Japanese Space Industry Policy Overview

- Space industry in the big data era-

September 6th, 2017
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Director, Space Industry Office
Ministry of Economy, Trade and Industry (METI)
Current situation of the Space Industry in Japan

- Sales amount has steadily increased, but,,, still not big
- Heavily depends on government mission

Trend of Sales


⇒ Expansion of the user business is the key
1. Policy Direction(1)  
- The space industry in the fourth industrial revolution, Connected Industries-

● The quality and quantity of the data derived from space are improving dramatically.
  
  – Positioning: high-precision positioning service
  – Earth Observation: high resolution, high frequency data brought by small satellite constellation

● AI/deep learning is good at analyzing image data.

● Application business which will provide the solution for user industries is expected to develop rapidly, by integrating ground data and “space data.”

● “Space Industry Vision 2030” & “Growth Strategy 2017”

“Space Industry” can be positioned as “big data” industry.
The space industry is a strong driving force for promoting the fourth industrial revolution. In addition to promoting productivity in other sectors, it is a frontier field for the creation of new growth.

Innovative space technology is being combined with the innovation based on big data, AI, and IoT. The fields of space utilization is being expanded by declining costs through miniaturization.

Through the expansion of the role of the private sector, Japan aims to double the market size of its entire space industry (currently 1.2 trillion yen), including the space utilization industry, in the early 2030s.

### Space Utilization Industry

<table>
<thead>
<tr>
<th>&lt;CHALLENGES&gt;</th>
<th>① Improving Access to Satellite Data</th>
</tr>
</thead>
<tbody>
<tr>
<td>Satellite Data Utilization</td>
<td>Listing the types, storage locations, etc. of satellite data, including data utilization methods etc. in the future. Enhanced data continuity. Establishing a platform for data utilization (i.e., a data center)</td>
</tr>
<tr>
<td>Open and Free Government-owned Satellite Data</td>
<td>Promoting new business creation by facilitating the use of satellite data by venture companies</td>
</tr>
</tbody>
</table>

#### Satellite Data Utilization

- Matching market needs
- Reducing costs by half and shortening the production period
- Selection and development of key parts and components

#### Improvements of the Procurement Framework

- Support System for Technological Development

### Space Equipment Industry

<table>
<thead>
<tr>
<th>&lt;CHALLENGES&gt;</th>
<th>② Supporting New Enterprises</th>
</tr>
</thead>
<tbody>
<tr>
<td>New-type Mainstay Rocket (i.e., the H3)</td>
<td>Providing one-stop service for overall support measures</td>
</tr>
<tr>
<td>Parts and Components Technology</td>
<td>Researching market trends, establishment of guidelines, and trends in small rocket ventures</td>
</tr>
</tbody>
</table>

#### Consistent Satellite Development

- Match market needs

#### Environment for New Space Businesses

- Shortage of risk money and thickness of new enterprises
- Global trends focusing on the establishment of laws for new businesses
1. Policy Direction(2)

- The space industry in the fourth industrial revolution, Connected Industries -

Users/Other industries

Application business

Positioning Service

Remote sensing

Other data

Rocket service (small rocket)
2. Positioning(1) - QZSS (Quasi-Zenith Satellite System) -

- Three satellites have been already launched, and an additional satellite will be launched this year. The operation starts in 2018.
  - 7 satellites around 2023 is national target
- Positioning service at cm-level
- Asia-Oceania region will be covered.

Diversified application service is expected in Japan and Asia-Oceana region

Source: cabinet office
## 2. Positioning(2)
- Possible application cases -

<table>
<thead>
<tr>
<th>Category</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mobility</td>
<td>Autonomous driving, new road charging system, Unmanned aerial vehicle(UAV)/drone, etc.</td>
</tr>
<tr>
<td>Location Based Service (LBS)</td>
<td>Mobile application including commerce, sports, etc.</td>
</tr>
<tr>
<td>Agriculture</td>
<td>Autonomous driving, etc.</td>
</tr>
<tr>
<td>Airline</td>
<td>Satellite-based augmentation system(SBAS), etc.</td>
</tr>
<tr>
<td>Railway</td>
<td>Operation management, etc.</td>
</tr>
<tr>
<td>Construction</td>
<td>Autonomous driving, etc.</td>
</tr>
<tr>
<td>Marine</td>
<td>Fish boat monitoring, etc.</td>
</tr>
</tbody>
</table>
Autonomous Driving = Dynamic Map + relative sensors (IMU, vision sensor, radar, etc.) + absolute sensor (GNSS including QZSS)

High resolution digital map
Road, Traffic Information on the driving route
※Precise positioning of QZSS → detection of “lane” base

Source: Japan Cabinet Office Strategic Innovation Program (SIP) Symposium 2014
(Reference) Applications (Tractor Auto-Driving)

Tractor tracks of RTK and PPP-AR guidance

JP-AU joint project

(C) MIC, Hitz, Hitachi, Hitachi Solutions, Yanmar, CRC-SI, et al.
Positioning (3) - Collaboration with Europe in GNSS -

- Collaboration between Europe (Galileo) and Japan (QZSS) is vital to stimulate the world’s GNSS market and to incubate new business which can bring a variety of benefits to end user in the world.

- METI welcomes the MOU singing between Europe and Japan in this area so that Europe and Japan may accelerate the GNSS application.

Date: March 8th, 2017
Purpose: exchanging views on civilian use of space / supporting civilian use of positioning satellites by Japan-Europe collaboration
Japan side: the National Space Policy Secretariat, Cabinet office of Japan
EU side: the Directorate General for Internal Market, Industry, Entrepreneurship and SMEs of the European Commission
Remote sensing technology has improved dramatically in recent years and became indispensable part of the big data infrastructure.

Venture companies that provide huge amounts of data at high frequency by using small satellite constellation are emerging.

Need to create the friendly environment including finance for new participants to the market.
3. Remote Sensing (2)

- New utilization, but still seems transition

source: Planet, Orbital insight
### 3. Remote Sensing (3)
- Possible application cases -

<table>
<thead>
<tr>
<th>Category</th>
<th>Application</th>
</tr>
</thead>
<tbody>
<tr>
<td>Agriculture</td>
<td>Monitoring, growth survey, etc.</td>
</tr>
<tr>
<td>Forest</td>
<td>Surveillance for illegal deforestation, etc.</td>
</tr>
<tr>
<td>Infrastructure</td>
<td>Monitoring, construction management, plant management, etc.</td>
</tr>
<tr>
<td>Natural resources</td>
<td>Field development management, etc.</td>
</tr>
<tr>
<td>Finance, insurance</td>
<td>Trading (energy, minerals, agricultural products), damage survey, etc.</td>
</tr>
<tr>
<td>Urban development</td>
<td>Housing information, traffic management, etc.</td>
</tr>
</tbody>
</table>

Space data is not enough! Combination with other ground data, UAV and positioning service is important.
4. Rocket Service

- There is a growing demand for small satellites.
- Competitive rocket service is vital to make satellite service competitive.
- Promotion of the new players

<JAXA SS520-4>
- Using consumer parts
- Renovated into a three-stage rocket based on sounding rockets “SS 520”
- Put microsatellite weighing)
- Demonstration failed in January
- Challenge again

<Interstellar Technologies>
- Small venture: 10 employees
- Location: Taikicho, Hokkaido
- Using general parts and manufacturing by themselves
- Try to reach 100 km altitude

source: JAXA, Interstellar Technologies
5. New participants to the market

- Japanese space industry is to be more attractive.
- Promotion of new participants to the market and supporting the creation of venture companies is important

<S-NET: Space New Economy Creation Network>

- Providing a platform that connects companies and individuals involved in the creation of new industries and services with the keyword of space
- Conducting business matching and supporting business development
- Japan has held B to B matching events for private companies with EU countries
- Precious opportunity for both companies to expand new business potential

<table>
<thead>
<tr>
<th>Year</th>
<th>Partner country</th>
<th>Partner company</th>
<th>Place</th>
<th>Participating companies (JP side)</th>
</tr>
</thead>
<tbody>
<tr>
<td>June, 2016</td>
<td>France</td>
<td>Airbus Safran Launchers, Airbus Defense &amp; Space, Thales Alenia Space etc</td>
<td>Paris</td>
<td>13 companies</td>
</tr>
<tr>
<td>April, 2017</td>
<td>Italy</td>
<td>e-GEOS, AVIO, Thales Alenia Space Italia, Leonardo</td>
<td>Tokyo</td>
<td>9 companies</td>
</tr>
<tr>
<td>July, 2017</td>
<td>Germany</td>
<td>Airbus Defense &amp; Space, Kastanienbaum, Vialight etc</td>
<td>Tokyo</td>
<td>15 companies</td>
</tr>
</tbody>
</table>
Industrial Policy Dialogue
We have decided to launch a new Industrial Policy Dialogue to deepen our cooperation on industrial policies, focused on innovative economies of the future. Our senior officials will convene in Tokyo this year for the first round of this dialogue. **This co-operation will initially be based on space**, aviation, energy and climate change, advanced manufacturing, and bio-economy.

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Industrial co-operation on space is stipulated in Japan-UK Joint Declaration on Prosperity Cooperation (August 31, 2017)
Thank you for your attention