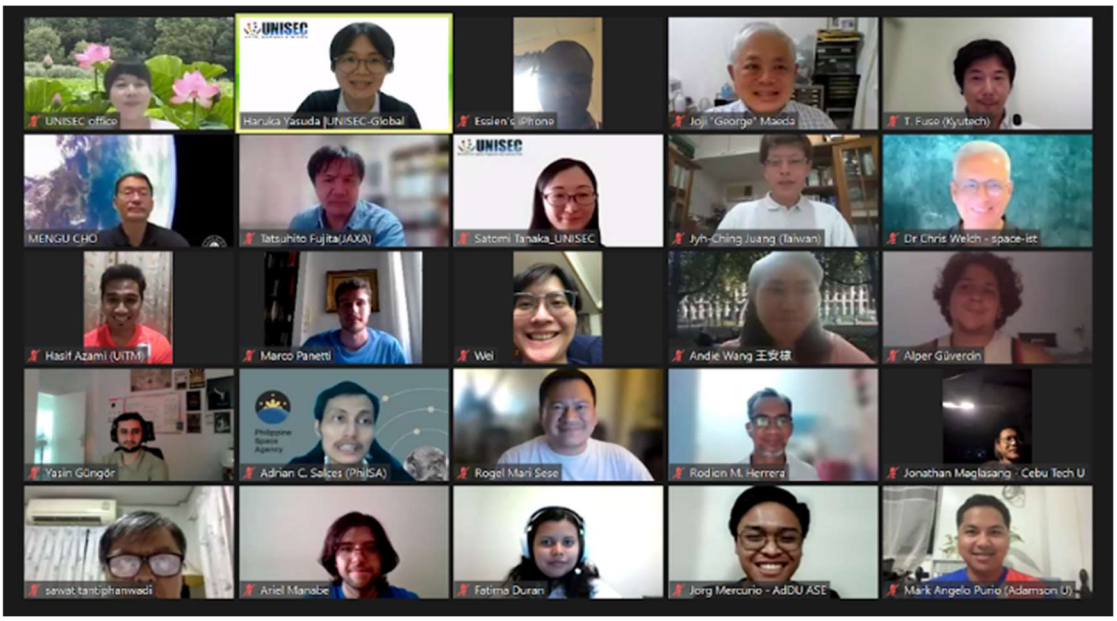
UNISEC-Global The 36th Virtual Meeting

August 19, 2023, 22:00-24:00
(Standard Japan time GMT +9)



The following report was prepared by UNISEC-Global Secretariat
August 19, 2023
Japan

Table of Content

1. Opening Remarks

Mengu Cho, Kyushu Institute of Technology

Prof. Mengu Cho received the B.S. and M.S. degrees from the Department of Aeronautics and Astronautics, University of Tokyo, Tokyo, Japan, in 1985 and 1987, respectively, and the PhD degree from the Department of Aeronautics and Astronautics, Massachusetts Institute of Technology, Cambridge, MA, USA, in 1992. From 1992 to 1995, he was a research associate with Kobe University, Kobe, Japan. From 1995 to 1996, he was a Teaching Associate with International Space University, France. Since 1996, he had been with the Department of Electrical Engineering, Kyushu Institute of Technology (Kyutech), Japan, where he was an Assistant Professor in 1996 and Associate Professor in 1997. Currently, he is a Professor and the Director of the Laboratory of Spacecraft Environment Interaction Engineering (LaSEINE) of Kyutech. He has been with the Department of Applied Science for Integrated system engineering since 2010.

Pictured: Prof. Cho giving the opening remarks

Highlights:

- CubeSat is a good platform as the first satellite but have they launched the second satellite of the country?
- Out of about 200 countries/ regions, about 40% of countries (80) own a satellite
- The time taken for technologies to reach a high market penetration takes about 35 to 100 years
- However, in the last decade, the pattern has slightly decreased
- Since satellites were introduced much later, it is predicted to reach the highest market value
- Time to reach is minimum of 20 years, can be compared to growth pattern of cars or radios
- About 35 countries launched CubeSat as their first satellites
- Kyutech contributed about 10 satellites among the 35
- CubeSat is an integral component to “democratize” space
- Countries like Finland and Switzerland have more than 20 CubeSats launched making them quite advanced
- 22 out of the 35 countries are still struggling to launch their second satellite
- Empowering such countries who are struggling and countries that are involved in space is important
- Sustainability of the CubeSats is something to be considered as well

2. Presentation on “Deployment Service of CubeSATS from ISS”

Tatsuhito Fujita, Japan Aerospace Exploration Agency

Tatsuhito Fujita is an associate senior engineer at Japan Aerospace Exploration Agency (JAXA) and is currently working for JEM Utilization Center, Human Space Development Directorate. Mr. Fujita did his undergraduate from Keio University and his Masters at International Space University. He has been with JAXA since 1992.

Pictured: Fujita-san provides an overview of JAXA's small satellite deployment program

Highlights:

- Japan Aerospace Exploration Agency (JAXA) was formed with the merge of three different institutions
- Support the Japanese governments' overall space involvement: from basic research to deployment to utilization
- CubeSat Deployment Mission
    - ISS is 400m above Earth was a huge construction
    - Aiming to advance science and technology
    - 50 countries participate in ISS
- Kibo - Japanese Experimental Module in the ISS has two modules: Pressured Module and Exposed Facility
- Missions conducted both inside and outside the modules
- Air Locks (AL) and Robotic Arm (JEMRMS) is present in the KIBO Exposed Facility
- The JEM Small Satellite Orbital Deployer (J-SSOD) deploys small satellites since 2012
- With an inclination of about 51 degrees, the deployer can deploy satellites of sizes 1U- 6U of a max. of 50 kg
- J-SSOD deploys satellite with the spring mechanism and the separation mechanism adjusted to the case
- The first successful deployment of a small satellite occurred on 4 October, 2012
- The satellite is adjusted into the airlock, the robotic arm places it in deployment position and deployed
- Ground control plays a very vital role in the success of the mission
- The JEM Payload accommodation handbook Vol 8 has a list of requirements of J-SSOD
- Regarding the safety, JAXA is responsible for the safety of JEM, visiting vehicle and other payloads

Pictured: Tatsuhito Fujita explaining the Small Satellite Deployment Process

- Safety review panel reviews the human payloads and collectively reviews risk hazards

- Implementations of risk mitigations also takes place
- Safety Review Procedure:
    - Preliminary Design: Hazard Identification
    - Critical Design: Designing of hazard elimination methods
    - Production and testing: Verifying the designed methods
    - Launching
    - On Orbit Operations
- About 72 CubeSats have been deployed from a total of about 31 countries from J-SSOD from 2012 - 2023
- Kibo also operates any satellite deployment missions of NASA or US private sectors
    - Totals to about 278 satellites deployed
- Programs of Capacity Building through JAXA:
    - J-Cube - A fee-based program to provide satellite deployment opportunities to many countries
    - KiboCube - collaboration with UNOOSA
    - KiboCube Academy - webinar and online lectures on UNOOSA Website
        - collaboration with UNISEC-Japan
- All programs contribute to the SDG goal 4,8, and 9

3. Presentation on "Introduction to J-Cube"

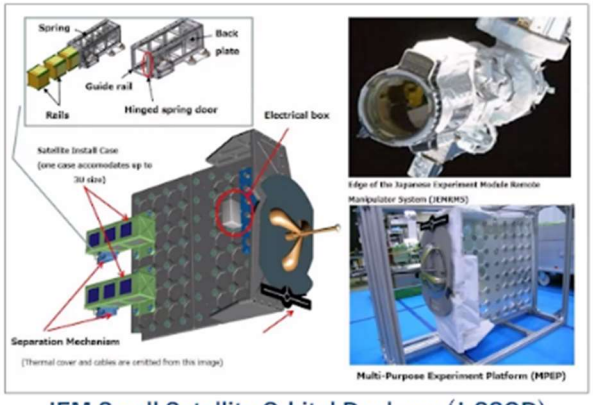
Tetsuhito Fuse, Kyushu Institute of Technology

Tetsuhito Fuse graduated Waseda University of Japan in 2002, with a BS degree in applied physics and a master's degree in the same field in 2004. He was an engineer at Japan Aerospace Exploration Agency (JAXA) from 2004 to 2022. He worked at Satellite Operation and Network System Center, and International Space Station (ISS) Kibo utilization center as a systems engineer. After working at the management department at headquarters of JAXA, he started an open-innovation activity which is called Space Exploration Innovation Hub Center and designed and promoted its system. He finished his second master's degree in Management of Technology (MOT) at Tokyo Institute of Technology (Titech) in 2020. In 2022, he began working as associate professor at Kyushu Institute of Technology (Kyutech) at the Laboratory of Lean Satellite Enterprises and In-Orbit Experiments (LaSEINE) and coordinating collaborative activities with international and domestic partners for promoting Space Engineering International Course (SEIC) program at Kyutech.

Pictured: Fuse-san provides an overview of J-Cube program

Highlights:

- Presentation focuses on how to collaboration with a Japanese University for J-Cube
- J-Cube is a collaboration between JAXA and UNISEC to help countries deploy their CubeSat
- J-SSOD deploys the J-Cube at LEO from ISS
- A reusable version of J-SSOD, known as J-SSOD-R has been introduced in March 2021
- Deal with major emerging interest in deploying CubeSat; accommodates max 24U per deployer
- J-Cube and KiboCube is different
    - **KiboCube**
        - Collaboration between JAXA and UNOOSA, no-cost launch opportunity
        - Only 1 time per year with limited selection, extremely competitive
        - Size of CubeSat is 1U max
    - **J-Cube**
        - a wider initiative curated with collaboration between JAXA and UNOOSA
        - not free but low cost
        - size can be up to 3U
- J-Cube orientation notice on 1st December, 2023 through UNIGLO on-site meeting
- Kyutech University has been one of the main collaborating faces for launch of CubeSats
    - Over 10 international launch projects conducted
- Main goals of collaboration with international participants
    - Assisting emerging countries to develop space technologies and access space
    - Being an agent of bringing diversity into space sector
    - Personal advantages to the Japanese University in each mission
- Process includes contacting individuals, meetings (remote/ in-person), exchange of statement of work
- Discussion of responsibilities, contract signing, funding, launch and operation
- UNISEC-Global meetings, IAC are good platforms for individual connections
- Collaboration continuing after project is beneficiary for global goals
- Collaboration schemes:
    - Joint development - student exchange from different background
    - Learn to work in new environment during exchanges
    - Satellite built in other countries but further inspection and studies in Japan
    - Students come from other countries to build satellite in Japan
- Student exchange - >1 year, preferably full graduate student
- Contract between foreign entity and Japanese Uni is necessary
- Contract must be legally binding covering non-military aspects, UN registration and article points dealing with currency.
- Recent CubeSat projects include:
    - Maya-5 and Maya-6 (Philippines)
    - ASEANSAT(Malaysia)
    - KNACKSAT-2 (Thailand)
    - K'OTO UNAM (Mexico)

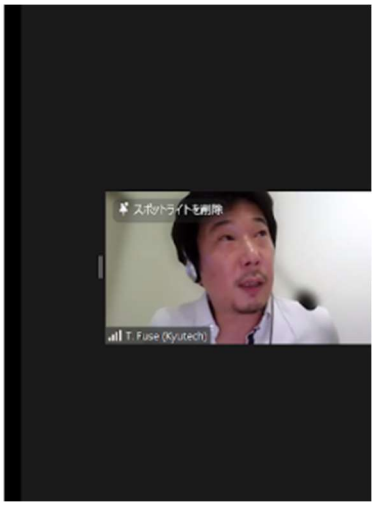


JEM Small Satellite Orbital Deployer (J-SSOD) is a mechanism for deploying small satellites. It is designed in accordance with CubeSat design specification (10cm×10cm×10cm). The satellites installed in J-SSOD is transferred from the Japanese Experiment Module Kibo's airlock to space and are released on orbit.

In order to respond the increased demands for the CubeSat deployments, a reusable satellite orbital deployer (JEM Small Satellite Orbital Deployer Re-usabla: J-SSOD-R) has been introduced in March 2021, which accommodates the maximum 24U (6U per each deployer) capability.

JEM Small Satellite Orbital Deployer (J-SSOD)

FROM: https://humans-in-space.jaxa.jp/en/biz-lab/experiment/facility/ef/jssod/



Pictured: Fuse-san explaining about J-SSOD

4. Question and Answer (Q&A) Session

Q: What is The difference between the KiboCube and J-Cube?
Mengu Cho: J-Cube is fee based and provides 1U, 2U and 3U, collaborating with Japanese University. However, KiboCube is free for launch and provides 1U capacity to be launched only for capacity building purposes. Most KiboCube winners also go to a country's first satellite whereas there are no such restrictions for J-Cube.

Q: What is the cost of J-Cube?
Satomi Tanaka: For the cost, please contact us through email: info-jcube@unisec.jp . Since this meeting will be put up in an open domain, we do not wish to disclose the number publicly.

Q: Could you explain the difference, when partnering with Kyutech, between J-Cube and BIRDS?
Mengu Cho: J-Cube originated from a similar idea of BIRDS. When we conducted the BIRDS Project, we had a special agreement with JAXA and when the purpose was to continue capacity building, JAXA opened lower launch prices. The special agreement was not just between JAXA and Kyutech but also between JAXA and other universities like University of Tokyo and Tohoku University. The agreement expired about 4 years ago and then J-Cube was launched. J-Cube inherit the idea and framework of the BIRDS Project. And hence, there is not such a major difference between partnering with Kyutech, between J-Cube and BIRDS.

Q: How do we decide whether to develop the satellite in Japan or in our country?
Mengu Cho: We have a J-Cube participant from Malaysia with us, Hasif Azami. I would like to ask him this question.

Hasim Azami: Our decision is to have a team in Malaysia so that we can also develop the environment here in Malaysia. We also have a graduate student from Kyutech, so we help them.

Mengu Cho: So yes, it basically depends on the situation. If you have enough people and support through countries but if you do not have enough staff or enough experience, then you can send students to Japan and work directly. For example, Maya-5 and Maya-6 were all made in the Philippines and for the final review and testing, they came to Kyutech and during tests, they received some trainings and hands-on experience. For KNACKSAT-2, they made all of it in Thailand. Even though I have not seen the satellite yet, I think they made it all by themselves since they have the experience and also some testing facilities. They might not need Kyutech's assistance as well. K'OTO UNAM is also made in Mexico and we are only working for the safety review of the satellite. So, overall it depends on the situation. If you're opting for a second satellite, I suggest you make it domestically and we can definitely assist for testing.

Q: Could you please give more information about student exchange? When, and how a student can apply to be an exchange student in Kyutech?
Mengu Cho: For the student exchange, not only Kyutech, but almost all the other Japanese Universities have shifted their focus on Student Exchange. One thing to be noted is that you make sure the student does not have to pay. If you do that way, the student may end up paying for the tuition fees. So, specifically for a short-term student exchange, you make of MoU between the university and the person along with the student's consent.

For full time, you can apply two ways. One is the full admission which starts about six months ago the session. Getting to the exams, taking the exams which is usually through virtual means. In such a case, the student has to pay tuition fees. However, another way is if the exchange is more advanced, if lots of exchanges happen, there is a double degree program. Actually, we have a double degree program with Thailand where students come to Kyutech for about 1 and a half to 2 years and take a double degree: one in Thailand and in Japan as well.

For a short-term exchange, I suggest a MoU which is really necessary.

Q: Should participants in J-Cube be academic or others?
Mengu Cho: We do not have such restrictions, do we, Satomi Tanaka?

Satomi Tanaka: Yes, for the international organizations, we do not have any such restrictions for any academic qualifications.

Mengu Cho: If you are from a company, that is okay but if you are just chasing for profit, no. It must contribute to capacity building/ human resource

Satomi Tanaka: I would like to add some comments that; for international organizations, you should find some Japanese academic organization who belongs to UNISEC-Japan. So, if you try to find some academic organization, you can contact us and we can help if you want.

Mengu Cho: Okay, so, the first thing is you can contact UNISEC.

Q: Can a PhD student be exchanged?
Mengu Cho: Yes, if you are an undergraduate, graduate or PhD student, you can be an exchange student but if you want an exchange program for some hands-on experience, its better you have some experience. Meaning, for an undergraduate student with a fresh mind, it can be a little difficult.

Q: Do the Japanese universities have mission proposals or we just contact and decide the mission together?
Mengu Cho: Yes, basically, the Japanese Universities may have some mission ideas. I think you just contact them and they have some ideas. I suggest you come to UNISEC Global meetings in December, meet with Japanese professors and discuss possible collaborations.

There are more than 20-30 universities that are making satellites in Japan. So, there are many possibilities. And some schools even have some very good exchange programs and some have a good capacity to accept foreign students and some are in very nice locations, which can be attractive to foreign tourists.

Q: Was PNST mentioned today?
Mengu Cho: No, but another possibility is that at Kyutech, we have the PNST, joint fellowship with UNOOSA, and we are now a prime point for the Japanese government. And it is still pending. If succeeded, we will open a call for the long-term fellowship for master and doctorate students. The application would probably open in December. Sorry, it will be very late but we have to wait for the government's decision.

5. Announcement and Acknowledgement

Haruka Yasuda, UNISEC-Global

Pictured: Yasuda-san announcing the latest updates from UNISEC

- **Change of Point-of-Contact of Nigeria Announcement**
  - Dr. Essien Ewang
    - PhD in Space Systems Engineering from Kyutech in 2017
    - Working in African Regional Centre for Space Science and Technology Education in English (ARCSSTE-E) from 2010-2014 as a researcher and lecturer
    - Has Amateur Radio Operator License
    - Satellite station operation and managed Kyutech Ground Station
    - Presently, serving as Space Systems Engineer in CSTD under NASRDA, Nigeria
- **CLTP 12 (Cansat Leadership Training Program)**
  - Program Date: August 21, 2023 - September 1, 2023
  - Venue: Nihon University, Chiba, Japan
  - 17 trainees from 13 countries
  - Website: http://cltp.info/index.html, contact info: secretariat@cltp.info

- **Mission Idea Contest (MIC8)**
  - 23 abstracts from 17 countries
  - Notification were sent to all on August 8, 2023 and 10 finalists and 2 semi-finalists
  - Full paper submissions will be October 3, 2023
  - Final presentation will be November 29, 2023 during 9th UNIGLO Meeting
  - Will be broadcasted online
  - Register here: http://www.spacemic.net/application.html, contact info: info@spacemic.net

- **9th UNISEC-Global Meeting**
  - Venue: X-Nihonbashi Tokyo, Japan, in-person event
  - November 27 - December 1, 2023
  - Collaboration with Nihonbashi Space week
  - Tentative schedule (Subject to change) :
    - Nov 27: HEPTA- Sat Workshop
    - Nov 28: Space Job fair
    - Nov 29: Keynote Speech, MIC8, Reception for 10th UNISEC GLOBAL Anniversary
    - Nov 30: Regional Report, Company Presentation, Earth Observation Data Workshop
    - Dec 01: Regional Report, Student Activity Report, J-Cube Workshop
    - Fees: TBD

- **37th UNIGLO Virtual Meeting**
    - Date: September 16, 2023 22:00 - 24:00 (JST)
    - Host: UNISEC-Taiwan
    - Moderator: Jyh-Ching Juang
    - Virtual UNISEC-Global Meetings takes place third Saturday of almost every month of 2023

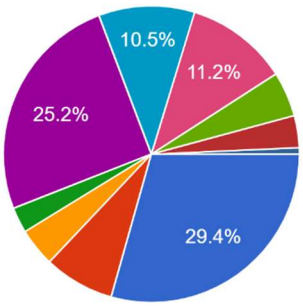
6. Participant Statistics

143 registered participants from **39** countries and regions for the 36th Virtual UNISEC-Global Meeting.

Country/Region	Number of registrations	Country/Region	Number of registrations
Argentina	1	Nepal	4
Australia	1	Nigeria	1
Austria	1	Pakistan	1
Bangladesh	6	Paraguay	4
Brazil	2	Peru	3
Bulgaria	4	Philippines	35
Burkina Faso	1	Romania	2
Chile	3	Singapore	2
Colombia	4	Taiwan	9
Egypt	5	Tunisia	2
Ethiopia	1	Turkey	5
Finland	1	UAE	2
France	4	Uganda	1
Ghana	1	UK	1
India	3	US	4
Italy	2	Zimbabwe	1
Japan	18		
Laos	1		
Malaysia	1		
Mongolia	1		
Namibia	1		

Student or professional?

143 responses

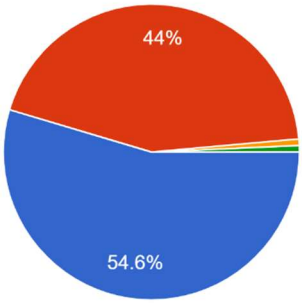


- Student（undergraduate)
- Student (master)
- Student (PhD candidate)
- Student (other)
- Professional (university)
- Professional (government, space age…
- Professional (private company)
- Professional (NGO)

1/2

Have you participated in the UNISEC-Global Meeting previously?

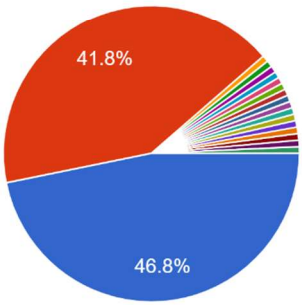
141 responses



- Yes
- No
- Yes but only once in 4 years

Have you ever considered applying to J-CUBE?

141 responses



- Yes
- No
- Already done
- I am confused about the eligibility.
- Not decided
- I intend to do so in the future
- Already did
- Let's see

1/3


Talking: Rei
UNISEC-Global Social network accounts
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https://www.instagram.com/unisec_japan/
LinkedIn
https://www.linkedin.com/groups/8982613/
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6
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Thank you