

## Frequently Asked Questions (version 11 February 2021)

If you have a question that is not answered here, please contact [unoosa-access-to-space \[at\] un.org](mailto:unoosa-access-to-space@un.org)

**Q:** What is the collaboration between UNOOSA and ZARM and DLR Space Administration about?

**A:** In collaboration with the Center of Applied Space Technology and Microgravity (ZARM) and the German Aerospace Center (DLR) Space Administration, the fellowship programme offers a selected research team the opportunity to conduct its own microgravity experiments at the Bremen Drop Tower. The series of experiments will consist of five drops or catapult launches during which approximately 5 or 10 seconds of microgravity, respectively, are feasible.

This Programme is aimed at contributing to the promotion of space education and research in microgravity around the world, particularly for the enhancement of relevant capacity-building activities in United Nations member countries.

Applicants are expected to make the link between their application and the [2030 Agenda for Sustainable Development](#) and its [17 Sustainable Development Goals](#) and are also expected to contribute to broaden space activities and applications and to foster capacity-building in space science and technology.

**Q:** What are the benefits of this opportunity?

**A:** This opportunity is focused to develop STEM skills and winners will get to access a cutting-edge research facility and be supported by experts to run experiments in a unique microgravity environment.

In previous rounds of opportunities, winners have conducted a variety of experiments in different research areas, which varies from material sciences, robotic arm, satellite deorbiting mechanism, medicine, fluid dynamics, those experiments foster the STEM skills of winner institutes. Some examples of the impact that this opportunity has shown are that winners of DropTES are leading the center for innovation, development, and research on mechatronics engineering (CIDIMEC) in Bolivia and manage the mechatronics department in Universidad Boliviana La Paz (Bolivia). Also, with the skills and knowledge acquired through their DropTES experience, a team participated in developing a low-cost ventilator to fight COVID-19.

The capacity building development brought by DropTES is much bigger than the experiment itself. Applicants could broaden their research areas with the help of microgravity and contribute further to realizing the [17 Sustainable Development Goals](#).

**Q:** Who can apply to this opportunity?

**A:** The DropTES Fellowship Programme is open to research teams from research institutes, universities, and other public organizations that are located in Member States of the United Nations. Each team should consist of up to four Bachelor, Master and/or PhD

students who must be endorsed by their academic supervisor (team leader). The teams may be larger, however the financial support is applicable to the above only. The teams could consist of several entities, with one leading entity that takes responsibility. Please check the announcement of opportunity for all the details.

**Q:** Is there a limit on team members?

**A:** Each team should consist of up to four Bachelor, Master and/or PhD students who must be endorsed by their academic supervisor (team leader). The teams may be smaller or larger, however considering the workload, we would recommend the size of the team does not exceed 10 members.

**Q:** What are the applications of microgravity? Where to start learning about what can be done at Bremen Drop Tower?

**A:** Applications of microgravity are in many research areas, such as combustion, fundamental physics, fluid dynamics, astrophysics, material sciences, etc. New materials can be created in a microgravity environment as there is no gravity force and sedimentation of particles. Also, microgravity is fantastic for creating very homogeneous materials, but there are more examples, and applicants are encouraged to read publications on ZARM website (<https://www.zarm.uni-bremen.de/en.html>) and previous winners' reports (<https://www.unoosa.org/oosa/en/ourwork/psa/hsti/capacity-building/droptes.html>) on UNOOSA website. Applicants can propose any experiment compatible with the Drop Tower (please check ZARM Drop Tower User Manual - [https://www.zarm.uni-bremen.de/fileadmin/user\\_upload/drop\\_tower/Users\\_Manual\\_0412.pdf](https://www.zarm.uni-bremen.de/fileadmin/user_upload/drop_tower/Users_Manual_0412.pdf)) and within the limits of the Announcement of Opportunity. Examples of categories of experiments are material science, combustion, fluid dynamics or technology demonstrators, but do not be constrained, we are looking forward to seeing your new ideas!

**Q:** What happens if an experiment does not work? Have there been cases like that before?

**A:** Failure may occur, although ZARM and the team will review the details of the experiment together. Sometimes failure occurs due to technical or unpredicted issues. However, once it occurs, ZARM and the team will analyse the issue together, to make an adjustment for the next experiment. Great success always comes after a failure.

**Q:** Is it possible to test adaptive learning?

**A:** Applicants will have five chances to conduct an experiment, therefore if the team wants to test adaptive learning, they should consider how many times the actions can be done

in the almost 10 seconds of microgravity. Overall, adaptive learning needs hundreds of repetitions, the team should evaluate the feasibility.

**Q:** How much is the cost of an experiment?

**A:** Applicants' idea and proposal will decide the cost of the experiment, there is no fixed number, but it varies depending on idea, design, components you use, the facilities you have access to... etc.

**Q:** Is there a maximum number of applications per research team?

**A:** An institute could submit more than one application. In that case, please send separate Application Forms, but keep in mind that it is better to have a very good application than several that are just ok.

**Q:** Is this opportunity covering the cost of taking the experiment to Germany, for example expedition and customs fees?

**A:** No, fees for the transport of the experiment are NOT covered. For customs fee of the equipment, applicants are encouraged to understand the relevant laws and regulations of the customs in Germany, and the winning team could contact ZARM in advance in seek of help in a possible reduction or exemption of the custom fee (although it is NOT guaranteed).

**Q:** How should we decide on which of the two modes (drops or catapult launches) to use in the experiment?

**A:** The choice between two modes also depends on the type of experiment, the most significant difference between the two modes is mainly the acceleration phase. In the drop mode, the experiment will have a 1g-to-microgravity transition. For catapult launch, the capsule will take an initial acceleration process, accelerating to around 170km/h in 250ms and the acceleration level is up to 30 times Earth's gravity. Nevertheless, the sophisticated catapult mode offers a smooth transition from the acceleration phase to microgravity. One can put a glass filled with water on the capsule platform - it will not slosh during the catapult acceleration.

**Q:** How are combustion experiments performed in a vacuum environment? Is the use of hazardous materials allowed?

**A:** A pressure sealed capsule will be used. Inside the capsule, there is nominal air pressure (1 bar). ZARM has dedicated combustion chambers for the combustion experiments, and many combustion experiments have been performed. Hazardous materials are allowed, however more safety measures will be taken, and the material has to be checked in advance.

**Q:** Would It be possible to have a CAD design of the capsule?

**A:** Yes, the winning team will receive a STEP file of the capsule, which will describe the dimension and other detailed information, so that the team could start their development such as 3D modelling. Further information about the platform and capsule will also be provided.

**Q:** Is the GraviTower Bremen Pro (GTB Pro) also available in this opportunity?

**A:** Applicants shall submit their experiments considering that the regular drop tower is available. The GTB Pro is still work in progress. It is highly probable that this new type of drop tower system can be made available for DropTES in 2022. Certainly, the GTB Pro will be an integral part in coming cycles of DropTES.