Foreign Policy at BROOKINGS

The personnel base of the Japan Self-Defense Forces in an era of demographic decline

Promoting labor-saving and unmanned capabilities in the Air Self-Defense Force

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Photo: David Mareuil/Pool via REUTERS

Executive summary

The acquisition of the most advanced fighter aircraft is of little strategic value if there are insufficient personnel to operate them. This is no longer a concern for the distant future—it is an immediate and pressing reality.

As Japan's security environment grows increasingly severe, the Japan Self-Defense Forces (JSDF) is undertaking a fundamental reinforcement of defense capabilities. At the same time, they face the irreversible constraint of a declining population. A shrinking pool of recruitment-age individuals, mounting difficulties in attracting new personnel, and rising mid-career attrition have collectively made it increasingly difficult for the JSDF to maintain even its authorized strength (i.e., the personnel level legally defined by Japan's Ministry of Defense). Moreover, the nature of warfare itself is shifting, with unmanned systems becoming a global standard for reducing human casualties on the battlefield.

Against this backdrop, this paper focuses on the personnel base of the JSDF—particularly that of the Japan Air Self-Defense Force—and explores the need to restructure force development considering a steadily shrinking manpower base. It proposes the strategic advancement of labor-saving and unmanned approaches. Specifically, it identifies five key areas for further deliberation: rationalizing the number of manned aircraft with the integration of unmanned assets; streamlining and optimizing command and control structures; promoting multi-skilling (i.e., equipping personnel with competencies beyond their primary specialty) among personnel; enhancing base defense through advanced technologies; and optimizing the number and operation of pilot trainer aircraft.

This paper's aim is to offer concrete proposals to strengthen Japan's defense capabilities from a human-resources perspective, and to inform and advance future discussion, while acknowledging the structural constraint of demographic decline. Reducing reliance on manpower is not simply about efficiency—it represents a fundamental reconfiguration of personnel roles that protects and empowers those who serve. This evolution should not be limited to the JSDF alone. Rather, labor-saving and unmanned capabilities should be clearly positioned as a national-level initiative to support the long-term sustainability of Japanese society in the era of demographic change.

Introduction

The Japanese government has stated that "Japan is facing the most severe and complex security environment since the end of World War II." In response, Japan is undertaking a fundamental review of its defense posture. Under newly formulated strategic documents, the Japan Self-Defense Forces (JSDF) is undergoing major reforms in both quality and quantity, including the acquisition of counterstrike capabilities; the enhancement of capabilities in new domains such as space, cyber, and the electromagnetic spectrum; and the establishment of the Joint Operations Command. However, no matter how advanced the equipment may be, it is ultimately human personnel who determine whether the JSDF's capabilities can be fully utilized. Ensuring stable and sufficient recruitment and retention remains a critical issue.[1]

Indeed, a range of structural factors—including a declining youth population due to demographic aging, changes in the employment environment, and shifting values among younger generations—have begun to seriously impact the JSDF's human resource base. While significant efforts have been made to improve compensation and benefits and reform personnel systems, these measures alone are not sufficient to counter the irreversible effects of demographic decline. The emerging reality suggests the need to reassess the organizational structure and force design of the JSDF itself.

This paper intends to assess the fundamental reinforcement of Japan's defense capabilities from a human resource perspective—specifically, how to ensure that deterrence and response capabilities can be sustained even under demographic constraints. To this end, it sets forth two strategic orientations: the advancement of labor-saving[2] and unmanned[3] approaches. It then examines a range of specific policy measures to support this shift. In this paper, "labor-saving and unmanned approaches" are positioned as initiatives aimed at maintaining and enhancing defense capabilities under constrained human resources, while reasonably reducing both personnel burden and dependence.[4]

The expanding role of the JSDF and JASDF

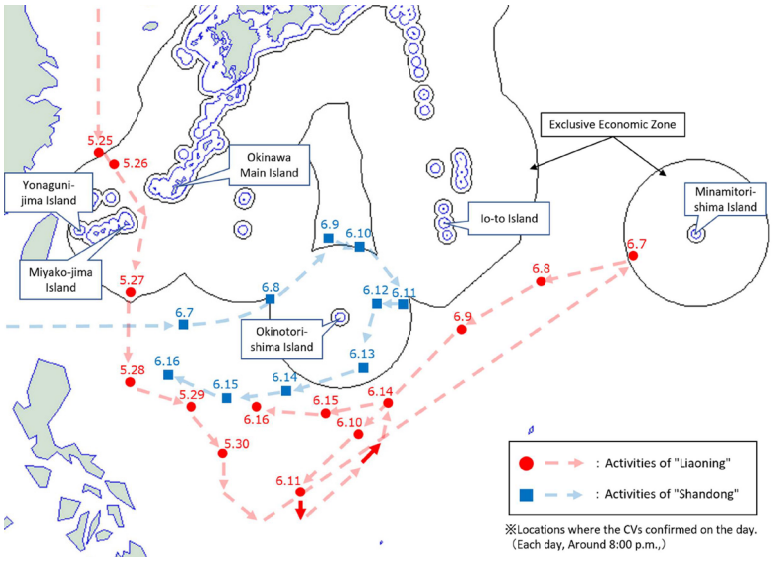
In order to keep up with the evolving security challenges surrounding Japan, the fundamental reinforcement of Japan's defense capabilities—including the Japan Air Self-Defense Force (JASDF)—can no longer be postponed. Japan's surrounding security environment is becoming increasingly serious and complex, driven by recent developments such as Russia's invasion of Ukraine, intensified joint military activities by China and Russia, the increased frequency of Chinese military aircraft entering Taiwan's airspace and crossing the median line, large-scale military exercises around Taiwan, and North Korea's ongoing nuclear and missile development programs. These actions mark the most serious security situation facing Japan since the end of World War II—and it is expected to become even more severe in the years ahead.

Meanwhile, China's use of unmanned systems for intelligence, surveillance, and reconnaissance (ISR) activities has been increasing significantly in recent years. Chinese unmanned aerial vehicles (UAVs) such as the BZK-005[5] and WZ-7[6] are now routinely operating in areas around the East China Sea and Taiwan. In addition, newly developed UAVs, including the WL-10[7] and GJ-2,[8] were confirmed for the first time operating over the East China Sea in FY2024. In response, the JASDF is compelled to conduct scrambles using manned aircraft—resulting in asymmetrical operational and maintenance burdens in both human and financial terms and raising concerns about long-term sustainability.

In 2024, a large-scale joint flight by Chinese and Russian bombers was observed around Japan. In August of the same year, a Chinese Y-9 intelligence aircraft intruded into Japan's territorial airspace.[9] That was the first intrusion into Japan's territorial airspace by a Chinese military aircraft.[10] Furthermore, on May 3, 2025, a helicopter launched from a China Coast Guard vessel intruded into Japan's territorial airspace around the Senkaku Islands, prompting an emergency scramble response by the JASDF.[11] In early June of the same year, China deployed two aircraft carriers, the Liaoning and Shandong, simultaneously to the Pacific Ocean near Japan for the first time. During this period, a serious incident occurred in which a J-15 fighter jet[12] launched from one of the carriers approached a Japan Maritime Self-Defense Force (JMSDF) P-3C maritime patrol aircraft[13] conducting surveillance in international airspace, flying at the same altitude and closing to a horizontal distance of approximately 45 meters (see Figure 1). Furthermore, in early July of the same year, another serious incident occurred in which a Chinese JH-7 fighter-bomber[14] made an unusual approach toward a JASDF YS-11EB electronic intelligence aircraft[15] conducting surveillance over international waters in the East China Sea.[16] These incidents suggest a gradual qualitative escalation in attempts to alter the status quo by force.

FIGURE 1

Activities of Chinese naval vessels (aircraft carriers) and unusual approaches by Chinese military aircraft toward JSDF aircraft



Overview of activities of the Kuznetsov-class CV "Liaoning" and "Shandong"

Kuznetsov-class CV "Shandong" (hull number 17)

Chinese J-15 fighter jets that made unusual approaches to a JMSDF P-3C

Source: Ministry of Defense website, excerpts from releases dated June 11 and June 23, 2025

The war in Ukraine has served as a catalyst for further strategic rapprochement between Russia and North Korea, presenting a growing concern for regional and international security.

There are increasing concerns over nuclear or missile-related technology transfers and the provision of military supplies from Russia, which could contribute to the modernization, extension of operational range, and improved precision of North Korea's weapons systems.

According to estimates by the Korea Institute for Defense Analyses, North Korea has generated economic effects worth approximately 28.7 trillion South Korean won (equivalent to about 2.8 trillion yen or $19.5 billion), including material goods, cash, and technology transfers, as a result of its military cooperation with Russia, such as the provision of ammunition and the deployment of North Korean troops.[17] There are concerns that these resources may be allocated to further enhance North Korea's nuclear and conventional military capabilities.

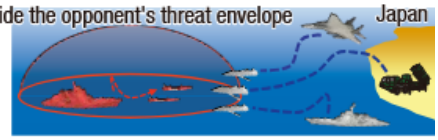
The 2025 Annual Threat Assessment released by the U.S. Office of the Director of National Intelligence identifies China's military coercion around Taiwan and its "aggressive efforts to assert sovereignty claims in South and East China Seas," North Korea's continued advancement of nuclear and missile capabilities, and Russia's sustained challenges in the military, cyber, and space domains as major threats to the United States.[18] These assessments reinforce the international recognition that the operational demands on the JSDF will continue to grow.

In response to this evolving threat environment, the Government of Japan has announced its policy of taking the necessary measures to ensure that the budget level in FY2027 "for both

the fundamental reinforcement of defense capabilities and complementary initiatives" reaches 2% of GDP under the National Security Strategy and the National Defense Strategy formulated in 2022. The JSDF is implementing a fundamental reinforcement of defense capabilities across seven key areas, including stand-off defense capabilities and integrated air and missile defense systems (see Figure 2).[19] Furthermore, alongside the traditional domains of land, sea, and air, the JSDF is strengthening capabilities in new domains such as space, cyber, and the electromagnetic spectrum. In March 2025, the Joint Operations Command was established to centrally command and control joint operations functions across the Ground, Maritime, and Air Self-Defense Forces on a permanent basis.[20]

FIGURE 2

Seven priority areas for fundamentally reinforcing defense capabilities

(1) Stand-off Defense Capabilities	•Strengthening the defense capabilities to oppose invading forces from a safe distance where we will not be attacked 
(2) Integrated Air and Missile Defense Capabilities	•Strengthening our capabilities to respond to increasingly diverse and complex airborne threats such as missiles  Shipbuilding of an Aegis System-Equipped Vessel (Note)
(3) Unmanned Defense Capabilities	•Strengthening our capabilities, e.g., via intelligence gathering and combat support with unmanned assets  Preparation of UAV for reconnaissance (for mid-range) (Note)
(4) Cross-Domain Operation Capabilities	•Strengthening space, cyber, electromagnetic spectrum, land, sea and air capabilities necessary for combat by fusing all capabilities  Development of Stand-off Electronic Warfare Aircraft (Note)
(5) Command and Control and Intelligence-related Functions	•Strengthening command and control and intelligence-related functions to accelerate and refine decision-making  Acquisition of Signals Intelligence Aircraft (RC-2)
(6) Mobile Deployment Capabilities/ Civil Protection	•Strengthening maritime and air transport capabilities to quickly maneuver and deploy the necessary forces •Implementing civil protection by utilizing the above capabilities  Acquisition of transport vessels
(7) Sustainability and Resiliency	•Preparation of necessary and sufficient ammunition, guided missiles and fuel from an early stage •Securing expenditures for acquiring equipment parts, equipment repairing and improving the resiliency of facilities  Securing the ammunition storage facilities (Note)

Source: Excerpt from the Defense of Japan White Paper

The JASDF, in particular, is undergoing rapid modernization. This includes the acquisition of F-35A/B aircraft, upgraded F-15 fighter jets, and participation in the trilateral Global Combat Air Program (GCAP) with the United Kingdom and Italy, which is aimed at developing a next-generation fighter. These developments are expected to increase the number of fighter aircraft from approximately 290 to around 320.[21] Additionally, the JASDF is preparing for a major organizational transformation, including the planned expansion of the Space Operations Group into a Space Operations Corps and a potential future reorganization into an "Aerospace Self-Defense Force."

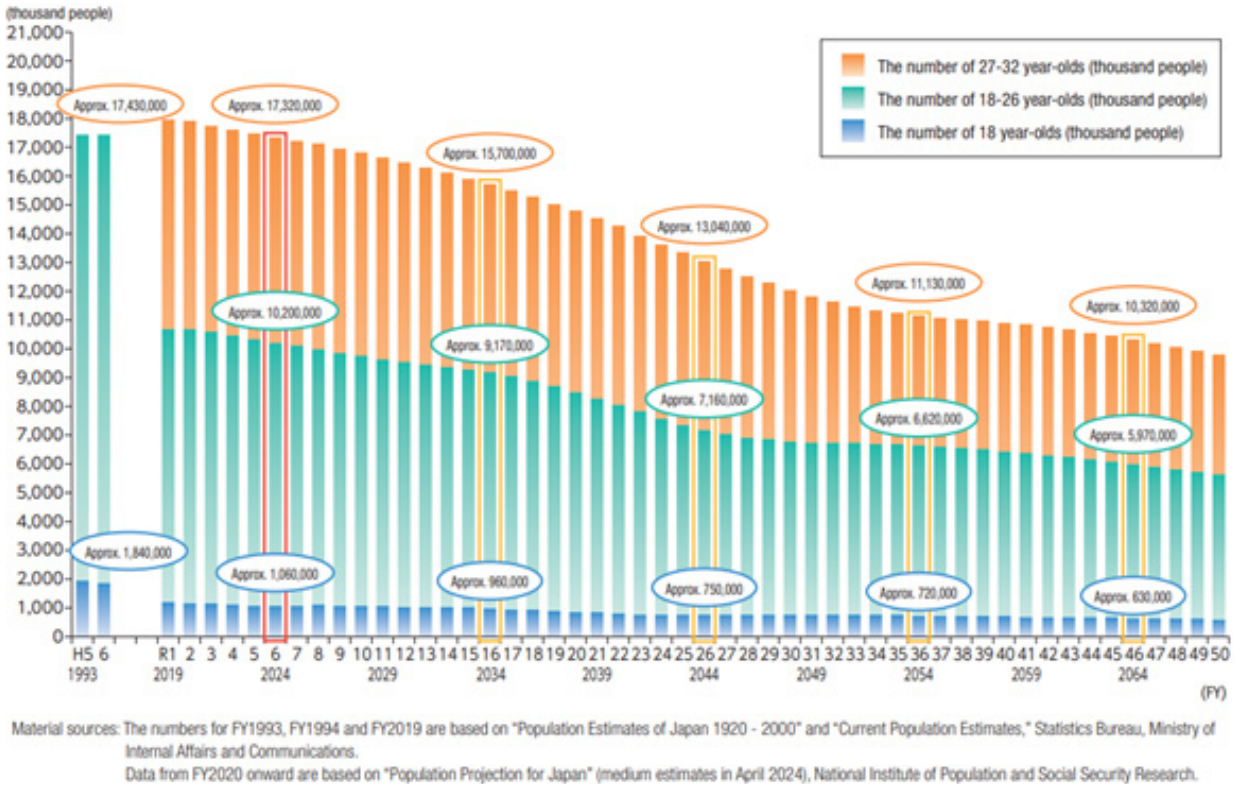
However, any such enhancement must be underpinned by a sustainable personnel base. The following section examines the deepening structural constraints on manpower, which are intensifying alongside expanding missions, as well as the institutional limitations that challenge an adequate response.

Efforts to secure human resources and the structural challenges ahead

While the JSDF's roles continue to expand, its human resource foundation—the very basis for exercising defense capabilities—is now facing a structural crisis. Japan's total population peaked in 2008 at approximately 128.1 million[22] (with a total fertility rate of 1.37) and has since been declining. As of 2024, the population stands at approximately 123.78 million, with the total fertility rate having fallen further to 1.15 in 2024.[23] The declining trend in birth rates is expected to persist.

FIGURE 3

Trends in the population eligible for SDF recruitment



Material sources: The numbers for FY1993, FY1994 and FY2019 are based on "Population Estimates of Japan 1920 - 2000" and "Current Population Estimates," Statistics Bureau, Ministry of Internal Affairs and Communications.
Data from FY2020 onward are based on "Population Projection for Japan" (medium estimates in April 2024), National Institute of Population and Social Security Research.

Source: Excerpt from the Defense of Japan White Paper

As shown in the figures, the population of young people aged 18 to 26—a key recruitment age group for the JSDF—has declined from approximately 17.43 million in 1994 to about 10.2 million in 2024. Furthermore, according to future projections, this number is expected to decrease to approximately 9.17 million by 2034 (a decrease of around 10% compared to 2024) and to about 7.16 million by 2044 (a decrease of around 30%).

These projections indicate that the decline in the youth population will continue to progress in an irreversible and long-term manner (see Figure 3). This irreversible demographic shift indicates that the challenge of labor shortages will grow more severe across Japanese society in the future, posing even greater constraints on the human resource base of the MOD and the JSDF.

TABLE 1

Trends in authorized and actual strength of the SDF

Category	GSDF	MSDF	ASDF	Joint Staff etc.	Total
Authorized	149,767	45,452	47,007	4,928	247,154
Actual	131,293	41,818	42,608	4,533	220,252
Staffing rate	87.7%	92.0%	90.6%	92.0%	89.1%

Category	Non-fixed-term personnel				Fixed-term personnel
	Officer	Warrant officer	Enlisted (upper)	Enlisted (lower)	
Authorized	46,788	4,883	141,848	53,635	
Actual	43,434 (2,888)	4,699 (132)	139,572 (11,141)	20,552 (3,516)	11,995 (2,369)
Staffing rate	92.8%	96.2%	98.4%	60.7%	

Notes: 1) The number of authorized personnel is determined based on the budget. 2) Figures in parentheses denote the number of females included in the preceding value. 3) The "etc."of the Joint Staff Office refers to internal bureaus, acquisition, technology and logistics agency, defense intelligence headquarters, and joints units.

Source: Compiled by the author based on the Defense of Japan White Paper

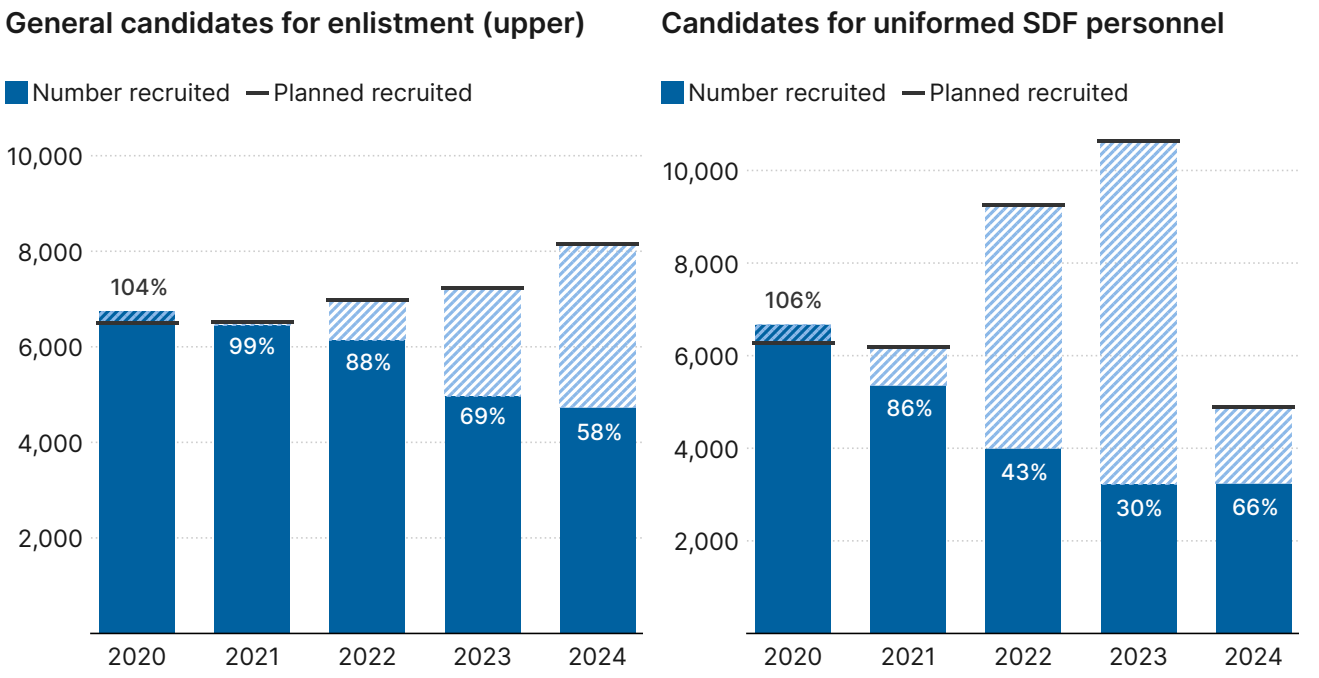
As of March 2025, the actual strength[24] of the SDF was 220,252, compared to an authorized strength[25] of 247,154, resulting in an overall personnel fulfillment rate of approximately 89.1%. In particular, the rate for lower enlisted personnel (shi) was only 60.7% (32,547 out of 53,635; see Table 1). In the JSDF, shi ranks include both fixed-term and indefinite-term enlisted personnel. Many begin their careers under multiyear contracts. Upper enlisted personnel (sō) generally serve on indefinite terms and are responsible for leading shi, supporting officers, and applying specialized skills in their respective fields.[26] These shortfalls suggest that many units operate below authorized strength, increasing the workload on individual service members and raising concerns about the sustainability of mission execution.

In the National Defense Strategy adopted in December 2022, increasing the authorized number of personnel was considered as part of the broader reinforcement of defense capabilities, but it was ultimately determined that addressing the shortfall in actual strength should take priority. As a result, the policy direction was set not to increase the total authorized personnel (approximately 247,000), but rather to optimize allocations—such as transferring about 2,000 positions from the Ground SDF to the Maritime and Air SDF—while seeking to secure personnel through measures like organizational realignments and expanded outsourcing to civilians.[27] Actual personnel, however, do not automatically follow authorized shifts, meaning that even with these adjustments, recruitment will still need to be increased, particularly in the JASDF and JMSDF, to achieve true optimization.

Recruitment trends are becoming increasingly dire due to a combination of factors such as a shrinking youth population and intensifying competition with the private sector. From FY2019 to FY2023, the number of new recruits for general enlisted candidate positions has faced persistently low recruitment levels. In FY2023, achievement rates for both general candidates for enlistment (upper)[28] and candidates for uniformed SDF personnel[29] fell to historic lows—particularly for the latter, with an achievement rate of only 30% (see Figure 4). In response, the government has decided to abolish the Self-Defense Official Candidate category from FY2026 and replace it with a new personnel track that grants full JSDF status and improved compensation from the outset.[30]

FIGURE 4

Trends in recruitment plans and actual numbers



Source: Compiled by the author based on official data from the Ministry of Defense

Even in officer training programs—such as those for National Defense Academy students,[31] officer candidates,[32] and aviation cadets[33]—the number of applicants continues to decline. This has raised concerns over narrower recruitment pools, potential underachievement of future quotas, and a decline in academic and performance standards.[34]

In addition, the JSDF's mid-career attrition rate is also rising. By the author's calculation, using personnel totals from the end of the previous fiscal year as the denominator, the rate stood at approximately 2.46% in FY2021 (5,742 resignations during FY2021 out of 232,509 personnel as of March 31, 2021), and in FY2023, it rose to around 2.75% (6,258 resignations during FY2023 out of 227,843 personnel as of March 31, 2023).[35]

While this remains lower than the private sector average, it is higher than among other public servants.[36] Commonly cited reasons for resignation include a lack of personal growth or fulfillment, long working hours, and dissatisfaction with the work environment.[37] Retaining recruited personnel over the long term has become a significant challenge.

Recognizing the severity of this personnel crisis, the MOD has been implementing a variety of institutional responses. These include raising the maximum recruitment age for candidates (from 26 to 32), expanding the use of reserve personnel[38] and female service members, and gradually increasing the retirement age.[39] In late 2024, a major recruitment reform plan was announced as part of broader efforts to strengthen the JSDF's human resource base. This included a 13% increase in the starting salary for enlisted personnel and improvements in quality-of-life provisions such as housing and welfare benefits.[40] These efforts are designed to make the JSDF a more attractive career option amid intensifying competition with the private sector and are expected to contribute significantly to increasing recruitment and reducing mid-career attrition. In fact, some signs of improvement have already begun to emerge.[41] However, despite the importance of these measures, demographic realities suggest that maintaining current personnel levels will likely become increasingly difficult. Most JSDF bases are located in rural areas, and the ongoing population concentration in Japan's three major metropolitan regions[42]—Tokyo, Nagoya, and Osaka—along with the continued depopulation of rural areas, is expected to have a significant impact on recruitment.[43] Moreover, as traditional employment norms such as lifetime service continue to break down and job-hopping becomes more common, younger generations are placing greater emphasis on stable income and work-life balance.[44] The JSDF's employment model—based on nationwide assignments and long-term service—no longer aligns well with these preferences. In addition, as competition for talent intensifies, the public servant status of uniformed JSDF personnel may lead to disadvantages in salary competitiveness and career flexibility compared to private-sector employment.

Thus, while ongoing improvements to treatment and working conditions remain essential, Japan's demographic outlook suggests that maintaining current staffing levels may become increasingly unsustainable. At the same time, as Japan moves forward with the acquisition and expansion of high-cost, long-lifespan platforms such as fighter aircraft as part of its defense buildup, the risk of future shortfalls in personnel to operate and sustain these systems is becoming increasingly real.

As the structural mismatch between expanding missions and a shrinking personnel base continues to widen, Japan must assess these risks with clear eyes and pursue defense enhancement that fully accounts for demographic constraints. It is precisely the redesign of the JSDF's force posture—based on the reality of manpower limitations—that will determine the long-term sustainability of its defense capabilities.

The challenges posed by a shrinking human resource base and expanding mission sets are not unique to Japan. The following section examines how other countries facing similar structural constraints have responded, with the aim of drawing relevant insights for Japan.

Strategic restructuring under manpower constraints

Sustaining capabilities under demographic stress requires not simply recruiting more personnel but fundamentally restructuring the force itself. Other countries, such as the United Kingdom and the Republic of Korea, have encountered similar issues and have responded by redesigning their respective force structures.

In the United Kingdom, successive strategic defense and security reviews since 2010 have called for the gradual downsizing of the regular forces, prompted by fiscal constraints and a reassessment of post–Cold War threats.[45] The Royal Air Force has reorganized its force structure based on reduced manpower, consolidating fighter squadrons and integrating multiple specialties, including maintenance, transport, and logistics support.[46] In parallel, the U.K. has pursued efficiency through aircraft type reductions and integration of training systems. The design philosophy behind GCAP, jointly developed with Japan and Italy, also reflects an intent to integrate unmanned assets to achieve both manpower savings and enhanced responsiveness. In addition, automation technologies have been introduced for base security and maintenance support, while personnel are being reassigned to non-contact domains such as cyber and space. These efforts represent a holistic approach to reducing manpower dependency through reforms in equipment, organization, and operations.

Even after the heightened threat perception in Europe following the war in Ukraine, the United Kingdom has not moved toward a rapid expansion of its force size but has instead continued to maintain readiness and sustainability through manpower reduction and functional integration. The Royal Air Force has engaged in NATO's Air Policing mission without undertaking large-scale force expansion.[47] Such contributions suggest that a compact force structure centered on labor-saving and automation can not only maintain alliance commitments but also support sovereign defense and the ability to sustain operations over time—offering insights into sustainable force employment under personnel constraints.

South Korea, unlike Japan, maintains a conscription-based system. Despite having a population of approximately 51.68 million in 2025[48]—less than half of Japan's 123.78 million—it sustains an active-duty force of about 500,000,[49] more than twice the size of Japan's 247,000. However, Korea is now facing acute personnel shortages due to a world-low fertility rate of just 0.75 in 2024.[50] In response, it has launched the "Defense Innovation 4.0" initiative, which centers on advanced technologies and calls for a phased shift toward manned-unmanned integrated operations. The initiative includes the gradual reduction of active-duty strength, expansion of unmanned assets and generative artificial intelligence (AI), automation of command-and-control functions, and broadening of post-retirement reappointment schemes.[51] These measures reflect a deliberate effort to reduce reliance on human resources while enhancing warfighting flexibility and minimizing casualties.

In the air domain, South Korea is expanding its use of UAVs and aerial refueling capabilities to extend its reach and endurance with fewer personnel. These initiatives are designed to mitigate manpower constraints while reinforcing operational resilience—addressing the dual pressure of growing security threats and declining human resources.

South Korea, despite maintaining conscription, now struggles to field its forces due to its demographic cliff. In Japan's case, given constitutional constraints and public opinion, conscription is not a realistic policy option. The social, legal, and economic costs of such a shift would be prohibitive.[52]

Instead, Japan must pursue realistic and flexible approaches within its existing voluntary recruitment system. These may include adjusting age requirements, extending retirement and reemployment options, and expanding the use of reservists—measures that enable a broader and more adaptable personnel base. While institutional differences must be acknowledged, Japan can and should draw insights from other nations' restructuring efforts to chart its own sustainable path forward.

While the direction toward labor-saving and unmanned approaches is certainly driven by structural constraints on the JSDF's personnel base, the rationale for this shift extends beyond demographic pressures. Recent changes in the nature of warfare further underscore the necessity of reassessing human dependency in defense structures. The following section explores the strategic significance of labor-saving and unmanned capabilities from a tactical perspective, with a focus on how evolving modes of warfare justify this transformation.

Why unmanned systems matter: Tactical effects and strategic utility in modern warfare

Recent shifts in the security environment have prompted major transformations in military strategies and force structures worldwide. One of the most notable developments is the accelerating shift from manned to unmanned platforms. As manpower constraints become an unavoidable reality, there is an urgent need to transition from a force posture centered on human labor to one that prioritizes protecting and maximizing human assets. The key to this transformation lies in the strategic use of unmanned systems.

This shift is closely linked to rapid technological advances in unmanned assets. Innovations in AI, communications, sensors, and battery systems have made real-time and persistent surveillance and analysis possible—capabilities that were (or still are) difficult to achieve with traditional manned platforms. Moreover, unmanned assets can be mass-produced more quickly and cost-effectively, offer lower observability, and are highly suitable for distributed operations and saturation attacks. As a result, they provide greater operational flexibility and sustainability, making them especially valuable for nations with limited human resources by enabling a reduction in personnel attrition while still achieving desired tactical effects.

The combat effectiveness of unmanned systems has been clearly demonstrated in recent conflicts. During the 2020 Nagorno-Karabakh war, Azerbaijan extensively used Turkish Bayraktar TB2[53] drones and Israeli IAI Harop[54] loitering munitions to neutralize Armenian air defense systems, armored vehicles, and artillery units. These operations allowed Azerbaijan to gain air superiority without deploying manned aircraft, significantly shifting the course of the conflict.[55] The case illustrated how unmanned assets can enable even mid-sized powers to achieve tactical dominance.

This trend has become even more pronounced in the context of Russia's invasion of Ukraine. Commercial and military drones are widely used for ISR, ground attack, and electronic warfare missions with a frequency and intensity that manned systems alone could not support.[56] By combining reconnaissance, strike, and targeting functions, these systems shorten the sensor-to-shooter loop and increase the speed of tactical decisionmaking. In June 2025, a Ukrainian drone attack destroyed or damaged several Russian strategic bombers stationed far from the front lines. This incident highlighted both the vulnerability of aircraft on the ground and the operational and cost-effectiveness of employing low-cost commercial drones for strategic strikes.[57] In July 2025, the U.S. secretary of defense announced the "Unleashing U.S. Military Drone Dominance" initiative, directing the rapid, field-driven deploy-

ment of low-cost small drones and the removal of institutional barriers.[58] Reflecting this trend, countries around the world are accelerating the development and integration of diverse unmanned assets with varying capabilities and roles, making them indispensable components in preparation for future conflicts.

Against this backdrop, the U.S. Air Force (USAF) is advancing its Collaborative Combat Aircraft (CCA) program as a concrete effort to realize manned-unmanned teaming,[59] wherein manned and unmanned aircraft operate in coordination to execute shared missions. In this concept, AI-equipped unmanned aircraft operate in formation with manned platforms to perform tasks such as ISR, electronic warfare, and fire support. The unmanned assets shoulder a wide range of roles—including decoys and saturation operations—which reduces structural dependence on personnel and contributes to the creation of a sustainable force structure.[60] Through this approach, new forms of aerial combat involving integrated operations between manned and unmanned aircraft are being explored.

In recent years, advances in AI have significantly enhanced the tactical potential of unmanned systems. Under the Air Combat Evolution program jointly promoted by the USAF and the Defense Advanced Research Projects Agency, Shield AI's Hivemind AI has been installed on the X-62A VISTA, demonstrating maneuverability equivalent to that of experienced pilots in simulated air-to-air combat scenarios.[61] This indicates that AI may soon be capable of making tactical decisions in real combat environments, and it reflects steady technological progress toward such realization.[62] While these technological demonstrations are advancing, the USAF has already designated the CCA as a core component of its future airpower. In addition to the FY2025 defense budget, supplementary proposals submitted by the Republican Party also specify CCA-related development and procurement as high-priority investment areas.[63] These initiatives strongly indicate that unmanned assets will play a central role in future air operations, and their development and deployment are expected to accelerate further.

These developments are not an exception for Japan. In recent years, the vulnerability of runways themselves has come into sharp focus.[64] The USAF has been promoting the Agile Combat Employment concept, which seeks to avoid reliance on large fixed bases by enabling dispersal and rapid deployment.[65] As precision-guided munitions pose an increasing risk of rendering major runways unusable in a short period of time, Japan must also consider the introduction of runway-independent platforms—such as vertical take-off and landing-type unmanned aircraft and air-launched drones—as well as operational concepts that enable aircraft to be deployed and sustained by a minimal number of personnel. These approaches are highly meaningful from the perspective of reducing human attrition and ensuring responsiveness.

The use of unmanned assets is also designated as a priority in Japan's National Defense Strategy, and their deployment and operational expansion are steadily progressing. Notably, unmanned systems have proven their relevance not only in wartime but also in peacetime. As mentioned above, China's unmanned ISR operations have become increasingly routine. Responding to such activities with manned aircraft imposes a continuous operational burden and creates an asymmetric cost structure. For missions such as persistent peacetime surveillance and the defense of national airspace, the effective use of unmanned assets offers a realistic means of maintaining necessary deterrence while reducing manpower requirements and overall costs.

Going forward, it is essential to position the utilization of unmanned systems as an integral part of force design, based on actual operational environments. Such an approach should be strategically promoted as a framework for both enhancing defense capabilities and optimizing the human resource base.

KEY FINDINGS

The analysis in this section leads to the following strategic findings regarding the structural challenges facing the JSDF's human resource base:

1. **Demographic decline is not a future risk, but an ongoing constraint.** Japan's rapidly aging society and declining youth population are already severely limiting the JSDF's ability to recruit personnel. This is no longer a future concern but a structural constraint in effect today. This challenge is not limited to the JSDF but reflects a broader issue facing Japanese society as a whole.

2. **Maintaining current authorized strength levels is becoming increasingly unrealistic.** As Japan faces a continued decline in its youth population and increasing diversification in work styles, manpower constraints are becoming more acute. Adjusting authorized strength to reflect actual personnel availability is essential to ensure the sustainability of force readiness.

3. **Further advancement of labor-saving and unmanned capabilities is an inevitable and forward-looking strategic choice.** As quantitative personnel acquisition becomes increasingly difficult, the flexible employment of emerging technologies such as AI and UAVs will form the core of future deterrence and response capabilities. This shift represents not a reduction in capability but a structural transformation toward maintaining and enhancing operational effectiveness while rationally reducing human dependency.

4. **International examples are informative, but Japan must craft an institutionally tailored and feasible strategy.** Cases such as the U.K.'s force compacting and South Korea's "Defense Innovation 4.0" provide useful insights. However, Japan must develop its own strategy that reflects its unique institutional, legal, and cultural constraints and enables phased and realistic implementation.

Reframing force design through labor-saving and unmanned capabilities

This section outlines a new direction for Japan's defense development, considering demographic constraints and the growing reliance on unmanned systems, by proposing labor-saving and unmanned approaches aimed at supporting the recalibration of personnel strength. This is not a call to reduce personnel, but to flexibly adjust authorized strength in line with actual staffing—while considering mission requirements and budgeting constraints—to better utilize limited human resources and ensure sustainability.

As of March 2025, the JASDF had an authorized strength of 47,007 and an actual strength of 42,608—a fulfillment rate of 90.6%. If current initiatives like improved treatment and lower attrition yield results, and operational performance is maintained, it may be reasonable to revise the authorized strength to a midpoint—around 45,000. This adjustment, implemented in phases over the next decade alongside labor-saving and unmanned capability development, would reflect a realistic approach to force structure.

This recalibration would reduce the gap between authorized and actual strength, ease burdens on personnel, and support better retention and organizational appeal. At the same time, distinguishing between essential missions for uniformed personnel and those that can be outsourced will be crucial to focus limited manpower on core duties.

Implementing these personnel reforms requires investment in equipment, training, and operational systems. Because such transitions take time, early and deliberate action is essential.

These reforms should extend beyond the JASDF. The entire JSDF must pursue labor-saving and unmanned innovations, including structural redesign. While current defense policy emphasizes seven core capability areas, labor-saving and unmanned systems should also be recognized as a strategic pillar, supported institutionally and financially.

Future defense programs should be assessed for their contribution to labor efficiency. In parallel, institutional designs should be restructured based on a leaner personnel model.

With rapid advances in AI and unmanned technologies, the JSDF should actively evaluate and adopt proven practices from advanced militaries like the United States. These efforts will not only enhance performance but also improve the JSDF's appeal as a modern, adaptive force. This section presents five illustrative initiatives to support the proposed restructuring of personnel strength through labor-saving and unmanned approaches. While not comprehensive, they offer a starting point for broader discussion and may be adapted to areas such as force integration, equipment systems, and personnel policies.

1. OPTIMIZATION OF MANNED AIRCRAFT NUMBERS THROUGH A FORCE STRUCTURE CENTERED ON UNCREWED SYSTEMS

In the United States, the introduction of CCA, designed to operate in coordination with F-35 and F-22 fighter jets, has entered full-scale development. In 2024, two prototypes—the YFQ-42A by General Atomics and the YFQ-44A by Anduril—were selected for further development (see Figure 5). These aircraft are expected to enter initial operational capability around 2030, with eventual procurement plans envisioning up to 1,000 platforms.[66]

FIGURE 5

Concepts of the collaborative combat aircraft

Source: Artwork excerpted from the USAF official website[67]

In Japan, development is also underway on an unmanned aerial vehicle which will collaborate with the next-generation fighter aircraft, with a target deployment around 2035. Technical studies on manned-unmanned teaming (MUM-T) operations have already begun, alongside efforts to develop AI-based flight control and simulation technologies. While Japan's approach differs from that of the United States, the direction is aligned in its emphasis on integrating unmanned assets through the MUM-T concept—opening the door to future cooperation in technical development.

Positioning CCAs and similar unmanned assets as core elements of the future force structure would help Japan both enhance its defense capabilities and achieve labor-saving effects. If such platforms are effectively applied not only to wartime missions but also to peacetime operations such as airspace or Air Defense Identification Zone violation response (scrambles), they could significantly reduce the personnel and financial burden on the JASDF. In fact, the USAF's CCA designs are expected to reduce the workload of both pilots and maintenance crews.[68] Taking into account the recent evolution of warfare, if the currently planned increase of approximately 30 manned fighter aircraft can be offset through rationalization enabled by CCAs—thus reallocating scarce human resources to other critical functions—this would directly contribute to relieving pressure on personnel and budgets.

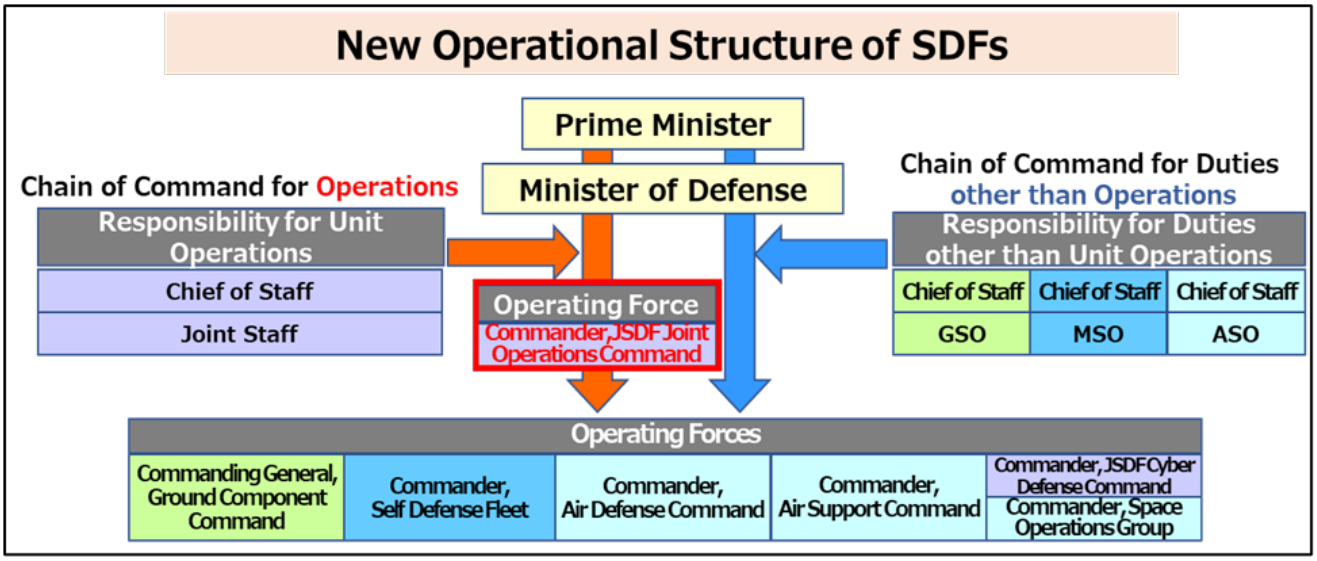
Moreover, particularly in times of contingency, the risk of attacks on bases and runways during the initial phase of conflict has become increasingly apparent. In this context, the utilization of runway-independent unmanned assets is also considered a promising option for enhancing the sustainability of defense capabilities.[69] Platforms capable of distributed operations and austere field deployment can serve as effective means of generating operational power even under constraints in manpower and physical resources.

On the other hand, the introduction of CCA is also expected to generate new personnel requirements. For example, maintenance personnel will still be needed, and the burden on personnel in data analysis and communications is also expected to increase. Additionally, there is growing recognition that personnel with cross-functional skills beyond traditional occupational categories will be necessary. In the USAF, there are discussions about having individuals take on multiple roles such as analysis, intelligence, maintenance, and piloting.[70] In this sense, CCA eliminates the need for a pilot, but does not necessarily reduce the burden on other roles. Rather than eliminating human involvement altogether, it is more realistic to understand that the nature of human roles will be restructured.

Nonetheless, the introduction of unmanned assets such as CCA remains essential—not only due to Japan's operational and strategic rationale, but also in terms of minimizing human attrition and optimizing sustainment and operational costs. As the emphasis in warfare continues to shift from manned to unmanned systems, positioning such assets as a central element of the future force structure is highly meaningful for enhancing sustainability and efficiency. At the same time, to achieve truly effective labor-saving outcomes, it is essential to combine these efforts with a reconfiguration of the human resource base—including operators, maintainers, and support personnel—to maximize the benefits of their introduction.

FIGURE 6

Operational System of the JSDF and the JSDF Joint Operations Command



Source: Excerpt from the Defense of Japan White Paper

2. STREAMLINING AND OPTIMIZING COMMAND STRUCTURE

With the establishment of the JSDF Joint Operations Command (JJOC), Japan has begun to strengthen its joint operational command and enhance its ability to conduct combined operations with the United States (see Figure 6).

At the same time, while the existing service-specific command structures remain in place, the addition of the JJOC, highlighted in red in the figure, has introduced a new command node. As a result, from peacetime through contingencies, ensuring timely situational awareness and decisionmaking will require the streamlining and optimization of this structure—an increasingly important issue going forward.

In the JASDF, for instance, the Air Defense Command (ADC), under the authority of the joint operations commander, is tasked with air combat operations.[71] Four regional air defense force headquarters are subordinate to ADC to ensure effective responses to airspace incursions.[72] While redundancy and backup functionality across commands remain critical in contingency scenarios or large-scale disaster response, evolving security dynamics and growing personnel constraints suggest that the current command structure warrants reevaluation.

Against this backdrop, the MOD formulated the Ministry of Defense Basic Policy on Promoting the Utilization of AI (commonly known as the MOD AI Strategy) in July 2024, designating seven priority areas for AI applications, including command and control.[73] The policy promotes the use of AI to generate action plans, support targeting, and accelerate information analysis and assessment in increasingly complex and fast-paced operational environments. These measures aim to reduce the burden on personnel while enhancing decisionmaking.

Reports by institutions such as the RAND Corporation have similarly suggested that replacing repetitive and structured tasks with AI can improve both efficiency and responsiveness.[74] Given personnel limitations, it is essential to redeploy human resources as core assets where they are most needed. In the case of JASDF regional commands, maintaining their function and operational relevance while streamlining workflows and roles would be a realistic path forward.

The integration of AI into command restructuring initiatives represents a phased and pragmatic approach to improving labor efficiency and organizational optimization, without compromising command effectiveness or flexibility. These efforts are in line with the MOD AI Strategy. As personnel constraints intensify, leveraging advanced technologies such as AI to streamline and optimize command structure will be an indispensable strategic adaptation for the JSDF. Moreover, the application of AI should not be limited to the command structure; it should also be considered for all applicable units across the force going forward.

3. THE MULTI-SKILLING OF PERSONNEL

The USAF is advancing the Agile Combat Employment (ACE) concept,[75] which emphasizes dispersal and rapid deployment to reduce reliance on large, fixed bases. In Japan as well, the Defense Buildup Program identifies the need to establish a framework enabling flexible, dispersed operations at each base to enhance the JASDF's resilience and operational continuity.[76]

The JASDF's current personnel system is based on highly specialized occupational fields (tokugi), with personnel assignments and promotions largely determined by the specialty selected during initial training.[77] To support such operations with limited manpower, a flexible organizational structure is essential, making the multi-skilling of personnel (i.e., equipping personnel with competencies beyond their primary specialty) an increasingly critical initiative.

For example, if tasks such as aircraft maintenance, refueling, facility management, transport, and security can be executed by cross-functional personnel under the supervision of specialists, then operational capabilities can be maintained with a smaller footprint. This would not only contribute to a reduction and rationalization of personnel requirements but also enhance unit responsiveness and self-sufficiency—maximizing the operational value of limited human resources.

That said, the development of such multi-capable personnel is recognized—even within the USAF—as one of the most challenging initiatives to implement. While the concept has been promoted under the Multi-Capable Airmen (MCA) initiative, institutionalization has faced obstacles. For instance, while Pacific Air Forces (PACAF) actively promote MCA as part of their ACE posture, United States Air Forces in Europe – Air Forces Africa has adopted a more cautious stance due to concerns over skill dilution and increased training burdens.[78] "PACAF Strategy 2030" clearly states that continued investment in leadership education, technical training, and advanced exercises is essential for MCA development—indicating its institutional prioritization.[79] Such divergent approaches highlight the complexities of embedding MCA into force structure, and underscore concerns about cultural resistance, loss of specialization, and underdeveloped training systems.

To address these challenges, the USAF introduced an MCA training framework in 2023. This system integrates foundational training—such as Ready Airman Training—with cross-utilization instruction and occupational-specific modules.[80] In March 2024, the 29th Aircraft Maintenance Unit at Holloman Air Force Base launched MCA training programs that allow personnel to acquire foundational skills across multiple career fields, signifying a step toward selective and phased implementation.[81]

Within the ACE concept, MCA is valued as a key enabler of flexibility, responsiveness, and self-sustainment. However, the U.S. experience illustrates that a phased and pragmatic approach is essential for success.

As discussed above, promoting multi-skilling among personnel is one of the most challenging reforms to implement. To institutionalize this initiative, it is essential not only to establish a structured training system but also to foster an organizational culture that treats multi-skilling as a fundamental competency for JASDF personnel. Although the JASDF does not maintain a global posture like the USAF, the implementation of multi-skilling remains challenging, given the enduring influence of Japan's occupational specialization system. Overcoming friction with the traditional culture of occupational specialization requires sustained and proactive engagement by commanders and other leaders at all levels.

In addition to establishing an appropriate education and training system, it is essential to position multi-skilling as a foundational competency for JASDF personnel and to cultivate an organizational culture that supports its development. Since the current occupational specialty system and training framework are not designed with such an approach in mind, it will also be necessary to provide appropriate incentives—such as evaluation, promotion, assignment, and allowances—for those undertaking multi-skilled roles.

Accordingly, the introduction of multi-skilling should not be carried out uniformly or immediately. Instead, it should be implemented in a phased and selective manner, tailored to the nature of missions, unit operations, and organizational culture. By ensuring both institutional support and operational flexibility, this effort has the potential to become a highly effective measure for sustaining force readiness and enhancing mission execution capability.

4. ENHANCING BASE DEFENSE FUNCTIONS THROUGH ADVANCED TECHNOLOGIES

JASDF bases serve as the foundation for generating operational capabilities and house high-value assets such as aircraft and radar sites, making the impact of any attack on them particularly severe. The JASDF maintains approximately 70 bases and subordinate installations across the country and undertakes base security missions such as perimeter patrols, access control, and suspicious object response on a 24-hour basis—an area characterized by a high personnel burden.

In addition, the emergence of new threats, such as reconnaissance by small unmanned aerial vehicles and swarm drone incursions, has posed increasing challenges to base defense. The previously mentioned Ukrainian drone attack on Russian strategic bombers further highlighted the vulnerability of aircraft while on the ground, underscoring the need to strengthen defensive measures against such evolving threats. Against this backdrop, along with advancements in unmanned assets and AI, base security has come to be regarded as an area warranting urgent modernization and early fielding of advanced technologies. As this is also a domain where labor-saving effects are anticipated, various militaries have been pursuing initiatives to reduce the number of personnel required for base protection.

For example, the USAF has initiated research on utilizing autonomous security robots for interior perimeter patrols,[82] and studies suggest that the use of AI-powered image analysis could potentially reduce the workload of personnel engaged in direct visual monitoring by up to approximately 75%.[83]

Furthermore, in response to emerging threats such as drone swarms, high-power microwave (HPM) weapons have attracted attention as a potential countermeasure. HPM systems possess a "one-to-many" capability, enabling the simulta-

neous neutralization of multiple targets, and are considered to have potential as a cost-effective means of responding to such threats with relatively limited personnel.[84]

According to the MOD's FY2025 budget, initiatives such as the testing of remote surveillance systems for garrison security are currently underway.[85] For the JASDF as well, it will become increasingly important to establish posture through autonomous patrols using ground robots and aerial drones, the deployment of all-weather surveillance cameras and infrared sensors, and the construction of AI-based alert systems to detect abnormalities. In addition, for countering threats such as drone swarms, consideration should be given to equipping both non-kinetic systems, such as HPM and laser weapons, and conventional kinetic means, in a manner that enables an effective response with minimal personnel.

Nevertheless, it must be noted that compromising the actual effectiveness of base security would be counterproductive; hence, human involvement remains essential for final judgment and contingency response. It is necessary to establish optimal coordination frameworks between personnel, AI, and unmanned systems.

Moreover, the introduction of advanced technologies such as drones and HPM entails the acquisition of new technical skills and could lead to an increase in personnel requirements. This highlights the importance of pursuing parallel efforts in multi-skilling JASDF personnel and advancing education and training. As such, capability enhancement in base defense through advanced technologies should not be understood as a mere reduction of personnel, but rather as a strategic realignment of valuable human resources to mission-essential areas.

Taking these technological trends into account, the JASDF should promote the phased introduction of unmanned and automated systems in base defense, particularly in areas with a high personnel burden and in domains where technical maturity allows for realistic near-term implementation. This should be accompanied by ongoing verification and evaluation to gradually expand the scope of application.

5. OPTIMIZING THE NUMBER OF TRAINING AIRCRAFT THROUGH SIMULATION-DRIVEN REFORM

The JASDF currently operates approximately 200 domestically produced T-4 jet trainer aircraft, which are used for pilot training as well as for aerobatic missions such as the Blue Impulse demonstration team. However, more than 35 years have passed since the T-4 was introduced in 1988, and the platform is rapidly aging. The Defense Buildup Program explicitly states the need to upgrade the flight training and exercise environment, particularly to accommodate next-generation aircraft such as the F-35.

In the 2024 Japan-U.S. Joint Leaders' Statement, the two governments also announced their intention to pursue opportunities for joint development and production of a next-generation trainer aircraft.[86] This area is thus becoming increasingly important in the context of deepening Japan-U.S. defense industrial cooperation. Accordingly, Japan must carefully consider the institutional and technical requirements for such a bilateral effort.

Looking ahead, Japan's training system should be fundamentally redesigned through digital transformation, including the application of virtual reality (VR) and augmented reality (AR) technologies. These systems can replicate flight environments virtually, enabling safe, efficient, and effective ground-based training. When combined with high-performance simulators, they are expected to reduce reliance on live-flight hours while maintaining training quality, improving aircraft availability, and easing the maintenance burden.

If parts of traditional flight training can be substituted with VR/AR and advanced simulators, it would reduce both personnel and component

demands, potentially allowing for a rationalization of the number of trainer aircraft to be acquired. The procurement of new trainer aircraft should be aligned with a restructured training system, enabling simultaneous optimization of both equipment acquisition and human resource utilization.

This reform would serve as a strategic measure to balance operational readiness, cost-efficiency, and labor-saving—contributing to the sustainability of the JASDF's training infrastructure in the decades to come.

Conclusion

As Japan's security environment becomes increasingly serious and operational demands grow, the idea of rationalizing the personnel base and reorganizing force structures may appear, at first glance, contradictory. However, maintaining the current posture without securing the necessary personnel due to structural constraints on human resources may, in fact, undermine the effectiveness of deterrence and response. It could also undermine the trust of Japan's only formal ally, the United States, as well as that of like-minded countries and other partners. Therefore, efforts toward labor-saving and unmanned approaches—including force structure reform—should be understood not as retrenchment, but as forward-looking strategic adaptations that rationally reduce dependence on human personnel while protecting and empowering those who serve. It is, in essence, an evolution.

That said, as such efforts progress, growing risks associated with centralized information systems, cyber vulnerabilities, and reliance on networked communications must not be overlooked. As AI-enabled tactical decisionmaking and autonomous operations continue to expand, institutional and ethical frameworks governing their use will also need to be developed.

To advance these efforts, in addition to joint training with the United States and other partners, bilateral and multilateral cooperation in emerging technologies—such as unmanned systems and AI—will be essential. Such cooperation presents not only opportunities to reduce personnel burdens and improve cost-effectiveness, but also strategic opportunities to strengthen shared technological foundations. In particular, working with both advanced economies facing demographic decline and emerging countries with comparatively ample human resources will enable mutual complementarity in capabilities, technology, and operational concepts. These forms of collaboration can enhance the sustainability and flexibility of Japan's defense posture, while also contributing to the development of a multilayered structure of deterrence and stability in the Indo-Pacific.

The impacts of population aging and human resource constraints are not limited to the Ministry of Defense or the Japan Self-Defense Forces. They extend across government agencies, private industry, and Japanese society. For this reason, Japan must pursue labor-saving and unmanned approaches as a broader national effort to ensure institutional resilience.

Fundamentally strengthening defense capability from a personnel perspective does not mean simply gathering more people; rather, it means shifting to a force design that can be sustained and strengthened even as the number of personnel declines. If we postpone addressing personnel challenges, we cannot deny the risk that the effectiveness of our defense capabilities will be undermined in the medium to long term.

Although changes in the personnel base may appear gradual, their effects are irreversible and accumulate over time. Once the impact becomes visible, the range of available options will be limited.

That is precisely why beginning to think about these issues now is the first step toward ensuring flexibility in the future.

Endnotes

1 "National Defense Strategy," (Tokyo: Japan Ministry of Defense, December 16, 2022), 23-28, https://www.mod.go.jp/j/policy/agenda/guideline/strategy/pdf/strategy_en.pdf.

2 "Labor-saving" refers to efforts to suppress the number of personnel required for mission execution—while maintaining operational effectiveness—through measures such as innovations in equipment and operations, the streamlining of work processes, and the optimization of personnel deployment.

3 "Unmanned" refers to efforts to substitute or automate tasks traditionally dependent on human labor using advanced technologies such as unmanned systems and artificial intelligence. Unmanned capabilities are not only a powerful means of achieving labor savings but also offer distinct tactical value by enabling operations that reduce human risk and enhance operational flexibility and responsiveness.

4 The term "labor-saving and unmanned" is frequently used in an integrated and parallel manner in official policy documents issued by the Ministry of Defense, and this paper adopts that usage in its discussion. While the two are treated as a unified concept, the paper also addresses the specific characteristics and strategic potential of unmanned technologies as appropriate.

5 BZK-005 is a medium-altitude, long-endurance UAV developed by China for strategic ISR missions. It has been frequently observed operating in the East China Sea and is capable of extended-range surveillance. See "BZK-005 Chang Ying/Long Eagle," GlobalSecurity.org, accessed May 8, 2025, https://www.globalsecurity.org/military/world/china/bzk-005.htm.

6 WZ-7 "Soar Dragon" (Xianglong) is a high-altitude, long-endurance UAV designed for wide-area ISR missions. With its distinctive joined-wing design, it serves as a strategic platform for monitoring maritime and regional activities across the Western Pacific. See "Xianglong/Flying Dragon/WZ-7," GlobalSecurity.org, accessed May 8, 2025, https://www.globalsecurity.org/military/world/china/xianglong.htm.

7 The WL-10 is a high-altitude, long-endurance UAV developed by China, believed to be capable of reconnaissance and electronic warfare missions. It was confirmed by Japan's Ministry of Defense to have flown over the East China Sea, prompting a scramble response by the JASDF. See Joint Staff Press Release, Japan Ministry of Defense, May 27, 2020, https://www.mod.go.jp/js/pdf/2024/p20240527_01.pdf.

8 The GJ-2 (Wing Loong II) is a medium-altitude, long-endurance UAV developed by China for surveillance and strike missions. It was confirmed by Japan's Ministry of Defense to have flown through the airspace between Okinawa and Miyako Islands, prompting a scramble by the JASDF. Joint Staff Press Release, Japan Ministry of Defense, February 26, 2020, https://www.mod.go.jp/js/pdf/2025/p20250226_01.pdf.

9 Y-9 is a medium transport aircraft developed by China, with several variants configured for electronic intelligence, signals intelligence, and surveillance missions. The Y-9GX series has become increasingly active in the airspace near Japan. "Shaanxi Y-9 (Yun-9)," GlobalSecurity.org, accessed May 8, 2025, https://www.globalsecurity.org/military/world/china/y-9.htm.

10 "Regarding Airspace Violations by Chinese Aircraft," Japan Ministry of Defense, August 26, 2024, https://www.mod.go.jp/j/press/news/2024/08/26d.html.

11 "Regarding Airspace Violations by Ship-based Helicopters," Japan Ministry of Defense, May 3, 2025, https://www.mod.go.jp/j/press/news/2025/05/03a.html.

12 The J-15 is a carrierbased multirole fighter developed by China, operating from People's Liberation Army (PLA) Navy aircraft carriers and capable of both air superiority and strike missions. "J-15 Flying Shark (Jianjiji-15 Fighter aircraft 15) / F-15," GlobalSecurity.org, accessed June 23, 2025, https://www.globalsecurity.org/military/world/china/j-15.htm.

13 P-3C is a maritime patrol and antisubmarine warfare aircraft operated by the Japan Maritime SelfDefense Force, equipped with advanced sensors for surveillance, submarine detection, and C4ISR. "P-3C Orion Maritime Patrol Aircraft," GlobalSecurity.org, June 23, 2025, https://www.globalsecurity.org/military/world/japan/p-3c.htm.

14 The JH-7, also known as "Flying Leopard," is a twin-engine fighter-bomber developed by China, primarily used by the PLA Air Force and Navy for maritime strike and interdiction missions. "JH-7 [Jianhong Fighter-Bomber] [FB-7] / FBC-1," GlobalSecurity.org, July 15, 2025, https://www.globalsecurity.org/military/world/china/jh-7.htm.

15 The YS11 is a twin-turboprop airliner developed by Japan's Nihon Aircraft Manufacturing Corporation in the 1960s. Its electronic intelligence variant, the YS11EB, is used by the JASDF for electronic intelligence missions. "NAMC YS11," Aircraft Recognition Guide, accessed July 17, 2025, https://aircraftrecognitionguide.com/namc-ys-11.

16 "Regarding the unusual approach of a Chinese military aircraft toward a JSDF aircraft," Japan Ministry of Defense, July 10, 2025, https://www.mod.go.jp/j/press/news/2025/07/10a.html.

17 "North Korea's dispatch of troops and weapons to Russia has had an economic impact of 2.8 trillion yen, equivalent to six years' worth of food, according to a report by the Korea Institute for Defense Studies," Chosun Ilbo, April 9, 2025, https://www.chosunonline.com/site/data/html_dir/2025/04/09/2025040980034.html.

18 "Annual Threat Assessment of the U.S. Intelligence Community," (Washington, DC: Office of the Director of 11National Intelligence, March 2025), 6-11, 16-18, 26-28, https://www.dni.gov/files/ODNI/documents/assessments/ATA-2025-Unclassified-Report.pdf.

19 "National Security Strategy of Japan," (Tokyo: Government of Japan, December 2022), 20, https://www.cas.go.jp/jp/siryou/221216anzenhoshou/nss-e.pdf.

20 "2025 Defense of Japan (Digest)," (Tokyo: Japan Ministry of Defense, 2025), 3, https://www.mod.go.jp/j/press/wp/wp2025/pdf/DOJ2025_Digest_EN.pdf.

21 The Global Combat Air Program is a trilateral joint development initiative between Japan, the United Kingdom, and Italy to produce a next-generation fighter aircraft—often referred to as a sixth-generation platform—by around 2035. The program aims to integrate advanced stealth capabilities, sensor fusion, artificial intelligence, and manned-unmanned teaming. "Defense Buildup Program," (Tokyo: Japan Ministry of Defense, December 16, 2022), 34, https://www.mod.go.jp/j/policy/agenda/guideline/plan/pdf/program_en.pdf.

22 Population Estimates as of January 1, 2024 (Preliminary Report)," Statistics Bureau of Japan, January 2024, https://www.stat.go.jp/data/jinsui/2024np/index.html.

23 The total fertility rate (TFR) refers to the average number of children a woman is expected to have over her lifetime, based on current age-specific fertility rates. A TFR of approximately 2.1 is considered the replacement level needed to maintain a stable population. In Japan, the TFR declined from 1.37 in 2008 to 1.15 in 2024, indicating a structural demographic contraction. For the latest fertility rate, see "令和 6 年(2024) 人口動態統計月報年計(概数) の概況" [Vital Statistics of Japan: Final Data for 2024], Japan Ministry of Health, Labour and Welfare, May 2025, https://www.mhlw.go.jp/toukei/saikin/hw/jinkou/geppo/nengai24/dl/gaikyouR6.pdf.

24 "Actual strength" (Gen'in) refers to the number of personnel currently employed and assigned to the JSDF. This reflects the real, operational manpower available, and often falls short of the authorized strength due to factors such as recruitment shortfalls or mid-career attrition.

25 The term "authorized strength" (Teiin) refers to the maximum number of personnel legally permitted to be maintained by the Japan Self-Defense Forces (JSDF). This is stipulated in Article 6 of the Ministry of Defense Establishment Act and is determined annually through defense budget planning.

26 Unlike many Western militaries, the Japan Self-Defense Forces does not use the term "non-commissioned officer" (NCO) as a formal category. However, the sō (upper enlisted) ranks are legally recognized under the Self-Defense Forces Law and are institutionally equivalent to NCOs, performing supervisory duties, guiding shi (lower enlisted) personnel, and supporting commissioned officers. Together with commissioned officers, they form the backbone of unit leadership and operations.

27 "National Defense Strategy," 35.

28 General candidates for enlistment (upper) (Ippan-sō Kōhosei): This is a fixed-term enlisted program in the Japan Self-Defense Forces, designed to train future non-commissioned officers. Recruits—typically high school graduates—undergo initial training and serve in operational units, with opportunities for promotion to the "Sō" (NCO) rank based on performance and examination results. The program serves as a primary entry point for long-term enlisted service and leadership development.

29 Candidates for uniformed JSDF personnel (Jieikan Kōhosei): This former category referred to recruits enlisted for short-term service, primarily assigned to general duties after basic training. While it offered an accessible entry route, candidates were not granted full SDF status upon recruitment and received lower initial pay than in other public-sector roles. Due to declining recruitment and institutional limitations, the system is scheduled to be abolished starting in FY2026. It will be replaced by a new framework that offers full status and improved compensation from day one.

30 "第 3 回 自衛官の処遇・勤務環境の改善及び新たな生涯設計 の確立に関する関係閣僚会議" [Third Ministerial Meeting on Improvements to the Working Environment and Career Development for SDF Personnel: Reference Materials], December 19, 2024, 3, https://www.cas.go.jp/jp/seisaku/jieikan/gijisidai/dai3/siryou.pdf.

31 National Defense Academy Students (Bōei Daigakkō Gakusei): These are full-time undergraduate cadets enrolled at Japan's National Defense Academy (NDA), a four-year institution operated by the Ministry of Defense. The NDA provides academic education, physical training, and leadership development to prepare cadets for commissioning as officers in the Japan Self-Defense Forces. The institution is

broadly comparable in structure and function to U.S. service academies such as the U.S. Air Force Academy or West Point.

32 Officer Candidates (Ippan Kanbu Kōhosei): These are university graduates who enter the JSDF through a competitive examination and undergo officer training at a designated officer candidate school. This pathway is comparable to the U.S. Air Force's Officer Training School, which commissions officers from both civilian applicants and prior enlisted personnel.

33 Aviation Cadets (Kōkū Gakusei) are enrolled in a specialized flight training program designed to train future pilots and aviation officers in the Japan Air or Maritime Self-Defense Forces. The program typically spans approximately six years, during which cadets receive comprehensive flight instruction, academic education, and leadership development. Upon successful completion, they are commissioned as officers, typically holding the rank of second lieutenant or ensign. This pathway is roughly comparable to the U.S. Air Force's Undergraduate Pilot Training or the U.S. Navy's Naval Flight Officer program.

34 Third Ministerial Meeting," 3-4.

35 "資料2: 経験・知識のある人材の活用に関する施策について" [Document 2: Fundamental Examination on Defense Buildup Plan], (Tokyo: Military of Defense, May 2023), 6, https://www.mod.go.jp/j/policy/agenda/meeting/kiban/pdf/20230531_02.pdf; "資料4-2: 防衛力の抜本的強化に関する有識者会議 [Expert Panel on the Drastic Reinforcement of Defense Capabilities, Document 4-2] (Tokyo: Ministry of Defense, January 2025), 5, https://www.mod.go.jp/j/policy/agenda/meeting/drastic-reinforcement/pdf/siryo04_02.pdf; "Defense of Japan 2024," (Tokyo: Ministry of Defense, September 2024), 67, https://www.mod.go.jp/j/press/wp/wp2024/html/ns067000.html.

36 "Document 2: Fundamental Examination on Defense Buildup Plan, 11."

37 "第213回国会 予算委員会 第7号 会議録" [Record of the 213th Diet Budget Committee, No. 7], National Diet Library, April 11, 2024, https://kokkai.ndl.go.jp/simple/dispPDF?minId=121303815X-00720240411#page=17.

38 Reserve personnel in the Japan Self-Defense Forces are part-time members who undergo limited annual training and can be mobilized primarily during emergencies, natural disasters, or to support specific missions. Unlike reserve forces in the U.S. military, Japan's reserve personnel are not regularly integrated into active-duty units and do not maintain continuous combat readiness, though they are expected to respond when called upon.

39 "Raising of the Retirement Age for Self-Defense Force Personnel," Japan Ministry of Defense, September 20, 2024, https://www.mod.go.jp/j/press/news/2024/09/20b.html.

40 "防衛省の職員の給与等に関する法律の一部を改正する法律案" [Amendment to the Act on Salaries of Ministry of Defense Personnel], Japan Ministry of Defense, December 9, 2024, https://www.mod.go.jp/j/presiding/houan/pdf/216_20241209/01.pdf.

41 "第 5 回 自衛官の処遇・勤務環境の改善及び新たな生涯設計 の確立に関する関係閣僚会議" [The 5th Meeting of the Inter-Ministerial Council on Improving the Treatment and Working Conditions and Establishing New Career Paths for SDF Personnel], Prime Minister's Office (Japan), June 10, 2025, 6-7, https://www.cas.go.jp/jp/seisaku/jieikan/gijisidai/dai5/siryou.pdf.

42 "年住民基本台帳人口移動報告 (要約)" [Annual Resident Register-Based Internal Migration Report (Summary)], Statistics Bureau of Japan, 2023, https://www.stat.go.jp/data/idou/2023np/jissu/youyaku/index.htm.

43 "White Paper on Information and Communications in Japan," (Tokyo: Ministry of Internal Affairs and Communications, 2015), 2, https://www.soumu.go.jp/main_content/000452793.pdf.

44 "国民生活に関する世論調査" [Public Opinion Survey on the Life of the People], Government of Japan Cabinet Office, November 2023, https://survey.gov-online.go.jp/r05/r05-life/.

45 "Securing Britain in an Age of Uncertainty: The Strategic Defence and Security Review," (London: Government of the United Kingdom, October 2010), https://assets.publishing.service.gov.uk/media/5a-78da21ed915d0422065d95/strategic-defence-security-review.pdf.

46 Ibid., 26.

47 "RAF to Protect European Skies on NATO's Eastern Flank," ASDNews, April 3, 2025, https://www.asdnews.com/news/defense/2025/04/03/raf-protect-european-skies-natos-eastern-flank.

48 "Population Projections for Korea," KOSIS, accessed March 4, 2025, https://kosis.kr/eng/.

49 "2022 Defense White Paper," (Seoul: Ministry of National Defense, 2023), 47-49. https://www.mnd.go.kr/user/mndEN/upload/pblictn/PBLICTNEBOOK_202307280406156170.pdf.

50 "South Korea's fertility rate to rise for the first time in nine years to 0.75 in 2024, but remains the world's lowest," Bloomberg, February 27, 2025, https://www.bloomberg.co.jp/news/articles/2025-02-27/SS9X6DT0G1KW00.

51 "National Defense Strategy," 23-28.

52 "強制労働の禁止と兵役義務" [Prohibition of Forced Labor and the Constitutionality of Military Service] (Tokyo: National Diet Library, November 2021), https://dl.ndl.go.jp/view/download/digidepo_11884862_po_085102.pdf?contentNo=1.

53 The Bayraktar TB2 is a medium-altitude long-endurance unmanned combat aerial vehicle developed by Turkey. It is capable of precision strikes using laser-guided munitions and has been widely used in asymmetric warfare.

54 The IAI Harop, developed by Israel Aerospace Industries, is a loitering munition (or "suicide drone") designed to identify and destroy enemy air defense assets by autonomously diving into targets once detected.

55 Shaan Shaikh and Wes Rumbaugh, "The Air and Missile War in Nagorno-Karabakh: Lessons for the Future of Strike and Defense," (Washington, DC: Center for Strategic and International Studies, December 8, 2020), https://www.csis.org/analysis/air-and-missile-war-nagorno-karabakh-lessons-future-strike-and-defense.

56 Samuel Cranny-Evans, "As small drones shape how we fight, is the British Army ready to face them?" Royal United Services Institute, July 21, 2022, https://www.rusi.org/explore-our-research/publications/commentary/small-drones-shape-how-we-fight-british-army-ready-face-them.

57 Tom Balmforth and Milan Pavicic, "Satellite imagery shows Ukraine attack destroyed, damaged Russian bombers," Reuters, June 3, 2025, https://www.reuters.com/business/aerospace-defense/satellite-imagery-shows-ukraine-attack-destroyed-damaged-russian-bombers-2025-06-03/.

58 "Unleashing U.S. Military Drone Dominance," (Washington, DC: U.S. Department of Defense, July 10, 2025), https://static.foxnews.com/foxnews.com/content/uploads/2025/07/unleashing-u.s.-military-drone-dominance-osd006689-25-res-final.pdf.

59 The concept of Manned-Unmanned Teaming—in which manned and unmanned aircraft operate in coordination to execute missions such as ISR, electronic warfare, and strike—is formally articulated in the U.S. Air Force's Air Force Future Operating Concept. This document outlines how AI-enabled unmanned systems are expected to complement manned fighters under future force design. See "Air Force Future Operating Concept," U.S. Department of the Air Force, September 2015, https://www.af.mil/Portals/1/images/airpower/AFFOC.pdf.

60 The CCA program is a U.S. Air Force initiative to operationalize manned-unmanned teaming concepts through AI-enabled uncrewed aircraft. The program represents a key example of how unmanned systems are being positioned to play a central role in future combat airpower.

61 Hivemind is an AI flight autonomy system developed by Shield AI, designed to enable aircraft to execute tactical maneuvers and mission decisions without human input. The X-62A (VISTA) is a highly modified version of the F-16 used by the U.S. Air Force as a variable stability flight test aircraft. For further detail on the demonstration of Hivemind's capabilities in air-to-air combat simulation, see Chase Kohler, "USAF Test Pilot School and DARPA announce breakthrough in aerospace machine learning," U.S. Air Force Research Laboratory, April 17, 2024, https://www.afrl.af.mil/News/Article-Display/Article/3745032/usaf-test-pilot-school-and-darpa-announce-breakthrough-in-aerospace-machine-lea/.

62 Greg Hadley, "In F-16 dogfight, AI and human pilots are 'roughly an even fight,' says Kendall," *Air & Space Forces Magazine*, May 8, 2024, https://www.airandspaceforces.com/kendall-ai-piloted-flight-embrace-autonomy/.

63 Valerie Insinna, "Shipbuilding, 'Golden Dome' and munitions win big as GOP unveils $150B bill to boost defense," Breaking Defense, April 27, 2025, https://breakingdefense.com/2025/04/shipbuilding-golden-dome-and-munitions-win-big-as-gop-unveils-150b-bill-to-boost-defense/.

64 Kelly A. Grieco, Hunter Slingbaum, and Jonathan M. Walker, "Cratering Effects: Chinese Missile Threats to US Air Bases in the Indo-Pacific," (Washington, DC: Stimson Center, December 2024), 3-5, 32, https://www.stimson.org/report/cratering-effects/.

65 "Agile Combat Employment," Air Force Doctrine Note 1-21, Curtis E. LeMay Center for Doctrine Development and Education, August 23, 2022, https://www.doctrine.af.mil/Portals/61/documents/AFDN_1-21/AFDN%201-21%20ACE.pdf.

66 Some CCA variants are expected to operate without the need for conventional runways, making them well-suited for rapid deployment in dispersed and forward-positioned airspaces. Additionally, it has been demonstrated that an F-35 fighter can simultaneously control up to eight CCAs, and the U.S. Air Force is currently exploring manned-unmanned teaming (MUM-T) formations in which manned aircraft serve as airborne command nodes. For details on CCA vendor selection and the Air Force's plans for operationalizing MUM-T, see Secretary of the Air Force Public Affairs, "Air Force designates two Mission Design Series for collaborative combat aircraft," U.S. Air Force, March 3, 2025, https://www.af.mil/News/Article-Display/Article/4092641/department-of-the-air-force-selects-cca-vendors-for-increment-1/.

67 Matthew Cox, "Navy Eyes Interchangeable CCA with Air Force," *Air & Space Forces Magazine*, April 8, 2024, https://www.airandspaceforces.com/navy-eyes-interchangeable-cca-air-force/.

68 John A. Tirpak, "New CCA Unit at Beale Will Focus on Ops, Not Training," *Air & Space Forces Magazine*, May 3, 2025, https://www.airandspaceforces.com/new-cca-unit-beale-not-schoolhouse/.

69 Thomas H. Shugart III and Timothy A. Walton, *Concrete Sky: Air Base Hardening in the Western Pacific* (Washington, DC: Hudson Institute, January 2025), 12-16, 21-22, https://www.hudson.org/military-defense/concrete-sky.

70 Greg Hadley, "Will Unmanned Collaborative Combat Aircraft Mean Airmen Need New AFSCs?" Air & Space Forces Magazine, April 12, 2024, https://www.airandspaceforces.com/collaborative-combat-aircraft-airmens-jobs/.

71 The Air Defense Command, under the command of the Commander of the Air Defense Command, oversees fighter, surface-to-air missile, warning and control, and electronic warfare units, and plays a central role in ensuring Japan's airspace security. For an official overview of the mission and organizational structure of the Air Defense Command, see Japan Ministry of Defense, "Missions of the Air Defense Command," April 9, 2025, https://www.mod.go.jp/asdf/adc/ninmu/ninmu.html.

72 Japan is divided into four air defense regions—Northern, Central, Western, and Southwestern—and each is assigned to a regional Air Defense Force under the Air Defense Command. These forces are responsible for tactical air defense operations in their respective areas, including airspace surveillance, scramble responses to airspace violations, and disaster relief operations. For detailed organizational information, see "Overview of Koku-Jieitai" Japan Air Self-Defense Force, November 2024, 37-39, https://www.mod.go.jp/asdf/en/uploads/docs/20241118E.pdf.

73 "防衛省ＡＩ活用推進基本方針" [Defense Ministry Basic Policy for Promoting AI Utilization], (Tokyo: Ministry of Defense, July 2, 2024), 7-10, https://www.mod.go.jp/j/press/news/2024/07/02a_03.pdf.

74 Keller Scholl et al., "Understanding the Limits of Artificial Intelligence for Warfighters: Volume 5, Mission Planning," (Santa Monica: RAND Corporation, 2024), 6, https://www.rand.org/pubs/research_reports/RRA1722-5.html.

75 "Agile Combat Employment."

76 "Defense Buildup Program."

77 "Tokugi" refers to the occupational specialization system unique to the JASDF, in which each service member is assigned to a specific technical field—such as aircraft maintenance or radar operations—based on their initial training. These categories are fixed early in a member's career and typically define their professional trajectory, with limited opportunities for cross-functional reassignment or retraining. See "隊員の仕事" [Job Descriptions], Japan Ministry of Defense, accessed April 9, 2025, https://www.mod.go.jp/asdf/about/work/index.html.

78 Shawn Cochran et al., "The Forces We Need: Building Multi-Capable Airmen to Enable Agile Combat Employment," (Santa Monica: RAND Corporation, December 2023), 40-47, https://www.rand.org/pubs/research_reports/RRA1746-1.html.

79 "PACAF Strategy 2030: Evolving Airpower," (Washington, DC: U.S. Pacific Air Forces, June 2023), 8, https://www.af.mil/Portals/1/documents/2023SAF/PACAF_Strategy_2030.pdf.

80 "Air Force introduces MCA Training Framework," U.S. Air Force, September 19, 2023, https://www.af.mil/News/Article-Display/Article/3528864/air-force-introduces-mca-training-framework/.

81 Michelle Ferrari, "Multi-Capable Airmen Training Program launches at Holloman," U.S. Air Force, June 21, 2024, https://www.aetc.af.mil/News/Article-Display/Article/3813885/multi-capable-airmen-training-program-launches-at-holloman/.

82 "Knightscope partners with U.S. Air Force on autonomous security robots," Businesswire, January 28, 2025, https://www.businesswire.com/news/home/20250128604994/en/Knightscope-Partners-with-U.S.-Air-Force-on-Autonomous-Security-Robots.

83 "Force Protection A.I. Surveillance Systems," SAM.gov, March 26, 2025, https://sam.gov/opp/4dfd151dbf654ae-7a0bbf5d345bba72a/view.

84 Epirus to deliver Leonidas Expeditionary in partnership with ONR, JCO & USMC, expanding high-power microwave product suite," Epirus, September 23, 2024, https://www.epirusinc.com/press-releases/epirus-to-deliver-leonidas-expeditionary-in-partnership-with-onr-jco-usmc-expanding-high-power-microwave-product-suite.

85 "Progress and Budget in Fundamental Reinforcement of Defense Capabilities: Overview of FY2025 Budget," Japan Ministry of Defense, December 2024, 12, https://www.mod.go.jp/en/d_act/d_budget/pdf/fy2025_20250411a.pdf.

86 "防衛大臣記者会見（令和6年4月12日)" [Press Conference by Minister of Defense (April 12, 2024)], Japan Ministry of Defense, April 12, 2024, https://www.mod.go.jp/j/press/kisha/2024/0412a.html.

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