

防 衛 省

Ministry of Defense

Defense Programs and Budget of Japan

Overview of FY2019 Budget Request



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Defense Programs and Budget of Japan

Overview of FY2018 Budget Request

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Concept of **FY2019** Budget Request

- 1 The FY2019 budget request is carried out in accordance with studies within the Ministry of Defense concerning the review of the National Defense Program Guidelines and the formulation of Mid-Term Defense Program, both of which are to be completed by the end of FY2018.
- 2 In order to fully provide for Japan's defense towards the future in the severe security environment, Japan will substantially bolster its defense capability, thereby establishing a defense posture that squarely addresses the reality. In particular, there is a need to develop cross-domain defense capability that holistically leverages capabilities in new domains such as space, cyber and electromagnetic spectrum on top of the existing domains of land, sea, and air. Moreover, the Japan-U.S. Alliance as well as defense cooperation with India, Australia, ASEAN countries and other partners can work very effectively in maintaining peace and stability of Japan and the region. Japan should develop a defense capability that can further deepen and expand these endeavors. Furthermore, Japan's capability development should take into account Japan's demographic trends, other countries' military developments and future technological, given that defense capability development requires time.
- 3 For this reason, Japan will place particular emphasis on the following: focused resource allocation to priority areas, strengthening of human foundation that accommodates low birth rate and aging population, strengthening of technological bases including structural reform in research and development, strengthening of Japan-U.S. Alliance and enhancing cooperation with other nations in light of changing strategic environment.
- 4 In light of the increasingly severe fiscal situations, Japan will further promote efforts to achieve greater streamlining that is in harmony with other national policies through initiatives such as the one to bring in more efficiency in procurement.

Overview of JFY2019 Request

Given the severe security environment surrounding Japan, it is critical to secure necessary and sufficient “quality” and “quantity” of defense capability. Besides conventional domains of land, sea, and airspace, it is vitally important to utilize new domains, such as space, cyber, and electromagnetic spectrum. Japan needs to establish a defense posture that enables cross-domain operations. The following are force development priorities.

Strengthening Capabilities in New Domains

- In view of diversifying and intensifying threats in space, cyber and electromagnetic spectrum domains, in order to protect lives and properties of Japanese people from various threats, Japan needs to strengthen response capabilities in space domain, strengthen readiness for addressing cyber attacks and improve response capabilities against attacks in the electromagnetic spectrum.

Strengthening Capabilities in Sea and Air Domains

- It is essential to maintain and strengthen air and maritime superiority in defense Japan. Also, it is important to counter invasions from a stand-off distance by long-range missiles and by island-to-island firing.

Strengthening Response Capabilities against Ballistic and Cruise Missile Attacks

- In light of diversifying and intensifying threats posed by ballistic and cruise missiles, it is crucial to effectively and efficiently respond to these threats by effectively combining and integrating all capabilities of the three SDF services.

Strengthening Mobilization/Deployment Capabilities

- To enhance deterrence and response capabilities, it is important to improve the effectiveness of rapid and seamless deployment of units from peacetime and to strengthen presence.

Strengthening SDF Operational Bases

- In order for the SDF to respond to various situations continuously, Japan needs to ensure resiliency of camps, bases and other facilities as operational bases for the SDF, to secure necessary ammunition and fuel, and to increase equipment operational-rate.

Strengthening Human Foundation

- To bolster human foundation, which underpins SDF missions, it is necessary to implement various measures as a whole, including recruiting and retaining highly capable personnel, promoting active participation of female personnel, improving work-life balance and enhancing the SDF Reserve Personnel system.

Strengthening Technological Bases

- In times of rapid technological innovation, in order to maintain quality and quantity of highly advanced defense equipment, it is necessary to promote measures for quick turnaround of R&D and ensure technological superiority.

I Defense-Related Expenses

Overall Defense-Related Expense

【Expenditures (classified into three categories)】

(Unit: ¥100 million)

Categories	F Y 2 0 1 8 B u d g e t	Year on Year Change	F Y 2 0 1 9 B u d g e t R e q u e s t	Year on Year Change
Defense-related Expenses	4 9, 3 8 8 (5 1, 9 1 1)	3 9 2[0. 8] (6 6 0[1. 3])	5 2, 9 2 6 (5 2, 9 8 6)	3, 5 3 8[7. 2] (1, 0 7 5[2. 1])
Personnel and provisions expenses	2 1, 8 5 0	1 8 7[0. 9]	2 1, 9 0 8	5 9[0. 3]
Material expenses	2 7, 5 3 8 (3 0, 0 6 1)	2 0 5[0. 7] (4 7 2[1. 6])	3 1, 0 1 7 (3 1, 0 7 8)	3, 4 7 9[1 2. 6] (1, 0 1 7[3. 4])
Obligatory outlay expenses	1 7, 5 9 0 (1 8, 8 9 8)	2 2 6[1. 3] (1 3 1[0. 7])	2 0, 6 4 7 (2 0, 7 0 8)	3, 0 5 7[1 7. 4] (1, 8 0 9[9. 6])
General material expenses (activity expenses)	9, 9 4 9 (1 1, 1 6 3)	△ 2 1[△ 0. 2] (3 4 1[3. 2])	1 0, 3 7 0 (1 0, 3 7 0)	4 2 2[4. 2] (△ 7 9 3[△ 7. 1])

(Note)

1. []: growth rate (%).

2. Figures may not add up to the total due to rounding (the same hereafter).

3. The upper figures in each cell do not include SACO-related expenses, U.S. Forces realignment-related expenses (the portion allocated for mitigating the impact on local communities) and expense for the introduction of new government aircraft. The lower figures in parentheses indicate the expenses that include those above.

The amount of the SACO-related expenses are:

FY2018: ¥5.1 billion; FY2019: Item request

The U.S. Forces realignment-related expenses (the portion allocated for mitigating the impact on local communities) are:

FY2018: ¥216.1 billion; FY2019: Item request

Expenses related to the introduction of new government aircraft are:

FY2018: ¥31.2 billion; FY2019: ¥6.1 billion

4. Exchange rate for FY2019 defense budget request: US\$ = JPY110.

【Future Obligation Concerning New Contracts】

(Unit: ¥100 million)

Categories	F Y 2 0 1 8 B u d g e t	Year on Year Change	F Y 2 0 1 9 B u d g e t R e q u e s t	Year on Year Change
Total	1 9, 9 3 8 (2 1, 1 6 4)	2 3 8[1. 2] (△ 1 3 5[△ 0. 6])	2 5, 1 4 1 (2 5, 1 4 1)	5, 2 0 3[2 6. 1] (3, 9 7 7[1 8. 8])
Conventional portion	1 9, 6 6 6	5 1 9[2. 7]	2 5, 1 0 9	5, 4 4 3[2 7. 7]
Long-term contracts	2 7 2	△ 2 8 1[△ 5 0. 8]	3 2	△ 2 4 0[△ 8 8. 1]

(Note)

1. []: growth rate (%) (the same hereinafter).

2. The upper figures in each cell do not include SACO-related expenses, U.S. Forces realignment-related expenses (the portion allocated for mitigating the impact on local communities) and expense for the introduction of new government aircraft. The lower figures in parentheses indicate the expenses which include those above.

The amount of the SACO-related expenses are:

FY2018: ¥6.5 billion; FY2019: Item request

The U.S. Forces realignment-related expenses (the portion allocated for mitigating the impact on local communities) are:

FY2018: ¥109.9 billion; FY2019: Item request

Expenses related to the introduction of new government aircraft are:

FY2018: ¥6.2 billion; FY2019: ¥ - million

3. Details of long-term contract are:

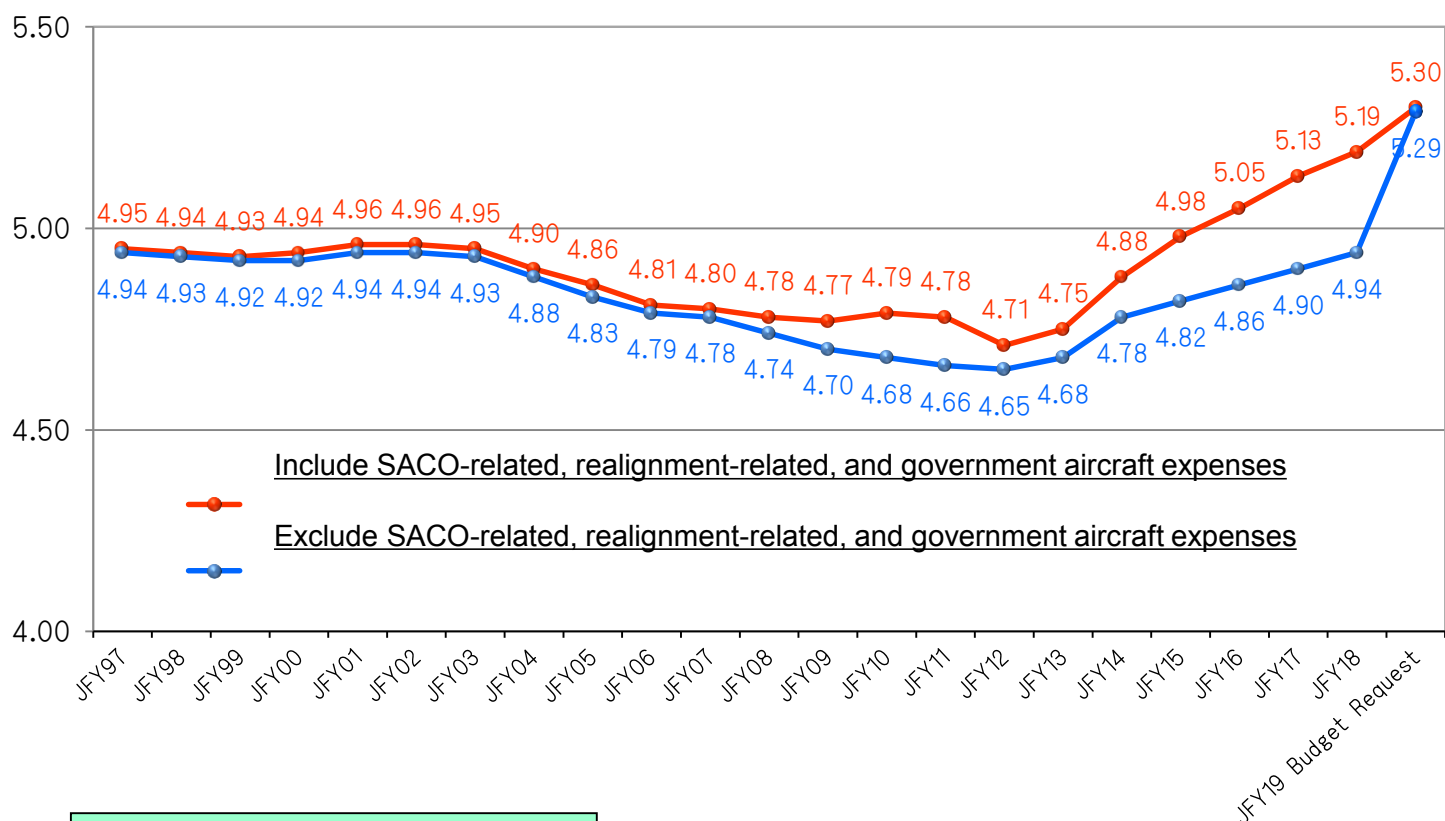
FY2018: Performance Based Logistics (PBL) for maintenance components of F110 engine (for fighter aircraft (F-2))

FY2019: Comprehensive contract for components of PAC-3 missiles

Transition of the Defense-Related Expenses

Transition of the Total Amount

(Unit: ¥1 trillion)



Transition of the Growth Rate

(Unit: %)

Categories	FY97	FY98	FY99	FY00	FY01	FY02	FY03	FY04	FY05	FY06	FY07
Include SACO-related, realignment-related, and government aircraft expenses	2.1	△ 0.2	△ 0.2	0.1	0.4	0.0	△ 0.1	△ 0.1	△ 0.1	△ 0.9	△ 0.3
Exclude SACO-related, realignment-related, and government aircraft expenses	2.0	△ 0.3	△ 0.2	0.0	0.3	0.0	△ 0.3	△ 1.0	△ 1.0	△ 0.8	△ 0.2

Categories	FY08	FY09	FY10	FY11	FY12	FY13	FY14	FY15	FY16	FY17	FY18	FY19
Include SACO-related, realignment-related, and government aircraft expenses	△ 0.5	△ 0.1	△ 0.3	△ 0.3	△ 1.3	0.9	2.8	2.0	1.5	1.4	1.3	2.1
Exclude SACO-related, realignment-related, and government aircraft expenses	△ 0.8	△ 0.8	△ 0.4	△ 0.4	△ 0.4	0.8	2.2	0.8	0.8	0.8	0.8	7.2

Note: The above figures are on an expenditure base.

- Notes 1: Numbers in the text represent **expenses, excluding non-recurring costs**, that are required for the production of equipment, unless otherwise specified.
- 2: Numbers in the text are on a **contract basis**, unless otherwise specified.
- 3: **Blue text** indicates **new programs**.

II Strengthening Cross-Domain Defense Capabilities

Given the severe security environment surrounding Japan, it is critical to secure necessary and sufficient “quality” and “quantity” of defense capability. Besides conventional domains of land, sea, and airspace, Japan will establish a defense posture that enables cross-domain operations, including new domains, such as space, cyber, and electromagnetic spectrum.

1 Strengthening Capabilities in New Domains

In view of diversifying and intensifying threats in space, cyber and electromagnetic domains, in order to protect lives and properties of Japanese people from various threats, Japan needs to strengthen response capabilities in space domain, strengthen readiness for addressing cyber attacks and improve response capabilities against attacks in the electromagnetic spectrum.

Space-related budget: ¥92.5 billion *

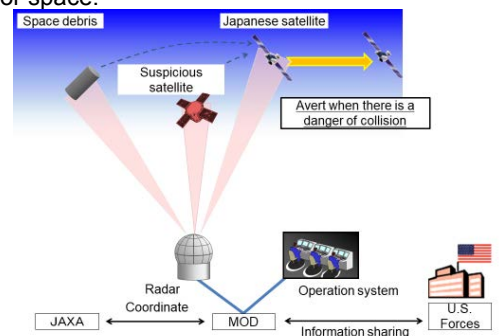
* Excluding the portion related to ballistic missile defense allocated for space.

(1) Strengthening Capabilities in Space Domain

- Procurement of the Space Situational Awareness (SSA*) system (¥26.8 billion)
 - Develop **Deep Space (*) radar and operation system** to perform Space Situational Awareness in cooperation with the U.S. and the relevant domestic organizations such as the Japan Aerospace Exploration Agency (JAXA).

* SSA: Space Situational Awareness

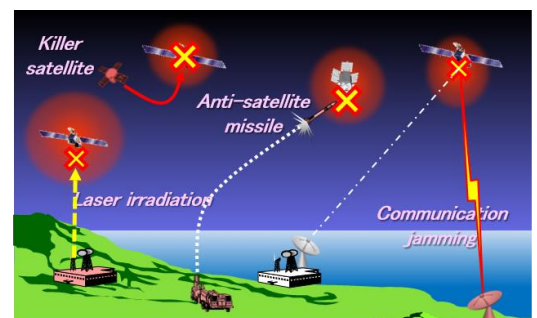
* Deep Space: outside of the altitude of approximately 5,800km



*SSA System and its Operation
(conceptual image)*

- Research and study for strengthening the C4ISR* functions by utilizing space (¥2 billion)
 - Verification study of dual-band infrared sensor in space.
 - **Research and study on the space electromagnetic spectrum surveillance posture.**
 - **Research and study on the vulnerabilities of satellites and their countermeasure.**
 - **Research and study to secure stable utilization of outer space.**

* C4ISR: Command, Control, Communication, Computer, Intelligence, Surveillance, Reconnaissance



*Threat against Stable Use of Outer Space
(conceptual image)*

- **Research and study on SSA capability enhancement, including space-based optical telescope (¥30 million)**

- Use of satellite communication (¥53.5 billion)
 - Partial development of the X-band Defense Communication Satellite-3 (successor satellite of Superbird-C2).
 - Modification to equipment, etc. to adapt to the X-band communication satellite.
 - Leasing of commercial communication satellite lines, development and maintenance, etc. of satellite communication equipment.



*X-Band Defense Communication Satellite
(conceptual image)*

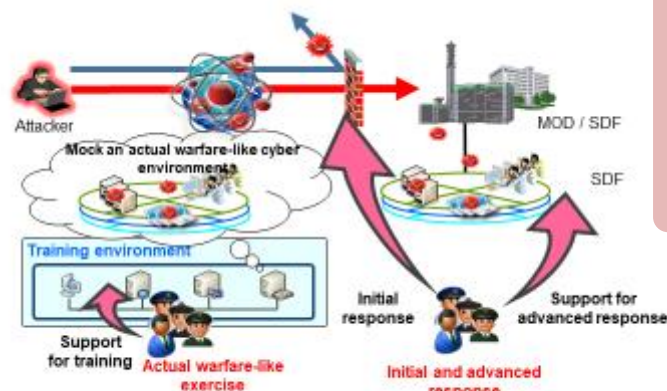
- Use of commercial imagery satellites/meteorological satellites information (¥10.2 billion)
 - procurement of data for image analysis (WorldView-4, domestic commercial optical satellite, miniature earth observation satellite, etc.).
- Dispatch of personnel to the U.S. Air Force Space Operations Course, etc. (¥20 million)
 - Acquire knowledge concerning matters related to outer space by dispatching personnel to the Space Operations Course provided at U.S. Air Force base in the U.S. state of Colorado.
 - Participate in multilateral table-top exercises in the field of outer space.

* Budget related to BMD (only the space-related portion): ¥339.9 billion

(2) Strengthening Capabilities in Cyber Domain

- Enhancement/strengthening of cyber postures
Enhancement/strengthening of Cyber Defense Group (approx. 150 → approx. 220 personnel)

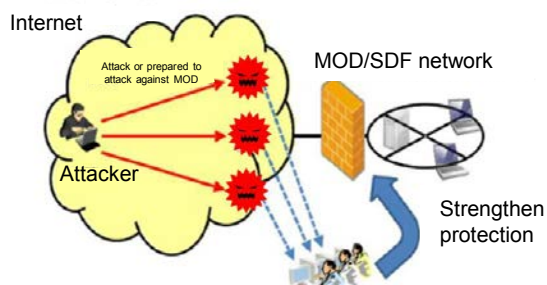
- Enhance the posture to conduct realistic training (increase of approx. 50 personnel)
 Enhance postures to conduct realistic trainings for responding to cyber attacks.
- Enhance initial and advanced response postures (increase of approx. 20 personnel)
 Enhance postures to respond to cyber attacks against the JMOD/JSDF.



Improvement/Enhancement of Postures (conceptual image)

- Improvement of the Defense Information Infrastructure (closed) (¥11 billion)
 Improve the closed system of the DII to prevent cyber attacks by intruders.

- Procurement of cyber information gathering devices (¥3.8 billion)
 In order to gather information on the tactics, techniques and procedures (TTPs) of cyber attacks against the JMOD/JSDF, the JMOD will procure cyber information gathering devices.



Information gathering and analysis Development of Cyber Information Gathering Devices (conceptual image)

- Utilization of external capabilities related to response to cyber attacks (¥2.4 billion)
 Utilization of external capabilities for tasks that require advanced expertise on response to cyber attacks.

- Enhancement of cyber security measures of the air operation system (600 million)
 Develop security surveillance equipment to quickly detect and appropriately respond to cyber attacks, etc. against the operation system of the JASDF.



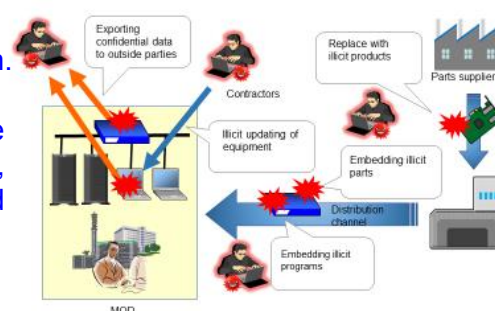
Operation System Security Surveillance Equipment

- Implementation of common cyber course (¥50 million)
Develop personnel specialized in the cyber field by offering common and advanced knowledge/skills concerning cybersecurity as common education for each service of the SDF.
- Participation in international training, etc related to cyber security (¥60 million)
In order to improve response capabilities against cyber attacks, acquire cutting-edge skills, etc. through participation in international training, etc.
- Research on countermeasures for supply-chain risk* (¥100 million)
Conduct research and study on methods and countermeasures to detect and remove attacks such as chips and software illegally embedded in the supply-chain.

* Supply-chain risk: Risks involved in the whole lifecycle of information systems and equipment, including operation, maintenance and disposal, as well as development and production prior to delivery.



*Implementation of Common Cyber Course
(conceptual image)*



*Supply-Chain Risk with Information System
(conceptual image)*

(3) Strengthening Capabilities in Electromagnetic Spectrum Domain

- Establish “Electromagnetic Spectrum Policy Office (tentative name)” in the Information Communications Division of the Bureau of Defense Buildup Planning to strengthen the function of project planning related to effective/efficient utilization of electromagnetic spectrum in the JMOD/JSDF and coordination with other ministries and agencies.
- Establish “Electromagnetic Spectrum Domain Planning Section (tentative name)” in the C4 Systems Planning Division of the C4 Systems Department in Joint Staff for project planning related to joint operation in the field of electromagnetic spectrum.
- Research and study for optimal joint electromagnetic spectrum management (¥20 million)
Research and study on the technical aspects of information sharing among JSDF forces on effective utilization of electromagnetic spectrum for cross-domain joint operation.

- Improvement of F-15's electronic warfare (EW) capability
Conduct refurbishment of F-15 fighter jets to load new electronic warfare devices with ability to respond to increased capabilities of neighboring countries' air forces. * Refer to the page 9 for the details of program in general.



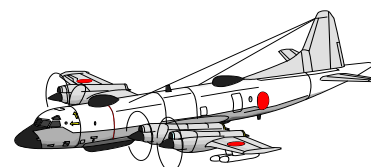
Improvement of Electronic Warfare Capability for F-15 Fighter Jets

- Procurement of network electronic warfare system
(1 set: ¥2.5 billion)
Improve the GSDF's network electronic warfare system to have an advantage in operations by collecting and analyzing signals and jamming communication.



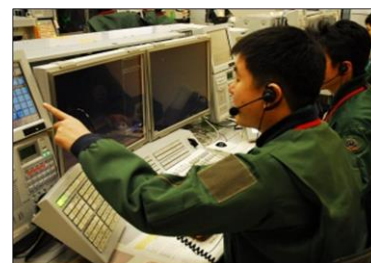
Network Electronic Warfare System

- Refurbishment of the airframe of utility aircraft (UP-3D)
(¥1.5 billion)
Refurbish the airframe of the UP-3D and equip it with an improved jammer to support training based on trends in electronic warfare in recent years.



UP-3D (utility/training support aircraft)

- Improvement of sharing/processing capability of Electronic Warfare information of the Japan Aerospace Defense Ground Environment (JADGE) (¥2.9 billion)
Provide the JADGE electronic warfare data retained by SDF units to improve information sharing on the electromagnetic spectrum.



Improvement of JADGE Capability (conceptual image)

2 Strengthening Capabilities in Air and Sea Domains

It is essential to maintain and strengthen air and maritime superiority in defense of Japan. Also, it is important to counter invasions from stand-off distance by long-range missiles and by island-to-island firing.

(1) Strengthening Capabilities in Air Domain

- Procurement of F-35A (6 aircraft: ¥91.6 billion)
 - ¥47.5 billion is accumulated separately for other related expenses (ground support equipment, etc.).
- Upgrade of F-15 (2 aircraft: ¥10.1 billion)
 - Upgrade to load standoff missiles (JASSM, etc.), increase the number of weapons to carry, and improve electronic warfare capabilities in order to provide effective defense against surrounding countries' modernized air forces.
 - ¥43.9 billion is accumulated separately for other related expenses (design changes, etc.).
- Procurement of stand-off missiles (¥7.3 billion)
 - Procure stand off missiles (JSM) which can be loaded on the F-35A and launched from a stand-off distance in order to repel enemy fleets, attack ground units on Japan's territory, and protect BMD Aegis-equipped destroyers, while ensuring the maximum safety of JSDF personnel.
- Shifting the posture of fighter squadrons, etc.
 - Shift the posture of fighter squadrons to develop readiness for ensuring air superiority.
 - Move the F-2 squadrons at Misawa Air Base to Hyakuri Air Base.



Fighter Jets (F-35A)



Fighter Jets (F-15)



*Stand-Off Missile (JSM)
(conceptual image)*



Shifting the Posture of Fighter Squadrons

- Procurement of long-endurance UAV (RQ-4B Global Hawk): (¥8.1 billion)
 - Accumulate expenses for the assembly of one UAV in order to enhance persistent wide-area surveillance capability.
 - * ¥10.8 billion is accumulated separately for other related expenses (maintenance equipment, etc.).



Long-Endurance Unmanned Aerial Vehicle (RQ-4B Global Hawk)
(picture of the same vehicle type)

- Procurement of new airborne early-warning aircraft (E-2D) (2aircraft: ¥54.4 billion)

Procure new airborne early-warning aircraft in order to strengthen the warning and surveillance capabilities in air domain surrounding Japan, including over the southwestern region.

- * ¥26.5 billion is accumulated separately for other related expenses (long-lead items for 7 aircraft).



New Airborne Early-Warning Aircraft (E-2D)

- Capability improvement of Airborne Warning and Control System (E-767) (1 aircraft: ¥12.9 billion)

Implement aircraft modifications necessary for conversion of central computing devices and installation of electronic warfare support equipment in order to improve the warning and surveillance capabilities of the existing E-767.



Airborne Warning and Control System (E-767)

- Establishment of “Airborne Warning and Control Wing”

Establish Airborne Warning and Control Wing by abolishing Airborne Warning and Control Group to strengthen posture for continuous surveillance activities by Airborne Early Warning Aircraft, etc.



Establishment of Airborne Warning and Control Wing

- Procurement of Type-03 middle-range surface-to-air missile (modified) (1 set: ¥13.8 billion)

Procure the Type-03 medium-range surface-to-air missile (modified) with enhanced capability to respond to low-altitude and high-speed targets in order to strengthen air defense capability.



Type-03 Middle-Range Surface-to-Air Missile (modified)

- Procurement of Type-11 short-range surface-to-air missile (1 set:¥4.6 billion)
Procure the Type-11 short-range surface-to-air missile, which is capable of responding to various airborne threats, in order to strengthen the capability to provide air defense for rapid deployment units, etc.



Type-11 Short-Range Surface-to-Air Missile

- Procurement of air defense command and control system (2sets: ¥7.1 billion)
Procure the air defense command and control system to ensure effective joint response operations against airborne threats.



Air Defense Command and Control System

(2) Strengthening Capabilities in Sea Domain

- Capability improvement of fixed-wing patrol aircraft (P-3C) (¥30 million)
Implement upgrades necessary to improve capabilities of the radars to improve the detection/discernment capabilities of the fixed-wing patrol aircraft (P-3C).
- Life extension of fixed-wing patrol aircraft (P-3C) (5 aircraft: ¥2.3 billion)
Implement life extension measures for P-3C to maintain the number of fixed-wing patrol aircraft.
- Life extension of patrol helicopters (5 helicopters: ¥7.6 billion)
Implement life extension measures for three SH-60K and two SH-60J to maintain the number of patrol helicopters.

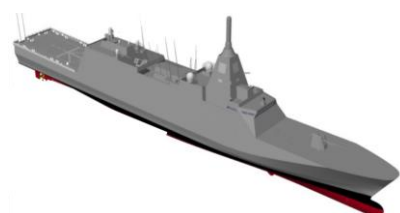


Fixed-Wing Patrol Aircraft (P-3C)



Patrol Helicopter (SH-60K)

- Construction of destroyer (2 ships: ¥99.5 billion)
Construct 2destroyers (third and fourth ships of new class ships (3,900t class) built in FY2018), equipped with compact hulls and improved multi-role capability (such as mine countermeasures, which were conventionally served by minesweeping vessels); bringing the total number of destroyers to 54.



FY2019 New Class Ship (3,900t) (conceptual image)

- Life extension of destroyers (life extension for 3 ships and parts procurement for 4 ships: ¥6.1 billion)
Implement life extension measures for the Asagiri-class (3 ships), Abukuma-class (1 ship), Kongo-class (2 ships), and Murasame-class (1 ship) to maintain the number of destroyers.

- Construction of a submarine (1 ship: ¥71.1 billion)
Construct a submarine (third ship of new class ship (3,000t class) built in FY2017) with enhanced capabilities (detection, etc.) to effectively carry out intelligence and surveillance activities in the surrounding sea with 22 submarines.



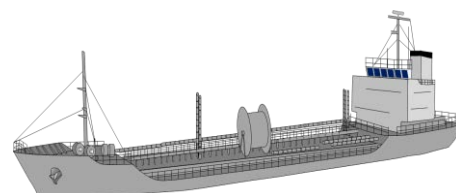
*FY2019 Submarine (3,000t)
(conceptual image)*

- Life extension of submarines (life extension for 4 vessels and parts procurement for 3 vessels: ¥6.2 billion)
Implement life extension measures for Oyashio-class submarines; bringing the total number of submarines to 22.



*Oyashio-Class Submarine
(2,700t)*

- Procurement of crude oil tanker (tentative name) (2 ships: ¥5.5 billion)
Procurement of crude oil tanker to ensure support capability of JMSDF vessels.

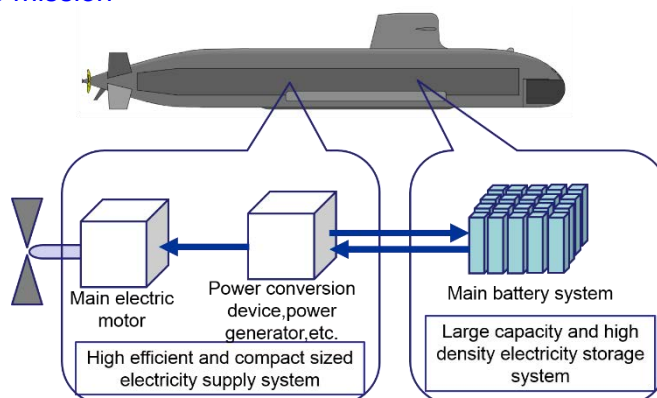


*Oil Tanker (tentative name)
(conceptual image)*

- Research on modular UUV* (¥4.2 billion)
Conduct research to establish UUV technology which is applicable to various missions such as warning and surveillance and marine observation, by prototyping a long-term operational UUV which has exchangeable mission modules.

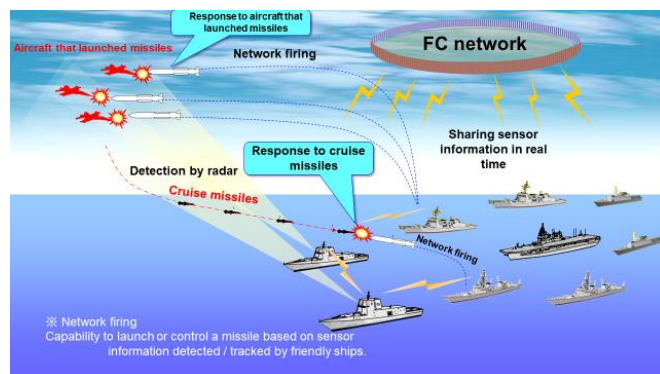
* UUV: Unmanned Underwater Vehicle

- Research on high-efficient electricity storage and supply system for submarines (¥4.4 billion)
Conduct research on electricity storage system with large capacity and high density, electricity supply system with high efficient and compact sized to extend submarines' underwater endurance without increasing ship size.



*High Efficient Electricity Storage and Supply System
for Submarines (conceptual image)*

- Research on FC Network (¥6.9 billion)
Research on FC (Fire Control) Network that enables real time sharing of sensor information within destroyer and Network Launches.



FC Network (conceptual image)

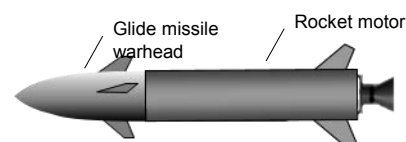
- Procurement of Type-12 surface-to-ship missile (1 set: ¥ 13.2 billion)
Procure Type-12 surface-to-ship missile, an upgraded version of the existing Type-88 surface-to-ship missile, to enhance combat capabilities against ships.



Type-12 Surface-to-Ship Missile

(3) Strengthening Stand-Off Firepower

- Procurement of F-35A (repost)
- Upgrade of F-15 (repost)
- Procurement of stand-off missile (repost)
- Research on HVGP (Hyper Velocity Gliding Projectile) for Defense of Remote Islands (¥13.8 Billion)
HVGP intended for the defense of remote islands can glide at high velocity and attack a target in order to enable island-to-island firing.



HVGP for Defense of Remote Islands (conceptual image)

(4) Strengthening Air Defense Capabilities over Remote Islands on the Pacific Coast

- Linkage of the radar on Iwo To to JADGE, etc. (¥100 million)
Improve the warning and surveillance capabilities in the airspace over Iwo To and its vicinity by connecting the radar on the island (FPS-2) to JADGE.
- Capability improvement of Airborne Early Warning Aircraft (E-767) (repost)



Radar on Iwo To (FPS-2)

3 Strengthening Response Capabilities against Ballistic and Cruise Missile Attacks

In light of diversifying and intensifying threats posed by ballistic and cruise missiles, it is crucial to strengthen postures to effectively and efficiently respond to these threats by effectively combining and integrating all capabilities of the three SDF services.

BMD-related budget: ¥424.4 billion

○ Introduction of the land-based Aegis system (Aegis Ashore)

- Procurement of 2 units of Aegis Ashore with cutting-edge radar (LMSSR) that drastically improve ballistic missile defense capability such as response against lofted trajectory projectiles (procurement cost of 1 unit: ¥123.7 billion).

Accumulated cost* to JFY2019 budget request: ¥235.2 billion
* include related costs

- #### ○ Procurement of SM-3 Block IIA and SM-3 Block IB (¥81.8 Billion)
- Procure SM-3 Block IIA and SM-3 Block IB to be deployed for ballistic missile defense.
 - (* Bulk procurement is under consideration for the SM-3 Block IB)



Aegis Ashore



SM-3 Block IIA

- #### ○ Capability improvement of the Atago-class destroyers (¥7.5 billion)
- Implement upgrades to enable them to launch the SM-3 Block IIA.
- #### ○ Modification to the Patriot system (¥19.9 billion)
- In order to maintain and improve the BMD and air defense capabilities, implement upgrades to the Patriot system (¥11.1 billion).
 - Secure necessary PAC-3 missiles by replacing parts that are close to the end of their service life and inspecting the whole missile as part of the reassuring process of the PAC-3 missiles. (¥8.8 billion).
- #### ○ Procurement of Type-03 middle-range surface-to-air missile (modified) (repost)
- #### ○ Procurement of Type-11 surface-to-air missile (repost)
- #### ○ Procurement of air defense command and control system (repost)
- #### ○ Research on FC network (repost)
- #### ○ BMD training
- Improve SDF's capabilities concerning a series of BMD response and enhance operational coordination with U.S. Forces.



BMD Training (conceptual image)

4 Strengthening Mobilization/Deployment Capabilities

To enhance deterrence and response capabilities, it is important to improve the effectiveness of rapid and seamless deployment of units from peacetime and to strengthen presence.

- Procurement of Type-16 mobile combat vehicles (22 vehicles: ¥16.4 billion)
Strengthen rapid deployment capabilities of the basic operational units (rapid deployment division and rapid deployment brigades) by deploying Type-16 mobile combat vehicles suited for transportation by aircraft and other mean.



Type-16 Mobile Combat Vehicle

- Procurement of 155mm wheeled howitzer (7 vehicles: ¥4.8 billion)
As a successor to the existing 155mm self-propelled howitzer (FH70), procure the 155mm wheeled howitzer, which is capable of rapid deployment in various situations and can also be used for efficient training purposes.



155mm Wheeled Howitzer (proto type)

- Development of multi-purpose missile system (modified) (¥3.5 billion)
Develop a multi-purpose missile system with higher function and performance compared to the existing equipment, such as a longer range and better capability to simultaneously respond to multiple targets, at a lower procurement cost.



Multi-Purpose Missile System (modified) (picture is the existing equipment)

- Prototypes of candidates for the next wheeled armored vehicle which is newly introduced (¥2 billion)
Expenses related to the procurement of the prototype vehicles to be used for test and evaluation required for selection of the next wheeled armored vehicle.
- Procurement of new utility helicopter (UH-X) (6 aircraft: ¥11 billion)
Procure new utility helicopter (UH-X) for rapid deployment through airmobile and airlift, to succeed the utility helicopter (UH-1J).
- Development of facilities related to the Amphibious Rapid Deployment Brigade (Ainoura, etc.) (¥500 million)



New Utility Helicopter (UH-X) (conceptual image)

- Development for an area security unit in the southwestern region (19.4 billion)
In order to improve the initial response readiness in the defense of remote islands, allocate budget related to the development of training facilities and others associated with unit deployment on Amami-Oshima and Miyako-jima and expenses necessary for preparing construction design on Ishigaki-jima.



Office Bui Maintenance Factory

Daily Life-related Fa Fuel Facility

Key Facilities associated with Unit Deployment (conceptual image)

○ Procurement of crude oil tanker (tentative name) (repost)

○ Procurement of transport aircraft (C-2)
(2 aircraft: ¥45.7 billion)

In view of the decreasing number of the current transport aircraft (C-1), Procure transport aircraft that contribute to large scale deployment by improving flight range and payload (* Cost per aircraft, excluding engine, is ¥16.5 billion compared to ¥17.2 billion of JFY2018 budget (decrease by ¥700 million)).



Transport Aircraft (C-2)

○ Training to Enhance/Develop Rapidly Deployable Ground Defense Forces (¥7.4 Billion)

Maintain/improve high unit readiness, demonstrate its presence from peacetime, and strengthen deterrence/response capability by effectively conducting training at various environments in and out of Japan, mainly for Amphibious Rapid Deployment Brigade and Deployment Division/Brigade.

~ Various trainings ~

• Relocation exercises (¥1.1 billion)

By refining operational coordination required for rapid deployments in collaboration with the ASDF and the MSDF, improve Army's response capabilities to various situations.



Relocation Exercise

• Exercise, etc. involving the Amphibious Rapid Deployment Brigade (¥200 million)

Strengthen the readiness of the Amphibious Rapid Deployment Brigade through training boarding the MSDF's ships and training at remote islands.



Exercise involving the Amphibious Rapid Deployment Brigade

• Field training exercise with the U.S. Marine Corps in the U.S., etc. (¥6.2 billion)(Iron Fist, Kamandag, Talisman Saber, etc.)

Enhance bilateral response capabilities with the U.S. and others through exercises in the U.S., etc. to improve tactical skills and interoperability necessary for operations in remote islands.



Iron Fist

○ Conduct a joint amphibious operation exercise

Conduct a joint amphibious operation exercise in order to enhance the SDF's joint operation capabilities and bilateral response capabilities with U.S. Forces for amphibious operations.



Joint Amphibious Operation Exercise

5 Strengthening SDF Operational Bases

In order for the SDF to respond to various situations continuously, Japan needs to ensure resiliency of camps, bases and other facilities as operational bases for the SDF, to secure necessary ammunition and fuel, and to increase equipment operational-rate.

(1) Enhancement of Continuous Warfare Capabilities and Resiliency

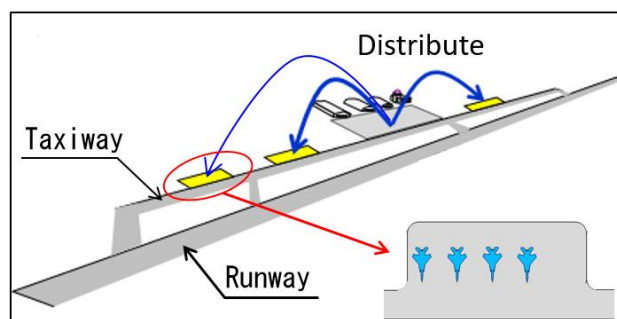
- Procurement of ammunition that contributes to air superiority and provides effective response to threats as well as torpedoes needed to secure sea superiority (¥57.1 billion)



Ammunition (AIM-120)

- Procurement of stand-off missile (repost)

- Development for dispersion pads (¥20 million)
Development for dispersion pads at air bases for enhancing resiliency.



Dispersion Pads

- Procurement of equipment necessary to improve the capabilities to restore damaged runways (¥900 million)
Procure equipment which enables a faster restoration of damaged runways of an airbase.



Equipment to Restore Damage in Runways

- Establishment of Maritime Operation Center (¥3.6 billion)
In order to establish postures to respond to various situations smoothly in collaboration with the GSDF/ASDF, U.S. Forces as well as other related ministries and agencies should establish a Maritime Operation Center in the Funakoshi area in Yokosuka.

- Construction of ammunition storage
Construct new ammunition storage
 - Oita Ammo Branch Depot (¥700 million)
 - Setouchi Sub-camp (tentative name) (¥1.8 billion)



Ammunition Storage

(2) Enhancement of Transport Capabilities

- Procurement of new utility helicopter (UH-X) (repost)
- Procurement of transport aircraft (C-2) (repost)
- Procurement of crude oil tanker (tentative name) (repost)
- Enhancement of readiness for joint transportation using PFI ships
Enhance the readiness for joint transportation by improving the operational effectiveness of PFI ships through the implementation of an exercise using such ships to transport units and equipment and verification of port entry.

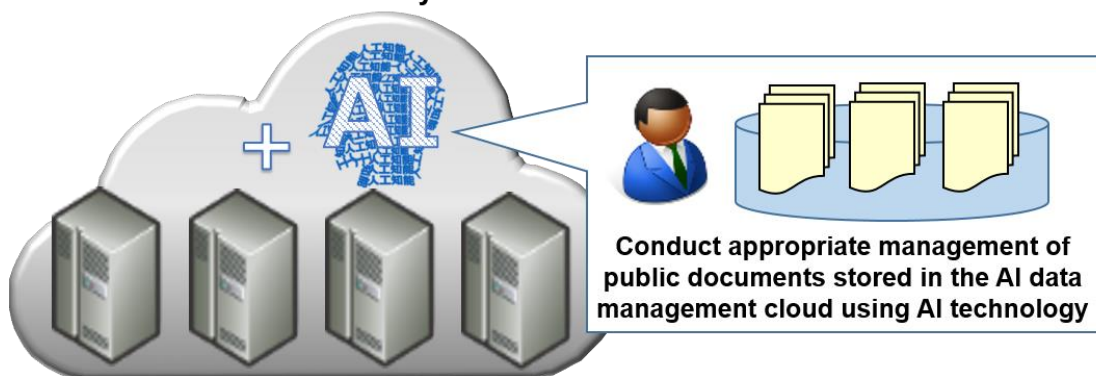


*Joint Transportation using PFI Ships
(conceptual image)*

(3) Strengthen the Infrastructure for C3I

- Strengthen postures for the introduction of AI
To strengthen postures in the whole JMOD/JSDF for the introduction of AI, establish the “AI / Cyber Security Promotion Office (tentative name)” in the Information and Communication Division of the Bureau of Defense Buildup Planning, and create the “AI Planning Section” (tentative name) in the new office.
- Development of the JMOD AI data management cloud (¥55.8 billion)
Make efficient development through integration and cloud computing of the JMOD administrative system, and build AI data management cloud that is capable of efficiently managing a large volume of administrative data.

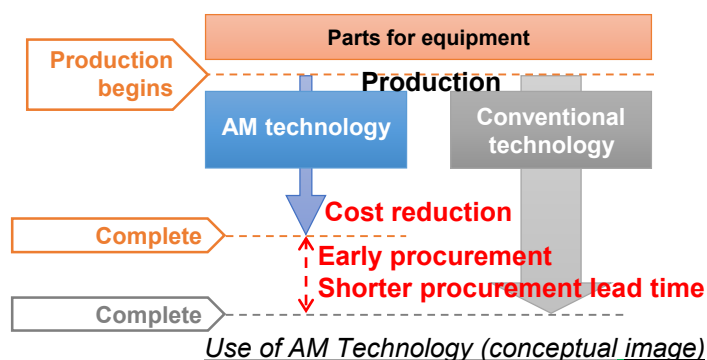
Integration and cloud computing of JMOD administrative system



JMOD AI data management cloud (image)

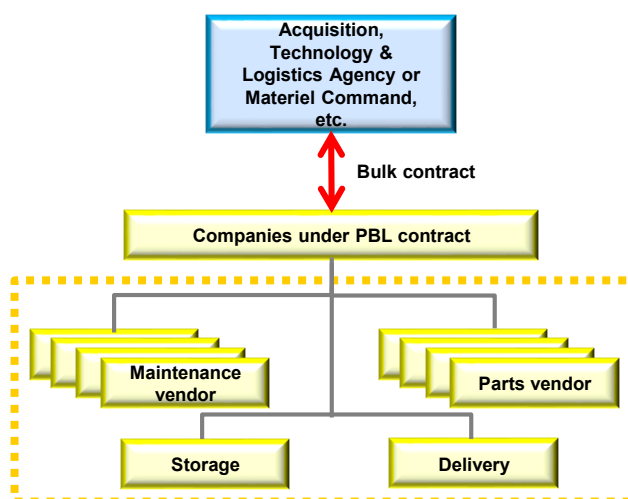
(4) Improvement of Equipment Operational Availability

- Maintenance to improve the equipment operational availability ratio (¥883.5 billion)
* ¥28.2 billion increase from FY2018
- Research on the use of Additive Manufacturing (AM) technology in equipment maintenance
Improving equipment availability ratio by reducing the procurement lead time and cost, and preventing DMSMS through the use of the latest production technology, which expands the possibilities of part procurement for maintenance (¥30 million).



- Reduction in procurement lead time through the use of PBL (Performance Based Logistics) contracts

Realize a timely supply of parts through PBL contracts, in which contract procedures are no longer required for every procurement, and estimating demands and controlling inventory that are left at the discretion of suppliers, while also taking advantage of global supply chains.



PBL (conceptual image)

(5) Enhancement of Function of Facilities

- Upgrade of aging SDF facilities (¥42 billion)
Ensure the SDF's stable operational readiness by renovating SDF facilities such as office buildings and barracks, which undermine operations of the SDF.

* Including the promotion of aseismic construction to maintain and enhance their functions in the event of a disaster.



SDF Facility

6 Response to Large-Scale Disasters

Swiftly transport and deploy sufficiently sized units in the event of various disasters, and develop response readiness that is sustainable over a long-term through establishing a rotating staffing system based on a joint operational approach

(1) Maintenance/Enhancement of Function of Military Camps/Bases to Serve as Hubs for Disaster Response

- Promotion of seismic retrofitting and tsunami defense measures to maintain and enhance functions in preparation for the event of a disaster (¥16.2 billion)
- Development of disaster response hub areas, etc. (Iruma) (¥900 million)



Development of Disaster Response Hub Areas, etc. (Iruma)

(2) Implementation of Exercises to Respond to Large-Scale and Unconventional Disasters

- SDF Joint Exercise for Rescue (JXR: Joint Exercise for Rescue)
Implement the SDF Joint Exercise for Rescue to maintain and improve the SDF's joint operation capabilities to respond to large-scale domestic disasters, in order to minimize damage through smooth and effective responses in the event of large-scale domestic disasters.
- Joint Disaster Response Exercise with U.S. Forces (TREX: Tomodachi Rescue Exercise)
Implement Joint Disaster Response Exercise with U.S. Forces to establish procedures on coordination with U.S. Forces in Japan in the event of large-scale domestic disasters, and to maintain and enhance the disaster response capabilities.
- Remote Island Disaster Relief Exercise (RIDEX: Remote Island Disaster Exercise)
Implement drills to maintain and enhance capabilities to ensure smooth joint disaster response operations against sudden crises caused by large-scale disasters on remote islands.



SDF Joint Exercise for Rescue (JXR) (conceptual image)



Joint Disaster Response Exercise with U.S. Forces (TREX) (conceptual image)



Remote Island Disaster Relief Exercise (RIDEX) (conceptual image)

(3) Procurement of Equipment Contributing to Disaster Response

- Procurement of new utility helicopter (UH-X) (repost)
- Procurement of transport aircraft (C-2) (repost)
- Procurement of equipment to respond to various situations, including disasters.
 - Water purification set (1 set: ¥100 million)
 - Hydraulic pressure shovel (with grapple) (3 sets: ¥100 million)
 - Material transport vehicles (8 vehicles: ¥80 million)



Water Purification Set



Hydraulic Pressure Shovel
(with grapple)



Material Transport Vehicle

- Development of aerial fire fighting equipment for wildfire
(1 set: ¥10 million)
Procure aerial fire fighting equipment (fire fighting bucket, etc.)
necessary for disaster dispatch to conduct swift and effective fire
suppression in the event of a disaster dispatch for wildfires.



Aerial Fire Fighting Equipment

- Development of drone for disaster response (¥150 million)
Procure drone for disaster response for quick and on-target rescue
operations in the event of a large-scale disaster.

- Development of a life-saving system (2 sets: ¥50 million)
Procure a life-saving system in order to conduct life-saving activity
quickly and effectively in the event of large-scale disasters.



Life-Saving System
(component: rescue boat)

- Procurement of Type-10 snow tractors (10 tractors: ¥300 million)

- Type-07 mobility support bridge (1 set: ¥1.2 billion)
Procure a mobility support bridge in order to temporarily restore bridges damaged by earthquakes, floods, etc., conduct emergency evacuation of disaster-affected people and enable relief activities by the SDF and local governments.



Type-07 Mobility Support Bridge
(disaster management exercise)

- Response to NBC weapons
 - Procurement of decontamination set (decontamination vehicle) (1 vehicle: ¥100 million)
 - Procurement of NBC alarms (1 set: ¥300 million)
 - Procurement of decontamination set (Type-1 decontamination equipment) (1 set: ¥100 million)
 - Type-18 personal protective equipment (7500 sets: ¥1.8 billion)
 - Chemicals detectors (10 sets: ¥40 million)



Decontamination Set
(decontamination vehicle)

7 Strengthen Intelligence Capabilities

Strengthen JMOD's capability for collecting and processing information, and analyzing and sharing the collected information. This will enable JMOD to promptly detect indications of various situations and swiftly respond to them as well as take measures based on medium-to-long-term military trends in areas surrounding Japan and others.

- Enhancement of Defense Attaché system

- Reinforcement of intelligence collection and analysis capabilities
 Establish necessary arrangements at the Defense Intelligence Headquarters, etc. to enhance capabilities of intelligence collection and analysis of international military situations, etc.

- Development of common infrastructure at the Defense Intelligence Headquarters
 Establish shared information platform to integrate various and wide range of intelligence gathered by all services of the SDF and the Defense Intelligence Headquarters, in order to promote all-source analysis.

- Procurement of long-endurance UAV (RQ-4B Global Hawk) (repost)

- Procurement of data for imagery analysis (WorldView-4, domestic commercial optical satellite, miniature satellites for earth observation, etc.) (repost)
 Collect information concerning the region surrounding Japan using domestic commercial optical satellite, miniature satellites for earth observation, etc., including the MOD's main optical satellite (WorldView-4), to which JMOD has an exclusive tasking right.



WorldView-4
(conceptual image)

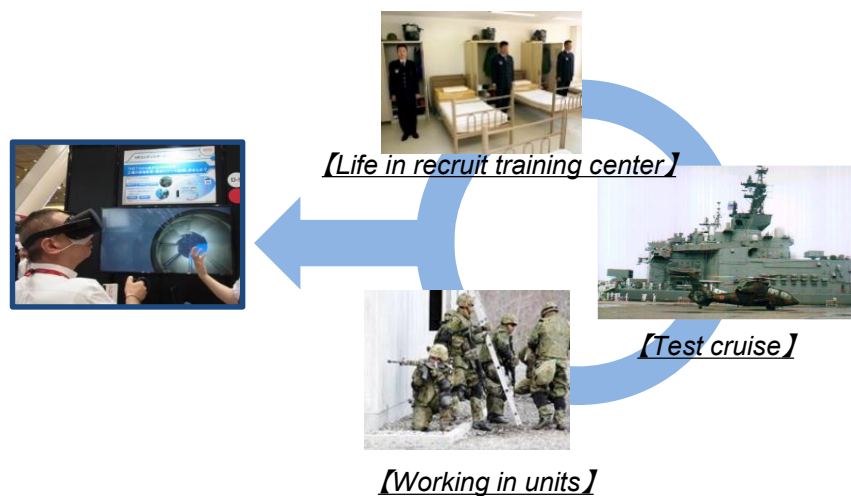
III Strengthening Human Foundation

In order to strengthen the human foundation that underlines operations of the SDF, implement various measures in a comprehensive manner, such as promotion of further engagement of female personnel, improvement of the work-life balance, and enhancement of the SDF Ready Reserve Personnel System, while securing highly-qualified personnel.

1 Promotion of Measures to Secure Highly-Qualified Personnel

(1) Enhancement of Recruitment Programs

- Workplace experience using VR (Virtual Reality) (¥30 million)
Create VR content to enable visitors to various information sessions and unit tours to experience the life in recruit training centers and working in units to facilitate understanding of the job and to increase motivation.



- Recruitment advertising videos (200 million)
Promote recruitment advertisement targeted at potential applicants from various angles by creating recruitment advertising videos and strengthening the lineup of recruitment advertising media.
- Enhancement of recruiting systems
Establish “Recruitment Promotion Office (tentative name)” in the Human Resources Development Division of the Personnel and Education Bureau to work on strengthening collaboration with local public entities and other ministries and agencies.

(2) Enhancement of Re-employment Support Programs

- Establishment of vocational training programs (¥10 million)
 - Create new subjects related to the procurement of the drone operator’s license in order to expand the occupational field of reemployment to include the drone operators field, which is anticipated to grow in demand in the fields of disaster prevention, security and surveying.
 - Create new subjects related to the procurement of career consultant qualifications in order to expand the occupational field of reemployment to include administration and human resources divisions of private companies.

- Expansion of prep course for civil service exams (¥20 million)
Create more seats in courses intended for uniformed SDF personnel serving under the fixed-term system who wish to get another civil service job, such as police officers and fire fighters, after their term is complete.



[Image of Distance Learning]



[A Scene of a Prep Course for Civil Service Exams]

- Support for uniformed SDF personnel who wish to get a higher education (¥80 million)
Support uniformed SDF personnel serving under the fixed-term system who wish to go to university after their term is complete by providing distance learning offered by prep schools.

(3) Improvement of the Sufficiency Ratio of SDF Reserve Personnel

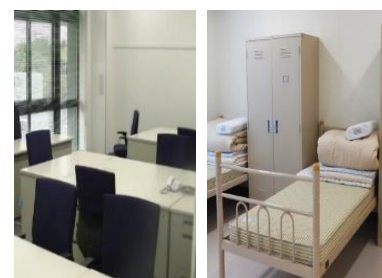
- Promotion of SDF reserve personnel hired under the public recruitment system to SDF ready reserve personnel (60 million)
In addition to former uniformed SDF personnel, who were the only candidates for SDF ready reserve personnel until now, include those of SDF reserve personnel hired under the public recruitment system (promoted from SDF reserve candidates to reserve personnel) who wish to be appointed as SDF ready reserve personnel and have necessary expertise through required education or training to improve the sufficiency ratio.
- Development of uniforms and accessories, etc. (¥60 million)
In order to improve the effectiveness of SDF reserve personnel, implement developments in uniforms, accessories, as well as containers and shelves to store those.

(4) Improvement of Working Environment

- Development of new uniform (¥5.2 billion)
To coincide with organizational reforms in the GSDF such as the Ground Component Command established in March 2018, the GSDF's dark green uniform, which was adapted 26 years ago, will be replaced by a new dark purple uniform.
- Development of supplies (¥1 billion)
Gradually upgrade aging supplies to improve the living and working environment for SDF personnel while also creating a more attractive working environment for possible future recruits.
- Upgrade of aging SDF facilities (repost)



New Uniform



Development of Supplies

(5) Others

- Expansion of the Defense Meritorious Badge Program (¥60 million)
Establish a new class of defense meritorious badge, which is presented to individuals of the SDF, to be given with the 4th (presented by regimental commander) and 5th (presented by company commander) encomium, in addition to the existing classes accompanying the special 1st through 3rd encomiums.
- Promotion of measures to prevent power harassment
- Promotion of measures to prevent suicides (¥20 million)
 - Use of outside expertise for analysis and suggestions concerning measures to prevent suicides .
 - Training by outside professionals for company commanders to improve communication skills.
 - Establishment of counselling service using SNS (LINE).



Defense Meritorious Badge

2 Promote Measures to Ensure Further Participation of Female Personnel and the Work-Life Balance

Further promote greater engagement of female personnel through expanding recruitment and promotion, while implementing and enhancing measures concerning the work-life balance.

○ Female SDF Personnel in Action



Inspection by Female Regimental Commander



First Female Commanding officer of the MSDF Escort Division



First Female Fighter Pilot

(1) Improvement of the Environment for the Working Style Reform (¥70 million)

- Develop an environment to ensure flexibility in working hours and location
 - Provision of terminals for telework.

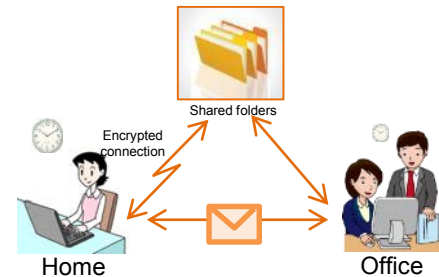


Image of Telework

(2) Improvement of the Working Environment for Female SDF Personnel (¥3.3 billion)

- Development of facilities for female SDF personnel
 - Promote secured sections for female personnel in barracks.
 - Make renovations to improve living and working environments for female SDF personnel (renovations of lavatory and bathing facilities).
 - Improvement in training foundation for female uniformed SDF personnel.



Image after the Renovation

Improvement of Section for Female Personnel



Image after the Renovation

Improvement of Section for Female Personnel

- Improvement of sections for female personnel on ships (MSDF)
- Development training for mentors
- Invite outside counselors for female SDF personnel, etc.

(3) Support for Work-Life Balance (¥110 million)

- Development of an environment that makes it easy for child-caring personnel to continue working
Introduce a system that enables the use of a sitter service when personnel cannot care for children due to an emergency duty or for other reasons (Ichigaya area).
- Improvement of workplace nurseries (¥80 million)
Promote workplace nurseries suitable for working patterns particular to SDF so that personnel raising children can engage in their duties without concerns.
 - Improvement of workplace nursery (National Defense Medical College).
 - Provision of supplies in workplace nurseries.
- Provision of supplies for temporary child-care service in case of emergency operations (¥20 million)
 - Provide supplies (safety mats, baby beds, etc.) for temporary child-care service in case of emergency operations (each SDF).
 - Implement temporary child-care service drills, preparing for emergency operations.
 - Participate in courses designed to improve child-care skills for temporary child-care service in case of emergency operations (GSDF and MSDF).



Workplace Nurseries (conceptual image)



A Scene of Temporary Child-Care Drill in Support of Emergency Operations



A Scene of The JSDF-USFJ Women's Forum

(4) Promotion of Female Personnel Engagement in International Cooperation, etc.

- Hold a forum for female SDF personnel and servicewomen from foreign countries
- Dispatch SDF personnel for training as gender advisors
Send SDF personnel to "Gender Field Advisor Course" (sponsored by the Swedish Armed Forces) in order to introduce the perspective of eliminating gender* disparity in international peace cooperation efforts, etc.

* Gender: Distinction between men and women formed historically, socially, and culturally, such as the "male image" and "female image," different from sex that shows the biological difference between males and females.

(5) Implementation of Training and Drills for Raising Awareness (¥30 million)

Effort to eliminate conventional mindset about gender roles in the workplace and develop a work environment that enables all personnel, including those under time restriction due to child-care or nursing care, to demonstrate their full potential.

- Hold seminars on mentality reform, etc.
- Collective trainings for promoting gender equality, etc.
- Creation and distribution of pamphlets featuring roles played by female personnel and support for work-life balance, etc.



A Scene of the Collective Training

(6) Others (¥30 million)

- Recruitment of female SDF personnel
Create brochures targeting female recruits
- Promote measures to prevent sexual harassment

3 Enhancement of Educational and Research System

Implement measures to enhance the education and research systems at the National Institute for Defense Studies, the National Defense Academy, and the National Defense Medical College, and develop an environment enabling personnel to devote themselves to their duties.

(1) The National Institute for Defense Studies

- Promoting global academic exchange
Start academic exchange programs with national defense academies and security policy think-tanks in Africa.



Reference: African Security Studies Seminar (held at the National Institute for Defense Studies)

(2) The National Defense Academy

- Development of the education and research system
Develop educational experimental equipment to adapt to advances in the field of science and technology and to the expansion of the educational research field. (¥400 million).

(3) The National Defense Medical College

- Strengthen the functions of the college as a hub for education and research in the field of defense medicine
 - Conduct advanced research on defense medicine (¥300 million).
- Enhance the patient examination system
 - Increase the number of nurses corresponding to the 7 patients to 1 caretaker system.

Advanced Research on Defense Medicine (battle injury/trauma field)



Blast-Simulated Shock Wave Generator



Nurses at Work (conceptual image)

4 Enhancement of Medical Functions

Promote initiatives for upgrading SDF hospitals to hubs with enhanced functions and establish an efficient and high-quality medical care system, including improved management of the National Defense Medical College Hospital. In addition, greater emphasis will be placed on securing and training medical officers, nurses, and emergency medical technicians. Furthermore, strive to enhance frontline first aid capabilities and develop postures for rapid evacuation of the injured personnel.

- Initiatives toward upgrading SDF hospitals to hubs with enhanced functions
Steadily promote development of a core hospital in each district and hospitals with special functions, including education of international activities, submarine medicine, and aviation medicine.
 - Construction of the building of SDF Iruma Hospital (provisional name) in line with the centralization of SDF hospitals (¥4 billion).
 - Basic study for the reconstruction of SDF Yokosuka Hospital (¥70 million).
 - Development toward the conversion of JSDF central Hospital's medical care information system (¥2.2 billion).
 - Development of medical devices to reinforce the patient examination system at SDF Hospitals and Clinics (¥800 million).



SDF Iruma Hospital (tentative name) (conceptual image)

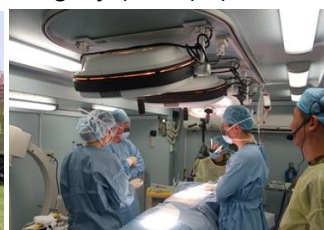


Example of Medical Devices

- Improve first aid and transfer capabilities in response to emergency events
 - Development of educational equipment to enhance the first aid capability (¥200 million).
 - Develop a simulator as an educational equipment intended to help acquire skills required for the treatment of gunshot wounds and other injuries.
 - Development of portable medicine equipment necessary for medical protection unit personnel who are certified assistant nurses and paramedics to implement life-saving procedures in the front lines.
 - Development of medical equipment necessary to perform a damage control surgery.
 - Develop a Field surgical system (¥200 million).
 - Develop equipment required in a damage control surgery (DCS) (¥50 million).



Field surgical System



Examples of Equipment for DCS



- Enhance capabilities in response to infectious diseases
 - Training to develop medical officers and others with professional expertise.
 - Overseas field survey to consider measures for training personnel in the field of global infectious diseases.
 - Field survey to grasp detailed procedures in order to establish a system to transfer patients with infectious diseases.



Image of Response to an Infectious Disease



Image of Transferring a Patient

IV Strengthening Technological Bases

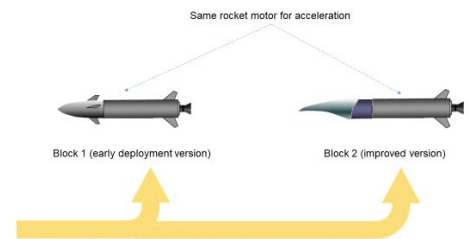
In order to ensure optimal procurement of equipment and secure defense equipment both in quality and quantity during rapid technological innovation, implement initiatives for early operationalization of equipment as well as technological superiority while steadily and appropriately conducting project management.

1 Promotion of Research and Development for Early Practical Use

Cut down the time required for research and development as well as procurement of equipment, and promote research and development for early operationalization.

Promotion of Early Practical Use of Equipment through Stepwise Research and Development

- Research on HVGP (Hyper Velocity Gliding Projectile) for Defense of Remote Islands (repost)
Use the block method in the research on element technologies of a hyper velocity glide missile intended for the defense of remote islands, which began in FY2018, to promptly apply research results to equipment, and make them operational sequentially.

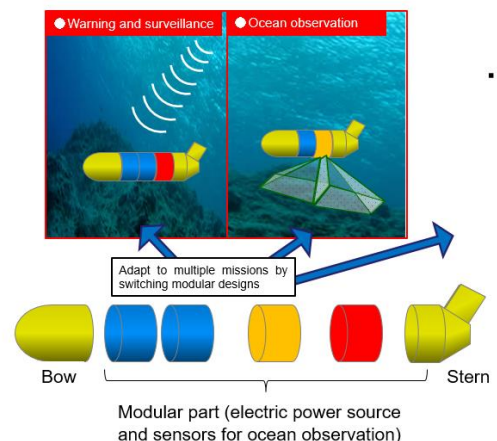


Stepwise Development of HVGP for Defense of Remote Islands (conceptual image)

Reduce Future Lead Time for Research and Development and its Cost by Modularization

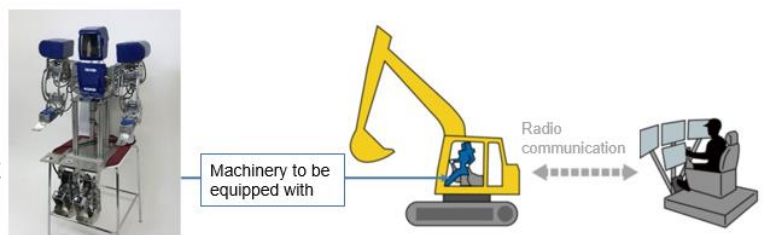
- Research on modular UUV* (repost)
Modularization allows prompt development of module with new functions and capabilities according to operational needs in the, and therefore realize an expansion of capabilities at a reduced lead time and cost.

* UUV: Unmanned Underwater Vehicle



Research on Modular UUV (conceptual image)

- Initiatives to realize rapid prototyping of new technologies (1.2 billion)
Realize practical application in a short time period - around three to five years - through cooperation between engineers and operators in incorporating rapidly evolving, cutting-edge civilian technologies which have a short innovation cycle, including information and communication technology (ICT) seek to curb product price and maintenance costs for defense equipment by using the results of these initiatives in the civilian market.



An Example of Initiatives Related to Quick Practical Application of Rapidly Evolving Cutting-Edge Civilian Technologies (enabling unmanned operation of equipment with the use of actuator technology)

2 Promotion of Strategic Effort to Ensure Technological Superiority

Promote prioritized research in promising fields and proactively utilize civilian technologies in order to ensure Japan's technological superiority during rapid technological innovation.

Promotion of Prioritized Research in Promising Fields

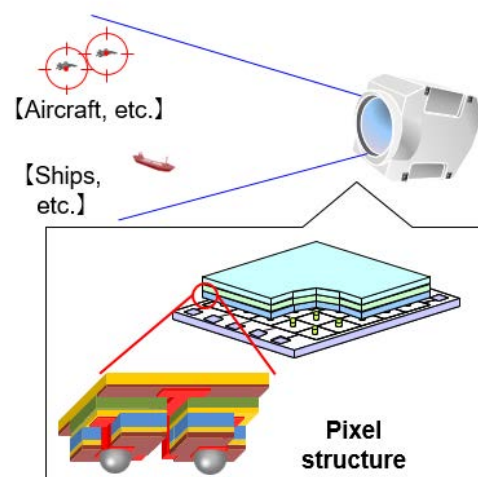
Place priority on fields related to (i) unmanned technology, (ii) smart and network technology, (iii) high-power energy technology, and (iv) improvement of function and performance of existing equipment, as indicated in the Medium-to-Long Term Defense Technology Outlook (announced in August 2016)

Enabling Unmanned

- Research on modular UUV (repost)
- Research on technologies used for remotely-operated support aircraft (¥800 million)
Conduct research related to human machine interface technology necessary for formation flight technology and remote control, which are required for a future remote-control support aircraft that can assist manned aircraft.

Smart and Network Technology

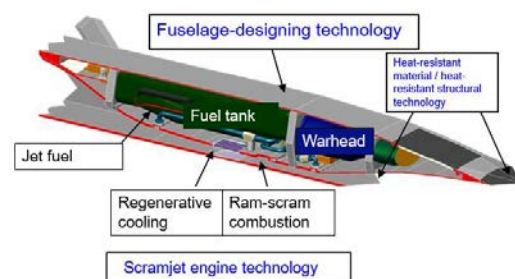
- Research on high-sensitivity and broadband infrared detecting element (¥4 billion)
Establish technology for dual-band/one element infrared detecting element that will deliver high sensitivity, broadband, and that comes with a reduction in size and weight by taking advantage of semiconductor technology built in Japan.



Research on High-Sensitivity and Broadband Infrared Detecting Element (conceptual image)

Improvement of Function and Capabilities of Existing Equipment

- Research on component technologies of hypersonic weapons (¥6.4 billion)
Conduct research on component technologies of scramjet engines operated by jet fuel, to realize a scramjet engine* which is capable of cruising in hypersonic speed.*



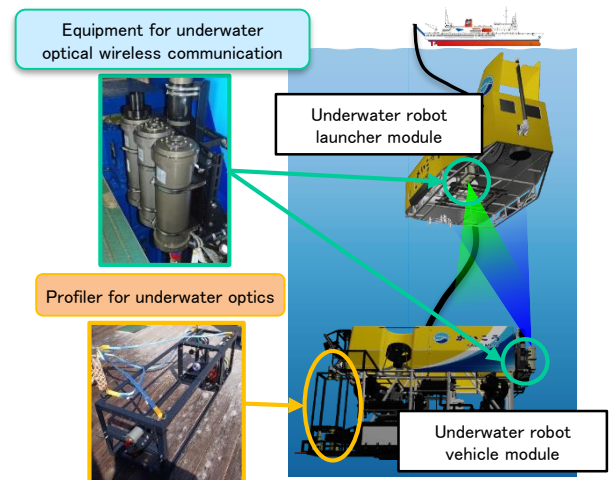
Research on Element Technologies of Hypersonic Projectile (conceptual image)

* Hypersonic speed: five times faster than the speed of sound

* Scramjet engine: An engine utilizing the combustion in the sonic speed airflow

Discovery and Promotion of Cutting-Edge Technologies Expected to be Used for Defense Applications

- Innovative Science & Technology Initiatives for Security (Funding Program) (¥10.3 billion)
Established in FY2015 with the aim to discover ingenious research regarding advanced civilian technologies, with the expectation that the studies would contribute to future research and development in the defense field.
Expanded to enable the awards of larger-scale and longer-term research projects for advanced technologies in FY2017 to continue to push the funding program.



An Example of a Research Program Conducted under the Innovative Science & Technology Initiatives for Security (Underwater optical wireless communication)

Initiatives to Use Private-Sector Knowledge

- Conduct a study to take advantage of private-sector knowledge to be used in the new operational concept, which utilizes cutting-edge technologies anticipated to be practically applied in the future. Additionally, hold a workshop-inviting experts from abroad in these fields. (¥90 million).

3 Promotion of Efficient Procurement through Project Management

Strengthening project management to steadily implement major procurement programs, and promotes initiatives of joint operation and standardization.

Steady Implementation of Procurement Programs

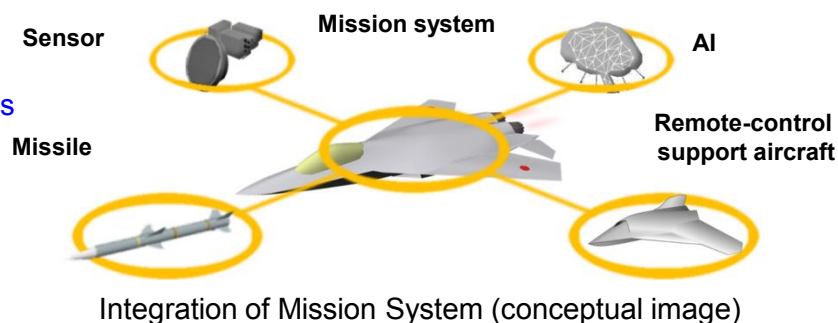
- Efficient procurement-for designated major equipment
 - Major programs designated for procurement management
Advanced ballistic missile interceptor (SM-3 Block IIA), Type-03 medium-range surface-to-air missile (modified), unmanned aerial vehicle (Globalhawk), amphibious vehicle (AAV7), new vessel, new utility helicopter (UH-X for GSDF), tilt-rotor aircraft (V-22), new patrol helicopter (improved SH-60K), fixed-wing patrol aircraft (P-1), transport aircraft (C-2), fighter aircraft (F-35A), future fighter aircraft, FY2017 submarines, [land-based Aegis System \(Aegis Ashore\)](#), [Type-16 mobility combat vehicle](#), [new aerial refueling and transport aircraft \(KC-46A\)](#), and [new air-borne early-warning aircraft \(E-2D\)](#).
 - Semi-major designated programs (project management should be conducted in a similar manner to the major programs)
New ship-to-air missile, Type-12 surface-to-ship missile (improved), new air-to-ship missile for patrol aircraft, and Space Situational Awareness (SSA) system.
- Strengthening project management
 - Research on improving life cycle cost estimate (¥30 million).
 - [Increase the number of project managers related to the newly designated equipment.](#)

Initiatives Related to Equipment Intended for Priority Project Management

(Future Fighter Jet)

- [Research on the integration of the mission system of a fighter aircraft \(¥7.9 billion\)](#)

[Conduct research on the integration technology of the mission system, which is a basis for operation/mission execution capabilities, to control mission system freely through the life cycle.](#)



- Research on overall feasibility of the development of a future fighter (¥1 billion)
Conduct studies on concept and development plans as well as capability assessment in the event of cooperation with other countries
- [Research on technologies used for remotely-operated support aircraft \(repost\)](#)

Study on the Feasibility of Cost Reductions using Cutting-Edge Production Technologies

- [Study on the use of Additive Manufacturing \(AM\) technology in the maintenance of equipment \(repost\)](#)

Initiatives Related to Equipment Taking Account of the Viewpoint of Joint Operation

- Promotion of standardization of equipment contributing to joint operation

4 Promotion of Defense Equipment and Technology Cooperation

Strengthen measures to promote effective defense equipment and technology cooperation in collaboration with private sectors through collecting information on partner countries' needs, promoting the cooperation as a package including assistance for maintenance, and publicizing our defense equipment, based on the progress of cooperative projects with the countries.

- Measures to promote defense equipment and technology cooperation
 - In order to improve the feasibility of defense equipment and technology cooperation in the field of ships, conduct studies on issues related to realize the transfer of ship parts (¥20 million).
- Measures to improve the bases for promoting defense equipment and technology cooperation
 - Conduct research on technology control for preventing technology leakage using superior outside knowledge in order to obtain information necessary for appropriate and quick evaluations of technological sensitivity in strict examination based on the Three Principles on Transfer of Defense Equipment and Technology (¥80 million).
 - Conduct studies taking account of the overseas transfer on newly initiated research and development projects.
- Strategic intelligence gathering to realize cooperation suited to other countries' circumstances
 - Clarify cooperation partner countries' needs and the feasibility of cooperation by conducting a survey on their procurement systems, production and technological bases (¥300 million).
 - Promoting cooperative projects closely with other countries through dispatch of personnel of the Acquisition, Technology and Logistics Agency, who engage in defense equipment cooperation (¥80 million).
 - Conduct a survey on other countries' research and development systems and circumstances concerning technological cooperation to further promote technological cooperation (¥60 million).
- Promotion of comprehensive cooperation with not only equipment but also maintenance
 - Dispatching personnel of Japanese maintenance companies to the Philippines.
 - ① Improve the maintenance capability on the TC-90 (¥200 million).
 - ② Transfer of technological information related to the transfer of parts and maintenance equipment for UH-1H (¥40 million).
 - Dispatch Japanese private-sector engineers and invite local private-sector engineers as part of capacity building assistance concerning equipment maintenance for ASEAN member states (¥30 million).
- Disseminate information of Japan's equipment through cooperation between the public and private sectors

Open booths of the Acquisition, Technology and Logistics Agency during international defense equipment exhibitions and display defense equipment developed in Japan and superior technologies possessed by small and medium-sized Japanese enterprises (¥300 million).



Component for UH-1H to be Transferred (a part of the whole)



Booth Hosted by the Acquisition, Technology and Logistics Agency (Eurosatory 2018)



Exhibition of P-1 Maritime Patrol Aircraft (International Berlin Air Show 2018)



Ground Display of the C-2 Transport Aircraft (Dubai Air Show 2017)

- Initiatives to improve the level of participation in the NATO Codification System which is the international standard concerning the codification of equipment, etc.

Budget related to the modification of the system to improve the level of Japan's participation and to enable Japan to register domestically-produced defense equipment, and to share and disseminate information (¥200 million).

5 Promotion of Measures to Maintain and Strengthen Defense Production and Technological Bases

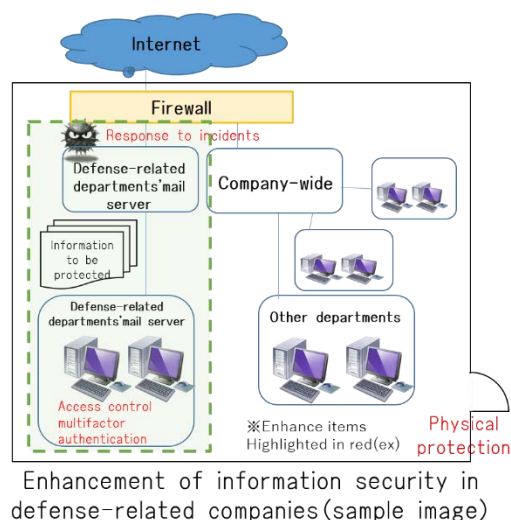
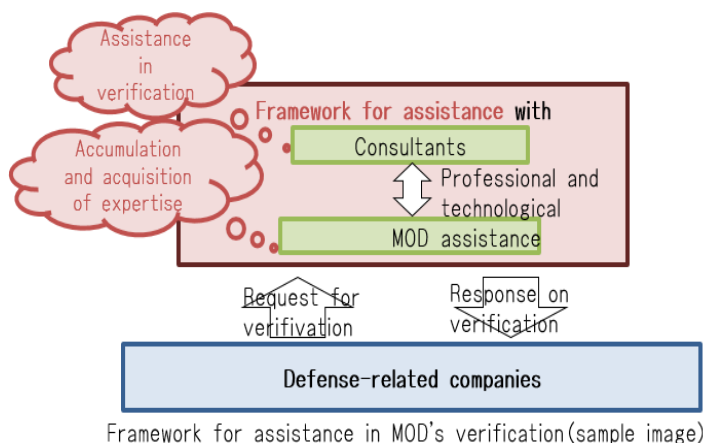
Regarding the defense industry in a severe environment, promote measures to maintain and strengthen the technological bases such as discovering and utilizing superior technologies possessed by small and medium-sized enterprises through meticulously grasping the actual circumstances of supply chains.

- Discover and utilize **innovative manufacturing technologies** and technologies possessed by small and medium-sized enterprises
 - Create opportunities for small and medium-sized enterprises possessing technologies applicable to defense equipment to match with the MOD/SDF by making use of exhibitions (¥10 million).
 - Conduct a surveys on the possibility of applying **innovative production technologies such as 3D printers and AI** to defense equipment through the matching project (¥130 million)
 - Discover advanced civilian technologies through a program for quick practical application of new technologies (repost).



Workshops and Exhibitions to Encourage Entry by Small and Medium-Sized Enterprises (conceptual image)

- Conduct surveys on the actual circumstances of supply chains of defense equipment
 - In particular, survey small and medium-sized enterprises with advanced technologies and study measures to robust defense supply chains.
 - Conduct surveys on identifying components of defense equipment with high applicability to other industrial sectors and companies involved in that production in order to take necessary measures (¥50 million).
- Research on a new method of promoting the procurement reform
 - Conduct surveys and research on ways of streamlining and reducing the cost of defense equipment, such as encouraging competition between companies through active evaluation of companies by the MOD, and then establish concrete systems (¥50 million).
- Strengthen information security concerning defense procurement
 - Build a framework utilizing technological and professional support from outside consultants to assist JMOD in verifying companies' compliance with the strengthened information security standard that is applied to companies handling the information to be protected, to encourage JMOD's security inspectors to acquire and cultivate knowledge concerning the new standard, and to facilitate companies to swiftly achieve the adaptation to the new standard (¥200 million).



V Support Stabilization of the Indo-Pacific Region and Improvement in the Global Security Environment

In order to ensure the stability of the Indo-Pacific region, Japan will enhance bilateral and multilateral cooperations and conduct various activities, including training and exercises, in a timely and appropriate manner. Japan will also actively engage in international peace cooperation efforts to properly address global security challenges.

1 Contribution to Stabilization of the Indo-Pacific Region

Promotion of Capacity Building

- Promotion of initiatives emphasizing capacity building for the ASEAN as a whole
Implement capacity building initiatives concerning humanitarian assistance/disaster relief and maritime security, while also promoting sharing of the recognition of international laws.
- Promotion of capacity building in the Indo-Pacific region
 - Implement programs in improving capabilities and training personnel in Southeast Asia in fields such as humanitarian assistance/disaster relief and PKO.
 - Implement capacity building programs related to field such as maritime security in South Asia and Pacific island nations.



Japan-ASEAN Humanitarian Assistance/Disaster Relief Seminar



Field Training in the PKO (facility) field

Promotion of Defense Cooperation and Exchanges

- Initiatives under the ASEAN Defense Ministers' Meeting-Plus (ADMM-Plus)
Proactively facilitate the enhancement of regional defense and security cooperation through the ADMM-Plus, which is the only official meeting of defense ministers of the whole Asia-Pacific region.



ADMM-Plus

- Initiatives based on the Vientiane Vision
Promote practical defense cooperation that contributes to the enhancement of the capabilities of the whole ASEAN in addition to individual ASEAN countries based on the Vientiane Vision, which is the guidelines for Japan-ASEAN defense cooperation.



Japan-ASEAN Ship Rider Cooperation Program

- Reinforcement of relationships with foreign graduates of JMOD/JSDF educational institutions (¥40 million)
Invite foreign graduates of the National Defense Academy, who are active liaisons between the MOD/SDF and their respective countries, and conduct visits to the NDA and interactions with Japanese classmates to help enhance relationships with the foreign graduates of the NDA.

- Hosting the International Defense Rugby Competition and the International Cadets Rugby Competition (¥800 million)

In order to encourage interactions among armed forces and cadets from various countries in the area of sports, and help them build mutual understanding and relationships of trust, the International Defense Rugby Competition and International Cadets Rugby Competition will be held in line with the Rugby World Cup 2019. The JSDF team and armed forces from various countries will participate in the IDRC and the National Defense Academy Cadets' team and teams of cadets from various countries will participate in the ICRC.



[SDF Vs. UK Royal Navy (last competition)]

- Participation in the Pacific Partnership 2019

By visiting countries in the Indo-Pacific region to provide medical services and conduct cultural exchanges, the Pacific Partnership strengthens partnerships among participating countries and facilitates international disaster relief operations through cooperation with governments, militaries, international organizations and NGOs.



Pacific Partnership

- Japan-U.S.-Australia Humanitarian Assistance/Disaster Relief Joint Exercise in Micronesia (¥10 million)

Jointly working with the U.S. and Australia to improve the airdrop capabilities and to reinforce partnerships in order to conduct swift and effective assistance operations in flooded areas or sea areas in the event of a large-scale disaster including flood or a tsunami.



Japan-U.S.-Australia HA/DR Joint Exercise

2 Appropriately Respond to Improve Global Security Challenges

Enhancement of Capability to Conduct Overseas Activities

- Participation in multilateral exercises

The GSDF, MSDF and ASDF participate in multilateral exercises such as Cobra Gold in order to enhance capabilities for international peace cooperation activities.



Cobra Gold (conceptual image)

International Cooperation with UN and Partners in the Areas of Strength

- Dispatch of instructors to PKO Centers in African countries
The SDF dispatches personnel as instructors in order to educate peace keeper candidates, mainly in African countries, to help improve their own peacekeeping capabilities and to maintain stability in the region.
- Capacity building assistance of disaster response capacity enhancement for the Djibouti Forces
Promote mutual understanding and confidence building with the Republic of Djibouti, mainly through enhancement of the relationship between the defense authorities, and contribute to the development and peace of Africa by implementing assistance to enhance disaster response capabilities for the Djibouti Forces, for which there has been a strong request from the Djibouti government.
- Dispatch of lecturers to the UN project for Rapid Deployment of Enabling Capabilities (RDEC)
Contribute to rapid deployment of U.N. PKO engineering units by dispatching SDF personnel and providing education to engineers from African and other countries with regard to the operation of heavy machinery.



Education Concerning the Operation of Engineering Equipment (conceptual image)



A Japanese Instructor Training Students (Tanzanian Armed Forces, etc.) on operation of heavy machinery

Ensuring Maritime Security

- Counter-piracy operations off the coast of Somalia and in the Gulf of Aden
 - Continue counter-piracy operations by destroyers and P-3Cs off the Coast of Somalia and in the Gulf of Aden.
 - Carry out activities in Combined Task Force 151 (CTF151), a multinational counter-piracy task force.
 - Conduct air transportation using C-130H as necessary.



A Destroyer Escorting Commercial Vessels (conceptual image)

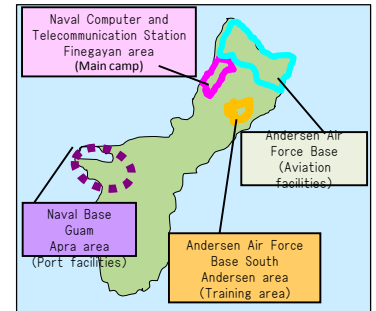
VI Strengthening Japan-U.S. Alliance and Measures for Bases

While maintaining the deterrence of U.S. Forces, Japan will steadily implement specific measures, including the realignment of U.S. Forces in Japan, to mitigate the impact on local communities, such as those in Okinawa.

1 U.S. Forces Realignment-Related Expenses [measures for mitigating the impact on local communities] (item request)

Relocation of U.S. Marine Corps Stationed in Okinawa to Guam

- Projects concerning the relocation of the U.S. Marine Corps stationed in Okinawa to Guam



Guam

Realignment-Related Measures of U.S. Forces in Japan

- Project for the realignment in Okinawa
- Project for the relocation of carrier-based aircraft
- Project for contingency use
- Project for the relocation of trainings
- Project intended to facilitate smooth implementation of realignment-related measures



MCAS Futenma



2 SACO-Related Expenses (item request)

- Japan will continue to steadily implement the measures (mitigating the impact on local communities in Okinawa) in the Special Action Committee on Okinawa (SACO) Final Report unless changes were made under the Japan-U.S. Security Consultative Committee ("2+2") Joint Statement



Considering the importance of implementing the above measures as early as possible, the results of coordination with local communities, U.S. Forces, etc., during the budget drafting process needs to be reflected in the budget. The JMOD will carefully consider during the budgetary process and take necessary measures.

3 Promotion of Measures for Bases

In order to balance the operational requirements of defense facilities and local communities, Japan will steadily implement measures for communities around bases, and promote measures to secure smooth and effective stationing of the U.S. Forces in Japan.

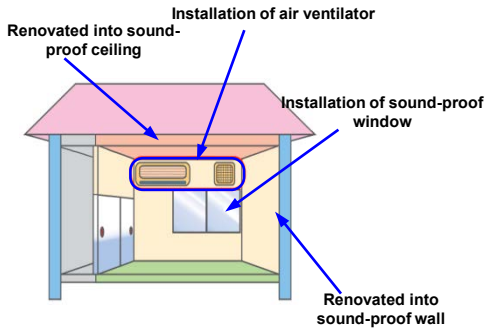
(1) Expenses Related to Programs for Communities Around Bases

¥157.5 billion

Including: Residential sound proofing: ¥64.5 billion
Improvement of living environment of neighboring communities: ¥92.9 billion

- Expenses for the prevention of disturbances resulting from SDF activities or the establishment and operations of defense facilities
 - Implementation of sound proofing projects for residences around air bases, etc.
 - Implementation of projects to improve the living environment of neighboring communities (river and road restoration, sound-proofing systems in schools, sand control dams, improvement of public welfare facilities, etc.).
 - Implementation of projects covered by specified Defense Facilities Environment Improvement Adjustment Grants, which are strongly requested from municipalities around bases (development of public facilities and so-called soft projects, such as medical cost subsidies, etc.).

[Example of Residential Sound Proofing]



Sand Control Dam

(2) Cost Sharing for the Stationing of U.S. Forces in Japan

¥198.8 billion

Including: Special Measures Agreement: ¥149.7 billion
Facilities Improvement Program: ¥21.7 billion
USFJ employee measures, etc.: ¥27.4 billion

- Expenses of burden cost sharing based on the Special Measures Agreement and other measures to ensure the smooth and effective stationing of U.S. Forces in Japan
 - Share the labor cost of USFJ employees and cost of utilities used at USFJ facilities.
 - Facilities Improvement Program (barracks, family housing, etc.).
 - Share the cost of social insurance premiums by the employer (healthcare insurance, welfare annuity insurance, etc.) for USFJ employees.



Barracks

(3) Rent for Facilities, Compensation Expenses, etc.

¥145.5 billion

- Rental cost for the land of defense facilities and compensation for the loss of fishers' income due to training on water areas, etc.

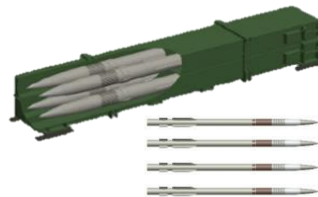
VII Streamlining Initiatives

Various initiatives will be promoted to further rationalize and streamline overall equipment procurements, seeking to save approx. ¥123.7 billion.

1 Procurement of Equipment and Services Using Long-Term Contracts [expected reduction: approx. ¥2.7 billion]

Pursue lower-cost and stable procurement of equipment and services by making use of long-term contracts of five fiscal years or longer

- Seek cost through the bulk purchase of maintenance parts for the PAC-3 missiles, which had previously been procured for each repair
 - Bulk purchase contract on parts for the PAC-3 missile (procured over 10 fiscal years) (Expected reduction: ¥2.7 billion).



Parts for PAC-3 Missile



PAC-3 Missile

2 Review of Maintenance Methods [expected reduction: approx. ¥21.2 billion]

Streamline maintenance costs by consolidating equipment, etc.

[Example]

- Project concerning the development of an AI data management cloud for the JMOD (expected reduction: ¥3.5 billion)

Pursue cost reduction by migrating the administrative system to a cloud-based and packaging the overall process from the design to the operation and maintenance of this new system in a project using the PFI method, based on the “Declaration to be the World's Most Advanced IT Nation: Basic Plan for the Advancement of Public and Private Sector Data Utilization”.

3 Use of Civilian Goods and Review of Specifications [expected reduction: ¥31 billion]

Pursue cost savings by using civilian goods and reviewing specifications of equipment

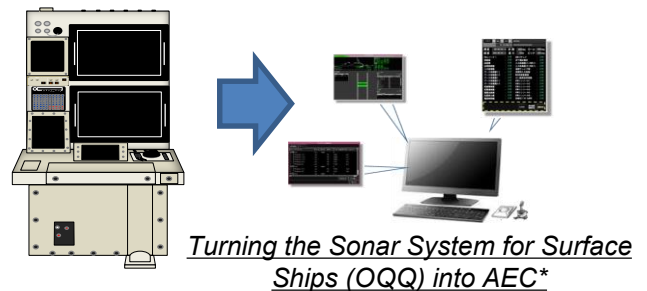
[Examples]

- Development of digital educational materials (expected reduction: ¥11.2 billion)

Seek to save costs by switching to inexpensive digital learning materials instead of introducing actual equipment for education and training machines.

* AEC Advanced Electronic Classroom System
- Develop a research prototype for the FC network (expected reduction: ¥4.5 billion)

Pursue cost savings by reviewing the specifications of radio equipment and utilizing existing technologies.



*Turning the Sonar System for Surface Ships (OQQ) into AEC**

4 Bulk Purchase of Equipment [expected reduction: ¥21.3 billion]

Streamline budget costs by concentrating budget requests in a single fiscal year for equipment, which is otherwise costly due to small-lot purchases.

5 Cost Scrutiny, etc. [expected reduction: ¥47.5 billion]

Pursue reduction of the procurement cost for major equipment through examination of the unit cost and related expenses.

VIII Others

1 Restructuring and Organizational Quota Changes

Implement unit reorganization programs in order to ensure effective deterrence and response to various situations.

○ Establishment of “Airborne Warning and Control Wing” (repost)

○ Request for increase in the number of SDF personnel

Improve the readiness to quickly respond to various situations by increasing the number of uniformed SDF personnel to develop and reinforce the defense postures in the southwestern region as well as in its surrounding sea and airspace, while also improving the response capability to cyberattacks.

	GSDf	MSDF	ASDF	Joint Staff Office and others	Total
Improve sufficiency rate	+ 2 5 0	+ 2 1 0	+ 2 0 4	0	+ 6 6 4
Transfer	△ 5 7	△ 4	△ 1 3	+ 7 4	
Total	+ 1 9 3	+ 2 0 6	+ 1 9 1	+ 7 4	

Note: Joint Staff Office and others include the Joint Staff Office, joint task units, the Defense Intelligence Headquarters, the Internal bureau, and the Acquisition, Technology and Logistics Agency.

○ Organizational quota changes

- Establish the “Electromagnetic Spectrum Policy Office (tentative name)” in the Information Communications Division of the Bureau of Defense Buildup Planning to strengthen project planning related to effective/efficient utilization of electromagnetic spectrum in the JMOD/JSDF and coordination with other ministries and agencies (repost).
- To strengthen postures in the JMOD/JSDF in a unified manner for the introduction of AI, establish the “AI/Cyber Security Promotion Office (tentative name)” in the Information and Communications Division of the Bureau of Defense Buildup Planning, and create the “AI Planning Section” (tentative name) in the new office (repost).
- Establish the “Recruitment Promotion Office (tentative name)” in the Human Resources Development Division of the Personnel and Education Bureau to work on strengthening collaboration with local public entities and other ministries and agencies (repost).
- In order to develop an organization of the Advanced Defense Technology Center in the Acquisition, Technology and Logistics Agency, to conduct translational research in an integrated manner to apply the results of advanced basic research obtained through the Innovative Science & Technology Initiative for Security to practical research on operationalization; transfer a portion of the operation concerning the said initiative, which is now administered by the Director of Technology Promotion and IP Management of the Department of Technology Strategy of the Acquisition, Technology and Logistics Agency, to the Advanced Defense Technology Center (change of operation).

2 Initiatives to Ensure Appropriate Management of Administrative Documents

- Establish the position of Chief Record Officer (tentative name) (universally known as “CRO of government organizations”) and the Office of Chief Record Officer
Create the position of Chief Record Officer (provisional name), who is in charge of the management of public documents and public information disclosure, and the Office of Chief Record Officer, which reports to the newly established Chief position to enhance the ability to oversee the management of administrative documents and response to requests of public information disclosure, and to ensure a unified and appropriate management of administrative documents.
- Increase the number of personnel to advance the electronic management of documents
Increase the number of personnel to advance the efficient management of digitalized documents and to shift to an electronic approval system
- Development of an AI data management cloud for the JMOD contributing to the integrated storage and understanding of documents (repost)

3 Tax Reform Request

- Expansion of Tax Exemption Measures for the case of Provision of Tax-Exempt Light Oil based on ACSA (procurement and Cross-Servicing Agreement)

【Light Oil Delivery Tax】

Currently, special measures for exemption of Light Oil Delivery Tax is applied to the JMOD when providing tax-exempt light oil to Australia and UK based on ACSA. The JMOD requests for the application of special measures for tax exemption in the same manner when providing tax-exempt light oil based on a new ACSA if it is concluded hereafter.



Providing Light Oil to the Foreign Military Vessel at Sea

- Expansion of Special Deduction of Corporate Tax, etc. when Conducting Experimental Research (Joint Request: Ministry of Economy, Trade and Industry (METI), etc.)

【Income Tax/Corporation Tax/Corporate Inhabitant Tax】

The JMOD requests an increase in the maximum deduction cost of total-amount-type (including tax system for strengthening the technological bases of small and medium-sized enterprises (SMEs)) as well as a raise in the deduction rate in the case of cooperative research with venture enterprises, in order to strengthen incentives to invest in research and development, etc.

- Establishment of Tax Exemption Measures for the Australian Defense Force based on an Agreement Concerning Reciprocal Access Agreement between Japan and Australia (tentative name) (Joint Request: Ministry of Foreign Affairs (MOFA))
【Multiple Taxes】

The MOFA and JMOD jointly request for the establishment of tax exemption measures because an agreement currently being negotiated concerning the facilitation of reciprocal access between Japan and Australia (tentative name) could include tax exemption clauses for the Australian Defense Force (ADF) when importing items in case Japan accepts ADF as visiting force under this agreement. (Note: Such tax exemption is stipulated in a similar type of agreements that Australia has concluded with other countries.) There is a possibility that this agreement could be signed by the end of JFY2019.

Major Equipment

1 Major Equipment

Procurement type				FY2018 Number procured	FY2019	
					Number procured	Amount (¥100 million)
Aircraft	GSDF	Tilt-rotor aircraft (V-22)		4	—	—
		New utility helicopter (UH-X)		—	6	110 (52)
	MSDF	Life extension of fixed-wing patrol aircraft (P-3C)		(3)	(5)	23
		Life extension of patrol helicopter (SH-60K)		(3)	(3)	63
		Life extension of patrol helicopter (SH-60J)		(2)	(2)	13
		Life extension of imagery intelligence gathering aircraft (OP-3C)		(1)	—	—
		Improvement in capability of radars mounted on fixed-wing patrol aircraft (P-3C)	Upgrade	(4)	(1)	0.3
			Parts	(—)	(—)	
	ASDF	Fighter aircraft (F-35A)		6	6	916
		Improvement in air-to-air combat capability of fighter aircraft (F-2)	Upgrade	(2)	(—)	1
			Parts	(5)	(7)	
		Additional installment of JDCS (F) function to fighter aircraft (F-2)		(2)	—	
		Improvement in capability of fighter aircraft (F-15)		—	(2)	101
		Transport aircraft (C-2)		2	2	457 (31)
		New airborne early-warning aircraft (E-2D)		1	2	544
		Improvement in capability of Airborne Warning and Control Systems (E-767)	Upgrade	(1)	(1)	129
			Parts	(—)	(—)	
		New aerial refueling and transport aircraft (KC-46A)		1	—	—
		Installment of aerial refueling capability in transport aircraft (C-130H)	Upgrade	(1)	(—)	—
			Parts	(—)	(—)	
	Joint Unit	Unmanned aerial vehicle (RQ-4B Global Hawk)		1	1	81
Vessel	MSDF	Destroyer		2	2	995 (5)
		Submarine		1	1	711 (1)
		Life extension of Asagiri-class destroyer	Work	(2)	(2)	3
			Parts	(4)	(1)	
		Life extension of Abukuma-class destroyer	Work	(—)	(1)	0.1
			Parts	(2)	(—)	
		Life extension of Kongo-class destroyer	Work	(—)	(—)	26
			Parts	(1)	(2)	
		Life extension of Murasame-class destroyer	Work	(—)	(—)	32
			Parts	(—)	(1)	
		Life extension of Oyashio-class submarine	Work	(4)	(4)	62
			Parts	(5)	(3)	
		Life extension of Hibiki-class ocean surveillance ship	Work	(—)	(—)	11
			Parts	(1)	(2)	
		Life extension of Towada-class fast combat support ship	Work	(—)	(1)	3
			Parts	(2)	(1)	
		Improvement in capacity of the short-range SAM system on Takanami-class destroyer	Work	(1)	(1)	0.6
			Parts	(—)	(—)	
		Modernization of destroyer CIWS (high-performance 20mm autocannon)	Work	(3)	(5)	3
			Parts	(—)	(4)	
		Improvement in anti-submarine capability of Akizuki- class destroyer (multistatic)	Work	(1)	(2)	0.8
			Parts	(—)	(—)	
		Improvement in calculation capability of the type-3 short-range SAM system	Work	(—)	(—)	5
			Parts	(1)	(1)	

Procurement type				FY2018 Number procured	FY2019	
					Number procured	Amount (¥100 million)
Vessel	MSDF	Modernization of command system of Asagiri-class destroyer	Work	(2)	(2)	9
			Parts	(—)	(—)	
		Update of computers in command system of takanami-class destroyer	Work	(1)	(—)	—
			Parts	(—)	(—)	
		Update of computers in command system of Murasame-class destroyer	Work	(—)	(2)	9
			Parts	(2)	(—)	
		Update of computers in command system of Akizuki-class destroyer	Work	(—)	(—)	13
			Parts	(1)	(1)	
		Update of computers in command system of Hyuga-class destroyer	Work	(1)	(1)	10
			Parts	(—)	(—)	
		Update of computers in command system of Izumo-class destroyer	Work	(—)	(1)	2
			Parts	(1)	(—)	
		Modernization of command system of Oyashio-class submarine	Work	(2)	(1)	2
			Parts	(1)	(—)	
		Improvement in capability of Osumi-class LST	Work	(2)	(—)	—
			Parts	(—)	(—)	
		Upgrade of submarine rescue ship Chihaya	Work	(—)	(—)	23 (0.7)
			Parts	(—)	(1)	
Missile	GSDF	Type-03 middle-range surface-to-air missile (modified)		1 company	1 company	138
		Type-11 short-range surface-to-air missile		1	1	46
		Middle-range multi-purpose missile		9 sets	6 sets	45
		Type-12 surface-to-ship missile		1	1	132
Firearm, vehicle, etc.	GSDF	Type-89 rifle		1,500	—	—
		Anti-personnel sniper rifle		6	6	0.4
		60mm mortar (B)		6	6	0.2
		81mm mortar L16		1	—	—
		120mm mortar RT		2	12	6
		155mm self-propelled howitzer		—	7	48 (17)
		Type-99 155mm self-propelled howitzer		7	—	—
		Type-10 tank		5	6	80
		Type-16 mobile combat vehicle		18	22	164
		Vehicle, communications equipment, facility equipment, etc.		¥19.4 billion (1)	—	406
BMD	GSDF	Land-based Aegis system (Aegis Ashore)		—	2	2,343
	MSDF	Improvement in capability of Aegis-equipped destroyers		—	2 vessels	75
	ASDF	Upgrade of Patriot system		—	12	111

Note 1: The procurement amount for FY2018 indicates the number that was envisioned in the original budget.

Note 2: Price represents amounts, excluding non-recurring costs, needed for the production of equipment. The non-recurring costs are indicated in parentheses in the amount column (external value).

Note 3: "Number procured" indicates the number newly contracted in FY2019. (The period for acquiring the item varies by equipment, but can take between two to five years.)

Note 4: The number in brackets represents the number related to upgrading the existing commissioned equipment.

Note 5: Regarding the procurement for the improvement in capability of radars mounted on fixed-wing patrol aircraft (P-3C), improvement in air-to-air combat capability of fighter aircraft (F-2), improvement in capability of Airborne Warning and Control Systems (AWACS) (E-767), installation of aerial refueling capability to transport aircraft (C-130H), improvement of the short-range SAM system on Takanami-class destroyer, modernization of destroyer CIWS (high-performance 20mm autocannon), improvement in anti-submarine capability of Akizuki-class destroyers (multistatic), improvement in calculation capability of FCS-3, etc., modernization of command system of Asagiri-class destroyers, update of computers in command system of destroyers, modernization of command system of Oyashio-class submarine, and upgrade of submarine rescue ship Chihaya, the upper figure represents the procurement of modification and work services for the existing commissioned equipment, while the lower figure represents the number of parts, etc. necessary for the capability improvement. Regarding the volume of procurement for the service like extension of vessels, the upper figure represents the number of ships subject to service life extension work and the lower figure represents the number of parts procured for service life extension work.

Note 6: The number of procurements in FY2019 for the upgrade of the capability of Aegis-equipped destroyers represents the number of procurements for upgrading two Atago-class destroyers to be able to launch SM-3 Block IIA.

2 Major Research and Development Programs

Item	Overview	FY2019 Amount (¥100 million)
Research on HVGP (Hyper Velocity Gliding Projectile) for Defense of Remote Islands	Establish component technologies, including supersonic glide technology for high altitude and technology to hit a target with high accuracy, and conduct research on technologies necessary for the early practical usage of HVGP intended for the defense of remote islands, which projects firepower in island-to-island firing.	138
Development of multi-purpose missile system (modified)	Develop a multi-purpose missile system (modified) with higher function and capabilities compared to the existing equipment, such as a longer range and better capability to simultaneously respond to multiple targets, at a lower procurement cost.	35
Research on high-efficiency electricity storage and supply system for submarines	Conduct research on increasing the volume and density of electricity storage system and streamlining and downsizing the electricity supply system to extend submarines' underwater time and prevent submarines from becoming larger in size.	44
Research on FC network	Research on FC Network that Enables Network Launches through Real Time Sharing of Sensor Information within the utility Destroyer Fleet.	69
Research on modular UUV	Establish UUV (Unmanned Underwater Vehicle) technology which is available for various missions such as surveillance activities and marine observation, by prototyping a long-endurance UUV which has exchangeable mission modules, and conduct research to ensure credibility required in longer deployments in terms of distance and time.	42
Research on high-sensitivity infrared detection elements	Establish technology for dual-band/one element infrared detection elements, which will deliver a reduction in size and weight, high sensitivity and broadband by taking advantage of semiconductor technology built by Japan.	40
Research on component technologies for hypersonic Cruise Weapons	Conduct research on component technologies consisting of a scramjet engine operated by jet fuel to deliver a scramjet engine that can cruise at a hypersonic speed.	64

3 Changes in the Number of SDF Personnel

● Changes in the number of SDF personnel

(Unit: Person)

	End of FY2018	End of FY2019	Change
GSDF	158,909	158,758	△151
Regular personnel	150,834	150,777	△57
Ready reserve personnel	8,075	7,981	△94
MSDF	45,360	45,356	△4
ASDF	46,936	46,923	△13
Joint units	1,288	1,350	62
Joint Staff Office	372	376	4
Defense Intelligence Headquarters	1,910	1,918	8
Internal Bureau	48	48	0
Acquisition, Technology and Logistics Agency	406	406	0
Total	247,154	247,154	0
	(255,229)	(255,135)	(△94)

Note 1: Figures for the end of each fiscal year are budget figures.

Note 2: The number in the parentheses includes the number of SDF ready reserve personnel.

● Number of SDF personnel (annual average)

(Unit: Person)

	GSDF	MSDF	ASDF
Annual average	140,155	42,499	43,659

● Number of SFD reserve personnel

(Unit: Person)

	GSDF	MSDF	ASDF	Total
SDF reserve personnel	46,000	1,100	800	47,900

● Number of candidates for reserve personnel

(Unit: Person)

	GSDF	MSDF	Total
SDF reserve candidates	4,600	21	4,621

● Change in the number of administrative officials

(Unit: Person)

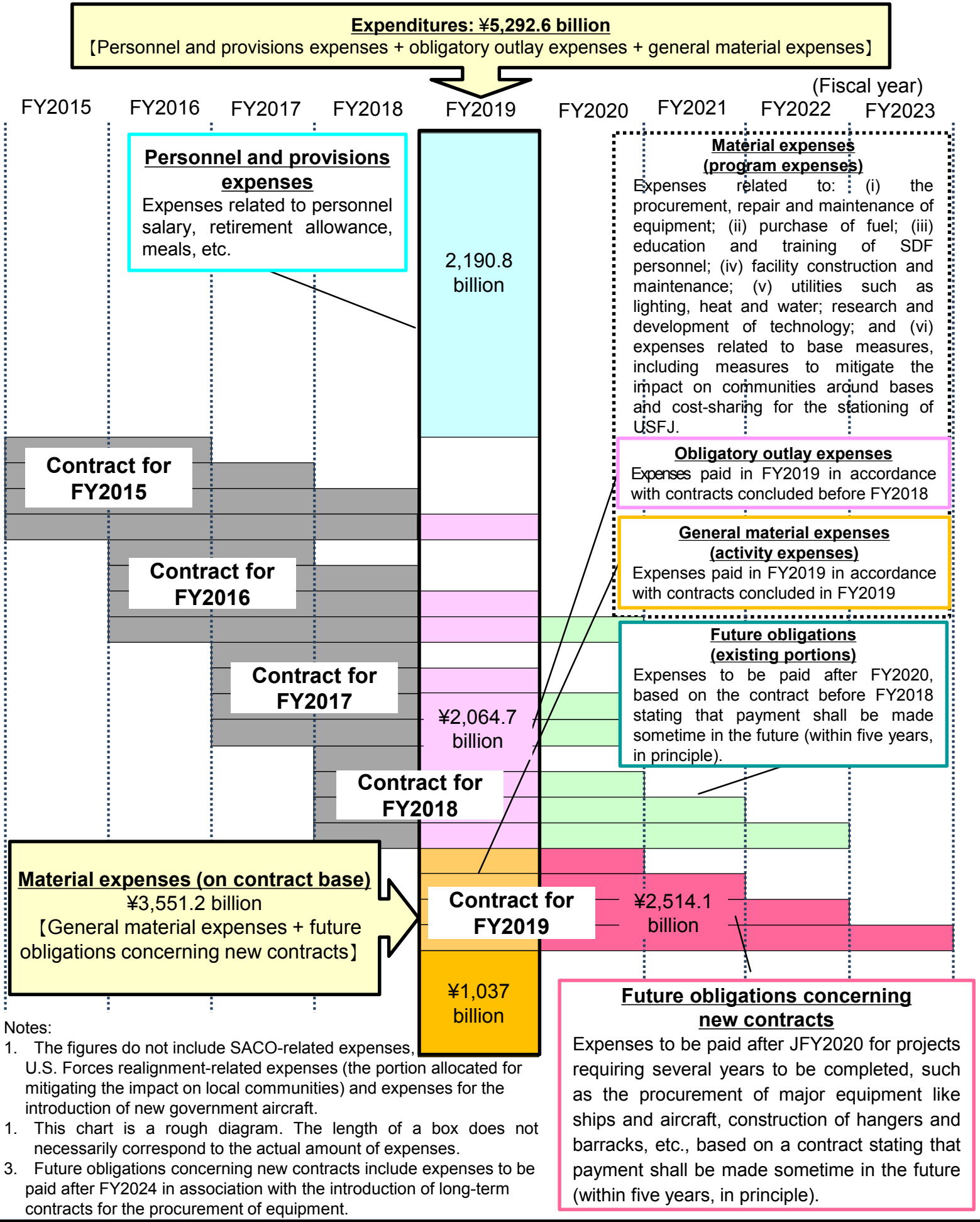
	FY2018	FY2019	Note
Increase	206	394	
Rationalization, etc.	△273	△270	
Total	△67	124	
Number at the end of FY	20,912	21,036	

Note 1: Including the Minister, State Minister, two Parliamentary Vice-Ministers, and Senior Advisor to the Minister

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Reference

Composition of Defense-Related Expenses



Notes:

1. The figures do not include SACO-related expenses, U.S. Forces realignment-related expenses (the portion allocated for mitigating the impact on local communities) and expenses for the introduction of new government aircraft.
1. This chart is a rough diagram. The length of a box does not necessarily correspond to the actual amount of expenses.
3. Future obligations concerning new contracts include expenses to be paid after FY2024 in association with the introduction of long-term contracts for the procurement of equipment.

【Details and Classification of Material Expenses (program expenses)】

(Unit: ¥100 million)

FY2019	Expenditure base	Contract base
Material expenses (program expenses)	31,017	35,512
Obligatory outlay expenses	20,647	
General material expenses (Activity expenses)	10,370	10,370
Future obligation concerning new contracts		25,141

(Explanation)

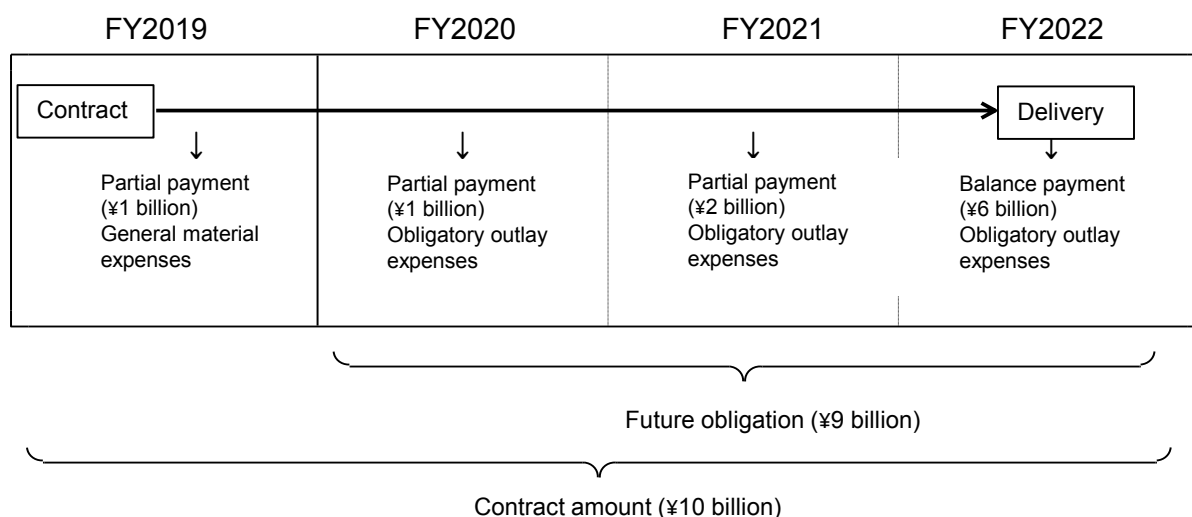
○ Expenditure base: Total amount to be paid in the current fiscal year for projects like procurement of equipment and facility development. Specifically, it is the sum of the expenses to be paid in FY2019 (general material expenses) based on the contracts concluded in FY2019 and the expenses to be paid in JFY2019 (obligatory outlay expenses) based on the contracts concluded before FY2018. This is a useful point of view in understanding the share of defense-related expenses in the overall expenditure budget of the government, which is in principle an annual budget.

○ Contract base: Total amount of contracts concluded in the current fiscal year for projects like procurement of equipment and facility development. Specifically, the sum of the expenses to be paid in FY2019 and the expenses to be paid after FY2020 (future obligation pertaining to new contracts) based on the contracts concluded in FY2019. This is a useful point of view in understanding the total amount of expenses by program with respect to year-by-year projects for developing defense capabilities.

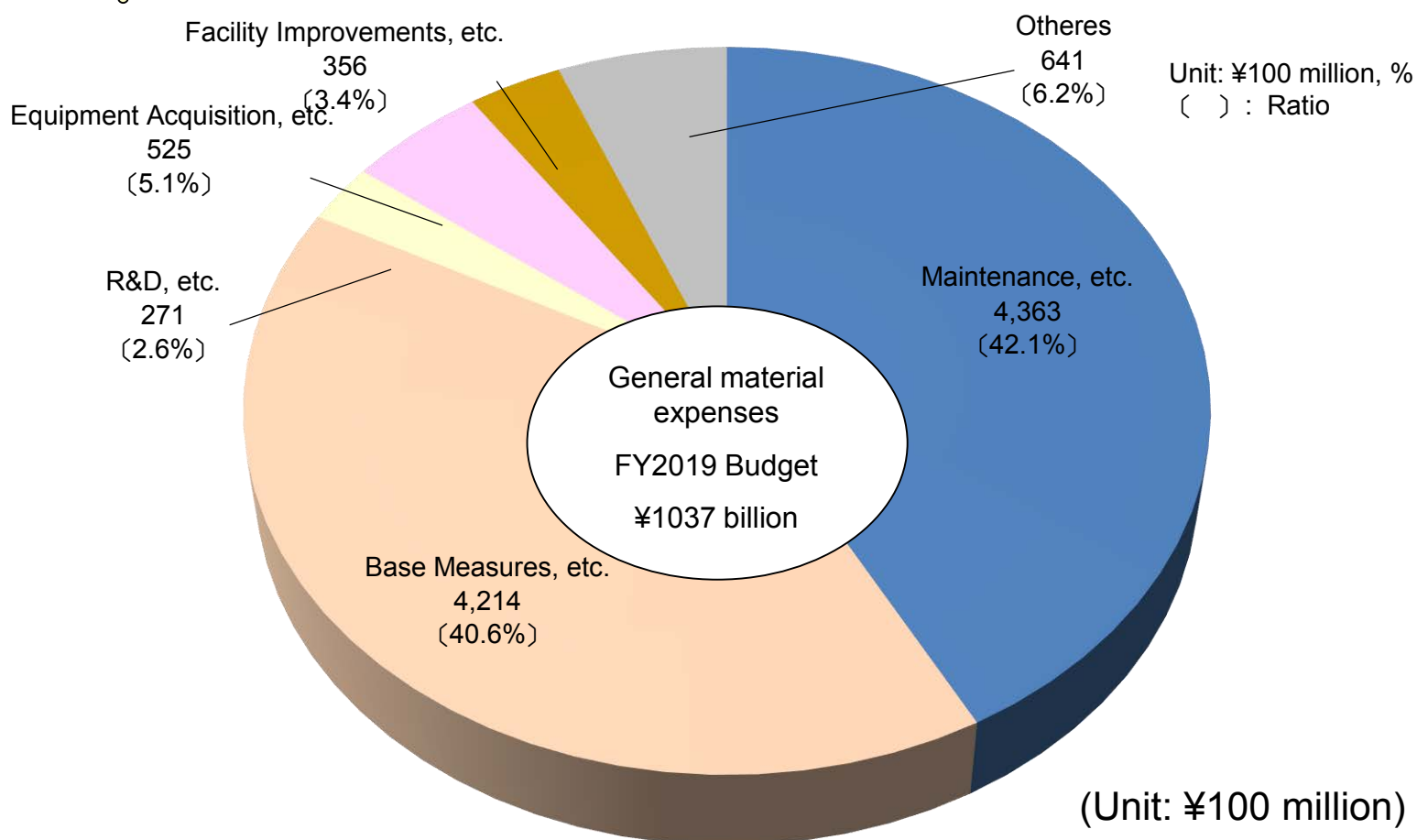
Concept for Future Obligation

The build-up of defense capabilities, such as procurement of major equipment including vessels and aircraft, as well as construction of hangars and accommodations for SDF personnel, may take several fiscal years. For this reason, the Ministry of Defense makes contracts for which the span is several fiscal years (up to five years, in principle), and, at the time of concluding a contract, makes an advance commitment to pay the expenses at a certain time in the future. Future obligation refers to the amount that will be paid in the fiscal year or years following the year the contract is concluded, in accordance with the contract of several fiscal years.

(e.g.) 10 billion worth of equipment is procured under a four-year contract



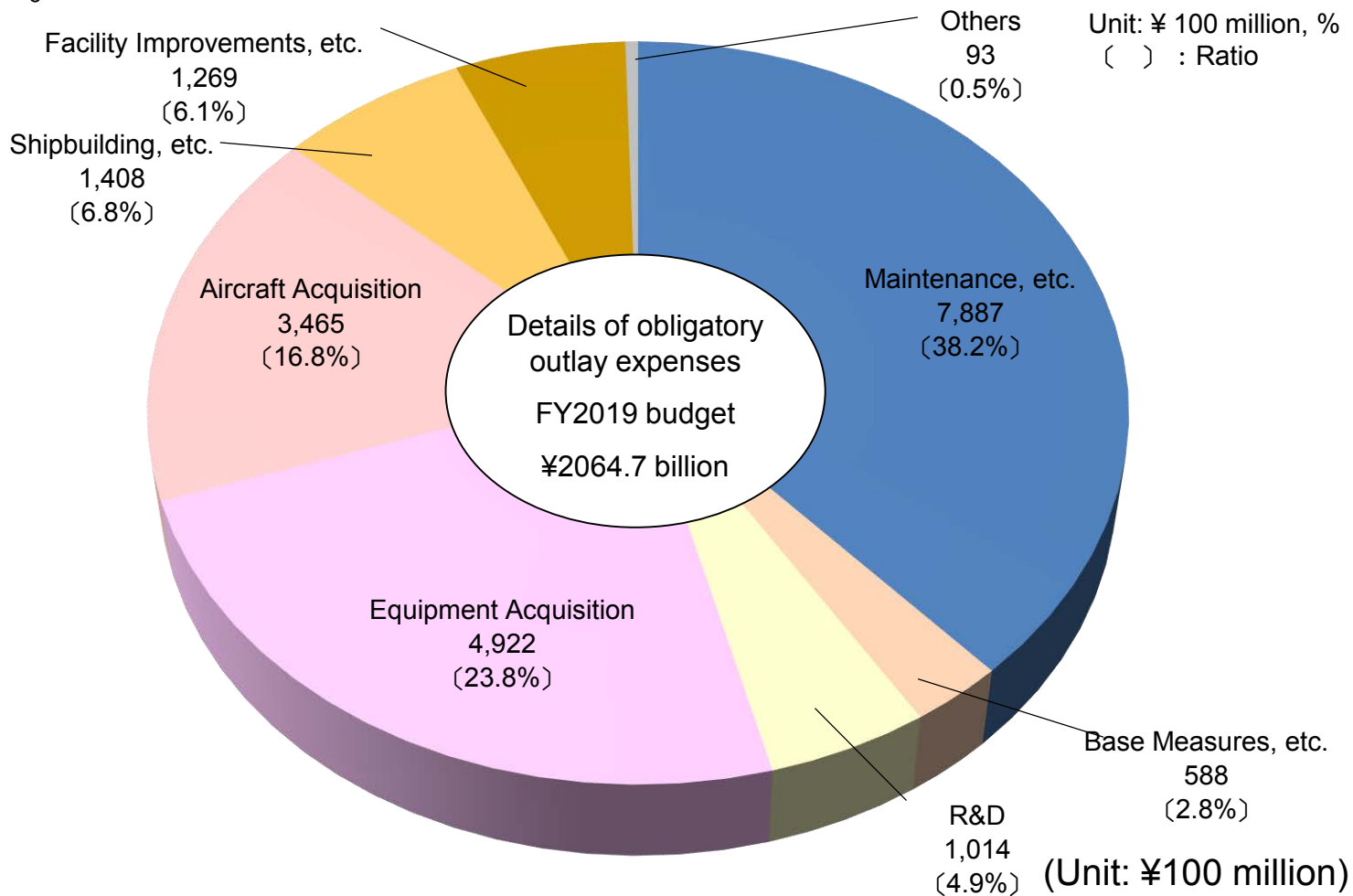
Details of General Material Expenses (activity expenses)



Item	F Y 2 0 1 8	F Y 2 0 1 9	YoY Change
Maintenance, etc.	4, 3 1 1	4, 3 6 3	5 2
• Petrol	8 9 7	9 6 9	7 2
• Repair	1, 8 8 9	1, 8 5 8	△ 3 1
• Education & training	2 8 5	2 9 3	8
• Medical care, etc.	2 7 2	2 7 9	7
• Utilities	9 6 8	9 6 5	△ 4
Base measures, etc.	4, 0 5 1	4, 2 1 4	1 6 3
• Countermeasures in areas near bases	8 6 9	1, 0 0 6	1 3 8
• Host nation support	1, 8 0 3	1, 8 0 6	4
• Rent, compensation costs, etc.	1, 3 8 0	1, 4 0 1	2 2
Research & development	2 7 2	2 7 1	△ 1
Equipment procurement, etc.	2 5 7	5 2 5	2 6 8
Facility improvements, etc.	4 2 4	3 5 6	△ 6 8
Other (computer rentals, etc.)	6 3 2	6 4 1	9
Total	9, 9 4 9	1 0, 3 7 0	4 2 2

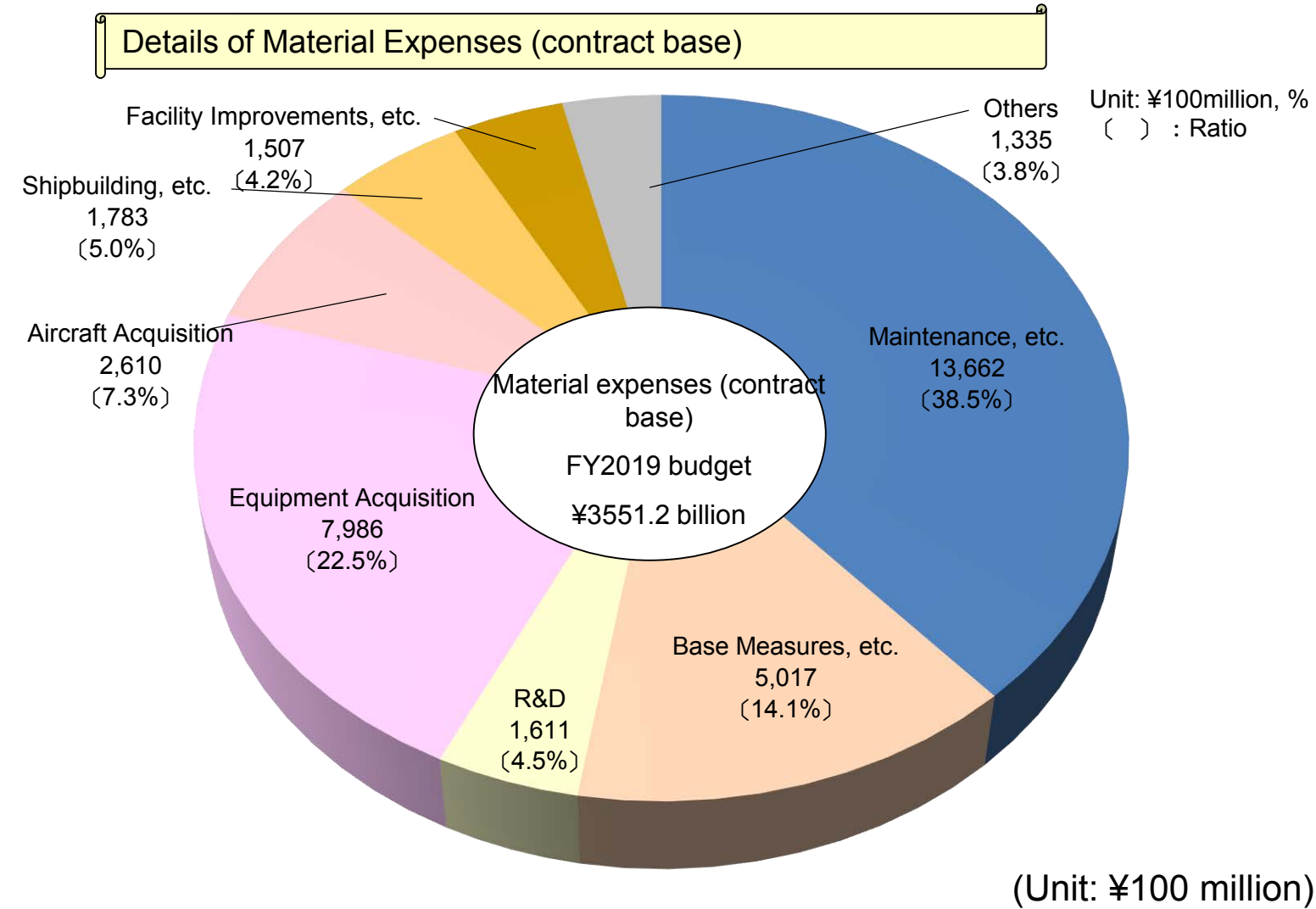
Note: The figures do not include SACO-related expenses, U.S. Forces realignment-related expenses (the portion allocated for mitigating the impact on local communities) and expenses for the introduction of new government aircraft.

Details of Obligatory Outlay Expenses



Item	FY2018	FY2019	YoY Change
Maintenance, etc.	7, 0 3 2	7, 8 8 7	8 5 5
Repair	6, 7 6 1	7, 5 3 9	7 7 9
Education & training, etc.	2 7 1	3 4 8	7 6
Base measures	3 9 8	5 8 8	1 9 0
Research & development	7 6 2	1, 0 1 4	2 5 2
Equipment procurement	3, 4 0 0	4, 9 2 2	1, 5 2 2
Aircraft procurement	3, 3 5 4	3, 4 6 5	1 1 1
Shipbuilding, etc.	1, 1 7 9	1, 4 0 8	2 2 9
Facility improvements, etc.	1, 3 2 8	1, 2 6 9	△ 6 0
Other (computer rentals, etc.)	1 3 5	9 3	△ 4 2
Total	1 7, 5 9 0	2 0, 6 4 7	3, 0 5 7

Note: The figures do not include SACO-related expenses, U.S. Forces realignment-related expenses (the portion allocated for mitigating the impact on local communities) and expenses for the introduction of new government aircraft.



Item		FY2018	FY2019	YoY Change
Maintenance, etc.		1 2, 2 6 1	1 3, 6 6 2	1, 4 0 1
	Petrol	8 9 7	9 6 9	7 2
	Repair	9, 4 9 3	1 0, 8 2 0	1, 3 2 6
	Education & training, etc.	1, 8 7 1	1, 8 7 3	3
Base measures		4, 6 4 2	5, 0 1 7	3 7 5
Research & development		1, 4 4 5	1, 6 1 1	1 6 7
Equipment procurement		4, 4 2 2	7, 9 8 6	3, 5 6 3
Aircraft procurement		2, 8 3 2	2, 6 1 0	△ 2 2 2
Shipbuilding, etc.		1, 7 7 7	1, 7 8 3	6
Facility improvements, etc.		1, 8 0 4	1, 5 0 7	△ 2 9 6
Other (computer rentals, etc.)		7 0 4	1, 3 3 5	6 3 1
Total		2 9, 8 8 7	3 5, 5 1 2	5, 6 2 5

Note: The figures do not include SACO-related expenses, U.S. Forces realignment-related expenses (the portion allocated for mitigating the impact on local communities) and expenses for the introduction of new government aircraft.

Changes in the Three Categories

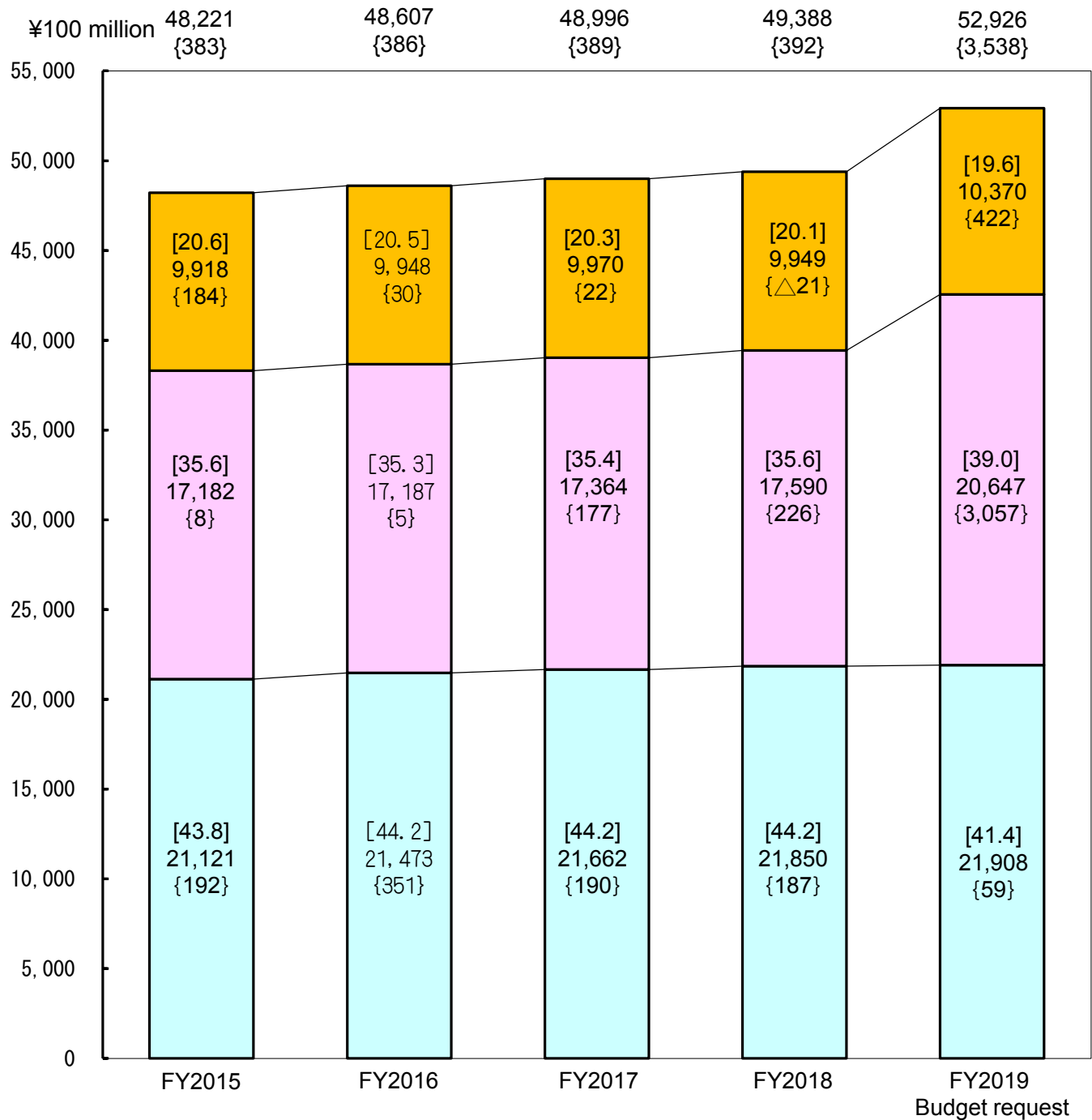
General material expenses

Obligatory outlay expenses

Personnel and provisions
expenses

[]: Ratio of expenditures (%)

{}: YoY change



Note: The figures do not include SACO-related expenses, U.S. Forces realignment-related expenses (the portion allocated for mitigating the impact on local communities) and expenses for the introduction of new government aircraft.

Breakdown by Organization

(Unit: ¥100 million, %)

Classification	FY2018 Budget	FY2019 Budget request	YoY change	Growth rate
Defense-related expenses	4 9, 3 8 8	5 2, 9 2 6	3, 5 3 8	7. 2
Ministry of Defense	4 9, 3 8 8	5 2, 9 2 6	3, 5 3 8	7. 2
(Ministry of Defense Head Office)	4 7, 8 9 3	5 1, 1 7 3	3, 2 8 1	6. 8
GSDF	1 8, 3 1 0	1 8, 7 7 0	4 5 9	2. 5
MSDF	1 1, 4 3 3	1 2, 8 1 3	1, 3 8 1	1 2. 1
ASDF	1 1, 6 6 3	1 2, 5 7 6	9 1 3	7. 8
Subtotal	4 1, 4 0 6	4 4, 1 5 9	2, 7 5 3	6. 6
Internal Bureau	4, 8 8 4	5, 2 7 4	3 9 0	8. 0
Joint Staff Office	4 4 0	5 5 5	1 1 5	2 6. 1
Defense Intelligence Headquarters	7 1 8	7 0 9	△ 9	△ 1. 3
National defense Academy	1 5 3	1 7 4	2 1	1 4. 0
National Defense Medical College	2 5 5	2 7 1	1 6	6. 2
National Institute for Defense Studies	2 8	2 6	△ 3	△ 9. 4
Inspector General's Office of Legal Compliance	9	7	△ 2	△ 2 1. 9
Subtotal	6, 4 8 7	7, 0 1 4	5 2 8	8. 1
(Regional Defense Bureaus)	1 9 9	2 0 3	4	2. 3
(Acquisition, Technology and Logistics Agency)	1, 2 9 6	1, 5 4 9	2 5 3	1 9. 5

Note: The figures do not include SACO-related expenses, U.S. Forces realignment-related expenses (the portion allocated for mitigating the impact on local communities) and expenses for the introduction of new government aircraft.

Promotion of Measures for Bases

(Unit: ¥100 million, %)

Classification	FY2018 Budget	FY2019 Budget request	YoY Change	Growth rate	Remarks
Promotion of base measures, etc.	< 4,642 > 4,449	< 5,017 > 4,802	< 375 > 352	< 8.1 > 7.9	
(1) Expenses for countermeasures in areas near bases	< 1,273 > 1,063	< 1,575 > 1,411	< 302 > 348	< 23.7 > 32.8	
Residential sound proofing	< 433 > 315	< 645 > 529	< 212 > 214	< 49.0 > 67.8	Subsidies for sound proofing work near air bases
Improvement of living environment of neighboring communities	< 840 > 747	< 929 > 882	< 89 > 134	< 10.6 > 18.0	Subsidies for living environment and facilities (river and road reconstruction, sound proofing systems in schools, improvements to sand control dam and public welfare facilities, etc.)
(2) Cost sharing for the stationing of USFJ	< 1,977 > 1,968	< 1,988 > 1,977	< 10 > 9	< 0.5 > 0.5	
Special Measures Agreement	1,492	1,497	4	0.3	
Labor cost	1,251	1,269	18	1.4	Labor cost of USFJ employees
Utilities	232	219	△13	△5.6	Cost of utilities used at USFJ facilities
Training relocation cost	9	9	△0	△2.7	Expenses related to U.S. field-carrier landing practice on Iwo To
Facilities improvement program	< 215 > 206	< 217 > 207	< 3 > 1	< 1.2 > 0.6	Improvement of USFJ facilities (barracks, family housing, etc.)
Measures for USFJ employees	270	274	4	1.3	Expense related to social insurance premiums by the employer
(3) Rent for facilities, compensation expenses, etc.	< 1,392 > 1,418	< 1,455 > 1,413	< 63 > △5	< 4.5 > △0.4	Rental cost of land used for defense facilities and compensation for loss of fisher's income, etc.

Note: The above figures are on an expenditure base (General material expenses + Obligatory outlay expenses), and figures in <> indicate a contract base amount.

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Defense Programs and Budget of Japan

Overview of FY2019 Budget Requirement

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Finance Division, Minister's Secretariat

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Equipment Policy Division, Acquisition, Technology & Logistics Agency

5-1 Ichigaya-Honmuracho, Shinjuku-ku, Tokyo 162-8801

Tel. +81-3-3268-3111



URL:<http://www.mod.go.jp>