



UNISEC-Global The 20th Virtual Meeting

April 16, 2022, 22:00-24:00
(Standard Japan time GMT +9)

Host: UNISEC-Global Secretariat
April 16, 2022
Time: 22:00 - 24:00 (JST)

Theme:
Space Capacity Building for Sustainable World

Moderator: **George Maeda**, Kyushu Institute of Technology

OPENING REMARKS
Shinichi Nakasuka, The University of Tokyo

PRESENTATIONS
Masahiko Yamazaki, Nihon University
Topic: Introduction to HEPTA-Sat training
Sibel Turkoglu, Istanbul Technical University
Topic: CLTP-8 Experience
Omar Ben Bahri, Taif University
Topic: CLTP-6 Experience
Willy Cabañas, Central American Association for Aeronautics and Space
Topic: CLTP-1 Experience

BREAKOUT SESSION
All Participants
Moderator: **Nate Taylor**, UNISEC-Global

ANNOUNCEMENT & CLOSING
Rei Kawashima, UNISEC-Global
and those who have announcements

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The following report was prepared by UNISEC-Global Secretariat
April 16, 2022.
Japan

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1. Announcement on J-CUBE Seminar

George Maeda, Kyushu Institute of Technology

J-CUBE is not to be confused with KiboCUBE

JAXA+UNISEC, low-cost opportunities	JAXA+UNOOSA, zero-cost opportunities
<p>The program has two categories:</p> <ol style="list-style-type: none">① one is construction of international collaborative relationships,② another is for domestic capacity building. <p>Both categories require Japanese partners (UNISEC-Japan's universities, institutes, and technical colleges) for small sat development.</p> <p>J-CUBE winners secure a low-cost launch opportunity 12U/per year (or 6 satellites/per year). The satellite size is assumed to be 1~3U.</p>	
<p>J-CUBE: http://unisec.jp/serviceen/j-cube</p>	<p>KiboCUBE: https://www.unoosa.org/oosa/en/ourwork/access2space4all/KiboCUBE/KiboCUBE_Index.html</p>

Pictured: J-Cube Seminar announcement by Maeda sensei

Highlights:

- A new collaboration between JAXA and UNISEC
- Supports emerging nations for low cost CubeSats launch to Low Earth Orbit (LEO)
- J-Cube should not be confused with KiboCube
- J-Cube is JAXA and UNISEC's low cost opportunity for launches
 - First category: international collaboration
 - Second category: domestic capacity building
 - Both category require Japanese partners
- Winners of J-Cube will secure a low-cost launch opportunity 12U/per year
- 6 satellites/per year
- KiboCube and J-Cube use both JSSOD on the ISS to deploy the satellite
- KiboCube:
https://www.unoosa.org/oosa/en/ourwork/access2space4all/KiboCUBE/KiboCUBE_Index.html
- J-Cube: <http://unisec.jp/serviceen/j-cube>
- Series of Webinars: J-Cube
 - First on April 21, 2022 7 PM JST
 - Second on June 22, 2022 9 AM JST

2. Opening Remarks

Prof. Sinichi Nakasuka, The University of Tokyo

Prof. Nakasuka graduated with a Ph.D. in Aeronautics and Astronautics at the University of Tokyo. His main research is on astrodynamics and artificial intelligence. He had joined a computer manufacturer and became involved in research around Artificial Intelligence and automated manufacturing. He became a lecturer at the University of Tokyo in 1990. He has been a professor at the Department of Aeronautics and Astronautics since 2004. He has led the students in his lab, ISSL (Intelligent Space Systems Lab) in developing CubeSat and small satellite. He has been one of the pioneers of small satellite development.



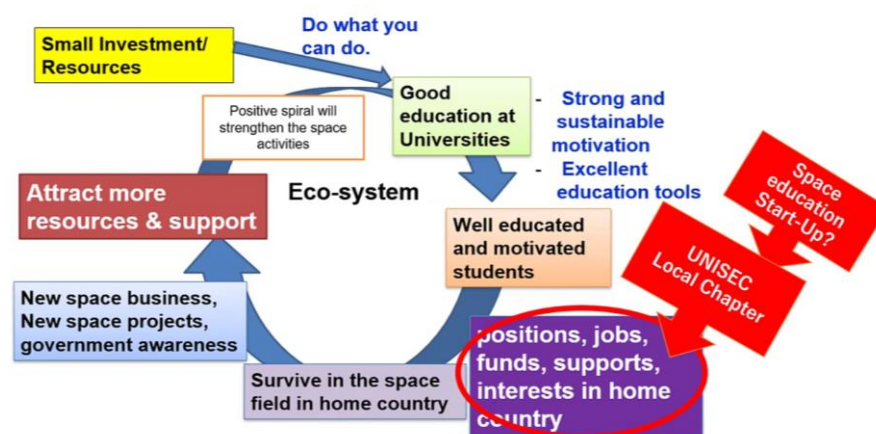
Pictured: Prof. Shinichi Nakasuka giving the opening remarks for 20th UNISEC Global Virtual Meeting

Highlights:

- Many global problems including global warming, earthquakes, tsunamis
- Situation seems to be getting worse
- UNISEC Global Community is growing
 - Kazakhstan and Colombia are welcome this month
- UNISEC's Vision 2030: Practical space projects in all countries
- What can we do when we achieve the goal 2030?
- Such global problems can be monitored by nano-satellite constellation operated by many countries
- Merits of universities for developers of satellites
 - Universities work for even non-profit satellite
 - New student intake every year who can/want to work on satellites
 - UNISEC can monitor problems in the next 10 years or so
- What is needed for successful constellation mission
 - Issues to be considered
 - System integration fabrication and operation
 - Reliable data and analytical methods
 - Finance and Legal
 - Strategy
 - There is also need for capable human resource
 - Engineers, scientists, lawyers, finance experts, enthusiasts, designers
 - People with passion and guts
- Education is indispensable
- Mission Idea Contest 8 (MIC8) next year
- Pre MIC-8 will be held in Istanbul on October 19, 2022
 - Abstract submission: July 25, 2022
 - Notification: August 31, 2022
 - Website: <http://www.spacemic.net/index.html>
- Requirements include
 - Mission carried out by multiple satellites of 6U CubeSat or smaller
 - Number of satellites are arbitrary
 - Constellation and Formation Flying (FF) are encouraged
- Every country/region needs space experts to lead space programs
- Key principle for Sustainable Development (UN): No one will be left behind

- Gap between space fairing and non-space fairing will be reduced by human resource development
 - Space fairing countries should support
 - Such as in the framework of UNISEC-Global
- Education is indispensable
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- Key principle for Sustainable Development (UN): No one will be left behind
- Gap between space fairing and non-space fairing will be reduced by human resource development
 - Space fairing countries should support
 - Such as in the framework of UNISEC-Global
- Local chapter can be center of training in the region
 - Can be done by joining training programs (Easy)
 - Training programs include CLTP, HEPTA-Sat, CanSat
 - Launch first CubeSat (Not Difficult)
 - BIRDS project, KiboCube, J-Cube
- Activities need to be planned properly for long-term continuity
- Who should pay for local chapter activities?
 - Government (Agencies, Higher Education for Science and Technology)
 - Industry (CSR, Collaborative Research)
 - Academic funds (Professional Training, Fund Raising)
- Need to establish a positive ecosystem
 - Small investment in training and good education at teaching institutions
 - Increases number of better students
 - They then form new startups/businesses and creates awareness in government
 - Attracts more resources and support
 - Then that supports education
 - Positive cycle can thus be established
- Final message: From zero to one, then step by step

Eco-system Model of University Space activities



Pictured: Prof. Nakasuka explains how to move into a virtuous cycle for sustainable space development

3. Presentation on “Introduction to HEPTA-Sat Training”

Masahiko Yamazaki, Nihon University

Dr. Masahiko Yamazaki is an assistant professor at Nihon University College of Science and Technology in the Department of Aerospace Engineering. Dr. Yamazaki heads the Miyazaki Laboratory which developed HEPTA-Sat kit that is being used for UNISEC's annual CanSat Leadership Training Program (CLTP). His research field is in science education, educational technology, mechanics and mechanics and aerospace engineering. He is also a member of American Institute of Aeronautics and Astronautics (AIAA).



Pictured: Dr. Yamazaki provides information on HEPTA-Sat and how it can be the first step towards space engineering

Highlights:

- Space industry needs radical collaborations among diverse sectors
- Practical knowledge can help collaboration to understand difficult elements in a space system
- Documentation and handling is not sufficient along with human resource in universities
- Therefore, difficult to pass concept and management methods of design development
- HEPTA-Sat training aims to reduce that gap through hands-on activity
 - People from different backgrounds gain necessary skills and knowledge on satellites
 - People new to the field can build an entire system and go through entire process
- Over 600+ trainees around the world with 53 countries delivered with 10 host countries since 2012
- Annual training program for instructors (CLTP)
- Online hands-on workshop through UNISEC-Academy
- Three steps of HEPTA-Sat training
 - Step 1: CubeSat system assembly, integration and test with textbook
 - Step 2: Problem and project based learning with HEPTA-Sat Bus
 - Step 3: Visualization of system design and development
- HEPTA-Sat simulates actual satellite-to-ground satellite communication experience
- HEPTA-Sat Bus consists of
 - Structure for support
 - Electrical Power Supply for producing, storing, checking, and controlling power
 - Command & Data Handling Subsystem for data handling and commanding
 - Communication and Ground Station for communication
 - Sensor for sensing and collecting data
- HEPTA-Sat features include
 - GPS receivers
 - Sensors: cameras, thermal sensors, 9-axis sensors

Three Steps of HEPTA-Sat Training Program

Step1 : CubeSat System Assembly, Integration and Test with Textbook.

- Understand the functional and physical elements and their relationships.

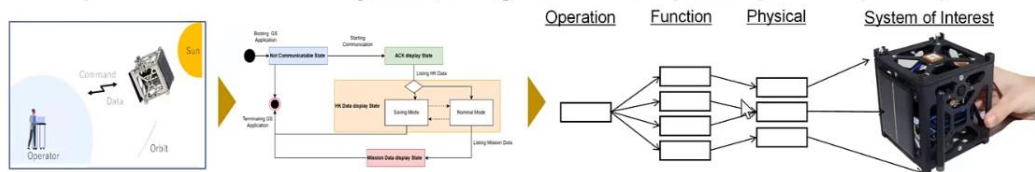


Step2 : Problem and Project based learning with HEPTA-Sat Bus

- Understand the relationship between operational, functional, physical point of view and there relation with design & development.



Step3 : Visualization of system, design and development process(MBSE)



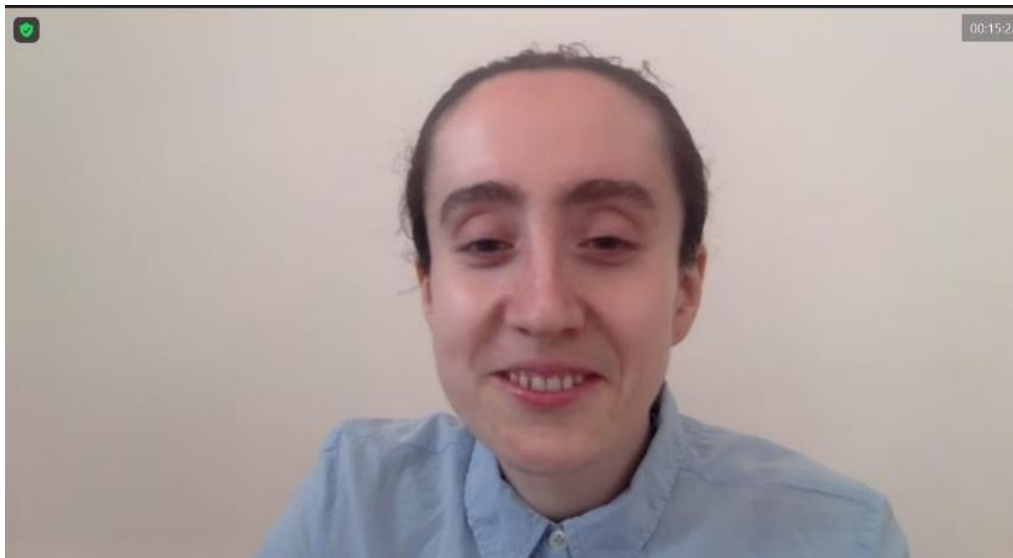
Pictured: Dr. Yamazaki explaining the three step process of HEPTA-Sat Program

- (Features cont.)
 - User board
 - Access ports
 - Antenna
 - 3D printed structure
 - Solar cell
 - Release detection switch
 - Flight switch
- HEPAT-Sat self-learning environment include
 - Textbook with all the relevant information
 - Open-source library and forum for codes, discussions and debugging issues
- The training provides easy access to space for newcomers requiring only internet and laptop
- Exploring HEPTA-Sat training steps
 - STEP 1: Using the textbook and understand functional and physical elements
Hands-on from component to sub-system to full system level
 - STEP 2: Understand operation and functional aspects of satellite by going through all process
Hands-on from Mission Definition Review to Flight Model to Launch
 - STEP 3: Visualization of entire system, design and development
Create verification matrix, use scenarios, block diagrams and apply V-chart
- Provides a good interface to connect students with current technologies
- Future work: would like to conduct earthquake prediction and tsunami early warning using swarm CubeSat
- CLTP is a training for teachers, professors and professionals that allows them to teach about space engineering to students
- CanSat Leader Training Program (CLTP) 11: <http://cltp.info>

4. Presentation on “CLTP-8 Experience”

Sibel Turkoglu, Istanbul Technical University

Sibel Turkoglu is a PhD candidate in the Program of Aerospace Engineering of Graduate Institute of Science and Technology at Istanbul Technical University (ITU). She received her MSc degree from the same program in 2015 and graduated as an Aerospace Engineer from the Astronautical Engineering Department of ITU Faculty of Aeronautics and Astronautics in 2012. She is currently working as a Research Assistant in the Space Systems Design and Testing Laboratory of ITU (ITU-SSDTL). She has been working in the ITU-SSDTL since 2014 and participated in 3 nanosatellite projects (two of them called BeEagleSat and HavelSat which are both in EU FP7 QB50 project and the other called ASELSAT).



Pictured: Sibel giving presentation about her CLTP-8 experience in Japan

Highlights:

- Attended CLTP-8 in 2017 at Nihon University in Chiba, Japan
- First group to work with HEPTA-Sat
- Online lecture series first
 - CanSat and CubeSat missions and sub-systems
 - Tests and safety standards
 - Provided necessary background information to a diverse group of students
- During CLTP
 - Textbooks and HeptaSat kits
 - Day 1-4
 - Main satellite sub-systems, functions, and architecture
 - Assembly, integration, and testing
 - Satellite structure and fit checking
 - Mission selection done
 - Day 5-8
 - Mission designed
 - Integration of new payloads
 - Mission selected by the speaker was GPS and magnetometer
 - Coding done
 - Drone testing and final fit check with a parachute
 - Thermal testing and Critical Design Review presentations before launch
 - Launching and receiving data

- Day 9-10
 - Mission data analyzed
 - Final presentations and conclusions done successfully
- After CLTP
 - Confidence to build a whole CubeSat
 - Provided assistance to juniors and organized CanSat boot camps in Lebanon
 - CLTP allowed the speaker to help more than 200 students with their first CanSat/Satellite projects
- Valuable experience through learning and then teaching



Pictured: Day 8 activity of the CLTP-8

5. Presentation on “CLTP-10 Experience”

Timothy Kudzanayi Kuhamba, Kyushu Institute of Technology

Timothy Kudzanayi Kuhamba did his graduate studies in Communication Engineering and used to work as a Spectrum Management Engineer at the Broadcasting Authority of Zimbabwe. He is currently a research student at Kyushu Institute of Technology and is involved with the BIRDS-5 constellation satellite project which is also building his country's first satellite.



Pictured: Timothy sharing his experience of CLTP-10

Highlights:

- Student at Kyushu Institute of Technology and currently building Zimbabwe's first satellite through BIRDS-5
- CLTP-10 had fourteen participants and used HEPTA-Sat developed by Prof. Yamazaki
- 12 Days of program from project management to mission implementation
- Team had a team leader and subleader along with teaching assistant
- Focused on team work and team building
- Timothy's team worked on a fire monitoring mission
- Lessons learnt
 - Project, schedule, risk, team, cost management along with system engineering
 - A stepping stone for students wanting to build a space system in the future

HEPTA Sat training consisted of four parts

- Design Subsystems
- Integration and Test
- Conceptualise and Practice
- Teaching Practice



Pictured: Timothy was trained using the HEPTA-Sat kit at CLTP-10

6. Presentation on "CLTP-1 Experience"

Willy Cabañas, ACAE Guatemala

Willy Cabañas is the president of Central American Association for Aeronautics and Space (ACAE). The non-profit organization is located in Guatemala. His interest areas are on all aspects of small satellite technology. He participated in the first CLTP back in 2011.



Pictured: Willy sharing his experience of the first CLTP program that was conducted in 2011

Highlights:

- Challenge to promote space program in developing countries of Central America,
- Challenge to conduct CanSat international competitions
- Lack of resources and need governmental support
- After CLTP-1, it built a dream in the mind to launch the first Quetzal-1
- Paradigm of no research, no development which leads to no resources
- Break the cycle through CLTP-1 through CanSats
- March 2011 at Wakayama University
 - Mission, planning, designing, testing and launching
 - Entire process in a short period of time
- Field testing of CanSat using rockets
- Homework for satellite development inside Guatemala
 - University students through cansat training
 - Attend CanSat competition
 - Private sector (Astrotechnologies), media and government involvement
- Conferences in 12 universities
- First Guatemalan satellite Quetzal-1 was launched through the KiboCube Program
- Quetzal-1 was a result of collaboration between national and international partners
- Space research and collaboration requires a lot of hard work but necessary
- Promotion through media is important for outreach
- Continuity is a must for sustainable space development

7. Presentation on “CLTP-6 Experience

Omar Ben Bahri, Taif University

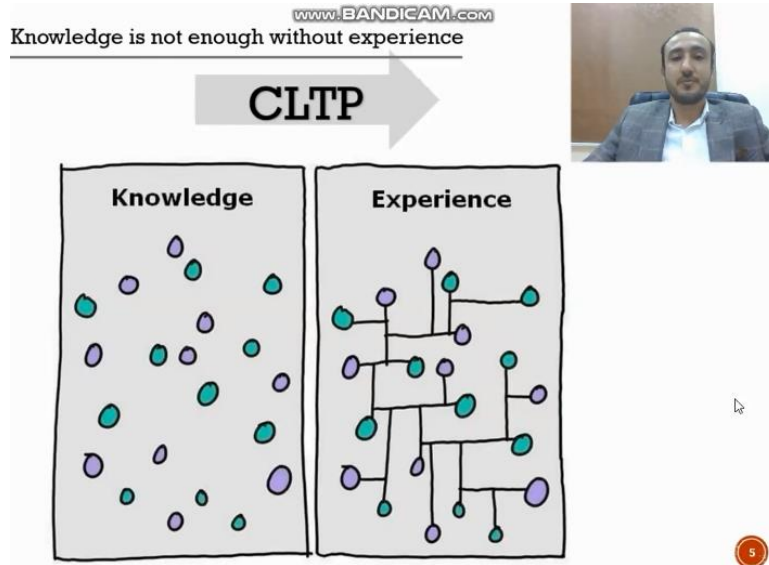
Dr. Omar Ben Bahri has been the Assistant Professor at University College of Ranyah, Taif University since 2019. He earned his doctoral degree in 2018 from University of Monastir. He received his Masters in Micro-Nano Electronics from the same university. Development of pico-satellite around mobile OS programming was the main objective of his research



Pictured: Dr. Bahri sharing his experience of CLTP-6

Highlights:

- Learned the basics of entire satellite including communications, soldering, tests and so on
- CanSat projects have gained popularity because it gives all the necessary learning tools
- CanSats allow hands-on practice before working on a real project
- Rocket preparation and launch was done at Uematsu Electric Co Ltd.
- Knowledge without experience is not good enough
- I encourage to everyone to participate in CLTP if possible



Pictured: Dr. Bahri explains that CLTP allowed this knowledge to become structured through experience of the program

8. Breakout Discussion and Sharing

Moderator: Nate Taylor, UNISEC-Global

UNISEC GLOBAL
University Space Engineering Consortium

UNISEC-Global The 20th Virtual Meeting Breakout Discussion

- I. Brainstorming: (25 mins)
 1. Discuss how space technology contributes to a sustainable world and select one topic (such as wildfire, deforestation, flood, global warming, etc.) to focus on
 2. Brainstorm what kind of space capabilities should be developed (or are required) to find solutions to the topic
 3. (optional) Propose capacity-building methods to accelerate the solutions

After closure of Breakout session (15 mins)

- II. Group **speaker** shares discussion: 1 minute to summarize your discussion (timer on-screen).

Pictured: Meeting breakout discussion for the 20th Virtual UNISEC Global Meeting

Highlights:

- 25 minutes Mission idea exercise is divided into 6 groups
- Discuss how space technology contributes to sustainable world, select a topic and focus
- Brainstorm on what kind of space capabilities can be developed
- Propose a capacity building method to accelerate the solution

Group	Speaker	Highlights
Room 1	Charleston	<ul style="list-style-type: none"> - Satellite can be used to monitor food security - That can be done by analyzing satellite data - Ecosystem of trained engineers in local economy - To sustain this initiative, need to train engineers in local government - Global startup for education of all stakeholders
Room 2	Ahmed	<ul style="list-style-type: none"> - Water scarcity is the target - Monitored through CubeSats - Data is analyzed and the government should provide solution - Capacity building: Academia involvement where students work with the industry to propose the solution for water scarcity - More students can be involved and problem can be solved
Room 4	Toshi	<ul style="list-style-type: none"> - Global warming and wildfire - Sustainable development satellite can play a big role, especially CubeSat - Sensor technology needs to be developed - Sharing vision with non-space related people - VR can be used to spread awareness - AI can also be used - A lot of parallel development need to take place for sustainable development
Room 5	Timothy	<ul style="list-style-type: none"> - Deforestation is the selected challenge - Energy challenges are there - Lack expertise, regional block can come to work together - CubeSat-level university collaboration for solution - Capacity building: primary school MCU, development module
Room 6	Satoru	<ul style="list-style-type: none"> - Forest management, food (rice, fish) - Capability: Developing countries need everything - Satellite building but importantly, how to use data? - Development of software that is easy to use - Many free images, how to use this information is the challenge
Room 7	Alvin	<ul style="list-style-type: none"> - Predictive models to create actionable items - Access to programs and technology - Spread awareness why space is needed in today's world - From elementary to school all the way up - Budget increase from government side
Notes	Nate	<p>Keywords: Collaboration, government involvement, utilizing data,</p> <p>Consider applying to the CLTP, best way to build capacity</p>

9. New Member Acknowledgment, Announcements and Closing

Rei Kawashima, UNISEC-Global

UNISEC-Kazakhstan

- POC: Prof. **Zaure Rakisheva**
- Member Universities
 - Al-Farabi Kazakh National University (al-Farabi KazNU)
 - Zaure Rakisheva
 - Almaty University of Power Engineering and Telecommunications named after Gumarbek Daukeyev
 - Kuanysh Alipbayev

UNISEC-Colombia

- POC: Prof. **Jose Fernando Jimenez**
- Sub-POC: **Giovanna Estefania Ramirez Ruiz**
- Member Universities
 - Los Andes University
 - Jose Fernando Jimenez
 - Science Park of Social Innovation of UNIMINUTO
 - Jair Eduardo Camargo Otavo
 - Colombian School of Engineering University Julio Garavito
 - Hernan Paz Penagos & Guillermo Teuta
 - Sergio Arboleda University
 - Sergio Andrés Sánchez Sanjuán
 - EAN university
 - Andrés Felipe Guarnizo Saavedra
 - Military Aviation School "Marco Fidel Suárez"
 - Héctor Fabio Calvo Valencia

Pictured: Kawashima-san making announcements of new members of UNISEC-Global Community

Highlights:

- **New Local Chapters**
 - UNISEC-Kazakhstan POC: **Prof. Zaure Rakhisheva**
 - Al-Farabi Kazakh National University
 - Almaty University of Power Engineering and Telecommunications
 - UNISEC-Colombia POC: **Prof. Jose Fernando Jimenez**
 - Sub POC: Giovanna Estefania Ramirez Ruiz
 - Los Andes University
 - Science Park of Social Innovation of UNIMINUTO
 - Colombian School of Engineering University Julio Garavito
 - Sergio Arboleda University
 - EAN University
 - Military Aviation School "March Fidel Suarez"
- **Invitation to CLTP-11**
 - August 17-31, 2022 (TBC)
 - Preliminary Online Lectures: August 1-15, 2022 (TBC)
 - Nihon University, Chiba, Japan (TBC) and AOTS, Tokyo, Japan (TBC)
 - Application deadline: May 18, 2022
 - Online assessment test deadline: May 31, 2022
 - Notification of acceptance: June 8, 2022
 - CLTP website: <http://cltp.info/>
- **11th Nano-satellite symposium**
 - Abstract submission, 15 July 2022
 - Notification, 15 August 2022
 - Early bird, September 15, 2022
 - Full paper submission, October 3rd, 2022
 - Presentation October 17, 18, 19 (morning)
 - Website: <https://nanosat11th.itu.edu.tr/index.php>
- **Pre-MIC 8**
 - Abstract submission July 25, 2022
 - Notification August 31, 2022
 - Presentation at workshop (not contest) October 19 (afternoon)
 - MIC 8 will be held in 2023
 - In 2022, local chapters are encouraged to organize regional competitions
 - Pre-MIC8 workshop will be held in Istanbul (or virtually) in Oct 2022
 - Website: <http://www.spacemic.net/>

- **8th UNISEC-Global Meeting**
 - Local Chapter registration for presentation September 5, 2022
 - UNIGLO opening October 19, 2022
 - Local Chapter presentation and breakout session October 20, 2022
 - Local Chapter Empowerment Workshop October 21, 2022
 - Website: <http://www.unisec-global.org/meeting8.html>

- **Next Virtual Meeting**
 - Date: May 21, 2022 10:00 pm - 0:00 am (JST)
 - Theme: TBD
 - Confirmed speaker: TBD
 - Local Chapter presentation: TBD
 - Host: TBD
 - Virtual UNISEC-Global Meetings take place on the third Saturday almost every month in 2022.
 - Seeking local chapters to host the virtual meeting on
 - May 21, June 18, August 20, Sep 17, Nov 19, and Dec 17.
 - Please contact the secretariat

- **Future Planning**
 - CubeSat Developers Workshop: USA , April 26-28, 2022
 - UNCOPUOS meeting: Vienna (hybrid), June 1-10, 2022
 - Small Satellite Conference, Utah, USA: August 6-11
 - 11th CanSat Leader Training Program: August 17-31, 2022(TBC)
 - 73rd IAC: Paris, 18-22 September
 - 11th Nano-satellite Symposium, 8th UNISEC-Global Meeting
 - Pre-workshop for the 8th Mission Idea Contest (PreMIC8)
 - in person or online (TBC)
 - Oct 17-21, 2022, Turkey



Pictured: Alvin (left) and Nate (right) give their respective announcements at the end of the meeting

- **Announcement by Alvin David Gregory Tatis (Colombia)**
 - Young space company called kiwibot which aims to bring eco-friendly delivery service bots
 - Cut down cost of delivery
 - New ideas for partnership
 - Website: <https://www.kiwibot.com/>
 - Email: alvin.gregory@kiwibot.com

- **Announcement by Nate Taylor (Australia)**
 - Australian space agency has embarked on the first earth observation mission
 - AUD 1.5 billion mission
 - 16 earth observation satellites being made over next 10 years
 - First 4 will be underway in the next 12 months
 - Investigation going on for human space flight
 - Going to probably be partnered with JAXA/NASA/ESA, not sure right now
 - Moon to Mars program to send rover to the moon

UNISEC-Global Social network accounts



@unisecglobal
<https://www.facebook.com/unisecglobal/>



@unisec_global
https://www.instagram.com/unisec_japan/



<https://www.linkedin.com/groups/8982613/>

10. Participant Statistics

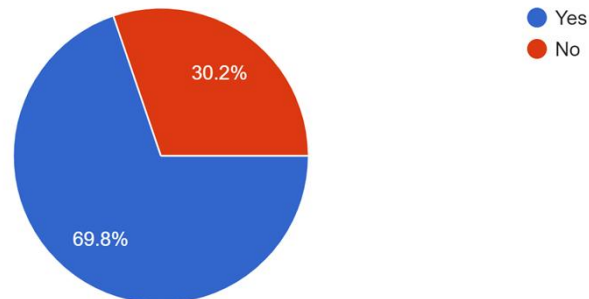
90 registered participants from 33 countries/regions participated in the 20th Virtual UNISEC-Global Meeting.

Country/Region	Number of registrants	Country/Region	Number of registrants
Algeria	1	Kenya	2
Australia	2	Lahore	1
Bangladesh	3	Nepal	3
Brazil	1	Nigeria	1
Bulgaria	2	Pakistan	12
Cameroon	1	Peru	2
Colombia	2	Philippines	6
Egypt	4	Rwanda	2
El Salvador	1	Saudi Arabia	2
Ethiopia	1	Singapore	1
France	1	Spain	1
Ghana	1	Sudan	1
Guatemala	2	Taiwan	1
India	2	Thailand	1
Japan	24	Turkey	1
Kazakhstan	3	UK	1
		Zimbabwe	1

11. Participant Questionnaire

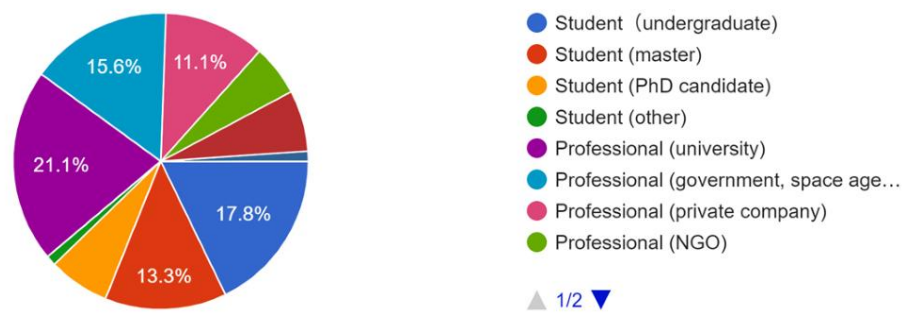
Have you participated in the UNISEC-Global Meeting previously?

86 responses



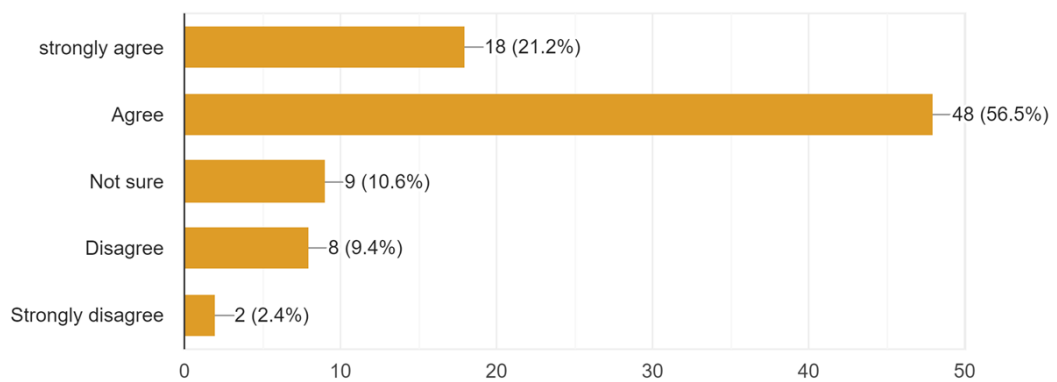
Student or professional?

90 responses



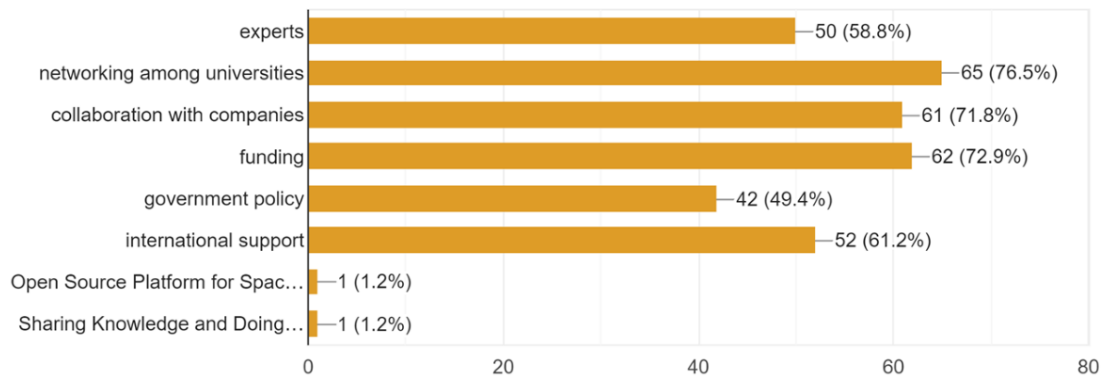
Do you agree that it is difficult to sustain space engineering education programs?

85 responses



What would help sustain the space engineering education activities? (You can select multiple options)

85 responses



Thank you