

presentations, publications, etc. From the perspective of smooth implementation of research projects, program officers, who are in charge of managing research progress, are assigned in the same manner as competitive research funding programs being conducted by other government ministries and agencies. The program officers provide support including checking research progress and processing budget execution procedures.

Active utilization of advanced civilian technology through such programs is not only essential for securing the lives and peaceful livelihood of the Japanese people

into the future, but is also beneficial for the development of Japan’s science, technology and innovation in non-defense areas as well, similar to how investment in innovative technology by the Defense Advanced Research Projects Agency (DARPA) of the United States facilitated advances in science and technology as a whole including civilian technology, such as the development of the Internet and GPS. From this perspective, the MOD intends to promote relevant measures.

**Q See** Fig. III-4-1-1 (FY2016 Awarded Research Projects for the “Innovative Science & Technology Initiative for Security” (Competitive Funding))

## Section 2 The Current Status of Defense Production and Technological Bases, and the Strategy on Defense Production and Technological Bases

Excellent defense production and technological bases are indispensable in inventing superior defense equipment in an effective and efficient manner, while ensuring technological superiority, based on the

Defense Technology Strategy. For this reason, the MOD established the Strategy on Defense Production and Technological Bases in 2014 to maintain and strengthen the bases.

### 1 The Current Status of Japan’s Defense Production and Technological Bases

The term “defense production and technological bases” refers to the human, physical and technological bases for development, production, operation, sustainment and maintenance, remodeling, and refurbishment of defense equipment required for the MOD/SDF’s activities. In Japan, most of those bases are covered by companies (the defense industry) that manufacture defense equipment and associated items. Therefore, a broad range of companies,<sup>1</sup> which own specialized and advanced skills and facilities are involved in the defense production and technological bases. In addition, volume efficiency of defense production

is unlikely to be expected due to its market being limited to the demand from the MOD. The degree of defense demand dependence (the ratio of defense-related sales that accounts for the entire company sales) is approximately 3% on average, indicating that the defense business does not comprise the main business in many companies.<sup>2</sup>

On the other hand, per unit cost and maintenance/sustainment costs are increasing due to the advances in recent defense equipment, while simultaneously imports of foreign-made equipment, such as U.S.-made aircraft, are also.

Fig. III-4-2-1 Current Status of the Procurement Unit Price of Defense Equipment



<sup>1</sup> For example, it is said that there are approximately 1,100 fighter aircraft-related companies, approximately 1,300 tank-related companies, and approximately 8,300 destroyer-related companies.  
<sup>2</sup> According to the survey on defense demand dependence conducted with 46 defense-related companies based on their sales performance in FY2015. Although relatively small in scale, some companies possess important technologies for supporting the defense industry with over 50% of the defense demand dependence, in which case the scale of defense demand has a significant impact on the management of these companies.

**Q See** Fig. III-4-2-1 (Current Status of the Procurement Unit Price of Defense Equipment)  
 Fig. III-4-2-2 (Maintenance and Upgrade Expenditures for Equipment, etc.)

In addition, while research and development expenditure is increasing, the ratio of research and development expenditure to defense-related expenditure has leveled off.

**Q See** Fig. III-4-2-3 (Current Status of Research & Development Expenditure)

Furthermore, Japan's defense production and technological bases also face challenges in retaining and passing on skills and techniques, and there have been emerging issues, for example, with some companies pulling out of the defense business. There has also been

exposure to changes in the international environment such as the realignment of the Western defense industries and advances in international joint development and production projects. Amidst these situations, there are new changes emerging in the political framework, such as the transfer of defense equipment and technology based on the Three Principles on Transfer of Defense Equipment and Technology (see Section 4), which was approved by the Cabinet in April 2014.

**Q See** Part I, Chapter 3, Section 6-2 (Trends Concerning Defense Production and Technological Bases)  
 Section 4-1 (The Three Principles on Transfer of Defense Equipment and Technology)

Fig. III-4-2-2 Maintenance and Upgrade Expenditures for Equipment, etc.

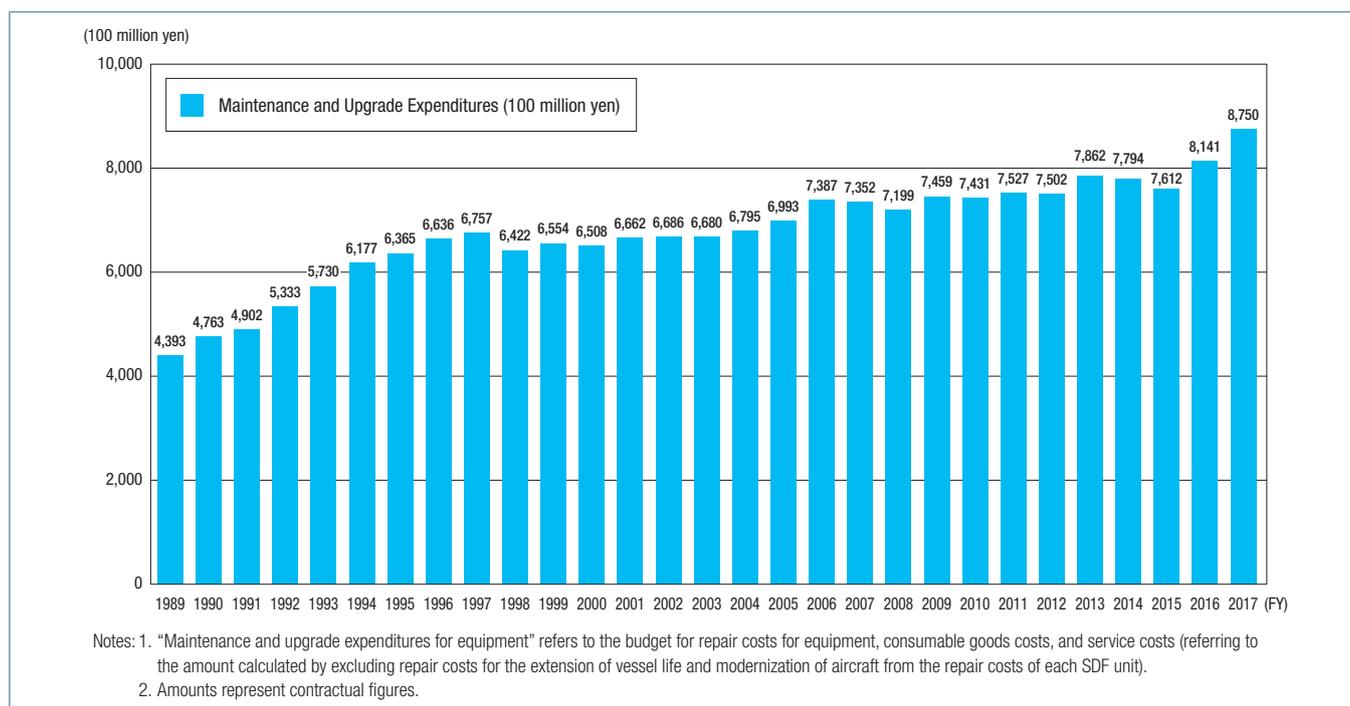
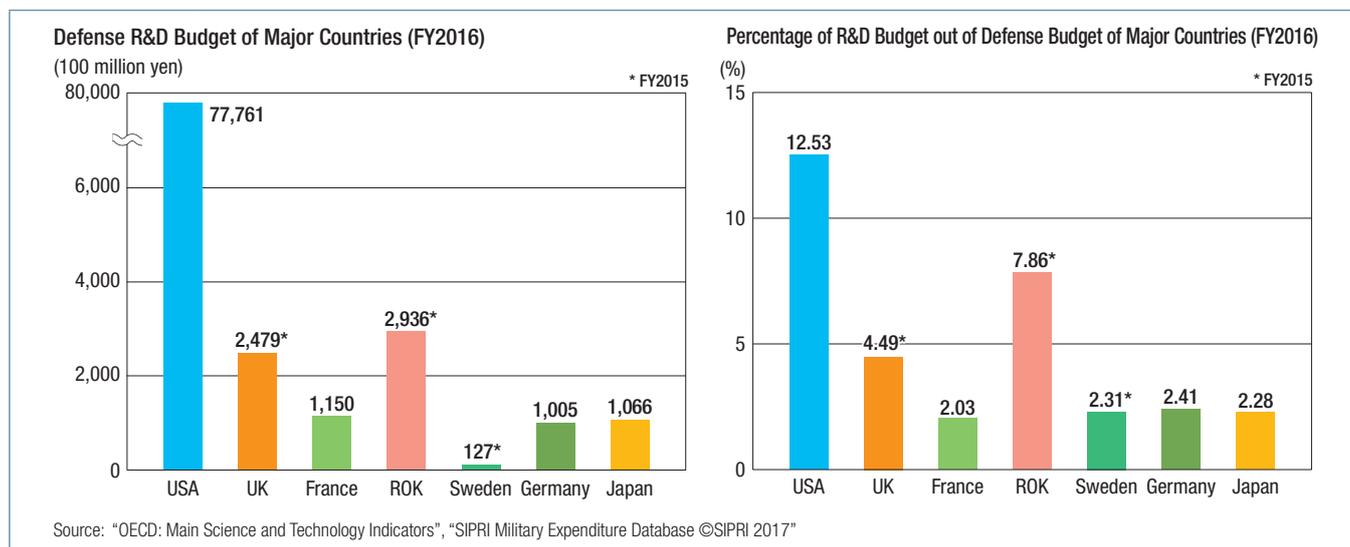


Fig. III-4-2-3 Current Status of Research & Development Expenditure



## 2 The Strategy on Defense Production and Technological Bases

### 1 Context of Formulation of the Strategy on Defense Production and Technological Bases, etc.

In light of the current situation, for the purpose of maintaining and strengthening Japan’s defense production and technological bases, which is important and an essential element supporting Japan’s defense capability, the “Strategy on Defense Production and Technological Bases” was adopted in June 2014. The Strategy responded to the National Security Strategy and the National Defense Program Guidelines (NDPG), replacing “Kokusankahoshin (guideline for domestic development/production).”<sup>3</sup>

**Q See** Reference 5 (National Security Strategy (Outline))  
Reference 6 (NATIONAL DEFENSE PROGRAM GUIDELINES for FY2014 and beyond)

### 2 Overview of Defense Production and Technological Bases

#### (1) Context of Formulation of the Strategy on Defense Production and Technological Bases

“The Strategy on Defense Production and Technological Bases” has made the following three points clear: (1) the context of the formulation of the strategy on defense production and technological bases and the status of this strategy; (2) characteristics of defense production and technological bases; and (3) changes in the security environment surrounding defense production and technological bases.

#### (2) Goals and Significance of Maintaining and Strengthening Defense Production and Technological Bases

Through the maintenance and strengthening of defense production and technological bases, the MOD intends to (1) ensure sovereignty of security, (2) potentially contribute to deterrence enhancement, and maintain and improve bargaining power, and (3) contribute to the sophistication of the domestic industry in Japan driven by cutting-edge technology.

#### (3) Basic Stance for Promoting Measures

For the promotion of measures, it is necessary to take into account the following basic viewpoints: (1) establishing long-term partnership between the private and public sectors; (2) strengthening international competitiveness; and (3) ensuring consistency with effective and efficient acquisition of defense equipment.

#### (4) Methods of Defense Equipment Procurement

With regard to defense equipment procurement, currently multiple methods, such as domestic development, international joint development and production, licensed domestic production, utilization of commercially produced goods, and imports, are adopted. These methods directly affect defense production and technological bases. According to the characteristics of defense equipment, it is necessary to select the acquisition method appropriately, including international joint development and production, which

Fig. III-4-2-4 Measures for Maintaining and Strengthening Defense Production and Technological Bases

Measures for Maintaining and Strengthening Defense Production and Technological Bases	
Improve contract system	<ul style="list-style-type: none"> <li>● Utilize negotiated contracts</li> <li>● Introduce longer-term contracts (multi-year procurements)</li> <li>● Establish flexible systems for taking orders such as joint ventures</li> <li>● Decrease procurement cost and improve companies’ incentives to reduce cost</li> <li>● Enhance project management throughout equipment’s life-cycle</li> </ul>
Measures regarding Research and Development (R&D)	<ul style="list-style-type: none"> <li>● Formulate a R&amp;D vision</li> <li>● Develop ability to survey technological information including civilian advanced technology</li> <li>● Strengthen cooperation with universities and research institutes</li> <li>● Cooperation with and utilizing R&amp;D programs including those that cover dual-use technology</li> <li>● Fund advanced research with promising output for defense</li> <li>● Strengthen cooperation with overseas organizations</li> </ul>
Defense equipment and technology cooperation	<ul style="list-style-type: none"> <li>● Deepen defense equipment and technology cooperation with the United States</li> <li>● Establish new defense equipment and technology cooperation</li> <li>● Contributing to international logistics systems</li> <li>● Improving bases for defense equipment and technology cooperation</li> <li>● Promote application of defense equipment to civilian use</li> <li>● Technology control and information security</li> </ul>
Measures regarding defense industry organization	<ul style="list-style-type: none"> <li>● Promote understanding of significance of defense business and industry</li> <li>● Maintain resilient supply chains</li> <li>● Defense industrial organizations and applications of contract systems</li> </ul>
Strengthen MOD’s structure	<ul style="list-style-type: none"> <li>● Implementation of efforts such as unification of departments associated with equipment acquisition, as a part of MOD reform</li> <li>● Implementation of strengthening inspection and audit functions as well as the training of human resources in project management and procurement</li> </ul>
Measures through cooperation with relevant ministries	<ul style="list-style-type: none"> <li>● Consideration of support measures through the use of policies of other ministries</li> </ul>

<sup>3</sup> The basic guideline for production and development of defense equipment, the development guideline for defense industry, and the stimulation guideline for R&D (Directive July 16, 1970)

became more agile and flexible due to the Three Principles on Transfer of Defense Equipment and Technology.

**(5) Measures for Maintaining and Strengthening Defense Production and Technological Bases**

In order to carry out the maintenance and strengthening of defense production and technological bases, the MOD will promote the following measures with a focus on variation and efficiency, while considering Japan’s severe financial condition: (1) improvement of the contract system; (2) efforts regarding research and development; (3) promotion of defense equipment and technology cooperation; (4) initiatives regarding defense industrial organizations including the building of a robust production and technology platform through understanding actual conditions of supply chain; (5) strengthening of the MOD’s structure through the establishment of ATLA, etc.; and (6) collaborative measures with other relevant ministries.

**Q See** Fig. III-4-2-4 (Measures for Maintaining and Strengthening Defense Production and Technological Bases)

**(6) Courses of Actions for Each Defense Equipment Sectors**

With regard to the main defense equipment sectors (such as land equipment, supplies, etc., ships, aircraft, explosives, guided weapons, communications electronics and command control systems, unmanned equipment, space systems and cyber), the MOD will analyze the current situation of defense production and technological bases. At the same time, it will also take the following actions. Based on the priority matters for developing the SDF’s structure indicated in NDPG, the MOD will present the future direction of the maintenance and strengthening of defense production and technological bases and the acquisition plan for each defense equipment sectors, and thereby, seek to increase predictability for companies.

**Q See** Fig. III-4-2-5 (Direction in the Various Defense Equipment Sectors (Outline))

**Fig. III-4-2-5** Direction in the Various Defense Equipment Sectors (Outline)

Ground equipment	<ul style="list-style-type: none"> <li>With regard to tanks and artillery, making use of its world-class level of strength in this area, the MOD will maintain its production and technological bases to the appropriate level. In addition, production and technological bases for mobile combat vehicles etc., will be built.</li> <li>Through further promotion of standardization (categorization), effective and efficient acquisition as well as the maintenance and strengthening of production and technology bases of wheeled vehicles will be implemented.</li> <li>Regarding amphibious capabilities, aspects of Japan’s technological weakness will be reinforced as necessary, while defense equipment and technology cooperation that make use of our strengths will be promoted.</li> </ul>
Supplies, etc.	<ul style="list-style-type: none"> <li>Based on factors such as compatibility with the physical characteristics of the Japanese people, the relevant foundations will be maintained, thereby making it possible to continue the procurement of supplies from domestic companies.</li> <li>As for fields where Japan can excel, such as chemical protection equipment, adapting equipment for civilian use, and defense equipment and technology cooperation will be considered.</li> </ul>
Ships	<ul style="list-style-type: none"> <li>With regard to vessels, in order to enable the MOD to respond to the latest technology such as stealth capabilities, production and technological bases will be maintained and strengthened through the entry of multiple prime enterprises.</li> <li>Consideration will be given to the bulk order of multiple escort ships with a standardized design. In doing so, a review of the format of contracts will also be considered, taking into account the effects of lowering prices.</li> <li>Since the National Defense Program Guidelines state that the number of submarines will be increased to 22, the existing bases will be maintained and strengthened through continuous research and development for enhancing capabilities.</li> </ul>
Aircraft	<ul style="list-style-type: none"> <li>For the acquisition of F-35A aircraft, the MOD will make efforts to promote the industrial participation of Japanese companies in production and to prepare for the start of Regional MRO&amp;U for F-35 aircraft in the Asia-Pacific region. As for future fighter aircraft, necessary measures including empirical research will be taken so as to maintain the option of the development of future fighter aircraft including the possibility of international joint development of an aircraft to replace the F-2 when it is time to retire it.</li> <li>With regard to transport aircraft and amphibian rescue aircraft, multifaceted use of the results of development such as the possibility of adaptation for civilian use, and defense equipment and technology cooperation will be promoted. For rotary-wing aircraft, keeping both the civilian and defense demand in mind, international joint development and production will be considered as an option based on the technologies cultivated through licensed domestic production and domestic development.</li> </ul>
Explosives	<ul style="list-style-type: none"> <li>A certain scale of procurement from domestic companies will continue to be made possible and bases, which ensure the necessary scale of explosives in various situations, will be maintained.</li> </ul>
Guided weapons	<ul style="list-style-type: none"> <li>In order to improve air defense performance, technological considerations regarding future SAMs will be pursued to further strengthen the relevant technological bases. A vision for research and development for the implementation of technological examinations of future guided weapons will be established including propulsion devices such as fixed rocket motors and other technologies required to improve the performance of various types of guided weapons such as the extension of their launch range.</li> <li>Regarding international joint development as one option, efficient acquisition methods will be selected based also on the enhancement of interoperability with allied and friendly nations.</li> <li>Along with the continuous promotion of SM-3 Block IIA Cooperative Development (SCD) between Japan and the United States, necessary measures for the transition to the production and deployment phases will be taken, considering the sustainment and enhancement of production and technological phases.</li> </ul>
Communications electronics and command control systems	<ul style="list-style-type: none"> <li>Research and development on cutting-edge technology for the bases required for defense will be implemented with priority, involving the improvement of the detection performance of fixed warning and control radar systems as well as the simultaneous, parallel use of multiple sonar systems. At the same time, the technological bases will be maintained and strengthened by pursuing the applicability of cutting-edge civilian technology.</li> <li>Because systems capable of responding to battles based around network data are necessary for future command control systems, civilian technological bases, which are progressing at a significant pace, will be adopted to ensure a system replacement at the appropriate timing reflecting the latest technological standards.</li> <li>Defense equipment and technology cooperation, as well as civilian use of wireless software technology, radar technology, which uses high-output semiconductors, and other technologies will be promoted.</li> </ul>
Unmanned equipment	<ul style="list-style-type: none"> <li>In light of the trend towards defense technology such as future battle conditions, smarter technologies and networking, a vision for research and development will be established and proactive research will be implemented for the enhancement of technological bases in order to present a direction of unmanned equipment whilst taking the perspective of integrated operation into account.</li> <li>Defense equipment and technology cooperation such as research collaboration with research institutions and joint research and development with other countries will be advanced in order to raise the level of Japan’s technological bases.</li> </ul>
Cyber and space systems	<ul style="list-style-type: none"> <li>While cooperating with the MOD’s initiatives to increase its capability to respond to cyber attacks and policies relating to the use of space development, from the perspective of the defense of Japan, the future outlook of defense production and technological bases, which will be required in the future, will be discussed.</li> </ul>

### 3 Initiatives in Line with the Strategy on Defense Production and Technological Bases

#### (1) Past Initiatives

Based on the Strategy on Defense Production and Technological Bases, the MOD has implemented various measures contributing to the maintenance and strengthening of defense production and technological bases, such as the improvement of contract system including the Long-term Contract Act, and the establishment of ATLA, which was formed by integrating the organizations involved in the procurement of defense equipment.

In addition, the following new measures are also taken in ATLA.

- Formulation of Defense Technology Strategy, Medium-to Long-Term Defense Technology Outlook and the Research and Development Vision for ensuring the technological superiority, and implementation of the “Innovative Science & Technology Initiative for Security.”
- Formulation of the Acquisition Strategic Plan for promoting project management and improvement of contract systems (see Section 3).
- Participation of Japanese companies in the international F-35 Program and defense equipment and technology

cooperation involving joint research and development with other countries (see Section 4).

- Grasping the supply chain in the defense industry and responses to risks in order to maintain and strengthen defense production and technological bases.
- Adopting a new procurement method for acquiring an escort ship (new destroyer) to ensure future technologies and price competitiveness while maintaining defense production and technological bases, as well as using advanced design and construction technology.

#### (2) Future Initiatives

With the understanding that defense production and technological bases are an important and indispensable foundation supporting Japan’s defense capabilities, ATLA plays the main role in promoting measures for defense equipment and technology while cooperating with relevant ministries, government agencies, and private companies, etc. These measures include swift application of quickly progressing advanced civilian technologies, promotion of defense equipment and technological cooperation as a package including maintenance, etc., early detection of risks pertaining to supply chains, and promotion of the matching of small and medium sized enterprises with the MOD/SDF.



### The Defense Industry that Supports the Improvement of Defense Capability

**Kazuichi Ando, Adviser, Marketing Department-Industrial Products, Industrial Rubber Products Division, Meiji Rubber & Chemical Co., Ltd.**

Meiji Rubber & Chemical Co., Ltd. was established in 1900 and became the first navy-designated factory in Japan in the following year. We at that time produced rubber lining for propeller thrust axis of submarines, battery containers, and tires for fighter aircraft, as well as other products. Since World War II, we have mainly produced civilian goods. Today our products cover a wide range of areas such as rubber products for printing machines and elevating machines, rolling mills for paper/iron manufacturing, and resin products including bottle containers/pallets.

With regard to products for the government (products for the MOD), we produce anti-vibration rubbers for ships and rubber parts for tanks. In particular, we are proud of the history of our engagement in the production of rubber parts for tanks, which are suspension parts for successive tanks (type-61, 74, 90 and 10). These parts are track rollers that are equivalent to tires for automobiles, crawler belts that are usually called crawler or track belt, rubber pads that are mounted to a track shoe composing crawler belts to protect paved road while driving on it, and anti-vibration rubbers for engine mount in the car.

Rubber products require repeated trial and error as well as conducting evaluations of prototype to design compounded rubber most suitable for specific terms of use, whereby they are developed to be a product with specification that meets the optimum condition. We take pride in the long-held recipe of compounded rubber, which has been developed since its establishment, and sees it as the company’s asset. Lastly, Meiji Rubber & Chemical has built a production system that positions defense-related products as the most important product management products. Going forward, we will continue to take responsibility and pride in producing defense equipment, maintain the production bases, and strive to enhance the technical capability of the company.



Deburring work for track rollers after rubber bonding, and finished products