Space Policy of Japan

Mar. 2018
National Space Policy Secretariat
Cabinet Office of Japan
1. Overview of Space Policy of Japan
2. Space Domain Mission Assurance
3. Quasi-Zenith Satellite System (QZSS)
4. Future direction
• Basic Act on Space policy was settled in 2008.

1. Non-military use ⇒ include use for national security within exclusively defensive oriented policy

2. Establishment of Strategic Headquarters for Space Policy
   • Chaired by Prime Minister.
   • Establishing “Basic Plan on Space policy”

3. Establishment of National Space Policy Secretariat in Cabinet Office
   • Adding new missions to JAXA
The Cabinet Office comprehensively navigates space policy

Strategic Headquarters for National Space Policy
(Chairman; the Prime Minister)

Committee on National Space Policy
(9 committees from industry, academia etc.)

Cabinet Office
National Space Policy Secretariat (NSPS)

Request for advice
Secretariat

Management of QZSS

[Cooperation among ministries]

Cabinet Satellite Intelligence Center (CSICE)
MLIT: Ministry of Land, Infrastructure and Transport
MOE: Ministry of the Environment
MOD: Ministry of Defense
MEXT: Ministry of Education, Culture, Sports, Science and Technology
METI: Ministry of Economy, Trade and Industry
MIC: Ministry of Internal Affairs and Communications
MOFA: Ministry of Foreign Affairs of Japan
NPA: National Police Agency
MAFF: Ministry of Agriculture, Forestry and Fisheries of Japan

Japan Aerospace Exploration Agency

Communications and Broadcast
Science and Technology Development
Space Industry Promotion

Intelligence
Meteorological Satellite
Greenhouse Gases Observing
National Defense
Basic Plan on Space Policy was established in Jan. 2015 as a long term implementation plan for around 20 years to reflect national security policy adequately and to give foresight for investment of industries.

**Change in balance of power on space policy**
- Transformation from the US-Soviet bipolar structure to multi-polarized structure
- Greater number of countries involved in space activities, and a corresponding growth in commercial space market

**Growing importance of the role of outer space to solve global challenges**
- Global challenges such as energy, environment, food and natural disasters have come to the forefront and posing severe threats to the international community
- Necessity to contribute to solve global challenges using space systems

**Growing importance of outer space for national security policy**
- Necessity to utilize space for the security area proactively based on the National Security Strategy

**Space industrial basis is at stake**
- Industrial basis is essential for conducting space activities autonomously
- Lack of foreseeability of investments led to continuous business withdrawals and stagnated new entries into space industry

**Growing risks against stable use of outer space**
- Increased number of space debris and growing threats of ASAT attacks
- Necessity to cope with such risks sustainably and ensure stable use of outer space

**Lack of organic cycles among science & technology, national security and industrial vitalization**
- Insufficient efforts of R&D in use of space for security purpose and of making the most of outcomes of R&D in civil space areas for individual vitalization
Space budget in Japan stays around ¥340B.

<table>
<thead>
<tr>
<th>Ministry</th>
<th>FY2017</th>
<th>FY2016</th>
<th>Difference (①)-(②)</th>
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<tbody>
<tr>
<td>MOD</td>
<td>41.1</td>
<td>38.7</td>
<td>2.4 (+6.1%)</td>
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<tr>
<td>METI</td>
<td>2.8</td>
<td>2.6</td>
<td>0.2 (+6.6%)</td>
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<tr>
<td>NPA</td>
<td>0.9</td>
<td>0.8</td>
<td>0.1 (+13.5%)</td>
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※ Each FY Budget includes supplementary budget.
JAXA contributes to space security with limited budget.

Instruction by Prime Minister Abe (Excerpt)  
(16th strategic headquarters fo space policy (12 December 2017))

- In recent years, as threat against the national security environment surrounding Japan increases, space security is extremely important. Under this awareness, not only the Ministry of Defense, but also relevant agencies including JAXA, should proceed medium and long-term efforts including the national security issues.

JAXA 4th medium and long-term target (1 March 2018)
Term: 7 years from April 2018

Process
Implementation of concrete plans on basic plan on space policy and research and develop plan

JAXA will change itself to an organization which leads society by science and technology and creates new values. JAXA promotes projects in consideration of 4 policies below.

- Secure national security and realize safe & secure society

- Expand utilization of space and industrial promotion

- Creation of world class results in space science and exploration fields  
  Keep and step up presence of JAXA in the world

- Promote the aeronautical industry and strengthen international competitiveness
Space Domain Mission Assurance is the first priority in space policy.

**Space Domain Mission Assurance**

Assuring the ability to achieve the objective of continuous and stable use of relevant space systems by detecting and avoiding threats and risks, strengthening the resiliency of systems, and early recovery of functions in the event of a situation where threats and risks related to space systems have been actualized.

- **Defensive Operations**
  - Strengthening threat and risk detection
  - Timely provision of warning
  - Strengthening operational ability

- **Resilience**
  - Every kind of Protective Measures
  - Distribution of Equipment
  - Redundancy of Means

- **Reconstruction**
  - System recovery
  - Substitute system(s)
Main Initiatives Going Forward

(1) Initiatives Aimed at Studying Measures to Strengthen Mission Assurance

① Information Sharing among Related Ministries and Agencies
   ・ Information sharing on threats and risks
   ・ Cooperation in times of emergency

② Implementation of Vulnerability Assessment
   ・ Establishing of method(s) of vulnerability assessment (for example, checklists)
   ・ Conducting vulnerability assessment in all related ministries

(2) Studying and Implementing Measures for Strengthening Mission Assurance

① Strengthening the Resilience of Space Systems
   (protection, distribution, disaggregation, proliferation, diversification)
   ・ Take effective measures including system redundancy through protection of equipment, increasing the number of satellites, etc.; promotion of international cooperation; and concretely studying measures for strengthening space systems’ resilience.

② Strengthening Defensive Operations
   (Improving SSA Capability)
   ・ MOD, JAXA, and other relevant government bodies intend to establish an operational system and strengthen cooperation with the U.S. and other nations

③ Improving Reconstruction Abilities
   ・ Formulating a response plan
   ・ Tabletop exercises, etc.

(3) Strengthening the Foundation of Space Technology and Industry

① Proactively discover and nurture private technology
② Development and utilization of new space technologies (e.g., the planned responsive small satellite for high-speed function recovery)
③ Ensure the stability of space system components, parts, etc.
④ Ensure demand by the government
⑤ Promote initiatives for foreign demand

Developed the basic concept of Japan’s Mission Assurance in 2017
Main Implementation in Government of Japan

① March 2017, Committee on National Space Policy established the Basic concept “Space Domain Mission Assurance”.

② April 2017, Ministerial level board, “Studying board of space development and utilization” and Director-General level board,” Conference of relevant ministries and agencies” were held.

③ Until December 2017, “Director-General level board” was held twice, “the director level meeting” was held 3 times, “the duty grade meeting” was held 4 times.
Initiatives for SSA, MDA and TTX are proceeding

SSA (Space Situational Awareness)

- SSA system in Japan will start operating in 2023. CAO, MEXT and MOD will start deliberations on the operation and maintenance.

MDA (Maritime Domain Awareness)

- We will steadily establish the Maritime Situational Display System and other systems to effectively gather, share, and distribute information. We are also promoting maritime information gathering and observation, including the use of earth observation satellites.

TTX (Table Top Exercise)

- Japan will for the first time participate in the Schriever Wargame, a multilateral tabletop exercise in the space field, in FY2018.
Japanese Government is promoting 7 satellite constellation of QZSS.

【QZSS Orbit】

- “QZO” satellites move in elliptical orbits tilted between 40 to 50 degrees with respect to the “GEO” orbit. The orbital period is about 24 hours and in-sync with the earth’s rotation, like GEO. As a result, they trace a figure “8” on the earth’s surface, with a focus around 135 degrees east longitude, and stay long-term just above Japan.
- QZO covers East Asia.

【QZO】
Elliptical orbit tilted between 40 to 50 degrees with respect to the stationary GEO orbital plane.
(set to remain over Japan)
(From ground it traces an “8” orbital path.)
about 3km/sec Period: 24 hours

【GEO】
Above the equator 36,000km
about 3km/sec(constant velocity) Period: 24 hours
Used by communication satellites, and weather satellites
### Initial Operations with 4-Satellite-Constellation in 2018

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<td>QZSS</td>
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<td></td>
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<td>Development / Design</td>
<td>Adjustments</td>
<td>In operation</td>
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<td>(No. 2~4)</td>
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<td>Preliminary design</td>
<td>Development Design</td>
<td>Adjustments</td>
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<td>1st (Michibiki) Successor</td>
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<td></td>
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<td>3 Sats Launch</td>
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<td>Around 2023; 7 satellites constellation</td>
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#### ① GPS complementary
Improved accuracy by using more satellites (improved in urban areas)

#### ② GNSS augmentation
Improved precision positioning (enables cm-class positioning utilizing GPS-based Control Station)

#### ③ Messaging service
- Disaster/crisis report
- Safety confirmation service through QZS

![Diagram of initial operations and messaging service](image)
Autonomous operation; Promotion of utilization of QZSS

• Autonomous Farming
  - weeding (day)
  - weeding (night)
  - fertilization

• Autonomous Construction

• Autonomous 3D-MAP Creation

Mitsubishi Electric
Develop and sale car for creation of 3D-MAP

Mitsubishi Mobile Mapping System

Secure implementation of the Basic Plan on Space Policy
- Ensuring space security

Secure Mission Assurance
- Partnership with allies
- Strengthen collaboration among ministries and agencies in government of Japan
- Strengthen basic infrastructure (satellites, ground systems etc.)

Challenge
- Strengthen collaboration towards integration of space, cyber, and intelligence
Cabinet Office

Thank You