UNITED NATIONS
Office for Outer Space Affairs

Access to Space for All Initiative Expert Meeting

15-17 May 2023

Access to Space for All
Agenda

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Day 1 Monday 15 May
- Opening Remarks
- Overview of the Access to Space for All initiative
- Session 1: Introduction of the Hypergravity and Microgravity Track

Day 2 Tuesday 16 May
- Session 2: Introduction to the Satellite Development Track
- Session 3: Introduction to the Space Exploration Track

Day 3 Wednesday 17 May
- Session 4: Effective Outreach
- Session 5: Lessons Learned and Way Forward
  (Restricted to partners, awardees and past applicants)

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Access to Space for All

Objectives of the Expert Meeting

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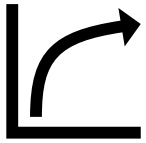
Share and gain insights from success stories and challenges on capacity-building activities and effective outreach



Discuss **how to improve** the Access to Space for All initiative

Bring together partners, awardees, supporting governments, and potential future partners and applicants of the initiative to **create a network and build new partnerships**

Raise awareness of the Access to Space for All initiative

Access to Space for All

Space Technology Capacity Building

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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**

Acquire cutting-edge skills for jobs and other opportunities and **develop hands-on capabilities** from A-Z

Access to unique ground and space infrastructure, technology, and information

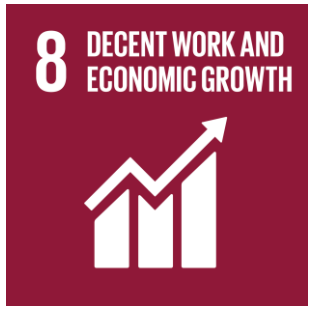
Gain international cooperation experience through working with the UN and space-faring partners

Visibility to of the R&D and space activities already done in the country/region

Motivate the young generation and **boost interest in STEM**

Access to Space for All in Numbers

- **9** Hands on Opportunities
- **1** Annual Fellowship
- **32** Awardees involving **44** Entities from **32** countries
- **5** CubeSats launched
- **7** Microgravity Experiments performed
- **20** projects in development
- **68** Scholarships granted
- **80+** Hours of educational content on YouTube



SPACE4SDGS

Access to Space for All

Impact of the initiative

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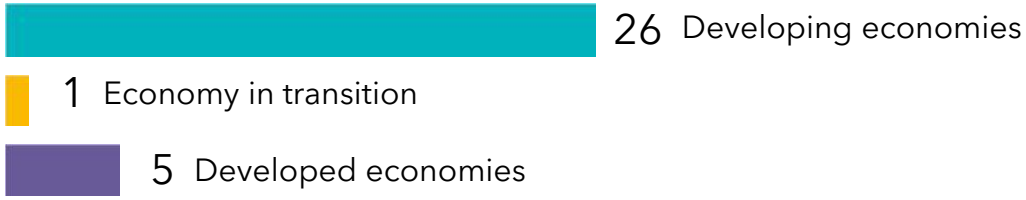
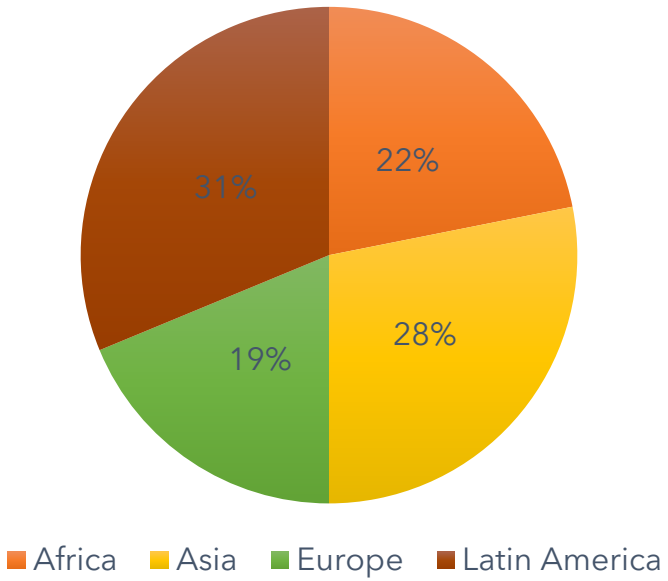
Our Awardees

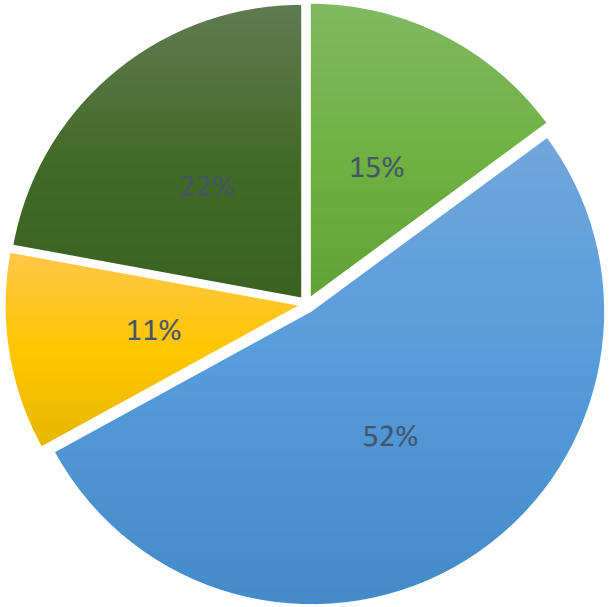
32 Principal investigators distribution





Our videos

As of April 2023, more than 20,000 reviews on YouTube



- Hypergravity and Microgravity series webinar
- KiboCUBE Academy series webinar
- General Information about Access to Space for All
- Announcement of Opportunity or Awardees

For more stats and information, check out the brochure!

Access to Space for All

Impact of the initiative

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Learn More About our Awardees!

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Awardee Page

ACCESS TO SPACE FOR ALL
AWARDEE PAGE

Mauritius Research and Innovation Council

"The First Mauritian Satellite is a historical achievement for the Republic of Mauritius. We are proud to count amongst the handful of Space faring Small Island Developing States. This initiative prompts a number of promising avenues for research development and innovation in Space and Satellite technology in Mauritius - fields which were, in the recent past, unaccessible for our small nation. We look forward to seeing Space and Satellite technology bring a new thrust to STEM in Mauritius." **Vickram Bissonauth, co- project coordinator from Mauritius Research and Innovation Council**

Team Photo Credit: MRIC

AWARDS

KiboCUBE

The first satellite of Mauritius, MIR-SAT 1 has been deployed from the International Space Station on 22 June 2021 (click here to see the deployment from JAXA YouTube) thanks to KiboCUBE. The initial goal of the team from Mauritius Research Innovation Council was to design, develop, and operate a CubeSat-class satellite to test the transmission of imagery and on-board communication systems. MIRS-SAT 1 was deployed in orbit on 22 June 2021.

About KiboCUBE

Mission e-patches awarded to Mauritius Research and Innovation Council

NEWS

- The Prime Minister, Mr. Pravind Kumar Jugnauth, inaugurated the Satellite Ground Station (7 October 2021)
- " Mauritius Imagery and Radiotelecommunication Satellite (MIR-SAT1) Commemorative Magazine" published (7 October 2021)
- Mauritius deploys first satellite into low-Earth orbit by ITU (25 June 2021)
- Successful Deployment of First Mauritian Satellite, Selected in the Third Round of KiboCUBE Program by JAXA (25 June 2021)
- The First Mauritian Satellite deployed in Space by the Ministry of Foreign Affairs of Mauritius (23 June 2021)
- The First Mauritian Satellite MIR-SAT 1 has Successfully Launched by AAC Clyde Space (22 June 2021)
- Mauritius deploys first satellite thanks to UNOOSA and JAXA KiboCUBE programme (22 June 2021)
- Small Satellites Deployment from "Kibo" (MIR-SAT 1, Mauritius) YouTube streaming by JAXA (22 June 2021)
- CRS-22 #NASASocial What's on Board Briefing by NASA Kennedy Space Center (2 June 2021)
- MIR-SAT 1, Mauritius First Satelite to be Launched on 3 June by Space in Africa (29 May 2021)
- Mauritius selected as winner for 3rd Round of KiboCube (June 2018)

ACTIVITIES

- Interview Article with MRIC team members by UNOOSA (11 August 2021)
- Inspiring young Mauritians to Space and Satellite Technology (December 2020)

PUBLICATIONS

- Soreefan M.Z, Shamutally M.F, Bissonauth. V ; *The Mauritian Journey to Space*, 71st International Astronautical Congress (IAC) -The Cyberspace Edition , 12-14 October 2020 . IAC-20-E1.5.12 (2020)

PHOTOS

MIR-SAT1 deployed from the ISS
©JAXA/NASA

Prime Minister of Republic of Mauritius The Hon Pravind Kumar JUGNAUTH witnessing the deployment of MIR-SAT1 (In front left)
©Government of Mauritius

Ambassador of Japan to Mauritius H.E. KAWAGUCHI Shuichiro witnessing the deployment of MIR-SAT1 (In front left)
©Government of Mauritius

Interview Articles

Contribution to the SDGs

Access to Space for All is key in raising awareness about what space technology can do for the Sustainable Development Goals. Each application for an Access to Space for All hands-on opportunity requests the applicants to provide information on how their activity will support the Sustainable Development Goals. To date, UNOOSA has received applications that spanned over the 17 Sustainable Development Goals. Examples of how Access to Space for All supports the Sustainable Development Goals are:

- **SDG 4 "Quality Education"**: Access to Space for All provides educational resources supporting the hands-on component.
- **SDG 8 "Decent Work and Economic Growth"**: Access to Space for All builds capacity for individuals to access jobs in the space industry.
- **SDG 9 "Industry, Innovation and Infrastructure"**: Thanks to some of the hands-on opportunities of Access to Space for All, institutions create facilities that remain available once the opportunity has been completed.

However, the contribution of the initiative goes beyond those three SDGs. Access to Space for All initiative for Sustainability: Interview Series is a series of interviews of the partners and the awardees in the initiative, where they explain how their projects are tackling different SDGs.

- **Article #1** - How Bartolomeo x ClimCam Project Contributes to the SDGs, an interview with Airbus and the awardee in the first round of Bartolomeo, read more
- **Article #2** - How Education Through PNST Contributes to the SDGs, an interview with Kyushu Institute of Technology and a graduated student, read more
- **Article #3** - DropTES: The Stepping Stone into Space Activities and its Contribution to the SDGs, an interview with ZARM and Universidad Católica de Boliviana, read more
- **Article #4** - DropTES: The Opportunity to Expand Your Horizon and its contribution to the SDGs, an interview with the 1st round and 3rd round awardee read more
- **Article #5** - PHI: The Platform to Realize Your Dreams, an interview with the two 1st round awardees read more

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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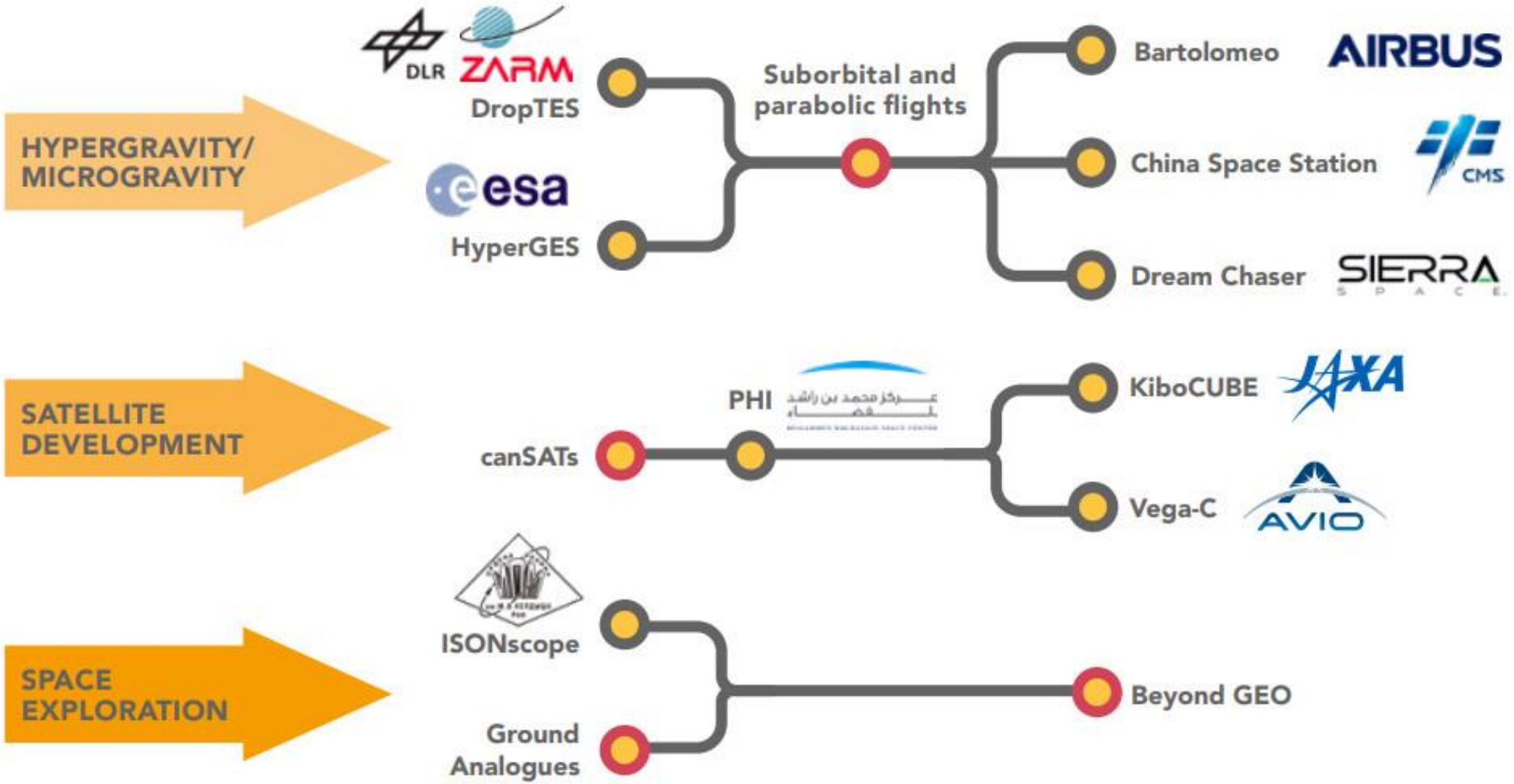

Access to Space for All
Hypergravity/Microgravity Track

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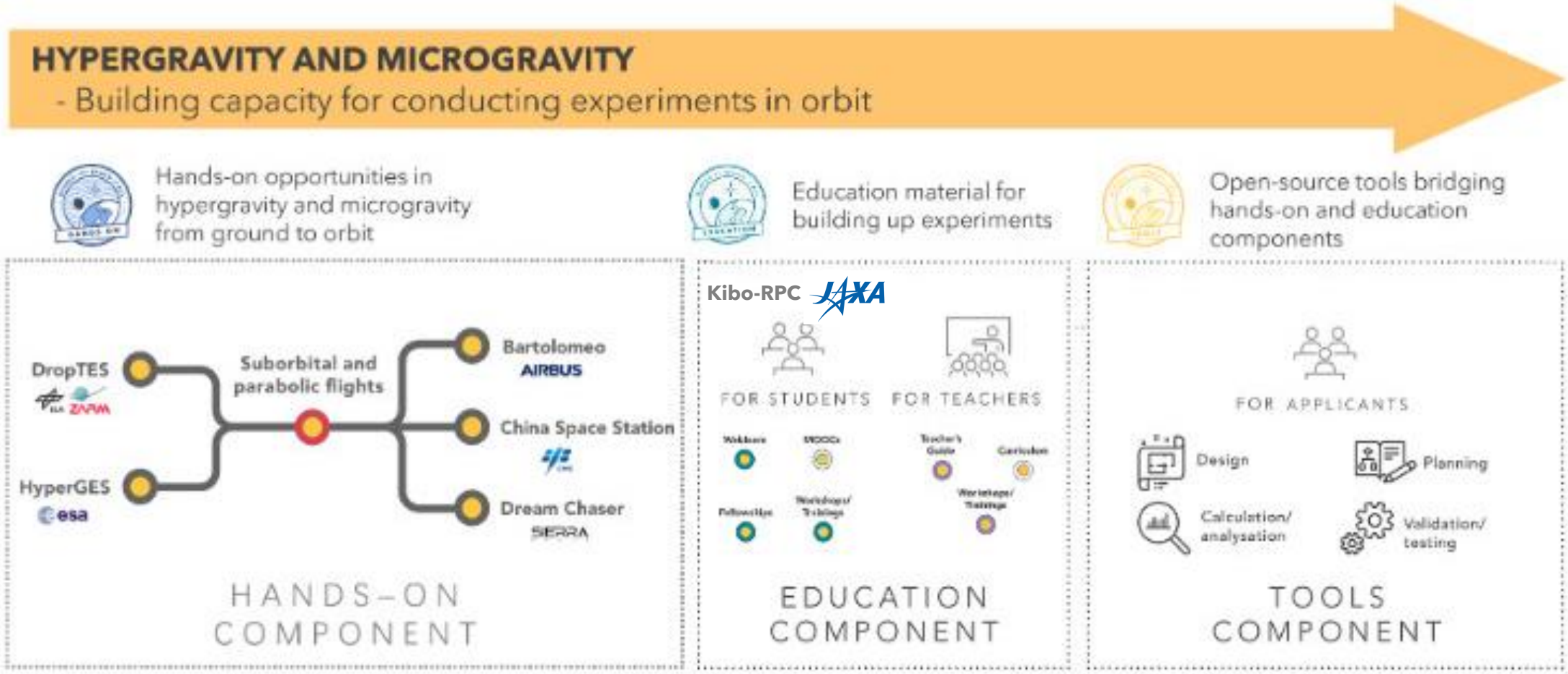
- **Achievable entry point** to acquire knowledge and skills through conducting various experiments in many different scientific fields
- **Beneficial first step to start capacity-building** for space activities



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Hypergravity/Microgravity Track

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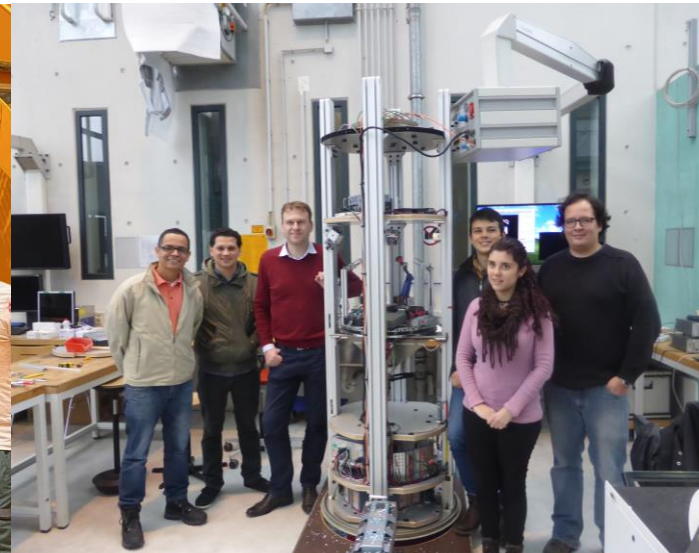
DropTES

- Partners: Center of Applied Space Technology and Microgravity (ZARM) and German Aerospace Center (DLR)
- Established: 2014
- Aims to provide educational or research institutions with opportunities to conduct a series of **microgravity experiments** at the Bremen Drop Tower and new GraviTower Bremen Pro in Germany.
- The drop tower experiment series consists of **5 drops or catapult launches** 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.
- 7 experiments from Jordan, Bolivia, Costa Rica, Poland, Romania, and Italy have successfully been conducted and the 8th round has been awarded to a team in Colombia who will examine the effects of microgravity on the deposition of tin drops and their properties, as well as the possibility of soldering in space.
- **9th round will be open for applications at the end of May 2023!**



Access to Space for All

Hypergravity/Microgravity Track

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HyperGES

- Partner: European Space Agency (ESA)
- Established: 2019
- Aims to provide educational or research institutions with opportunities to conduct a series of **hypergravity experiments** at the Large Diameter Centrifuge (LDC) facility at the European Space Research and Technology Centre (ESTEC) in the Netherlands.
- The LDC allows samples to be exposed to acceleration forces of 1-20 times Earth's gravity. The experiment series consists of 1-2 weeks for on-site experiment integration/preparation and actual experiment campaign.
- The first round awardee from Thailand will test the effect of hypergravity on watermeal, as a **possible food source for space exploration**. The second round awardees from Macao that will will analyse the medical and biotechnological potential of fungi for future space exploration and from Bolivia will examine the break-up of human red blood cells to get a better understanding of anaemia in space
- **3rd round will be open for applications at the end of May 2023!**

©ESA

Photo credit: ESA


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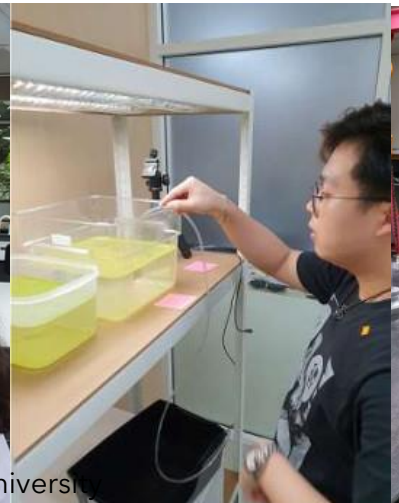

Access to Space for All
Hypergravity/Microgravity Track

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Bartolomeo

AIRBUS

- Partner: Airbus Defence and Space
- Established: 2018
- Aims to provide institutions with opportunities to **accommodate a payload on the Airbus Bartolomeo external platform on the International Space Station**.
- The opportunity is for a **3U CubeSat payload** which will get an "All in One" Space mission service (integrated, launched, installed as a part of the Bartolomeo for a mission operation span of a year)
- The first round was awarded to a team formed by 3 African countries, Egypt, Kenya and Uganda which will develop an **imaging system to monitor climate change in East Africa**, to be launched in 2024.


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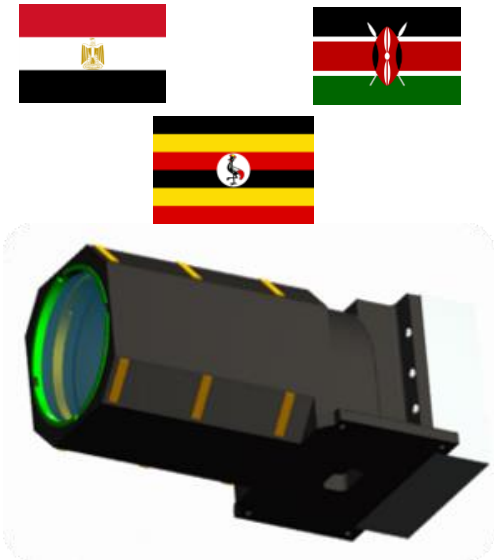
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Hypergravity/Microgravity Track

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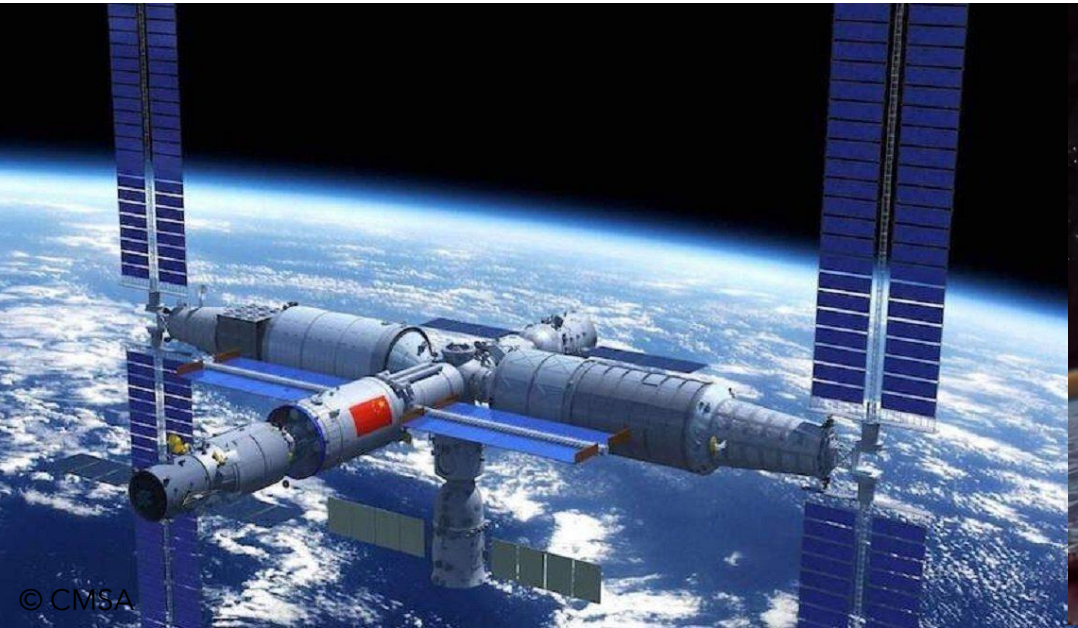
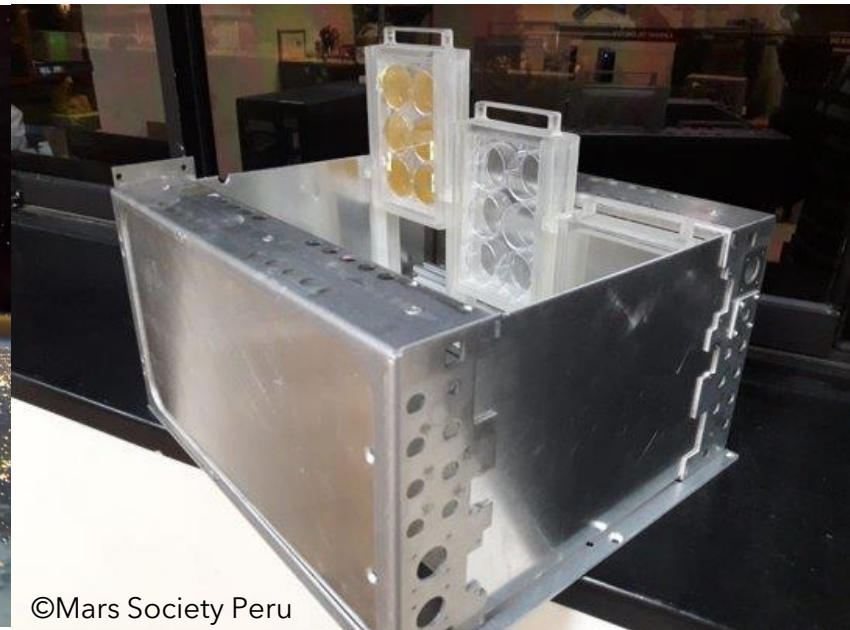
China Space Station

- Partner: China Manned Space Agency (CMSA)
- Established: 2018
- Aims to provide scientists from around the world with opportunities to **conduct their own experiments on board the China Space Station (CSS) either inside or outside the CSS**.
- **7 projects involving 22 institutions from 17 UN Member States** has been selected for the first round. The research areas vary from life science, biotechnology, fluid physics, combustion, astronomy to space technologies.
- Few of the projects are scheduled to be launched to the CSS in 2023 to start their on-orbit experiments.





Access to Space for All

Hypergravity/Microgravity Track

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Kibo Robot Programming Challenge (Kibo-RPC)

- Partner: Japan Aerospace Exploration Agency (JAXA)
- Established: 2023
- Aims to provide an opportunity where students will obtain and test programming skills to solve various problems by moving free-frying robots (Astrobee and Int-Ball) in a simulation environment.
- Kibo-RPC is originally a programme organized by JAXA and in 2023, UNOOSA joined as a partner to provide the opportunity to more countries.

Access to Space for All
Satellite Development Track

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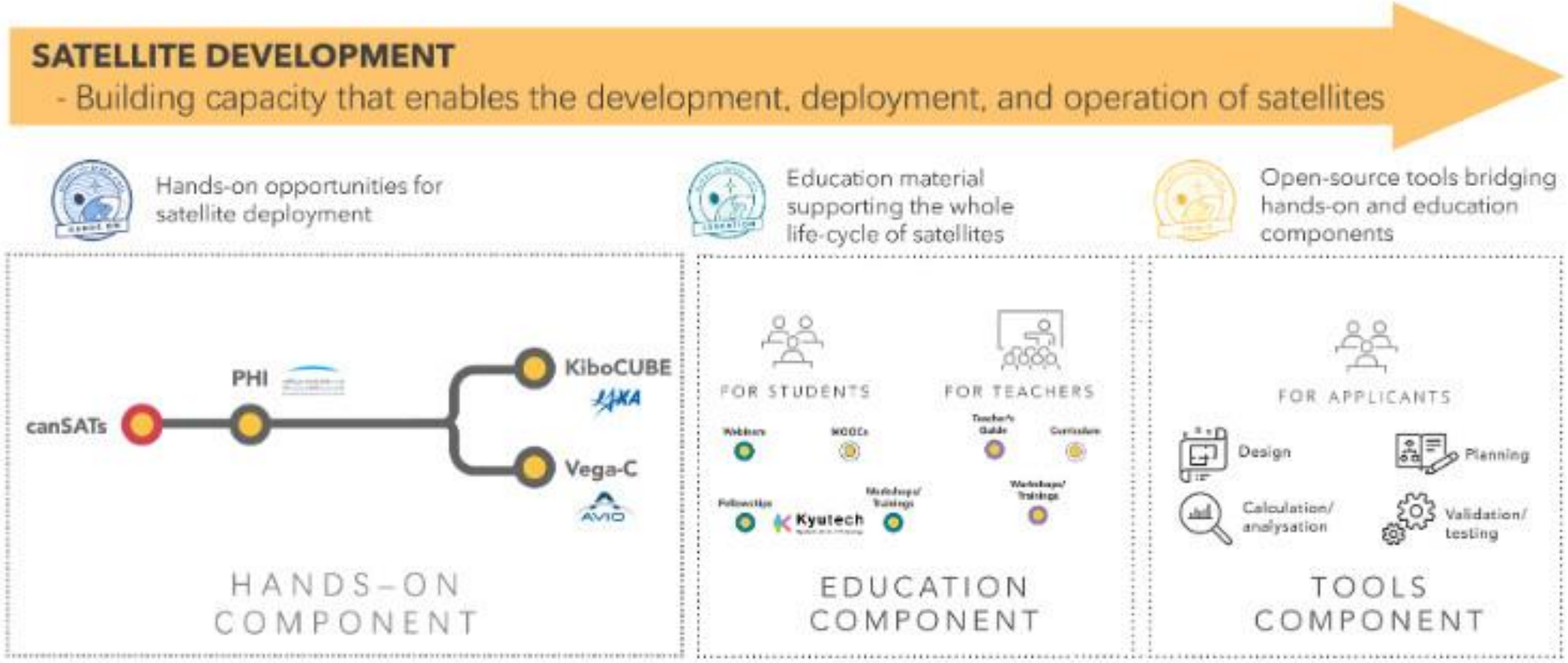
- CubeSats offer a **large variety of applications**
- CubeSat development can be the **first step for a country in the acquisition of the skills and know-how needed to develop a space programme**
- CubeSats are **affordable to develop** and represent an **achievable entry point to space activities**.



Access to Space for All
Satellite Development Track

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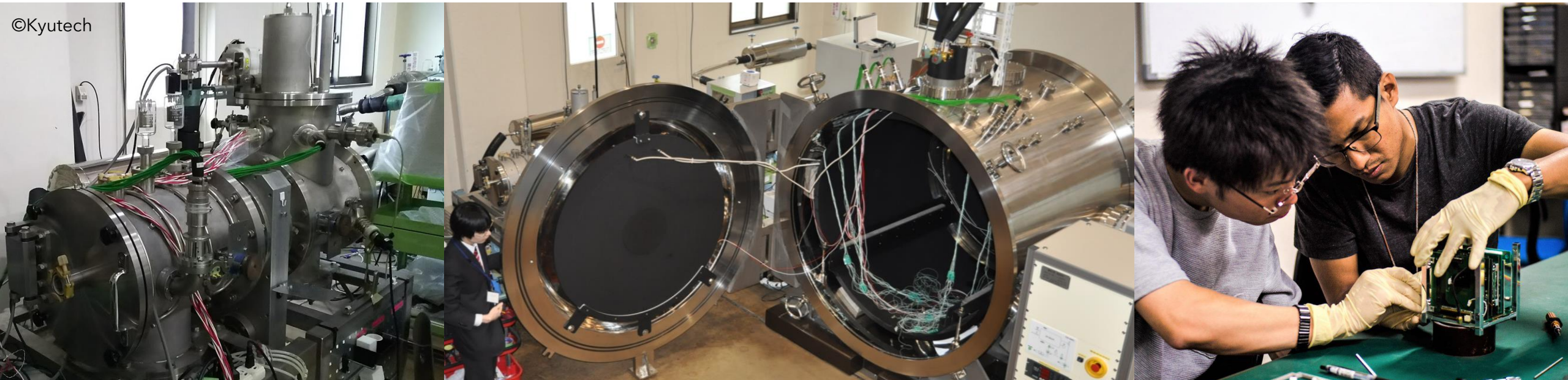
Post-graduate Study on Nano-Satellite Technology (PNST)

MEXT MINISTRY OF EDUCATION, CULTURE, SPORTS, SCIENCE AND TECHNOLOGY-JAPAN

Kyutech
Kyushu Institute of Technology

- Partner: Kyushu Institute of Technology (Kyutech) with the support of the Gov. of Japan (MEXT)
- Established: 2013
- Provides **3 students in the Master's Programme (2 years duration) and 3 students in the Doctoral Programme (3 years duration)** to enroll in Kyutech's **Space Engineering International Course (SEIC)** for a **hands-on, extensive research opportunity in nano-satellite systems through the use of the nano-satellite development and testing facilities** available at Kyutech.
- The selected fellows are expected to return to their home counties upon completion of their studies and contribute to their countries using the experience and knowledge gained from the programme.
- **Will be open for applications in late fall 2023!**



Access to Space for All
Satellite Development Track

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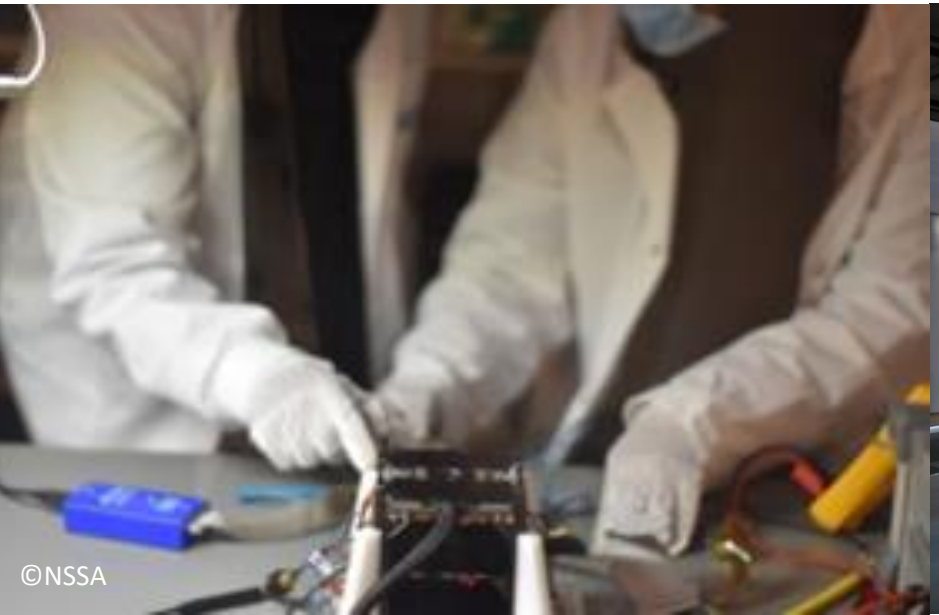
Payload Hosting Initiative (PHI)

مـــــركز محمد بن راشد للـــــــفضـــــــاء
MOHAMMED BIN RASHID SPACE CENTRE

- Partner: Mohammed Bin Rashid Space Centre (MBRSC)
- Established: 2021
- Aims to provide opportunities for **hosting a payload (up to 5U) on a 12U PHI modular satellite platform** developed by MBRSC.
- The first round was awarded to 2 teams from Bahrain and Nepal in October 2022. Bahrain will test communication between the satellite and the ground station/Internet of Things (IoT) terminals. Nepal will study the operation of middleware for drones in space.
- **Will be open for applications in late fall 2023.**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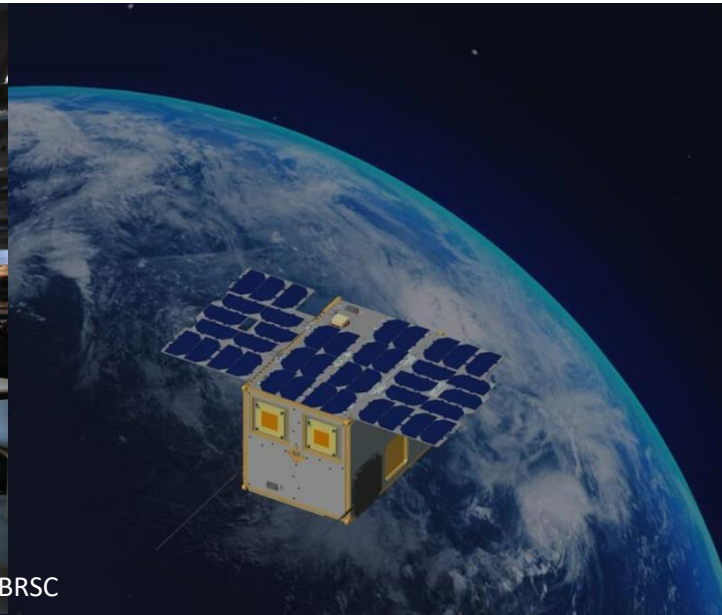
©MBRSC



Access to Space for All

Satellite Development Track

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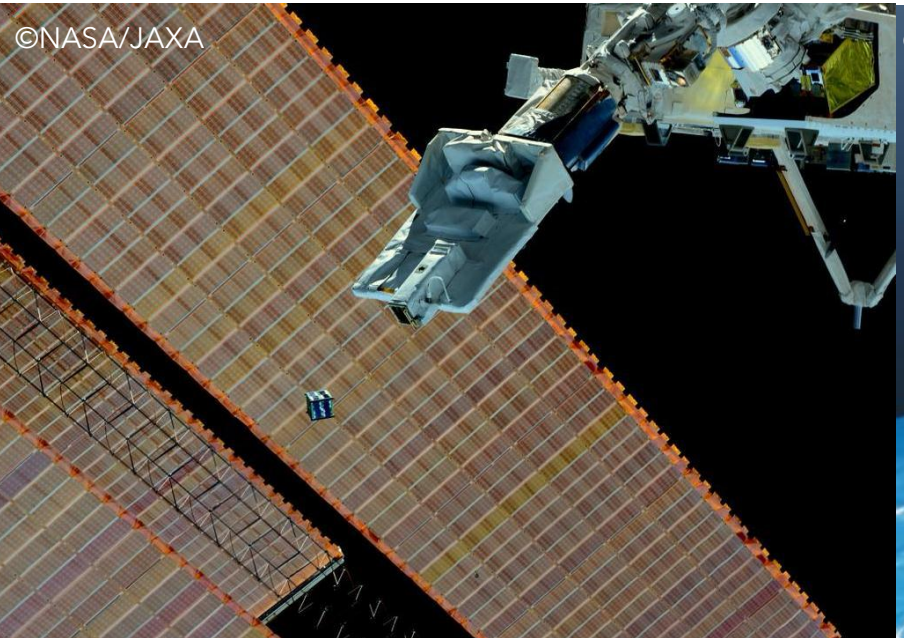
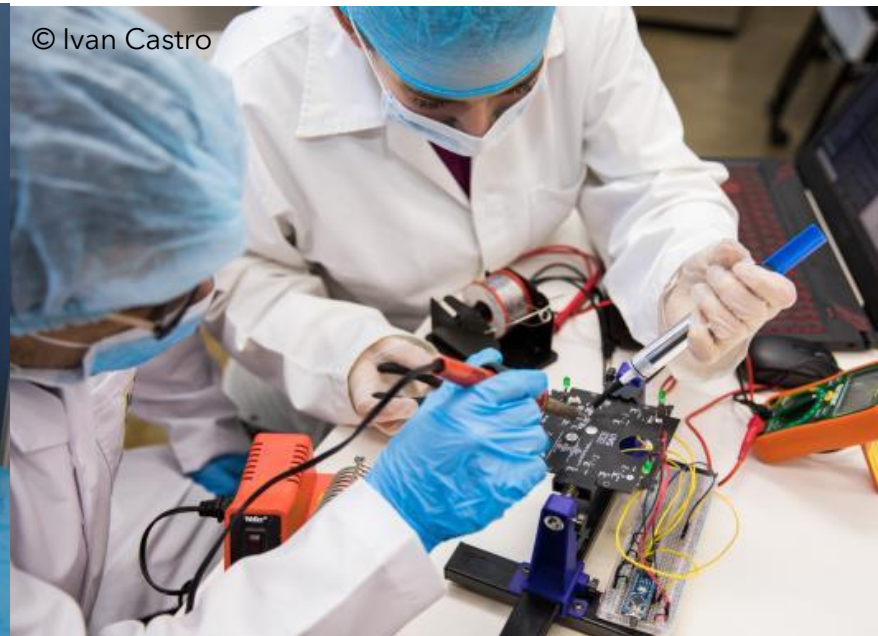
KiboCUBE

- Partner: Japan Aerospace Exploration Agency (JAXA)
- Established: 2015
- Aims to provide educational or research institutions from developing countries with opportunities to **deploy 1U CubeSats from the Japanese Kibo module of the International Space Station**
- 5 CubeSats have been deployed; the first satellite of Kenya:"1KUNS-PF" in 2018, Guatemala: "Quetzal-1" in 2020, Mauritius: "MIR-SAT 1" in 2021, Moldova: "TUMnanoSAT" in 2022, and Indonesia: "SS-1".
- 3 CubeSats are under development in the Central America Integration System (SICA), Mexico, and Tunisia.
- **Will be open for applications in June 2023!**





Access to Space for All
Satellite Development Track

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KiboCUBE Academy

KiboCUBE Academy is an online educational series that aims to provide **theoretical knowledge to develop, operate and utilize small satellites.**
https://www.unoosa.org/oosa/en/ourwork/access2space4all/SatDevTrack_Webinars.html#Tag5

JAXA

UNISEC
University Space Engineering Consortium

No.	Contents of Pre-Recorded Lectures
1	Introduction to Small satellite mission and Utilization
2	CubeSat for Capacity Building
3	Introduction to CubeSat Project Management
4	System Engineering for CubeSat
5	Introduction of J-SSOD and Safety Review process
6	CubeSat design for safety requirements
7	Introduction to CubeSat technologies
8	Subsystem Lecture for CubeSat (Power control system)
9	Subsystem Lecture for CubeSat (Communication system)
10	Subsystem Lecture for CubeSat (Command and Data Handling system)
11	Subsystem Lecture for CubeSat (Structure system)
12	Subsystem Lecture for CubeSat (Mechanism system)
13	Subsystem Lecture for CubeSat (Thermal control system)
14	Subsystem Lecture for CubeSat (Attitude Control System)
15	Introduction to CubeSat Environmental Testing
16	Orbit Dynamics of CubeSat
17	Introduction Operation technics and ground system
18	Introduction Payload for CubeSat
19	Satellite operation and Related Regulations (ITU etc.)
20	Space debris problem and Countermeasures
21	Lessons & Learned for CubeSat mission

Access to Space for All

Satellite Development Track

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Vega-C

- Partner: Avio S.p.A.
- Established: 2018
- Aims to provide educational and research institutions with opportunities to **deploy a CubeSat of maximum 3U size using the Vega-C launcher**
- The first round was awarded to a consortium led by the University of Nairobi in Kenya, joined by the University of Arizona from the United States of America and the non-profit organization Space Trust. The CubeSat will be used to demonstrate technologies, such as an inflatable antenna.

©Avio

Access to Space for All
Space Exploration Track

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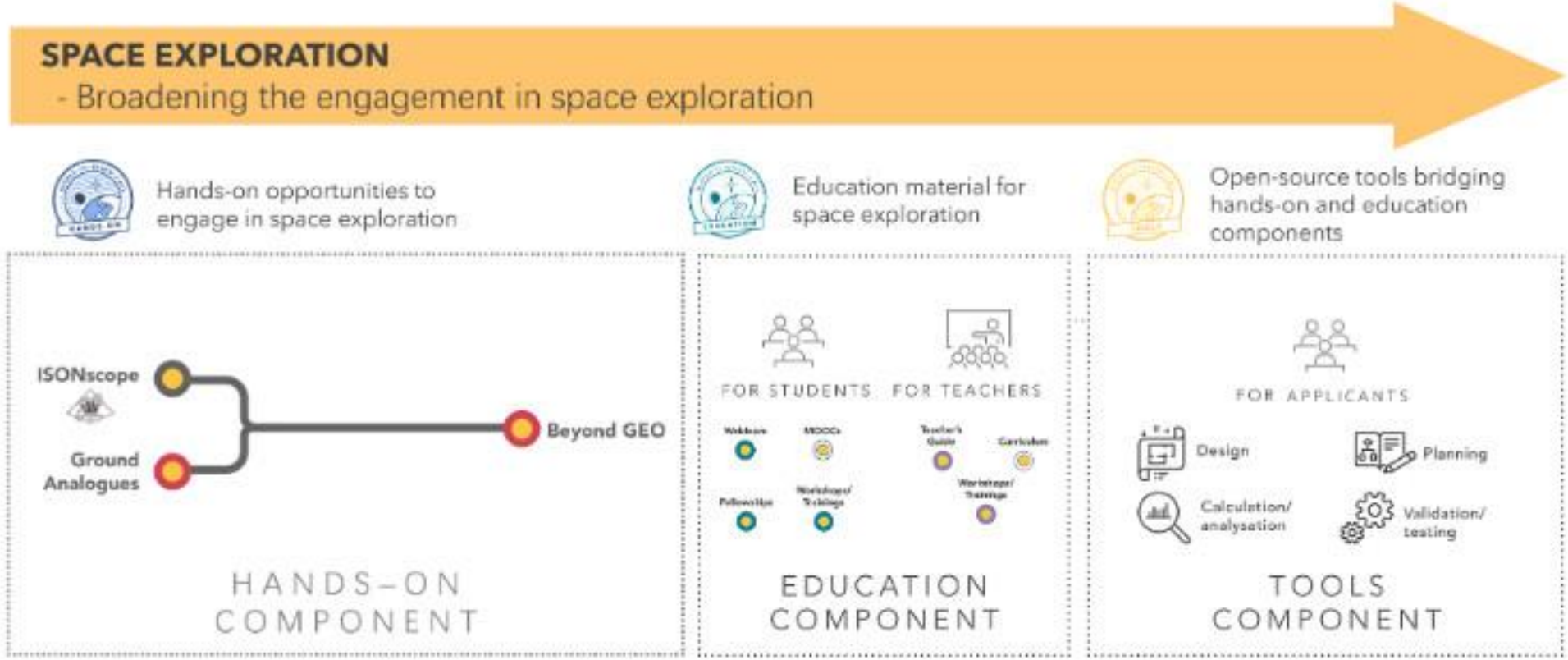
- Increasing capability in astronomy/observation and space data analysis can **deepen scientific knowledge and support necessary technology** for monitoring space debris, managing space traffic, and future exploration beyond GEO
- Space exploration can **motivate the young generation** who are the leaders of tomorrow
- Space exploration is an international effort and it can **foster international cooperation**



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Space Exploration Track

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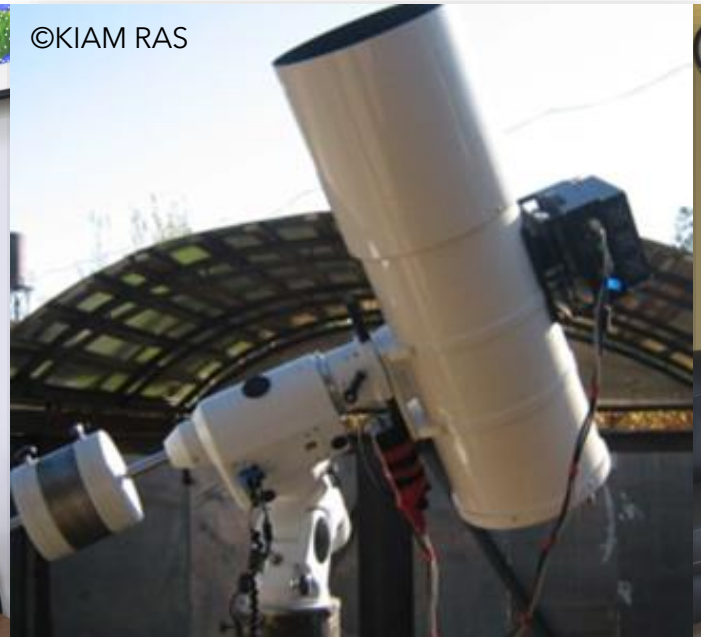
ISONscope

- Partner: Keldysh Institute of Applied Mathematics, Russian Academy of Sciences
- Established: 2020
- Aims to **provide a small wide field-of-view telescope to educational or research institutions from developing countries**
- The cooperation is under the International Scientific Optical Network (ISON) and awarded teams are expected to contribute to the observation campaigns of ISON.
- The first round opened in 2021 and 2 African countries, Kenya and Nigeria have been selected.


©Kenya Space Agency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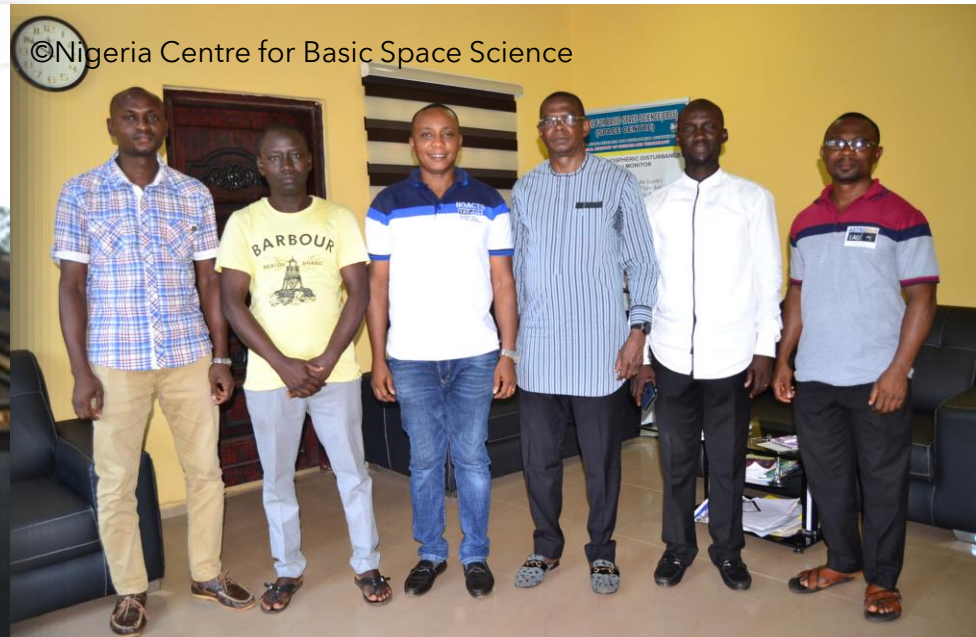

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Access to Space for All

Partnerships

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SPACE AGENCIES

CMS · DLR · esa · JAXA · Mohammed Bin Rashid Space Centre

RESEARCH INSTITUTIONS AND UNIVERSITIES

Kyutech Kyushu Institute of Technology · ZARM

PRIVATE SECTOR

AIRBUS · AVIO · SIERRA SPACE

17 PARTNERSHIPS FOR THE GOALS

We are looking for…

- **On-ground and on-orbit experiment opportunities**
- **Sub-orbital, parabolic and balloon flight opportunities**
- **Launch opportunities for CubeSats/hosted payloads**
- **Access to infrastructure and provision of scientific tools**
- **Fellowships/internships** for students/professors from developing countries
- **Educational content**
- **Open-source cost-free software and tools**

Any questions?

Contact us

unoosa-access-to-space@un.org

Help us help

#AccSpace4All

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