



**United Nations/Japan Cooperation Programme on CubeSat Deployment from
the International Space Station (ISS) Japanese Experiment Module (Kibo)
“KiboCUBE”
Sixth Round**

Announcement of Opportunity

10 December 2020

- 1. Thematic Area:** Basic and Human Space Technologies
- 2. Title:** United Nations/Japan Cooperation Programme on CubeSat Deployment from the International Space Station (ISS) Japanese Experiment Module (Kibo) or “KiboCUBE”
- 3. Implementing Organizations:** United Nations Office for Outer Space Affairs (OOSA) and Japan Aerospace Exploration Agency (JAXA)
- 4. Deadline for Applications:** Fully completed application forms must be submitted to the United Nations Office for Outer Space Affairs 31 May 2021. Applicants will be notified of the outcome of their application by middle of July 2021.
- 5. Number of Opportunities for Deploying CubeSat:** For each AO, maximum of two entities/ One Unit (1U) CubeSat per entity will be selected depending on the number and content of applications and J-SSOD utilization plan.
- 6. Language of the Programme:** English
- 7. Brief Programme Description:**

The United Nations Office for Outer Space Affairs (OOSA) promotes international cooperation and capacity-building in the area of space technology and its applications in the world, especially in developing countries, within the framework of the United Nations Programme on Space Applications.

OOSA launched the Basic Space Technology Initiative (BSTI) in 2009 with the mission of enhancing access to space application tools for sustainable development through building capacity in basic space technology, and in 2010 OOSA launched the Human Space Technology Initiative (HSTI) with the objective to promote international cooperation in human spaceflight and space exploration-related activities. In 2018, OOSA launched the Access to Space for All Initiative aiming at building capacity through opportunities in space research and space science data services such as micro- and hypergravity experiments, space missions, and human spaceflight-related activities.

The Japan Aerospace Exploration Agency (JAXA) carries out Japan’s space programme conducting research and development on launch systems, satellites, and human space facilities. JAXA developed the International Space Station (ISS) Japanese Experiment Module “Kibo” and has been operating it since 2008. The ISS is a human-tended space facility orbiting at around 400 kilometers above the ground with six crew members on board.

Currently, the only way to deploy CubeSats from the ISS is from Kibo. Kibo's unique capability is comprised of an airlock system and a robotic arm. The first orbital deployment of CubeSats from Kibo was successfully conducted through the Small Satellite Orbital Deployer (J-SSOD), developed by JAXA, in October 2012. Since then, nano-satellites and CubeSats from numerous countries around the world have been deployed from Kibo, that has contributed to the development of technology as well as to capacity-building, particularly in space engineering (see what winners who have deployed a CubeSat say about KiboCUBE <https://www.unoosa.org/oosa/en/ourwork/psa/hsti/kibocube/kiboquotes.html>)

Both OOSA and JAXA along with the Government of Japan are pleased to announce a joint cooperation programme that provides an opportunity for orbital deployment of a CubeSat from the ISS Kibo. In line with the mission and objectives of OOSA initiatives BSTI and HSTI, and JAXA's demonstrated commitment to promoting space science and technology in developing countries, this cooperation programme entitled KiboCUBE is intended to contribute to broadening space activities and applications and to capacity-building in space science and technology.

By providing the opportunity to deploy a CubeSat developed at educational or research institutions from developing countries which are United Nations Member States, OOSA and JAXA will both raise awareness of the role that space science and technology plays in promoting sustainable development and contribute to building capacity in space science and technology.

Kenya's "1KUNS-PF," which was selected as first round of KiboCUBE, was successfully deployed from Kibo in May 2018. 1KUNS-PF was developed by the team from the University of Nairobi and it re-entered the atmosphere in June 2020 after having successfully completed more than ten thousand orbits. It produced many beautiful images and temperature/ velocity data from the on-board components. The KiboCUBE programme has contributed to the capacity building of Kenya, as 1KUNS-PF is Kenya's first satellite. The experience and technology acquired from the development of this CubeSat will be applied in future earth observation satellite of Kenya. For the second round, Quetzal-1 from Guatemala was selected and was developed by the team from Universidad de Valle de Guatemala. It was deployed in April 2020 becoming Guatemala's first satellite in orbit.

8. Scope of Opportunity for Deploying a CubeSat:

Through this Announcement of Opportunity, OOSA and JAXA undertake to provide CubeSat deployment from Kibo. Maximum of two entities (One Unit (1U) CubeSat per entity) in each Announcement of Opportunity will be selected and expected to be deployed into space. JAXA shall bear the costs of launch of the CubeSat to the ISS and deployment from Kibo. The Selected Entity shall bear the costs of the activities identified under Section 11. This Cooperation Programme is subject to the availability of funds of OOSA and JAXA.

9. Programme Schedule and Milestone

(A) Programme Schedule

Application Submission	31 May 2021
Selection and notification of shortlisted applicants	Middle of July 2021
Updated application submission	31 October 2021

Selection and notification of winner(s)	1 December 2021
Preparation period including technical coordination	Approximately 15-18 months (subject to the progress of the CubeSat development)
Safety Review and Compatibility Review	To be determined and arranged by JAXA taking into account the progress of the CubeSat development.
Deployment	Expected by the end of 2023, subject to the ISS operational requirements and progress of the CubeSat development.
Reporting	<ul style="list-style-type: none"> - A semi-annual report on the CubeSat mission, related activities and on any publications regarding the participation of this Programme by the Selected Entity must be submitted to OOSA and JAXA - A first briefing report on the operational results shall be submitted no later than 3 months after the deployment of the CubeSat. - A final report on the CubeSat mission and related activities must be submitted to OOSA and JAXA within 3 months following the re-entry of the CubeSat mission.

It must be noted that;

- The application process consists of two stages, in the first stage, entities shall describe the cost elements of the CubeSat. If the entity is shortlisted, the entity will have 3.5 months to submit a detailed explanation on how the budget will be acquired.
- The number of opportunities and the launch and deployment schedule may change due to constraints on the ISS operation or for any other reasons.

(B) Programme Milestone

1) Webinars

- A number of webinars will be organized to provide indications to participants for the preparation of the application form and to guide the development process.
- Participation in the preparatory webinars is recommended.

2) Selection of successful applicants and signing of an agreement (contract)

- Several entities will be selected as “short listed entities” and notified by middle of July 2021
- The shortlisted entities should submit an updated application form by 31 October 2021.
- Maximum of two entities will be selected among the short-listed entities and notified by 1 December 2021.
- Signing of legal arrangements between JAXA and the Selected Entity.

3) Technical coordination

- Technical coordination in preparation of the CubeSat deployment between JAXA and the selected entities.

4) Safety review

- The developer of the CubeSat is required to undergo a JAXA safety review.
- Given that the materials for the safety review are to be handed in no later than 30 days prior to the date of the review, the functional and environmental tests shall be completed at least 30 days before the delivery of the CubeSat to JAXA.

5) Compatibility review

- JAXA and the Selected Entity will review the compatibility of the CubeSat with the interfaces, such as the mechanical, electrical, and thermal interfaces between the CubeSat and the deployment structure, and with the launch environment, including vibration frequencies and acceleration rates checks. Applicable testing procedures will be reviewed at this stage.
- Data gathered from the test and inspection conducted during the CubeSat development phase may be required as input for the compatibility tests.

6) Critical readiness review

- The Selected Entity will conduct the critical readiness review. JAXA may attend the review as an observer.

7) Transport and delivery of the CubeSat to Tsukuba Space Center of JAXA (TKSC) scheduled 2 to 4 months prior to its transport to the ISS

- The Selected Entity shall bring its own CubeSat to a facility specified by JAXA (TKSC, in general) for the handover to JAXA. The battery of the CubeSat shall be fully charged before delivery. After that, JAXA will manage the maintenance work on the satellite.

8) Transport of the CubeSat to a launch site

- JAXA will transport the CubeSat to a launch site.

9) Operational work at the launch site

- JAXA will be responsible for the operational work at the launch site.

10) Launch and deployment of the CubeSat

- Launch of the CubeSat to the ISS/Kibo by a designated space transportation vehicle, and deployment of the CubeSat from Kibo.

11) Registration of the CubeSat

- The country of the Selected Entity will register the CubeSat either in accordance with the Convention on Registration of Objects Launched into Outer Space or, if the country of the Selected Entity is not a party to the Convention, in accordance with General Assembly resolution 1721B (XVI).

12) Operation of the CubeSat

- The Selected Entity will conduct satellite operation, data evaluation, and space object registration.

13) Reporting the results

- All reports will be submitted to OOSA and JAXA by the Selected Entity.
- A first briefing report on the operational results shall be submitted no later than 3 months after the deployment of the CubeSat.
- A semi-annual report on the CubeSat mission, related activities and on any publications regarding the participation in this Programme by the Selected Entity must be submitted.
- A final report on the results of the mission shall be submitted no later than 3 months after re-entry of the CubeSat mission. It should include educational and promotional activities related the CubeSat mission.

10. Requirements for Participation

(A) Eligibility Criteria

This Opportunity is open to entities located in developing countries that are Member States of the United Nations:

- Heads of research institutes, universities, and other public organizations are eligible to apply for this Opportunity. Private companies, non-governmental or non-profitable agencies are ineligible.
- Entities located in countries that have the means to transport artificial satellites into space and place them in orbit are not eligible, taking into account the objectives of this Opportunity.

OOSA and JAXA will use the list of developing countries indicated in the joint report, *World Economic and Situation Prospects* published by United Nations Department of Economic and Social Affairs and other related organizations:

https://www.un.org/development/desa/dpad/wp-content/uploads/sites/45/WESP2019_BOOK-ANNEX-en.pdf

Entities applying for this Opportunity are responsible for the development of their CubeSat including the design, manufacturing, test and verification of their CubeSat, as well as its operation and utilization after the deployment. Therefore, to be eligible for this Opportunity, applying entities must have sufficient capability in the following areas, as demonstrated in their application materials upon submission:

- CubeSat design, manufacture, testing and operation
- Ability to transport the CubeSat to JAXA (planning, budget, export/import control etc.)
- Preparation of safety review (submission of safety assessment reports etc.)
- International coordination of the CubeSat's radio frequency
- Ability to obtain a license of radio stations for CubeSat in the country
- Development of the ground station facility with radio frequency license
- Letter of endorsement from the head of the entity

The balanced participation of women and men in teams as well as supervising positions is encouraged.

(B) Selection Criteria

The Selection Board consists of members nominated by OOSA and JAXA and will review the incoming applications according to the following criteria:

- Completeness of application form;
- Scientific and technical value of the CubeSat to be deployed under this Opportunity, as determined by either:
 - (a) The CubeSat's expected contribution to developing human knowledge and capacity to undertake activities in the field of space science and technology in the applying entity's home country or abroad; or
 - (b) The CubeSat's expected contribution to enhancing research and development through the technological demonstration of deploying and operating the CubeSat in the applying entity's home country or abroad.
- Capability of meeting or exceeding the minimum technical requirements as outlined by OOSA and JAXA;
- Compliance with the Programme Schedule, including the deployment schedule;
- Communication and dissemination plan
- Inclusiveness (In case of proposals with the same score, the shares of men and women in the teams will be compared. The proposal with the share closer to 50/50 will rank higher)
- Demonstrating that the applying entity itself and the intended design and function of the CubeSat are consistent with peaceful exploration and use of outer space, and are not intended solely for commercial, political or religious purposes.
- Link between the CubeSat in the Sustainable Development Goals

(C) Technical Requirements

Regarding the detailed interface requirements required for the CubeSat design, please refer to "*JEM Payload Accommodation Handbook -Vol. 8- Small Satellite Deployment Interface Control Document (JX-ESPC-101133)*" . http://iss.jaxa.jp/kiboexp/equipment/ef/jssod/images/jpah_vol.8_b_en.pdf

11. Roles and Responsibilities

The Selected Entity will conduct the following activities:

- Submit the overall schedule/timeline for the CubeSat development and its mission to JAXA.
- Design, analyze, manufacture and test the CubeSat and its supporting systems including verification of the compatibility with the technical requirements, except for the tests that will be conducted by JAXA as specified in Section 12.
- Conduct all radio frequency related matters in full compliance with the applicable International Telecommunication Union radio regulations.
- Implement the safety assessment to verify the compliance with JAXA technical requirements and prepare the materials and operations required for the review.
- Attend the technical coordination meeting which is to be arranged by JAXA.
- Deliver the CubeSat to the location specified by JAXA (expected to be Tsukuba Space Center) for the compliance tests (Fit-check and outgassing test can be conducted by JAXA.) and

- conduct a visual inspection, uninstall non-flight items for the compatibility tests and the handover.
- Operate the CubeSat including tracking control and data acquisition after the deployment from Kibo.
 - Register the space object (the CubeSat). For more information, please refer to the following document: http://www.unoosa.org/documents/pdf/psa/bsti/2015_Handout-on-Small-SatellitesE.pdf
 - Cooperate with the public relations and promotion activities of OOSA and JAXA including responding to press inquiries about the CubeSat and preparing information materials upon request from OOSA and JAXA.

Please note that any cost associated with the activities above, including employment costs, travel expenses and transportation fees shall be borne by the Selected Entity.

There might be a possibility to provide limited support for this opportunity by generous donation from third party.

To support and follow the implementation of the KiboCUBE project, UNOOSA and JAXA requires the following document to be submitted from the **selected entity** during the course of the development;

- J-SSOD/ satellite interface verification record (same document that will be submitted to JAXA for the safety assessment to verify compliance with JAXA technical requirements)

The selected entity has included in their application whether or not, they are willing to allow UNOOSA to publish the application documentation in the UNOOSA website. The aim of publishing this information is to further extend the knowledge of development of CubeSat to other institutions.

UNOOSA and JAXA encourage the selected entity to submit the model of their receiver using GNU Radio Companion (GRC) format for publication. This will enable other entities to access the telemetry of the satellite and participate on the KiboCUBE initiative. UNOOSA will consider publishing the telemetry (e.g. pictures or other data), subject to consultation with JAXA and the selected entity.

For any publication (journals or conferences) concerning the CubeSat deployed through this opportunity, the applicants agree to include the following sentence as part of the acknowledgement:

“The authors would like to thank the United Nations Office for Outer Space Affairs and the Japan Aerospace Exploration Agency. This project has been made possible thanks to KiboCUBE, the programme on CubeSat deployment from the International Space Station Japanese Experiment Module Kibo”

12. Terms and Conditions:

By submitting a completed Application, the applicant agrees to the following:

- The Selected Entity will enter into an arrangement (contract) with JAXA to resolve any and all practical, logistical, technical and/or legal issues related to the deployment of the CubeSat from Kibo that may arise between JAXA and the Selected Entity. The arrangement (contract) will contain terms to define, *inter alia*, scope of work, the necessary conditions for the deployment, allocation of costs, compliance rules, handling of technical information and test results, confidentiality, security issues of JAXA facilities, declarations of immunity and hold harmless on the part of JAXA, cross-waivers of liability for damages sustained by either party, 3rd party liability claims, registration of the CubeSat space object and apportionment of other responsibilities arising under United Nations treaties on outer space, and dispute resolution procedures.
- This arrangement (contract) shall also be consistent with the “Agreement among the Government of Canada, Government of Member States of the European Space Agency, the Government of Japan, the Government of the Russian Federation, and the Government of the United States of America,

concerning Cooperation on the Civil International Space Station,” signed on January 29, 1998 (hereinafter referred to as “IGA”). Articles set forth in the IGA, including but not limited to the Cross-Waiver of Liability, shall be applied to the Selected Entity through this arrangement (contract).

- JAXA does not in any way guarantee the launch date, the launch success, the deployment date and/or the deployment success, nor will JAXA be in any way responsible for the overall success of the mission. The specific date of the launch and deployment will be fixed by negotiation between JAXA with the Selected Entity after assignment of the launch.
- JAXA may terminate the provision of the deployment opportunity at any time, should the Selected Entity violate the terms and conditions as described in this Announcement of Opportunity and/or the separate arrangement (contract).

13. Application Submission

The **fully completed application documents of the letter of endorsement from the head of the entity** (Document 1) and **CubeSat Mission Application** (Document 2) must be submitted to OOSA by 31 May 2021 by email to the following address:

unoosa-access-to-space@un.org

In the email, applying entities are requested to attach scanned copies of the Document 1 and the cover page of Document 2 as pdf-file (.pdf) and the entire document of the Document 2 in pdf. Please note that the OOSA email account only accepts emails with a size limit of up to 10 M bytes. Submission of all necessary documents (Document 1 and Document 2) is mandatory.

After receipt, OOSA and JAXA will proceed to evaluate each application. At OOSA’s or JAXA’s sole discretion, additional information may be requested from applicants, if necessary, to assist in the evaluation of the application. The Selected Entity will then be notified with the results of the selection process. All awards are final, are made at the sole discretion of OOSA and JAXA, and not subject to challenge or review.

14. Additional Information

The latest information on KiboCUBE will be made available on the website of OOSA at:

<http://www.unoosa.org/oosa/en/ourwork/psa/hsti/kibocube.html>

For further information regarding KiboCUBE and applications, please contact

unoosa-access-to-space@un.org