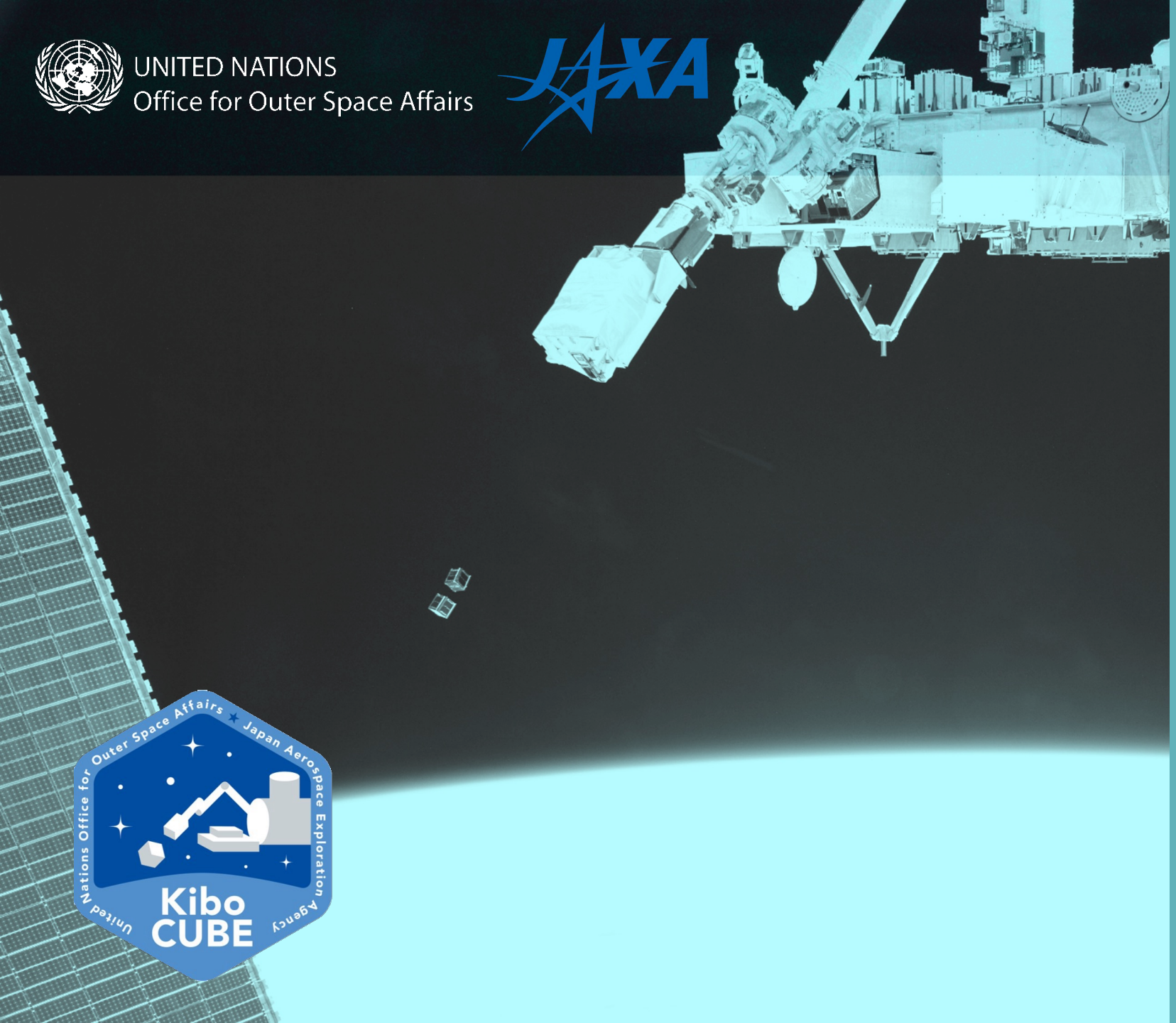

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JAXA

KiboCUBE 8th round Announcement of Opportunity

Webinar

Details and Tips on
How to Fill in the Form

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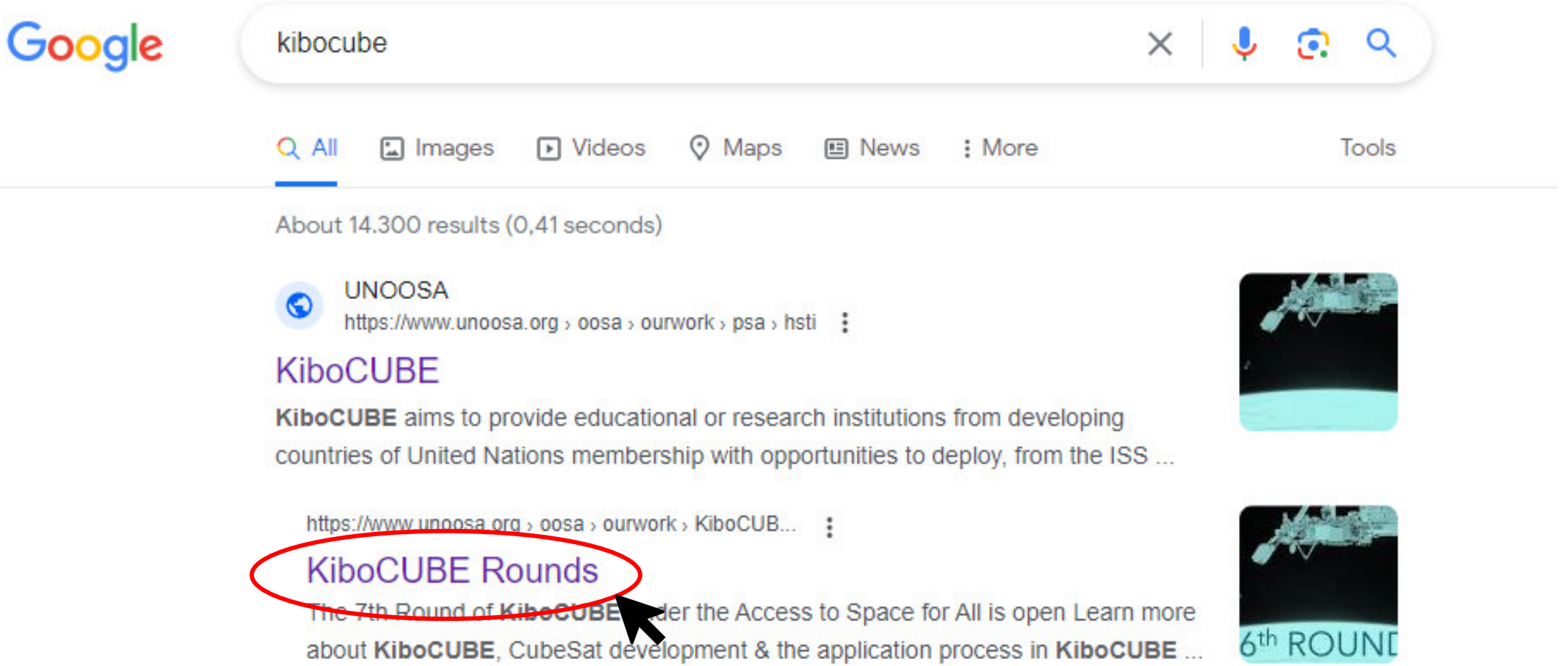

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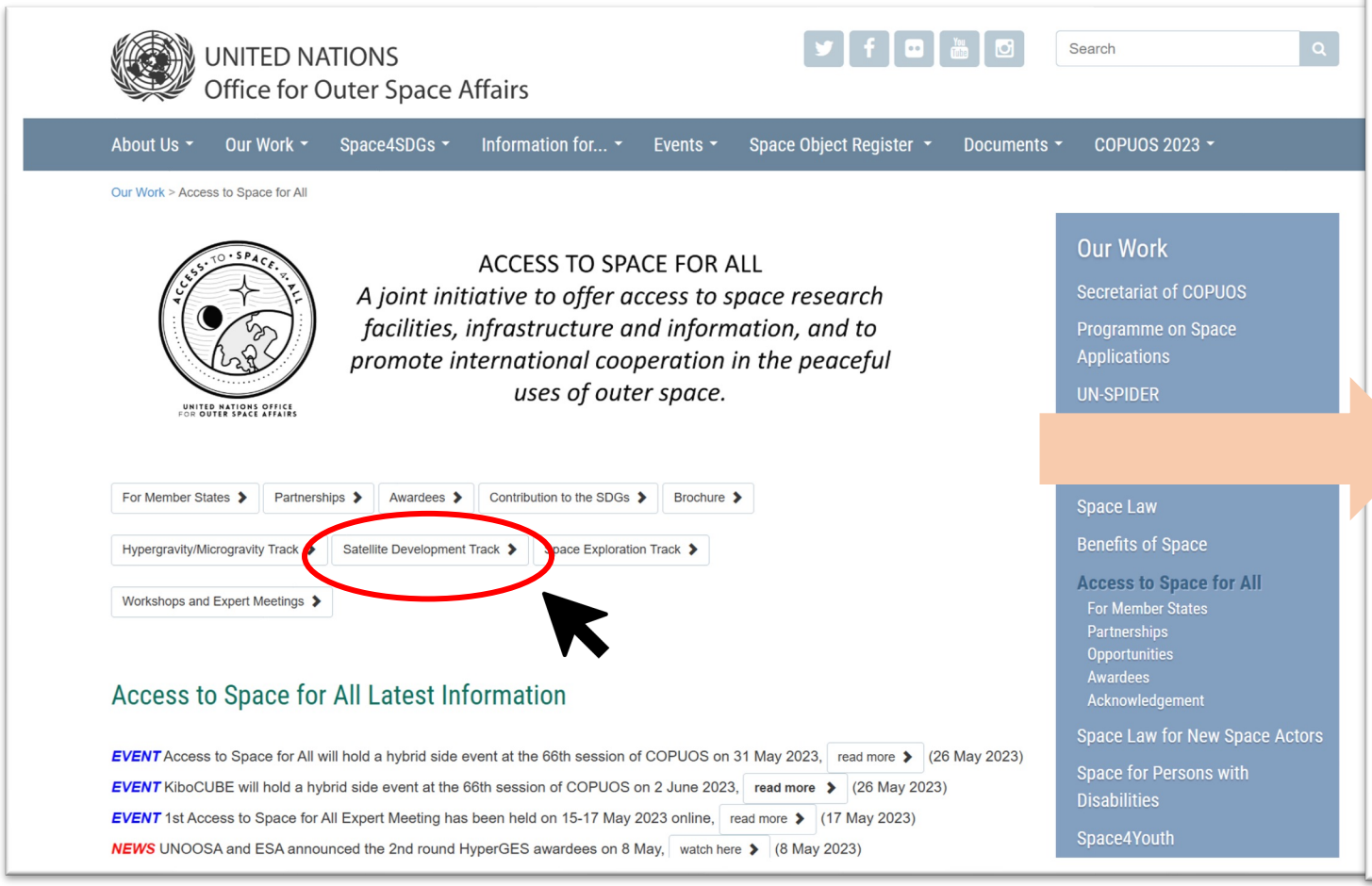
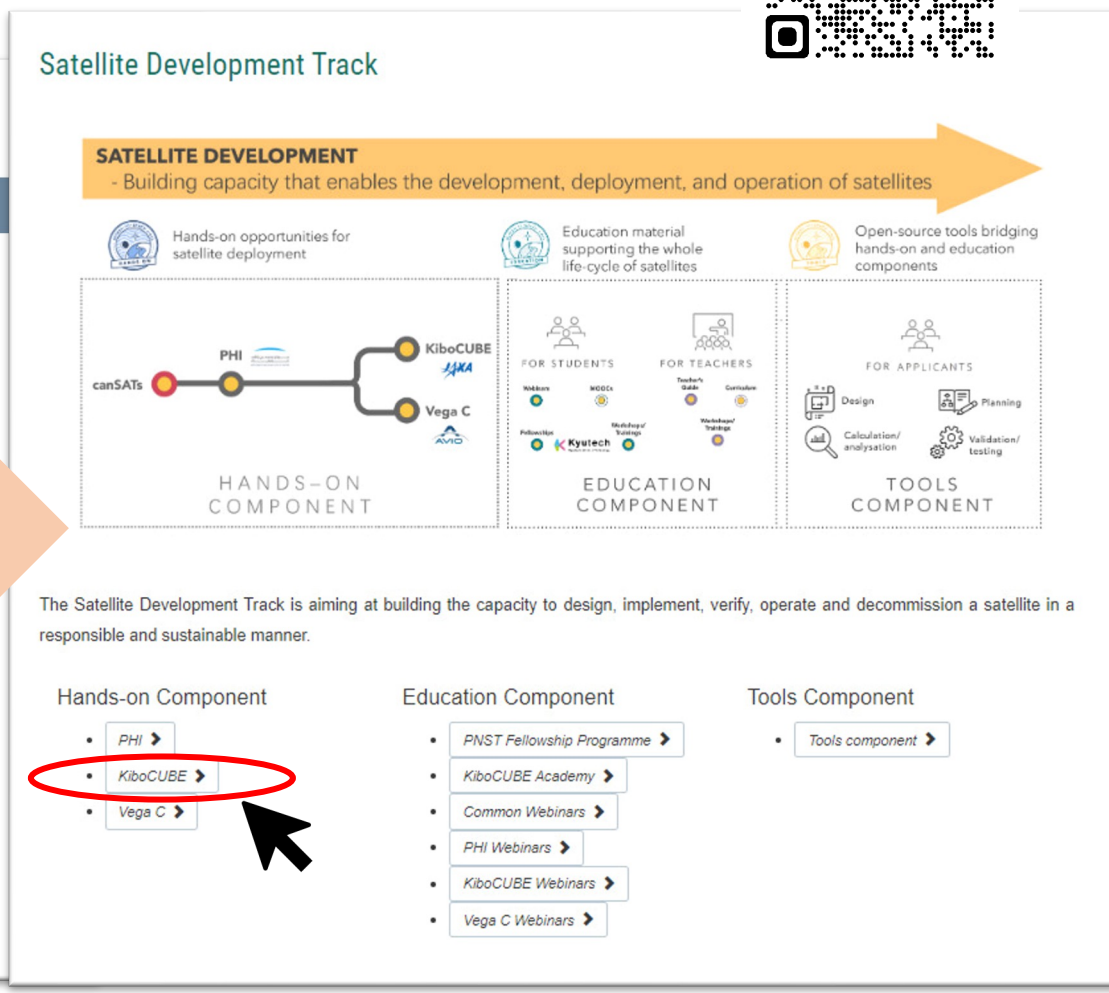
Search **Access to Space for All**

https://www.unoosa.org/oosa/en/ourwork/access2space4all/index.html





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Our Work > Access to Space for All > Opportunities > Satellite Development Track

United Nations/Japan Cooperation Programme on CubeSat Deployment from the International Space Station (ISS) Japanese Experiment Module "KiboCUBE"

KiboCUBE in partnership with Japan Aerospace Exploration Agency provides the opportunity to develop a cube satellite (CubeSat) and have it deployed from the International Space Station Japanese module "Kibo".

KiboCUBE enables access to space promoting the sustainability of future space activities.

News

- KiboCUBE will hold a hybrid side event at the 66th session of the COPUOS on 2 June 2023, read more.
- KiboCUBE Academy webinar held on Thursday 9 March 1pmCET. Watch from here .
- 3rd round awardee Surya University's SS-1 was deployed from the ISS on 6 January. Watch from the JAXA YouTube .
- More live-sessions and pre-recorded lectures for KiboCUBE Academy have been uploaded! Check them out here
- Interview with Mauritius Research and Innovation Council (MRIC) is published! Read from here
- Check out our new brochure: "KiboCUBE: Expanding Possibilities for Space Emerging Countries"

Our Work
- Secretariat of COPUOS
- Programme on Space Applications
- UN-SPIDER
- International Committee on
- UN-Space
- Space Law
- Benefits of Space
- Access to Space for All
  - For Member States
  - Partnerships
  - Opportunities
    - Hypergravity/Microgravity Track
    - Satellite Development Track
    - Space Exploration Track
  - Awardees
  - Acknowledgement
- Space Law for New Space A
- Space for Persons with Disabilities
- Space4Youth

ROUNDS

The United Nations/Japan Cooperation Programme on CubeSat Deployment from the International Space Station (ISS) Japanese Experiment Module (Kibo) "KiboCUBE" is a programme of the United Nations Office for Outer Space Affairs (UNOOSA) in collaboration with the Japan Aerospace Exploration Agency (JAXA). The programme started in 2015. KiboCUBE is the dedicated collaboration for utilizing the ISS Kibo for the world. KiboCUBE aims to provide educational or research institutions from developing countries of United Nations membership with opportunities to deploy, from the ISS Kibo, cube satellites (CubeSats) which they develop and manufacture. The deployment of CubeSats from ISS is easier than the direct deployment by a launch vehicle thanks to the lower vibration environment during launch. With these comparatively less demanding interface requirements, UNOOSA and JAXA believe that KiboCUBE will lower the threshold of space activities and will contribute to building national capacity in spacecraft engineering, design and construction.

read more

AWARDEES

1st Round: University of Nairobi (Kenya)
2nd Round: Universidad del Valle de Guatemala (Guatemala)
3rd Round: Mauritius Research and Innovation Council (Mauritius) and Surya University (Indonesia)
4th Round: Technical University of Moldova (Moldova)
5th Round: Central American Integration System (SICA)
6th Round: Universidad Popular Autonoma del Estado de Puebla (Mexico) and Ecole Superieure Privee d'Ingenierie et de Technologie Appliquee (Tunisia)

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PARTNER

JAXA

This opportunity is in collaboration with the Japan Aerospace Exploration Agency (JAXA), the national space agency of Japan. Currently, the only module to deploy CubeSats from the ISS is Kibo, developed by JAXA. 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 in October 2012 through the Small Satellite Orbital Deployer developed by JAXA. Since then, nano-satellites and CubeSats from various countries around the world have been deployed from Kibo.

read more

- Space4Women
- World Space Forum
- Worldwide Space Agencies
- Capacity Building Activities

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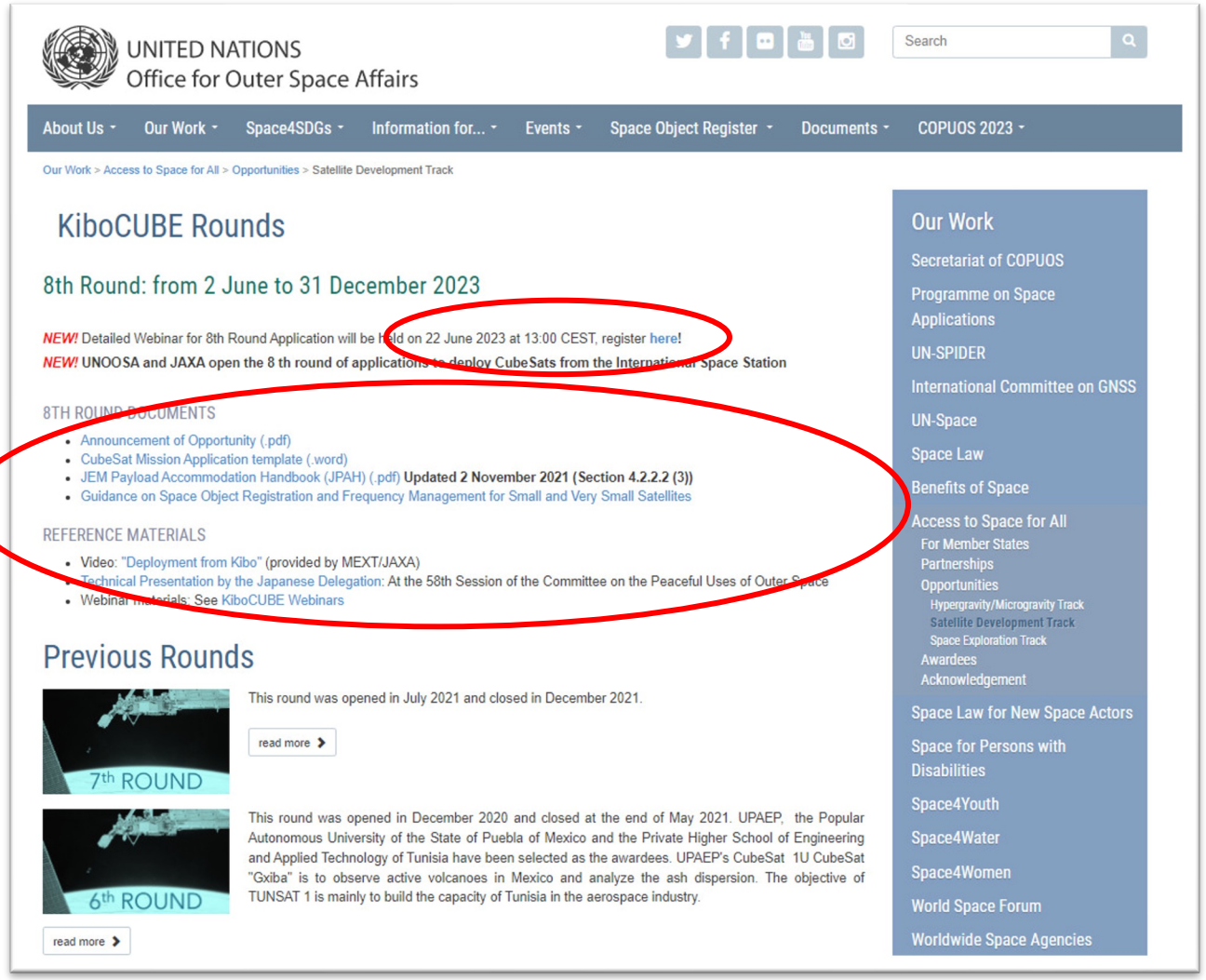

READ all of the documents carefully

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WATCH the on-demand pre-recorded KiboCUBE Academy Webinars

SUBMIT the documents on time

DEADLINE: 31 December 2023

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Announcement of Opportunity!
2 June 2023

Announcement of Opportunity Webinar: Ask your question!
22 June 2023

KiboCUBE Academy Live Session
xx July 2023

KiboCUBE Academy Live Session
1 October 2023

Submit the completed Application Form!
31 December 2023

2023

June | July | August | September | October | November | December

Outreach & Publication Phase

Announcement of Short-listed Selection
February 2024

Interview + Submission of updated Application Form + Review & Confirm legal agreement
31 May 2024

Announcement of Selection Results
June 2024

Development Phase

Handover & Transportation Phase
3-4 months prior to lauch to ISS

Launch **1-2 months prior to deployment**
& Deployment

Reporting Phase

Post-deployment Phase

2024 | 2025 | 2026

January | February | March | April | May | June

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12. Eligibility Criteria

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

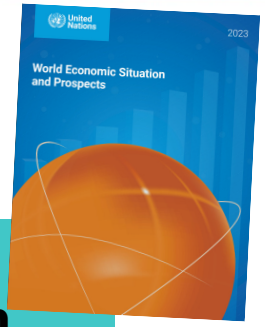
- Government organisations, research institutes, universities, and other public organisations are eligible to apply for this Opportunity. Private companies, non-governmental, or non-profit agencies are ineligible.
- Entities located in countries that do not have satellites in orbit at the time of the opening of this application (according to the information on the United Nations Register of Objects Launched into Outer Space) are particularly encouraged to apply.

To assess eligibility, UNOOSA and JAXA will use the country classification list of developing economies and economies in transition indicated in the joint report, *World Economic and Situation Prospects* published by the United Nations Department of Economic and Social Affairs and other related organisations: https://desapublications.un.org/file/1098/download

Entities applying for this Opportunity are responsible for the development of their CubeSat, including the designing, manufacturing, testing, 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 demonstrate in their application that they have sufficient capability and resources in the following areas:

- CubeSat design, manufacture, testing, and operation, in accordance with JAXA requirements.
- Transportation of the CubeSat to JAXA (planning, budget, export/import control etc.).
- Coordination of all radio frequency-related matters in full compliance with the applicable International Telecommunication Union radio regulations.
- Development of the ground station facility with a radio frequency license.
- Registration of the CubeSat in the Register of Objects Launched into Outer Space.

Teams are allowed and encouraged to partner with external entities that can support their development, even if those entities are not eligible themselves. These partnerships should be clearly written as "External Support" in the Application Form and external partners shall not be included in the team.



- Entities located in **developing economies and economies in transition**
- Entities = **Government organisations, research institutes, universities, other public organisations**
- Team = as many members as deemed necessary
- Partnerships = Include in team if the partner is also an eligible entity, if not put them under "External Support"

13. Selection Criteria

UNOOSA and JAXA will nominate members of the Selection Board, which will review the incoming applications according to the following criteria:

- Completeness of application form.
- Scientific and technical value of the CubeSat mission, as determined by either:
  - (a) The CubeSat mission'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 mission'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.
- Novelty of the mission (the CubeSat mission shall not copy any previous development design of the applying entities, if any).
- 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 mission and the Sustainable Development Goals.
- Capability of the team to comply with the "*JEM Payload Accommodation Handbook -Vol. 8- Small Satellite Deployment Interface Control Document (JX-ESPC-101133-D).*" and any other technical requirements outlined by UNOOSA and JAXA.
- Compliance with the Programme Schedule, including the deployment schedule.
- Outreach, communication, and dissemination plan about the CubeSat mission.
- The team composition of proposals with the same score will be compared and the proposal with a larger number of women will be ranked higher.
- Compliance with the Space Debris Mitigation Guidelines and Guidelines for the Long-term Sustainability of Outer Space Activities.

14. Roles and Responsibilities

The awardee shall conduct the following activities:

- Update the overall schedule/timeline for the CubeSat development and its mission to JAXA.
- Attend the technical coordination meetings arranged by JAXA.
- Submit the 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).
- Design, analyze, manufacture, and test the CubeSat and its supporting systems, including verification of the compatibility with the technical requirements, except for the compliance tests that will be conducted by JAXA.
- Conduct all radio frequency-related matters in full compliance with the applicable International Telecommunication Union radio regulations.
- Verify the safety assessment, as well as the compliance of the CubeSat design with JAXA's technical requirements for the safety assessment, and prepare the materials and operations required for the safety review.
- Deliver the CubeSat to the location specified by JAXA (expected to be Tsukuba Space Center) for the compliance tests (JAXA will conduct the fit-check and outgassing test) and conduct a visual inspection, uninstall non-flight items for the compatibility tests on site in Japan and handover the satellite to JAXA.
- Operate the CubeSat, including tracking control and data acquisition, after deployment from Kibo.

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- 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).
- Conduct outreach activities to promote capacity-building and STEM education related to the CubeSat project.
- Contribute to the public relations and promotion activities of UNOOSA and JAXA including responding to press inquiries about the CubeSat and preparing information materials upon request from UNOOSA and JAXA.
- Inform UNOOSA and JAXA of any publication that uses the outcome of this CubeSat mission, including PhDs, Master theses, publications in journals, and conference or workshop proceedings and presentations. The awardee is requested to include the following sentence in their peer-reviewed publications, contributions to congresses, and other forms of written dissemination:
  "The authors would like to thank the United Nations Office for Outer Space Affairs and the Japan Aerospace Exploration Agency for the Access to Space for All Initiative: Programme on CubeSat deployment from the International Space Station Japanese Experiment Module Kibo: KiboCUBE for their support in enabling the deployment of the CubeSat."

Please note that the awardee shall bear any costs associated with the activities above, including employment costs, travel expenses, and transportation fees.

UNOOSA and JAXA encourage the awardee 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 in efforts to track the CubeSat developed by the awardee. UNOOSA will consider publishing the telemetry (e.g., pictures or other data), subject to consultation with JAXA and the selected entity.

☑ **All costs** related to the preparation, development, transportation, shipping, insurance, outreach activities etc.

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15. Terms and Conditions

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

- The awardee will enter into an agreement (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 awardee. The agreement (contract) will contain terms to define, *inter alia,* the 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, third 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 agreement (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 International Government Agreement (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 agreement (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 awardee after the assignment of the launch.
- JAXA may terminate the provision of the deployment opportunity at any time, should the awardee violate the terms and conditions as described in this Announcement of Opportunity and/or the separate agreement (contract) and/or when the awardee cannot meet the Programme Schedule.

The bilateral agreement template will be shared when the team has been short-listed. The team will have 3 months to review and confirm the contents.

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Chapter 1: Team Composition

1.1 Project Title **[Mandatory]**
1.2 Executive Summary: (no more than 150 words) **[Mandatory]**
1.3 Certificate **[Mandatory]**
1.4 Head of Applying Organization Information **[Mandatory]**

Summarize
- why you chose to perform this experiment
- what are expected outcomes
- why your experiment is unique
- your plan

Besides the Certificate, a Letter of Endorsement is also required from each applying entity.
There is no template for the letter.

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Chapter 2: Team Composition

2.1 Description of Cooperation **[Optional]**

If it is a joint proposal from several entities, please describe the role and responsibilities of each one.

2.2 Project Coordinator **[Mandatory]**

2.3 Team Member(s) **[Mandatory]**

Please note that **all team members must belong to applying organizations that are eligible**, as specified in Section 12 of the Announcement of Opportunity.

2.4 External Support **[Optional]**

If you have support during the project from external organizations or individuals, please list them here.

The difference between 2.1 and 2.4

- 2.1 is the roles & responsibilities **within the team**
- 2.4 is the roles & responsibilities **of external organizations/individuals**

Chapter 3: Technical Abstract

3 Proposal Technical Abstract **[Mandatory]**

Please insert a brief description of the proposed CubeSat, starting with the **objectives and aim of the mission, including the scientific or technical value, design of the CubeSat, ground segment and user segment if applicable**.

Summarize
- What your CubeSat aims to do
- What kind of value will it bring
- Overview of the design and related segments

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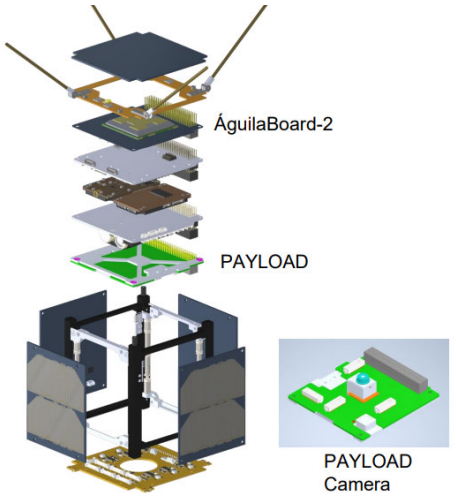
Chapter 4: Mission Objectives and Requirements

4.1 Mission Statement: Contribution to Capacity-Building and Objectives **[Mandatory]**

Please include a mission statement (one or two sentences maximum) and **how the development and deployment of CubeSat could contribute to capacity-building in your country**. Please use SMART criteria (Specific, Measurable, Achievable, Realistic, Time-bounded) to define **what you want to achieve through the project**. Details on how to realize that contribution are to be included in the communications plan and dissemination plan

GXIBA: Mission

The mission is to develop a 1U CubeSat, named "Gxiba-1", to observe the active volcanoes in Mexico and analyze the dispersion of ash to alert the population in the vicinity of the volcano.



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QUETZAL-1
Mission

*To design, develop, and operate a CubeSat-class satellite to **test a multispectral sensor prototype**, opening the field of space science & technology in Guatemala, **developing the country's human capital**, and enabling the independent acquisition of remote sensing data for natural resource management.*

5 GENDER EQUALITY
9 INDUSTRY, INNOVATION AND INFRASTRUCTURE
17 PARTNERSHIPS FOR THE GOALS

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4.2 Foreseen Outcomes and Deliverables **[Mandatory]**

Please insert a description of the **specific outcomes of the CubeSat mission** and **how the outcomes and its related activities contribute to one or several Sustainable Development Goals (SDGs).** Note that KiboCUBE contributes to SDG 4 "Quality Education; SDG 8 "Decent Work and Economic Growth" and SDG 9 "Industry, Innovation and Infrastructure". Please also explain which deliverables will be produced out of the CubeSat mission.

Access to Space for All Awardees page:

https://www.unoosa.org/oosa/en/ourwork/access2space4all/Awardees.html

All of the 17 Goals each have
- Targets
- Indicators

Check the UN SDGs page:
https://sdgs.un.org/

4.3 Novelty and Uniqueness **[Mandatory]**

Describe why the proposed CubeSat is **new and unique**, including **how it differs from similar CubeSats**. In the case that this is not the first satellite that the applying institutions have developed, please indicate **the difference with the previous missions**.

4.4 Technical Heritage**[Mandatory]**

Include any previously related work you have performed and any relevant scientific/engineering background supporting your experiment.

Why is your experiment special?

Is your CubeSat just another satellite in the constellation?

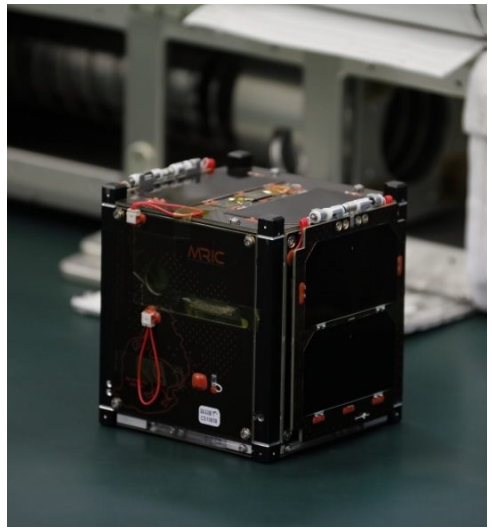
©Aerospace Corp.

Show us your experience and capabilities

4.5.1 Mission Requirements **[Mandatory]**

Please insert a list of the primary and secondary requirements needed to accomplish the mission objectives. Mission requirements shall be numbered as PrimMis-XXX and SecMis-XXX respectively (e.g. PrimMis-001, PrimMis-002…; SecMis-001, SecMis-002….). The Space Debris Mitigation Guidelines shall be part of the mission requirements and flow down to the necessary technical requirements.

Example:
PrimMis-001: The CubeSat shall take images of (target) (number) times a day with a definiton of (resolution).



Mission Requirements= requirements related to a task, a function, a constraint, or an action induced by the mission scenario (ECSS)

Primary Requirement= requirements that need to be met to accomplish the mission objectives

Secondary Requirement= requirements that are "good to have"

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4.5.2 CubeSat Design Requirements **[Mandatory]**

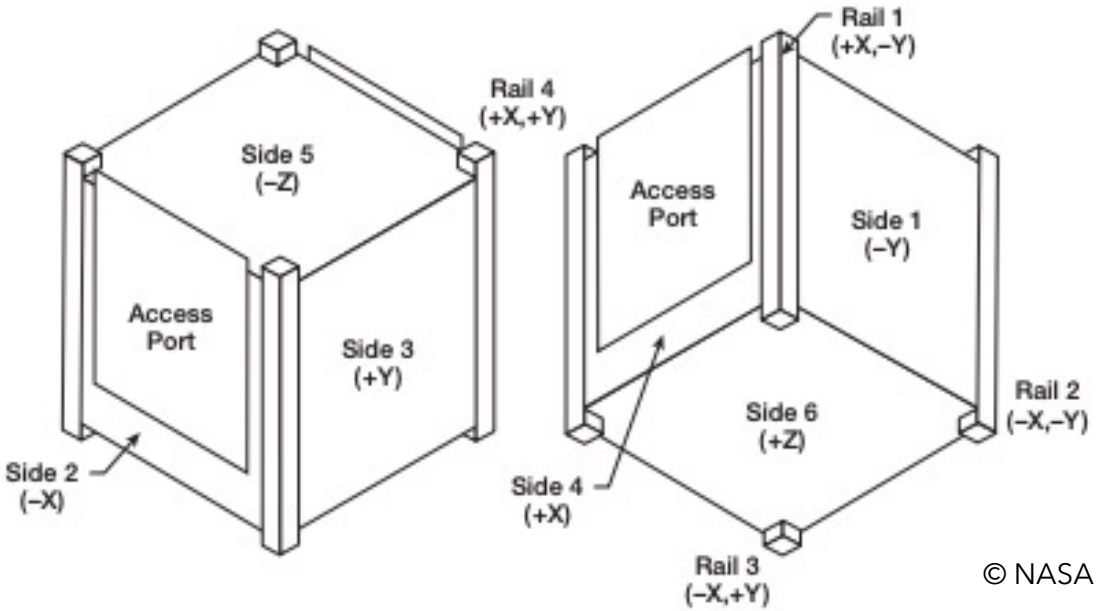
Please describe the design requirement of the CubeSat. Note that the requirements have to be **verifiable and compatible** with what is stated in the JEM Payload Accommodation Handbook -Vol.8- Small Satellite Deployment Interface Control Document (JX-ESPC-101133-E). Requirements shall be numbered as Des-XX (e.g. Des-001, Des-002…).

Design Requirements= requirements related to the imposed design and construction standards such as design standard, selection list of component or materials, interchangeability, safety or margins. (ECSS)

Example:

Des-001: The CubeSat structure shall be compatible with the J-SSOD.

Des-002: The CubeSat shall be 100mm wide with 0.1mm tolerance in X and Y.



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4.5.3 Ground Segment Design Requirements **[Mandatory]**

Please list your design requirements (for example tracking related, link budget related etc.) for the ground segment. Requirements shall be numbered as GSeg-XX (e.g. GSeg -001, GSeg-002…)

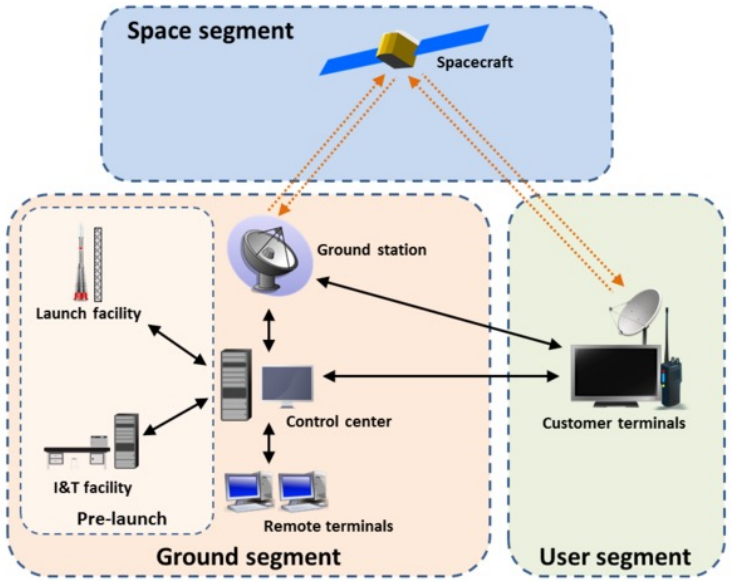
Example:

GSeg-001: The ground stations shall use UFH band in the range 430-440 MHz for both uplink and downlink.

4.5.4 User Segment Design Requirements **[Optional]**

Please list your design requirements (for example maximum size, weight, and power etc.) for the user segment. Requirements shall be numbered as USeg-XX (e.g. USeg-001, USeg -002…).

Check out KiboCUBE Academy Pre-Recorded On-Demand Lecture 17
Introduction to CubeSat Operation and Ground System
https://www.unoosa.org/documents/pdf/psa/access2space4all/KiboCUBE/AcademySeason2/On-demand_Pre-recorded_Lectures/KiboCUBE_Academy_2022_OPL17.pdf



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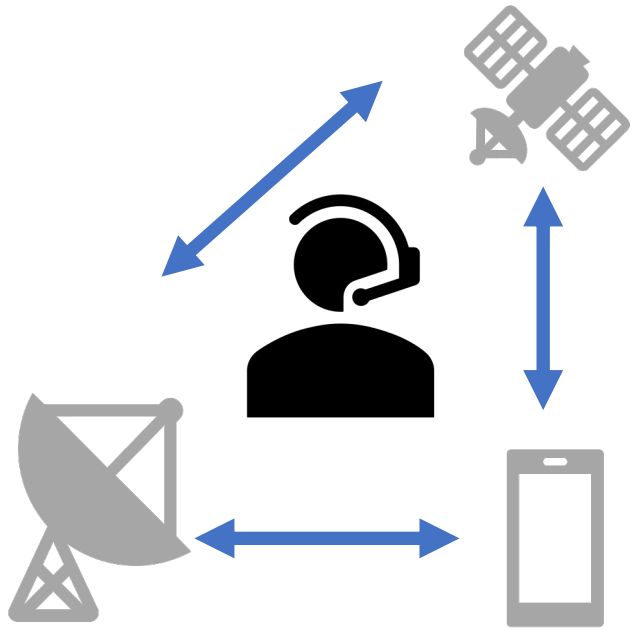
4.5.5 Operation Requirements **[Mandatory]**

Please list your operation requirements (for example tracking related, expected actions during operations, concept of operations etc.). Requirements shall be numbered as Ope-XX (e.g. Ope-001, Ope-002…).

Example:

Ope-001: Radio Frequency transmissions shall wait to transmit for 30 minutes at minimum after the deployment switches are activated at ejection from J-SSOD.

Ope-002: The mission operations team shall generate, verify, and send command sequences to the spacecraft.



Check out KiboCUBE Academy Pre-Recorded On-Demand Lecture 17
Introduction to CubeSat Operation and Ground System
https://www.unoosa.org/documents/pdf/psa/access2space4all/KiboCUBE/AcademySeason2/On-demand_Pre-recorded_Lectures/KiboCUBE_Academy_2022_OPL17.pdf

Operation Requirements= requirements related to the system operability (ECSS)

Include operation requirements for both **early orbit phase and normal phase.**

Chapter 5: System Specifications and Detailed Description

5.1.1 Main Specifications **[Mandatory]**

You can use graphs and tables for some items such as Table 5.1 provided as an example.)

Table 5.1. CubeSat main specifications

Parameter	Values	Units
Mass	[1U: less than 1.33]	kg
Dimensions	[1U: 100×100×113.5]	mm
Dimensions (deployed)		cm
Ballistic coefficient		kg/m^2
Expected Center of Gravity position		mm

5.1.2 3D View**[Mandatory]**

Please provide the front-view, side-view, bird's view, and deployed configuration

5.1.3 External Dimensions **[Mandatory]**

Please provide the size of any protruding objects, if any.

Front-view

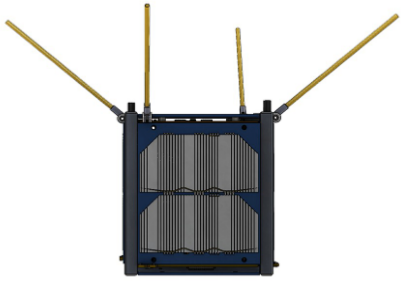


Image 5.1 Front view of complete assembly

Top view

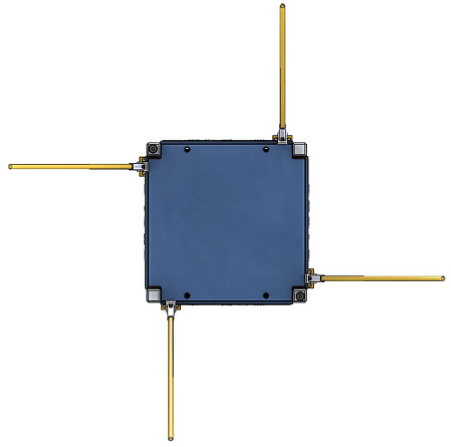


Image 5.2 Top view of complete assembly (AguilaBoard)

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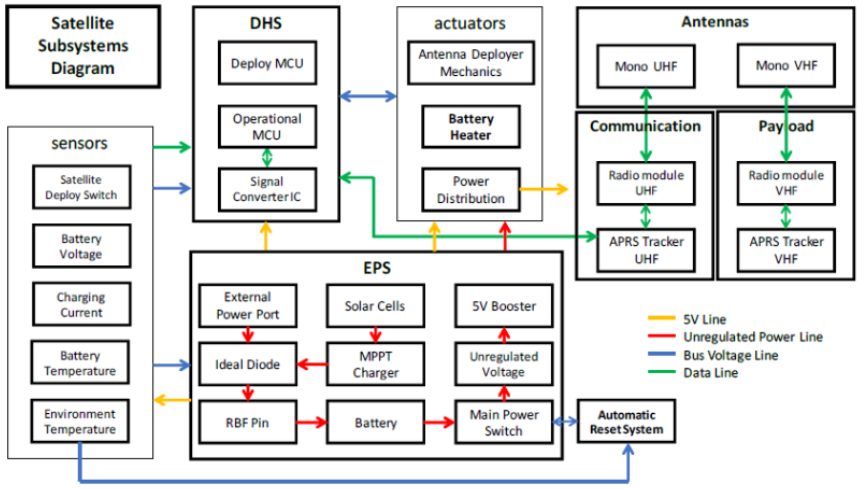
5.2 System Block Diagram and List of Components

5.2.1 System Block Diagram **[Mandatory]**

Please include information on all subsystems and how they are related.)



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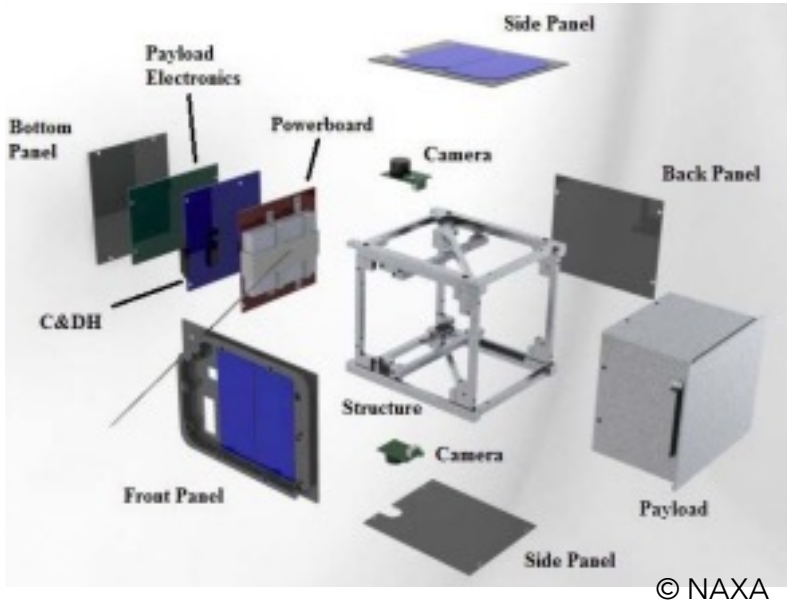
5.2.2 List of Components **[Mandatory]**

Please provide a list of components, **up to the lowest level available**. For custom-made components, please provide the name, 3D view (as Section 5.1.2), and describe the main features of the component (mass, location of center of gravity, and functionality). **Include whether the item is going to be made in-house or purchased**, please include the vendor's name if purchased. **A Product Breakdown Structure** will be highly appreciated. If the component will be made in-house, please provide the **Technology Readiness Level.**



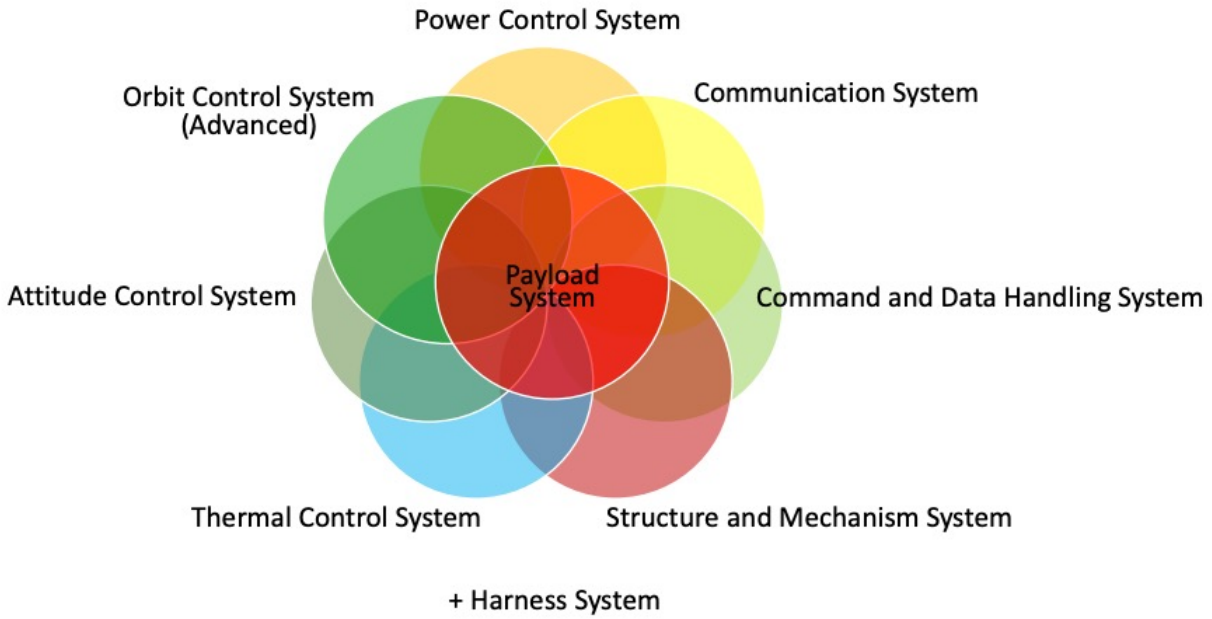
© NAXA

5.2.3 Subsystems Design

3. Definition of Satellite Subsystems

3.1. Satellite Subsystems

A satellite system consists of several subsystems. Typical categorization is as follows:



Check out KiboCUBE Academy Pre-Recorded On-Demand Lecture7 Introduction to CubeSat Technologies https://www.unoosa.org/documents/pdf/psa/access2space4all/KiboCUBE/AcademySeason2/On-demand_Pre-recorded_Lectures/KiboCUBE_Academy_2021_OPL07.pdf

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5.2.3.1 Structural and Mechanical Subsystems **[Mandatory]**

Please provide the design for the primary structure, mechanisms such as the deployment of solar panels and antenna, equipment layout plans, separation mechanism, and materials for the primary structure. Please provide as much detail as possible.

5.2.1 Electrical Power Subsystems **[Mandatory]**

Please provide a list of components, scheme of the electronics, control system and description of the power subsystem. Please provide as much detail as possible (e.g. how the different elements of the EPS are connected, expected depth of discharge (DoD) for the battery etc.).)

Check out KiboCUBE Academy Pre-Recorded On-Demand Lecture 11
Introduction to Nano-Satellite Technologies
https://www.unoosa.org/documents/pdf/psa/access2space4all/KiboCUBE/AcademySeason2/On-demand_Pre-recorded_Lectures/KiboCUBE_Academy_2021_OPL11.pdf
Lecture 8
Introduction to CubeSat Power Control System
https://www.unoosa.org/documents/pdf/psa/access2space4all/KiboCUBE/AcademySeason2/On-demand_Pre-recorded_Lectures/KiboCUBE_Academy_2021_OPL08.pdf

5.2.3.3 Thermal Subsystems **[Mandatory]**

Please provide a list of components and type of control system (passive/active) with a description of the subsystem. Please provide as much detail as possible.

5.2.3.4 Communications Subsystems **[Mandatory]**

Please provide a list of components and a description of the communications system for telemetry, tracking, and telecommand between the CubeSat and the ground. If your mission includes more communication links, please describe them. Please provide as much detail as possible such as the data compression method, multiplexing scheme, and description of the subsystem etc.

Check out KiboCUBE Academy Pre-Recorded On-Demand Lecture 13
Introduction to CubeSat Thermal Control System
https://www.unoosa.org/documents/pdf/psa/access2space4all/KiboCUBE/AcademySeason2/On-demand_Pre-recorded_Lectures/KiboCUBE_Academy_2021_OPL13.pdf
Lecture 9
Introduction to CubeSat Communication System
https://www.unoosa.org/documents/pdf/psa/access2space4all/KiboCUBE/AcademySeason2/On-demand_Pre-recorded_Lectures/KiboCUBE_Academy_2021_OPL09.pdf

5.2.3.5 Command and Data Handling (C&DM) **[Mandatory]**

Please provide a list of components, and if applicable, data compression method, data recorder, multiplexing scheme, and description of the subsystem etc. Please provide as much detail as possible.

5.2.3.6 Attitude Determination and Orbit Control System (AOCS) **[Mandatory]**

Please provide a list of components, redundancy, schematics, and description of the AOCS. Please provide as much detail as possible.

Check out KiboCUBE Academy Pre-Recorded On-Demand

Lecture 10
Introduction to CubeSat Command and Data Handling System
https://www.unoosa.org/documents/pdf/Access2Space4All/KiboCUBE/KiboCUBEAcademy/2023/KiboCUBE_Academy_2023_OPL10.pdf

Lecture 14
Introduction to CubeSat Attitude Control System
https://www.unoosa.org/documents/pdf/Access2Space4All/KiboCUBE/KiboCUBEAcademy/2023/KiboCUBE_Academy_2023_OPL10.pdf

5.2.3.7 Propulsion or Deorbiting Subsystems **[Optional]**

If this subsystem is different from the Attitude and Orbit Control, please provide a list of components and deorbiting mechanisms to be used, including redundancy if any. Please provide as much detail as possible.

5.2.3.8 Payload **[Mandatory]**

Please insert a description of the payload and list of its components. Please provide as much detail as possible.

5.2.3.9 Additional Technical Features of the CubeSat **[Optional]**

Please insert a description of any unique equipment used in the CubeSat and the specifications of unique equipment.

Check out KiboCUBE Academy Pre-Recorded On-Demand Lecture 18
Introduction to CubeSat Payload System
https://www.unoosa.org/documents/pdf/psa/access2space4all/KiboCUBE/AcademySeason2/On-demand_Pre-recorded_Lectures/KiboCUBE_Academy_2022_OPL18.pdf

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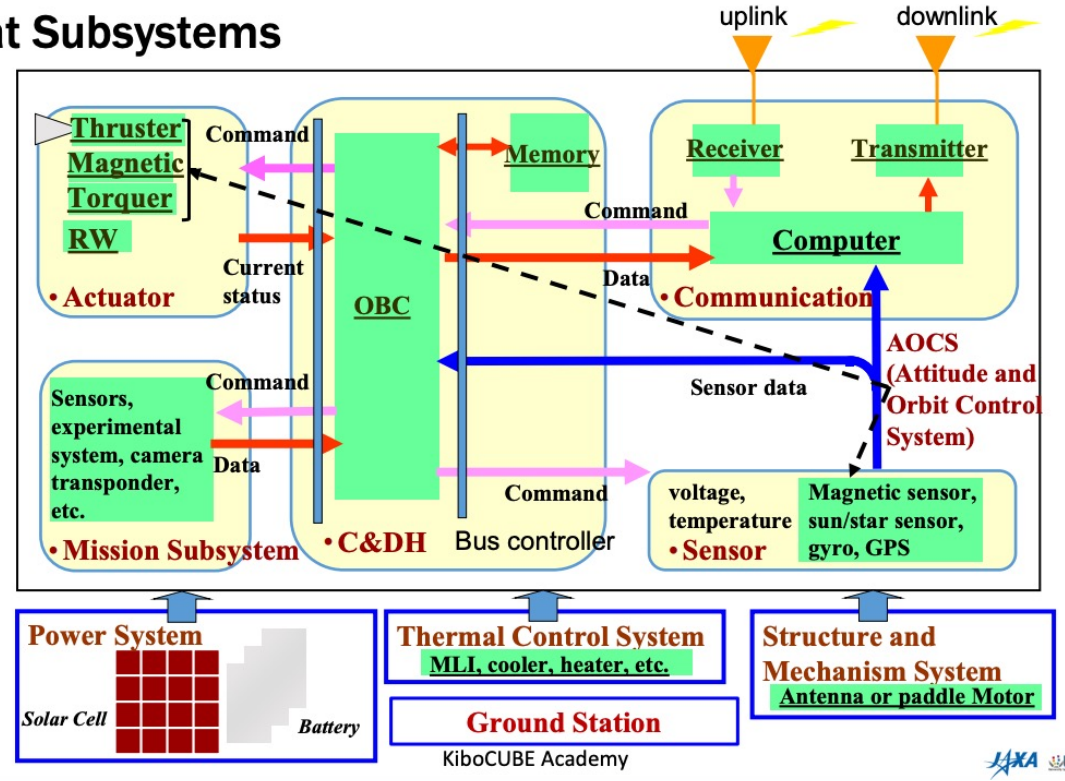
5.2.4.1 Interface

CubeSat Subsystems



Relationships between Subsystems

You should design subsystem interfaces properly.

- How many CPUs are to be used?
  - One or two OBCs for main functions and attitude control, or more?
- Between C&DH and other subsystems
  - Information line: RS-232C, RS-422, MIL-STD-1553B, SpaceWire, CAN bus, ----
  - Interval of data exchange
  - What kind of data to be transferred
- Between C&DH and communication subsystem
  - How will large volumes of data for downlink be stored?
- Between C&DH and mission subsystem
  - How will mission components be controlled and how are those data received?
- Between power subsystem and other subsystems
  - What kind of reset (power off-on) function is to be implemented?

Check out KiboCUBE Academy Pre-Recorded On-Demand Lecture 4
Systems Engineering for Micro/nano/pico-satellites
https://www.unoosa.org/documents/pdf/psa/access2space4all/KiboCUBE/AcademySeason2/On-demand_Pre-recorded_Lectures/KiboCUBE_Academy_2021_OPL04.pdf

5.2.4.1 Mechanical Interface **[Mandatory]**

Please provide information on the mechanical interface between subsystems. Provide as much detail as possible (e.g. how the different components will be arranged inside the structure etc.)

5.2.4.2 Electrical Interface **[Mandatory]**

Please provide information on the electrical interface between subsystems. Provide as much detail as possible (e.g. how the EPS is interfacing with other subsystems etc.)

- Explain how the various components listed in sections 5.2.3.x are integrated.

5.2.4.3 Thermal Interface **[Mandatory]**

Please provide information on the thermal interface between subsystems. Provide as much detail as possible (e.g. how the components are kept inside their temperature operational range and which are the elements part of the interface etc.)

5.2.4.4 Communications Interface **[Mandatory]**

Please provide information on the communications interface between subsystems. Provide as much detail as possible (e.g. which are the signals sent and received from the transponder, how are they processed, which frequencies are used for communications etc.)

5.3 Concept of Operations **[Mandatory]**

Please insert a description of the planned operations for the CubeSat (e.g. operational constraints: operations only during illuminated, when passing over certain regions of the Earth, type of operations: autonomous operations, controlled operations etc.). Please include any activation/deactivation procedures and disposal type. Consider breaking it down into several sections.

5.4 Communications Links **[Mandatory]**

Please insert a description of the communication link budget(s) (frequencies and data rate) used by the CubeSat and how they are used. Please refer to elements of Section 5.2.3.4 of the present document if needed.

Check out KiboCUBE Academy Pre-Recorded On-Demand Lecture 17
Introduction to CubeSat Operation and Ground System
https://www.unoosa.org/documents/pdf/psa/access2space4all/KiboCUBE/AcademySeason2/On-demand_Pre-recorded_Lectures/KiboCUBE_Academy_2022_OPL17.pdf

5.5 Ground Segment **[Mandatory]**

Please provide a list of ground equipment including details of the ground station set-up.

5.6 User Segment **[Optional]**

Please provide a list of user segment equipment if applicable

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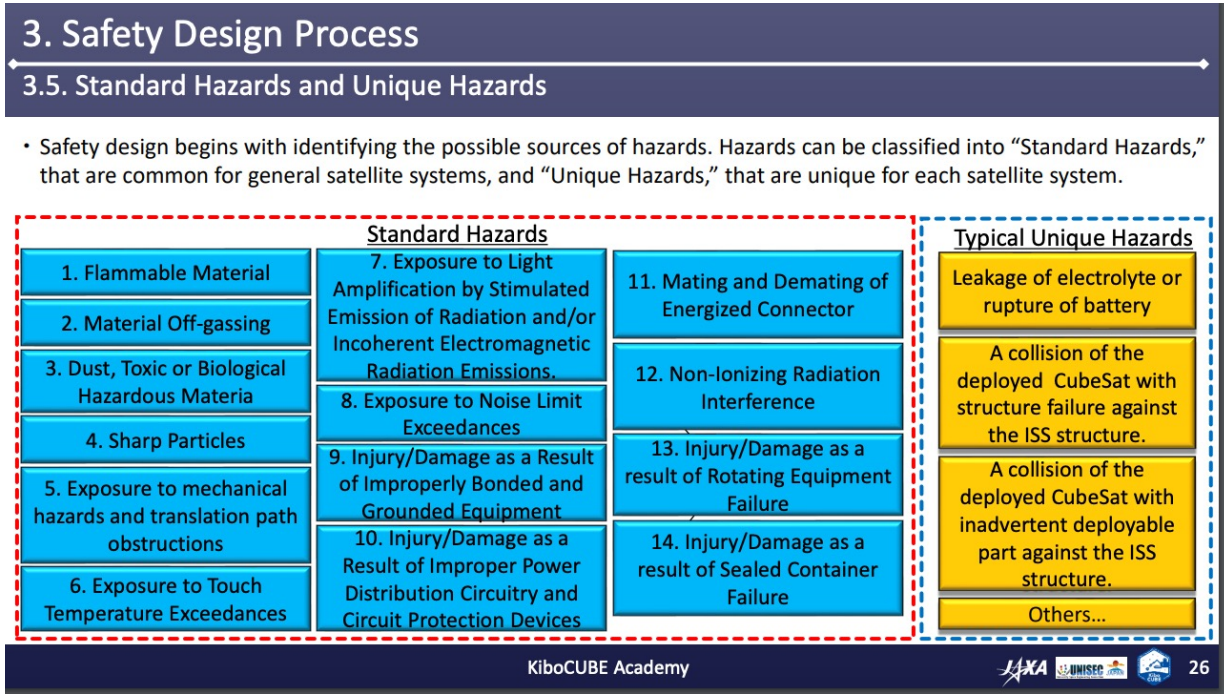
5.7 Safety **[Mandatory]**

Please refer to JEM Payload Accommodation Handbook - Vol.8- Small Satellite Deployment Interface Control Document (JX-ESPC-101133-E) to include any relevant information regarding the safety considerations for your CubeSat. In case of any safety hazard, please describe the control mechanisms.



Check out KiboCUBE Academy Pre-Recorded On-Demand Lecture 5
Introduction of Safety Review Process
https://www.unoosa.org/documents/pdf/psa/access2space4all/KiboCUBE/AcademySeason2/On-demand_Pre-recorded_Lectures/KiboCUBE_Academy_2021_OPL05rev.pdf
Lecture 6
CubeSat Design for Safety Requirements
https://www.unoosa.org/documents/pdf/psa/access2space4all/KiboCUBE/AcademySeason2/On-demand_Pre-recorded_Lectures/KiboCUBE_Academy_2021_OPL05rev.pdf

Chapter 6: Verification and Validation Planning

Verify and validate the various requirements set out in 4.5.x.

6.1.1 Verification Plan for Design Requirements **[Mandatory]**

Please explain how you will test the system against each of the system requirements and what facilities you would need for the tests.

6.1.2 Verification Plan for Operation Requirements **[Mandatory]**

Please explain how you will test the operations against the requirements.

6.1.3 Validation Plan for Mission Requirements **[Mandatory]**

Please explain how you will validate each of the mission requirements.

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6.2.1 Description of the assembly facilities **[Mandatory]**

Please describe the facilities that can be accessed for the assembly of the CubeSat. In case the facilities do not belong to the institution submitting the application, please also include a letter from other institution(s) authorizing the use of their facilities.

6.2.2 Description of the testing facilities **[Mandatory]**

Please describe the facilities that can be accessed for the testing of the CubeSat. In case the facilities do not belong to the institution submitting the application, please also include a letter from other institution(s) authorizing the use of their facilities.

6.2.3 Description of the facilities that are missing **[Mandatory]**

Please describe the facilities that are missing for the assembly and testing of the CubeSat.)

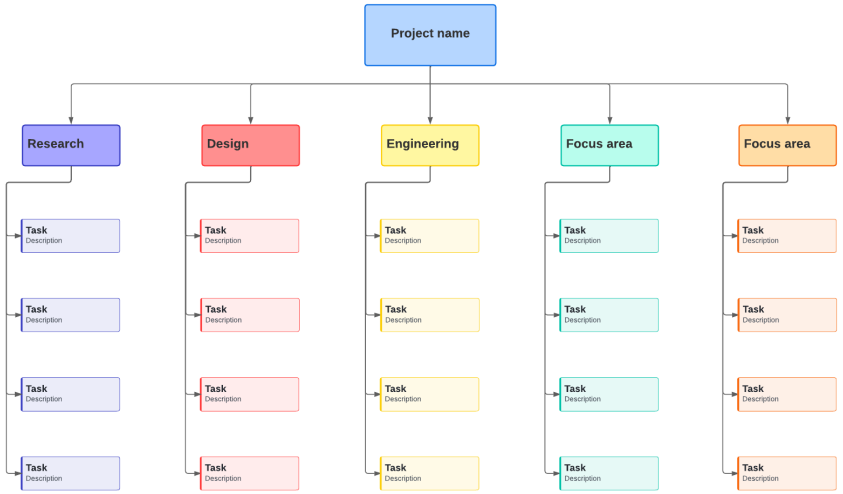
Check out KiboCUBE Academy Pre-Recorded On-Demand Lecture 19
Introduction to CubeSat System Integration and Electrical Testing
https://www.unoosa.org/documents/pdf/psa/access2space4all/KiboCUBE/AcademySeason2/On-demand_Pre-recorded_Lectures/KiboCUBE_Academy_2021_OPL19.pdf

Lecture 15
Introduction of Satellite Testing
https://www.unoosa.org/documents/pdf/psa/access2space4all/KiboCUBE/AcademySeason2/On-demand_Pre-recorded_Lectures/KiboCUBE_Academy_2021_OPL15.pdf

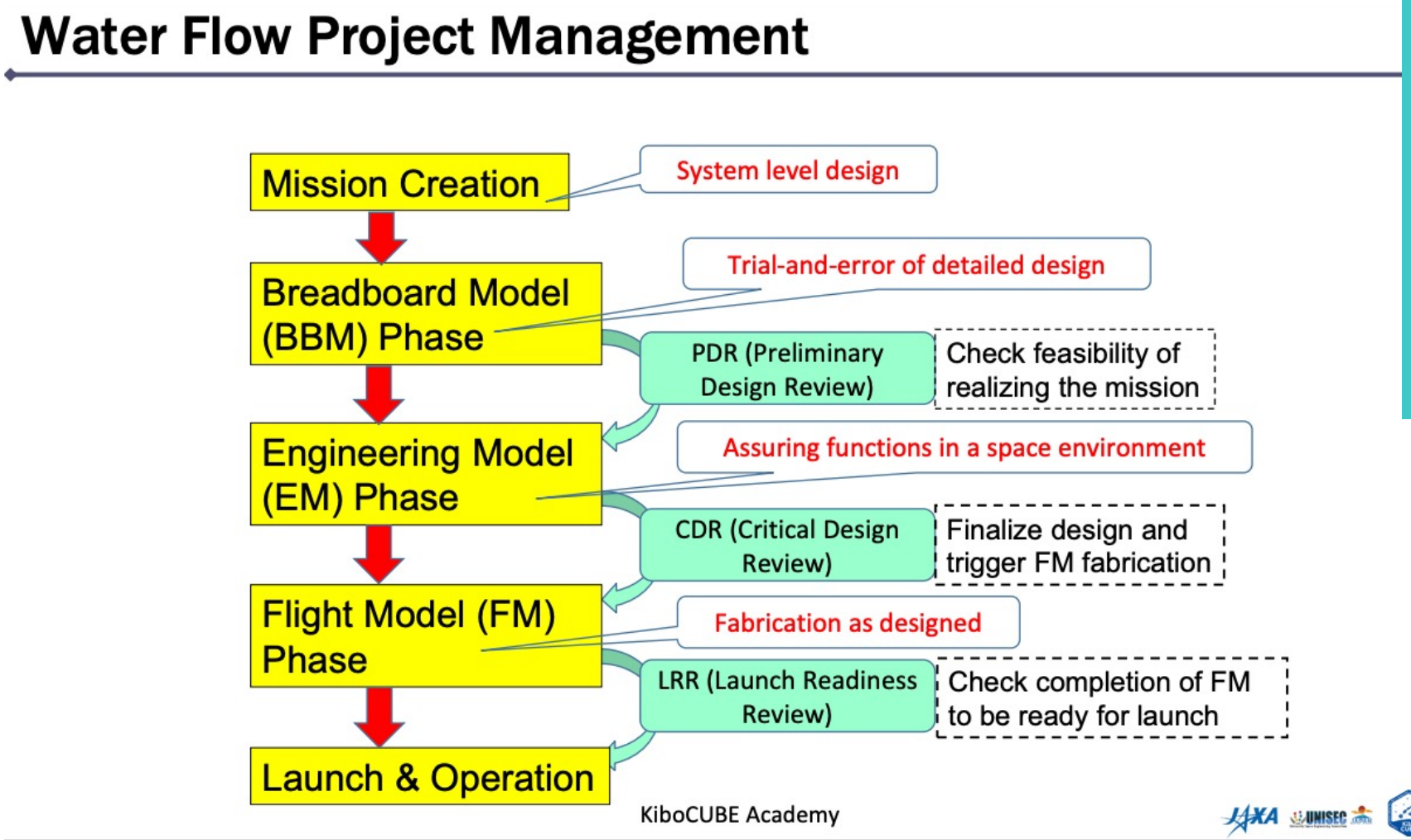
Chapter 7: Planning

7.1 Work Breakdown Structure **[Mandatory]**

Please include the Work Breakdown Structure for the design, development, testing, operations, decommissioning of the satellite and all other activities required until the experiment has been completed, including the outreach activities. In case of partnerships or external support, please indicate the share of the work among the partners, the external support, and team members for the different work packages.



7.2 Design and Development Schedule **[Mandatory]**



Check out KiboCUBE Academy Pre-Recorded On-Demand Lecture 3
Overview of Project Management of Satellite Development
https://www.unoosa.org/documents/pdf/psa/access2space4all/KiboCUBE/AcademySeason2/On-demand_Pre-recorded_Lectures/KiboCUBE_Academy_2021_OPL03.pdf

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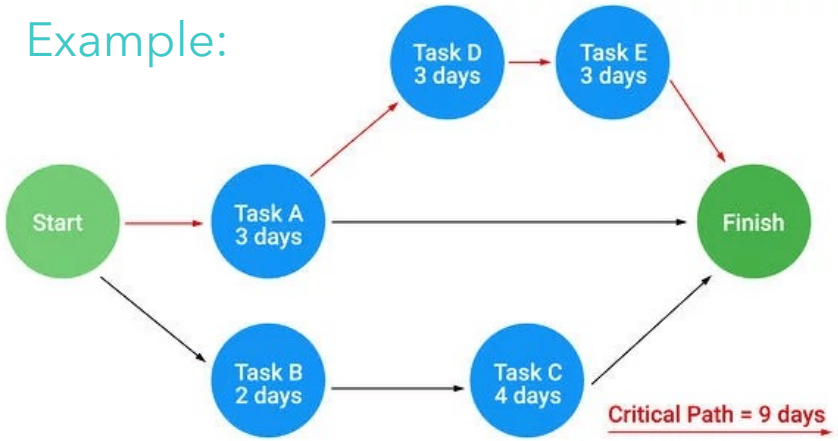
7.2 Design and Development Schedule **[Mandatory]**

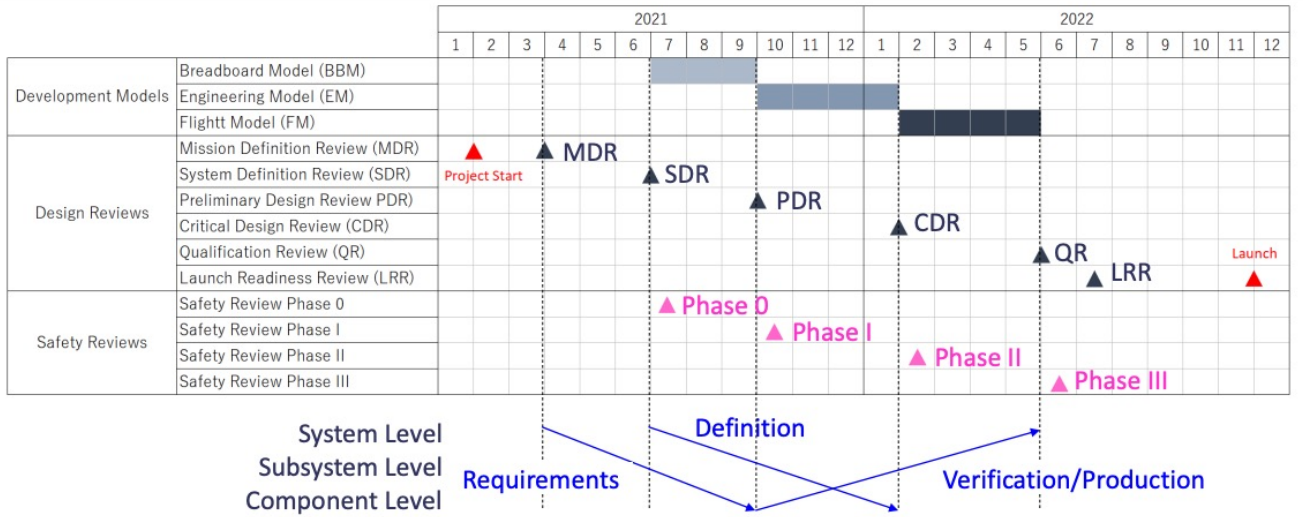
Please provide a schedule of how you will design, develop, and test the system of your CubeSat, including milestones and pass/fail criteria for each one. Please include two safety reviews allocating one month to each of them, the first one after the Critical Design Review and the second one before the Handover. The schedule should include the space segment and ground segment plus the user segment if applicable. The final milestone of the development schedule should be the delivery to JAXA. A Gantt chart and a description shall be included. Please provide the critical path.)

Critical path= longest path (in time) from start to finish; it indicates the minimum time necessary to complete the entire project

Example:



Relationship between Satellite Development Schedule, Design Reviews, and Safety Reviews



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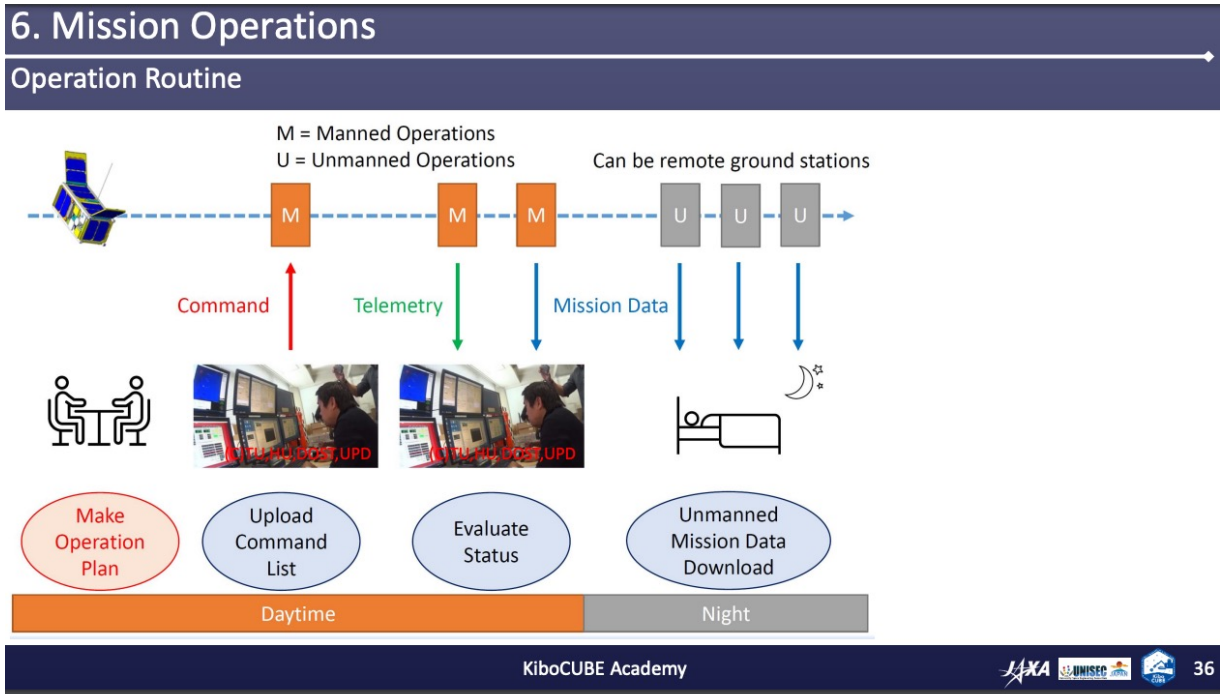
7.3 Operations Schedule **[Mandatory]**

Although at this stage it might be difficult to provide a complete schedule for the operations, please provide as much detail about the schedule as possible (e.g. initial system checkout phase, payload activation phase, steady operation phase or end of mission etc.). A Gantt chart and its description shall be included.



Check out KiboCUBE Academy Pre-Recorded On-Demand Lecture 17
Introduction to CubeSat Operation and Ground System
https://www.unoosa.org/documents/pdf/psa/access2space4all/KiboCUBE/AcademySeason2/On-demand_Pre-recorded_Lectures/KiboCUBE_Academy_2022_OPL17.pdf

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7.4 End of Life and Deorbiting Schedule **[Mandatory]**

Although at this stage it might be difficult to provide a complete schedule for disposal, please provide as much detail about the schedule as possible (e.g. campaigns, phases etc.). Please include the schedule of when the Space Debris Mitigation Guidelines and Guidelines for the Long Term Sustainability of Outer Space Activities will be applied and effective. A Gantt chart and its description shall be included.

Check out KiboCUBE Academy Pre-Recorded On-Demand Lecture 20
Introduction to Space Debris Problem and Countermeasures
https://www.unoosa.org/documents/pdf/psa/access2space4all/KiboCUBE/AcademySeason2/On-demand_Pre-recorded_Lectures/KiboCUBE_Academy_2022_OPL17.pdf

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Chapter 8: Budget

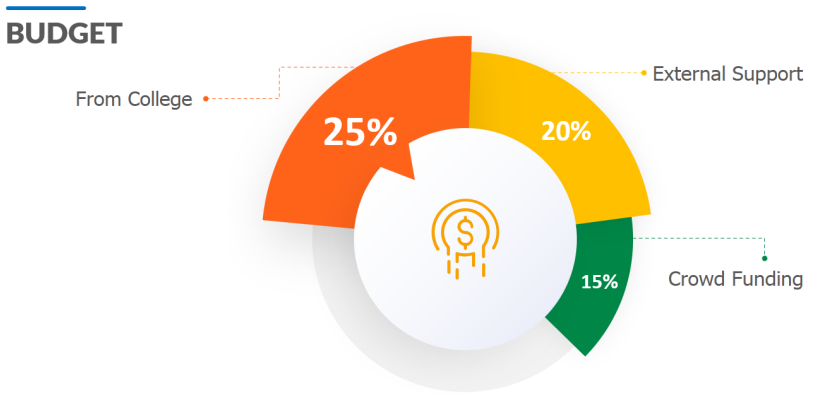
8.1 Budget Plan **[Mandatory]**

Please provide information on the cost, **including the price of the parts, personnel costs, facilities costs, operation costs, travel expenses, shipment of the CubeSat, dissemination activities etc. ＝Everything**

For the first deadline, teams **do not have to have the funding secured** If the team has been short-listed, the team will **have 3 months to confirm the funding** outlined in 8.1

8.2 Budget Source and Expected Budget Source **[Mandatory]**

Please provide information on the budget you have obtained and letters of commitment **specifying the funding source, and information on what are the envisaged funding sources of any remaining non-secured budget**. If the budget cannot be secured in the first round of selection, please explain the prospect of securing the budget.



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Chapter 9: Transportation to Japan

9. Transportation to Japan **[Mandatory]**

Please provide information concerning the transportation of the CubeSat to Japan (usually Tsukuba Space Center) such as customs arrangements.)

©JAXA
Tsukuba Space Center
2-1-1 Sengen, Tsukuba-shi, Ibaraki 305-8505

- Sending equipment is more complicated than you think…
  Check customs and export control regulations for both your country and Japan
- What documents do you need to prepare?
- How long will it take?

Plan the shipment in advance!

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Chapter 10: Licensing and Compliance with International Guidelines and Regulations

10.1 Frequency Allocation **[Mandatory]**

Please provide the plan to obtain the license **(timeline, entity(ies) involved etc.)**

Webinar with ITU scheduled in September 2023!

Check out the International Telecommunications Union (ITU) websites

Small Satellites Support
https://www.itu.int/en/ITU-R/space/support/smallsat/Pages/default.aspx

Small Satellite Handbook
https://www.itu.int/en/ITU-R/space/support/smallsat/sshandbook/Pages/default.aspx

It is a lengthy process. **Start as soon as possible.**

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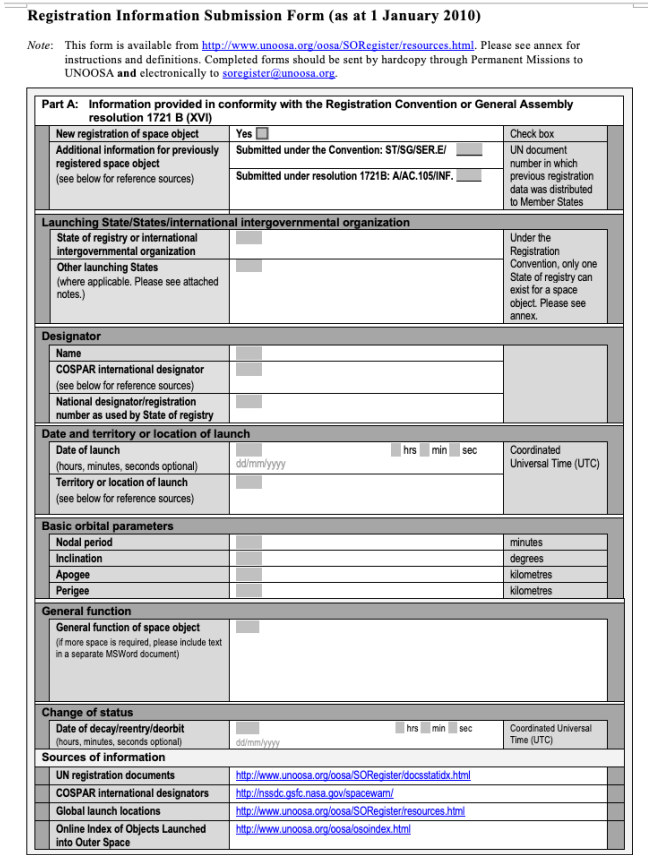
10.2 Space Object Registration **[Mandatory]**

Please provide information on the steps for the registration of your CubeSat in the United Nations Register of Objects Launched into Outer Space.

Webinar scheduled in September 2023!



Registration Information Submission Form (as at 1 January 2010)

Note: This form is available from http://www.unoosa.org/oosa/SORegister/resources.html. Please see annex for instructions and definitions. Completed forms should be sent by hardcopy through Permanent Missions to UNOOSA **and** electronically to soregister@unoosa.org.

Part A: Information provided in conformity with the Registration Convention or General Assembly resolution 1721 B (XVI)

New registration of space object	Yes ☐	Check box
Additional information for previously registered space object (see below for reference sources)	Submitted under the Convention: ST/SG/SER.E/ ☐ Submitted under resolution 1721B: A/AC.105/INF. ☐	UN document number in which previous registration data was distributed to Member States
Launching State/States/international intergovernmental organization		
State of registry or international intergovernmental organization	☐	Under the Registration Convention, only one State of registry can exist for a space object. Please see annex.
Other launching States (where applicable. Please see attached notes.)	☐	
Designator		
Name	☐	
COSPAR international designator (see below for reference sources)	☐	
National designator/registration number as used by State of registry	☐	
Date and territory or location of launch		
Date of launch (hours, minutes, seconds optional)	☐ ☐ hrs ☐ min ☐ sec dd/mm/yyyy	Coordinated Universal Time (UTC)
Territory or location of launch (see below for reference sources)	☐	
Basic orbital parameters		
Nodal period	☐	minutes
Inclination	☐	degrees
Apogee	☐	kilometres
Perigee	☐	kilometres
General function		
General function of space object (if more space is required, please include text in a separate MSWord document)	☐	
Change of status		
Date of decay/reentry/deorbit (hours, minutes, seconds optional)	☐ ☐ hrs ☐ min ☐ sec dd/mm/yyyy	Coordinated Universal Time (UTC)
Sources of information		
UN registration documents	http://www.unoosa.org/oosa/SORegister/docsstatidx.html	
COSPAR international designators	http://nssdc.gsfc.nasa.gov/spacewarn/	
Global launch locations	http://www.unoosa.org/oosa/SORegister/resources.html	
Online Index of Objects Launched into Outer Space	http://www.unoosa.org/oosa/oosoindex.html	

Check out the United Nations Register of Objects Launched into Outer Space https://www.unoosa.org/oosa/en/spaceobjectregister/index.html

It is not the team that submits the registration form to the UN. It is from **the Government in your country**.

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10.3 Compliance to the Space Debris Mitigation Guidelines and the applicable Guidelines for the Long-Term Sustainability of Outer Space Activities **[Mandatory]**

Please provide information on how **compliance is ensured** for the Space Debris Mitigation Guidelines and Guidelines for the Long Term Sustainability of Outer Space Activities.

Webinar scheduled in September 2023!

Example:

- Section A: explain the policy and regulatory framework in your country
- Section B: explain how your CubeSat follows the safety standards
- Section C: explain how international cooperation, capacity-building, and awareness are promoted through your project
- Section D: explain how you have considered a sustainable mission

Check out the
Space Debris Mitigation Guidelines
https://www.unoosa.org/pdf/publications/st_space_49E.pdf
Guidelines for the Long-Term Sustainability of Outer Space Activities
https://www.unoosa.org/res/oosadoc/data/documents/2021/stspace/stspace79_0_html/st_space79E.pdf
Tips on the Implementation of the Space Debris Mitigation Guidelines and Guidelines for the Long-Term Sustainability of Outer Space Activities Webinar
https://www.unoosa.org/oosa/en/ourwork/access2space4all/Common_Webinars.html#Tag7

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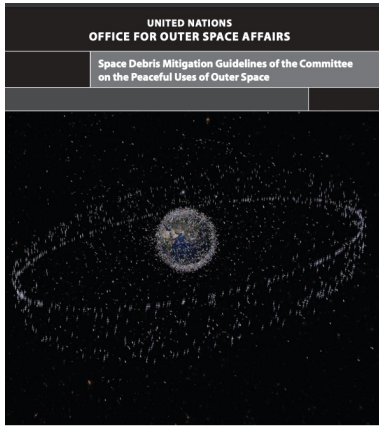

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Guideline	Information Needed
1: Limit debris related during normal operations	Explain how the CubeSat will not release debris into space during normal mission operations (ex. How it is designed to minimize any risks)
2. Minimize the potential for break-ups during operational phases	Explain how it is not applicable to the CubeSat mission or if applicable, how it is designed to avoid failure modes which may lead to accidental break-ups.
3: Limit the probability of accidental collision in orbit	Provide information that probability collision has been assessed.
4: Avoid intentional destruction and other harmful activities	Explain that this is not intended
5: Minimize the potential for post-mission break-ups resulting from stored energy	Explain how it is not applicalbe or if applicable, how the stored energy will be depleted or made safe for post-mission disposal
6: Limit the long-term presence of spacecraft and launch vehicle orbital stages in the LEO region after the end of their mission	Provide information that the expected mission lifetime and orbital decay simulation was considered.
7: Limit the long-term interference of spacecraft and launch vehicle orbital stages with GEO region after the end of their mission	Not applicable (Explain that the CubeSat will not be deployed into the GEO orbit.)

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ACCESS TO SPACE FOR ALL
SATELLITE DEVELOPMENT TRACK

Tools Component

This list is work in progress. The tools are maintained by third parties and are provided for information. Each user bears sole responsibility for their use and the use of their results.

Development, Operations, End of Life, and Deorbiting Tools

- CARA Analysis Tool Suit (NASA)
  - *Conjunction Consequence Assessment* is an algorithm for determining the expected amount of debris production in case of collision.
  - *Monte Carlo from TCA* is a method of determining the probability of collision.
  - *Single Covariance Max Pc* is a method by which the maximum possible probability of collision could be determined for a close approach event for which only one object has position uncertainty information.
  - *Two-Dimension Pc* is a method used to characterize and analyze close approach events and determine resultant probabilities of collision as a result of mitigation actions.
- DAS (NASA) The Debris Assessment Software
- DRAMA (ESA) Debris Risk Assessment and Mitigation Analysis
- MASTER (ESA) Meteoroid and Space Debris Terrestrial Environment Reference
- ORDEM (NASA) Orbital Debris Engineering Model
- ORIUNDO (ESA) On-ground RIsk estimation for UNcontrolleD re-entries tOol
- RABBIT (JAXA) Risk Avoidance assist tool based on debris collision proBaBIliTy

Check out the Satellite Development Track Tools Component
https://www.unoosa.org/oosa/en/ourwork/access2space4all/SatDev_Track.html

10.4 Earth Observation License **[Mandatory]**

Please provide information concerning the license to be requested and the plan to obtain the license (timeline, entity(ies) involved etc.

10.5 Other Compliance Required **[Mandatory]**

Please provide information concerning any other license to be requested for the operations and the plan to obtain the license(s) (timeline, entity(ies) involved, or how compliance is ensured etc.

The need of the Earth Observation License and process differs from country/region. **Check your country's regulations.**

Chapter 11: Feasibility and Risk Analysis

11.1 Risk Analysis **[Mandatory]**

Please use a risk matrix to describe the risks that you might face. These should include **technical risks (e.g. mechanical, thermal etc.), planning risks and budget risks**. Please assess the likelihood of occurrence and their impact (1 (not likely) 3 (very likely) and their impact (1 (minor impact) to 3 (catastrophic).)

11.2 Mitigation Plan **[Mandatory]**

Please explain how you would reduce the likelihood of occurrence or the impact of each of the risks.)

3x3 RISK MATRIX

LIKELIHOOD ↓ / SEVERITY →	1	2	3
1	LOW – 1 –	LOW – 2 –	MEDIUM – 3 –
2	LOW – 2 –	MEDIUM – 4 –	HIGH – 6 –
3	MEDIUM – 3 –	HIGH – 6 –	HIGH – 9 –

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Chapter 12: Communications and Dissemination Plan

12.1 Outreach to the General Public **[Mandatory]**

Provide the plan (e.g. scope, schedule, resources, means) that will be used to promote the opportunity and the results, as well as communication towards the general public. Specific activities shall be organised within the applicant country(ies).

12.2 Outreach to the Scientific and Technical Community **[Mandatory]**

Provide the plan (e.g. scope, schedule, resources, means) that will be used to promote the opportunity and the results, as well as communication towards the scientific and technical community. Specific activities shall be organised within the applicant country(ies).)

The plan shall include
- Type of activity
- Target audience
- Resources
- Budget
- Schedule

KiboCUBE is a capacity-building programme.
Do your best to maximise the impact to your country!

Session 4: Effective Outreach
Presentations on successful examples and discussion on how to conduct effective outreach activities. Presentations and Videos are available!

Any questions?

Contact us

✉ unoosa-access-to-space@un.org

Help us help
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For more stats and information, check out the brochure!

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