and has promoted initiatives to fill this gap under labels such as "bridging research for advanced technologies" and "breakthrough research."[15]

Therefore, while the overall direction of efforts pursued by the Ministry of Defense seems appropriate, it is important to enhance the policy tools available to make these efforts more effective. For example, drawing on the case of the Space Strategy Fund managed by the Japan Aerospace Exploration Agency (JAXA), one approach could be to structure grant programs that do not rely solely on funding or commissioned research and prototype production, but also set subsidy rates according to the level of technological maturity.[16]

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[15] Ministry of Defense, "Bōeiryoku bapponteki kyōka no shinchoku to yosan Reiwa 7 nendo yosan no gaiyō [Progress and Budget of Comprehensive Defense Capability Enhancement Overview of the FY2025 Budget]," April 2025, 36, https://www.mod.go.jp/j/budget/yosan_gaiyo/fy2025/yosan_20250402.pdf.

[16] Cabinet Office, Ministry of Internal Affairs and Communications, Ministry of Education, Culture, Sports, Science and Technology, and Ministry of Economy, Trade and Industry, "Uchū senryaku kikin kihon hōshin [Basic Policy on the Space Strategy Fund]," April

In addition, regularly commissioning studies and exploratory projects to clarify the operational concepts and doctrines of new equipment—before launching large-scale and high-risk R&D programs—would help promote dialogue and mutual understanding between the government and the private sector, while also reducing unnecessary rework and cost overruns.

6. Addressing Supply Chain Risks through the Strategic Use of Government-Furnished Equipment

In procurement contracts for defense equipment, there are cases in which specific components are procured directly by the Ministry of Defense without going through the prime contractor, and then handed over to the prime contractor for integration—this system is known as "government-furnished equipment" (GFE). Typically, GFE is used for components with high self-contained manufacturability, such as engines or onboard weapon systems. However, consideration should be given to expanding this approach to materials and other items that present high risks within the supply chain. For example, items essential to the manufacture of specific products or components, such as rare earths or rare-earth magnets—which carry political risks due to excessive dependence on China as a source—could be stockpiled in certain quantities by the Ministry of Defense in coordination with METI and the Japan Oil, Gas and Metals National Corporation (JOGMEC).

In addition, for components containing materials such as titanium or nickel, which face globally concentrated demand, delivery delays, and price surges, it is necessary for the Ministry of Defense and METI, among others, to work closely together to ensure that the needs of defense companies are adequately reflected in economic security measures, particularly those aimed at the stable supply of strategically important materials.[17]

7. Expanding Production Capacity Across Business Units and Industries, and Promoting Manufacturing Automation

Even if the government provides a medium-term outlook for defense procurement and prepares various measures to support corporate initiatives, it is ultimately the companies themselves that must undertake efforts to expand production. Government policies will not succeed unless defense firms adopt a proactive business strategy. Going forward, the way defense companies seek their business will come under scrutiny. First, by recognizing defense as a "growth industry," companies should actively share personnel across defense and commercial divisions and repurpose research and development outcomes.

It is also essential to promote capital investments, including automation and robotics technologies used in civilian manufacturing, while leveraging the financial support under the Defense Production Base Reinforcement Act (for

26, 8-9, https://www8.cao.go.jp/space/kikin/kihonhousin.pdf.
[17] METI, "Keizai anzen hoshō seisaku [Economic Security Policy],
" https://www.meti.go.jp/policy/economy/economic_security/index.html.

improving manufacturing efficiency). Drawing on examples such as those from the United States discussed in Chapter 2, incorporating automation technologies in areas like painting is one potential approach. However, introducing automation technologies based solely on current manufacturing practices has inherent efficiency limits. Therefore, it is necessary to adopt methods in the design and development stages that anticipate automation in the mass-production phase.

In addition, any remaining production resources must be sourced from other industries where surpluses exist. In particular, some companies in the automotive industry are planning factory closures, which creates a need to support the transition of affected personnel.[18] Defense companies should view this as an opportunity for increased production and actively engage in organizational-level coordination and dialogue with the automotive sector to rapidly acquire both the facilities slated for closure and the personnel requiring career transitions.

As noted in Chapter 2, Germany and Italy have considered repurposing automotive manufacturing plants slated for closure for the production of defense equipment. In France, there has also been consideration to utilize automotive companies for drone production. Similar initiatives could be explored in Japan to establish a domestic production base for drones.[19] Additionally, in preparation for the future spread of electric vehicles (EVs), measures anticipating reduced demand for suppliers in specific component sectors will likely be necessary.[20]

It could also be considered for the Ministry of Defense and METI to create opportunities for dialogue that encourage the sharing of equipment and workforce across industries. Additionally, a GOCO-type approach could be explored, whereby the government purchases closed factory sites, converts them into state-owned assets, and allows defense companies to use them.[21] Such initiatives would

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[18] For example, Nissan Motor Co., Ltd., "Nissanjidōsha, Oppama kōjō no sharyō seisan o Nissanjidōsha Kyūshū ni tōgō e [Nissan to Consolidate Vehicle Production at Oppama Plant into Nissan Motor Kyushu]," July 15, 2025, https://global.nissannews.com/ja-JP/releases/250715-01-j; " Nissan Oppama kōjō, tenshoku shien o kentō 2400 nin taishō Jisha group de zen'in no ukeire muzukashiku [Nissan Oppama Plant Considers Job Transition Support for 2,400 Employees – Difficult to Absorb All Staff Within the Company Group]," *The Yomiuri Shimbun*, August 19, 2025, https://www.yomiuri.co.jp/economy/20250819-OYT1T50006/.

[19] "Renault asked by French government to make drones in Ukraine," *Financial Times*, June 9, 2025, https://www.ft.com/content/51039f62-8acd-4444-9d4e-c6ddb0c9df8b; "'Win-win partnership': French companies to manufacture drones in Ukraine," *Euro News*, August 6, 2025, https://www.euronews.com/my-europe/2025/06/08/win-win-partnership-french-companies-to-manufacture-drones-in-ukraine.

[20] With the spread of EVs in mind, consideration has already been given to the entry of mold and parts manufactures into other sectors. In addition, several automobile parts manufactures have participated in the Defense Industry Entry Promotion Exhibition hosted by ATLA. "Kanagata ya buhin, datsu engine izon EV-ka misue handōtai ya uchū e [Molds and Parts Shift Away from Engine Dependence: Eyeing EV Adoption, Companies Move into Semiconductors and Space]," *The Nikkei*, https://www.nikkei.com/article/DGXZQOUA221B50S4A720C2000000/; ""Bōei sangyō sannyū sokushinten 2024 in NAGOYA" ga Aichiken Nagoyashi de kaisai, 10 gatsu 30-31 nichi ["Defense Industry Entry Promotion Exhibition 2024 in Nagoya" Held in Nagoya, Aichi Prefecture (October 30–31)]," *J Defense News*, October 31, 2024, https://j-defense.ikaros.jp/docs/mod/002004.html.

[21] The Ministry of Defense has already announced its intention to acquire the site of the former Nippon Steel Kure Works and develop a multi-purpose defense hub, including facilities for unmanned aircraft manufacturing. Ministry of Defense, "Nippon seitetsu kabushikigaisha Setouchi seitetsusho Kure chiku atochi no baibai keiyaku teiketsu ni muketa kihonteki jikō no gōi nitsuite [Agreement on Basic Matters for Concluding a Sale and Purchase Contract for the Site of the Former Kure Works, Setouchi Steelworks, Nippon Steel Corporation]," July 31, 2025, https://www.mod.go.jp/j/press/news/2025/07/31c.html.

also create significant industrial policy value in terms of retaining highly skilled labor within the manufacturing sector.

8. Utilization of Foreign Workforce and Implementation of Information Security Measures

Even after implementing the measures outlined in section 7, it remains crucial to attract a workforce that has traditionally been underutilized, especially as labor shortages have become severe across all industries, not just defense. For example, the utilization of foreign workers is expected to become an urgent necessity. Of course, cross-cutting considerations at both the government and industry levels, as well as responses to various social issues associated with expanding the intake of foreign workers, are indispensable. However, continuing to rely on cautious practices rooted in an era of abundant domestic labor will risk the timely production of defense equipment at the required scale, ultimately undermining Japan's defense capabilities. [22] Therefore, it is necessary to consider employing foreign workers, particularly from regions with established manufacturing expertise, especially in fields requiring technical skills.

At the same time, it remains essential to maintain rigorous information security within the industry. In recent discussions on Japan's economic security, the focus has often been limited to personnel security clearances; however, in defense equipment manufacturing, ensuring physical and cyber security is equally critical, regardless of whether foreign workers are utilized. To this end, the processes of product development and manufacturing should be thoroughly analyzed, and steps containing sensitive or controlled information should be physically segregated, with strict compartmentalization of the employees and facilities that can access each segment. In securing such information protection within companies, the specialized division of ATLA (Equipment Security Management Division) should provide tailored guidance based on the characteristics of specific products or projects. Information security cannot be established solely through standardized legal frameworks; rather, the most critical factor is securing and developing specialized personnel in both government and industry who can provide such tailored guidance.

In addition, initiatives could be considered where defense companies collaborate with universities, technical schools, and other educational institutions to provide training in languages, specialized skills, and related areas. It would also be effective for the government to support part of the costs associated with these efforts.

9. Promotion of Joint Production and

[22] In fact, many major companies have indicated that they plan to actively hire foreign employees in the future. "Gaikokujin ukeire kakudai, keiei top no 9 warichō" sansei" kōdona senmonshoku nado [Expansion of Foreign Workforce: Over 90% of Top Executives "Support" Hiring Highly Skilled Professionals]," *The Nikkei Shimbun*, September 30, 2025, https://www.nikkei.com/article/DGXZQOUC242920U5A920C2000000/.

Technology Transfer, and Establishment of Mechanisms to Facilitate These Processes

The overseas exports of defense equipment can contribute not only to building international security cooperation but also to establishing a surplus production base that Japan could rely on in the event of a crisis. The explosive surge in weapons demand during wartime has been vividly demonstrated in the Ukraine conflict, highlighting the structural impossibility of meeting wartime production solely through domestic means. Given this, if Japan can provide capabilities that its allies and partner countries require during peacetime, it would help build a strong foundation for seeking support when Japan itself faces a crisis. This is because most of the countries that Japan is considering exporting equipment to, or is already moving toward exports with, either already possess a domestic defense production base or are motivated to develop one. By engaging in joint development and production with these countries and establishing production bases for the equipment Japan needs, Japan would be able to rely on these defense production capabilities in times of crisis.

Such a production base is already being established through international joint development programs, such as the Global Combat Air Programme (GCAP) with the UK and Italy, and the DICAS program between Japan and the United States.[23] However, it is necessary to further expand these initiatives, including joint production at the component level. In particular, in Europe, the UK, Germany, Denmark, Norway, and Lithuania are advancing discussions with the Ukrainian government for the joint production of Ukrainian-made drones ("Build with Ukraine"), fostering collaboration between domestic companies and Ukrainian startups.[24] Japan could similarly consider cooperating with Ukraine on the joint production of drones and their components.

Even in defense equipment transfer projects without joint development elements, consideration should be given to transferring technologies related to Japanese equipment. In this context, defense technologies that enable local production may include intellectual property held by the Ministry of Defense or classified information. To facilitate such technology transfers smoothly while ensuring information security, procedures and standardized formats should be established for the Ministry of Defense to assess the feasibility of technology transfer for licensed production, and these should be communicated in advance to defense companies. Furthermore, regarding the protection of transferred technology, a system should be established in which the government (ATLA) can provide tailored advices to companies according to the characteristics of each project. Depending on the circumstances of the recipient country, it may also be appropriate

[23] Hirohito Ogi, "Navigo ergo sum. Tōkyō si prepara alla guerra nel mare," *Limes* (November 2024), https://www.limesonline.com/articoli/i-signori-degli-oceani-il-numero-1024-di-limes-17721112/?ref=LHTP-BH-I17692635-P1-S1-T1.
[24] Hirohito Ogi, "Drone seizō sensō: Ukraine sensō niokeru mō hitotsu no senjō [The Drone Manufacturing War: Another Battlefield in the Ukraine Conflict]," the presentation at the 40th Annual Conference of the Japan Association of International Security and Trade, September 27, 2025, https://cistec.or.jp/jaist/event/kenkyuutaikai/kenkyu40/annai.html.

to provide training related to information security as part of capacity-building assistance.

10. Enhancement of OSA

As noted in Chapter 1, some defense companies have pointed out that the budget size of the OSA is too small for them to participate. Since the OSA is relatively new, its budget has not been able to expand rapidly. Therefore, MOFA should work to expand the scale of OSA programs to effectively enhance the capabilities of partner countries. In addition, it should implement a range of support measures, such as using OSA resources to cover the costs incurred by companies for maintenance, logistics, and training related to commercial sales of defense equipment to developing countries.

Section 2 Conclusion

In summary, the policy recommendations presented in the preceding section are as follows.

1. The government should promptly begin revising the Defense Buildup Program for fiscal year 2027 and beyond to enhance predictability for defense firms and encourage the formulation of medium-term investment plans.

2. The Ministry of Defense should amend the Defense Production Base Reinforcement Act to encourage upfront investment decisions by companies and expand their production base by:
（1）Enabling the government to provide financial support (subsidies) to defense companies for expanding their production capacity, public loans on terms more favorable than market loans, as well as equity investment by public-private investment funds such as the Japan Investment Corporation (JIC). In addition, a system that allows the government or government-related funds to hold “golden shares” in defense companies to prevent foreign acquisitions should be studied based on its pros and cons and the precedents of other countries.
（2）Broadening the scope of eligibility for support under the Defense Equipment Transfer Facilitation Fund so that part of the costs for production facilities and related requirements for defense exports can be covered. In addition, enable the Japan Bank for International Cooperation (JBIC) to provide public finance —such as low-interest, long-term loans or government guarantees—for commercially viable international projects.

3. To encourage companies to strengthen their surplus production capacity, the Ministry of Defense should revise the corporate evaluation criteria used as the basis for determining profit margins in individual defense contracts to include firms’ efforts related to capital investment and securing human resources. This would provide companies with contractual incentives for upfront investments by increasing their profit margins.

4. To promote companies' proactive in-house research, the Ministry of Defense should consider revising the contracting system to:
   (1) Allow companies to include part of the related costs of in-house research—research that indirectly supports the fulfillment of defense contracts—in the cost estimates for procurement contracts; and
   (2) Set profit margins for contracts involving highly challenging research and development above the current maximum of 10 percent.

5. The Cabinet Office, the Ministry of Education, Culture, Sports, Science and Technology, the Ministry of Economy, Trade and Industry (METI), and the Ministry of Defense should increase budget allocations for projects that fall between grant programs supporting advanced dual-use technology research and development (R&D) and full-scale defense equipment R&D that involves producing prototypes.

6. The Ministry of Defense, in coordination with METI and the Japan Organization for Metals and Energy Security (JOGMEC), should stockpile specific materials and components essential for defense equipment production to mitigate supply chain risks. For components that incorporate materials subject to concentrated global demand, the Ministry of Defense should also work closely with METI and other relevant ministries to ensure that the needs of defense companies are adequately reflected in broader economic security promotion initiatives.

7. Defense companies should consider reallocating personnel and equipment from their civilian divisions, as well as repurposing surplus production bases and workforce from other industries—such as the automotive sector—through cross-industry dialogue. The Ministry of Defense should support these efforts, for example, by acquiring factories from other industries scheduled for closure and entrusting them to defense companies as government-owned, contractor-operated (GOCO) facilities. At the same time, defense companies should advance the introduction of automation and robotics technologies in manufacturing, utilizing the financial support under the Defense Production Base Reinforcement Act to streamline production processes. In design and development, it is also essential to adopt approaches that could anticipate automation at the mass-production stage.

8. To address the persistent shortage of skilled personnel, defense companies should consider employing foreign workers, particularly those with relevant technical expertise. In turn, the

Ministry of Defense and other relevant ministries should support and encourage such initiatives by providing guidance on strengthening information security measures.

9. To ensure the sustainability of defense business in peacetime and to secure surplus production capacity in times of crisis, the Ministry of Defense and defense companies should actively pursue joint production of weapons used by the Self-Defense Forces with foreign partners, as well as local production overseas. To facilitate the transfer of technologies necessary for local production with partners, the Ministry of Defense should clarify and communicate to companies the procedures for handling intellectual property owned by and classified information designated by the Ministry. Furthermore, the Ministry should strengthen its advisory functions for companies by providing guidance on appropriate methods of technology and information security tailored to the characteristics of each project, thereby ensuring the effective protection of sensitive information.

10. The Ministry of Foreign Affairs should work to expand the scale of Official Security Assistance (OSA) projects in order to enhance the effectiveness of security aid to partner countries. At the same time, OSA should be implemented in ways that create synergies with defense exports, including coverage of costs associated with procuring spare parts and maintenance support of the products that accompany commercial exports by defense companies.

Since the Japanese government formulated its three strategic documents in 2022, the international security environment has continued to evolve in an increasingly unpredictable manner. Defense production, given that it depends on corporate initiatives, requires a certain amount of time to expand its underlying capacity. However, changes in the international security environment will not wait for such preparations. That is precisely why both the government and the industry must take the necessary actions immediately. What is first required in this context is a transformation of the strategic culture surrounding defense production. This entails shifting from policies and business practices premised on decline in peacetime or mere maintenance of the status quo toward a mindset aimed at building a production base capable of responding in times of crisis. Such a transformation in strategic culture is exactly what Japanese defense industrial policy demands.

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Appendix 1　List of Interviewees

IHI Corporation
Kawasaki Heavy Industries, Ltd.
Komatsu Ltd.
Japan Marine United Corporation
SUBARU Corporation
Toshiba Corporation
Japan Steel Works, Ltd.
NEC Corporation
Fujitsu Limited
Mitsubishi Heavy Industries, Ltd.
Mitsubishi Electric Corporation

Japan Association of Defense Industry (JADI)

Appendix 2 Questionnaire

1) Which aspects of the government's past initiatives regarding the defense industry are favorable, and which initiatives are still lacking?
2) What are the challenges in responding to the increase in domestic defense demand (including issues related to production capacity such as workforce and facilities, etc.)?
3) What are the challenges in initiatives related to overseas exports (focusing on how to mitigate competing domestic and international demand)?
4) What are your plans for future business strategy and upfront investment (especially in terms of addressing domestic and international demand from FY2028 onward)?
5) What initiatives do you expect from the government when formulating your future business strategy?

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Expertise

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Expertise

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