

OVERVIEW OF JAPANESE SPACE INDUSTRY



source: JAXA



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2014

The Society of Japanese Aerospace Companies
(SJAC)

What is SJAC ?



- **Sole public entity founded in 1952 as a private forum representing the interests of Japanese aerospace industry**

- **Mission**

1. **Industrial Policies Promotion**

- Participation and support in reviewing aerospace administration
- Negotiation with government ministries and departments

2. **Industrial Foundation Buildup and Maintenance**

- Wide range of survey, research and investigation on industries status quo
- Search of trends in aerospace technology
- Review of technical standards, i.e. ISO

3. **Cooperation with Oversea Aerospace Industries**

- Participation in international exhibitions and hold meetings

4. **Host our international exhibition every 4 years**

- **Member**

Regular : 90 Companies

Associated : 46 Companies

Recent Topics in Government Space-Related Policy

2008 Basic Space Law

Establishment of a State Minister for Space

2009 Basic Space Plan

Establishment of a Cabinet Office for Space Development

2010 Announcement by Headquarters for Space Policy

- Promoting **Development for small rocket and satellite**
- Promoting **Utilization of Earth Observation Satellite Data**
- Study on establishment of a mechanism for **QZSS**

2011 Cabinet Decision

- Promoting a **practical QZSS** QZSS : Quasi-Zenith Satellite Systems
- Targeting preparation for **4 Satellite in the later of 2010**
- Aiming at operation with 7 Satellite in the future
- Promoting the development, service, operation and utilization

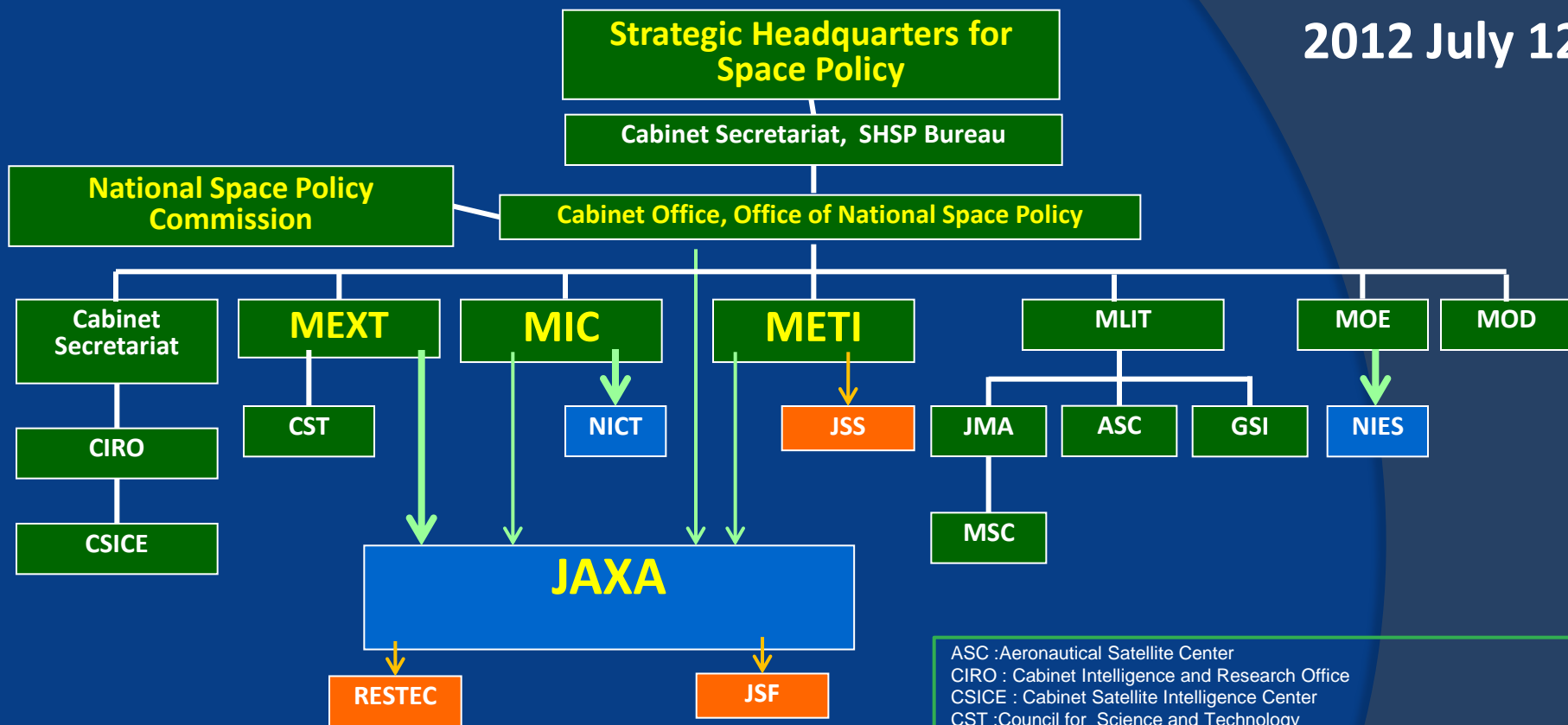
2013 Revised Basic Space Plan

- Utilization of Space and **Strengthening industrial base**

Selling space systems as a package abroad as a part of soft diplomacy

Organization Chart of the Space-Related Establishments

2012 July 12



- Government Organization
- Incorporated Administrative Agency
- Incorporated Foundation

JAXA : Japan Aerospace Exploration Agency
 NICT : National Institute of Information and Communication Technology
 NIES : National Institute of Environmental Studies

RESTEC : Remote Sensing Technology Center
 JSS : Japan Space Systems
 JSF : Japan Space Forum

ASC : Aeronautical Satellite Center
 CIRO : Cabinet Intelligence and Research Office
 CSICE : Cabinet Satellite Intelligence Center
 CST : Council for Science and Technology Japan
 GSI : Geospatial Information Authority of Japan (Geographical Survey Institute)
 JMA : Japan Meteorological Agency
 METI : Ministry of Economy, Trade and Industry
 MEXT : Ministry of Education, Culture, Sports, Science and Technology
 MIC : Ministry of Internal Affairs and Communication
 MLIT : Ministry of Land, Infrastructure and Transport
 MOD : Ministry of Defense
 MOE : Ministry of the Environment
 SHSP : Strategic Headquarters for Space Policy

Recent Topics in Japanese Space Industry

Technology : **Reliability**

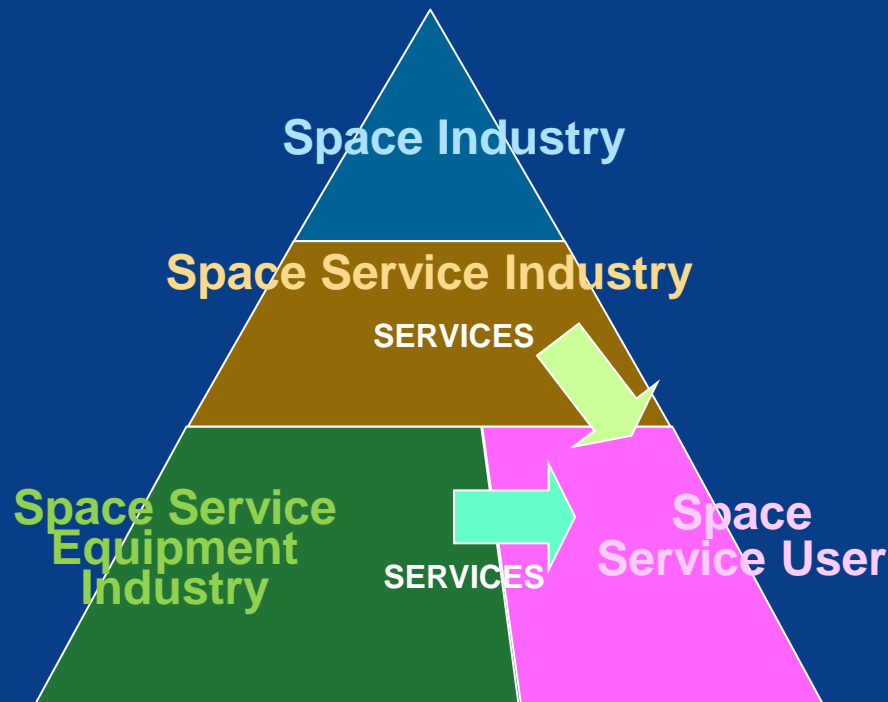
- **2010.Jun. Return of Asteroid Explore “ HAYABUSA”**
Success of Asteroid Surface Sample Return traveling **over 6 billion kilometers**
- **2014.Feb. Consecutive success launch of H-2A**
Total success rate of H-2A and H-2B marked with **96.29% (26/27)**

Market : **Export Sales**

- **2011.Mar. Commercial Satellite Award by Turkish Government**
Two Communication Satellites **designed and built** by Japanese Company as the first competition win in foreign market
- **2011.Oct. Vietnam – Japan Agreement on Earth Observation Satellite**
The first case **in ODA (Overseas Development Assistance) loan** applied to Japanese- design satellite
- **2012.May. First Commercial Launch Service by H-2A**
The first Commercial Launch mounted with **South Korean** multifunctional satellite

Japanese Space / related Industry (FY2011)

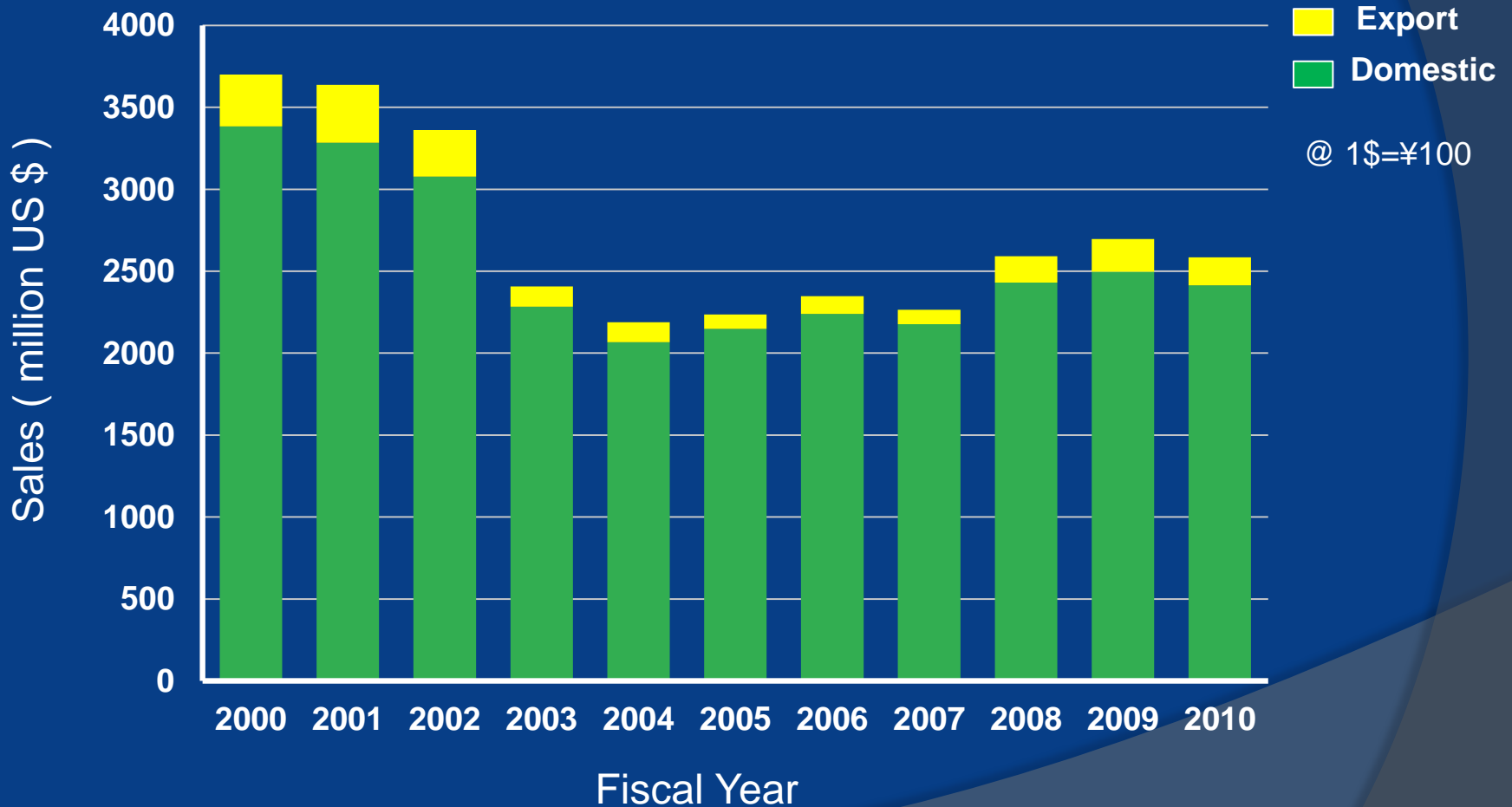
- Total Sales Volume of the Space Industry is **\$ 2.65 B**
- The sales for User and Service Equipment Industry made major contribution
- Main User's Sales depend on foreign Satellite
- Space related Industry makes big contribution to development of the economy



| | Sales Volume [B US\$] |
|---|--------------------------|
| Space Industry (Rocket, Satellite, Ground Facility) | 2.65 |
| Space Service Industry (Communication, Broadcasting, Positioning, Remote sensing Service) | 8.4 |
| Space Service Equipment Industry (BS TV, BS Tuner, Car-Navi., GPS Equipment) | 30.3 |
| Space Service User (Utilization of Space Services) | 36.3 |
| Total Sales Volume | 77.7 |

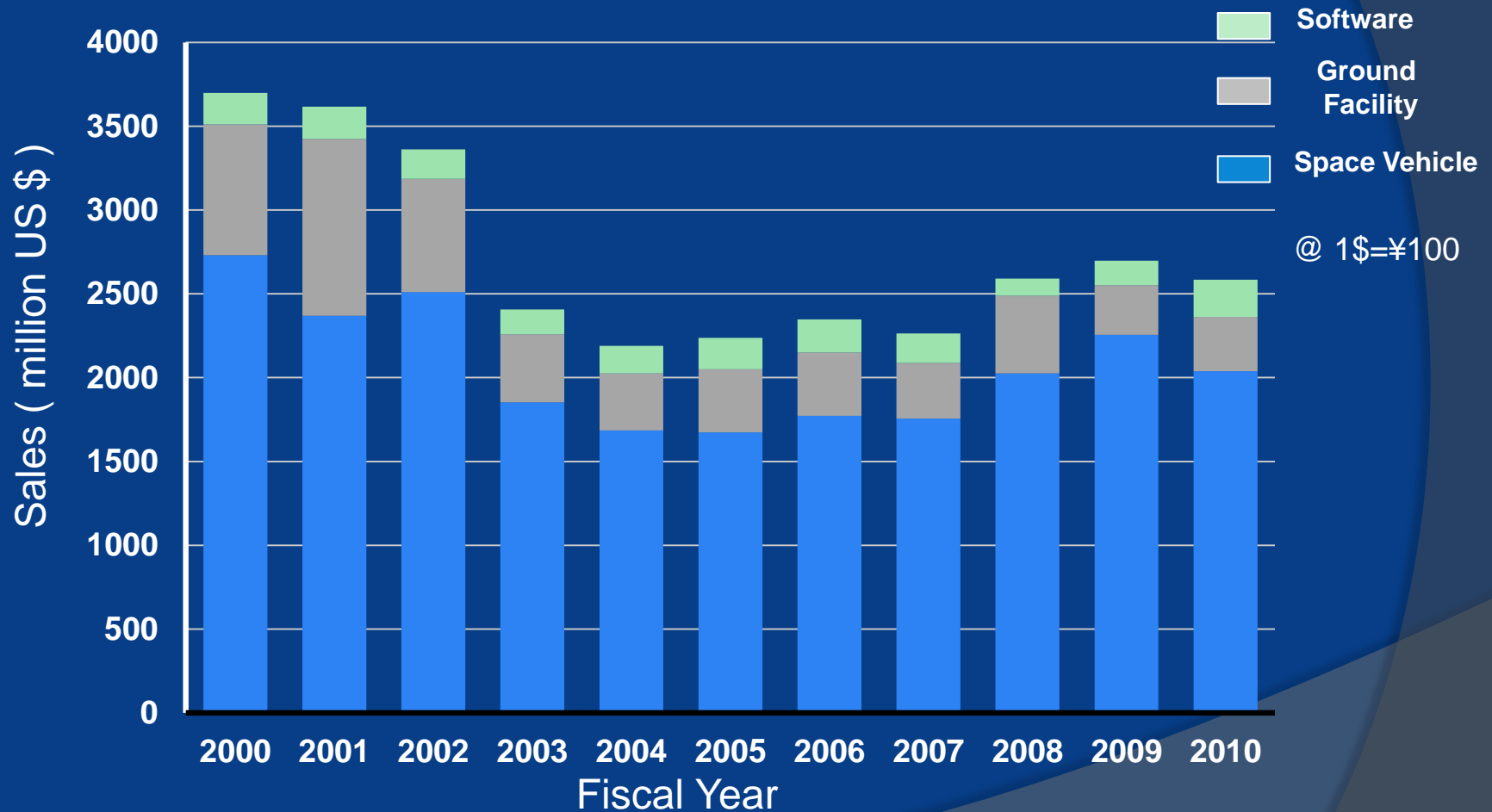
Trend of the Product Sales in Japanese Space Industry

Sales : Export / Domestic

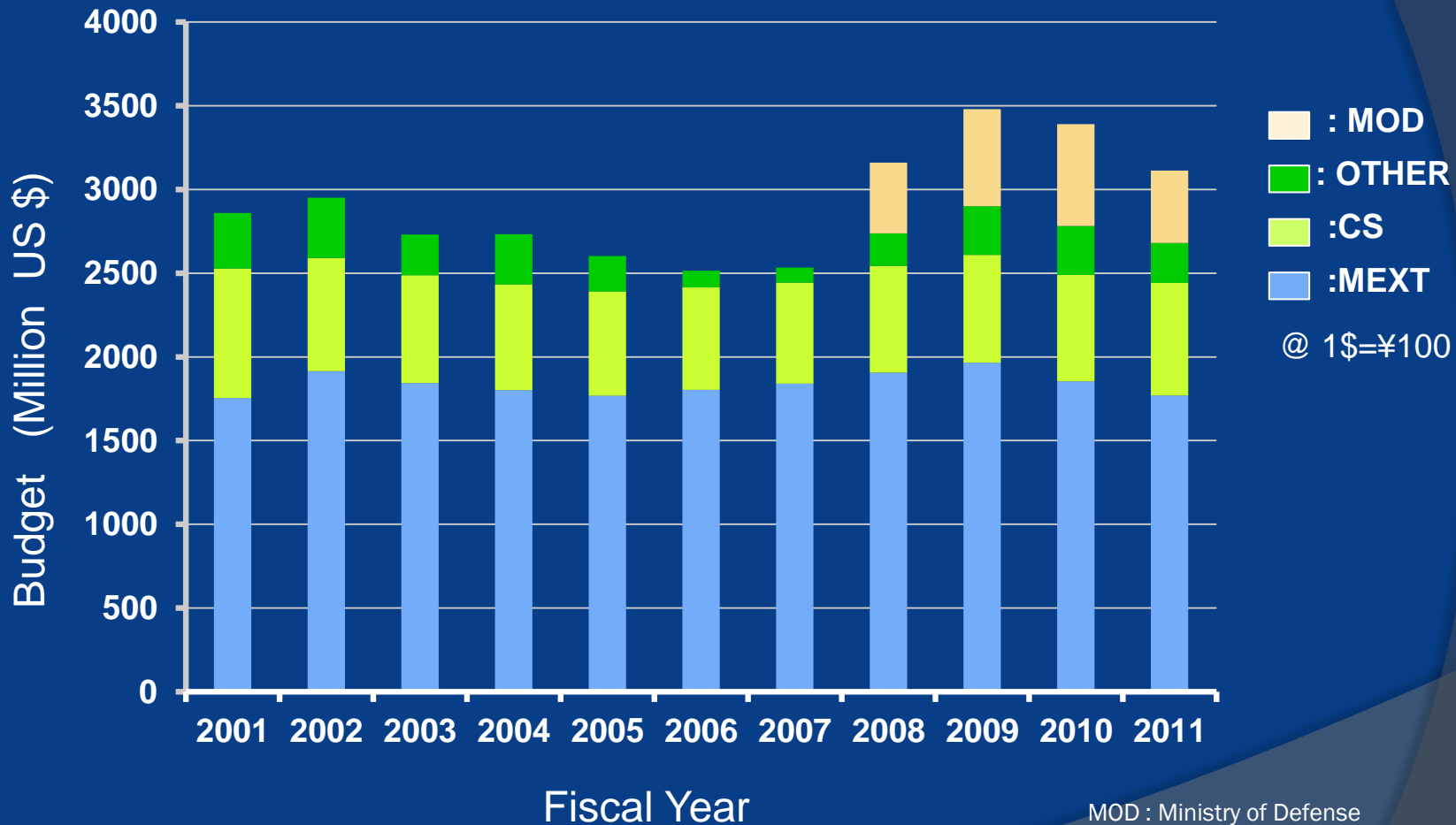


Trend of the Product Sales in Japanese Space Industry

Sales by Product Category

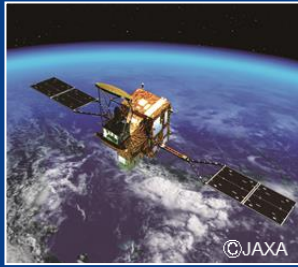


Trend of the Space-related National Budget



MOD : Ministry of Defense
MEXT : Ministry of Education, Culture, Sports, Science and Technology
CS : Cabinet Secretariat

Providing Service in Almost the Entire Space Field



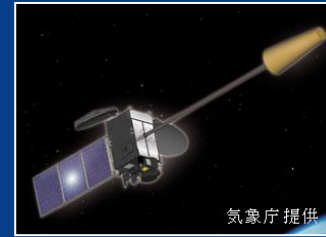
earth observation



space science & planetary exploration



communications



meteorological



navigation



launch vehicle



H-2 Transfer Vehicle (HTV)



International Space Station Japanese experiment module



space operation



Launch Vehicle

| Specification | | H-IIA (Standard) | H-IIB (Heavy Lift) | Epsilon Rocket |
|---|-----------------------|---|----------------------------|----------------------------|
| Length | | 53 m | 56 m | 24 m |
| Diameter | | 4.0 m | 5.2 m | 2.5 m |
| Engine | 1 st stage | Liquid (LOX/LH2) | Liquid (LOX/LH2) x 2 | Solid |
| | 2 nd stage | Liquid (LOX/LH2) | Liquid (LOX/LH2) | Solid |
| | 3 rd stage | — | — | Solid |
| Gross Weight | | 289 t | 561 t | 92t |
| LEO Launch Capability (Low earth orbit) | | 10 t | | 1.2t |
| SSO Launch Capability (Sun synchronous orbit) | | 3.6 t (Summer) 4.4 t (Other Seasons) | | 0.42t |
| GTO Launch Capability (Geostationary transfer orbit) | | 4.0 t | 8.0 t | |
| Status | | On Service | On Service | First launch 2013.8 |



Land and Earth Observation



(SOURCE : JAXA)

Advanced Land Observing Satellite(ALOS)

ALOS has been developed to contribute to the fields of mapping, precise regional land coverage observation, disaster monitoring, and resource surveying.



(SOURCE : JAXA)

Greenhouse Gases Observing Satellite (GOSAT)

GOSAT is observing satellite for the global distribution of greenhouse gases from outer space, and it contributes to the international effort toward prevention of the global warning .

Communications and Broadcasting



(SOURCE : MELCO)

SUPERBIRD C2

SUPERBIRD series are the first commercial communications satellite designed and manufactured by domestic companies. The four planes are operated as the series of the efficient communications satellite that SKY Perfect JSAT Ltd. has and operates on the orbit now.



(SOURCE : JAXA)

Wideband Inter Networking engineering test and Demonstration Satellite(WINDS)

WINDS uses the latest technology to create faster, more efficient and more convenient communication environment.

Positioning



(SOURCE : JAXA)

Multi-functional Transport Satellite(MTSAT)

MTSAT are Multifunctional Transport Satellites with the Airlines mission and the weather mission function. The series fulfills a meteorological function for the Japan Meteorological Agency and an aviation control function for the Civil Aviation Bureau (CAB) of the Ministry of Land, Infrastructure and Transport(MLIT).



(SOURCE : JAXA)

Quasi-Zenith Satellite-1(MICHIBIKI)

The Quasi-Zenith Satellite System(QZSS) uses multiple satellites that have the same orbital period as geostationary satellites with some orbital inclinations. These satellite are placed in multiple orbital planes, so that one satellite always appears near the zenith above the region of Japan.

Space Science, Exploration and Discovery

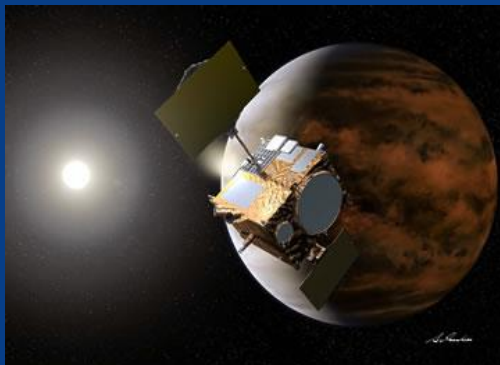


HAYABUSA(MUSES-C)

"HAYABUSA " was launched aboard the M-V Launch Vehicle on May 9,2003. It reached its target Asteroid "ITOKAWA" on September 12,2005.

For about seven years since, " HAYABUSA " successfully completed a great achievement by landing on the asteroid gathering sample and returning to the Earth with them while overcoming various troubles.

(SOURCE : JAXA)



AKATSUKI (PLANET-C)

AKATSUKI is the next planetary exploration project . This project's main purpose is to elucidate the mysteries of the Venusian atmosphere. Its mission to enter the orbit of Venus in December in 2011 unfortunately failed.

(SOURCE : JAXA)

International Cooperation



(SOURCE : JAXA)

KIBO : Japanese Experiment Module

Japan is participating in the assembly of the International Space Station (ISS), a large-scale multinational project. Its contribution is the Japanese Experiment Module (JEM) "KIBO". The project involves experiments and research in open space and in a zero-gravity environment aboard the space station. JAXA is also providing training for ISS astronauts. It is expected that research in outer space will improve human life on Earth.



(SOURCE : JAXA)

H-II Transfer Vehicle (HTV)

The HTV is an unmanned cargo transporter to be launched by the H-IIB launch vehicle. It is designed to deliver up to six tons of supplies including food, clothes, and experiment devices to the ISS in orbit at an altitude of about 400 kilometers and return with spent equipment, used clothing, and other waste material.

Major Companies in Space Industry

| Category | Activities | Company Name |
|-------------------------|--|---|
| Satellite System | <ul style="list-style-type: none"> · R & D · Manufacturing · Ground Systems · Components · Software | Mitsubishi Electric Corp (MELCO) NEC Corp Fujitsu Ltd. Mitsubishi Precision Co. Ltd. Tamagawa Seiki Co. Ltd. Japan Aviation Electronics Industry Ltd. |
| Launch / Space vehicles | <ul style="list-style-type: none"> · R & D · Manufacturing · Propellant · Launch Services | Mitsubishi Heavy Industry Ltd. (MHI) IHI Corp. IHI Aerospace Corp. (IA) Kawasaki Heavy Industries Ltd. (KHI) Fuji Heavy Industries Ltd. (FHI) Nippi Corp. Mitsubishi Space Software Co. Ltd. Daisel Corp. NOF Corp. |

Major Companies in Space Related Industry

| Category | Activities | Company |
|---------------------------------|--|--|
| Satellite Applications Services | <ul style="list-style-type: none"> · Map Imaging · Data Processing · Broadcasting /Communication Services · Engineering Support | Hitachi Ltd. Defense Systems Company SKY Perfect-JSAT Corp. Japan Space Imaging Corp. PASCO Corp. Japan Manned Space Systems Corp. |
| Trade | <ul style="list-style-type: none"> · Trading · Marketing | Sumitomo Corp. Mitsubishi Corp. Itochu Corp. Marubeni Aerospace Corp. Mitsui Bussan Aerospace Corp. Sojitz Aerospace Corp. |

Final Remarks

*Thank you
for your attention*

