UNISEC-Global The 57th Virtual Meeting

June 21st, 2025, 22:00-24:00
(Standard Japan time GMT +9)

The following report was prepared by UNISEC-Global Secretariat
June 21, 2025
Japan

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1 CubeSat Salon

Prof. Mengu Cho & Hiroki Akagi, Kyushu Institute of Technology

Prof. Mengu Cho is the Professor and the Director of the Laboratory of Spacecraft Environment Interaction Engineering (LaSEINE) at Kyushu Institute of Technology. He received his B.S. and M.S. degrees from the University of Tokyo, Tokyo, Japan, in 1985 and 1987, respectively. Similarly, he received his Ph.D. degree from the Massachusetts Institute of Technology, Cambridge, 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 the International Space University, Illkirch-Graffenstaden, France. Since 1996, he has been with the Department of Electrical Engineering, Kyushu Institute of Technology, Kitakyushu, Japan. He was an Assistant Professor in 1996, an Associate Professor in 1997, and a Professor since 2004. He has been with the Department of Applied Science for Integrated System Engineering since 2010. His research interests include spacecraft-plasma interaction, space power system, laser application, and computational electromagnetics.

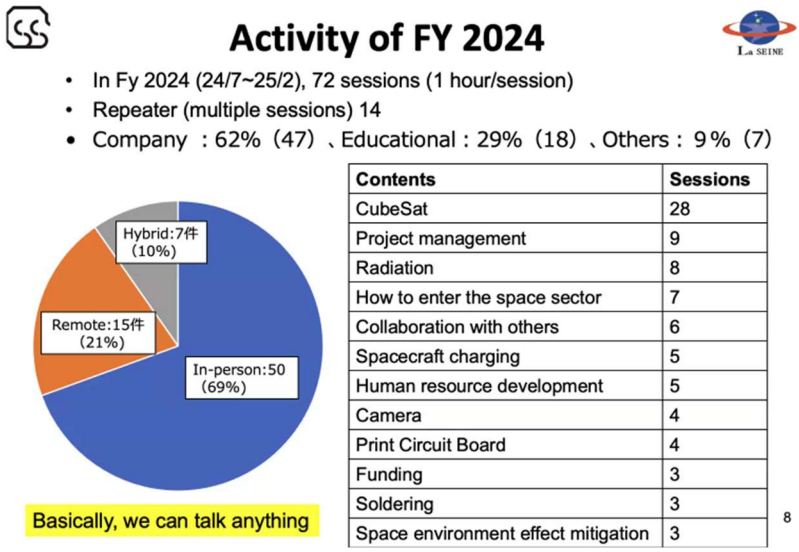
Dr. Hiroki Akagi is a Specially Appointed Associate Professor at the Laboratory of Lean Satellite Enterprises and In-Orbit Experiments (LaSEINE) at Kyushu Institute of Technology. He received his B.S. degree from the Tokyo Institute of Technology, Tokyo, Japan, in 2009. He received his Ph.D. degree from the Graduate School of Systems Design, Tokyo Metropolitan University, in 2024. From 2009 to 2025, he has been with the Japan Aerospace Exploration Agency (JAXA), where he contributed to structural design and verification for spacecraft, mission integration and operations for the International Space Station (ISS) Program, and international cooperation involving human spaceflight programs such as ISS, Gateway, and lunar surface missions. From 2019 to 2022, he served as the Deputy Director of JAXA's Houston office in the United States. Since 2025, he has been with Kyushu Institute of Technology as a Specially Appointed Associate Professor. His research and professional interests include human spaceflight, international collaboration, small satellite deployment through the KiboCUBE program, and capacity building for emerging space nations. He was awarded the Prize for Science and Technology by MEXT in 2018 and was selected as an IAF Young Space Leader in 2020. He was certified as a Project Management Professional (PMP) in 2023.

Pictured: Prof. Cho (left) and Dr. Akagi (right) while presenting about CubeSat Salon Consultation

Highlights:

- CubeSat Salon started in Spring, 2020
- Conducted remote sessions on lessons learned from university satellite
- The survey was sponsored by JAXA
- With 439 pages of analysis about success and failure cases
- Based on that “Mission Assurance Handbook” was published in March 2022
- Currently 4th version published in March 2025

- During MA activity of 2021
    - Discussed the best way to assist the university satellite MA
- CubeSat Solon works
    - Assisting in the mission definition phase in the early stage of the project
    - Frankly question
        - Viability of missions
        - How are you going to make the satellite
        - How do you achieve your mission
    - Give advice on
        - Mission planning
        - Mission feasibility
        - Optimum satellite bus selection
        - System lifecycle planning
        - Introduction to helpers and collaborators
- Low barrier for getting in touch



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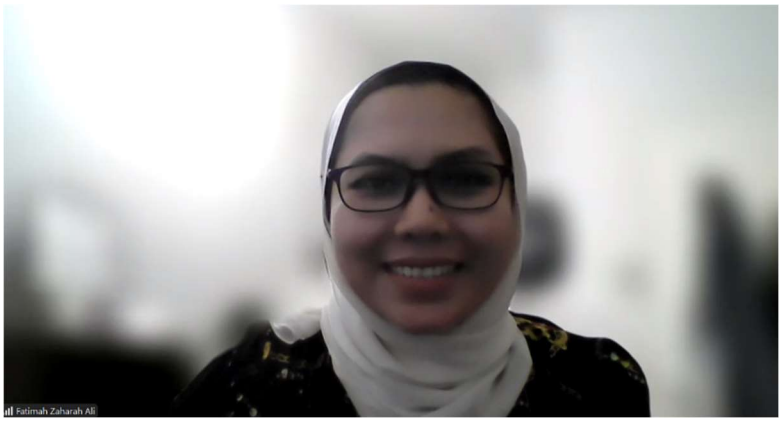
Pictured: Prof. Cho presenting activity of FY 2024

- Goal of lean Satellite MA
    - Improve the mission success rate of lean satellites
    - To be used for national space program
    - Lean satellites are already used in US/Europe with
        - Cutting edge science
        - Provision of weather data
        - Provision of images for national securities
- To improve the mission success rate of lean satellites
    - Lean satellites should be used in higher-level missions
    - Programs and project management
    - With a standard document
- To make standard document
    - Need knowledge of
        - Past missions
        - Theoretical background
        - Space agency’s mission results
    - Research cumulation for lean satellites is insufficient
    - Need mechanism to share the mission results and lessons
    - With can be done by CubeSat Salon
- CubeSat Salon can be the networking hub between
    - Company – Company
    - Company – University
    - University – University

- Consultation will be 2 times a month
    - From 9 :30 – 10: 30 and 16 :30 to 17 :30 (Japan time)
- All consultation is free

2 Consultation (1)

Fatimah Zaharah Ali, Universiti Teknologi MARA



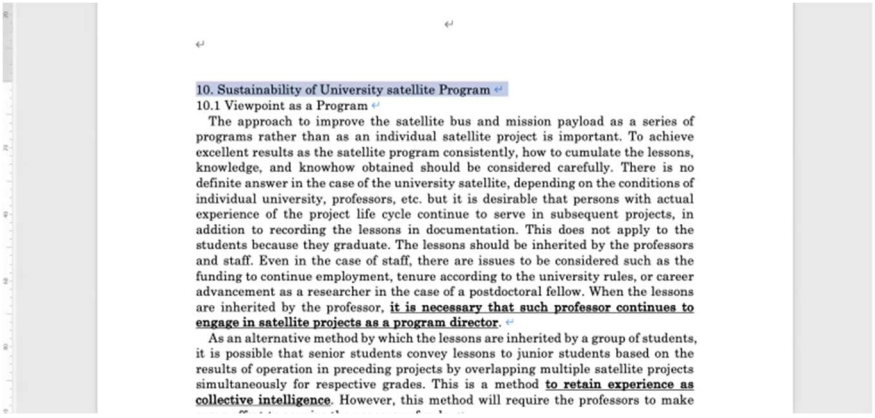
Pictured: Dr. Fatimah during her presentation

Highlights:

- UiTM student chapter
    - 15 first year students
    - All beginners
- Vision
    - Cultivate interest
    - Long term commitment
    - Hands on skill in satellite development
- Problems
    - Many students lose interest
    - Prolonged timeline
    - Project discontinuity
    - Sustaining funds
    - Right space activities
    - Managing expectations and timeline
- Outreach program funded by IEEE which is USD $2000
- Including 50 school students aged 15-16 years
- UNISEC Malaysia UiTM student chapter needs training first
- Which will be executed during August 2025
- No ongoing technical project yet
- Missions
    - Camera
    - APRS-DP and Store-and-Forward
- Currently handover to JAXA for lunching process
- Operation will involve all the BIRDS member
- Concerns
    - Sustainable program
    - Capacity building
    - International collaboration
    - Next-step technology roadmap
    - Funding and institutional support

Consultation:

Consultant: Mengu Cho: *So, you don't have to come with a presentation. When we talk about coffee, we don't make any presentations. So then, your point about sustainability, I wrote something in MA handbook in a chapter 10 of the Mission Assurance handbook. Well, you are not the only one with this problem, I think all the audience of today's meeting have very similar problems.*



10. Sustainability of University satellite Program

10.1 Viewpoint as a Program

The approach to improve the satellite bus and mission payload as a series of programs rather than as an individual satellite project is important. To achieve excellent results as the satellite program consistently, how to cumulate the lessons, knowledge, and knowhow obtained should be considered carefully. There is no definite answer in the case of the university satellite, depending on the conditions of individual university, professors, etc. but it is desirable that persons with actual experience of the project life cycle continue to serve in subsequent projects, in addition to recording the lessons in documentation. This does not apply to the students because they graduate. The lessons should be inherited by the professors and staff. Even in the case of staff, there are issues to be considered such as the funding to continue employment, tenure according to the university rules, or career advancement as a researcher in the case of a postdoctoral fellow. When the lessons are inherited by the professor, **it is necessary that such professor continues to engage in satellite projects as a program director**.

As an alternative method by which the lessons are inherited by a group of students, it is possible that senior students convey lessons to junior students based on the results of operation in preceding projects by overlapping multiple satellite projects simultaneously for respective grades. This is a method **to retain experience as collective intelligence**. However, this method will require the professors to make

Pictured: Prof. Cho presenting chapter 10 of MA handbook

How do we get a support from the school especially the management? Ok I think you have to convince the body, like how this satellite program benefits the school. We can say that yes it contributes to education, it is good for student. It is really right sense to say but more practical benefit to school is student recruitment. I think every university in the world have concerns; they want to have good students. They want to have high school students to want to come to their schools. So, student requirement and public relations, schools want their names to appear in media. I think all the universities in Malaysia, Japan, Africa, or anywhere; any management praises if their schools name appears in the media. Some students will be like yes; I will come to this school because they have satellite development. How you sell those stories to the school is very important. They are students coming from high schools, and they are joining from the class here, right?

Consultee: Fatimah Zaharah Ali: *Yes, Cho Sensei if I may say in UiTM technically we do not have specific course for satellite. So, satellite communication system is one of the topics in communication technology or communication engineering systems so, they learn a very basic about satellite. Not really into the development, we do not have that particular subject and that's the only subject related to satellite.*

Consultant: Mengu Cho**:** *They are doing the student chapter from first year, right?*

Consultee: Fatimah Zaharah Ali: *The student chapter from first year, oh yes.*

Consultant: Mengu Cho**:** *So that means they come to UiTM because they have opportunity to work on space. That is what management want to hear what sensei want to hear. So, to sustain satellite programs, sometimes you have to do something hunting, other than simply research. You have to have good relationships with management, with agencies, with international corporators, and also with local communities. Because local communities also see oh UiTM is doing satellite and parents to see oh my child is doing satellite.*

Also, UiTMSat-1 UiTMSat-2 is very important. You use them. So, UiTMSat-1 is already 6 or 7 years old to use their data, however, UiTMSat-2 you maximize that one. To promote the information data and show UiTM is really doing something. Then you have to think weather to give data for free or of course it needs significant amount of funding. Keep doing satellite project, it's really a bicycle operation. Keep walking if you stop you will fall down. The best is you keep launching satellite every 2 years. Probably its very difficult. But using the momentum of UiTMSat-2, there are lots of exposures to media and lot of attention from management, you maximize that opportunity. Not to get the big funds. I remember after UiTMSat-1, I said to everybody try to get big funds, try to get benefit. Its okay to have a big fund but you can think about some small fundings and medium fundings. Try to chase small also to continue. You are lied that students need to do something otherwise they lose the education, and they will go away. So, important thing is making a student busy. I think for UiTMSat-2 you can use the operations; the operations are very good. Also, through that operations you set up that ground stations. You can use the ground station for other satellite too.

Consultee: Fatimah Zaharah Ali: *That is also one of the plans. More operations so that we can attract more students to get involved.*

Consultant: Mengu Cho**:** *Yes, because their specialty is satellite communication. Yeah so, we can have students seeing if they are really communicating with space. You can let them work with an actual radio. If you try to work with attitude controls, it may be a bit difficult. Well, communication is their specialty so it can be tied with communication. First of all, for continuity, I think a good relationship with the management is very important and to convince the management of the body of this project. And you can make one exposure to look like ten exposures.*

Consultee: Fatimah Zaharah Ali: *One exposure?*

Consultant: Mengu Cho**:** *Yeah, you can make one media exposure look like ten exposures. For higher funding who is important. Oh, I think those things so if you make school happy, I think they make you happy. It's really a give and take. I think lots of things. Akagi-san do you have any comments?*

Consultant: Hiroki Akagi: *Yes, thank you. I noticed that the same as the Cho Sensei. I directly recommend that you promote the creation of the supportive environment in your university. It is important to continuously communicate with the faculty management about what you have done around previous satellite development and the operation. And I'd like to recommend that you communicate not only for good results, good operation ,and opportunities but also the challenging problem and issues. The challenging situation, or challenging program, or something like that. I think that it is important to promote or create the supportive environment in your university. The one option to create that, as Cho Sensei said so, I think the good opportunity is to use real satellite data, not only for the operational data, but also that you have already some design or development and all the phase of the satellite data. This is good material to share with your university student, not only for the student, but also to the faculty management.*

Consultee: Fatimah Zaharah Ali: *It's one of the issues, like to get the support from the institution, from the university. And in term of financial, in term of funding. Like mentioned, every time that we present the project, the very first question it comes up is, what do they get in return? How much is the revenue? Because, everyone knows that university is the institution, academic institution. We are not looking for money, return in money. But even though we are, in academic institutions. And we are not looking into profit. But in order to get, the financial support from the funder, profit is one of the most valuable things to them, so they keep asking if they invest in this, what do they get? So how do we convince them? That's one of the issues as well.*

Consultant: Mengu Cho**:** *Okay, in university, I think it's rather easy compared to company. Company, they have to make up, there is a cost, and they have to get the money more than the cost. So that they don't go to red. But the university, they don't have to get a return more than the investment. As long as they get return, it's okay. Because many of the return is cannot be quantified. Like student recruitment. We cannot really compare to the money. Right, so as long as you get some external fundings, I think it's okay. If you ask schools million dollars and the school gives you a million dollars to make a satellite and then at the same time you say okay, I'd ask the external companies to give us funding: to assist the programs. And if the company gives you at least some money. It doesn't have to be a million dollars. If the company gives $100,00. Yeah, it really clearly tells that these satellite programs can really regenerate revenue. As long as it generates revenue, it's good. Doesn't have to pay off all the cost. Because schools are supposed to pay certain part. After all, it's an educational and research institution. That means external funding doesn't have to cover entire thing. If the external funding covers everything, you don't have to be in the school.*

Consultee: Fatimah Zaharah Ali: *I'm sorry Sensei if I interrupt because in Malaysia, the academician has to think not only about research, but also how to commercialize the research. So, that is when the difficulty comes because even though our plan is just to do the research, we need to think about the profit and how to commercialize the research so that we can get money. That is also one of our tasks as academician in Malaysia.*

Consultant: Mengu Cho**:** *Okay, do you have to really make money?*

Consultee: Fatimah Zaharah Ali: *Not really have to but, if the project has that kind of things and is convincing to the shareholder, so they can provide the fund.*

Consultant: Mengu Cho**:** *Yeah, so as long as what you say is convincing and as long as you get some kind of symbolic money from, is it okay? Yeah, do you really have to be the millionaire?*

Consultee: Fatimah Zaharah Ali: *Yeah no.*

Consultant: Mengu Cho**:** *Cool, then I think there would be a company who would want to invest money. Because if you start, if you keep doing it, there will be a company who wants to join the project. They want to put payload in the satellite. And that's what many universities in the world are doing. So, they get the money they offer company: do you want to put your payload in our satellite? If you pay some money, we can do that. Actually, many universities do this. So, you can approach the company and say if you pay money, we will put your payload and there you can tell the management, yes we are getting some money from them. And if we keep doing, I think this is not difficult. But this model will generate significant revenue. And then you can convince the management that this is not just education. But, at same time, education and revenue generating. But it may not become very big revenue. But the constantly generate revenue and the pay for the minimum money and also good whole society. So, contribute good to the local industries. If you cannot make a satellite by yourself, because making satellite by yourself and launching, costs lot of money. That's why there is the international collaboration. So, you can find partners and put your payload. Then through this channel, you don't have to secure all the money, you can just share the half the money, or even much less than half. You can still do the satellite the mission. The important thing is you keep doing, keep doing somethings and it is related to the space. And give the student feeling that they working in the space. And think of logic to please I think it's just a matter of logic to convince the management.*

Consultant: Hiroki Akagi: *So, I directly add as Cho Sensei mentioned so, Fatima, you mentioned that the university focused on the lecture regarding to communication, space communication, right?*

Consultee: Fatimah Zaharah Ali: *Yeah.*

Consultant: Hiroki Akagi: *So, I think the one option is to ask the private company, like local communication companies.*

Consultee: Fatimah Zaharah Ali: *We do have one company locally that works on satellite communication. If you and Sensei knows the name is MEASAT yeah and MEASAT just operates the satellite. So yeah, that's a good idea. Thank you, Sensei.*

3 Consultation (2)

Marina Duval, APEC University

Pictured: Ms Marina during her presentation

Highlights:

- APEC university is actively working to advance CubeSat technology
- They have never launched a regular satellite mission
- The development of space sector is nonexistent
- They are trying to assign this project to a student
- To develop the submodules of CubeSat mission
- With questions from border concepts as well as specific technical questions

Consultation:

Consultee: Marian Duval: *What are the main criteria for defining a CubeSat mission? How is the payload related to the mission objectives? What factors should we consider when deciding whether to develop a custom payload or select an existing one? And what is the simplest CubeSat architecture, and what will the more complex one look like, taking into account that we are trying to develop a one-unit CubeSat?*

Consultant: Mengu Cho: *Okay, how long have you been working now on this project?*

Consultee: Marian Duval: *It's been around one year.*

Consultant: Mengu Cho: *Oh, okay and what are the student population like? Are they from the first year to the fourth year?*

Consultee: Marian Duval: *Well, we are electronics and communication engineering students and in the final years. I am an engineer right now, I already graduated, and my partner is working on his final year project, which is the thesis, to graduate.*

Consultant: Mengu Cho: *Okay and what are your questions? Well, I'd like to answer by questions. Have you defined a satellite mission?*

Consultee: Marian Duval: *Exactly. What are the main criteria for defining a CubeSat mission?*

Consultant: Mengu Cho: *Okay, I think my answer is up to you. It's really up to you for how you define missions. For what do we usually do, for education satellite is I ask the students to list all the programs in the world, in the countries, in the neighborhood. They start up from very big to very small. So, to define CubeSat mission, you can worry about space, you can worry about the world, you can worry about your neighbors. It can be for any kind of issue. You can talk about that and ask if it can be followed by space and can it be followed by a small satellite*

and can it be followed by the CubeSat. And from that we narrow down and finally choose one or two missions. And that's how we do it. I do this for the training because my idea is that we shouldn't build a satellite because we want to build a satellite. We should build a satellite to solve somebody's problem and for the need of people. So, the training process is how to answer people's needs. So, for yourself, if you're making the satellite for education and if your purpose is really to make something that works in space, that itself can be a mission. And that you want to master the skills to make a satellite that can function in space. And if there's some needs and you want to solve them; that can be the mission. But for 1U CubeSat it's very impractical; it doesn't have to be a practical function. It's just technology demonstrators or some path finders. So, 1U CubeSat, you can do either way: you can build the satellite because you want to learn, or you can identify some needs and try to fit those needs. But if you want to get the funding, you have to do the second one. To get the funding, you have to, if you ask the money, can you give some money because I want to build the satellite. I don't think you can get the money. If you want the money, you have to say we want to build a satellite; this satellite will be of help in this way and in the long run, this satellite will solve these problems. And the details will be different or something. So, then you can convince your schools or your government or the company assisting you or some foundations who are looking for money they can spend. If you choose your mission based on your needs, for example: there are very severe pollutions in lake where people get drinking water. We need to monitor that lake; we need to monitor the water quality from space. We need to take picture in a specific spectrum band. To get the practical data, we need this size of satellite, which is probably much bigger than 1U and it's also very expensive. However, the precaution we can build, we can take pictures of the lake with two or three cameras. Even in 1U CubeSat you can carry 2 or 3 cameras and put some filter on the camera and look at difference in different biomes and we can use the test case monitoring and we can collaborate with researchers who work on the environment and we practice from the supply of data. From the satellite and ground station and these scientists will analyze and we implement that one. And this is a very good start and don't give up for money.

Consultee: Marian Duval: *Thank you so much. You have answered three questions already. There's only one left actually. How to decide whether to develop my own payload or select an existing one?*

Consultant: Mengu Cho: *Okay, Let's talk about satellite bus and mission payload. Well recently I strongly suggest procuring a satellite bus over buying the satellite. I think developing a satellite bus by yourself will satisfy your ego over other engineering students so you feel very good that you're making things, but it'll take time and also it's not reliable and you solve that by spending some money. Of course, even if you spend some money to buy, it doesn't guarantee that it'll work but it's much better and much faster. For the satellite BUS, I strongly suggest you buy from a single vendor. I don't want to name a company here because different people are listening but in a private facility, I can tell the company's name. So, you buy and for 1U CubeSat you can buy for less than hundred thousand. You need two units, one for an engineering model, and one for a flight model because you are beginner, you need to practice how to handle the satellite. Also, the engineering model can be the spare for the flight model. For the satellite BUS, I strongly suggest that you buy it. For mission payload, I think first of all, it's very difficult to find mission payload that suits the mission objective. Let's say, for the case of camera, it usually doesn't fit 1U CubeSat. Usually, the payload itself, is of 1U. I think for the first one, concentrate on making the mission payload because in 1U CubeSat satellite bus, even if you buy, it is limited, especially attitude control and communication. So, even if you have very good expensive mission payload, you cannot utilize the full capacity of that one. Instead, downgrade the mission payload and make something yourself. That is my suggestion.*

Consultee: Marian Duval: *That's very good advice. Also, we're a third world country with not enough funding. It is more affordable for us to downgrade and create our own payload sometimes.*

Consultant: Mengu Cho: *Yes, because mission payload sometimes costs as much as satellite BUS.*

Consultee: Marian Duval: *Yeah. I now have a more specific question in regard to the ADCS system.*

Consultant: Mengu Cho: *Hold on a moment, Akagi-san, do you have any comments?*

Consultant: Hiroki Akagi: *Nothing special but as for the satellite BUS, as Cho Sensei mentioned you have to purchase for the two models, EM and FM. So, I would recommend that if you develop the first satellite, you have to understand that's the system and what you can do with it. So, understanding that system is really important to the developer that operates their flight model.*

Consultee: Marian Duval: *Yeah. Makes sense. So, the first question in regards to this topic is what specific design constraints does the 1U form factor imposes on the attitude control system.*

Consultant: Mengu Cho: *1U CubeSat?*

Consultee: Marian Duval: *We are trying to develop a 1U CubeSat first. So, my partner is developing an ADCS system for 1U CubeSat and this is a very important question in regard to the design. We need to know the design constraints that we might face while developing this system.*

Consultant: Mengu Cho: *Actually, I think you are doing this in the wrong order. Usually, in satellite development, you define the mission first and then you define the system which does the mission. And from that system, you define the subsystem. So, you don't start making attitude control before you define the mission.*

Consultee: Marian Duval: *So, do you recommend first working on defining the mission and moving towards the systems?*

Consultant: Mengu Cho: *Yes, because if we have missions, for example: if your mission is to take picture then you work on what kind of picture you want to take, how big the picture will be ,and that determines attitude control. But if your mission is communication, then attitude control is not really important depending on the frequency you use. If you use UHF or VHF, attitude control is not that important. The important thing is that you stabilize the satellite. If you have satellite spinning so quickly, the radio pattern changes. You may have difficulties but as long as the satellite is steady, I think for communication, it's usually not a problem. But for the picture, we need to know at what degree the image is going to take image. So, there are degrees to attitude control. Sometimes, you may need to just stabilize the satellite and as long as the satellite faces earth, it's okay. We know that even if the satellite looks at the area of 1000km then it's okay or it must be 100km wide or it must be 10 km wide. Depending on the requirement, the attitude control is different. So, that's really the target.*

Consultee: Marian Duval: *Well, let's make an example. For example, in the previous mission idea concept, we designed a CubeSat Constellation mission to monitor sargassum in the Caribbean which impacts the country in the public sector, health, economy, etc. So, for this kind of mission, which is the first mission that we sort of designed, what do you recommend for the attitude determination control system?*

Consultant: Mengu Cho: *Sorry, I couldn't catch it, what do you want to detect in the Caribbean region?*

Consultee: Marian Duval: *We were studying and monitoring the sargassum. It is contaminant in the ocean.*

Consultant: Mengu Cho: *Oh okay, we can see by looking at the sea. From a changeable color or something?*

Consultee: Marian Duval: *It is something that is generated thanks to the pollution in the ocean; it is a contaminant. It is born in the ocean, and it is being fed by the Sahara dust and when it comes to the Dominican Republic shores, it has toxins that can cause cancer, skin irritation, allergies and all that. It also impacts the tourism because when it is in the decay phase, the odor, it is not very attractive for tourism in the Dominican Republic, which is a country with its main income comes from tourism. And this is why we design the mission first.*

Consultant: Mengu Cho: *Oh okay, we can see by our naked eye? So, it is in the visible group?*

Consultee: Marian Duval: *Yes, it is in the visible spectrum.*

Consultant: Mengu Cho: *Oh okay, so if it is ocean pollution, I think you don't need much of a resolution. You don't need one meter resolution. If you want to see how it is distributed over the ocean, I think 100 meter is good enough. I think the 1U CubeSat, many universities CubeSat use Raspberry Pi and attach a camera. And that camera is usually 10 million pixels or something. So, its 3000 by 2000 or something. Let's say we have a 3000 pixel by 100 meters mean 300 km. How big is the Caribbean Ocean?*

Consultee: Marian Duval: *It is pretty wide actually. But the sargassum is not only affecting the Caribbean, but also the Atlantic and the Gulf of Mexico. So, it is a wide area of coverage but we are only focusing on the Dominican Republic about I don't know 1000 km? We allow for example the government; we give them enough time to take preventive measurements before the Arga comes to the shore.*

Consultant: Mengu Cho: *So, let's say 1000 km, if you take a picture by 3000 pixels, it's about 300 meters. Well, it may not be enough, but you can take multiple pictures, the way the satellite is moving. So, for 300 km, if you take a picture from 500km, it's about 30 to 40-degree view angle. The view angle of 300 km from 500 km is quite wide. So that means the attitude pointing requirement is quite easy. 10 degrees could be , so, you don't need very precise three axis pointing control. Yes, and you may be able to achieve just by the magnetic torquer. You may not need a reaction wheel. And for the sensor, if you identify from basic sun sensor, because you take a picture during the daytime, sun sensing detects the earth and also magnetic field. I think sun sensor is good enough.*

Consultee: Marian Duval: *I was thinking the same thing actually. We were working, developing the ADCS and using Boltzsmann coils.*

Consultant: Mengu Cho: *I think the Dominican Republic, your country is almost near the equator, right?*

Consultee: Marian Duval: *Yes, 18 degrees.*

Consultant: Mengu Cho: *Yeah, okay. That means the magnetic field lines are almost parallel to the ground. So, you can use that magnetic field to arrange your satellite.*

Consultee: Marian Duval: *Awesome. Now, that comes with this new question, which is, what kind of software do you recommend us to use to do virtual modeling of this system for testing. For example, we have MATLAB. But do you recommend another one?*

Consultant: Mengu Cho: *I think MATLAB is a good example but, in the end, you have to embed your programs in the processor, in fact, you have to do the embedded program. So, you have to work on the real microcontroller inside the satellite.*

Consultee: Marian Duval: *Understood. And what kind of advice can you provide us in regard to funding? Because like I said, we don't have a developed space sector, we don't even have laws to control or to handle space missions. So, whether you recommend it since we are you know, working on baby steps, in this country.*

Consultant: Mengu Cho: *First of all, identify who would benefit from your satellite.*

Consultee: Marian Duval: *Let's say the government because we don't have private companies interested in this kind of technology yet. Let's say the government but we don't have any laws to regulate the space sector.*

Consultant: Mengu Cho: *Well, is it only the government? Because you just said that it affects the tourism of the country. So, that means the tourism companies, they are the stakeholders, right? Yes so, you shouldn't limit yourself from the beginning. Now, everybody that's for government, but maybe it's from private sector, who could be the stakeholder. So, identify the stakeholders and explain the benefit of these programs. Don't say that you want to build a satellite, you could fail. But the long-term benefit that this satellite would help the education of the country. And it also promotes finance industries, you can say but it's very long term. You may want to say this would benefit and will bring a return maybe in 10 years or something. The education, the whole difference would come maybe 20 or 30 years later. But for the first one, if this CubeSat works then we can go to something bigger. And then for the third one, we can provide practical data and that directly benefits the tourism industry*

and we'll save this amount of money. So, you can identify how much money you can save if this problem is solved. And this first 1U CubeSat cannot be the solution. Let's say the economic benefit is 100 million dollars. You can't say this $100,000 satellite will solve a $100 million problem. But okay, a $100,000 dollar satellite is a first option. If we do the first one, we can go to the next one. And this will be from, kind of, pilot program. And the third one, we can go to very practical solutions. And if you really provide the data and then we can fight against these $100 million problems. You need to show the long-term problem. Because 1U CubeSat is not a solution for a problem right now.

Consultee: Marian Duval: *Yeah. And this is more like a personal question, not of the team. Do you recommend us beginning with a single CubeSat or to go fully with the constellation mission design? Because by my perspective, if we want to have data in real time, we will need more than a single CubeSat base on the orbital period. What do you think about that? Also, take into account that this is our first mission. We have never built a CubeSat. This will be like a pilot.*

Consultant: Mengu Cho: *For the first satellite, build just only one. You can build constellations in the second or third generation. But for the first one, just build one. I think it is too risky. Also, it's very hard to find sponsors who will give you money. So, build the first one, it could be a path finder. So, you can show that this CubeSat can take a different picture and from this picture we can disseminate this kind of information and with the concentration of about 10 CubeSats, we can get this data and how frequently we can obtain the data. And this frequency is good enough to provide some practical data.*

Consultee: Marian Duval: *I've been taking some keynotes. But just to confirm: We first need to define the parameters and the mission idea. Then we can move towards selecting the payload. You recommend us, since we don't have enough funds, to develop our own payload right? Instead of purchasing expensive stuff in the market.*

Consultant: Mengu Cho: *Two reasons: Because you don't have funding and the expensive payload available in the market does not fit 1U CubeSat. And maybe three, it's good for training.*

Consultee: Marian Duval: *And as for the ADCS, you recommended us to keep doing the modeling and simulations on MATLAB which is reliable. And as for funding, identify the benefiting companies and try to sell the idea in the most attractive way. As for launching, I'm not going to ask the question right now, because we don't have the time but after defining the key ideas with the mission, we'll probably schedule a session with you guys to take about launching, which agency can we contact to launch the CubeSat to space. Or if we could somehow, I don't know, get someone to launch the mission for us for free? Because I know the United Nations has this program for that. I don't have enough information.*

Consultant: Mengu Cho: *Next month, we have a session about J-Cube. J-cube is a framework of a joint satellite mission between Japanese universities and foreign entities. You may be interested.*

Consultee: Marian Duval: *Awesome. Now, I'm going to tell my professor to reach out to you in regard to the J-Cube so we can do some kind of partnership. Yes, thank you so much!*

Consultant: Hiroki Akagi: *So, Marian, I'd like to add to that, so I think you have already researched and checked the previous missions. Like what you want to do that but I'd like to share that several years ago, the University of North Carolina, they launched the ocean colormonitor satellite, and they developed a 3U CubeSat and the 2U satellite bus they purchased from a private company, and then they integrated their payload. It's an out-of-body technology. I think it is a good reference for you.*

Consultee: Marian Duval: *Okay, can you tell me again the name of the university?*

Consultant: Hiroki Akagi: *University of Carolina. The name of the satellite is Seahawk-1.*

Consultee: Marian Duval: *Oh, I think I've seen that CubeSat. Not like investigating it. But when I was testing my ground station, I saw it.*

Consultant: Hiroki Akagi: *Okay, So, I think you can find several papers about the information on the web.*

Consultee: Marian Duval: *Thank you so much! That's very helpful!*

Q/Ans:

Q: **Raul Figueroa: Is there a possibility to keep in contact with professionals in technical and some other parts? To collaborate and integrate Peruvian space sector in UNISEC space projects?**

A: ***Mengu Cho:*** *So, you are now developing some payload to measure precipitation particles? An you are looking for some partner to make the mission and satellite?*

A: ***Raul Figueroa:*** *Yeah, the payload is commercial. We are trying to use, I don't know if you know, dosi of Skylab, it is a dosimeter. But we are trying to develop the bus. Because we have some experience, we have a FlatSat for testing these subsystems.*

A: ***Mengu Cho:*** *Well, what do you need to develop? Why are you not going to do some procurement solution? Because making your ADCS system is your own research area?*

A: ***Raul Figueroa:*** *We're trying to make the ADCS because our second mission is to use the atmospheric to space debris to reduce the time of the CubeSat. Stating the space environment, and something to make that like movement to match us with SDK and software.*

A: ***Mengu Cho:*** *My suggestion is that you have a mission and achieving the mission is the most important. Of course, there is money and schedule and skills which are all related. But the satellite BUS, unless there is a strong reason to develop satellite BUS, nowadays you can buy components which have a flight record. And now you can focus more on the payload. If you are doing research in altitude control in engineering department, it is good if you develop attitude control. But, if that is not the case; you need to do some missions which requires special ADCS which is not doable by the current ADCS units, then I think it make sense to develop the ADCS. Do you have any such special requirement?*

A: ***Raul Figueroa:*** *Really no, because out first mission is the dosimeter which is omnidirectional. We do not need a ADCS control. But, without state commission only to prove our technology is more recent, we are trying to make subsystems with a very cheap technology, we try to make communication, we have a ground station in Peru, and we have all the parts but, in some cases, we think it is important to have recommendation of experts. Because I think ADCS is a big deal in CubeSat.*

A: ***Mengu Cho:*** *Okay, so if you develop your own ADCS you have to ensure that even if your ADCS does not work, there should be success. Let's say you want a 100% mission achievement but if your ADCS does not work and your mission becomes 0%, it is very risky. So, you have to make it such that even if your component fails, you can achieve 50% of the mission. The mission is a bus and the satellite goal is to achieve the mission. You should not risk the entire mission by simply making the component because we want to develop the technology. There are priorities, if developing ADCS is the top priority then okay but if not make your even without ADCS you can achieve at least 50% of the mission. You have to think that way. Like if you can achieve 200%, it can be worth it.*

Q: **Pooja Lepcha*:* A few countries who have launched a few satellites maybe, for capacity building but wants to venture into satellite or a satellite service that can generate economy for the country. So, what application or what aspect of satellite do you recommend Cho sensei and Akagi-san?**

A: ***Hiroki Akagi:*** *So, after you develop your first nation for the satellite. Who are the big stakeholders? The government? So, what they want to solve then with the space technology?*

A: ***Pooja Lepcha:*** *They want to solve anything, but I think at the end, they want to generate revenue.*

A: ***Hiroki Akagi:*** *So, you mean that's the economy in your country, right? So, I think that there are several options. But if your government wants to establish the startups or space companies to provide the satellite component or the subsystems, at that case, the university should cooperate with the government and establish the university startups to develop or operate the satellite. So, there are many options, you can provide data service from the university startups or have outreach with your data. But you have to just start with even small steps if you want to create a big economy with 1U CubeSat or 2U CubeSat. So, talk with the government and what they want to establish through the economy. Like, if they want satellite data like an image or a communication system. At that case, you have to focus on that technology.*

A: ***Mengu Cho:*** *Adding to that I think there is not a single answer to the country. Depends on the country. First thing is to analyze who can invest, who will benefit. Like if we improve this part how much money can be generated. Like quantify how much economical value it can create.*

4 Announcement and Acknowledgment

Haruka Yasuda, UNISEC-Global

Pictured: Yasuda-san announcing the latest updates from UNISEC-Global

Highlights:

- **Nano-satellite IoT Constellation Program**
  - A new program launched by UNISEC-Global
  - Jointly design satellite bus (3-6U) with online guidance
  - Each satellite will be developed by each country with its own funding or if difficult, we will jointly search for international funds
  - All the satellites have the **same mission payload** to contribute to solving global problems or local problems as a constellation
  - Each country can have **one specific mission payload** for its own interest
  - Web: https://unisec-global.org/iot.html
  - Interested ones can submit the form here: https://forms.gle/WcdvQ9GiQV9rxssj6
  - Deadline for "STEP 3: Hearing session with stakeholders": June 30, 2025
  - Contact: iot@unisec-global.org

- **The Mission Idea Contest**
  - The 9th Mission Idea Contest : to the Moon
    - Theme: Lunar Mission
    - https://www.spacemic.net/
    - 25 abstracts were submitted from 15 countries
    - 10 finalists and 4 semi-finalists were selected
  - **Important Dates:**
    - Full Paper submission due : August 25, 2025 (Finalists and Semi-finalists)
    - Final Presentation : November 1, 2025 at the 11th UNISEC-Global Meeting in Tokyo
    - Contact: info@spacemic.net

- **CLTP14 (CanSat/ CubeSat Leader Training Program)**
  - Date: August 19 – 29, 2025
  - Venue: Nihon University, Chiba, Japan
  - Application Submission Due: April 22, 2025
  - Notification was made in early June

    - CLTP14 Website: https://cltp.info/cltp14.html
    - Contact : secretariat@cltp.info

- **The 11th UNISEC-Global Meeting**
    - Date: November 1 - 4 2025
    - Venue: Tokyo, Japan
    - https://www.unisec-global.org/meeting11.html
    - **Tentative Program (T.B.C)**
        - November 1: Opening Ceremony, The 9th Mission Idea Contest: to the Moon, Reception
        - November 2: Nano-satellite IoT Constellation Program Workshop
        - November 3: Regional Report, Deep Space Workshop, Student Session, POC Meeting
        - November 4: Supporter Presentation, Industry Visit, Gala Dinner

- **Call for proposal for 15th Nano-Satellite Symposium and the 12th UNISEC-Global Meeting 2026**
    - Next 11th UNISEC-Global Meeting will be held in Japan 2025
    - Will call for proposal for venue of Nano-Satellite Symposium and UNISEC-Global Meeting in 2026
    - **Important Dates**
        - Proposal submission due : July 7, 2025
        - Proposal presentation : September 20,2025 (at Virtual UNIGLO meeting)
        - Local Chapter voting : October 2025
    - Download the format here: https://unisec-global.org/support.html

- **Launch Opportunity: J-Cube**
    - Special Discounted opportunities
    - 1U, 2U, 3U, deployment from International Space Station
    - Collaborate with UNISEC-Japan's University
    - Technical support will be provided
    - Contact: info-jcube@unisec.jp , http://unisec.jp/serviceen/j-cube

- **Next Virtual Meeting**
    - Date: July 19, 2025
    - Theme: Introduction to J-CUBE
    - Host: UNISEC-Japan

5 Participant Statistics

105 registered participants from 41 countries and regions for the 57th Virtual UNISEC-Global Meeting.

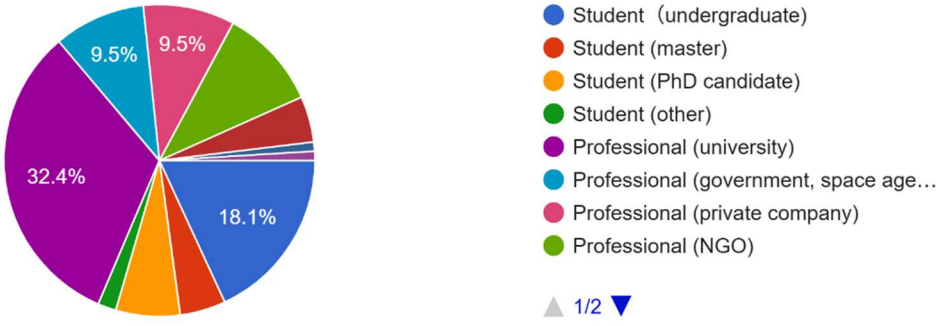
Country/Region	Registrants	Country/Region	Registrants
Algeria	1	Malaysia	3
Argentina	1	México	5
Austria	1	Morocco	1
Bhutan	1	Nepal	2
Bulgaria	5	Nigeria	2
Burkina Faso	3	Paraguay	1
Burundi	1	Peru	5
Colombia	3	Philippines	4

Côte d'Ivoire	2	Portugal	1
Dominican Republic	3	Somalia	2
Egypt	6	South Africa	1
France	2	Taiwan	2
Germany	1	Tanzania	1
Guatemala	3	Thailand	2
India	9	The Gambia	1
Indonesia	1	Tunisia	3
Italy	1	Turkey	1
Japan	14	UK	1
Kenya	1	Uruguay	1
Korea	1	USA	4
		Zambia	2

Survey on the next page

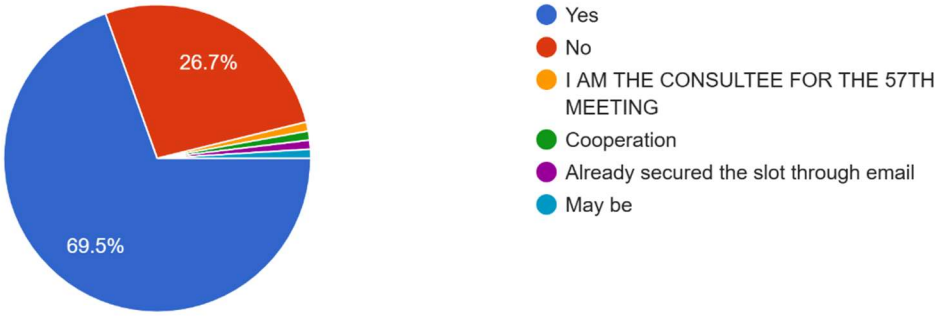
Student or professional?

105 responses



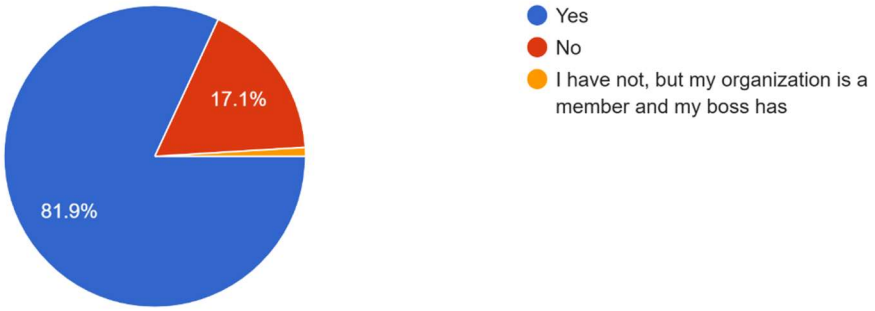
Would you like to have a free consultation regarding CubeSat?

105 responses



Have you participated in the UNISEC-Global Meeting previously?

105 responses

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Thank you