



Announcement of Opportunity

United Nations Access to Space for All initiative

Fellowship Programme for “Drop Tower Experiment Series (DropTES)”

31 May 2023

- 1. Thematic Area:** Access to Space for All - Hypergravity/Microgravity Track
- 2. Title:** Fellowship Programme for Drop Tower Experiment Series (DropTES)
- 3. Subject:** Realization of a scientific and/or technological experiment under short-term conditions of weightlessness at the Bremen Drop Tower and/or GraviTower Bremen Pro in Germany.
- 4. Implementation:** DropTES is being supported by the Center of Applied Space Technology and Microgravity (ZARM), University of Bremen, Germany and German Aerospace Center (DLR) - German Space Agency, executed by the United Nations Office for Outer Space Affairs (UNOOSA), and implemented through strong collaboration among UNOOSA, ZARM, potential applicants, and their organisations from Member States of the United Nations.
- 5. Duration:** May 2023 – January 2025
- 6. Deadline for Applications:** Completed application forms must be submitted to the United Nations Office for Outer Space Affairs (UNOOSA) **by 26 November 2023 at 23:59 Central European Time (CET, UTC+1)**. Applicants will be notified of the outcome of the application by February 2024.
- 7. Expected Profile of Applicants:** Government organisations, research institutes, universities, and other public and non-for-profit organisations.
- 8. Number of Selected Applicants:** One team leader with up to four team members who are from Member States of the United Nations. The teams may be larger, however, the financial support listed in Section 17 is limited to five team members.
- 9. Language of the Programme:** English
- 10. Brief Programme Description:**

The DropTES fellowship programme, provided under the Access to Space for All initiative, is contributing to the promotion of space education and research in microgravity, particularly for the enhancement of relevant capacity-building activities in developing countries. DropTES aims at providing opportunities up to two weeks at ZARM to conduct microgravity experiments consisting of five drops or catapult launches in the Bremen Drop Tower or five half-days in the GraviTower Bremen Pro in Germany.

ZARM is a scientific institute at the University of Bremen in Germany with a focus on research under space conditions and questions related to space technology. With a height of 146 meters, the Bremen Drop Tower is the predominant laboratory at ZARM and also the only drop tower of its class in Europe. ZARM has a stellar international reputation for its ability to conduct experiments under conditions of weightlessness (10^{-6} g0). Moreover, ZARM's unique catapult system, which can operate three times per day, provides the longest Earth-based microgravity experiment duration (9.3 seconds, or 4.7 seconds with the standard drop mode). ZARM's new GraviTower Bremen Pro can operate up to 960 times a day for experiments not limited to microgravity (max. 2.5 seconds, $< 10^{-4}$ g0). A partial-gravity option will be available at a later development stage of the GraviTower Bremen Pro, e.g., Moon and Mars gravity levels, but this option is not available in the context of this Announcement of Opportunity, which offers only microgravity experiments.

Experiments in microgravity afford researchers the opportunity to develop new perspectives and technologies in a wide range of research fields such as gravity-relevant phenomena in fundamental physics, astrophysics, and biology, as well as applied sciences like fluid dynamics, combustion, chemistry, and material sciences. For the preparation of a future space mission, dedicated technology tests in microgravity are often part of a drop tower experiment series as well.

11. Schedule of the DropTES Fellowship Programme

One round of the fellowship programme comprises the following phases: application, selection, preparation, experiment execution, outreach, and reporting.

Application Phase: May 2023- November 2023

- Following this Announcement of Opportunity (AO), applicants will prepare their application package, including the application form.
- UNOOSA and ZARM will conduct technical consultation sessions online to provide feedback and advice on experiment ideas. Applicants interested in technical consultation sessions should submit the Expression of Interest form containing a summary of their experiment idea by **31 August 2023 23:59 Central European Summer Time (CEST, UTC+2)**. The duration of the technical consultation sessions will be 30 minutes per applying team and will be held in September 2023. **Please note that submitting an expression of interest is not mandatory for selection, and technical consultations are optional.**
- Applicants to submit their completed application forms by **26 November 2023 at 23:59 Central European Time (CET, UTC+1)**.

Selection Phase: November 2023- January 2024

- Selection of the awardee by the Selection Board.
- UNOOSA to announce the results and notify the awardee and non-selected applicants of their selection results.
- Awardee to confirm their participation in the fellowship programme to UNOOSA.

Preparation Phase: February 2024 - 4th Quarter 2024

- UNOOSA and ZARM invite awardee to kick-off meeting.
- Awardee to prepare their experiment in close cooperation with ZARM.

- Awardee to submit their experiment progress report to ZARM and UNOOSA in May 2024, at the latest.
- Awardee to submit their revised experiment progress report and, awardee, ZARM, and UNOOSA to conduct the critical design review in July 2024, at the latest.
- Awardee to submit their final experiment progress report to ZARM and UNOOSA in September 2024, at the latest.
- Awardee to transfer the experiment and relevant equipment to the ZARM facility in Germany.

Experiment Phase: 4th Quarter 2024

- One week of experiment integration at the ZARM facility prior to the experiment series.
- One week of drop tower experiments at the ZARM facility. The final dates of the experiment series will be decided together with the awardee, ZARM, and UNOOSA.

Reporting Phase: until 31 January 2025

- Awardee to submit a final experiment report.

Outreach and Publication Phase

- Awardee to conduct outreach activities to promote capacity-building and STEM education.
- Awardee to publish experiment results in journals, proceedings, conferences, workshops, Bachelor, Master and PhD theses, etc., if possible.

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, other public and non-for-profit organisations are eligible to apply for this Opportunity.

To assess eligibility, UNOOSA 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 located in countries that have not conducted research under space conditions at the time of the opening of this application are particularly encouraged to apply. Priority will be given to teams that have not previously participated in an experiment series at the Bremen Drop Tower and/or GraviTower Bremen Pro and/or research projects that have never been conducted at the Bremen Drop Tower and/or GraviTower Bremen Pro.

Each team should consist of a team leader and up to four team members. The team leader must belong to the same entity as at least one of the team members. All team members must be from entities that are eligible to participate and all participating entities must submit the Letter of Endorsement from their entities' directors. The team leader shall be responsible for all matters related to the application and bear responsibility for the execution of the experiment. The teams could consist of several entities, with one leading entity that takes responsibility.

The teams may be larger, however, the financial support listed in Section 14 is applicable to one team leader and four team members only. The final number of team members who will participate in the experiment on-

site at the ZARM facility depends on the requirements of the experiment and is subject to approval by the Selection Board of the DropTES Fellowship Programme. The Board reserves the right to limit the team size if it deems necessary.

Changes to the composition of the team are NOT allowed once the application has been submitted. If, for exceptional reasons, changes are absolutely necessary, they will be subject to the approval of the Selection Board.

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.

13. Selection Criteria

The Selection Board will consist of team members from UNOOSA, ZARM, and DLR - German Space Agency. The Board will assess all applications against the following criteria:

- (i) Experiment Content:
The educational, scientific, and/or technological value of the proposed experiment and the relevance of the utilisation of the ZARM facility, details of the experiments as well as the data acquisition and data analysis plan in the proposed experiment.
- (ii) Team Composition:
The skills set, organization, and composition of the team. The team shall demonstrate competence in scientific and technological research or in education as well as in project management. 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.
- (iii) Planning:
 - General feasibility of the proposed experimental design and procedure, including data acquisition and data analysis plan, the work breakdown structure, overall schedule credibility, and risk analysis.
 - Budget plan to support the development, preparation, transportation, and shipping of the experiment, as well as the availability of funds.
- (iv) Outreach:
The communication and dissemination plan for outreach activities to promote capacity-building and STEM education, clearly linking the project with the Sustainable Development Goals of the United Nations 2030 Agenda on Sustainable Development.
For more information about the SDGs: <https://sdgs.un.org/>

The entire selection process will be performed in a single step.

14. Financial and Technical Support

The awardee will be offered the most economical round-trip air tickets for up to five persons between the participants’ international airport of departure and Bremen. Participants are responsible for any en-route expenses or flight changes.

UNOOSA, ZARM, and DLR will neither bear the expenses related to the preparation, transportation, shipping, nor the insurance of the experiment or of the team members. The awardee must cover these costs.

The use of the Bremen Drop Tower or the GraviTower Bremen Pro is sponsored by DLR - German Space Agency. The technical support provided by ZARM is included and therefore free of charge.

ZARM will provide the team access to its cost-free on-site apartment at the drop tower facility. The apartment has two separate rooms with two beds in each room, a common bathroom, and a common kitchen. The ZARM apartment can accommodate up to four people.

UNOOSA will cover the accommodation expenses of the team leader at a nearby hotel, within walking distance from ZARM.

15. Publications

The awardee is requested to inform UNOOSA, ZARM and DLR of any publications related to this experiment including PhD, Master thesis, 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, the Center of Applied Space Technology and Microgravity (ZARM), and the German Aerospace Center (DLR) - German Space Agency for the Access to Space for All initiative: DropTES opportunity for their support in enabling the utilization of ZARM's Bremen Drop Tower and/or GraviTower Bremen Pro facility.

16. Application to the Technical Consultation Session

Applicants must email the fully completed expression of interest document to UNOOSA by **31 August 2023 23:59 Central European Summer Time (CEST, UTC+2)** to the following address:

unoosa-access-to-space@un.org

UNOOSA and ZARM will then evaluate each expression of interest document. UNOOSA will notify applicants for the coordination of the technical consultation session.

17. Application to the Programme:

Applicants must email the fully completed application documents including the Letter of Endorsement from the head of their entity (Document 1) and **DropTES Application Form** (Document 2) to UNOOSA by **26 November 2023 23:59 Central European Time (CET, UTC+1)** to the following address:

unoosa-access-to-space@un.org

In the email, applying entities are requested to attach scanned PDF versions (.pdf) of both documents. Please note that the UNOOSA email account only accepts emails with a size limit of up to 10 megabytes. Submission of all necessary documents (Document 1 and Document 2) is mandatory.

Applicants are required to notify their country's permanent mission in Vienna ([Permanent Missions to the United Nations \(Vienna\) \(unodc.org\)](https://www.unodc.org/)) of their application submission to UNOOSA. If they cannot locate the permanent mission's information in the above link, please refer to Geneva ([Member States | UN GENEVA](#)) or New York ([e-BlueBook \(unmeetings.org\)](https://www.unmeetings.org/)).

At the discretion of UNOOSA, ZARM, or DLR - German Space Agency, additional information may be requested, if necessary, to assist in evaluating the application. Selected applicants will then be notified of the results of the selection process. All awards are final and made at the sole discretion of UNOOSA, ZARM, and DLR - German Space Agency, and are not subject to challenge or review.

18. United Nations Privileges and Immunities

Nothing in or relating to this Announcement of Opportunity shall be deemed a waiver, express or implied, of any of the privileges and immunities of the United Nations, including its subsidiary organs.

19. Reference Documents

ZARM's Bremen Drop Tower - Payload User's Guide at its latest version: <https://www.zarm.uni-bremen.de/en/drop-tower/experiment-support.html>.

General information on the Bremen Drop Tower or GraviTower Bremen Pro, e.g., "How does the drop tower work?" or "What is the catapult system?" and detailed overviews of former drop tower experiments and projects can be found at: <https://www.zarm.uni-bremen.de/en/drop-tower/general-information.html>.

20. Additional Information

The latest information on the DropTES will be made available on the website of UNOOSA: https://www.unoosa.org/oosa/en/ourwork/access2space4all/DropTES/DropTES_Index.html

For further information regarding the Fellowship Programme and applications, please contact: unoosa-access-to-space@un.org