

## United Nations/China Cooperation on the Utilization of the China Space Station

### First Announcement of Opportunity

28 May 2018

**Deadline for Applications: 31 August 2018**

The mission of the United Nations Office for Outer Space Affairs (UNOOSA) is to promote international cooperation in the use of outer space to achieve development goals for the benefit of humankind. There is no better example of UNOOSA's vision 'to bring the benefits of space to humankind' by showing space's importance in the realization and implementation of the 17 Sustainable Development Goals (SDGs) shown in Figure 1.



Figure 1. Sustainable Development Goals Accepted by the UN General Assembly

Through the “United Nations/China Cooperation on the Utilization of the China Space Station”, UNOOSA capitalizes on the technological and innovative skills of the Government of China to benefit Member States of the United Nations, in particular developing countries, and to allow “Access to Space” to address all 17 SDGs.

In 2010, UNOOSA launched the [Human Space Technology Initiative \(HSTI\)](#) with the objective to involve more countries in activities related to human spaceflight, space exploration, and to increase the benefits from the outcomes of such activities through international cooperation. This cooperation with the Government of China is part of a series of activities to provide access to experimental facilities or payload opportunities to space

scientists worldwide, for both on-ground and on-orbit facilities.

The [China Manned Space Programme](#) was launched in 1992 by the Government of China. In 1993, the [China Manned Space Agency \(CMSA\)](#) was established to manage and carry out China's Manned Space Programme. CMSA is responsible for planning, resource allocation, designing and development, supporting infrastructure and promoting China's Manned Space Programme by working with all relevant space entities in China. CMSA is also dedicated to international cooperation and making the facilities of the China Space Station an international privileged resource for development.

The “United Nations/China Cooperation on the Utilization of the China Space Station” is jointly implemented by UNOOSA and CMSA. It provides scientists from around the world with an opportunity to conduct their own experiments on board the China Space Station (CSS) depicted in Figure 2. The “United Nations/China Cooperation on the Utilization of the China Space Station” is an innovative and forward-looking initiative to open space exploration activities to all nations and to create a new paradigm in building capabilities in space science and technology.

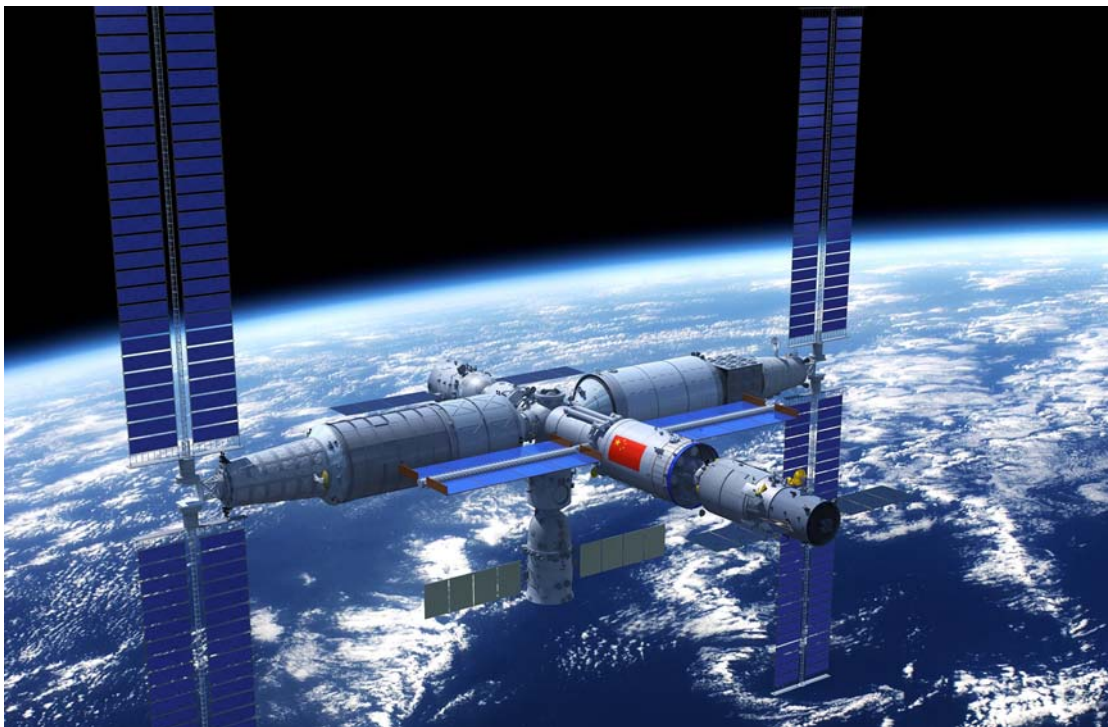


Figure 2. Depiction of China Space Station

This Announcement of Opportunity (AO) is the first invitation of “United Nations/China Cooperation on the Utilization of the China Space Station” for scientific experiments on board the CSS. The AO and its supporting documents provide detailed technical information, defining the modalities of the opportunity including the eligibility criteria, roles, and responsibilities. An application form is also available at:

[http://www.unoosa.org/documents/doc/psa/hsti/CSS\\_1stAO/CSS\\_1stAO\\_ApplicationForm\\_2018.doc](http://www.unoosa.org/documents/doc/psa/hsti/CSS_1stAO/CSS_1stAO_ApplicationForm_2018.doc)

## 1. The China Space Station

In its basic configuration, the CSS includes a Core Module (CM), an Experiment Module I (EM I) and an Experiment Module II (EM II). The three modules are symmetrically T-Shaped. The station will be operating in a 340 to 450 km orbit with an inclination of 41 to 43 degrees. It can accommodate 3 astronauts for daily life and work or 6 during crew rotation. With reserved interfaces for docking extra modules and reserved mounting points for hanging large-scale exposed facilities, the CSS can be expanded.

The CSS modules will be launched atop Long March 5B (i.e. “CZ-5B”) carrier rockets at China Wenchang Space Launch Site. The CM will be firstly launched with space experiments capability. It is planned to complete CSS construction in space and put it into operation in 2022 when large-scale space experiments and applications could be implemented. The Shenzhou manned spaceflight missions, Tianzhou cargo spaceflight missions, Extravehicular activities (EVAs) and on-orbit operations of robotic arms will contribute to the construction and operation of the CSS.

The pressurized segments of CM, EM I and EM II will be equipped and configured with internationally standardized experiment racks. Most of the racks will be equipped with exchangeable advanced experiment and application payloads for Chinese and foreign partners to perform their experiments. A predetermined number of racks will be reserved as empty with only basic configuration and interfaces for foreign partners to develop and upload their own payloads. The exterior of EM I and EM II will be equipped with multiple standard payload interfaces and large payload hanging points allowing for conducting exposed experiments. A predetermined number of exposed payload interfaces will be reserved for utilization by foreign partners.

The Handbook-China Space Station and its Resources for International Cooperation along with this Announcement of Opportunity (AO) provides additional information on the China space station. The Handbook is also available at:

[http://www.unoosa.org/documents/doc/psa/hsti/CSS\\_1stAO/CSS\\_1stAO\\_Handbook\\_2018.pdf](http://www.unoosa.org/documents/doc/psa/hsti/CSS_1stAO/CSS_1stAO_Handbook_2018.pdf)

## 2. Scope of opportunity and cooperation modalities

Through this AO, UNOOSA and CMSA agree to provide Member States of the United Nations with the following opportunities under three cooperation modalities:

**Modality-1:** Conducting experiments inside the CSS by utilizing experiment payloads to be developed by selected applicants.

A predetermined number of general science experiment racks inside EM I and EM II are reserved as empty with only basic configuration and interfaces for selected applicants to develop their payloads for experiments. The payloads will be installed inside standard payload units which have three different specifications for accommodating different sizes of experiment payloads. The standard payload units can be developed by selected applicants as agreed with CMSA. Upon completion of ground tests and verifications, the developed experiment payloads along with the standard payload units will be uploaded to CSS during the Tianzhou cargo spaceflight mission to be scheduled by CMSA. The overview of the general

science experiment racks including the available interfaces is described in “4.1 Inboard General Science Experiment Racks” of the Handbook.

**Modality-2:** Conducting experiments inside CSS by utilizing experiment payloads already provided by CMSA.

Most experiment racks inside CM, EM I and EM II are equipped with experiment payloads developed by CMSA for conducting scientific research, space technology and its applications in various fields including: human system research, medical sample analysis, life ecological experiment, biotechnology experiments, fluid physics, two-phase systems, combustion science, high-temperature material science, and container-free material science. The features and supporting research and application areas of each provided experiment payload are detailed in “4.2 Inboard Domain Research Experiment Racks” of the Handbook.

General supporting racks and facilities are also provided on board the CSS to satisfy the common demands in conducting experiments in the above-mentioned research and application fields. They include a scientific glove box, freezer facility, high microgravity science experiment rack, variable gravity experiment support facility, in-orbit maintenance/installation/commissioning support platform, and independent payload support facilities. Their main features and interfaces are described in “4.3 Inboard General Supporting Racks and Facilities” of the Handbook.

Applicants are provided with the opportunity to apply for utilizing these existing experiment payloads for their experiments by proposing experiment schemes such as providing experiment samples, developing experiment units, and/or undertaking experiment designs. The selected experiments pertaining to this modality will be uploaded along with the launch of the corresponding experiment module or during the Tianzhou cargo spaceflight mission to be scheduled by the CMSA.

**Modality-3:** Conducting exposed experiments outside CSS by utilizing exposed experiment payloads to be developed by selected applicants.

Integrated exposed platforms are built on the exposed surface of EM I and EM II. The exposed platforms are equipped with payload adapters providing standard mechanical, power, data, and heat interfaces for exposed experiment payloads. A payload adapter comprises an active end and a passive end. The active end will be mounted to an exposed experiment payload, while the passive end will be deployed on the exposed platform. An exposed experiment payload will also be mounted with a robotic arm targeted adapter so that it can be deployed by a robotic arm to dock and lock the active end with the passive end. A limited number of exposed payload adapters will be available to selected applicants. Information on supporting conditions of the exposed payload adapters is outlined in “4.4 Exposed Experiment Supporting Facility” of the Handbook.

Applicants are being provided with the opportunity to apply for utilizing exposed payload adapters to develop their exposed facilities and conduct exposed experiments such as: astronomical observation, Earth observation, space materials, and biological experiments. The selected experiments pertaining to this modality will be uploaded to CSS during the Tianzhou cargo spaceflight mission to be scheduled by CMSA.

### **3. Eligibility criteria**

This opportunity is open to all Member States of the United Nations, with particular attention to developing countries. Public and private organizations including institutes, academies, universities, and private enterprises with scientific orientation are eligible to apply for the opportunity.

Each application shall be for one single experiment proposal (hereinafter referred to as “project”). It is encouraged that two or more organizations from developed/industrialized and developing countries submit application(s) in partnership. In such cases, a Principal Investigator (PI) shall be identified by the applying organization(s). The PI will lead the project, be the point of contact, and should have a good command of spoken and written English.

Applying organizations are responsible for the development of their projects including: design, manufacturing, programming, testing, verification of the hardware and software, data management and processing during and after the space experiment. Therefore, applications should clearly demonstrate the following fundamental capabilities:

- Having research and technology background relevant to the proposed project;
- Having research facilities for development of the project;
- Having the ability to transport experiment hardware, software, and related facilities to a handover location in China designated by CMSA.

### **4. Programme procedures and milestone**

#### **4.1 Programme procedures**

##### (1) Submission of Application

Eligible applicants submit to UNOOSA their applications as per this AO.

##### (2) Preliminary selection

A selection committee consisting of engineers, domain experts, and management officers nominated by CMSA and UNOOSA will be established to conduct the preliminary selection according to the following criteria:

- Completeness of application form;
- Scientific and technical value of the proposed project as determined by either:
  - (a) The project’s expected contribution to advancing scientific knowledge or technology; or
  - (b) The project’s expected contribution to enhancing research capacity through developing and performing the experiment in the applying countries; or
  - (c) The project’s expected contribution to furthering international cooperation between developed/industrialized and developing countries;
- Demonstrating that the applying organizations and the intended cooperation activities are consistent with peaceful exploration and use of outer space; and
- The capability of meeting or exceeding the technical requirements.

Applicants will be notified of their selection results at the end of the preliminary selection.

(3) Submission of implementation scheme

All applicants short-listed through the preliminary selection are required to submit the implementation scheme of their projects for final selection. UNOOSA and CMSA will provide technical specifications and requirements necessary for the implementation scheme to each short-listed applicant. The implementation scheme should include comprehensive and concrete solutions on how to implement the project from design to experiment result analysis, including a workplan and a financial plan. The implementation scheme needs to be developed in close coordination and negotiation with designated Chinese counterparts through the facilitation and coordination of UNOOSA.

(4) Final selection

The selection committee will make the final experiment selection based on the implementation schemes, feasibility, safety review, compatibility review, meeting of constraint conditions of the CSS, financial resources, and flight mission plan.

Applicants will be notified of their results from the final selection.

(5) Signing bilateral agreement

Upon final selection, organization(s) will sign, on the witness of UNOOSA, a bilateral implementation agreement with the CMSA or its subordinate organization for each selected project with a budget plan included.

(6) Project implementation

Parties of each bilateral agreement will carry out their projects as per their implementation agreements.

(7) Reporting

Selected applicants may be required to report progress on cooperation activities to UN events under coordination with UNOOSA and/or CMSA.

A written report on the experiment flight mission and the results of the space experiment shall be submitted to UNOOSA and CMSA no later than 5 months after completion of the flight mission.

**4.2 Programme milestones**

<b>Milestone</b>	<b>Deadline</b>
Submission of application	31 August 2018
Preliminary selection and notification	30 November 2018
Submission of implementation scheme	28 February 2019
Final selection and notification	31 May 2019
Conclusion of bilateral agreements	31 August 2019
Implementation of each project	Follow the signed bilateral agreement(s)
Submission of report	5 months after flight mission

## **5. Roles and responsibilities**

Selected organizations will conduct the following activities:

- Implement the selected projects following the bilateral agreement(s); and
- Cooperate on public relations and promotion activities of UNOOSA and CMSA, including responding to press inquiries about the experiments and preparing information materials upon request from UNOOSA and CMSA.

Please note that any costs associated with human resources, travel expenses and transportation shall be borne by the selected organizations, unless otherwise indicated in bilateral agreements, as per implementation schemes.

## **6. Budget principle**

The CMSA will bear the costs of launch to and operation aboard the CSS of the selected experiments from governmental organizations or non-profit organizations. Private entities may engage in fundraising from public and private sectors or negotiate with CMSA cost-sharing plans of launch and operation of their experiments, as per the corresponding implementation schemes.

The participating organizations, either governmental or private entities, will bear the costs of development and ground preparation of their experiments, including design, hardware manufacturing, software programming, tests and evaluations, transportation, human resources, etc. Where facilities and/or technical conditions are not available in the applying countries, CMSA could provide those to support the development and tests of the experiments at a reasonable cost.

## **7. Terms and conditions**

By submitting completed applications, the applicants agree to the following:

- Each selected organization will enter into a bilateral agreement with the CMSA or its designated subordinate organization to resolve any and all practical, logistical, technical, and/or legal issues relating to those projects. The agreements will include but are not be limited to: articles detailing aspects of the project's content, work plan and responsibility for each party in terms of detailed design, hardware and software development, ground test and verification, pre-flight work at the launch site, in-orbit experiment procedures, post-flight analysis, experiment result analysis and publication, project funding, and legal aspects such as, *inter alia*, customs support, intellectual property, confidentiality, risk assumption and hold harmless clauses, dispute resolution and covering any other aspect of responsibility or liability accruing to those parties under applicable legal regimes, including the United Nations treaties on outer space, as appropriate.
- The agreements will not in any way guarantee the launch date, launch success, experiment success, nor will CMSA be in any way responsible for the overall success of the experiment projects. The specific date of the flying mission will be fixed by

negotiation between the selected organizations and CMSA in line with the plan and capacity of flight missions for CSS construction or operation.

- CMSA may terminate the provision of the experiment opportunities at any time, should the selected organizations violate the terms and conditions as stipulated in this AO and the bilateral agreements.

## **8. Application submission**

The application form is released as a separate word document along with the publication of the present AO.

The fully completed application form, including a signed and stamped endorsement page from the Head of each partner organization and of the PI, must be submitted to UNOOSA by the deadline of **31 August 2018** and mailed to the following address:

Office for Outer Space Affairs  
United Nations Office at Vienna  
Vienna International Centre  
P.O. Box 500, A-1400 Vienna, Austria  
Phone: (+43 1) 26060-4957  
Fax: (+43 1) 26060-5830  
c/o: Aimin Niu (Mr.)  
Email: [aimin.niu@un.org](mailto:aimin.niu@un.org)

Application forms sent by email should be in PDF format. Please note that the maximum total size of all attachments to one email message is 10 MB.

In order to reduce the size of the PDF file of your application, it is encouraged to firstly separate the WORD file of your application form into Part1.doc (from beginning to Section 5) and Part2.doc (Section 6, i.e. the Application endorsement). Then, convert Part1.doc into Part1.pdf by using an electronic PDF generator software application or virtually printing, instead of scanning the printed copy of Part1.doc; Print Part2.doc, sign and stamp it, then scan the hard copy into Part2.pdf. Finally, combine the Part1.pdf and Part2.pdf into a single PDF file by using a software application or free online PDF file combination service.

## **9. Additional information**

The latest information on the “United Nations/China Cooperation on Utilization of the China Space Station” will be made available on the website of UNOOSA at:

[http://www.unoosa.org/oosa/en/ourwork/psa/hsti/chinaspacestation/1st\\_cycle\\_2018.html](http://www.unoosa.org/oosa/en/ourwork/psa/hsti/chinaspacestation/1st_cycle_2018.html)

For information regarding the AO and applications, please contact:

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