

# The KiboCUBE Programme



December 14, 2017

United Nations / South Africa

Symposium on Basic Space Technology

“Small satellite missions for scientific and technological advancement”

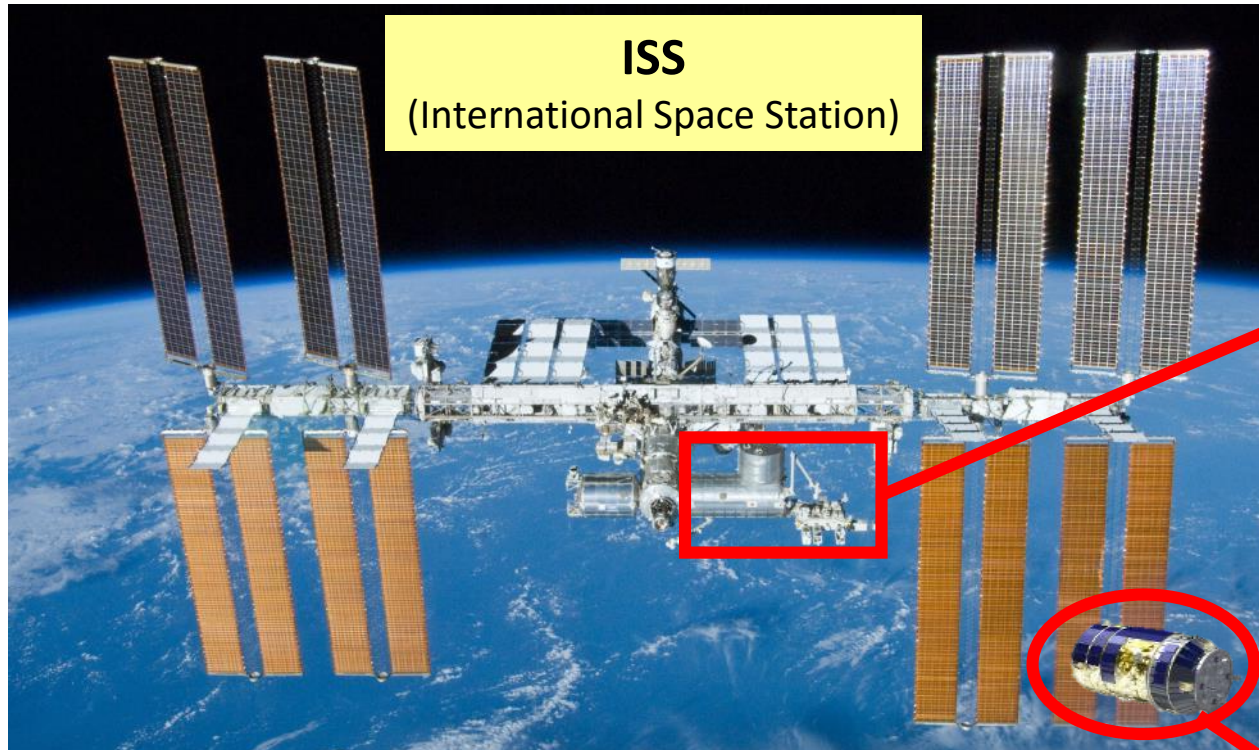
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Japan Aerospace Exploration Agency (JAXA)

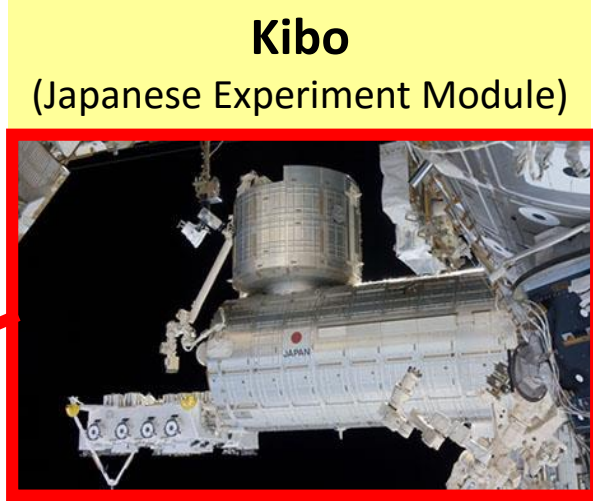




# ISS: Japan's Capabilities and Contributions



**ISS**  
(International Space Station)



**Kibo**  
(Japanese Experiment Module)

**HTV**  
(H-II Transfer Vehicle)



**H-IIB**

- ISS is a huge manned construction located about 400km above the Earth.
- 15 countries participate in the ISS program
- Japan strives to make concrete international contributions through extensive utilization of Kibo and HTV.



# ISS: Japan's Capabilities and Contributions

## Kibo: Japanese Experiment Module

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

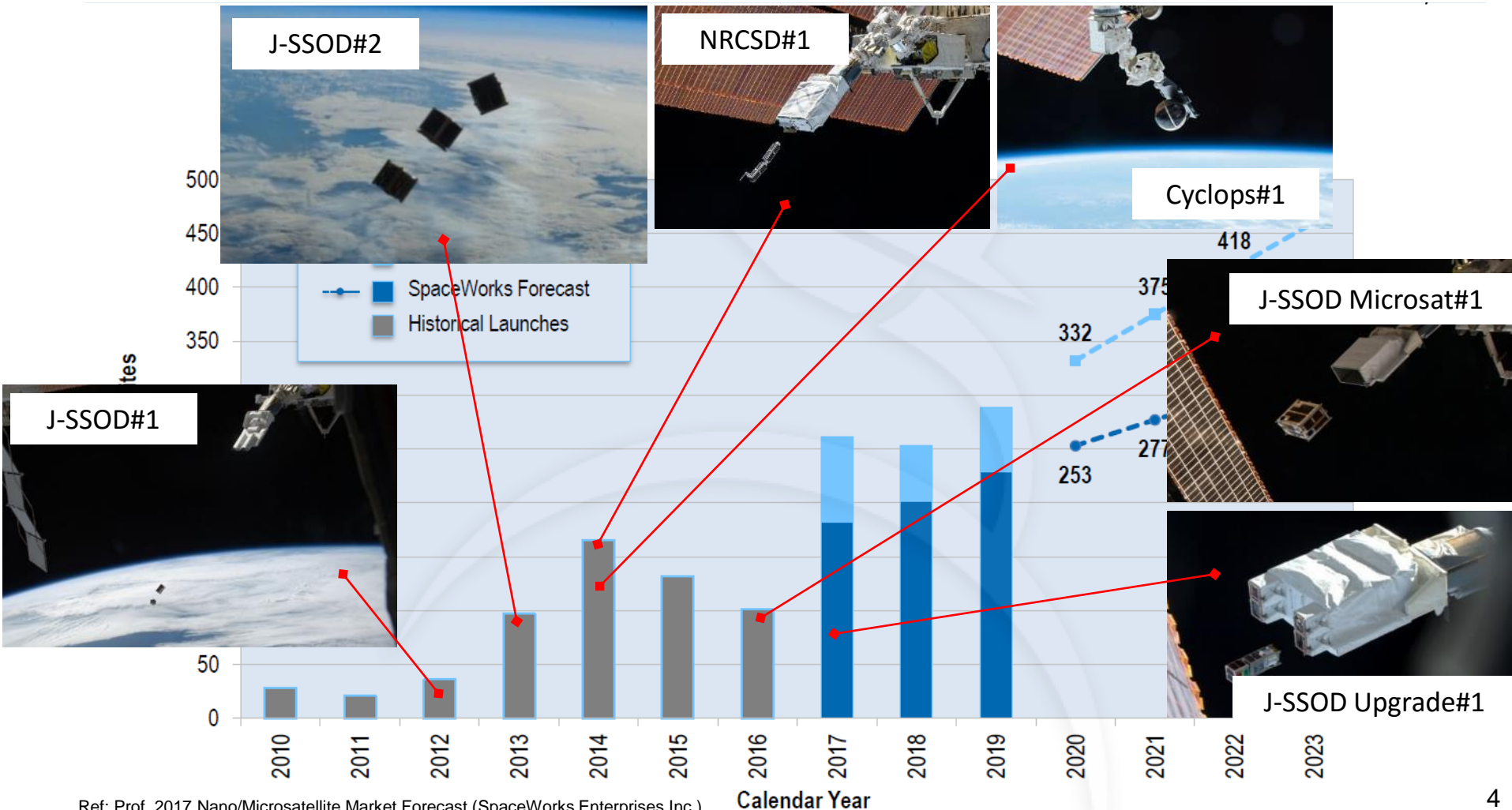
**Robotic Arm  
(JEM-Remote  
Manipulator  
System)**

**Airlock**

# “Kibo” is Unique! – Exposed Facility

## Small Satellite Deployment platform using J-SSOD

At present, satellite deployers other than J-SSOD that use **Kibo** include the NanoRacks CubeSat Deployer (NRCSD) and Cyclops (Space Station Integrated Kinetic Launcher for Orbital Payload Systems).



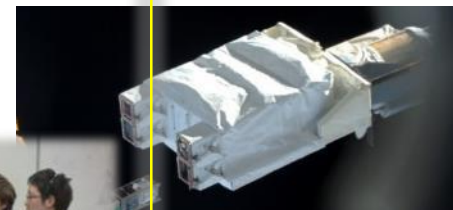
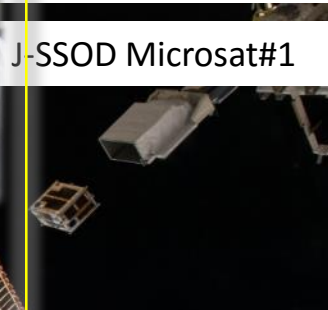


“Kibo” is Unique! – Exposed Facility

# Small Satellite Deployment platform using J-SSOD

As of today, **200 satellites** have been successfully deployed from **Kibo**.  
JAXA operates the innovative launch opportunity by using one and only function on Kibo/ISS  
**From JAXA Tsukuba Space Center (TKSC) in JAPAN**

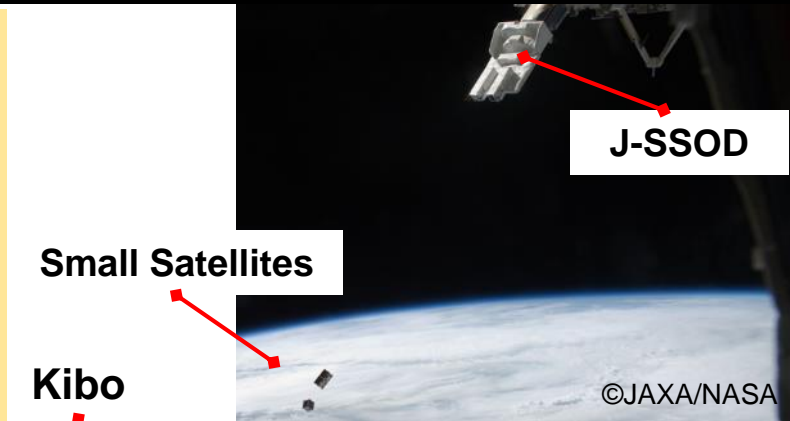
Credit : JAXA/NASA



# “Kibo” is Unique! – Exposed Facility

## Small Satellite Deployment platform using J-SSOD

- **Lower vibration environment** are provided since Small Satellites are stowed in a soft bag and carried to the ISS together with other cargo.
- Use the Airlock and Robotic Arm of Kibo without Extra-Vehicular Activity(EVA) of astronauts.



Item	Specification
Satellite Size	CubeSat : 1U, 2U, or 3U (*1) 6U:10cm (W) × 20cm (D) 30cm (H) (*2) 50 kg class satellite: 55×35×55 cm
Satellite mass	CubeSat : 1.33 kg or less per 1U 50 kg class satellite: 50kg or less
Orbital altitude	approximately 380 - 420 km (*3)
Inclination	51.6°
Deployment direction	Nadir-aft 45° from the ISS nadir side
Deployment velocity	CubeSat : 1.1 - 1.7 m/sec 50 kg Microsat : 0.4 m/sec
Ballistic coefficient	100kg/m <sup>2</sup> or less (*4)

\*1) CubeSat specification: 10 cm (W) × 10 cm (D) Height: 1U: 10 cm, 2U: 20 cm, 3U: 30 cm

\*2) Available from April in 2018

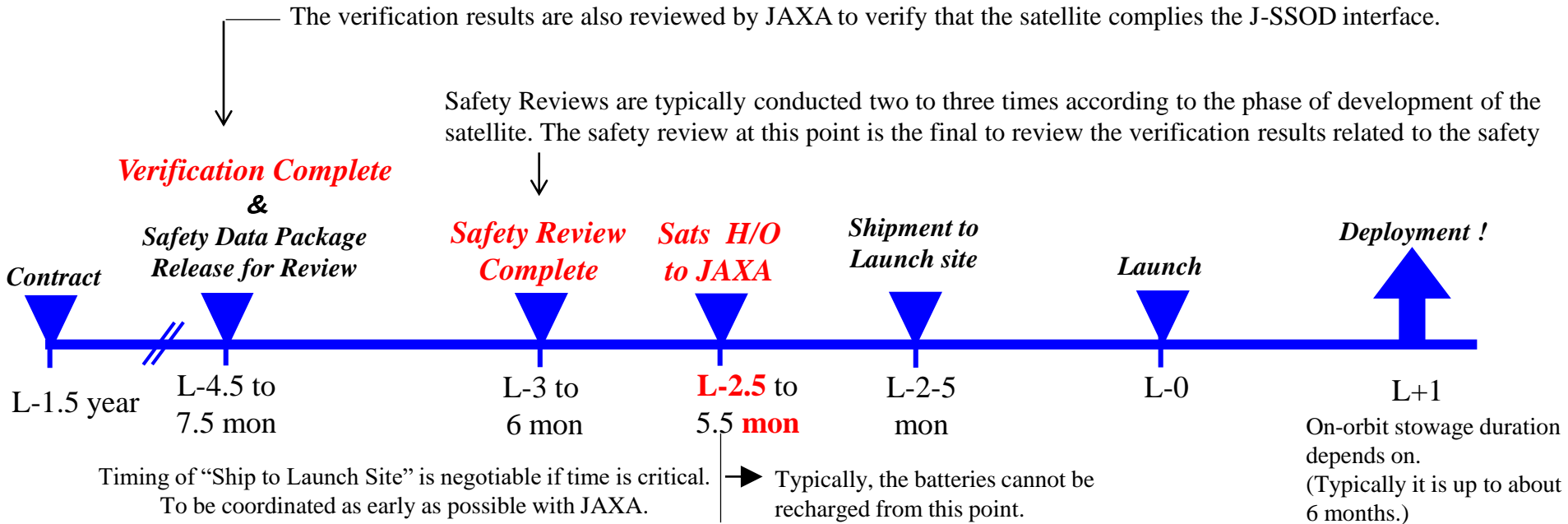
\*3) Depends on ISS altitude.

\*4) Depends on ballistic coefficient, altitude at release, solar activity, etc.

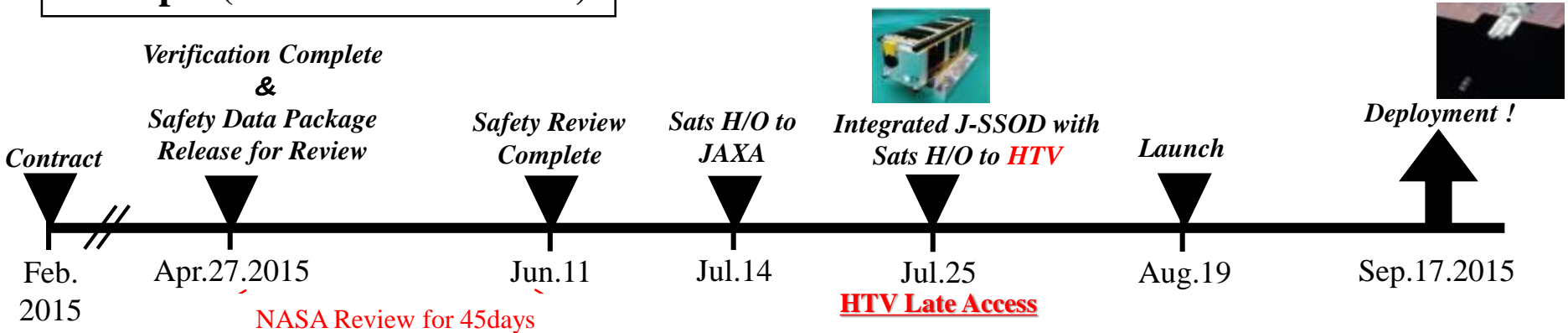
# “Kibo” is Unique! – Exposed Facility

## Small Satellite Deployment platform using J-SSOD

### Schedule for the satellite using the J-SSOD



#### Example (J-SSOD#4 Schedule)












# “Kibo” is Unique! – Exposed Facility

## Small Satellite Deployment platform using J-SSOD

### Partner to promote J-SSOD programme

Partner	Target	Purpose
Hokkaido and Tohoku University (Strategic Partner) 	Especially University's Students for Asian region 	Capacity building through developing Microsat (50kg) (DIWATA-1: refer to Page 10)
Kyushu Institute of Technology (Strategic Partner) 	Especially University's Students for developing country 	Capacity building through developing CubeSat such as BIRDS project (BIRDS: refer to Page 11)
UNITED NATIONS Office for Outer Space Affairs (KiboCUBE:Free Programme) 	Educational or research institutions from developing countries of United Nations member states 	Provide developing countries with opportunity to deploy CubeSat (KiboCUBE: refer to Page 12 to 14)
Japanese Private Companies/Japanese Universities	Does not matter 	Does not matters

- ➡ (1) Fee-Based service is available for any users at this moment.
- (2) Early 2018, JAXA will establish the new framework of J-SSOD service for overseas users.





“Kibo” is Unique! – Exposed Facility

# Small Satellite Deployment platform using J-SSOD



Credit : JAXA/NASA

- ✓ First Philippine's satellite
- ✓ First J-SSOD mission for 50 kg satellite deployment



High Precision Telescope image captured on August 2016, (image credit: DOST/ASTI)

## DIWATA-1 Launch and Deploy:2016

Investigator:

University of the Philippines(Philippine)  
Department of Science and Technology(DOST)  
Tohoku University/Hokkaido University

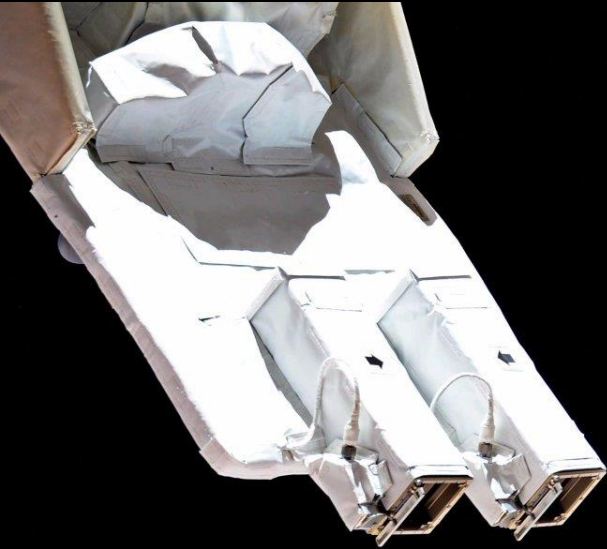


Size: Micro-Satellite(55cm × 35cm × 55cm)



“Kibo” is Unique! – Exposed Facility

## Small Satellite Deployment platform using J-SSOD



Credit : JAXA/NASA

- ✓ Capacity building of developing country
- ✓ First Deployment after conclusion of an partnership agreement between JAXA and Kyutech
- ✓ First Satellite for Ghana, Bangladesh, and Mongolia



## **BIRDS-1** Launch and Deploy:2017

Investigator: Kyushu Institute of Technology  
(KyuTech)

Japan, Ghana, Bangladesh, Mongolia, Nigeria,  
(For operation) Taiwan, Thailand

Size: 1U, 5 satellites





“Kibo” is Unique! – Exposed Facility

# Small Satellite Deployment platform using J-SSOD

## KiboCUBE

Collaboration between UNOOSA and JAXA to offer small satellite deployment opportunities from Kibo in order to facilitate improved space technologies in developing countries. (CubeSat (1U)/ once a year from 2017-2019)



UNITED NATIONS  
Office for Outer Space Affairs



- ◆ UNOOSA and JAXA have selected a team from the [University of Nairobi](#) to be the first to benefit from the KiboCUBE programme.
- ◆ We are going to launch a 1st Kenyan University NanoSatellite called 1KUNS-PF(1st Kenyan University NanoSatellite-Precursor Flight) in JFY2017. Its mission is Technology Demonstration.
- ◆ As for 2<sup>nd</sup> round opportunity, we have selected a team from the [Universidad del Valle de Guatemala](#) to be the second to benefit from the KiboCUBE programme.



Credit : JAXA



Announcing the first round of the KiboCUBE program at the International Astronautical Congress (IAC) in September 2016.

Credit : JAXA



Announcing the second round of the KiboCUBE program at the International Astronautical Congress (IAC) in September 2017.

# UNOOSA-JAXA Cooperation “KiboCUBE”

## [1<sup>st</sup> Round] Schedule of KiboCUBE



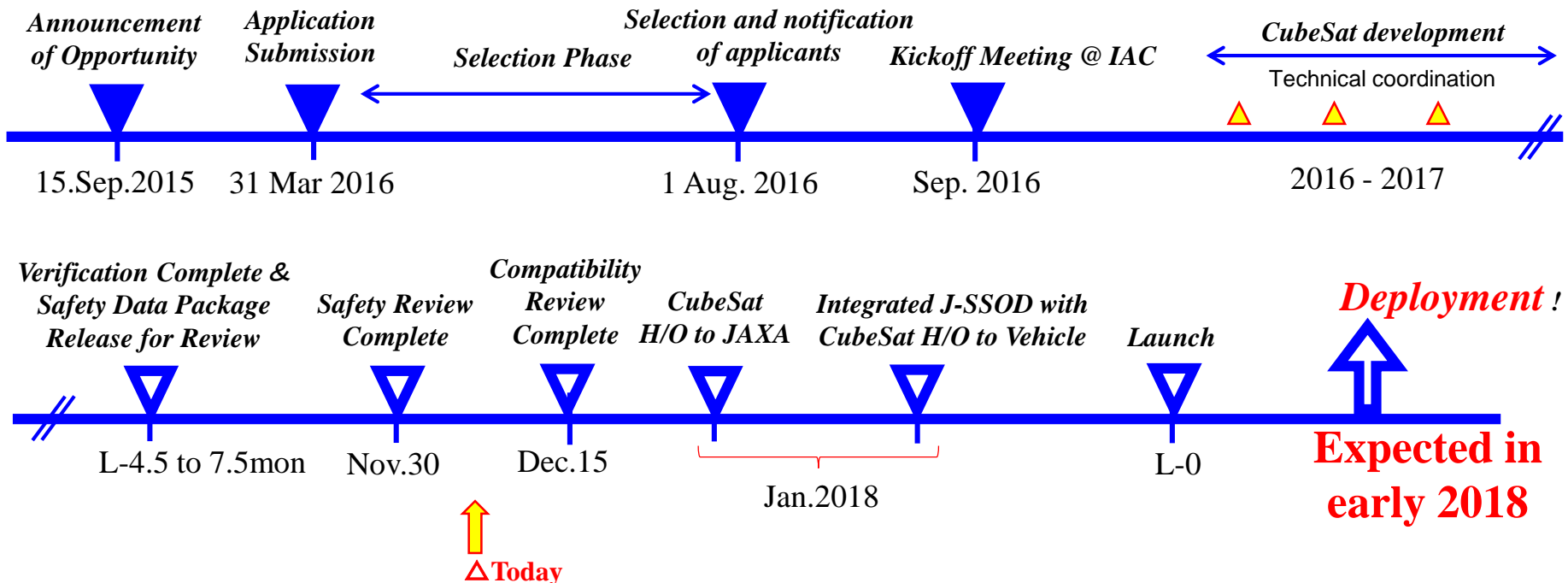
**Media Briefing**



**Kick-off Meeting with JAXA**



**Technical Meeting with JAXA**





# [3<sup>rd</sup> Round ] Announcement of Opportunity

- ◆ *Announcement of Opportunity has started from September in 2017 for 3<sup>rd</sup> round KiboCUBE project.*
- ◆ *Application Submission will be due no later than 31 March 2018*

The entity shall be...

Located in developing countries

Located in a country without the means to transport artificial satellites into space and place them in orbit

A head of research institutes, universities, or other public organizations

Responsible for the development, operation and utilization of their CubeSat

# [3<sup>rd</sup> Round ] Announcement of Opportunity

## Selection Milestone of 3<sup>rd</sup> Round

Announcement of Opportunity      Submitting application to UNOOSA

26 September 2017  
- 31 March 2018

<http://www.unoosa.org/oosa/en/informationfor/media/2017-unis-os-484.html>

Selection of Successful Applicant

Several entities will be selected as “short listed entities” and notified before 1 July 2018.

One entity will be selected among the short-listed entities and **notified by 1 August 2018**

Signing of an arrangement (contract) and Technical coordination

Signing of an agreement(contract) between JAXA and the Selected Entity.

1- 2 months

Technical coordination in preparation of the CubeSat deployment between JAXA and the Selected Entity.

5- 10 months





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Application Submission will be due no later than 31 March 2018

<http://www.unoosa.org/oosa/en/informationfor/media/2017-unis-os-484.html>



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# Thank you for your attention !!

If you are interested in these activities, please contact

[z-kibo-promotion@ml.jaxa.jp](mailto:z-kibo-promotion@ml.jaxa.jp)



Credit : JAXA/NASA

