UNISEC-Global The 56th Virtual Meeting

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(Standard Japan time GMT +9)

The following report was prepared by UNISEC-Global Secretariat
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1 Opening Remarks

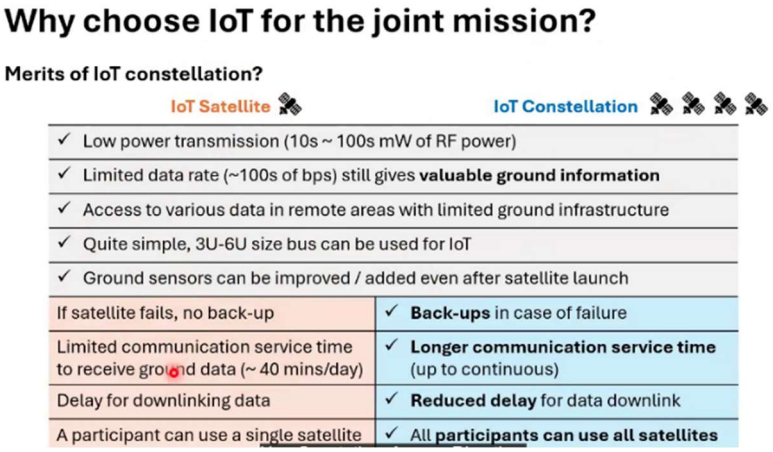
- Maximilien Berthet, The University of Tokyo

Dr. Maximilien Berthet is an Assistant Professor at Kojiro Suzuki Laboratory, University of Tokyo, Japan. He earned his Master's degree from the University of Durham and the University of Tokyo and his Ph.D. degree from the University of Tokyo. His Master's degree is in General Engineering, Aeronautics and Astronautics; he completed his Ph.D. in Aeronautics and Astronautics. He worked as a Research Fellow from April 2022 to October 2022 in Japan Society for the Promotion of Science. In November 2022, he became the Assistant Professor of the Department of Aeronautics and Astronautics. His research focus is on the dynamics of small satellites in low Earth orbit, applied to mission design for easier access to space via solar sails and drag sails. He is actively involved in research on space capacity building and the history of space development, with a focus on Southeast Asia.

Pictured: Dr. Berthet while giving the opening remarks

Highlights:

- Topic is “Nano-Satellite IoT Constellation Program by International Collaboration”
- 20+ years of satellite heritage of UNISEC
    - Launched 60+ satellites from 41+ universities in Japan alone
- UNISEC PoC in 69 countries and Local Chapters in 29 countries around the world
- Nano-Satellite Constellation Program
    - Jointly design satellite bus (3- 6U)
    - Own funding, and if difficult, can collaboratively search for international funds
    - Each country has its own specific mission payload
    - One common mission payload
        - **Decided to be an IoT-type payload**
- IoT-type payload was chosen to benefit diverse sectors through data collection
- Major limitations of ground infrastructure
    - Terrestrial communication can be costly in remote areas
    - Communication among multiple, far-distributed sensors is costly and complicated
- Satellites can communicate with remote locations
- Data collection methods are downlink and uplink, aka ‘store and forward’
- Is a cost-effective solution overall
- Although the data rate is limited, it can still give valuable ground information



Pictured: Dr. Berthet presenting the pros of IoT satellite and constellations

- Some common use cases are
  - Remote asset monitoring, flood detection/monitoring, fire detection/monitoring
  - Wildfire monitoring, oil spill detection/monitoring
  - Drought detection/monitoring, wildlife monitoring
  - Landslide risk monitoring
- Can address global challenges by combining data from all the satellites and all around the world
- Such problems are mostly common all around the world
- Timeline

Jan-Feb 2025	:	IoT mission proposals | Mission overview and data requirements
March 2025	:	Frequency information for uplink | Frequency bands, RF Power Limits, License Requirements
Apr-June 2025	:	Hearing session with stakeholders | Stakeholder needs, expectations, advice, Cost Estimation
July Onwards	:	Onboard receiver module | Teaching, design

- Participants were asked to prepare IoT mission idea proposals in the first stage of this program
  - Asked to identify sensor and data type, stakeholders, objectives, and societal contributions
  - Also asked to identify specific requirements of the mission
- Then, participants were asked to research on specific low-power radio stations in their country
  - Frequency band(s)
  - RF power limit
  - Technical compliance certifications, licenses, or operation conditions
- In stage 3, stakeholders' needs, expectations, and advice were considered
  - Cost estimation, discussion, and planning are also conducted in this stage
- **Proposals received from over 20 countries around the world as of now**
- Mission proposals cover a wide range of objectives
- 12 IoT mission idea presentations and 2 IoT company presentations done so far
- Encourages proposal submission if not done yet

2 IoT Mission Idea Presentation (1)

○ Bassem Boshra, SpimeSenseLabs

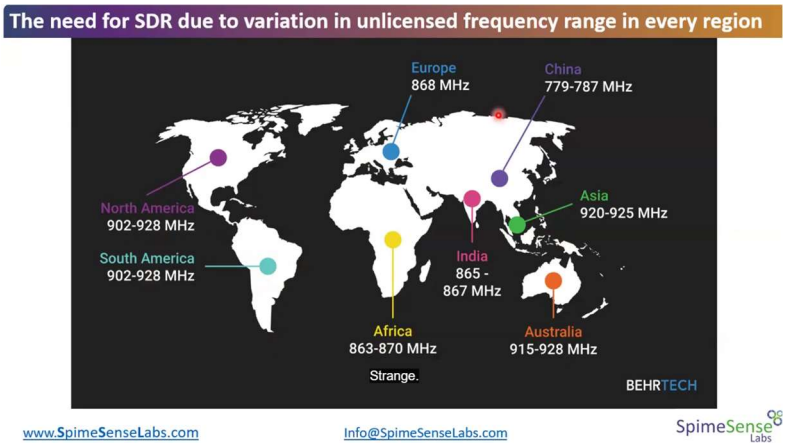
Bassem Boshra is the CEO and founder of SpimeSenseLabs, an Egyptian company specialized in building innovative IoT solutions and services. He began his career in 1995 as a programmer working on low-level system development and internet banking solutions. At Ericsson, he contributed to mobile internet, system integration, and software development projects across the Middle East and North Africa.

He is currently leading **MasterOfThings.com**, a platform for rapidly building IoT and M2M applications.

Pictured: Mr. Boshra during his presentation

Highlights:

- SpimeSenseLabs (SAE) is an IoT solutions provider established in 2013
    - More than 11 years of experience
    - Certified by a global telecom vendor
    - Delivered innovative solutions to telecom operators & government agencies
    - Vision is to develop innovative applications and platforms to facilitate industry verticals
    - Received various local and international awards
    - Has worked on a smart transportation station project in Egypt
    - Has more than 11 IoT education and innovation labs in collaboration with the MCIT (Ministry of Communication and Information Technology)
- Existing IoT solutions have 3 basic layers in a logical context
    - 1st Layer – IoT devices themselves
    - 2nd Layer – Platform
        - Provided by 'Master of Things' (masterofthings.com)
            - an application enablement platform
    - 3rd Layer – IoT Applications
        - Such as Access Control,
        - Digital Signage,
        - Env. Monitoring,
        - Asset tracking,
        - Queue Management,
        - Remote Fire Detection,
        - Transportation Management
- **First Mission proposed to UNISEC: Development of an Emergency Communication Device**
    - Provides communication where there is no mobile network coverage
    - Useful for tourists, for engineers, in rescue missions, and in case of disasters
    - Is used as a mobile accessory, and will connect the mobile to the satellite
- For this to work properly, from regulatory perspective, the frequency range needs to be determined according to the device location.



Pictured: Mr. Boshra presenting the different frequency range around the world

- Not just the satellite that needs to comply with the frequency regulations in each region, but the devices on the ground also need to comply with the allowable frequency regulations.
- Thus, the location of device use is also crucial to determine the allowed frequency
- **Second mission proposal: IoT Platform for UNISEC Nano-Satellite IoT Constellation**
    - Cloud-based platform for sensor data collection, user access right management, data visualization, applications development.
    - Will ensure management of the sensors' data collected by IoT Constellation Mission Then dropped to GS around the world and finally to the central platform on the cloud .
- Inspired by MasterOfThings IoT AEP (Application Enablement Platform) that he worked on.
- Allows users owning the data to to quickly and easily build Data visualization and applications utilizing their data.
- platform replication on various geographical locations can also be developed in later stages.

Q/Ans:

Q: **A. Rüstem Aslan: For example, in your idea, when there is no coverage, if it is for humans, then it is fine. But if you want to share information for a general purpose, then what will be the benefit of your idea? We will need many satellites for that.**

A: ***Bassem Boshra:*** *Yes, for sure. The minimum is requested here is to provide a constellation that makes communication available every 30 minutes or 40 minutes, but once we are using a bigger constellation, we can have much more frequent communication, and that would be the beauty about having a constellation. It can allow you to communicate every minute, so you can send a message and see the response within the same minute. That's the best situation. But in the worst case (with small constellation), you're sending the message in an emergency situation, and you know that this message will be delivered to its destination within 30 to 40 minutes. That is still good enough in emergency situations when you don't have any communication at all. That can save the lives of many people. It can also help engineers who are doing remote work or requesting help from their colleagues.*

Q: **Mansur Çelebi: I want to know if there are any practical applications of this project. Have you launched a connection with any ground vehicles? Maybe some UAV or other vehicles?**

A: ***Bassem Boshra:*** *We have not implemented IoT use cases using Satellites yet. But for terrestrial networks (whether 4G, LoRaWan, BLE, SigFox, etc.) we have implemented a lot of those IoT use cases using MasterOfThings IoT platform.*

In the first slide that I presented, I was just summarizing the number of use cases that we've implemented with MasterOfThings. One of the famous use cases we have implemented is a government central transportation station. We have 10 IoT use cases implemented using MasterOfThings platform to automatically manage everything in the central transportation station, where we manage the whole transportation facility from this transportation station. We manage the station entrance and exit access gates (automatic drop arm gates) for controlling flow of cars/micro buses entering to (and exiting from) the station to provide transportation service, a digital wallet for every bus owner, automatic collection of station service fee from every wallet, manage the travellers' guidance

screens (17 screens inside the station. One screen dedicated for each destination) displaying information about the schedule for each destination inside the station, manage the station lighting intensity and schedule, manage the station digital signage screens with its scheduled content, operation room maps to track the transportation cars/buses wherever they are during the trip. We also provide a mobile application for fleet owners to track the location of their own transportation buses. All of these IoT use cases are just one of the customer implementations.

I cannot really count the number of IoT use cases we have implemented using MasterOfThings IoT platform for all our customers during the 11 years representing SpimeSenseLabs company life.

3 IoT Mission Idea Presentation (2)

○ Essien Ewang, National Space Research and Development Agency

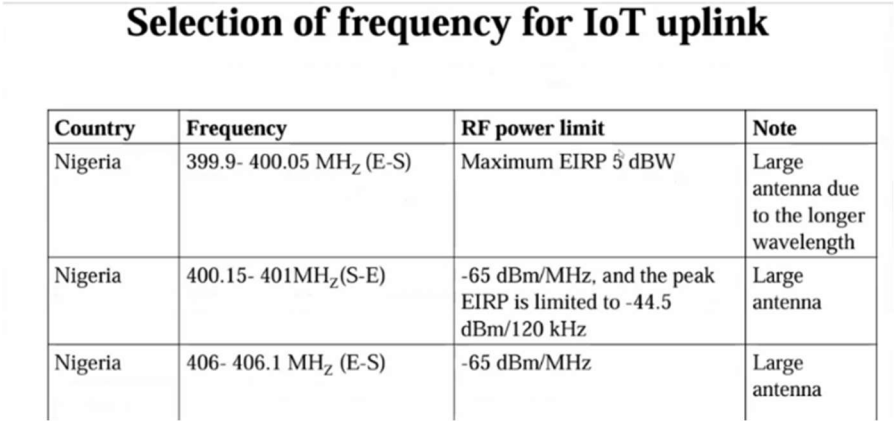
Dr. Essien Ewang received his Ph.D. in Space Systems Engineering from the Department of Engineering, Kyushu Institute of Technology, Japan, in 2017. He studied and obtained an M.Sc. in Electronic and Electrical Engineering, Obafemi Awolowo University, Ile-Ife, Nigeria, in 2014. He also studied and obtained B.Eng. in Electrical and Electronic Engineering, M.Sc. in Public Order and Information Management (POIM), and B.Sc. in Mathematics, University of Uyo, Uyo, Nigeria, in 2009, 2005, and 2000, respectively. Presently, he is serving as a Space Systems Engineer in CSTD under the auspices of the National Space Research and Development Agency (NASRDA) in Nigeria. He is the head of Industry and Academic Linkage, among other positions. In addition, he is an Assistant Professor in the Institute of Space Science and Engineering, NASRDA, an affiliate of the African University of Science and Technology, Abuja, Nigeria. He also serves as an Adjunct Assistant Professor at the University of Abuja, Nigeria. His research interests include Small Satellite, Space Environment Interactions, and Innovations.

Pictured: Dr Ewang during his presentation

<u>Highlights:</u>

- UNISEC-Nigeria
    - Established in 2013
    - Participated in CLTP 1,2, 3
    - Attended UNISEC Global meetings regularly
    - Organize MIC seminars, workshops, and practical space activities intermediately
    - A chapter is made up of
        - Member universities: 14
        - Students: 27
        - Professors: 9
        - Cooperating members: 2
- Background of IoT mission idea
    - Three socio-economic/ environmental problems identified that can be addressed using IoT missions
        - Identified problems are
            - Oil Spillage

        - Agriculture field monitoring
        - Flood Detection monitoring
    - Has a huge impact on the economy and social life
- Mission overview/requirements
    - Oil Spill Monitoring
        - Hydrocarbon sensors used
        - Data on the early detection of oil spillage is collected in the environment
        - Data frequency is once per day
        - When oil spillage is detected, the data frequency is once per hour
    - Water Level Monitoring
        - Water level detection sensors used
        - Monitoring helps with irrigation planning and early flood detection
        - Data frequency is once per hour when a flood is detected, otherwise once a day
        - Deployed every 2 km in agricultural areas
    - Soil Properties Monitoring
        - Soil moisture content, pH, temperature, and nutrient level
        - Monitoring of soil moisture content, pH, temperature,
        - Frequency is every day in the planting season, otherwise weekly
        - Deployment in 2km in agricultural areas
- Frequency for IoT Uplink



Selection of frequency for IoT uplink

Country	Frequency	RF power limit	Note
Nigeria	399.9- 400.05 MH_Z (E-S)	Maximum EIRP 5 dBW	Large antenna due to the longer wavelength
Nigeria	400.15- 401MH_Z(S-E)	-65 dBm/MHz, and the peak EIRP is limited to -44.5 dBm/120 kHz	Large antenna
Nigeria	406- 406.1 MH_Z (E-S)	-65 dBm/MHz	Large antenna

Pictured: Dr. Ewang presenting the frequency selection for IoT uplink

- Conducting a hearing session with stakeholders
    - Involves collecting feedback from each type of stakeholder
    - Estimate costs for each mission and project
- Future task
    - Continue with nano-satellite IoT constellation mission program
    - Collaborate with the local/international institutions on nanosat development

Q/Ans:

Q: **Rei Kawashima: If you put such an expensive device in the river to monitor water level, somebody may steal it. Is it safe in Nigeria?**

A: ***Essien Ewang:*** *We have had this conversation in our stakeholder meeting. We are working out to secure such a device in such areas. I think the action is in progress. Of course, we are going to protect that device.*

Q: **A. Rüstem Aslan: What is the cost of the sensor?**

A: ***Essien Ewang:*** *The cost for now, we are still working on the costing part of it. We have not analyzed how much it will cost. Maybe in the next couple of weeks, we will know how much this will cost.*

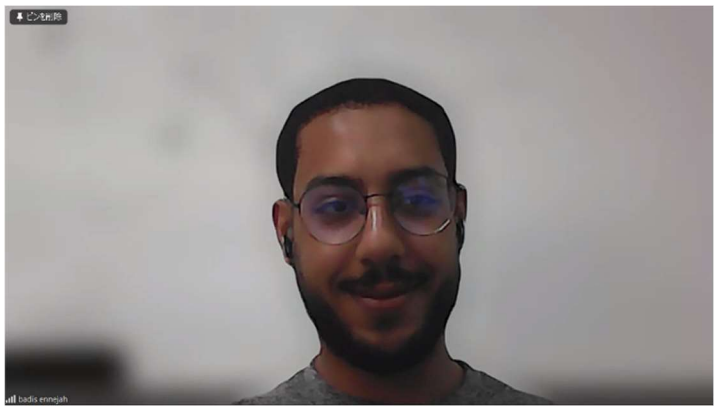
Q: **George Maida: Are you working with any universities?**

A: ***Essien Ewang:*** *Yes, many universities. For now, there is a university named Cosmopolitan University, which is very interested in the mission. Others are also ready to commit.*

4 IoT Mission Idea Presentation (3)

○ Badis Ennejah, Monastir University

Mr. Badis Ennejah is currently a PhD student at FSM and CRMN, pursuing research in the field of Micro and Nano Electronics. He previously earned a Research Master's degree in Micro and Nano Electronics and obtained a Bachelor's degree in Electronics, Electrotechnics, and Automation, specializing in Embedded Systems, in 2022.

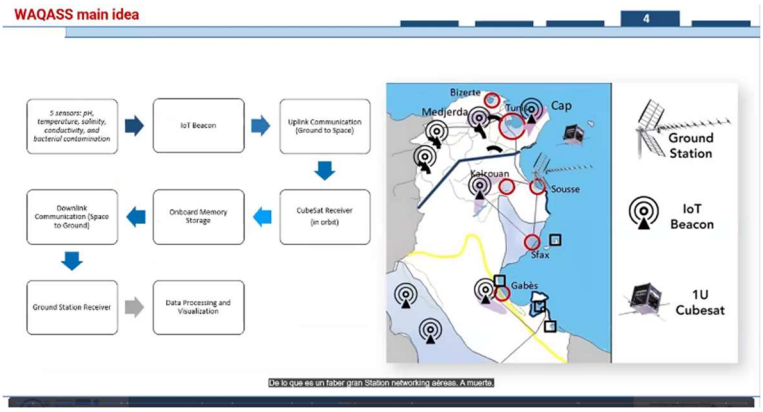


Pictured: Mr. Ennejah during his presentation

Highlights:

- Extends acknowledgement to the UNISEC community
- Topic is Water Quality Awareness Satellite System (WAQASS)
- Project inspired by the scarcity of water in remote parts of the world
    - "Access to safe water is a fundamental human need and, therefore, a basic human right."
- Report shows only 19% of Tunisians are satisfied with water quality
- Tunisia ranks highest in the country with the most water quality dissatisfaction
- Other countries such as Afghanistan, Liberia, Ethiopia, Congo, and Sierra Leone rank close
- Mission idea proposal: Single Payload, Software-Defined Radio (SDR)
- 5 types of data
    - pH

    - temperature
    - salinity
    - conductivity
    - bacterial contamination
- Transmitted to the IoT beacon and uplinked to the CubeSat
- Downlinked to GS, and data is processed and visualized
- The goal is to enhance space technology capacity by increasing local expertise in CubeSat fabrication
- Addresses the pressing water resource management issue
- Strengthens regional collaboration by establishing partnerships
- Meets SDG 4, 6, 17 directly and 3, 9, 11, 12, 13, 14, 15, 16 indirectly
- Call for collaboration: deploy IoT beacons
    - Is seeking partners interested in deploying IoT beacons in their country



Pictured: Mr. Ennejah presenting his IoT mission idea

Q/Ans:

Q: **Bassem Boshra: I have a question about deploying the beacon. I assume this is to be deployed within an area where there is water, right? It might be a lake; it might be a river. Which technology is the beacon using? How does the beacon transmit data?**

A: ***Badis Ennejah:*** *We are in the phase of developing, maybe we'll use SDR. Software Defined Radio.*

Bassem Boshra: *Yes, but which wireless technology will you be using? Yes, Software Defined Radio Chips, but which wireless technology will you use? Outside the satellite, how do you send the data?*

A. Rüstem Aslan: *I believe they are using LoRa.*

Q: **A. Rüstem Aslan: How do you connect your project with UNISEC Global's Project?**

A: ***Badis Ennejah:*** *Our project is supporting many universities with water quality monitoring, which allows us to know the quality of water in our country. It is using IoT technology.*

A. Rüstem Aslan: *You are proposing a 1U CubeSat. Would it be enough to have only 1 Unit? Have you analyzed whether the resources provided by the 1U CubeSat will be sufficient?*

Badis Ennejah: *I think it will be sufficient. Our only payload is SDR. So, the main task is communication.*

Q: **Rei Kawashima: You mentioned water quality management. I need to understand what is water quality management. What do you measure? pH? Temperature?**

A: ***Badis Ennejah:*** *The mission of Water Quality Monitoring, we measure pH, Temperature, and Bacterial Contamination which we can know from the data how the bacteria or what makes the water pollute.*
Rei Kawashima: *You will measure bacteria? What kind of bacteria?*

Badis Ennejah: *Anything that can pollute water, we try to measure.*

Rei Kawashima: *May I conclude that you are still in the process of investigation?*

Badis Ennejah: *Yes.*

Rei Kawashima: *Thank you.*

Q: **Omar Ahmed: Why would we use a beacon if we have the ground station? We can process the data in the ground station.**

A: ***Badis Ennejah:*** *The beacons will uplink the data from water sensors. But the ground station is the place where we will downlink the data to analyze.*

Omar Ahmed: *Can we not cover the location with IoT systems? What will we send to the beacon if data is already collected in the ground station?*

Badis Ennejah: *We don't send data to the beacon. We only send data to the ground station.*

Omar Ahmed: *So, the beacon already has the data. Then it is sent to the ground station.*

Badis Ennejah: *The beacon collects the data. The data is uplinked to CubeSat. Then the data is downlinked to the ground station.*

Omar Ahmed: *Why do we have this bridge when Beacon has the data? Why don't we use a beacon in the first place to analyze data?*

Badis Ennejah: *Because we can't build a ground station in many places. It is costly. So, we need to put small beacons to uplink and collect the data.*

5 IoT Company Presentation – Lacuna Space

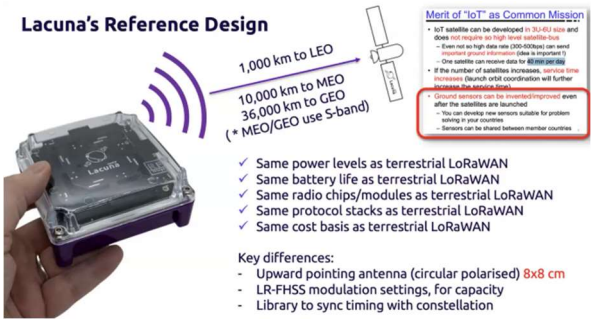
- Jon Pearce, Lacuna Space

Mr. Jon Pearce graduated in Electrical, Electronics, and Communications Engineering from University of Exeter. He has been with Lacuna Space for 3 years and now acts as their Chief commercial officer.

Pictured: Mr. Jon during his presentation

Highlights:

- The goal of Lacuna is to connect the unconnectable
- The majority of the planet is outside of ground coverage
- Lacuna is a small company with about 20 people
- It is located in Harwell Campus, UK
- About the previous UNISEC presentation to show where Lacuna stands
    - Lacuna has done a project on elephant trackers
    - Done lots on agriculture and farming
    - Has not been involved in oil pipeline, water distribution, and remote infrastructure
    - Lacuna uses a store-and-forward architecture
    - They have satellites based on SDR IoT payloads
    - Six-year heritage
    - The most critical parameter is capacity
    - So, Lacuna uses LR-FHSS modulation
    - 863-869 and 902-928 MHz bands (continental switching)
    - Lacuna satellites have been in the range of 3U to 6U
    - With a 488 bps
    - Currently stands with 6 satellites distributed in 3 planes
    - Also, make payloads available to other companies



Pictured: Mr. Jon presenting Lacuna's Reference Design

    - Route to market is open source
    - Customers always need a special sensor or industrial device
    - Lacuna helps IoT device makers add satellite capabilities to it
- Lacuna invested 6 years in spectral scanning
- Now holds a global database of spectrum profiles
- Not using satellite IoT today because
    - High power drain
    - Expensive services and terminals
    - Licensing
    - Large and directional antennas

    - Compatibility
    - Sovereignty concerns
    - Proprietary
- Lacuna solves these problems
- Lacuna SDR IoT payload is available to use on UNISEC common mission
- Lacuna can support technical and regulatory challenges
- Services and devices are available

Q/Ans:

Q: **UNISEC participant: Among different IoT companies, how compatible are their respective ground segments and satellites? For example, can a LoRa WAN ground transmitter developed by one company basically be used with other companies' satellites, and vice versa?**

A: ***Jon Pearce:*** *Yes, as mentioned, we are doing some work within the LoRa alliance. There is a satellite test force with a few different vendors. We all arrived with some unique way of doing something like the orchestration I mentioned, where we are conscious of orbits. Some other companies use beacons, for example. And within the LoRa alliance, we are trying to converge all of those various parts of it so we can all be compatible. And in Lacuna, we use both the Almanac method and the Beacon method as well. There are some deviations where some vendors are using license spectral 2GHz S-Band, and again, Lacuna uses both SRD S-Band, so we're trying to cover all those. I think the market is a little bit nascent. It will take a bit of a shakedown before all of these segments converge. But fundamentally, yes, a device built for one network can connect to another network. Hopefully, that was one of my points that I know I briefly skipped over to avoid vendor-locking. It is important for people to know, if one company is not there in 10 years' time, there will be another company they'll move to.*

Q: **UNISEC participant: You have 20 mW power. How do you close the link? Do you do it when the satellite is near the horizon? Or what will be the practical elevation angle? Because you are saying 12 minutes, typically tracking time is 7-9 minutes. It seems you can use only 2 minutes, so the elevation should be very less**

A: ***Jon Pearce:*** *Minimum elevation is around 45 degrees. In other regions in America, we use 100 mW S-Bands. We use 400 mW, and actually, the gain in MEO satellite in S Band is probably a big contribution to the lower elevation angle. That is almost done on the horizon.*

Rüstem Aslan: *Not very, very low power.*

Jon Pearce: *Well, that's still multi-year battery life, and I think it is important in most of these cases. It's just a simple upward pointing antenna, so it's not directional apart from being a hemispherical antenna. We don't point the antenna to the satellite.*

Q: **Bassem Boshra: Can you please elaborate a little bit on the Lacuna platform on the cloud? Can you give us more information on that?**

A: ***Jon Pearce:*** *The Lacuna platform is relatively simple. It is a rooting platform. We are collecting data from ground stations all around the world that are targeted at us. We have to solve those packets and route them to their correct owner. There are numerous vendors; the LNS is on the right-hand side of this slide. There are numerous vendors for LNS. Things network, OBY, etc. We need to identify where the packets should go and send them to the right place. That's the main work of the lacuna platform. Authenticating and routing a packet. We don't do any visualization. We can't even decode the payload because there is a second layer of encryption in LoRa WAN. We don't know what is inside the packet, and we don't do any visualization.*

Q: **Bassem Boshra: Is the payload available to be shared with other satellite missions? Do I understand it right, and can you please share the payload in one of the slides or make it available**

on UNISEC?

A: ***Jon Pearce:*** *Let's turn the screen to the companies that have publicly taken our payload for their own constellation. Is this slide what you were asking for?*

Bassem Boshra: *The payload itself is going to be used by multiple constellations available to UNISEC as well. Then there should be some sort of payload description. Can we look at it or consider it?*

Jon Pearce: *I mean, it's not just open-sourced and delivered. The integration of the payload to the satellite is a fairly major integration task. It's a lot of projects to do any of these. So yeah, it's normally done in a pretty rigorous delivery among engineers.*

Q: **Bassem Boshra: Do you also have a Lacuna repeater or the LoRa WAN gateway? You said it's open source or open sources? Is it the repeater itself or?**

A: ***Jon Pearce:*** *It's not a gateway. It's a LoRa WAN sensor, and the gateway is the satellite. So, there is nothing in between. This is the sensor on the ground. You can use it as a relay. You can have wired sensors. You can have Lora WAN, point sensors, or you can have Bluetooth sensors connecting to this. Ultimately, this is just a LoRa WAN device.*

Bassem Boshra: *This is open source, available right?*

Jon Pearce: *Yep. It's available to buy. Normally, we start any engagement with the customer when they buy a development kit from us. With that, they get all the support materials. It's not available on GitHub, it's available to those who buy the first kit from us.*

6 IoT Company Presentation – Plan-S Satellite and Space Technologies

- Mutlu Ahmetoğlu, Plan-S Satellite & Space Technologies Inc.

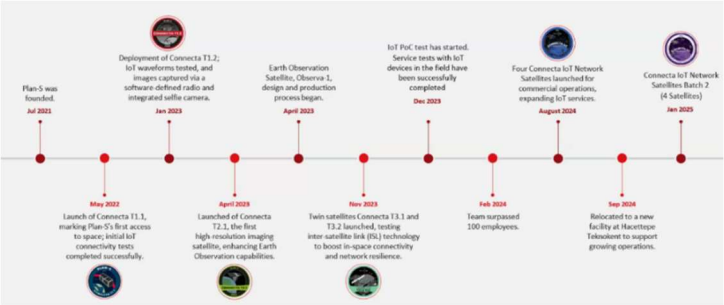
Mutlu did his bachelor's in Electrical and Electronic Engineering from Middle East Technical University. He has researched computer networks and has been working in Plan-S for the past 6 months.

Pictured: Mutlu Ahmetoğlu during his presentation

Highlights:

- **Plan-S Satellite and Space Technologies**
  - Founded in 2021, Türkiye
  - It embodies the spirit of the "New Space" movement
  - Representing IoT and Earth Observation technologies
  - Plan-S offers innovative 'Space as a Solution' services

- They have launched 5 test satellites within their first 2 years
- In August 2024, they launched 4 satellites with the Connect IoT Network constellation
- An additional 4 satellites were launched in 2025
- They plan to expand to over 200 satellites
- Plan-S business lines
    - Connect IoT Network
    - Earth Observation
    - Space as a Solution
- 13 satellites launched till now
- The fastest satellite took 8 months to build



Pictured: Mutlu Ahmetoğlu presenting a timeline of Plan-S

- Plan-S Activities
    - Satellite System Design and Production
    - Ground Station Design and Production
    - Testing Processes
    - Integration and System Engineering
    - R&D and Technological Innovations
    - Provides Comprehensive Services
    - 24/7 Technical Support
- Plan-S IoT device solutions
    - IoT Module
    - IoT Modem
    - IoT Gateway
    - Satellite Access Terminal
- Plan-S provides
    - Image Data Analytics
    - Ground Operations
    - Satellite Manufacture
    - Value-added Service
- 7 ground stations in use
- Aim of 100+ satellites by 2031
- IoT communication services
    - Global Coverage
    - Low Latency
    - Reliable and Comprehensive Data Flow

Pictured: Mutlu Ahmetoğlu presenting IoT Connectivity Products

- How Connect IoT Network works
  - IoT sensor data is transmitted via modules or satellite access terminals
  - To connect, ground stations are connected throughout the world
  - Data is then transmitted to the Plan-S core network
  - The processed data is transmitted to customers

Q/Ans:

Q: **Bassem Boshra: I understood that the Plan-S model is a LoRa model, is that correct?**

A: ***Mutlu Ahmetoğlu:*** *Yes, it's actually an Lora WAN device. 225 mW power with a special antenna. The antenna should look above the sky. You should see the clear sky. This is the only restriction that a standard LoRa device. Also, it uses LR-FHSS modulation, which is a type of LoRa WAN connectivity more suited towards satellite connectivity.*

Q: **Bassem Boshra: Okay, you also were telling us about a LoRa WAN gateway that can collect data from Bluetooth and from Wi-Fi sensors as well. So, the same gateway has Bluetooth, Wi-Fi, and LoRa WAN?**

A: ***Mutlu Ahmetoğlu:*** *I did not go into detail. But there was a satellite access terminal in the gateway, if you remember. The satellite access terminal is actually the connectivity part there. They work together, and yes, they bring the Bluetooth, Wi-Fi, and LoRa together. These two products, when they work together, can support any of these three types of connectivity and bring the data through our satellites. When the data reaches our satellite, it's just the same operation, downward to the ground station and then to the service provider. Wherever on the internet you want to route it.*

Q: **Bassem Boshra: My other question is about the data on the cloud. Did you provide a cloud platform for data collection, or do you cooperate with cloud platform providers?**

A: ***Mutlu Ahmetoğlu:*** *Yes, our software team inside has a website for this is a dashboard. They are using it to show the data for our customers as well as our POCs. When we do POCs with people from industry or academia, we show them data from the same dashboard. But I think your question may be what is under the hood, not just the website dashboard, but the LoRa WAN network server. We are using an open-source LoRa WAN network server as far as I know. There is an open-source LoRa WAN network server for that. We are using that on the ground station site to receive packets from the modems and grab them to the dashboard.*

Q: **Bassem Boshra: What about the ground station? Do you cooperate with ground station providers, or you have your own ground station facility?**

A: ***Mutlu Ahmetoğlu:*** *We have our own ground stations, also we are also using other people's ground stations. So, yes to both of them. Our ground stations are positioned like: 2 of them are in Ankara, 1 of them is in Erzurum. Both of these are in Turkiye, by the way. But also, we have ground stations abroad too, for example, we have 1 in Sweden, we have 1 in Switzerland. We have another one that we have rented.*

Q: **UNISEC participant: How would UNISEC project benefit from Plan-S?**

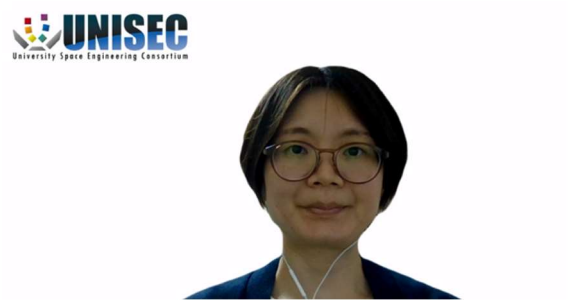
A: ***Mutlu Ahmetoğlu:*** *As I said in my presentation, Plan-S designs the payload of the satellite, the actual payload that speaks to the modems. There are many other components on the satellite for its health and maintenance it. But we are also designing those components, too, satellite bus components and of course the payload that connects the modems to the ground. Since these are all our designs, we are very flexible in changing the system to some other use cases or some other needs as necessary. But with that being said, Plan-S is a commercial company, and I am not the one to give promises, let's say. But I think it would be a good collaboration considering the fact that Plan-S is a commercial company, but we have a lot we can build with the flexibility we have on the payload as well as the modem side. We have flexibility on both sides because we have designed them ourselves.*

Q: Tsuji: **So, in summary, you can start working on ground sensors, and Plan-S satellites can collect data from UNISEC ground sensors.**

A: ***Mutlu Ahmetoğlu:*** *Yes, it's just a matter of interfacing. We have for example: RS485 interface on our modems. any device that has the same interface and connects with two cables to our modems has the capability to send any data to our satellites.*

7 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
    - If difficult, we will jointly search for international funds
  - All the satellites have the **same mission payload** to contribute to solving global/local problems
  - Solution through global **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
    - **Important Dates:**
        - Notification : June 2, 2025
        - Full Paper submission due : August 5, 2025 (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
    - Online assessment details will be provided to the applicants)
    - 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

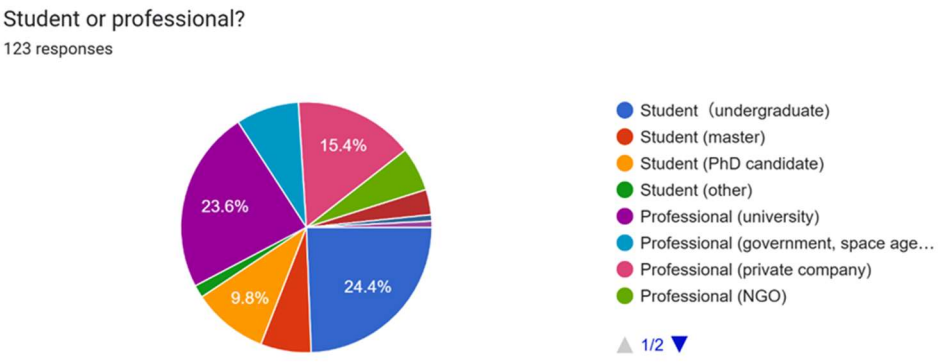
- **Launch Opportunity: J-Cube**
    - Special Discounted opportunities
    - 1U, 2U, 3U, deployment from International Space Station
    - Collaborate with UNISEC-Japan's University
    - Technical support will be provided
    - Contact: info-jcube@unisec.jp , http://unisec.jp/serviceen/j-cube

- **Next Virtual Meeting**
    - Date: June 21, 2025
    - Theme: T.B.D
    - Host: UNISEC-Global

8 Participant Statistics

123 registered participants from **39** countries and regions for the 56th Virtual UNISEC-Global Meeting.

Country	Registrants	Country	Registrants
Algeria	1	Lagos	1
Argentina	1	Malaysia	2
Bangladesh	1	Mauritania	2
Bhutan	1	México	3
Botswana	1	Nepal	3
Bulgaria	5	Nigeria	10
Burkina Faso	5	Paraguay	1
Burundi	1	Peru	1
Chile	1	Rwanda	1
Colombia	3	South Africa	1
Dominican Republic	1	Sudan	1
Egypt	10	Tanzania	6
France	3	The Gambia	1
Guatemala	9	The Netherlands	1
India	11	Tunisia	4
Japan	13	Turkey	6
Jordan	1	UK	4
Kenya	1	Uruguay	2
Korea	1	USA	2
		Zambia	1

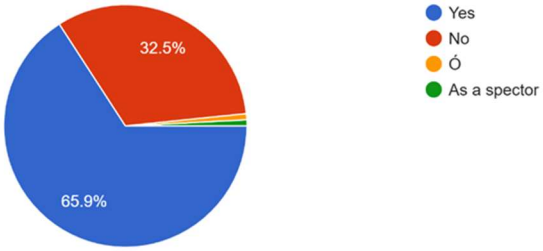


Will you join the Nano-satellite IoT Constellation Program?

123 responses

Have you participated in the UNISEC-Global Meeting previously?

123 responses



Thank you