[COLUMN]

VOICE

Trainings conducted by the SDF

In preparation for emergency situations, the SDF conducts trainings from normal times. Personnel and instructors talked about some of the trainings conducted by GSDF, MSDF and ASDF as follows.

Major Koichi Hamasaki, Commander,
Second Company, Infantry Regiment,
Western Army, GSDF

Major Hamasaki at the training site

Our infantry regiment of Western Army conducts trainings, day and night for the defense of remote islands. We participated in rapid deployment trainings exercises using helicopters and combat trainings in mountainous areas. Additionally, we participated in a training of infiltrating a remote island from the sea at San Diego, and other locations for the first time this year. The training took place at a coastal site into which a cold current flows. The water temperature was around 10°C, and the wave height exceeded 2m. It was so cold during the training that I couldn't stop shivering.

The training lasted for approximately two weeks. In the first basic training course, we learned how to steer a boat and the swimming form for reconnaissance infiltration. Then, we underwent infiltration trainings. At the last stage of the training, approximately 100 personnel of our Company underwent an infiltration training in which we steered boats on the furious sea at night for several hours from a point more than 10 km away from the shore. A single mistake could have led to death. Yet our company personnel gave their best to the training, sustaining bruises all over their bodies while also gaining a sense of fulfillment. They boasted of their bruises to each other as if they were medals, and it seems to me that they are strongly committed to develop skills necessary for defending remote islands.

Our largest mission is to defend remote islands. Therefore, we are strongly determined to improve our skills further.

(2) SDF Training

a. Joint Training

In order to deploy defense capability in the most effective way in the event of an armed attack on Japan, the GSDF, MSDF, and ASDF must conduct training in joint operations during peacetime. Therefore, the SDF has conducted and improved joint training involving the cooperation of more than two forces. Moreover, after the transition to a Joint Operations Posture in March 2006, joint training has been enhanced and strengthened to enable smooth completion of duties in joint operations.

For example, the training content not only addresses prevention and exclusion of direct threats to our country, but also includes activities to improve the international security environment. Concretely speaking,

in addition to the SDF joint exercise31, the Japan-U.S. Joint Exercises and Ballistic Missile Response Exercise, there are the International Peace Cooperation Exercises, the Joint International Humanitarian Operation Training, and other exercises. (See Fig. 6-2-10.)

Results of the Japan-U.S. Joint Exercises (FY2005)

Exercise	Period	Place	Participating Units		Remarks
			Japanese side	U.S. side	
Japan-U.S. joint exercise (Command post exercise)	February 20, 2006 – March 3, 2006	1. SDF Military garrison in Ichigaya Yokota Air Base of U.S. Forces in Japan 2. U.S. Forces Yokota Air Base of U.S. Forces in Japan	Approximately 1,100 personnel from Joint Staff Offices; Internal Bureaus; Maritime and Air Staff Offices; Regional District Units; Self-Defense Fleet; Air-Defense Command; and others	Approximately 1,300 personnel from Headquarters of USFJ; Headquarters of U.S. Air Force, Navy, and Army in Japan; and others	Exercises for command and staff activities

Fig. 6-2-10

[COLUMN]

VOICE

Trainings conducted by the MSDF

Lieutenant Junior Grade Yoichiro Sagawa, (Pilot of Rescue Amphibian),
Air Rescue Squadron 71, MSDF

Lieutenant Junior Grade Sagawa in the cockpit of a US-1A

I am a pilot of a rescue amphibian US-1A, the only aircraft in the world that can alight on the water even if the wave height is 3m. A rescue amphibian is an aircraft that can alight on the water to rescue people lost at sea. Unlike aircraft that land only on the ground, to acquire qualification as a pilot of a rescue amphibian, you must master the skill to alight a rescue amphibian on the water.

The skill to land aircraft is one of the most difficult in aircraft control. You cannot land aircraft unless you can assess the direction and velocity of the wind and accurately adjust the speed and landing angle of the aircraft. In the case of a rescue amphibian, one must alight the rescue amphibian on the water safely by paying due attention not only to the above-mentioned points but also to the wave height and the swell direction.

Therefore, we learn to assess the waves by repeatedly training to alight on the water and experiencing various types of waves. If we wrongly assess the waves, the airframe of a rescue amphibian may be damaged. Therefore, we must strain our senses to the utmost during training. If you successfully complete

the training, you are qualified as pilot of a rescue amphibian.

When I was a trainee, the crew captain (instructor) got a rescue amphibian to alight on the water without difficulty although alighting on such waves seemed to be impossible for me. Then, I thought that the captain was a real professional. I felt uneasy about whether I could become a professional some day. The first step to rescue people lost at sea is to get a rescue amphibian to alight on the high waves. Therefore, I will continue efforts to become a pilot like my instructor some day.

c. Unit Training

The purpose of training in the GSDF, MSDF, and ASDF can be divided into that for individual SDF personnel, which improves the proficiency in their respective fields, and that for units, which builds up the systematic action of units.

Training for individual personnel is conducted one-on-one and in phases based on occupational classification and the ability of the individual. Training for units is conducted by the size of the units, from small to large, aiming at execution of their overall abilities. Enhanced training has been implemented in recent years in an effort to cope with the diverse tasks required of the SDF, such as responding to situations in areas surrounding Japan, dealing with incidents related to suspicious boats and armed agents, and protecting SDF facilities from possible large-scale terrorist attacks in addition to training for the defense of the country. The outline of the unit training in the GSDF, MSDF, and ASDF is as follows. (See Fig. 6-2-11.)

Results of the Main Excercises of Each of the Self-Defese Forces (FY2005)

	Exercise	Period	Place	Main Participating	Units Outline
GSDF	Cooperative long-distance exercise (Northern Region)	June 21, 2005–Aug. 1, 2005	Central Army District–North Army District (Yausubetsu Maneuver Area)	Approximately 4,300 personnel and 1,200 vehicles from the 10th Division	Exercise to improve long-distance maneuver using various transportation methods including ground, sea and air, and also to improve integrated strategy capability for divisions and lower units through joint training with MSDF and ASDF
	Cooperative long-distance exercise (Southern Region)	(First) June 12, 2005 – June 29, 2005 (Second) July 2, 2005–July 20, 2005	North Army District–Central Army District (Higashi-Fuji Maneuver Area)	(First) Approximately 260 personnel and 70 vehicles from the 6th infantry regiment/the 5th Brigade (Second) Approximately 800 personnel and 170 vehicles from the 10th infantry regiment/the 11th Division	
MSDF	MSDF Exercise	(Map exercise) July 29, 2005–Sept. 30, 2005	MSDF Officer School	Maritime Staff Office, Self-Defense Fleet, Regional District Headquarters, and others	Exercise for senior commanders for making judgment on the condition, directing strategies, and unit operations
		(Field training exercise) July 29, 2005–Sept. 30, 2005	Sea area surrounding Japan	Approximately 80 naval vessels and about 180 aircrafts from Self-Defense Fleet, Regional District Units, and others	
ASDF	Air Defense Command Comprehensive Exercise	(Command post exercise) Sept. 12, 2005–Sept. 15, 2005	Air Defense Command Headquarters (Fuchu) and others	Approximately 300 aircrafts (cumulative) from Air Defense Command, and others	Exercise for command and staff activities before and after the determination of situations where an armed attack is anticipated and practice for response procedures in the situations with armed attacks through field exercise
		(Field training exercise) Nov. 14, 2005–Nov. 25, 2005	Entire Japan and the surrounding area space		

Fig. 6-2-11

1) GSDF

The GSDF is working to improve its units' capabilities, by conducting unit action training per different occupational classification, such as regular (infantry), technical (artillery), and armored (tanks and reconnaissance); joint training with units of other occupational classification; training to bring out comprehensive combat capability of units of various occupation classifications; and other similar trainings.

The Commander of the 2nd Company of the GSDF's 46th Infantry Regiment issuing an order to unit commanders

SDF is making efforts to conduct such trainings in an environment as close to actual warfare as possible, and owns various facilities and equipment. Concrete examples are, the Command Post Exercise Center, to effectively practice command and staff activities at the division/regiment level; and urban warfare training facilities, as well as Fuji Training Center, equipped with a system effective for training of smaller units (e.g., company). By executing training in such facilities, GSDF is trying to make its units acquire a sense of actual combat, to evaluate their capabilities objectively, and thereby to improve their strength.

Besides the above, GSDF conducts comprehensive trainings such as Cooperative Long-distance Exercise aiming at improving distance mobility of large-scale units at the division level.

[COLUMN]

VOICE

Trainings conducted by the ASDF

Master Sergeant Kensei Harada
(Instructor of the Rescue Crew Course) Rescue Training Group,
Air Rescue Wing, ASDF

I work as an instructor of the Rescue Crew Course. The main mission of the rescue crews is to rescue pilots of SDF aircraft that have made an emergency landing or crashed. In addition, rescue crews on a disaster relief mission often rescue distressed persons at sea or in a mountain.

Master Sergeant Harada wears a scuba and prepares for rescue drills

In the Rescue Crew Course, crews undergo risky trainings on skills that are hard to acquire, such as parachute drops, rescue drills using scuba equipment on the sea, rescue drills in a mountain, etc. Therefore, rescue crews must have uncommon physical capabilities and strength.

At rescue scenes, crew themselves may risk their lives. Therefore, rescue crews must not only acquire sophisticated skills but also have a firm spiritual strength and an iron will to "rescue distressed persons

without fail under any circumstances." In training, therefore, rescue crews undergo rescue drills after they have begun rescue activities early in the morning and they have become exhausted. This is because rescue crews can perform their mission only if they have acquired necessary skills and capabilities and a firm spiritual strength.

We instructors must make preparations in a prudent manner in order to ensure trainees do not fall in danger. We instructors must have a great personality, broad knowledge, and those experiences and physical strength superior to those of trainees. Otherwise, we cannot keep our dignity before trainees and be a good example to them. Therefore, we instructors must continue our own efforts to improve ourselves. As you can see, the job of instructors is tough. But we feel gratified as instructors when we see that rescue crew, who had completed the training courses, have become full-fledged rescue crews after having experienced actual rescue operations.

2) MSDF

The MSDF adopts the cyclical approach to training. This approach sees a specified period, with personnel replacement and repairs/inspection of ships in consideration, as one training cycle. This method improves proficiency in stages, within the training cycle. In one training cycle, training from initial stage to high-proficiency training is carried out.

MSDF personnel under training for flag semaphore

In the initial stages, MSDF conducts unit training with emphasis on establishing teamwork per each ship or airplane, which is the basic combat unit. Thereafter, applicative unit training is introduced as the capabilities of units are improved. Enlarging the unit scale, training on coordination among ships, and ships and aircrafts are carried out. In addition to such training, to enable coordination among larger units, MSDF conducts comprehensive trainings such as MSDF Exercise.

3) ASDF

ASDF is a group that utilizes high-tech equipment such as fighter aircrafts, the surface-to-air guided missiles, and radars. For this reason, at the initial stage of training, the Fighter unit, the Aircraft Warning and Control unit, and the Surface-to-Air Guided Missile unit individually execute training with main emphasis on leveling-up technical knowledge and capability of individual personnel, step-by-step. On such occasions, the training target is such that the individual personnel can organically operate the equipment (e.g., aircraft) to exercise the comprehensive capability of the unit. As the proficiency of units is enhanced, training on cooperation procedures among the units is executed. Furthermore, comprehensive training, such as the Air Defense Command Comprehensive Exercise is executed with additional participation by the Air-transport unit and the Air-rescue unit, so as to train cooperation procedures among units at the national level.

An F-2 jet fighter undergoing flight training

(3) Restrictions on Education and Training and Responses

a. GSDF

Training areas and firing ranges where the GSDF trains are unevenly dispersed and insufficient in terms of number and size. Therefore, the GSDF has only limited opportunities to carry out exercises involving large-scale units or fire training with tanks, antitank helicopters, missiles, and long-range artillery. This situation tends to worsen as equipment is modernized and the restriction caused by urbanization of areas surrounding training areas and firing ranges increases year by year.

The GSDF's 7th Division exercising at a training site in Hokkaido

To address these restrictions, the GSDF makes maximum use of the limited training areas in Japan, carrying out field exercises on a divisional level by moving participating units to large scale training areas in, for example, Hokkaido. In addition, the GSDF provides live-fire training in the United States for improved Hawk air-defense guided missiles and surface-to-ship guided missiles whose ranges exceed the limits for such training to be conducted in domestic facilities, as well as for other equipment, such as anti-tank helicopters and tanks that are unable to fire in Japan with their full capacity.

b. MSDF

There is the lack of sea and air areas where electronic warfare[32] exercises can be conducted under strenuous near-wartime conditions, and the absence of large-scale national facilities to evaluate missile and torpedo exercises. Given this, the MSDF conducts some near-wartime exercises in waters near Hawaii and other areas that provide the kind of environment unavailable in Japan.

An escort vessel cruising in waters off Uotsuri Island

The use of training sea areas is restricted in space and time by such factors as water depth. In particular, relatively shallow areas suited for minesweeping and submarine rescue training are limited to parts of Mutsu Bay, the Suonada Sea, and other bodies of water because these areas are also used by general ships for passage and fisheries. Therefore, the MSDF makes efforts to plan for conducting training efficiently so that more units can train effectively in the short periods of time available.

c. ASDF

Domestic air training zones are not large enough to allow high-speed fighters to train, making full use of their abilities. Effective and efficient training is hindered since round trip flights between bases and a number of training zones take a long time. Additionally, in terms of electronic warfare exercises, near-wartime exercises, and similar exercises are regulated to prevent radio interference.

Many air bases have restrictions on early-morning and nighttime flight training, and have other training constraints, such as the limitation of available missile firing ranges.

An annual regular firing exercise is under way for a Patriot system

Therefore, the ASDF dispatches its units to the United States, which offers a training environment unavailable in Japan, to conduct live-fire training with surface-to-air guided missiles (Patriot system) and Japan-U.S. joint exercises in Guam.

Since FY 2003, F-15 fighter and E-767 early-warning and control aircraft have joined the U.S. Air Force's Cope Thunder exercises.[33] The Japan-U.S. joint exercises have been conducted almost free from restrictions in terms of training zone and radio usage.

(4) Safety Management

Because the SDF's main mission is to defend Japan, SDF training and activities are inevitably accompanied by risk. At the same time, accidents that cause injury or loss of property to the public or the loss of life of SDF personnel must be avoided at all costs. Continuous review and improvement are vital for safety control, and it is a crucial issue that must be dealt with by joint efforts of the Defense Agency/SDF.

The Defense Agency/SDF will continue to pay full attention to safety protection in aircraft traffic and firing training at ordinary times, while preparing aeronautical safety radio facilities and equipment used for prevention and rescue in marine accidents.

4. Efforts to Strengthen Information and Communications Capability

Information and Communications in Defense Agency/SDF are the basis for command and control from the central command; headquarters of GSDF, MSDF, and ASDF; to the low-end units. In other words, it is the "nervous system" of the Defense Agency/SDF.

Therefore, Defense Agency/SDF places emphasis in efforts to enhance information and communication capability and related fields that connect directly to the capability of the SDF to execute missions.

(1) Response to the Information Technology Revolution[34]

In response to the IT Revolution, which has developed in recent years, Defense Agency/SDF announced the "Outline for Comprehensive Programs by the Defense Agency and the SDF to Adapt to the Information Technology Revolution (IT Outline)."

Based on this IT Outline, in order to pursue information superiority[35] and systematically establish an infrastructure for an integrated and organic operation of defense capability, the following three core measures have been taken for the materialization of goal. The three core measures are (1) creation of an advanced network environment[36], such as the Defense Information Infrastructure (DII) or Common Operating Environment (COE), (2) enhancing information and communications functions, such as the Central Command System (CCS) or improvement of the commanding system for GSDF, MSDF and ASDF and (3) assurance of information security[37], such as defense of the Defense Agency/SDF systems against cyber attack.

(2) Future Policy for Information and Communications (Action Plan)

The Defense Agency/SDF must respond to the new operational needs of the SDF, such as the promotion of joint operation and smooth execution of the international peace cooperation activities. Therefore, it has become a task to prepare a wide-range and maneuverable information and communications system by active use of the information and communications infrastructure constructed based on the IT Outline. To deal with this issue, the Defense Agency has set five policy targets concerning command and communications capability, and promotes advanced information and communication systems responding to superior information and communications technology both inside and outside Japan. In concrete terms, they are "Enhancement of Concentration/Communication of Information in the Chain of Command (Vertical

Direction)", "Promotion of the Information Sharing among Units (Horizontal Direction)," "Establishment of the Capability against Cyber Attacks", "Promotion of Information Sharing with External Organizations", and "Enhancement of Various Telecommunication Infrastructures." In FY 2006, as a policy to enhance Joint Operations Infrastructures, in addition to conventional policies, "Preparation of the Emergency Communication System to Respond to the Ballistic Missile" will be carried out.

Additionally, as a promotion measure for sharing information with other government agencies, projects such as "Preparation of Data Transmission Capability with Japan Coast Guard" and "Reinforcement of Communication Means with the Prime Minister's Office" will be implemented in FY2006. (See Fig. 6-2-12 and 6-2-13.)

Improvement in the capability to communicate with Japan Coast Guard

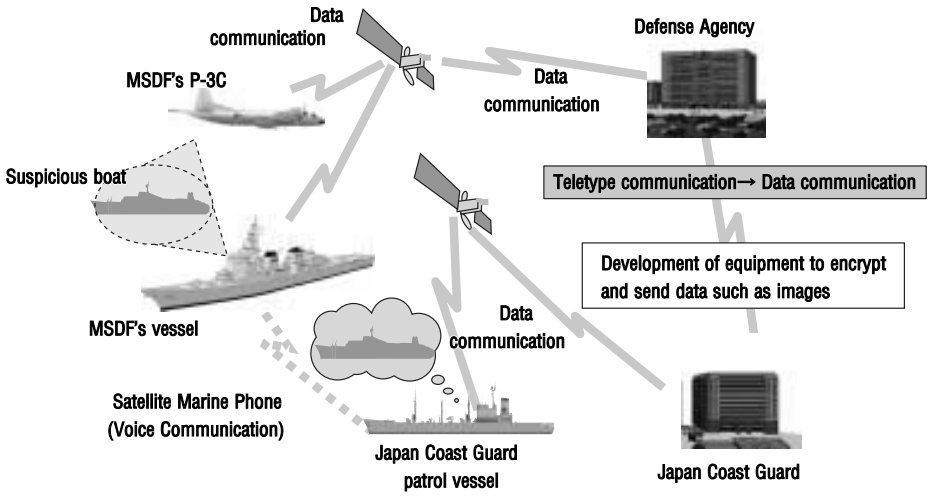


Fig. 6-2-12

Strengthening the Communication System with the Prime Minister's Office

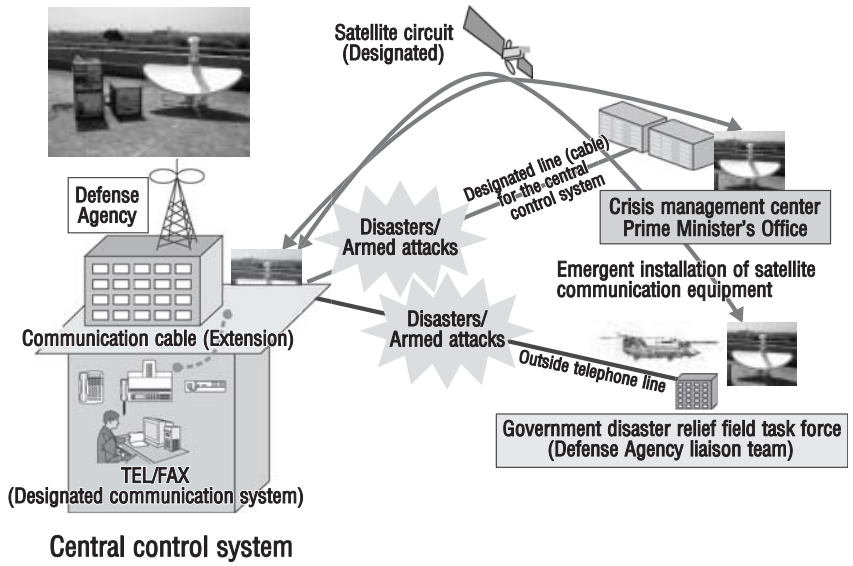


Fig. 6-2-13

5. Promotion of Comprehensive Acquisition Reform[38]

In relation to equipment and material, Defense Agency Acquisition Reform Committee was established in 1996 for purposes such as reviewing utilization of consumer products and repair methods, and keeping down procurement and maintenance costs for equipment and material.

After the malfeasance case involving the Central Procurement Office, the Study Group into Defense Procurement Systems convened in 1998 with the aim of establishing a transparent and fair procurement system. The Defense Procurement Reform Headquarters, established in 1998, compiled the Concrete Measures for Procurement Reform in 1999. According to above-mentioned measures, the Defense Agency has been promoting a procurement system review, structural reform, and a revision to the method for the reemployment of SDF personnel.

Additionally, based on the results of the procurement system and organization reforms to date, and in an effort to cope with environment change caused by the recent development in defense science and technology, the Comprehensive Acquisition Reform Promotion Committee, headed by the Director-General of the Defense, was established in September 2003. Together with moving ahead with the drastic reform of R&D, procurement, supply, and life-cycle management; examination to establish defense production and technology bases that are truly necessary for the country are in progress.

Also in 2006, the mid-term report on comprehensive acquisition reforms has just been summed up.

The present status of this approach is explained in the following. (See Fig. 6-1-14.)

Main Measures for the Comprehensive Acquisition Reforms

Item	Direction of reform
Establishing a procurement system to maximize corporate efforts	❍ Introducing the mechanism for efficient production acopted in the sectors for sivil-use products into manufacturing of defense use products ❍ Introducing a pricing system in which corporate efforts to lower prices adequately reflect in its profit
Promoting active use of consumer products	❍ Creating guidelines to introduce a standard process for deciding employment of consumer goods in the equipment procurement process
Establishing an effective and efficient procurement and supply system	❍ Utilization of electronic tags ❍ Improving the supply through the optimization of inventory level and mutual accommodation of common items. ❍ Further promoting standardization of equipments from the phase of creating specifications
Implementing effective and efficient research and development	❍ Creating "Med and Term Technology Estimation" to describe long-term prospects of technology areas to be focused in the years ahead ❍ Surveying state of the art technologies owned by private companies and academically advanced technologies owned by universities and other research institutions ❍ Enhancing the assessment system for adequate execution of projects
Improving transparency and fairness of acquisition	❍ Implementing the efforts for fostering the competitiveness through encouraging participation by providing public announcements and holding orientation meetings in advance to help vendors to be prepared for accepting orders where such a preparation is deemed to take considerable time ❍ Ensuring strict implementation of monitoring and assessment of bidding process ❍ Reconsider whether the reason for entering each private contract for equipment procurement is appropriate, and endeavor to decrease the number of contracts by enhancing competition through specification changes and other measures.
Human resource development for acquisition related personnel	❍ Examining measures to train personnel who engage contract, cost evaluation, supervision/inspection of manufacturing and project management at the Committee for Studying the Human Resource Development for JDA's Acquisition Related Personnel established in January 2006, headed by the parliamentary Secretary for Defence.

Fig. 6-2-14

(1) Establishment of Equipment Headquarters

With the rising price of equipment and material, caused by enhancement of their function and reduction in acquisition quantity; and considering the development of acquisition reforms in the U.S. and Europe; there is a growing need for the Defense Agency to procure better equipment and material at a more

inexpensive price.

Furthermore, since major equipment and material are used by the unit for a long term of 10 to 20 years, after development and procurement, it becomes critically important for the efficient acquisition of equipment and material, to take acquisition measures with features of major equipment and material taken into consideration.

With this background, the Defense Agency has examined project control[39] from various aspects so as to optimize schedule, cost and performance of the equipment and material throughout its life-cycle-from development, procurement, operation, maintenance/repairs, to disposal. Now there is a perspective on applying project control method to procure equipment and material.

Furthermore, in recent years, at the production sites of civilian goods, an approach to reduce costs for product development and manufacturing while securing quality, based on value engineering[40], has been bringing good results. Also in the Defense Agency, from FY 2004, trial implementation of an approach to introduce a production efficiency improving system, already implemented for civilian goods production, to the demand of the Defense Agency to make production more efficient, is underway for production of defense related goods. Currently, examination toward full-scale introduction is being carried out.

When procuring equipment and materials, it is important to reduce cost by improving production efficiency of equipment and materials and optimize performance, cost and schedule in the entire life cycle through project control by sufficiently incorporating information on procurement, operation, maintenance and repair into the introduction stage of equipment and materials such as for development of equipment. To do so, it would be effective to join the functions of cost control, production/quality control and development control and establish a system that enables joint operation[41]. To enable operation by combining these functions, the Defense Agency established the Equipment headquarters by unifying and reorganizing the cost accounting department of the Internal Bureau, contract department of Central Contract Office, and development control department of Technical Research & Development Institute (TRDI)[42].

In addition, on establishment of the Equipment headquarters, a multiple and multi-layered check system will be needed from both in and outside the Equipment headquarters, in order to fairly and properly conduct acquisition of equipment and material. This is to further strengthen the approach to enable early detection and deterrence of inappropriate acts, regarding procurement of material and equipment, such as bid-rigging and over-paying.

(2) Enhancement and Strengthening of Defense Production and Technological Bases

The defense industry is an important sector that plays a role in the security of our nation. Therefore, in order to "acquire high-quality equipment and material in a short term, at a low cost," it becomes essential to maintain defense production and technological bases that are capable to design, manufacture, and maintain equipment and material, from ordinary times. In particular, in the case of major equipment and material for air crafts, ships, tanks, guided missile and the like, production amount is small, with large initial investment, and highly advanced technology needed, in most cases. For this reason, manufacturers capable of developing and producing individual equipment and material will be limited to one or a few companies. Thus, retreat of one manufacturer, involved in manufacturing of an equipment or material, from the market can immediately impose an issue on stable acquisition or maintenance of equipment and material. Moreover, the maintaining of these bases are significant, even if equipment is procured from foreign nations, from the viewpoint of securing negotiating capability with the counterpart nation, and acquiring equipment at the best advantageous condition for our nation.

When acquiring equipment and material, acquisition method (e.g. domestic development, domestic production based on license, import) has been appropriately decided based on cost effectiveness, with

consideration on ease to maintain, supply, and educate/train, and need to make improvements intrinsic to our country-in addition to the aspect of performance and price. However, when taking the present severe financial situation and the increasing price of equipment and material into consideration, it is difficult to expect large increase in the acquisition quantity, also in the future. Therefore, it becomes necessary to make further considerations so that defense production and technological bases, with high productivity, high technological capability and stronger financial strength, are fostered and maintained.

On the other hand, in the private sector, our nation possesses the technical capabilities to realize cutting edge performance in the global standard and the production capability to manufacture highly reliable products. By appropriately combining such technologies with existing defense technologies, and utilizing dual-use technologies, it will become possible to establish technology for high-quality equipment production. In addition, by making efforts to expand use of technology solely for defense to private sectors, it may contribute to the fostering and maintenance of defense production and technological bases.

With such status in the background, intending to "establish truly necessary defense production and technological bases", the Defense Agency is examining to clarify the field of defense production and technological bases that should be fostered and maintained with focus attention.

6. Enhancement of Technological Research and Development

At the Defense Agency, to achieve "selection & concentration" of research work, with the strict financial situation in the background, technological strategy[43] is being planned so that vision on the technological

Cutting-Edge Technologies Underway at TRDI

Category	Item	Features	Started	To be completed
Aircraft	Demonstration engine	High-performance turbo fan engines equipped with afterburners indispensable for propelling future supersonic fighters.	FY 1995	FY 2013
	Flight control system for a high meneuver aircraft	Technologies for the flight control system that integrates engine thrust vectoring and flight control, and a techonology for the optimized aerodynamic shape that realizes both stealth and high-maneuver capabilities.	2000	2008
Guided missiles	Ground based guidance system	Technologies for future ground based guidance systems for anti-air missiles to combat against future aerial threats, and the present targets.	2003	2007
	Advanced SAM component technology	Tecnologies for implementing a missile system to intercept small supersonic targets cruising very low or flying from high altitudes using a multi-layered structure for from long to short ranges.	2005	2010
Artillery, combat vehicles	High-precision ammunition system	Technologies to measure the aerial trajectory of ammunitions with the functionality to measure flying position, and correct trajectory through the resistance fins attached at the tip of the ammunitions.	2000	2006
Vessels, submersible equipment	Multistatic sonar system (on board)	Improves the capabilities to detect quieter stealth submarines by simultaneously controlling the sonar systems of two or more vessels.	2001	2006
	Torpedo guidance and control device	Technologies to guide and control torpedoes in an image-homing system, which is superior in target identification for more secure defense for more stealth vessels.	2002	2010
Electronic devices	Software-defined radio	Highly interoperable technology for software-defined radio to enable communications with various kinds of radios solely through exchanging software.	2001	2006
	Infrared Countermeasure system	Technology for infrared countermeasure system to be applied to airborne environment in order to effectively protect aircraft itself against the threat of a man-portable surface-to-air missile with infrared guidance towards helicopters and large aircraft such as carriers.	2004	2009
Other	Countermeasure technology against biological weapons	Technologies concerning the detection and identification of biological agent and individual protective equipment against multiple threats of biological agents	2004	2010

Fig. 6-2-15

field to be prioritized, and long term view on each technological field are established.

From the viewpoint of responding to various situations, implementation of joint operation, and others, it becomes necessary to conduct R&D by making use of up-to-date technology, and conducting deeper analysis on operational needs. The below listed new R&D methods are adopted.

Trial production and related procedures are conducted on proto-type of equipment and material. "Operation and Experiment Research" is adopted-Have the material and equipment used by the relevant units, and reflect the results onto the after-the-fact R&D, procurement and related operations.

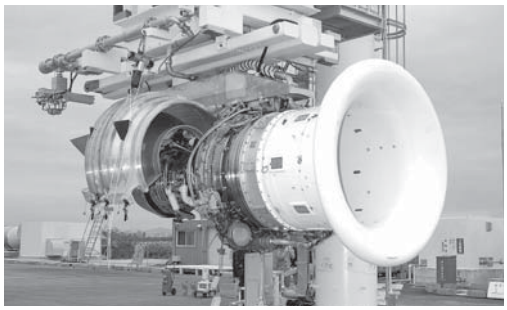
"Evolution-type Development" is adopted. At the start of development phase, the performance requirement to be finally achieved is left undecided. Even after the start of development phase, the precision of required performance can be leveled-up, and up-to-date military science technology can be newly introduced.

What is more, along with the enhancement of the operation evaluation system, a decision making system,

Major Systems and Equipment Currently under Development

Category	Item	Development Began (fiscal year)	Features
Aircraft	Rescue amphibian (US-1A upgrade)	1996	Developed on the basis of the existing Type-US-1A aircraft to enhance marine rescue capability.
	Next fixed-wing maritime patrol aircraft and transport aircraft	2001	Development of the next generation maritime patrol and transport aircraft as the replacement of relatively P-3C and C-1 after 2011, in which the commonality of technologies for the two airplanes reduces cost.
	Unmanned aircraft research system	2004	Used to facilitate research on the operation of unmanned fixed-wing aircraft that automatically gathers and transmits images and other data and returns; used to establish automatic running landing technology as well as image system technology.
Guided missiles	Type-99 air-to-air guided missile (remodeled)	2002	Intermediate-range air-to-air missile to improve functions and performance of the original Type-99 air-to-air guided missile in survivability, shooting coverage, and capability.
	Intermediate-range multipurpose missile	2004	Multipurpose missiles used in infantry units to destroy enemy units in diverse situations.
	Short-range SAM (Rev. II)/ Surface-to-air guided missile system for air defense at bases	2005	Surface-to-air missiles to provide overall air defense in the combat area as the raplacement of Type-81 short-range surface-to-air guided missiles, and also be used as major air-defense means at bases.
	New guided missiles for ballistic missiles defence	2006	Advanced sea-based guided missiles for ballistic missiles defence, to be jointly developed by Japan and U.S. with ability to respond to advanced and diversified ballistic missiles and with improved capability for responding to the threats of existing ballistic missiles.
Artillery, combat vehicles	New tank	2002	Used in tank units as the replacement of previous tanks to destroy enemy units in diverse situations.
	NBC detection vehicle	2005	Vehicle used by chemical protection units (or platoons) to quickly survey (detect, identify) harmful chemical and biological agents and radioactive contaminations over a wide area.
Vessels, submersible equipment	New ASROC	1999	Installed in destroyers to attack and destroy submarines in long distance by using sonar systems of surface ship.
	New anti-submarine short torpedo	2005	Short torpedo to be used to attack advanced submarines runs underwater from shallow area to deep area.
Electronic devices	IRST system for fighters	2003	Infra-Red Search and Track (IRST) system used to complement the weakening detection capability of fire control radar in the electronic warfare environment, and to detect target and track as well as control fire for air-to-air missiles on board.
	Antiaircraft combat command and control system	2004	System used by antiaircraft artillery unit, to gather, process, transmit necessary information for antiaircraft combat, and to realize the rapid and accurate command and control needed in antiaircraft combat unit.

Fig. 6-2-16



An engine for the MSDF's next patrol plane, meant for quieter engine sound, is under development

Strength and quietness of the ASDF's next transportation plane, which is being assembled, is being tested

that flexibly allows review when there is a situation change (incl. cancellation of the relevant operation caused by situation change) even after operation start, has been established.

When applying the viewpoint to optimize function/performance, schedule, and cost throughout the life-cycle of equipment or material; it is effective to thoroughly conduct trade-off analysis at the point of concept creation or R&D, and follow-up on improvement and the like. Continuous study is underway, as part of an approach for the R&D system. (See Fig. 6-2-15 and 6-2-16.)

7. Effort at Security of Classified Information

Some of the information that the Defense Agency deals with would significantly and seriously damage national defense if it is ever released in an unauthorized way. Therefore, the security of classified information is indispensable in ensuring national defense and safety.

In 2001, the Self-Defense Forces Law, was amended in order to strengthen criminal penalties regarding the compromise of "Defense Secret", and was enforced in November 2002.

The amendment set up provisions separate from the existing provision for the punishment of confidentiality infringement, imposing severer punishment to personnel who leak certain kinds of classified information (defense secrets) that must be particularly secured for the sake of national defense. Moreover, the penal provisions cover not only Defense Agency personnel but also those of other Departments and Agencies as well as contractors.

Furthermore, the "Defense Agency Information Protection Committee" was established, and the committee has been studying matters such as mutual cooperation for information security management at the agency-level; matters related to the various measures to enhance and strengthen organizations and functions involved with information security management at the Defense Agency; and drawing the basic principles on information security management by the GSDF, MSDF, and ASDF, such as information security management policies.

Moreover, in response to the compromise of confidential computer information, which became clear in February of this year, the Defense Agency is currently reviewing the various security systems of classified information to prevent recurrence of similar incidents.[44]

Considering the recent cases of information leakage, it is essential to ensure strict handling of information, particularly classified one, on the part of private companies having business with the Defense Agency/SDF. The Defense Agency therefore added a clause to contractual documents which stipulates the payment of fine in the event of leak of secret information as a civil punishment in addition to the existing criminal punishment.

Thus, the Defense Agency continues to do its best to protect classified information, in order to gain more trust from the people of Japan, and live up to the public's expectations.