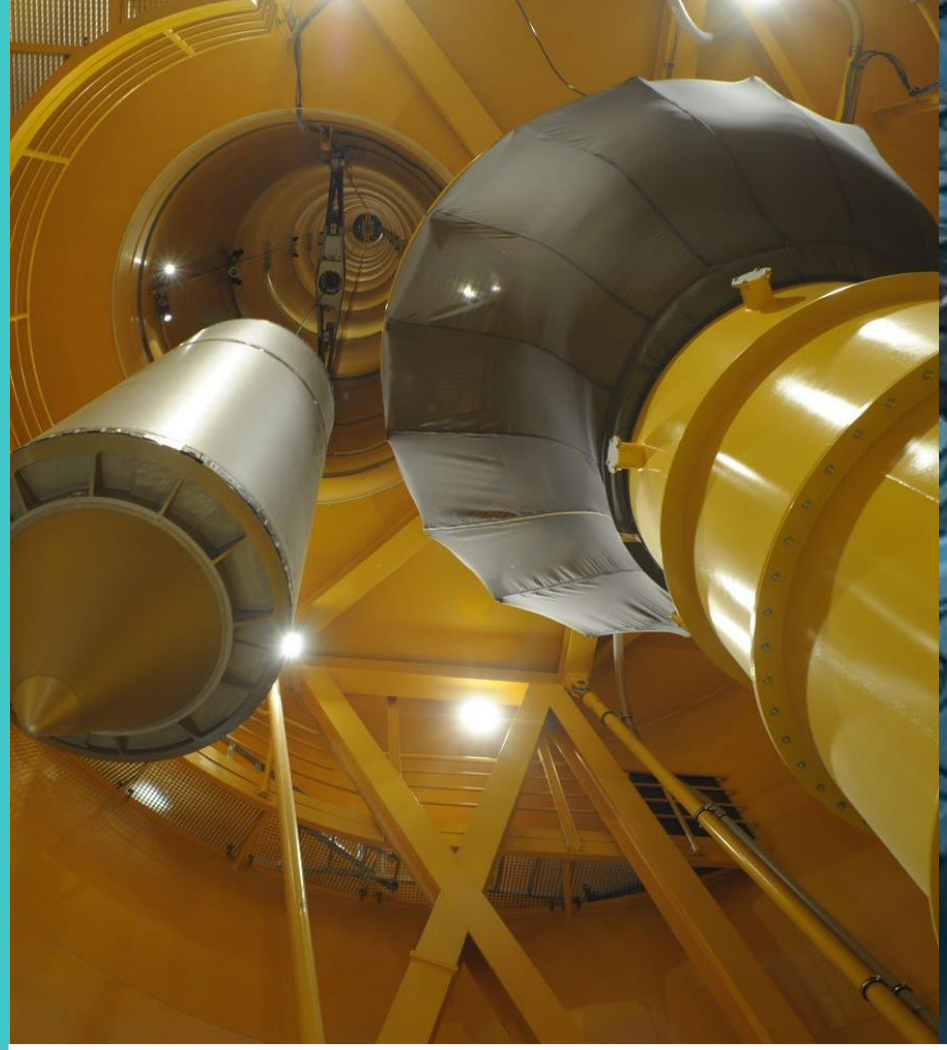
Announcement of Opportunity Webinar

2 December 2022

10:30- &16:30- CET



UNITED NATIONS
Office for Outer Space Affairs

DLR

CENTER OF
APPLIED SPACE TECHNOLOGY
AND MICROGRAVITY

ZARM

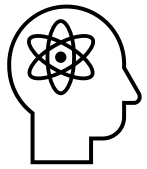
Access to Space for All

Space Technology Capacity Building

UNITED NATIONS
Office for Outer Space Affairs

The goal of the Access to Space 4 All initiative is to provide research and orbital opportunities for UN Member States **to access space and to ensure that the benefits of space, in particular for sustainable development, are truly accessible to all**

Provides the possibility of developing hands-on capabilities from A-Z in to promote the safe and sustainable use of outer space



Provides cutting edge skills for jobs and other opportunities

Fosters international cooperation between the UN, space-faring partners, and applying developing nations

Has a strong social impact to the country, regions, and young generations

Access to Space for All in Numbers

- **9** Hands on Opportunities
- **1** Annual Fellowship
- **27** Awardees involving **42** Entities from **30** countries
- **4** CubeSats launched
- **7** Microgravity Experiments performed
- **16** projects in development
- **62** Scholarships granted
- **70+** Hours of educational content on YouTube

4 QUALITY EDUCATION

8 DECENT WORK AND ECONOMIC GROWTH

9 INDUSTRY, INNOVATION AND INFRASTRUCTURE

SPACE AGENCIES

CMS DLR esa JAXA مركز محمد بن راشد للفضاء MOHAMMED BIN RASHID SPACE CENTRE

RESEARCH INSTITUTIONS AND UNIVERSITIES

Kyutech Kyushu Institute of Technology ZARM

PRIVATE SECTOR

AIRBUS AVIO SIERRA SPACE

Access to Space for All
Impact of the initiative

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HyperGES "Watermeal, the Future Food Source for Space Exploration"

HyperGES and community impacts

- Expand space-related knowledge and awareness in Thailand
- Flagship program in astroculture, produce intensive research environment
- Team up with other organization. Stepping out of their comfort zone encouragement

FIRST MAURITIAN SATELLITE – OPENING NEW OPPORTUNITIES

JOURNEY TO SPACE ALTHOUGH NOT EASY BUT EXTREMELY REWARDING AND OFFERS HIGHLY PROMISING FUTURE

MAURITIUS EMBARKS IN NEW SPACE ERA
- Geolocation interesting for future space related activities
- More advanced space nations interested to collaborate

BOOST TECHNICAL CAPACITY
- Building highly technical capacity
- Sophisticated ground station for future missions set up
- Training of younger generation

A POTENTIALLY NEW SOCIO-ECONOMIC PILLAR

ilities for Mauritius. Data
&D, business
ntal collaborations.

ENTHOUSIASTIC YOUNGSTERS
- The training program on antenna building gave us an insight of the high level of enthusiasm for this new field. There is hope to enhance this interest further to build new capacity.

GOVERNMENT FULLY SUPPORTIVE
- This historical initiative for the Republic of Mauritius promises to unlock new opportunities for research, innovation and socio-economic development.

Aerospace, AI and Digital Centre

ESPITA was able to grow ,to expand by inauguration **AEROSPACE, AI AND DIGITAL CENTER** on July 2022


ASU News

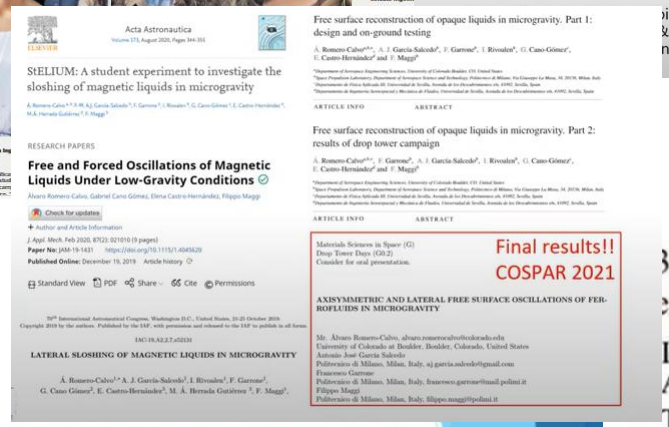
Guatemalan team launches nation's 1st CubeSat, wins Interplanetary Initiative prize

International student team recognized for its success through adversity

June 6, 2022

When members of the team that built the Quetzal-1 CubeSat watched their satellite take off on a SpaceX Falcon 9 rocket in 2020, it was the culmination of six years of hard work, overcoming financial and personnel hurdles, and challenging cultural barriers.

That hard work and ingenuity has garnered the team the CubeSat Delivery Prize award through Arizona State University's Interplanetary Initiative. The award is just the latest step in the team's remarkable journey.


Acta Astronautica

StELIUM: A student experiment to investigate the sloshing of magnetic liquids in microgravity

RESEARCH PAPERS

Free and Forced Oscillations of Magnetic Liquids Under Low-Gravity Conditions

Free surface reconstruction of opaque liquids in microgravity. Part 1: design and on-ground testing

Free surface reconstruction of opaque liquids in microgravity. Part 2: results of drop tower campaign

Final results!!
COSPAR 2021

AXISYMMETRIC AND LATERAL FREE SURFACE OSCILLATIONS OF FERROFLUIDS IN MICROGRAVITY

LATERAL SLOSHING OF MAGNETIC LIQUIDS IN MICROGRAVITY

3. How has participating in DropTES changed the environment around you? Cont'd (3)

In Feb. 2017 I was elected to be the President of the American University of Madaba (AUM) in Jordan.

That month AUM started the Innovation project for its students and for high school students in Jordan at large.

Access to Space for All

Structure of the initiative

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HYPERGRAVITY AND MICROGRAVITY

Building capacity for conducting experiments in orbit

- Hands-on opportunities in hypergravity and microgravity from ground to orbit
- Open source tools bridging hands-on and education components
- Educational material for building up experiments

SATELLITE DEVELOPMENT

Building capacity that enables the development, deployment, and operation of satellites

- Hands-on opportunities for satellite deployment
- Open source tools bridging hands-on and education components
- Educational material supporting the whole life-cycle of satellites

SPACE EXPLORATION

Broadening the engagement in space exploration

- Hands-on opportunities to engage in space exploration
- Open source tools bridging hands-on and education components
- Educational material for space exploration

Access to Space for All
Hands-on Component

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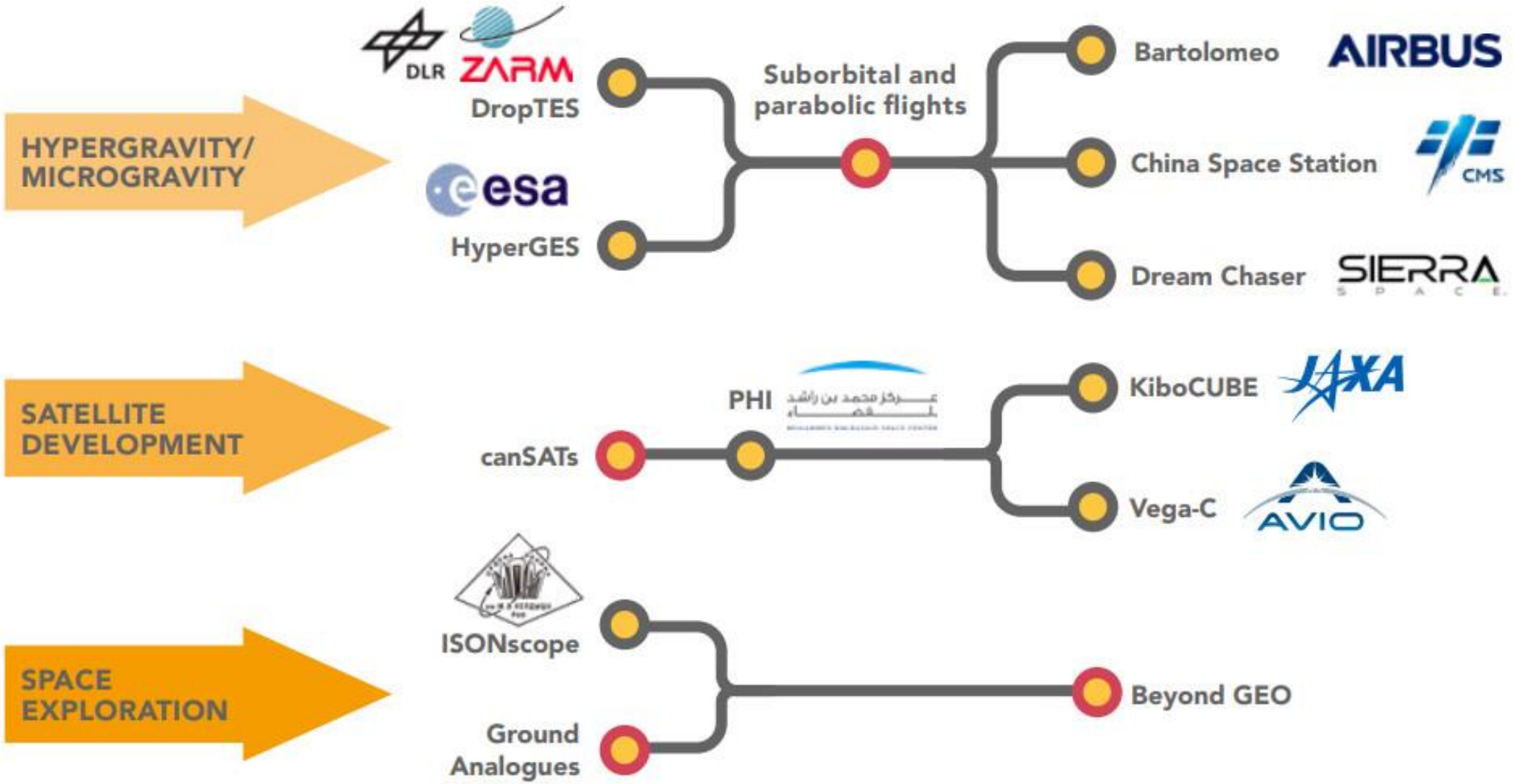

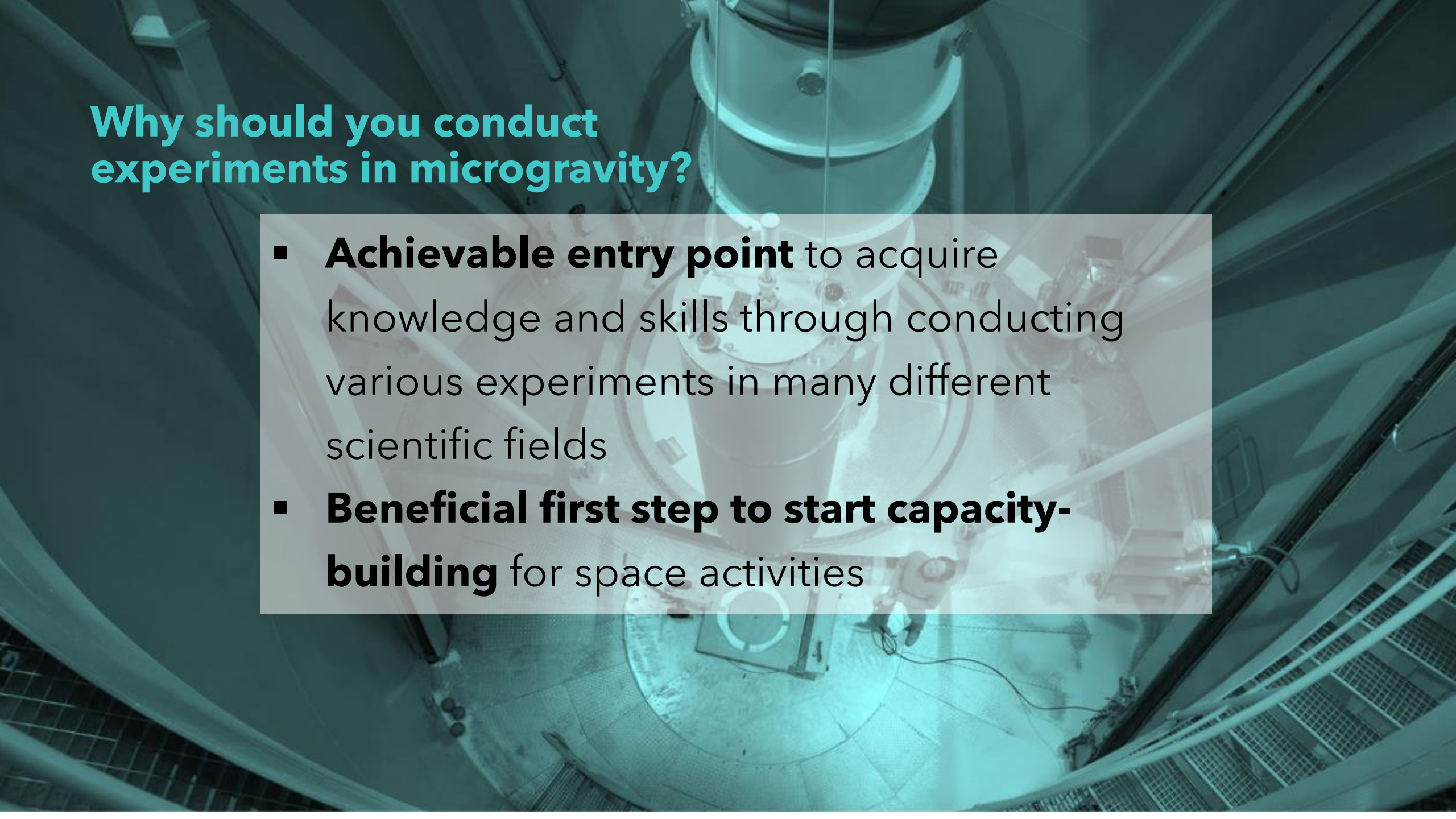

Why should you conduct experiments in microgravity?

- **Achievable entry point** to acquire knowledge and skills through conducting various experiments in many different scientific fields
- **Beneficial first step to start capacity-building** for space activities

What is DropTES?

A fellowship programme between United Nations Office for Outer Space Affairs (UNOOSA), ZARM (Center of Applied Science Technology and Microgravity) and DLR (German Aerospace Center) which started from 2014

Aims to provide opportunities to conduct a series of microgravity experiments at the Bremen Drop Tower and [NEW!]GraviTower Bremen Pro

The experiment campaign consists of 5 drops or catapult launches at the Bremen Drop Tower or half-days at the GraviTower Bremen Pro to be conducted within one week. Each experiment series is accompanied by an on-site experiment integration taking place one week prior to the campaign.

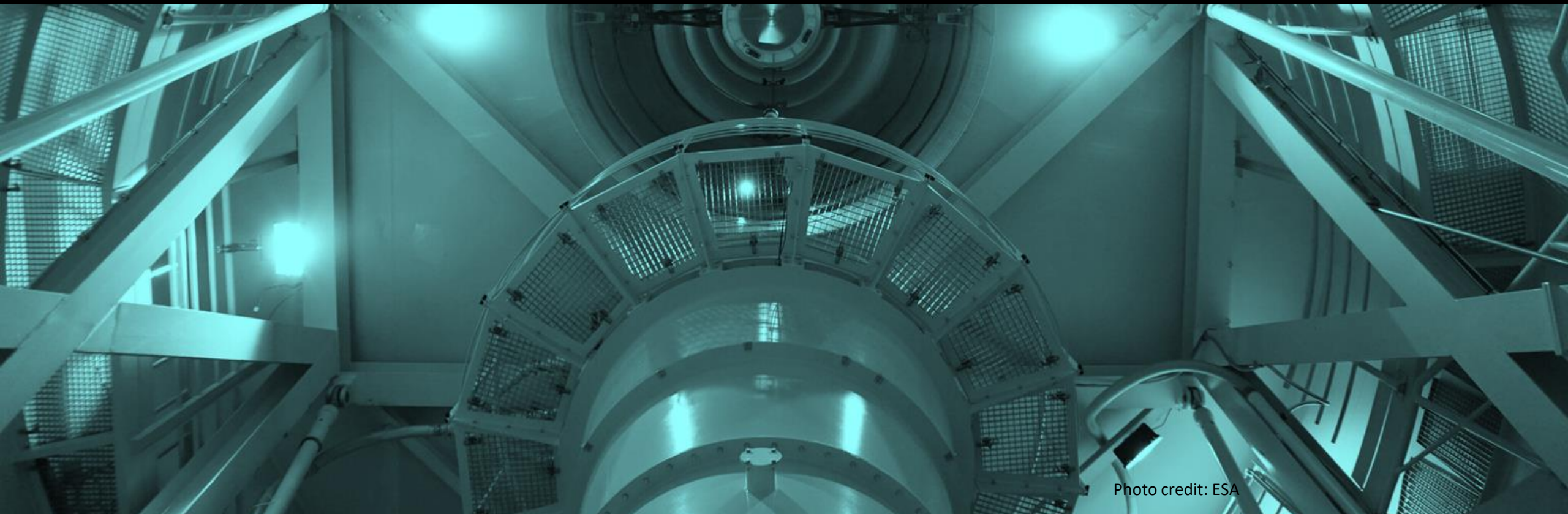

Photo credit: ESA

Why DropTES?

Access to state-of-the-art & unique ground infrastructure

- The Bremen Drop Tower is one of the tallest drop towers in Europe and the experiment duration has been extended to 9.3 seconds which is unmatched by any other drop facility worldwide.
- The new GraviTower Bremen Pro can perform experiments up to 960 times a day, which are not limited to microgravity (max. 2.5 seconds, < 10-4 g0).

Why DropTES?

Generous technical and financial support

- DLR will bear the cost to conduct the series of experiments.
- ZARM will provide technical support during the campaign along with on-site apartment for student accommodation.
- UNOOSA will provide financial support for the travel of the selected team.

All you have to do is develop your experiment and bring it to Germany!

Experience the entire experiment cycle

Writing an application, planning the project, designing/developing/manufacturing/testing the prototype, coordinating other necessary things, conducting the actual experiment, analysing, presenting the results, outreaching…

DropTES Awardees

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	Winner		Objective
1st round 2014	German Jordanian University JORDAN		to investigate the stability of tether dynamics for satellites with electromagnetic tether systems using a Tilger, a mass damper
2nd round 2015	Universidad Católica Boliviana "San Pablo" BOLIVIA		to examine and evaluate the property of an alloy of Nickel and Titanium "Nitinol" under the microgravity environment
3rd round 2016	Instituto Tecnólogico de Costa Rica Universidad de Costa Rica COSTA RICA		to expand the technical knowledge and information on the behaviour of a reduced-scale robotic arm manipulator such as dynamics, motion, and control under microgravity conditions
4th round 2017	Warsaw University of Technology POLAND		to verify, in vacuum and microgravity conditions, the deployment of the deorbit sail system on their two-unit CubeSat called "PW-Sat2"
5th round 2018	University of Bucharest Politehnica University of Bucharest ROMANIA		to expose medicine droplets containing aqueous chlorpromazine (CPZ) solution to both laser radiation and microgravity conditions
6th round 2019	Politecnico de Milano (Polimi) ITALY		to analyze the lateral sloshing of a ferrofluid solution in low-gravity with the aim of measuring its oscillation frequency while subjected to different magnetic field intensities.
7th round 2022	Universidad Católica Boliviana "San Pablo" BOLIVIA		to determine the 3D printing feasibility under microgravity conditions, measure intra-structure remaining liquid resin after light exposure and compare manufacturing time, amount of used material, while processing the same piece between 2 different approaches (Fused Deposition Modeling (FDM) and Digital Light Processing (DLP))

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

DropTES Awardees

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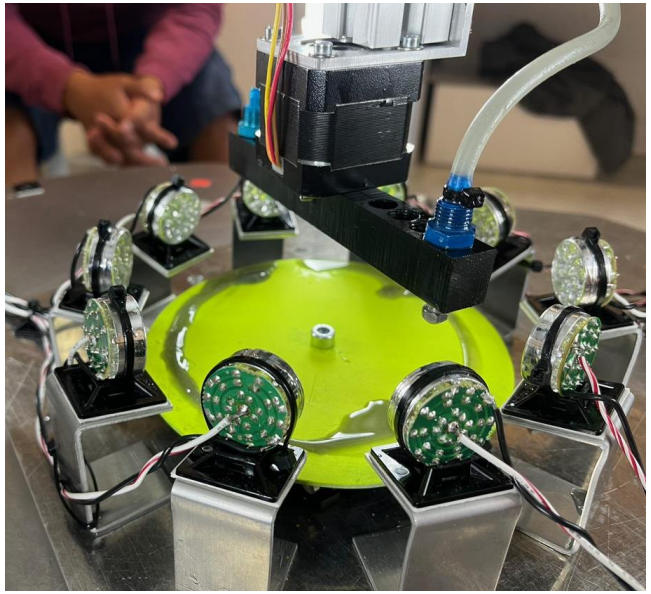
Office for Outer Space Affairs

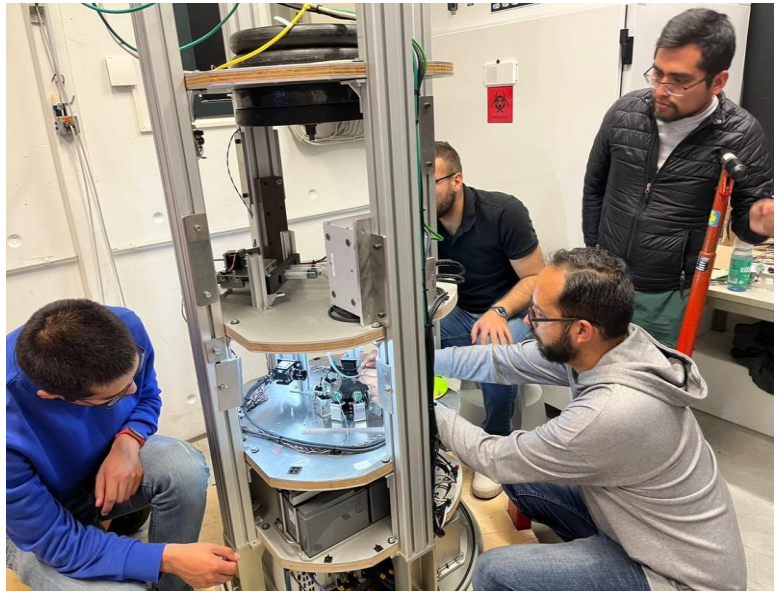
Universidad Católica Boliviana "San Pablo" awardee of DropTES 2nd & 7th round

- In 2015, the team **examined and evaluated the property of Nitinol**, which is a metal alloy often used in medical devices.
- In 2022, the team tested **3D printing techniques using liquid resin**, which could lead to new applications in various fields.

The **technical expertise and skills acquired through the experiments** helped develop ventilators during the COVID19 pandemic.

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





Access to Space for All
Education Component

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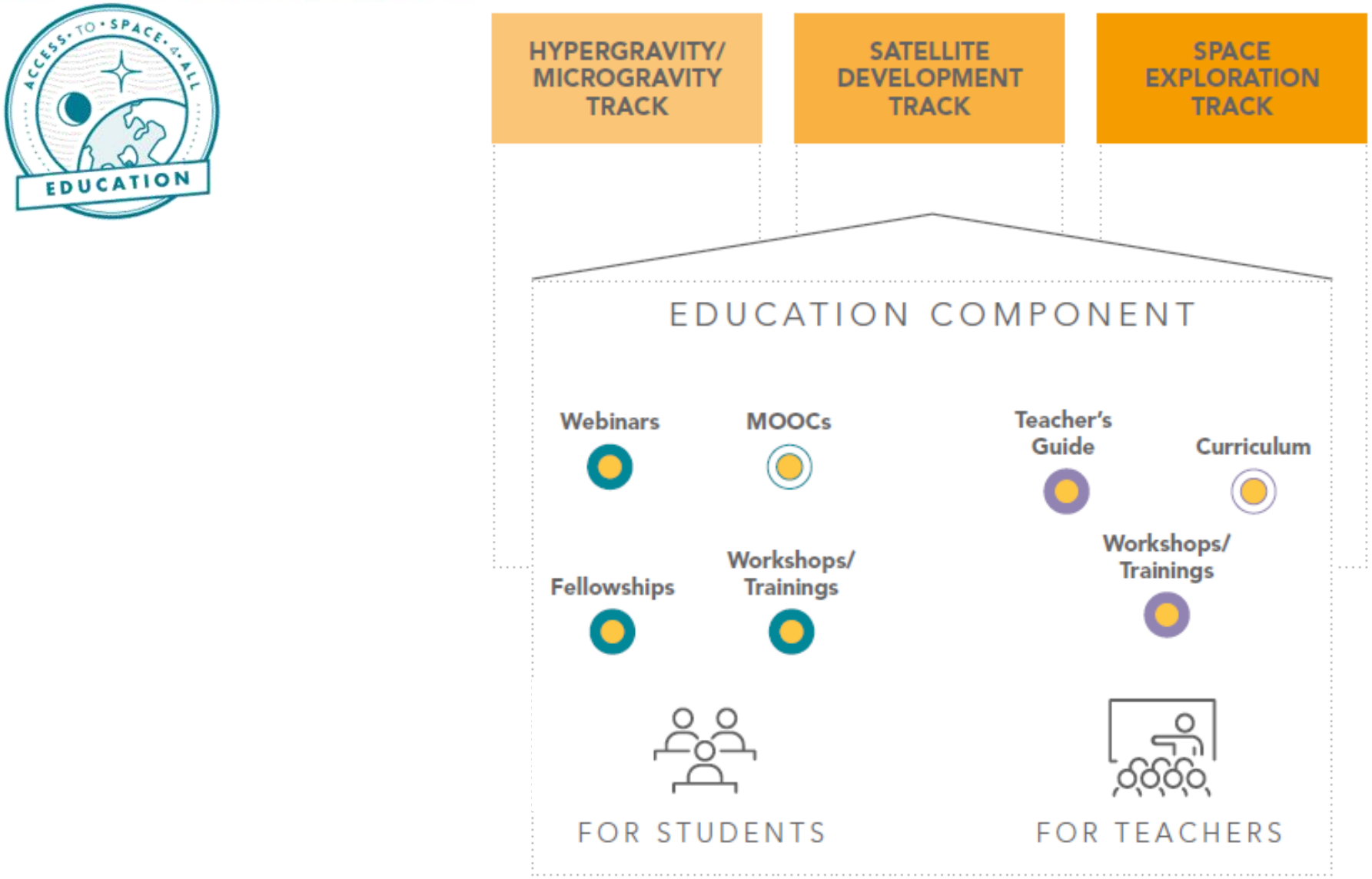

DropTES
Dedicated Webinars for DropTES

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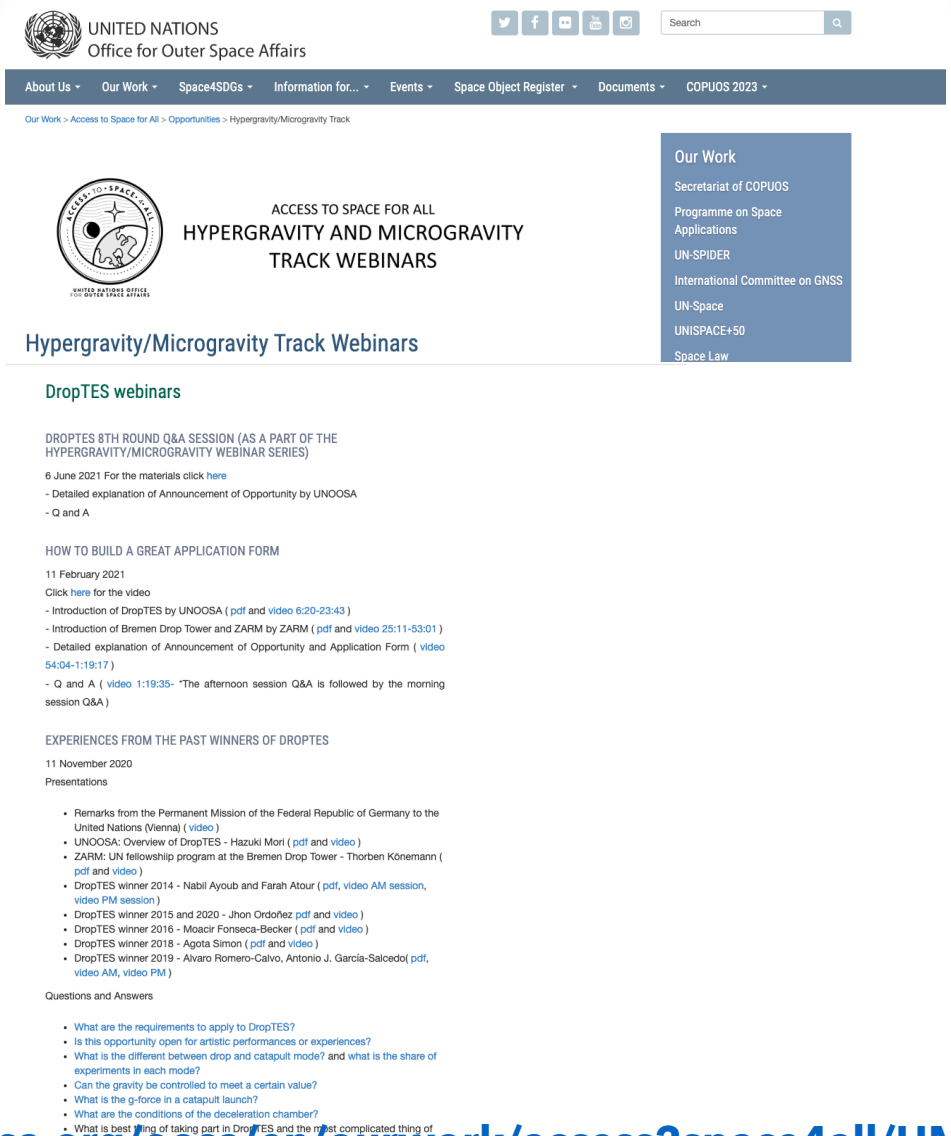

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ACCESS TO SPACE FOR ALL
HYPERGRAVITY AND MICROGRAVITY
TRACK WEBINARS

Our Work
- Secretariat of COPUOS
- Programme on Space Applications
- UN-SPIDER
- International Committee on GNSS
- UN-Space
- UNISPACE+50
- Space Law

Hypergravity/Microgravity Track Webinars

DropTES webinars

DROPTES 8TH ROUND Q&A SESSION (AS A PART OF THE HYPERGRAVITY/MICROGRAVITY WEBINAR SERIES)

6 June 2021 For the materials click here
- Detailed explanation of Announcement of Opportunity by UNOOSA
- Q and A

HOW TO BUILD A GREAT APPLICATION FORM

11 February 2021
Click here for the video
- Introduction of DropTES by UNOOSA (pdf and video 6:20-23:43)
- Introduction of Bremen Drop Tower and ZARM by ZARM (pdf and video 25:11-53:01)
- Detailed explanation of Announcement of Opportunity and Application Form (video 54:04-1:19:17)
- Q and A (video 1:19:35- *The afternoon session Q&A is followed by the morning session Q&A)

EXPERIENCES FROM THE PAST WINNERS OF DROPTES

11 November 2020
Presentations

- Remarks from the Permanent Mission of the Federal Republic of Germany to the United Nations (Vienna) (video)
- UNOOSA: Overview of DropTES - Hazuki Mori (pdf and video)
- ZARM: UN fellowship program at the Bremen Drop Tower - Thorben Könemann (pdf and video)
- DropTES winner 2014 - Nabil Ayoub and Farah Atour (pdf, video AM session, video PM session)
- DropTES winner 2015 and 2020 - Jhon Ordoñez pdf and video)
- DropTES winner 2016 - Moacir Fonseca-Becker (pdf and video)
- DropTES winner 2018 - Agota Simon (pdf and video)
- DropTES winner 2019 - Alvaro Romero-Calvo, Antonio J. García-Salcedo(pdf, video AM, video PM)

Questions and Answers

- What are the requirements to apply to DropTES?
- Is this opportunity open for artistic performances or experiences?
- What is the different between drop and catapult mode? and what is the share of experiments in each mode?
- Can the gravity be controlled to meet a certain value?
- What is the g-force in a catapult launch?
- What are the conditions of the deceleration chamber?
- What is best thing of taking part in DropTES and the most complicated thing of

https://www.unoosa.org/oosa/en/ourwork/access2space4all/HMTrack_Webinars.html#Tag1

DropTES
Conducting R&D in Hypergravity/Microgravity

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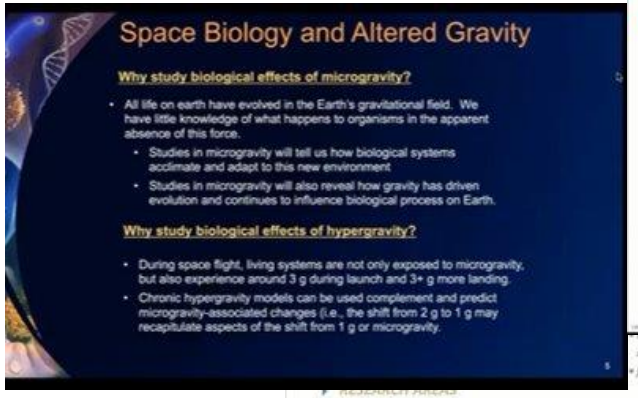
<u>9 webinars with 45 speakers from 40 entities in 13 nations</u>

Covered technical and fundamental knowledge on:

- Benefits of conducting R&D in Hypergravity/Microgravity environment
- What type of R&D can be done (with examples from life science, physical science, and technology demonstration)
- Existing available platforms, opportunities, and networks

No.	Contents
1	Introduction to Hypergravity/Microgravity
2	Life Science Part 1: Biology
3	Life Science Part 2: Physiology
4	Life Science Part 3: Pharmacology
5	Physical Science Part 1: Material Science
6	Physical Science Part 2: Fluid Dynamics
7	Technology Demonstration
8	UNOOSA Hypergravity/Microgravity Track Opportunities
9	Regional Hypergravity/Microgravity Activities



https://www.unoosa.org/oosa/en/ourwork/access2space4all/HMTrack_Webinars.html#Tag6

Any questions?

Contact us

✉ unoosa-access-to-space@un.org

Help us help
#AccSpace4All

Download and learn more about us!

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