KiboCUBE

CubeSat Mission Application for the Fifth Round

|  |  |  |  |
| --- | --- | --- | --- |
| CubeSat Name: (Name of the 1U CubeSat here) | | | |
| Organization: (Name of your organization) | | | |
| **Head of the organization:**  Dr./Prof./Mr./Ms. FirstName Middle LASTNAME  Position / profession  Address Line 1  Address Line 2  **Tel.:**  **Fax:**  **E-mail:** | | **Principal Investigator:** (this is the point of contact)  Dr./Prof./Mr./Ms. FirstName Middle LASTNAME  Position / profession  Address Line 1  Address Line 2  **Tel.:**  **Fax:**  **E-mail:** | |
| **Version:**  0.0 | **Issue Date:**  26/03/2019 | **Document Type:**  Application | **Valid from:**  (date) |

**Applicant’s Certification**

All statements in this CubeSat Mission Application are true, correct and complete.

**If selected, the applicant confirms that their Organization will comply with the Terms and Conditions described in the Announcement of Opportunity [1].**

Issued By:

(**issuer name** and **signature** here, usually Principal Investigator)

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Approved By:

(approver **name** and **signature** here, usually head of the organization)

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Document Change Record

|  |  |  |  |
| --- | --- | --- | --- |
| **Version** | **Date** | **Changed chapters** | **Remarks** |
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| 2.0 | (date) | 2-5 | Major update on... |

(Version 1.0 should be the first submission. Please submit an updated version to reflect any changes required by OOSA/JAXA. For small corrections, increment the subversion (e.g., 1.0, 1.1, 1.2...). Reflect major changes by incrementing the version number of the document (e.g., 2.0, 3.0...). During the duration of the project, please provide additional updates when requested: after various design and safety reviews, acceptance tests, and a pre-launch version. A final version should be submitted after the end of the project including results, outcomes, and lessons learned.)

PLEASE LEAVE ONLY VERSION 0 AND 1.0 AT FIRST SUBMISSION! ADD ADDITIONAL VERSIONS AT ANY SUBSEQUENT STAGE IF CHANGES ARE REQUESTED OR NEEDED

Abstract

The abstract comes here.

\*\*\*\*\* [Note to applicant: Please remove instructions before submission, in this abstract section and in the rest of the template.]

**General Instructions**

Fill each and every section of this document with as much detail as you can, following the instructions given.

1. Please prepare the CubeSat Mission Application in accordance with the instruction and guidelines given in this template.
2. Make the descriptions in the documents specific and comprehensive utilizing charts and tables. Reference in the text all charts, figures and tables used (for example, here we refer to **Table 1.1**).
3. Clearly define and explain uncommon words, abbreviations and acronyms. List all acronyms in Section 8.1.
4. Indicate the equipment of the CubeSat that have already completed design/development phases in [Chapter](#page16) ‎4.
5. Write “TBD” when information is not yet available on an item.
6. Using the provided Word templates is encouraged. If it is not possible, the application should follow the following general format:
   1. Size of paper: A4
   2. Margins: 20 mm from the edge
   3. Page number: 15 mm from the bottom edge
   4. Font and size: Times New Roman 10-12 points
7. The total number of pages of the body of the application materials cannot exceed 40 from Introduction to References (this excludes front page, change log, abstract, index, list of figures, list of tables and annexes). If an item has many pages, put a summary in the body with a reference to the associated annex.

The CubeSat Mission Application, FULLY COMPLETED, should be sent by e-mail the original e-file in pdf and word document including a scanned front page with the Applicant’s Certification signatures as a pdf-file and word document to unoosa-hstikibocube@un.org, in compliance with the Section 13 of the Announcement of Opportunity [1], **no later than 30 September 2019, 23:59 CET.** Please ensure the e-file size is less than 10 MB (or split it to send by email).

**IMPORTANT: The application is only considered valid if all the information requested from Announcement of Opportunity is provided.**

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Check List for CubeSat Mission Application

**for Eligibility Criteria**

|  |  |  |
| --- | --- | --- |
|  | **YES/NO: *All items are mandatory to be filled*** | **SECTION: *Please mention both of the section and page*** |
| 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 |  |  |
| **The letter of endorsement from the head of the entity** |  | - |

**for Selection Criteria**

|  |  |  |
| --- | --- | --- |
|  | **YES/NO** | **SECTION** |
| 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 |  |  |
| 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. |  |  |

**for Technical Requirements and Others**

|  |  |  |
| --- | --- | --- |
|  | **YES/NO** | **SECTION** |
| 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>  \*if needed, please use the Appendix D. on the Handbook for the compatibility check. |  |  |

# Introduction

## CubeSat Mission Statement

Include how the development and deployment of CubeSat could contribute to the capacity building of your country.

## CubeSat Experiment Objectives

List the objectives of the CubeSat mission, providing information in the staging of goals (minimum mission success, full mission success and secondary level objectives) and their evaluation criteria. Include also potential problems and conflicts and possible solutions to reach the above goals and explanations showing that the solutions proposed are eﬀective (you may refer to [Section](#page14) 3.5.1, if included, which provides a detailed risk analysis).

A table can be provided in order to provide a good overview of the objectives. See for example **Table 1.1**.

**Table 1.1.** Experiment objectives

|  |  |  |
| --- | --- | --- |
| **Objective** | **Nature** | **Priority** |
| objective text | scientific, | primary/secondary |
| objective 2 text | technical etc. | or minimum/full/secondary |

## Team Details

List the team/research collaborators. For each organization and collaborator, provide the status of the organization (Public or Private). For any academic institution involved, please provide:

* Age of students (if applicable)
* Gender of students admitted (male only / female only / both)

### Principal Investigator

Please provide again the contact details for the PI, who will also be the point of contact.

### Team Members

## Scientific/Technical Background

List past achievements on satellite development or subsystem development. Describe relevant past experience that can contribute to satellite development, if applicable.

# CubeSat Requirements and Constraints

Provide a list of requirements for your CubeSat. Please include all applicable requirements from the JEM Payload Accommodation Handbook [[2], from now on referred to as “the Handbook”.](#page27) Take as well into account applicable space debris mitigation requirements, as well as the deployment and safety standards of the ISS. The primary standards specific to the ISS are reported in the Announcement of Opportunity [[1].](#page27) A few examples are here included, please expand, split or join requirements together when needed.

## Mission Requirements

Please include all requirements related to your mission, from functional requirements (e.g.: The CubeSat shall be able to take pictures of cloud cover), to performance requirements (e.g.: The minimum resolution shall be XXX).

**Table 2.1.** Mission requirements

|  |  |
| --- | --- |
| **ID #** | **Requirement** |
| MI-010 | Text of first requirement. Number them in steps of 10. |
| MI-020 | text. |
| MI-030 | text. |
| MI-031 | Text of a related requirement. (If a sub-requirement or related requirement is added later on, use the intermediate numbers to group them in the most logical way.) |
| MI-040 | text. |
| MI-100 | For a complete set of requirements unrelated to the previous ones, skip to the next hundred. General rule: group them in this type of blocks for ease of reading. |
| MI-110 | text. |
| MI-120 | Deleted. (If a requirement is deleted or no longer applicable, indicate deleted but do not reuse the ID number. This way it is useful to track deleted requirements.) |
| MI-130 | text. |
| MI-200 | text. |

## Design Requirements

Please include also in this section all applicable and relevant design requirements from the JEM Payload Accommodation Handbook[[2].](#page27) For reference only, please see as well Appendix B-1 (for 1-U CubeSats) of the CubeSat Design Specifications[4].

**Table 2.2.** Design requirements

|  |  |
| --- | --- |
| **ID #** | **Requirement** |
| DE-010 | The CubeSat size in stored configuration shall correspond to the 1U CubeSat standard (100x100x113.5 ±0.1 mm). |
| DE-020 | The mass of the Cubesat shall be larger than 0.13 kg and less than 1.33 kg (1U) |
| DE-… | text. |
| DE-200 | The ballistic coeﬃcient of the CubeSat shall be less than 100 kg/m2 to ensure a faster orbiting decay of the CubeSat than the ISS. |
| DE-210 | The CubeSat minimum cross section (any cross section which can be physically or electromagnetically sighted) shall be no less than 100 cm2 to be trackable by the Space Surveillance Network (SSN) of the United States. |
| DE-... | text. |
| DE-300 | The materials and their outgassing characteristics shall meet the standard specified in the Handbook [2]. [Please expand or split into multiple requirements if applicable.] |
| DE-310 | Any leak of toxic liquid used in battery electrolyte solutions shall be prevented. |
| DE-320 | Any parts that may be broken by cracking shall be protected or strengthened by sealing. |
| DE-330 | Any materials that have the potential to shatter when cracked shall be contained. |
| DE-... | text. |

Regarding materials, to verify the appropriateness, all the data on the materials shall be reported to JAXA. In order to obtain necessary data of the materials, JAXA can support the outgassing test for the CubeSat.

## Operational Requirements

List your operational requirements (for example tracking related, link budget related...). Please include all applicable space debris mitigation requirements, as well as the deployment and safety standards of the ISS.

**Table 2.3.** Operational requirements

|  |  |
| --- | --- |
| **ID #** | **Requirement** |
| OP-010 | Once deployed from Kibo, the separation of the CubeSat from the center of ISS shall be larger than 200 m after the first orbit. |
| OP-... | text. |
| OP-100 | The CubeSat shall be able to remain in storage at a JAXA facility for a duration of six to twelve months from the time of delivery to JAXA to the deployment from Kibo. |
| OP-110 | The CubeSat shall not require the provision of electrical power during the transport of the CubeSat to and the deployment of the CubeSat from Kibo. |
| OP-120 | [The CubeSat shall be compliant with the Electromagnetic Compatibility requirements of the ISS. Please include all applicable and expand into multiple requirements if needed.] |
| OP-... |  |
| OP-200 | Safety features shall be put into place to protect astronauts from inadvertent contact with any sharp edges of the CubeSat. |
| OP-... |  |
| OP-220 | [The CubeSat design shall be compliant with the requirements of surface touch temperature of the ISS for crew contact. Please include details and expand only if applicable.] |
| OP-... |  |

## Constraints

[if applicable]

# Project Planning

Charts (e.g., Gantt charts) and graphs can be utilized for the description if needed. The following points should be confirmed in this section and its subsections:

* That manpower required to implement the plan is secured.
* That the project applicant is capable of performing the tasks according to the schedule and achieve results within their demonstrated experience and qualifications.
* That the support organizations involved in the plan can fulfil their tasks according to a detailed and adequate division of work and responsibility among the main actors.

## Implementation Structure

## Schedule

Indicate the timeline of the design, purchase, production and test plan per each model such as Breadboard Model (BBM), Engineering Model (EM), Structure/Thermal Model (STM), and Flight Model (FM), if applicable. Include plans for safety reviews for each phase and a final compatibility review of the Flight Model.

The satellite project team shall attend the following review panels and report on results of a satellite design, manufacture, test and so on. Please include these reviews on the project schedule.

(1) Safety Review

As for a selected satellite, JAXA is responsible for conducting safety reviews for the satellite in detailed design phase (phase 0/I/II) and in acceptance test phase (phase III). The satellite project team shall submit Safety Assessment Report (SAR) and necessary support documents such as drawings, analysis reports and test reports for review by JAXA.

(2) Compatibility Verification Review

JAXA is responsible for conducting a review to confirm that the satellite verification results comply with the requirements defined in the Handbook [2] before the satellite delivery to JAXA. The satellite project team shall conduct necessary verifications and submit necessary documents such as drawings, analysis reports and test reports for review by JAXA.

### Desired launch date and deployment date

* Specify the desired date for launch and deployment (MM/YYYY) along with the reasons. The scheduled deployment schedule is by March 2021,
* Indicate the time required to develop and deliver the satellite to JAXA after being designated as the Selected Entity.

## Resources and Financial Plan

* Provide a detailed financial plan to implement the project with material procurement cost, facility rental fees accrued for development of the CubeSat system, subsystem, and ground systems at a rough estimate.
* Confirm that you have secured all the funds necessary to design, develop and test the CubeSat, including the cost of delivering the satellite to JAXA and of visiting JAXA facility when required (for example, for the safety review). Attach a document as annex to certify the confirmation, if any.
* You may refer to any involvement of your Government to support the proposed CubeSat mission on relevant areas such as science and technology, economics and/or education programmes.
* If there is any possibility that the part of the budget is not secured by the time of the submission of application, confirm how and when the budget could be secured.

### Manpower

### Budget

### External support

If any support letter is included in Annex ‎C, you can refer to it here.

## Outreach Approach

Outreach/Public relations/Capacity-building aspects

* Explain how the results of the development and operation of the CubeSat could be maintained, disseminated and developed.
* Describe the plan for educational promotion and capacity-building activities in your institution as well as in your country and abroad through this programme.
* Describe the plan for public events in your institution as well as in your country when your CubeSat is deployed from Kibo.

Link also to Annex A, where a list of outreach and media coverage events during the project will be provided in subsequent versions of the document

[If you considered the additional sub-items should be included in the Project Planning (for example, Risk Analysis, Reliability Analysis, Maintainability), please describe below.]

## Supplementary Notes

# CubeSat Specifications and Detailed Description

Indicate the specifications and the design per subsystem according to the grouping as follows:

## CubeSat Setup and Overall System

Include (you can use graphs and tables for some items such as **Table 4.1**):

* 3D view.
* External dimensions: the size of protruding objects should be also indicated, if there are any.
* Mass: not only the total mass of the CubeSat, but the mass distribution among the satellite subsystems and CubeSat mission payload should also be indicated.
* System block diagram and list of components.
* Structural analysis.
* Payload profiles.
* Subsystem analysis (structure, thermal, power, communication, data processing, attitude and payload). See Sections 4.3 to  [4.9](#page18).

**Table 4.1.** CubeSat main specifications

[Please refer to the Handbook [2] and comply with the specifications]

|  |  |  |
| --- | --- | --- |
| **Parameter** | **Values** | **Units** |
| Mass | [1U: less than 1.33] | kg |
| Dimensions | [1U: 100×100×113.5] | mm |
| dimensions (deployed) |  | cm |
| ballistic coefficient |  | kg/m2 |
| expected COG position |  | — |

### CubeSat Components

Include a list of components produced or purchased. Components in the system block diagram are detailed per satellite subsystem. Based on this grouping, the subsystems will be summarized in the list of components as produced or purchased.

Please indicate one of the following for each item:

* Purchased item (Developed product),
* Purchased item (Proven product that has space-flight performance),
* In-house produced item (Developed), or
* In-house produced item (Proven).

## CubeSat Interfaces

Please refer to the Handbook [2] and the AO [[1]](#page27). Include a schematic of the interfaces.

### Mechanical

### Electrical

### Radio-frequencies

### Thermal

## Structural and Mechanical Subsystem Design

Design for primary structure, mechanisms such as deployment of solar panels and antenna, equipment layout plans, separation mechanism, and materials for primary structure

## Thermal Subsystem Design

List of components and control system

## Power Subsystem Design

List of components, schematic of the electronics, and control system

## Communication Subsystem Design and Ground Support Equipment

List of components, frequency, and satellite ground stations

## Data Processing Subsystem Design

List of components, CPU, data compression method, data recorder, and multiplexing schematics

## Attitude and Orbit Control Subsystem Design

List of components, attitude control methods, orbit control methods, and control accuracy

## Payload

List of components for the payload of the CubeSat mission

## Additional technical features of the CubeSat

Include existence or non-existence of hazardous materials such as toxic gas or flammable materials, and specifications of unique equipment.

Indicate the features, performances, and solutions towards development in detail including charts and diagrams.

## Novelty, progressiveness, uniqueness and possible evolution

Versatility of the CubeSat system, progressiveness and possible evolution of the CubeSat with comprehensive descriptions.

# CubeSat Verification

Include a verification plan for the CubeSat and a safety review schedule.

This plan should refer to Chapter 4.2.2. “Safety Design Guidelines” (for testing of the CubeSat), and Chapter 5.4. “Safety Review and Design Review” (for schedule), and Verification matrix in Appendix C of the JEM Payload Accommodation Handbook [2].

## Verification Matrix

[The verification matrix lists all still applicable requirements identified by their ID number -refer to Chapter 2-, with the type of verification that is used for that requirement, the test(s) that are used for verification, and the status. All requirements need to be verified by at least one test -or inspection/review/analysis procedure-, and all tests need to verify at least one requirement.]

**Table 5.1** shows the verification matrix. The following legend applies for the column **V** (verification):

**A** verification by analysis

**I** verification by inspection

**R** verification by review of design

**T** verification by test

**Table 5.1** Verification matrix

[Please refer to the Handbook [2] and comply with the specifications]

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **ID #** | **Requirement text** | **V** | **Test #** | **Status** |
| MI-010 | Text | T | 2,3,10… | TBD |
| ... | Text | ... | #, #, … | TBD |
| MI-... | Text | A/I/R/T… | # | TBD |
| ... | Text | ... | # | TBD |
| DE-010 | The CubeSat size in stored configuration shall correspond to the 1U CubeSat standard (100x100x113.5 ±0.1 mm). | I, R, T | 10 | TBD |
| ... | Text | I | # | TBD |

If verification by test (**T**) is selected, please provide in column 4 which tests apply as in the example for DE-010.

## Verification Plan

Include a verification plan for the CubeSat with facilities to be used.

* As listed above, verification methods are Analysis, Inspection, Review of design and Testing.
* Indicate the plans for verification such as electric and environmental tests on each model (BBM, EM, STM, and FM).
* For the electric tests, indicate the schedule for testing, not only for individual component tests but also for subsystem tests (including check out test for the interfaces among components), and system level tests (including End-to-End communication test) along with the preparation plan of the customized test equipment if required.
* For the environmental tests, indicate schedule and owner of the facilities for thermal cycle test, vacuum test, thermal vacuum test, vibration test, and shock test.

Provide a list and description of all test procedures (electric, vacuum, vibration…) planned to date following a template similar to that provided in **Table 5.2**.

**Table 5.2.** Test procedure #01: XXX [example]

|  |  |
| --- | --- |
| **Test #** | **01** |
| Test type/name | ... |
| Test facility | ... |
| Tested item | ... |
| Test level/procedure | ... |
| Test campaign duration | ... |
| Test campaign date | ... |
| Requirements verified | XX, XX, XX |
| Test status | To be performed, passed, failed… |

**Table 5.3.** Test procedure #10 [example number]: Integration Test [example]

|  |  |
| --- | --- |
| **Test #** | **10** |
| Test type/name | Integration test |
| Test facility | ... |
| Tested item | ... |
| Test level/procedure | ... |
| Test campaign duration | ... |
| Test campaign date | ... |
| Requirements verified | DE-010, DE-020, … |
| Test status | ... |

## Verification Results

For later and final versions of the document, provide results; otherwise, leave empty.

# Operations Planning and Preparation

## Ground segment operation plan

Indicate a plan for the ground station operation and maintenance diﬀerentiating between new implementation, maintenance or utilization of existing facilities. This plan includes not only telemetry command operation facility but mission data processing facilities.

## Frequency license plan

* Provide a plan for international frequency coordination to obtain a frequency license in compliance with the ITU regulations (including planned process, schedule and status).
* Provide a plan for obtaining a frequency license in compliance with the regulations in your country (including planned process, schedule and status). Provide evidence, such as the draft Advance Publication Information, if you have already started the licensing process.
* Indicate any foreseen obstacles for obtaining the license.

Please refer to the Guidelines on Space Object Registration and Frequency Management for Small and Very Small Satellites [[3]](#page27).

## Space object registration

Indicate your intention and provide a plan to register your CubeSat in the United Nations Register of Objects Launched into Outer Space. Please refer once again to the Guidelines on Space Object Registration and Frequency Management for Small and Very Small Satellites [3].

## End of life procedures of the CubeSat on orbit

Operations for the end of transmission, method for cutting oﬀ the battery charge lines, and for deorbiting the satellite within 25 years (after the launch).

## Safety risks during operations

## ISS operations planning and interfaces

List any operations and checks required during storage and deployment from ISS. They should take into account requirements and constraints listed in Chapter 2, and the CubeSat interfaces described in Section 4.2.

[Include additional sections as needed, such as... (remove unnecessary sections).]

## Post-flight activities

# Data Analysis and Results

## Data analysis plan

## Results

(leave empty until final version)

## Lessons learned

(leave empty until final version)

# Abbreviations and References

## Abbreviations

**AIT** Assembly, Integration and Testing

**a.k.a.** also known as

**AL** Airlock

**AO** Announcement of Opportunity

**API** Advance Publication Information

**asap** as soon as possible

**BBM** Breadboard Model

**BSTI** Basic Space Technology Initiative

**CDR** Critical Design Review

**CDS** CubeSat Design Specification

**COG** Centre of Gravity

**EAT** Experiment Acceptance Test

**EAR** Experiment Acceptance Review

**ECSS** European Cooperation for Space Standardization

**EIT** Electrical Interface Test

**EM** Engineering Model

**FAR** Flight Acceptance Review

**FM** Flight Model

**FST** Flight Simulation Test

**FRP** Flight Requirement Plan

**FRR** Flight Readiness Review

**GPU** Ground Power Unit

**GSE** Ground Support Equipment

**HK** House Keeping

**HSTI** Human Space Technology Initiative

**HTV** H-II B Transfer Vehicle

**H/W** Hardware

**IC** Integrated circuit

**ICD** Interface Control Document

**IDE** Integrated Development Environment

**I/F** Interface

**IGA** Inter-Governmental Agreement

**IPR** Integration Progress Review

**ISS** International Space Station

**ITU** International Telecommunication Union

**JAXA** Japan Aerospace eXploration Agency

**JEM** Japanese Experiment Module, a.k.a. Kibo

**Kibo** ISS Japanese Experiment Module, a.k.a. JEM

**LED** Light-Emitting Diode

**LO** Lift Oﬀ

**LT** Local Time

**LOS** Line of Sight

**MFH** Mission Flight Handbook

**n.a.** not applicable / not available

**OOSA** Oﬃce for Outer Space Aﬀairs

**PCB** Printed Circuit Board

**PDR** Preliminary Design Review

**PI** Principal Investigator

**PST** Payload System Test

**RBF** Remove Before Flight

**RF** Radio Frequency

**SSN** Space Surveillance Network

**STM** Structure/Thermal Model

**S/W** Software

**TBC** To Be Confirmed

**TBD** To Be Determined

**TKSC** Tsukuba Space Center

**UN** United Nations

**USB** Universal Serial Bus

**WBS** Work Breakdown Structure

**1U** 1-Unit (CubeSat)

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## Applicable documents

These three documents supersede any other reference document listed in case of conflict.

1. *Announcement of Opportunity: United Nations/Japan Cooperation Programme on CubeSat Deployment from the International Space Station (ISS) Japanese Experiment Module (Kibo) “KiboCUBE”.* OOSA/JAXA, fifth edition, 2019.
2. *JEM Payload Accommodation Handbook Vol. 8 - Small Satellite Deployment Interface Control Document Rev. B.* JX-ESPC-101133-B. Japan Aerospace Exploration Agency (JAXA), 2015.
3. *Guidance on Space Object Registration and Frequency Management for Small and Very Small Satellites.* OOSA/ITU, A/AC.105/C.2/2015/CRP.17, 2015.

## Reference documents

[Please list in this section any other document or report you have cited in your application. Please remove items below if not used (they are just examples).]

1. *CubeSat Design Specification (CDS) Rev. 13*. The CubeSat Program, Cal Poly SLO,2015.
2. *XXX*

PART I: Annexes

1. Outreach and Media Coverage
2. Additional Technical Information
3. Support Letters