Japan Aerospace Exploration Agency

- The core implementing agency to support the Japanese government's development and utilization of space with technology.
International Space Station

NASA

Russia

Canada

ESA

JAXA

72.8m

108.5m
Kibo (Japanese Experiment Module)
Kibo Exposed Facility

◆ Kibo has a unique Exposed Facility (EF) with an Airlock (AL) and a Remote Manipulator System (JEMRMS) and a high capacity to exchange experimental equipment.

◆ JEM Small Satellite Orbital Deployer has been operated to deploy the satellite from 2012.
### Specification of J-SSOD

<table>
<thead>
<tr>
<th>Item</th>
<th>Specifications</th>
</tr>
</thead>
<tbody>
<tr>
<td>Satellite size</td>
<td>CubeSat: 1U(^*1), 2U, 3U, 4U, 5U, 6U, W6U 50-kg class satellite: 55 (\times) 35 (\times) 55 cm</td>
</tr>
<tr>
<td>Satellite mass</td>
<td>CubeSat: 1.33 kg or less per 1U 50-kg class satellite: 50 kg or less</td>
</tr>
<tr>
<td>Orbital altitude</td>
<td>approximately 380 - 420 km(^2)</td>
</tr>
<tr>
<td>Inclination</td>
<td>51.6(^\circ)</td>
</tr>
<tr>
<td>Deployment direction</td>
<td>Nadir-aft 45(^\circ) from the ISS nadir side</td>
</tr>
<tr>
<td>Deployment velocity</td>
<td>CubeSat: 1.1 - 1.7 m/sec. 50-kg Microsat: 0.4 m/sec.</td>
</tr>
<tr>
<td>Ballistic coefficient</td>
<td>CubeSat: 120 kg/m(^2) or less(^*3) 50-kg Microsat: 100 kg/m(^2) or less(^*3)</td>
</tr>
</tbody>
</table>

\(^*1\) CubeSat specifications: 1U : 10 cm (W) \(\times\) 10 cm (D) \(\times\) 10 cm (H)  
\(^*2\) Depends on the ISS altitude.  
\(^*3\) Depends on the ballistic coefficient, altitude at release, solar activity, etc.
The spring mechanism and the separation mechanism are installed on the J-SSOD case to deploy the satellites. A new deployment case (J-SSOD-R), which can be used repeatedly and can release 6U satellites in a slot.
Small Satellite Deployment Process

Video
Support from the ground

Flight Control Team and Engineering Team
Overview of Small Satellites

◆ Extremely Low-cost
  (more than 200 M$ → less than 5 M$ (50kg class satellite))
  ● New players are welcome to join (enterprises, local governments, developing countries etc.)
  ● Great opportunity for education tools and challenging missions

◆ Short Turn Around Life Cycle
  (more than 5 years → less than 1-2 years)
  ● College students can experience whole development cycle
  ● Curriculum can be standardized as sustainable program
  ● Quick return on your business investments, technology demonstration

◆ Cost-Effective Method for Various Missions
  ● Practical remote sensing data can be obtained from small satellites

Ref: Prof. Nakasuka, Tokyo Univ. (2017.6.12)
(modified by JAXA)
Deployment Achievements from J-SSOD

- 38 Cubesats from 17 countries were deployed using J-SSOD.
- 54 Cubesats were successfully deployed from J-SSOD from 2012 to 2021.

- NASA and the U.S. private sector can operate the satellite deployment missions from Kibo. Including these deployment, 278 satellites have been successfully deployment from Kibo by May 2021.

2012, 2013: USA
2014, 2015: Brazil
2016: Singapore, Philippines, Italy
2017: Bangladesh, Ghana, Mongolia, Nigeria
2018: Bhutan, Costa Rica, Kenya, Philippines, Malaysia, Singapore, Turkey
2019: Nepal, Rwanda, Sri Lanka, Egypt, Singapore
2020: Philippines, Guatemala, Paraguay, Myanmar, Israel
2021: Mauritius
Thank you for your kind attention!!