

## *Chapter 10*

# **The Current Status and Review of Japan's Space Security Policy Seen in the Basic Plan on Space Policy and Subsequent Discussions**

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## **Introduction**

With the third version of the Basic Plan on Space Policy<sup>1)</sup> completed in January 2015, Japan made a fresh start under its new plan for space development. Behind the revision at this stage, just about a year after the formulation of the second version of the Basic Plan on Space Policy, there were major changes in the domestic and international situations surrounding space and security. In this paper, we provide an overview of such changes in the situations and summarize the new Basic Plan on Space Policy and subsequent policy discussions with a focus on those pertaining to security. On the basis of that, we will cap the discussions in this paper with a consideration of the concept of space security in the context of international cooperation.

## **1. Background to the Formulation of the Third Version of the Basic Plan on Space Policy**

### *1.1 Recognition of the Changing International Situation*

#### 1) The Multipolarity of Outer Space, Participation of Many Private Businesses and Emerging Countries in the Development and Utilization of Space

With the number of countries joining space activities increasing, outer space has shifted from the former bipolar structure between the United States and the Soviet Union into a multipolar structure. In particular, emerging countries, including China and India, as well as private businesses, have been rapidly stepping up space activities, and at the same time, movements are advancing to share international information obtained through international cooperation in the development and utilization of space and the use of space systems.

During the years of the bipolar structure between the United States and the Soviet Union, there was a common understanding that either country would not attack the space assets of the other country. In the era of the multipolar structure, however, such common understanding is not necessarily widely shared by all countries, and countries differ significantly in their intent of not producing

space debris.

## 2) Change in the U.S. Approach to Space Policy

In carrying out space projects, the United States has thus far been pushing ahead with the policy of establishing its predominant position in outer space single-handedly. In recent years, however, due in part to funding constraints, it has shifted to the policy of laying an emphasis on securing resilience through cooperation with allied and other responsible countries as well as private businesses and on efficiency through mutual complementation. It has also moved toward the policy of promoting the utilization of outer space within the framework of certain norms given the lack of common understanding in recent years about the utilization of outer space among a large number of entities engaging in space activities.

## 3) Growing Importance of Outer Space for Security and the Growing Sense of Crisis over the Continuity of Stable Utilization of Outer Space

The importance of outer space for security has increased remarkably in recent years. Outer space has not only been playing an important role as one of the social infrastructures with utilization for positioning, communications and broadcasting, and meteorological observation, etc., but also has also been playing a role of vital importance, particularly for the United States, as the security foundation with the utilization for information gathering and command and control, etc. An increase in space debris and experiments on weapons to destroy satellites are giving rise to an acute sense of crisis over the continuity of the stable utilization of outer space.

## 4) The Growing Role and Necessity Space Plays in Coping with Global Challenges

With a number of global challenges that are difficult to cope with by a single country coming to the fore, including energy problems, climate change issues, environmental problems, food problems and large-scale natural disasters, many countries are making proactive use of space systems. Furthermore, European countries, and China are trying to strengthen their leadership in the international community by providing their space technologies to emerging economies free of cost or at very low charges, thereby building up relationships of cooperation with those countries.

## ***1.2 Recognition of the Changing Situation surrounding Japan***

### **1) Change in Japan's Security Policy**

Japan formulated the National Security Strategy in December 2013 in order to identify its national interests from a long-term perspective and determine the course it should pursue in the international community. The Strategy describes outer space as one of the important areas related to national security along with sea and cyberspace, and says that the Government should promote the development and utilization of outer space and maintain and improve the foundation of science, technology, and industry that supports the development and utilization of outer space in a manner that contributes to national security in the medium- to long-term. More specifically, the Strategy says that Japan will build a system for maritime domain awareness (MDA), effective use of satellites and space situational awareness (SSA).

### **2) Advent of the New Phase of Japan-U.S. Space Cooperation**

As mentioned above, amid the situation where the U.S. space policies are shifting toward implementation under international cooperation instead of the United States on its own, the working-level meeting between the Japanese and U.S. Governments, or the Second Meeting of the Japan-U.S. Comprehensive Dialogue on Space, held in May 2014 following the Japan-U.S. Security Consultative Committee (the "2+2" Ministerial Meeting), said in the joint statement that "given the common security challenges our two countries face, both sides confirmed the advent of a new era for Japan-U.S. space cooperation in which invigoration of Japan's outer space activities would contribute to enhancing the resiliency of space assets essential to the security of both the United States and Japan." As specific areas of interest for bilateral cooperation, the joint statement cited further collaboration in the positioning of satellites between the U.S. Global Positioning System (GPS) and the Japanese Quasi-Zenith Satellite System (QZSS), SSA, the use of space for MDA and remote sensing data policy.

### **3) Weakening of Japan's Space Industrial Foundation**

The space equipment industry anywhere in the world is an industry in which public demand from government agencies of the home country accounts for the bulk of sales. Japanese space equipment also depends on government

expenditures on the development and utilization of outer space for over 90% of its sales. As such, the Japanese industry can receive only limited numbers of orders for satellites, rockets, equipment and parts and components. Furthermore, as it is impossible to look ahead to future business, or forecast when and for what types of satellite public tenders will be made, a number of private businesses have pulled out of the space business one after another, with few new entrants coming in. In order to maintain and enhance the industrial foundation that supports Japan's development and utilization of space on a continuing basis, it has been a pressing challenge to create a new market in response to external demand, on top of domestic demand.

## **2. Outline of Security Measures in the Third Version of the Basic Plan on Space Policy**

With the recognition of changes in the situations described above, the new Basic Plan on Space Policy was established and approved by the Strategic Headquarters for Space Policy in January 2015. In this section, we focus on security-related measures under the new Basic Plan.

### 1) Contribution to Enhancement of Resiliency of Space Systems and the Establishment of International Rules

By working for the resilience of space systems and promoting the creation of international rules concerning the utilization of space, Japan will prevent any abnormal change in outer space from adversely affecting Japan's security and civilian use of outer space and secure the stable utilization of outer space. More specifically, Japan will address the following matters:

- (1) Strengthening cooperation in satellite functions with allied countries, etc.; sharing of mission equipment (hosted payloads); utilization of commercial satellites; development of operationally responsive small satellites; enhancement of resiliency through complementation with ground systems.
- (2) Establishing Japan's SSA operating system by the first half of FY2018 and pushing ahead with the enhancement of its capabilities and information sharing with allied countries, etc. Promoting efforts toward the International Code of Conduct for Outer Space Activities (ICOC).
- (3) Commencing the consideration of the concept of launch sites from the perspective of the resiliency of space systems in FY2015.
- (4) Proceeding with the consideration of measures to comprehensively and continuously maintain and enhance the resiliency of space systems being

operated by Japan and allied countries as a whole.

## 2) Enhancement of Japan's Security Capabilities with the Utilization of Space

Japan will enhance its security capabilities by developing space systems for positioning, communications and information gathering as those more directly utilizable for Japan's diplomatic and security policies as well as for the operation of Self-Defense Forces (SDF) units. More specifically, Japan will address the following matters:

- (1) Establishing a 7-satellite constellation of quasi-zenith satellite systems (QZSS) by around FY2023 to realize continuing positioning.
- (2) Clarifying utilization needs in the security, public, and industrial sectors for the whole of satellite remote sensing, considering the specifications, operating methods and data availability of satellites that become necessary on a continuing basis to reflect in follow-on projects.
- (3) Regarding information-gathering satellites, from the standpoint of further enhancing their use in the security area, enhancing information-gathering capabilities on the basis of specific needs of the SDF and other related agencies, and also considering the increase in the number of satellites and performance enhancement toward enhanced temporal resolution and cost reductions.
- (4) Beginning the development of a geostationary data relay satellite for the real-time downlink of images obtained by information-gathering satellites, etc. in FY2015, and launching a highly-resilient optical data relay satellite by around FY2019. (The relay satellite is expected to have both the radio wave and optical functions.)
- (5) As dual-use satellites, launching an advanced optical satellite capable of high-resolution wide-area observation by around FY2019 and an advanced radar satellite (the successor model to Daichi-2) by around FY2020. Both satellites will be turned into the series, with a successor satellite to be launched about once in seven years.
- (6) Commencing research into operational needs and operational concepts of operationally responsive small satellites capable of immediate observation of particular areas in FY2015. In coordination with this, commencing the consideration of the concept of launch systems of operationally responsive small satellites, including air-launch.
- (7) In order to expand the X-band satellite-based defense communication network to the three-satellite structure to secure the highly resilient and

confidential satellite-based communication network, commencing the development of the third satellite in FY2016.

- (8) Proceeding with the consideration of early-warning satellites, etc., including their necessity, by taking into full account alternative means such as cooperation with allied countries, technological feasibility, and cost-effectiveness, etc., and taking necessary measures.

### 3) Strengthening of the Japan-U.S. Alliance through Space Cooperation

Japan will enhance the resiliency of space systems through stronger cooperation with the United States in satellite functions and also comprehensively enhance Japan-U.S. space cooperation in the security area, thereby contributing to the strengthening of the Japan-U.S. Alliance. Japan will also strive to strengthen the relationships of trust and cooperation in wide-ranging areas with friendly countries other than the United States and thereby build the multilayered international cooperative relationships between Japan and other countries. More specifically, Japan will address the following matters:

- (1) Further enhancing collaboration between Japan's quasi-zenith satellite system (QZSS) and the GPS of the United States.
- (2) Strengthening SSA capabilities and sharing information on SSA with the United States.
- (3) Enhancing cooperation on MDA as a whole. Compiling knowledge gained into a report by the end of FY2016 and reflecting it in subsequent related projects.
- (4) Building multilayered relationships of cooperation with Europe, Australia, India and ASEAN countries, etc.

### 4) Development of Legal Systems, etc.

Specifically, Japan will address the following matters:

- (1) Aiming to submit a bill for the Act on Space Activities to the 2016 ordinary session of the Diet in order to support space activities by private businesses by back up their receipt of orders for satellite launching services from overseas satellite business operators.
- (2) Aiming to submit a new bill to the 2016 ordinary session of the Diet in order to secure an institutional framework that becomes necessary to facilities the operations of private businesses using remote sensing satellites while ensuring the security interests of Japan and allied countries.
- (3) Researching and deliberating on the risk of and responses to the interception

of signals of positioning satellites, such quasi-zenith satellite systems, including legislative responses, drawing a conclusion by the end of FY2015 and taking necessary measures.

### **3. How Security Was Taken Up in Subsequent Space Policy Discussions**

#### **1) Reflection in the FY2015 Interim Summary<sup>2)</sup>**

The third version of the Basic Plan on Space Policy, established in January 2015, stated that the Basic Plan should be rolled over in light of changes in the situation, and the Implementing Schedule set up as part of the Basic Plan was to be reviewed and deepened each year. For that purpose, the Committee on National Space Policy is continuing its deliberation. The interim summary by the Committee, approved on June 24, 2015, detailed and deepened measures that should be taken in the immediate future. Key measures related to security are as follows:

- (1) Conducting research into operationally responsive small satellites and clarifying requirements in terms of performance and cost in FY2016.
- (2) Surveying launch sites, summarizing points of contention, and undertaking concrete deliberations concerning Japan's approach to launch sites in FY2016.
- (3) Putting in place the operational frameworks required for promoting space situational awareness (SSA) projects in FY2016 and strengthening the partnership with the United States.
- (4) Formulating a concept of maritime domain awareness (MDA) by the end of FY2015, and addressing the information sharing and the use of satellite data from FY2016 while strengthening the partnership with the United States.
- (5) Clarifying the status of utilization and interdependence of space systems, conducting research into a potential impact on the whole space systems in the event of a functional disturbance, and considering response measures beginning in FY2016.
- (6) Summarizing the deeper deliberations concerning the proposed Act on Space Activities and the Act on Satellite Remote Sensing.

#### **2) The Third Meeting of the Japan-U.S. Comprehensive Dialogue on Space**

Following the first meeting held in Tokyo on March 11, 2013, and the second meeting held in Washington on May 9, 2014, the third meeting of the

Japan-U.S. Comprehensive Dialogue on Space was held in Tokyo on September 11, 2015, as the session representing the strong commitment of Japan and the United States to closely cooperate with the international community to ensure the continuous and stable use of outer space for current and future generations, with the release of the joint statement afterward<sup>3)</sup>. The third meeting confirmed the direction of Japan-U.S. space cooperation in the civil, commercial and security areas. Extracting what is related to security from the discussions, the following matters were confirmed or agreed upon:

- (1) Both sides discussed space security cooperation and confirmed enhanced cooperation to maintain strong space industries and scientific and technological developments that contribute to the resiliency of critical space systems.
- (2) Both sides confirmed the steady progress in the two-way sharing of space situational awareness (SSA) information.
- (3) Both sides confirmed that they will further explore opportunities for collaboration on the use of space for Maritime Domain Awareness (MDA).
- (4) Both sides discussed furthering cooperation in collaboration between the U.S. Global Positioning System (GPS) and the Japanese Quasi-Zenith Satellite System (QZSS) as well as Earth observation and space science.
- (5) Both sides acknowledged the strategic and diplomatic significance of International Space Station (ISS) cooperation and the importance of continued cooperative utilization of the ISS for scientific and socio-economic benefits on Earth, and as a stepping stone for future space exploration activities.
- (6) Both sides confirmed progress in planning for the Second International Space Exploration Forum (ISEF).
- (7) Both sides agreed on the importance of exploring the next steps with regard to the issues related to the negotiation of an International Code of Conduct for Outer Space Activities (ICOC).
- (8) Both sides concurred on holding the Fourth meeting of the Japan-U.S. Comprehensive Dialogue on Space in Washington in 2016.

#### **4. Discussion on International Cooperation for Space Security**

In this chapter, we would like to discuss several perspectives on the concept of international cooperation for space security on the basis of measures incorporated in the Basic Plan on Space Policy, the Japan-U.S. Comprehensive

Dialogue on Space and the interim summary by the Committee on National Space Policy.

1) Perspectives of Japan-U.S. Cooperation

The United States, following the shift in its space policy, strongly desires the building of a cooperative relationship with Japan. The United States is believed to be seeking cooperation with Japan in the following direction.

(1) Perspective for relying on Japan's information-gathering ability in places where information cannot be obtained or is hard to obtained

In SSA, the accuracy of orbit prediction for space debris is deteriorating due to the lack of a system to measure the location of debris over Asia. Observation from Asia is also desirable for surveillance of anti-satellite weapons, or ASAT, on the geostationary orbit over Asia. For MDA as well, there is a high requirement for collection of information in the Western Pacific, the East China Sea, and the South China Sea. Under these circumstances, Japan is well-positioned and thus the United States appears to be counting on Japan's cooperation in the acquisition of information.

(2) Perspective for the backup (resiliency) in the event of destruction or malfunction of U.S. space assets

As the U.S. forces are no longer capable of functioning sufficiently without space assets, the destruction or malfunction of space assets directly leads to a significant decline in the U.S. defense capability. As an alternative to such space assets, the United States is counting on Japanese satellites. Positioning satellites are the typical example. Even when the U.S. GPS system is rendered inoperative for some reason, if the seven-satellite constellation of quasi-zenith satellite systems can be used, it would be possible to curb the decline in the U.S. defense capability to some extent. The United States is also believed to be counting on Japanese cooperation in information and communications between military units and the Japanese backup for earth observation satellites, including reconnaissance satellites and weather observation satellites. And the existence of such backup has the effect of restraining attacks on U.S. space assets by making potential attackers believe that their destruction would be meaningless.

(3) Perspective on a partnership with other countries resulting in deterrence against attacks

In the utilization of outer space, when jointly developed satellites are in use in partnership with two or more countries, any attack against such assets would antagonize not only the United States but also partner countries, thus working as deterrence. This perspective should be regarded as one of the reasons behind the United States beginning to enhance the partnership not only with Japan but also with Australia and other countries.

(4) Perspective for Japan being one of the markets for U.S. space industries

At present, Japanese security-related agencies purchase nearly ¥10 billion worth of high-resolution satellite images from DigitalGlobe, a U.S. commercial remote sensing satellite firm. Furthermore, the United States has changed the law to make it possible to sell high-resolution images up to 30 cm. There, we can see that the United States is hoping that Japan will become a part of the market for U.S. space industries.

(5) The Japanese version of ORS: Establishment and deployment of the unique Japanese concept of operationally responsive small satellites

Operationally responsive small satellites are one of the policy measures newly incorporated in the Basic Plan on Security Policy. In the United States, some of the Department of Defense budgets have been invested in projects of universities and venture business to develop a number of new technologies. Initially, the thrust of these investments is the observation of specific points in an operationally responsive manner in the event of emergencies and natural disasters. In recent years, the focus is placed on the concept of satellites to be launched as an emergency backup in the event of the malfunction of critical space assets. Regarding operationally responsive small satellites, while learning from these experiences of the United States, it will first be necessary to consider the image of the unique Japanese target system that combines Japan's specialty of micro- and mini- satellite/sensor technology with small rocket/air launch technology. In its utilization, it is also essential for Japan to have stance that considers the Japan-U.S. partnership.

There is no doubt that Japan-U.S. cooperation is a major pivot in considering Japan's space strategy, and space security policy in particular. It is imperative for Japan to proceed with consultations with the United States effectively and efficiently with the full understanding of U.S. intentions described above and from the perspectives of Japan's limited space budgets as

well as the maintenance and growth of the Japanese space industry. In doing so, particular heed should be paid to the following points:

- (1) Japan should make good use of special technologies only Japan has, such as L-band synthetic aperture radar (SAR) and debris removal technology.
- (2) It is necessary to consider the relationship with cooperation in areas other than security, including science and technology, ISS and space exploration.
- (3) Japan should consider sorting, from the Japanese point of view, what is realized through cooperation with the United States and what should be owned by Japan on its own.
- (4) In tabletop exercises of resiliency and SSA, it is necessary for Japan to grow, including in operational aspects, by learning from its predecessors.

## 2) Perspective that Japan Should Exercise International Leadership as a Nation Advanced in Space Activities

From this perspective, it is desirable for Japan to take the following measures in consideration of its position as a nation advanced in space activities in Asia:

- (1) Seeking to enhance the awareness for the prevention of satellites and other objects in orbit from turning into space debris and to set a good example. In Japan, there is a high anti-debris awareness among relevant agencies, including the Japan Aerospace Exploration Agency (JAXA). Research on the removal of space debris has also got under way (including JAXA's electrodynamic tether (EDT), activities of venture businesses developing satellites for debris removal and research on expansive membranes). Japan should help enhance the awareness about the prevention of space debris in emerging countries and should also consider, as necessary, the provision of necessary technologies, such as expansive membranes for micro- and mini-satellites, to them.
- (2) Strengthening partnerships through capacity-building support. Over 40 countries participated in a symposium held as part of the research and development project for micro/nano/pico-satellites in which this author is involved, and we heard a lot of requests for support for education in micro/nano/pico-satellite technology. Since emerging countries wish to build their own satellites instead of continuing to purchase foreign-made satellites, as the first step toward that goal, for example, they have high

expectations on Japan's educational support regarding affordable micro/nano/pico-satellites. By taking advantage of this situation, it is important for Japan to strengthen cooperation as a leader among peers by making a proactive contribution. Already, the MicroDragon project is under way to develop satellites with the University of Tokyo and four other universities cooperating in the education of 36 young experts of the Vietnam National Satellite Center (VNSC). Young people from emerging countries educated in Japan should become the core of space activities in their home countries, and in this sense as well, educational support for emerging countries is of important. It is similarly important for Japan to proactively accept students from those countries.

- (3) Japan should push ahead with measures and policies that contribute to the enhancement of space capabilities by contributing to solving development challenges developing countries are faced with by making use of space technologies in which Japan has the strength not only in the development of satellites but also in their utilization. Regarding natural disasters in particular, it is important for Japan, a nation with advanced anti-disaster measures, to package its experiences with measures against natural disasters and disaster prevention and disaster reduction efforts with the use of space in particular so that they can be spread to other countries for their utilization. In doing so, it would be advisable to consider the use of official development assistance (ODA) on top of seeking financial support from the World Bank, the Asian Development Bank (ADB) and the Japan International Cooperation Agency (JICA). The already existing frameworks, including the Asia-Pacific Regional Space Agency Forum (APRSF) and the Economic Research Institute for ASEAN and East Asia (ERIA), should also be proactively utilized.

### 3) Space Development and Utilization through International Cooperation Itself

#### Contributes to Enhancing Resiliency against Anti-Satellite Weapons

Space development is shifting from the era of single-handed development to the era of development through international partnerships. It is necessary to proactively push ahead with the joint development of satellites and sensors, etc. as it not only strengthens partnerships to concertedly solve budgetary problems and tackle global challenges but also contributes in itself to the enhancement of resiliency. In doing so, the following points should be noted:

- (1) There is a broad array of international partnerships for satellite projects, including not only the joint development of satellites but also the joint development of observing sensors and mission equipment, hosted payloads for using other countries' satellites to mount mission equipment, the joint development of element technologies for satellites and the joint development of upstream future satellite technology and mission technology. By taking into account the requests and future space needs of partner countries and budgetary prospects, Japan should consider a cooperative scheme that should lead to a win-win relationship with appropriate partner countries.
- (2) While cooperation in the development of rockets is difficult from the perspective of technological security, cooperation in launching services is of importance. Japan has already succeeded in the launch of a satellite of the Vietnam National Satellite Center (VNSC) in association with the University of Tokyo by taking advantage of the launch of satellites from the ISS. Japan has also received requests for cooperation in satellite launches from Turkey and Kazakhstan. Given that there are a much smaller number of countries with launch vehicles than countries that possess satellites, the offering of launch services (not only the launching of main satellites but also the launching of piggyback satellites) should lead to the enhanced presence of Japan.
- (3) Even when there are countries that try to destroy satellites mounted with equipment and technologies of a large number of countries, cooperation in this way should help the resiliency of satellites in the sense that destructive behaviors would antagonize a large number of countries involved. In the same vein, destructive activities against rockets that provide services to a large number of countries should be viewed critically by a large number of countries. Such deterrent effects of international cooperation are considered to be significantly large.

## **5. Conclusion**

As discussed above, as the development and utilization of space in the future are deemed to be difficult to function without international cooperation not only in the civilian sector but also in the security area. Conversely, they are considered to bring the enhancement of resiliency and other security effects,

and Japan should incorporate a further strengthening of international cooperation on governmental measures and policies.

The major challenges in doing so are the cultivation of strategic planning and the ability to carry out the plans as well as the development of human resources trained in international negotiations. Unfortunately, however, Japan lacks entities or only has weak organizations that are capable of acquiring knowledge and experiences by taking charge of these things for a long period of years and providing reliable advice on policy decisions. In the same manner as the latest Basic Plan on Space Policy mapped out 10-year plans for satellite projects in order to enhance predictability from a long-range perspective, efforts with continuity are hoped for in this area that requires long-term development.

#### References:

1) The Basic Plan on Space Policy (the text and the implementation schedule)

<http://www8.cao.go.jp/space/plan/keikaku.html>

2) The Interim Summary of the Committee on National Space Policy

<http://www8.cao.go.jp/space/committee/dai40/siryoushou5.pdf>

3) The Joint Statement of the Third Meeting of the Japan-U.S. Comprehensive Dialogue on Space <http://www.mofa.go.jp/mofaj/files/000099584.pdf>