



UNISEC-Global The 16th Virtual Meeting

December 18, 2021 22:00-00:00
(Standard Japan time GMT +9)

16TH VIRTUAL UNISEC-GLOBAL MEETING

OPENING REMARKS
Alim Rustem Aslan, Istanbul Technical University
UNISEC-TR Activities & UNISEC-Global Meeting

KEYNOTE SPEECH
Wataru Torii, ISAS/JAXA
Topic: Please help receive the UHF-band signal from
the world's smallest Moon lander, OMOTENASHI

PRESENTATION
A Year in Review - UNISEC-Global
Nate Taylor, UNISEC-Global

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

MIC6 PROGRESS REPORT
Carlos Rodriguez, Costa Rica Institute of Technology
Topic: MUSA Project Suborbital Flight

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

DECEMBER 18, 2021
10:00 PM to 00:00 AM (JST)
<http://www.unisec-global.org/virtual-meeting.html>







**The following report was prepared by UNISEC-Global Secretariat
December 18, 2021.
Japan**

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1. Opening Remarks

Alim Rustem Asian, Istanbul Technical University

Prof. Dr. A. Rüstem ASLAN was born in Ankara in 1962 and graduated from Istanbul Technical University (ITU) with a degree in Aircraft Engineering in 1983. He completed his Master's Degree in Aircraft Engineering in 1985 from ITU. During his studies, he began working as a Research Assistant in the Department of Space Engineering at Istanbul Technical University in 1984. He completed a second postgraduate (1985-86) and subsequently a Doctorate study at the Von Karman Institute with the grant he obtained in 1985. He returned to ITU after completing his doctorate. He was promoted to Assistant Professor in 1991, and Associate Professor in 1993. In 1999, he was promoted to full Professor. In 2000, he was awarded by the Rectorate of ITU for his contributions to the university. He was a visiting scholar and lecturer at Old Dominion University in the United States from 2001 to 2002.



Pictured: Prof. Dr. Alim Rustem Aslan giving the opening remarks during the meeting

Highlights:

- UzTED is being registered as an official entity
- UzTED means Space Technology and Education Society
- Going to teach about modern satellites and space engineering from elementary to high school
- Involved with NASA for space exhibition which started a few weeks ago in Istanbul
- UNISEC-TR has 20+ participant universities, began on 2011
- 23 members from 13 universities (7 public and 6 private)
- First general assembly conducted on 19th Sep 2021
- Number of CubeSat projects going on
 - SHARJAHSAT-1 will be launched from June to October of next year (2022)
 - 6 CubeSat projects
 - SHARJAHSAT-1 collaboration of University of Sharajah, Istanbul Technical University and Sabanci University
 - X-ray detector developed by Sabanci University
- UNISEC-TR
 - Invited talks, MIC8, regional report presentations, group discussions, technical visits, and associated events are yet to be determined.
- Istanbul University has astronomical observatory
- Sabanci University has an Integrated Manufacturing Technologies Research and Application Center

Lenovo  <

UNISEC-TR History 

- Started Nov 2011, by three Istanbul Universities (ITU, NDU (TurAFA), YTU)
- Over 20 participant universities
- Support of government, aerospace industry and research institutions
- 12 meetings so far hosted by starters and supporting institutions
- Working on establishing UTEB as a legal entity
- Various joint CanSat/CubeSat activities/projects
- International cooperation

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Pictured: All the elements of SharjahSat-1

Q&A:

Rainersandau: *When are you going to have the conference?*

Prof. Dr. Alim Rustem Aslan: *Well, it is in October or November but yet to be decided based on other activities. It may be at the beginning of November, the weather is not bad. However, it is needed to be set.*

Rainersandau: *Where is the second university you mentioned?*

Prof. Dr. Alim Rustem Aslan: *They all are in Istanbul.*

2. Presentation on "Let's Receive the Signal from the World's Smallest Moon Lander OMOTENASHI"

Wataru Torii, ISAS/JAXA

Wataru Torii is currently working on ISAS/JAXA. He holds an undergraduate master's degree in bioinformatics as well as Ph.D. in Human Information Engineering which he completed at Osaka University. He describes himself as a Physics Researcher who has taken many twists and turns to end working in the space field. (email: torii.wataru@jaxa.jp)

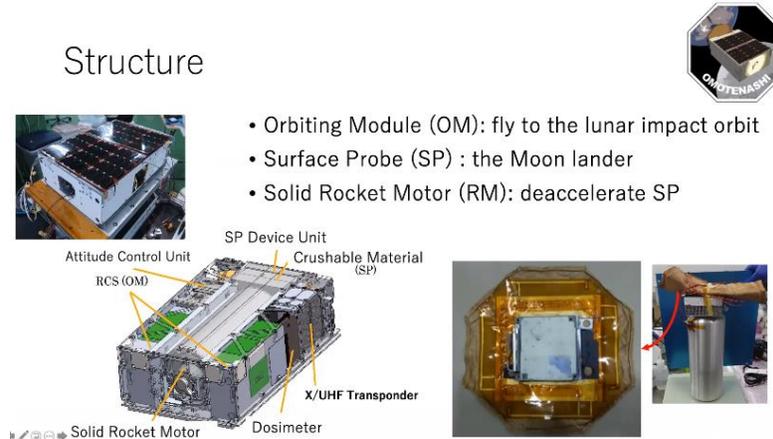


Pictured: Dr. Torii provides information on OMOTENASHI moon lander project

Highlights:

- Dr. Tori is working in JAXA and developing the communication system
- OMOTENASHI and EQUULEUS are 6U CubeSats and will be launched by the same rocket
- SLIM (Smart Lander for Investigating the Moon) is a Japanese technology demonstration lunar landing mission for pin-point landing
- OMOTENASHI has the UHF communication system for amateurs to operate
- OMOTENASHI is a 6U CubeSat and its primary mission is to verify technologies developed on the world's smallest moon lander

Structure

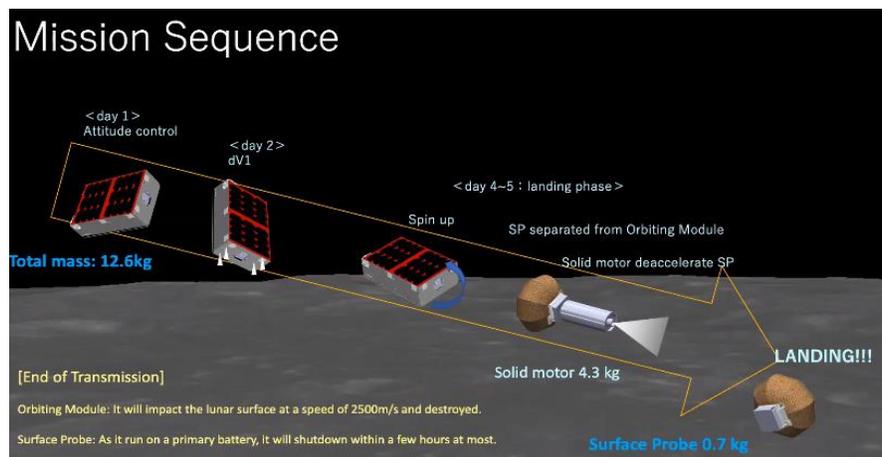


Pictured: Shows three modules; OM, SP and RM onboard OMOTENASHI

- If successful, this will be the first moon lander from Japan
- It will go to space by the most powerful rocket (SLS: Space Launch System) developed by NASA.
- The launch date is scheduled for February 2022. The date is not fixed.
- OMOTENASHI is comprised of three parts: Orbiting Module (OM), Surface Probe (SP), and Solid Rocket Motor (RM) (more info: <https://www.isas.jaxa.jp/home/omotenashi/JHRCweb/jhrc.html>)
- The unique characteristic of OMOTENASHI is that it has a SRM inside
- OMOTENASHI has no surface landing mechanism such as legs or parachutes
- The communication module and surface probe have been developed
- The transponder can transmit and receive the hex and UHF band
- The size of orbiting module is 8 sq. cm and the thickness is about 6cm.
- The surface probe has only a UHF transmitter
- After OMOTENASHI is ejected from the rocket, the attitude of the satellite is stabilized at first and the solar panel is directed to the sun. On the landing phase, OMOTENASHI spins around the z-axis to stabilize its posture before firing the RM. The RM is powerful but tiny that it can only decelerate the speed. Therefore, the RM and SP escape from the orbiting module.
- This is a semi-hard landing
- Based on the result of practice, surface probe (SP) can survive up to 10000g.
- From orbiting module, it transmits beacon messages via PSK31 modulation.
- Orbiting modulation also has a receiver, so we try to send several messages to OMOTENASHI from the ground station at Wakayama in Japan.
- The surface probe (SP) has an accelerometer inside and can transmit the acceleration data inside with FM modulation.
- The digital format is PCM-PSK/PM and it may be studied to PPS but the most interesting transmission format is analog FM modulation.
- The mission of OMOTENASHI is finished if we succeeded in firing the rocket motor and the OMOTENASHI flies to the moon

Highlights (Continued)

- However, the observational data is worth recording because it explains how OMOTENASHI landed on the moon.
- If the major acceleration varies, the carrier gets higher or lower in the 14KHz bandwidth.
- The carrier has been assigned to each of the three axes so the observed outer studying signal is three
- As surface probe (SP) has no receiver, it automatically switches from FM modulation to PCM-PSK/PM
- The ISM antenna could not be mounted from the restriction of structure, therefore SRR-antenna has been designed at 437MHz.
- The surface probe antennas are designed using inverted-F antennas
- The ground station is under preparation with Wakayama University



Pictured: Shows how the moon lander is ejected and deployed on to the surface

3. Presentation on "A Year in Review-UNISEC Global"

Nate Taylor, UNISEC-Global

As a Duty Manager and Space Communicator at the Australian Space Agency's Australian Space Discovery Centre, Nate Taylor assisted in the development of a team of science communicators to inspire and grow the Australian space sector, delivering and developing space educational resources through UNISEC-Global -including an address to UNCOPOUS in April 2021- and being a core member of UNISEC's Space Education Policy Compendium while facilitating online programs.



Pictured: Nate Taylor provides an overview of events in 2021

Highlights:

- Respects to Prof Plamen Dankov who we lost due to post covid complications on 28th of January.
 - Prof Plamen Dankov has published more than 125 papers presented in different journals and conferences and he was also the organizer of the MIC 2 seminar in Bulgaria in 2012 as well as the leader of the Sofia University team where he was also the assistant professor.
- The picture below was taken by the ISS by Astronaut Team Copra in 2016. In this image, countries can be seen from left to right along the Mediterranean coast that including Egypt, Gaza, Saudi Arabia, Israel, Jordan, Lebanon, Syria, and Turkey. This image is a good perspective that can be kept in mind for the new year and hopefully work together more to achieve things that are much bigger than ourselves.



Pictured: Image taken aboard the ISS by Astronaut Team Copra in 2016

- The year 2021 has been a year of challenges
- A lot of the activities had to be canceled or postponed and this included the inability to reschedule the previously canceled 8th UNISEC global meeting.
- In addition to this, HEPTA-SAT training and CLTP11 training had to be cancelled
- But we had the chance to explore new possibilities
- In collaboration with UNISEC Japan launching the UNISEC academy where a series of lectures about space engineering and machine design has been launched as well
- In order to reach a lot of people, sometimes developing content online can be an effective platform
- Several other presentations have been made throughout the year on various international platforms and that is an attempt to try to get closer to the goal of vision 2030.
 - The vision 2030 is to create a world where university students can participate in practical space projects in all countries.
- The MIC 7 was concluded after a year of its announcement.
- The fantastic thing about creating hybrid competitions and lecture series is the recordings continue to be accessed by anyone who can connect to the Internet that wants to learn about satellite engineering and machine design.
- Quite a lot of growth is seen from the corporate members in support of UNISEC activity
- The plan for 2022: **MIC 8** is coming which is going to challenge students to carry out design of multiple satellites of 6U or smaller. The size of the constellation has to be obviously greater than one.
- Aside from the mission idea contest, in-person training platforms are going to return but also the aim is to develop a bridge version of HEPTASAT called HEPTASAT-Lite.
- Set a goal of lining UNISEC systems among all of the UNISEC local chapters in a really explicit way.
- Continue to adopt integrated learning/hybrid time-saving approaches to some of our activities

4. Breakout Discussion and Sharing

Moderators: Nate Taylor, UNISEC-Global



UNISEC-Global The 16th Virtual Meeting Breakout Discussion

I. A Year in Review: (35 mins)

We would like you to use the time in the breakout rooms to discuss what would you like to see more of from UNISEC-Global in 2022?

Some ideas to help (all optional):

- Topics/Featured speakers (who?)
- Length and frequency of future meetings (monthly/quarterly; 1hr/2hr; etc.)
- Networking sessions (similar to breakout room activities but with the purpose of getting to know each other better)
- Projects/support for your region
- Online lecture series (similar to MIC7 Lectures / KiboCUBE / UNISEC-Academy)
- Competitions (such as MIC8)
- Speaking opportunities

How would the items you identify improve the community or impact in your region?

After closure of Breakout session (10 mins)

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

Pictured: The session focused topic possibilities for the year 2022

Highlights:

- Receive thoughts on what can be done next year in terms of planning
- Ideas on speakers, length and frequency of meetings and host networking sessions

Group	Speaker	Highlights
Room 1	Vidmastas Tomkus	<ul style="list-style-type: none"> - UNISEC should be more market-oriented because many developing countries need funds for better education. - Possible topics: <ul style="list-style-type: none"> - Optical broadband communication including quantum communication. The idea about these topics should be presented in academia and may be presented in the next mission contest
Room 2	Mansur Celebi	<ul style="list-style-type: none"> - We can organize some business sessions by corporate members and we can increase those corporate members. This can be one idea for marketing. - Create some opportunities for newly graduated space engineers - Search programs by UNISEC academy based on specific topics
Room 3	Cortes Rocillo	<ul style="list-style-type: none"> - The idea after the discussion is how can we get bonding for the praise because it is very important and also I think it is related with the participation before mine about business. - The second idea is to have a workshop to discuss, for example, the transfer of technology and related to other topics. - It is important to divide exercises for all levels.
Room 4	Rainer Rainer	<ul style="list-style-type: none"> - Error in space, astrobiology, space medicine are the topics that we should discuss next year

Group	Speaker	Highlights
Room 5	Kamran	<ul style="list-style-type: none"> - Want competitions for students on robotics or long-distance communication. - Presentations on the internet in space - Startup lecture series on the design of CubeSats because the people who are new to this group actually want to go for design or something will help them a lot. So it will be very nice if we can present something. - Want to have some presentations or workshops on artificial intelligence in space - Want presentations and workshops on sustainable energy like electric or chemical propulsion for CubeSats, how can we manage this for beginners,
Room 6	Ana Rebeca	<ul style="list-style-type: none"> - More theoretical lectures about space dynamics, microgravity space experimentations, constellations such as Starlink, and also in different types of proportions, mostly electric. - More current trending topics and up-to-date events in terms of transition of hardware to cloud applications and the storage of information, its access through several stations. - Satellite communications not only between the ground station and satellite but also between satellites. - Also want to know about Quantum computing, software device systems like the Internet of Things(IoT). - 2 hour format is ok, but want to implement session for networking
Room 7	Wataru Torii	<ul style="list-style-type: none"> - Our group discussed how to encourage students in the future - There is an opinion of using commercial tools or media to participate in some kind of contest or sessions to develop or study spacecraft designing.

5. MIC6 Progress Report: MUSA Project Suborbital Flight

Carlos Rodriguez, Orbital Space Technologies

Carlos Rodriguez is an electromechanical engineer and a physics student from Costa Rica. He is the co-founder of TECSpace. His team won in the MIC6 ICECubes category. He is helping other students in the region to gain access to similar opportunities by conducting central pre-Mission Idea Contest.



Pictured: Carlos Rodriguez giving a presentation on the development of MUSA project

Highlights:

- MUSA project won the 6th mission idea contest on the ICECubes category
- Project studies fungus in microgravity setting that causes the Panama disease
- This project hopes to see different gene expressions because of the stress of the space environment which will eventually lead to giving information that might be useful to develop a CubeSat for the disease.
- Experiment is thought of to go on-board of the ISS somewhere in 2023 and will be on board of the ICECubes facility.
- Recently signed a contract with Space Systems Laboratory in Costa Rica and with the Central American Association for Aeronautics and Space.
- Aims to send a mission in orbital flight to space and test this experiment in real space conditions
 - Important because it is the first time that Costa Rica has had this kind of experiment
- Right now, working with the Swedish Space Company (SSC) to launch the mission to space. It will be a short orbital flight on their Express Mission 3 and it will test all the critical things that the CubeSat needs to do in space so that we know all the systems work and are able to sustain the **launch and reenter conditions** because we need to have the samples returned to us.
- The project is in the funding stage
- After that manufacture mechanical components, integrate the system, assemble and test the flight object
- Give it to SSC for launch and test all of the critical components
- After the testing is successful, optimize the data, revise it and launch it to the ISS and do the operations
- Finally, need to sample analysis and document the results



Pictured: MUSA project aims to study a fungus used for treating the Panama disease in microgravity

Q&A:

Itzel N. Cortes Rocillo: My question is about the funding because, in our group discussion, we talked about the funding. Does Costa Rica have programs to support space companies?

Carlos Rodriguez: Right now we do not have such a system. The universities have some projects but it is very low especially if it is for student programs. It is about 2000 dollars per semester. So, it is not enough for sending something into space but what we have found is that to sell something for companies, something that will be useful for researchers and industry and that way we can ensure that people will collaborate with us in future. For this particular orbital flight, we are doing a crowd funding campaign because we believe we should ask for cooperation from companies and the industry once we have tested our technology. So, what we are trying to do, is to validate all the technology in the orbital flight, and then we can think of doing the experiment in a more serious environment. So, it is the route that we are taking right now.

6. New member acknowledgment, announcements and closing

Rei Kawashima, UNISEC-Global



Pictured: Kawashima-san making announcements for the UNISEC-Global Community

Highlights:

- **Introduction of new members**
 - Batangas State University, UNISEC Philippines
 - This is the 13th academic institute to join the Philippines chapter of the UNISEC-Global.
 - El Salvador
 - **(Luis Alfaro briefly describes the plan of UNISEC with El Salvador)**
 - This year in Dubai, introduced a long strategy to partner with some universities of El Salvador to support the aerospace field.
 - Earlier this month, initiated and have a ready Memorandum of Understanding (MOU) to join as a global chapter for UNISEC in 2022.
- **Launch opportunities**
 - KiboCube's 7th round application will be closed on December 31, 2021.
 - J-Cube which is a JAXA and UNISEC Japan's program is providing discounted launch opportunities and the deadline is on January 31, 2021 (info-icube@unisec.jp)
- **Next virtual meeting**
 - The date for the next virtual meeting is on **January 22, 2022 (10:00 pm-0:00 am, JST)**
- **Future planning**
 - The ISU Adelaide Conference will be held on February 4-5, 2022.
 - The conference will be completely dedicated to space debris.
 - Link for registration: - <https://www.adelaide.isunet.edu/>
 - The 10th Nano-Satellite Symposium will be held from February 26 to March 4, 2022.
 - The 3rd IAA Latin American Symposium will be held in March in Ecuador in 2022.
 - The 73rd IAC will be held at the Paris Convention Center next year.
 - The 11th Nao-satellite Symposium, 8th UNISEC-Global meeting (in person), 8th mission idea contest will be held in October or November next year in Turkey.
 - The CLTP11 is planned to be organized in August 2022 in Japan. However, might change.
- **Call for Idea: 8th MIC**
 - The requirement is the mission is carried by multiple nanosatellites.
- **Want to have a session on "Congruent System Among UNISEC Local Chapters"**

Small notes from participants

Kamran Saleem:

Hello everyone, first of all, I would like to thank Dr. Rustem. He was here two days ago in Islamabad, Pakistan and he introduced this platform to me and I found this very interesting and informative and hopefully, I will get a lot of information from here because most of the students here we have are actually beginners and not have much experience in space technology. So I am glad that I am a part of this team and thank you very much.

Fahad Moumni:

I would like to share an idea. I just had a small idea. Thinking about the fact that we are having a lot of people from academia and universities, I assume we also have a lot of professors. So one idea that I don't know if it was already suggested before but if it would be a platform, a UNISEC-Global or UNISEC-Web platform where we have classes given by teachers and record them and that would be like kind of online courses since we are having a lot of teachers from all around the world and I believe we have different methods, different ways of seeing things and also different subjects that we can talk about in space engineering. So, I believe it would be a good idea as we can lecture from Turkey, another one from Mexico, Japan and we can gather those in some platform and so that whoever wanted to consult these classes either do it through the network or has an open-source. So what do you think Kawashima and Mr. Nate about this idea? It just came to my mind.

Rei Kawashima: *Is it like the lecture series?*

Fahad Moumni: *Yes, kind of lecture but more like an organized platform. For example, I go to a website and have CubeSats and then I have I don't know "Communication-related classes" and then I have some professors from Turkey, Japan, etc. The other thing maybe "Power Sub-system" and then I have someone from JAXA talking about this, someone from Costa Rica. Just a bit of everything.*

Naseer Ahmad:

*Hello everyone, I thought to share my journey to get space friends. So that's why I thought to talk for a few minutes. Hopefully, everyone is fine there. My name is Naseer Ahmad from Afghanistan. As I started my journey from an Afghan refugee to become a space scientist. I was working with the space program in Kabul. I had some students over there and they also ask to establish and to work on the CubeSat at Kabul University.
[connection lost]*

Nate Taylor:

I want to say to everybody that thank you very much for your participation and your support throughout the whole year. Behalf of everybody from UNISEC-Global, I would like to extend my wishes to you for a happy and safe holiday season across this period and whatever you doing and whoever you are with, I hope it is full of joy and happiness and we will see you at the next meeting.

Satoru Kurosu:

I wish everybody a happy holiday season and see you. Thank you all.

Rei Kawashima: *I appreciate that though you not being a space engineer a businessman, you participated in this meeting every time. You joined very actively and I do appreciate that. Thank you very much and thank you very much to everybody. This is the last meeting this year and I did not expect that we continue this meeting because I expected that the pandemic will be gone quickly soon but unfortunately, we had to continue this. That's why we could meet new friends from Africa and even from Afghanistan. Without this technology, we could not do that. So, I want to say thank you for everything and I wish you all a happy new year and happy life ahead. Thank you very much and see you again next year on January 22, 2022, in the UNISEC-Global meeting again.*

Wataru Torii: *Thank you for your invitation.*

Rei Kawashima: *You (Wataru Torii) have made a huge difference in this community. What you are doing is influencing all of us. So thank you very much and we all support your project.*

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/>

7. Participant Statistics

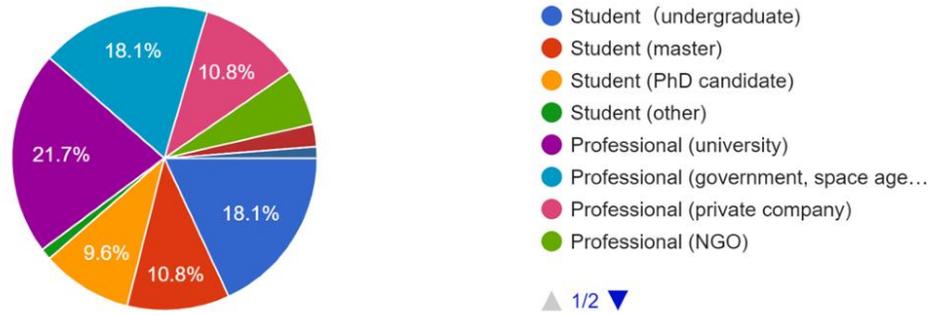
81 registered participants from 35 countries/regions participated in the 16th Virtual UNISEC-Global Meeting.

Country/Region	Number of registrants	Country/Region	Number of registrants
Afghanistan	1	Japan	9
Argentina / Freyre - Córdoba	1	Kenya	1
Australia	1	Lebanon	1
Bangladesh	1	Lithuania	2
Bulgaria	1	Malaysia	2
Cameroon	1	Mexico	2
Chile	1	Myanmar (Burma)	2
Costa Rica	1	Nepal	2
Egypt	6	Pakistan	3
El Salvador	1	Perú	1
France	1	Philippines	11
Germany	1	Rwanda	2
Ghana	1	Singapore	2
Guatemala	1	Sudan	2
India	3	Taiwan	1
Indonesia	1	Tunisia	1
Iraq	1	Turkey	9
Italy	4		

8. Participant Questionnaire

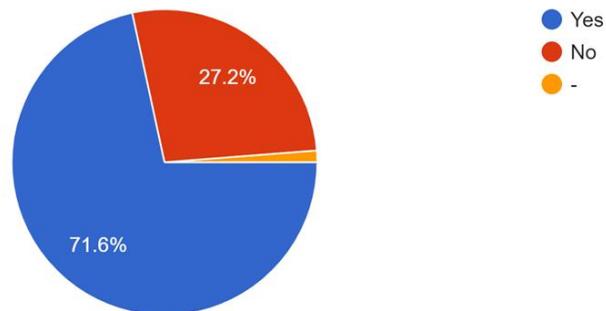
Student or professional?

83 responses



Have you participated in the UNISEC-Global Meeting previously?

81 responses



Thank you