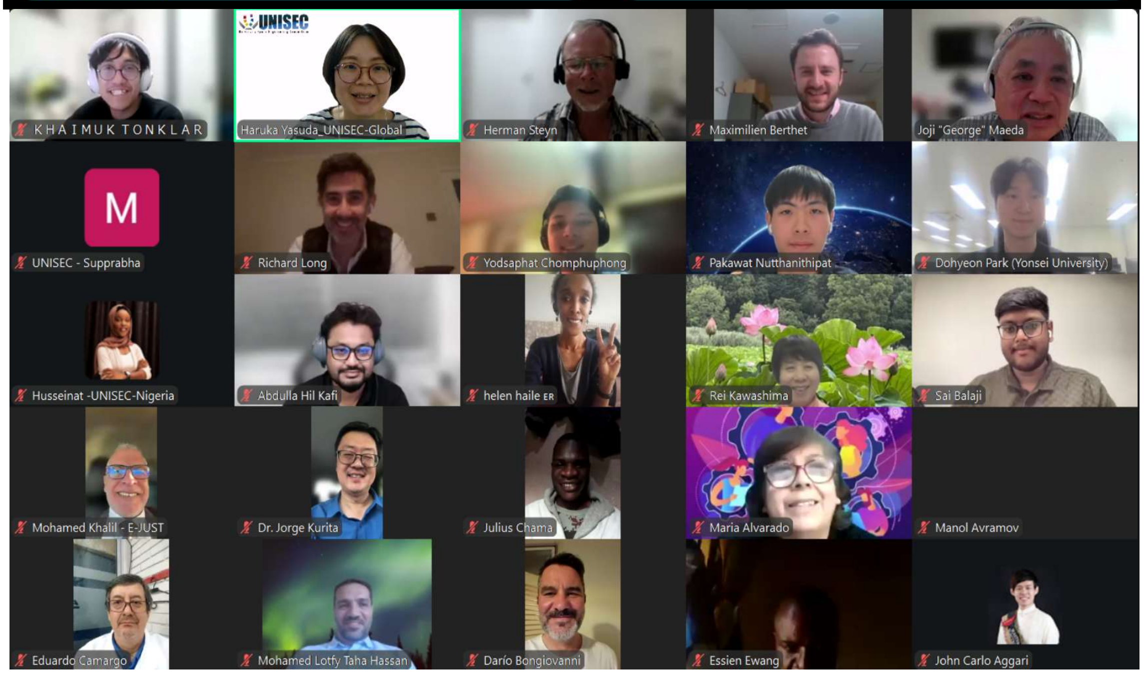
UNISEC-Global The 62th Virtual Meeting

November 15th, 2025, 22:00-24:00
(Standard Japan time GMT +9)



The following report was prepared by UNISEC-Global Secretariat
November 19, 2025
Japan

Table of Contents

1 Opening Remarks

Prof. Herman Steyn, Stellenbosch University

Professor Steyn is an Emeritus Professor at the University of Stellenbosch and a distinguished expert in satellite engineering and control systems. He served as the head of Satellite Engineering and Control Systems and was the ADCS designer for SUNSAT, Africa's first fully indigenous satellite. From 1998 to 2001, he was the Principal Engineer and Team Leader for ADCS at Surrey Satellite Technology. He later became the Director of SunSpace from 2002 to 2009, where he led the ADCS development for South Africa's Sumbandila Earth Observation Microsatellite. In 2015, he co-founded CubeSpace, a company specializing in small satellite ADCS, where he continues to contribute. His expertise extends beyond national projects, having participated in multiple European FP7 space initiatives and the ESA Rosetta Mission.

Pictured: Prof. Steyn while giving the opening remarks

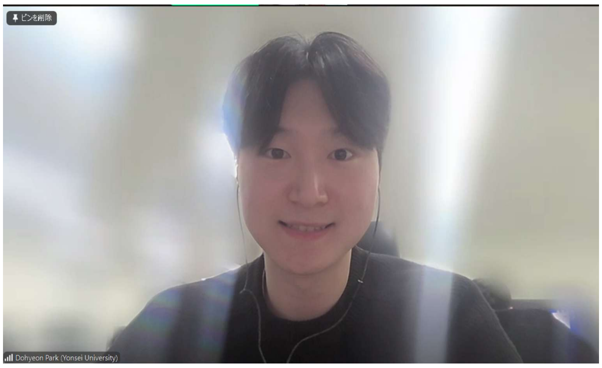
Highlights:

- **MIC9's theme is 'Lunar Mission'**
- Lunar Orbit CubeSat Mission (LOCM) including one or more CubeSats mission, orbits around moon
- Lunar Surface Rover Mission (LSRM) that places rovers on the surface of moon
- Full paper submitted on Aug 15, 2025
- 10 finalists and 4 semi-finalists were selected, final presentation on Nov 1, 2025
- Single satellites or constellations from 2U to 12U in lunar 100 km polar orbit presented
- **Swarm of 2.5 kg or a singular 10 kg lunar rover papers also presented**
- Various payloads also presented in hyperspectral, multispectral, LiDAR, dosimeters
- Other payloads include dust particle detectors, mass spectrometer, phase array antennas
- Mission was either to lunar surface or lunar orbit
- Evaluation criteria include novelty or improvement of an existing system
- Others include impact on society, technical description and overall feasibility
- **1st Place awarded with 300,000JPY (about 2,000 USD)**
- 2nd Place awarded with 100,000JPY (about 667 USD), student prize 50,000JPY (about 333 USD)
- 1st Prize received by the team of the university of Tokyo, Japan
    - CubeSat mission concept for TREED (The receiver Exploring Dark ages)
    - Presenters: Takato Hatae and Yojiro Yamashiro
- **2nd Place received by Kyushu Institute of Technology, Japan**
    - Virtual Immersive Sensing and Terrain Analysis for polar Ice Prospecting Rover Mission (VISTA-PIPR)
    - Presenters: Abdulla Hil Kafi,Yuzuki Fukata, Taichi Nakamura, Kosuke Iwatsu
- **IAA award awarded to Taiwan-India Joint team**
    - Taiwan-India Lunar Dust Analysis (TILDA) Mission
    - Presenter: Ying Liao, National Taipei University of Technology, Taiwan
- **Student prize awarded to Stellenbosch University, South Africa**
    - SLNQI (Stellenbosch Lunar Interferometric Network for Quasi-static Imaging)
    - Presenters: Jandrè Frey, Russouw Grobbelaar and Nortier Geyer

Pictured: 62^{nd} Virtual UNISEC-Global meeting agenda

2 LUMOS (Lunar Underground Monitoring via Optical Sensing)

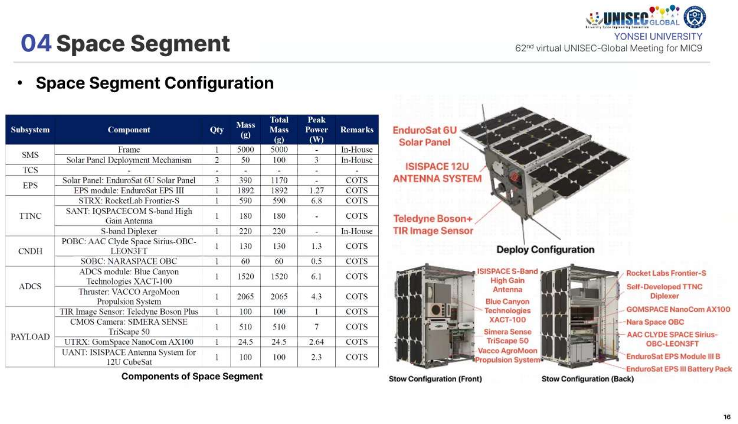
Dohyeon Park, Yonsei University



Pictured: Mr Park during his presentation

<u>Highlights:</u>

- Global interest in Lunar exploration increasing
- **Lunar Orbiters include LRO (NASA), Chandrayaan (ISRO), KPLO (KARI)**
- Lunar Lander SLIM(JAXA)
- Human Exploration called Artemis Project (NASA)
- Progress in future robotic and human exploration of the moon
- Long term human activity on moon increasingly becoming more realistic
- MIC9, a step towards preparing for the future
- **Challenges in establishing long term human presence on moon:**
  - Radiation, micrometeorites and extreme temperature fluctuation
- One promising solution is Lava Tubes for lunar bases
  - Large subsurface cavities and ideal site for permanent human bases
- **Another critical challenge regarding communication:**
  - Large path loss, no direct communication on the lunar far side
  - Pervious missions relied on large satellite like Queqiao-1 (CNSA)
- To demonstrate that CubeSats can also perform lunar relay operations
- Scientific mission is exploration of Lunar Lava Tubes
- Technological mission is demonstration of CubeSat-scale communication with relay tech on moon
  - Contributes to long-term vision and enabling sustainable human activity on the moon
- Lunar Tubes exploration, LO Diviner thermal data show subsurface lava tubes
- **Tubes tend to exhibit 10 to 15 K reduction**
- Detectable using thermal infrared (TIR) sensing, focusing on continuous TIR data
- Rather than absolute temperature, identification of regions with thermal inertia patterns
- Acquisition of images as supplementary tool to validate temperature data
- Lunar Communication Relay enables communication for challenging regions like lunar far side

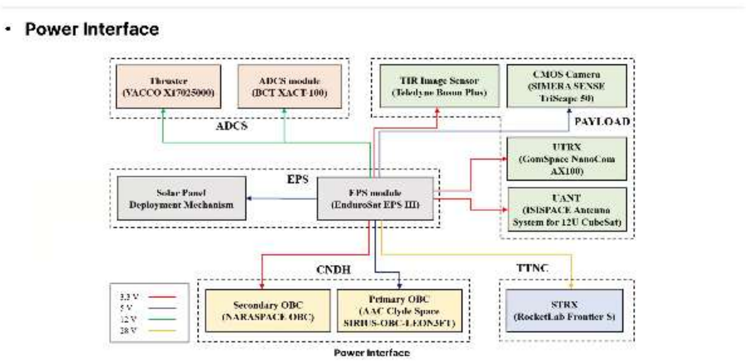


Subsystem	Component	Qty	Mass (g)	Total Mass (g)	Peak Power (W)	Remarks
SMS	Frame	1	5000	5000	-	In-House
	Solar Panel Deployment Mechanism	2	50	100	3	In-House
TCS	-	-	-	-	-	-
EPS	Solar Panel: EnduroSat 6U Solar Panel	3	390	1170	-	COTS
	EPS module: EnduroSat EPS III	1	1892	1892	1.27	COTS
TTNC	STRX: RocketLab Frontier-S	1	590	590	6.8	COTS
	SANT: IQSPACECOM S-band High Gain Antenna	1	180	180	-	COTS
	S-band Diplexer	1	220	220	-	In-House
CNDH	POBC: AAC Clyde Space Sirius-OBC-LEON3FT	1	130	130	1.3	COTS
	SOBC: NARASPACE OBC	1	60	60	0.5	COTS
ADCS	ADCS module: Blue Canyon Technologies XACT-100	1	1520	1520	6.1	COTS
	Thruster: VACCO ArgoMoon Propulsion System	1	2065	2065	4.3	COTS
PAYLOAD	TIR Image Sensor: Teledyne Boson Plus	1	100	100	1	COTS
	CMOS Camera: SIMERA SENSE TriScape 50	1	510	510	7	COTS
	UTRX: GomSpace NanoCom AX100	1	24.5	24.5	2.64	COTS
	UANT: ISISPACE Antenna System for 12U CubeSat	1	100	100	2.3	COTS

Components of Space Segment

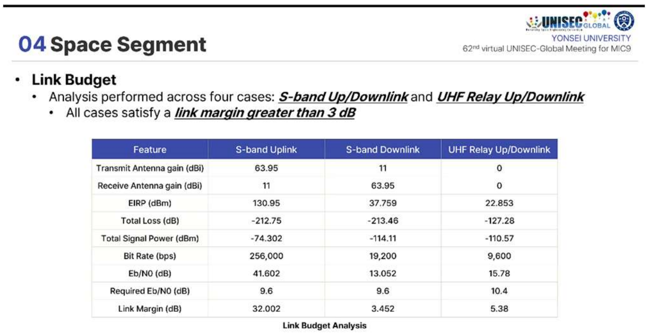
Pictured: Concept of operation of LUMOS

- Despite no direct line of sight, reduces communication burden on lunar surface
- Collaboration with Korea Lunar Lander and Rover, KLLR scheduled to launch in 2032
- CubeSat will be a 12U Platform with two Satellites
- Circular Lunar Orbit with altitude of Perilune: 100 km, altitude of Apolune: 100 km
- Inclination: 90 degrees, orbital period is 1 hour and 57 minutes
- Revisit the same region every 14 days
- For ground segment include NASA Deep Space Network (DSN)
- Primary Payload Lava Tube Detection, TIR sensor and CMOS camera
- Secondary Payload Lunar Communication Relay, UHF Transceiver and UHF Antenna
- COTS components with lunar/cislunar heritage
- Environmental testing for in-house testing
- **Primary Mission Payload (lava Tubes Detection)**
  - **TIR Image Sensor: Teledyne Boson Plus** to detect lava tubes by measuring surface temp
  - Lunar surface reaches 390 to 400 K during daytime
  - At 100 km orbit, BOSON provides, Ground Sampling Distance ≈ 66.7 meters
  - **CMOS Camera: SIMERA SENSE TriScape 50** for optical validation
  - Spectral band 450-670 micrometer, GSD of 60 m, swath 24 km
- **Secondary Mission Payload (Lunar Communication Relay)**
  - UHF Transceiver GomSpace NanoCom AX100
  - Frequency range of 430-400 MHz and 305-405 MHz, 500-19200 bps data rate
    - GFSK and GMSK modulation, 24-30 dBm RF output power and CSP protocol
    - ISISPACE antenna system, 0 dBi omni-directional antenna
- **TTNC includes S-band Transponder and Rocket Lab Frontier-S**
  - Challenges are that there is no GPS coverage on Moon
  - Rocket Lab Frontier-S supports ranging techniques
  - Turn-around tone ranging regenerative PN ranging fully compatible with the DSN
  - **Frequency range, RX: 2020 to 2120 MHz and TX: 2200 to 2300 MHz**
  - Data rate: RX: 100 bd to 1 MBd and TX: 100 Bd to 10 MBd
  - Modulation include PM, BPSK, QPSK and O/SQPSK
  - Compatible with DSN, SSC, SN, KSAT, TDRSS-SA
  - Can communicate reliably throughout the entire mission



Pictured: Power Interface of LUMOS

- Equipped with standard ADCS module including RW, Star Tracker, Sun Sensor
    - Magnetorquers cannot function effectively
    - **To compensate, use of thruster called VACCO ArgoMoon Propulsion System**
- Power Budget evaluated for 2 modes in CONOPS
        - Mission Mode peak is 24.4W and average power consumption is 16.27W
        - Transmission Mode peak is 13.27W and average power consumption: 8.5W
    - State of charge (SoC) increased by 2.8 percentage point (90% to 92.8%)
    - Depth of Discharge (DoC) decreased by 15 percentage point (90% to 75%)
- **Place to launch in 2032 by KSLV-III**
- KASA (Korean Aerospace Administration) and KARI (Korean Aerospace Research Institution)
- Conceptual studies 2025, Preliminary design 2026-2027
- Final design and part level test 2028- 2030, testing and launch in 2030- 2032
- Mission operation for 6 months (2032- 2033), disposal 2033



Feature	S-band Uplink	S-band Downlink	UHF Relay Up/Downlink
Transmit Antenna gain (dBi)	63.95	11	0
Receive Antenna gain (dBi)	11	63.95	0
EIRP (dBm)	130.95	37.759	22.853
Total Loss (dB)	-212.75	-213.46	-127.28
Total Signal Power (dBm)	-74.302	-114.11	-110.57
Bit Rate (bps)	256,000	19,200	9,600
Eb/N0 (dB)	41.602	13.052	15.78
Required Eb/N0 (dB)	9.6	9.6	10.4
Link Margin (dB)	32.002	3.452	5.38

Pictured: Communication link budget of LUMOS

Q&A Session:

Q: MIC9 Reviewer, Herman Steyn: You want to use the thermal signature to detect lower tubes. How is the lunar ice going to affect your measurements?

A: ***Dohyeon Park:*** *Yes, it is true that lunar ice will affect the thermal data of our payload. But our objective of this primary mission is to measure the difference of temperature, during day and night. So, we can detect the flow of temperature changes even if the average temperature might be low due to lunar ice.*

Q: MIC9 Reviewer, Herman Steyn: What if your KLLR rover is not available? That means your 50% mission is in failure; you cannot test your UHF communication system, or do you have a backup plan?

A: ***Dohyeon Park:*** *Yes, we have mentioned this risk in our full paper. So, if the KLLR mission fails, we could find another partner before the launch. Using the global reach of South Korea, we could find other partners before the launch.*

Q: MIC9 Reviewer, Richard Long: You mentioned that both of your sensors have a sampling distance of around 60 meters. So, what are the physical and geometric properties of the surface you are trying to sense? Is the resolution sufficient? And how can you be certain of your measurements and detection of lava tubes?

A: ***Dohyeon Park:*** *So, at 100 km altitude, GST is fixed at 66.7 meters. It is sufficient to detect huge scales of lava tubes. Actually, we have not fixed the magnitude of power we want to observe because if we collect as much data during the mission, we could analysis with those data. So, the magnitude has not been fixed, it is flexible.*

Q: **MIC9 Reviewer, Richard Long: You are switching between transition mode and mapping mode. What would happen if you had a problem with either of the modes, how long will it require you to recover and capture the data again?**

A: ***Dohyeon Park:*** *When our engineers analyzed our orbit, the revisit time of the orbit in the same region is 14 days. So, we could recover the science data after 14 days and our mission duration is 6 months so, there is no problem with data recovery.*

Q: **MIC9 Reviewer, Maximilien Berthet: In the full paper, in figure 8, you have shown the ground tracks of the satellite. However, the satellites do not cover the entire lunar surface, even though the inclination is 90 degrees. So, is there some inconsistency in figure 8?**

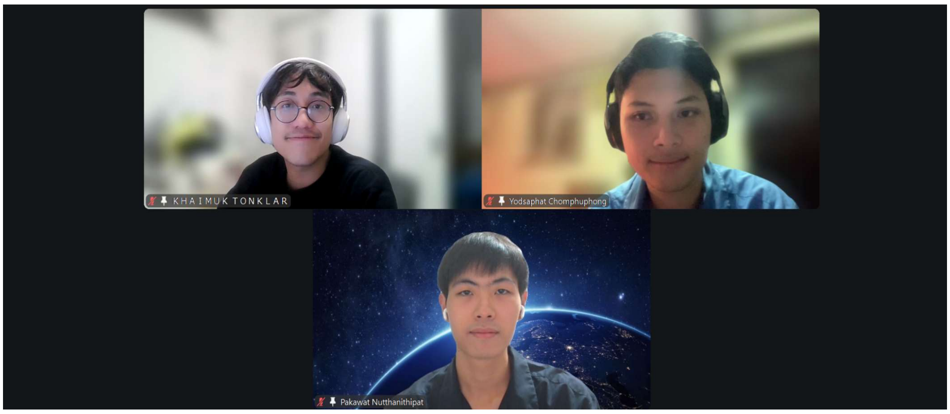
A: ***Dohyeon Park:*** *I think there is a software issue, as theoretically it should cover all surfaces of lunar, but it has not. So, maybe it is a rendering issue.*

Q: **MIC9 Reviewer, Maximilien Berthet: You mentioned that some of the components do not have heritage in deep space. Do you have a plan to investigate radiation tolerance before launch?**

A: ***Dohyeon Park:*** *Yes, so in the implementation plan, we plan to do the whole biometric test and radiation test. Also, in South Korea we have reliable radiation test facility so, yeah, we have time to do it before launch.*

3 Lunar Pole Link for Rover Self-Observation (LPIRSO)

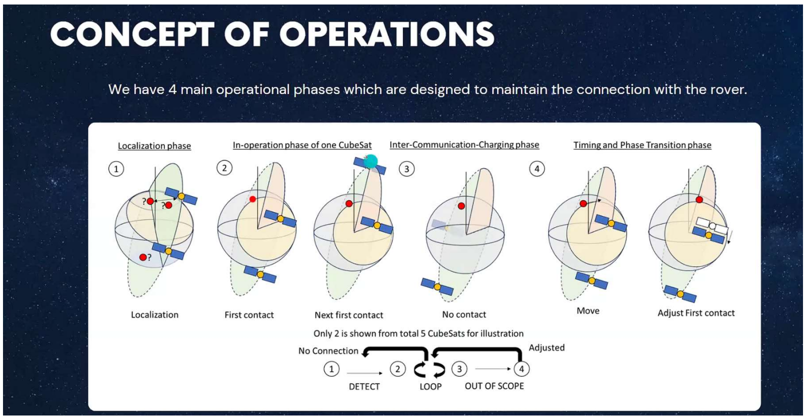
Tonklar Khaimuk, Tanis Phongphisantham, Yodsaphat Chomphong and Pakawat Nutanithipat, Tohoku University



Pictured: Mr Tonklar (left), Mr Yodsaphat (right), and Mr Pakawat (below) during their presentation

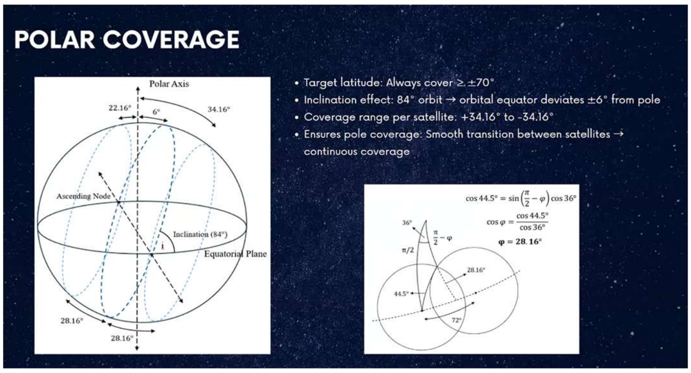
Highlights:

- Lunar CubeSat Constellation for assisting moon's pole rover
- Moon Polar Region, access to water and volatile rice regolith
    - Critical for ISRU, fuel, and human presence
- **Extreme terrain and lighting demand fast, reliable navigation and sensing**
- Communication gaps and latency by crater self-occlusion and limited earth visibility
- Conventional architectures fall short
- Polar mission needs resilient, distributed systems to ensure coverage while reducing cost
- Lunar's Rover Exploration
    - Lunar rover's exploration is a robust option due to its ability to navigate
    - Challenges include frequent comm blackouts, constant relay support, slow Earth communication



Pictured: Team LPIRSO presenting the concept of operation for their mission

  - Persistent pole coverage to let the rover always have communication platform
  - Provide orbital edge computing AI unit for rover to segment/ detect object during navigation
  - **Resilient inter communication through pentagon network 2.4UX5**
- Ground Segment will be smaller with necessary modules, optimized for hard terrain and survivability
- Space Segment consists of 5, 2.4U satellites with 700km altitude orbit
- Each CubeSat is equipped with OBC, EPS and intersatellite links
- **Key performance parameters**
  - Keep links reliable with ≥ 60 kB/s and ≤ 5s latency
  - Provide terrain maps, hazard labels, and path commands
  - Reconfigure in real time to follow rover position, balance compute and maintain service
  - Coordinate imaging and tasks under poor lighting, achieve ≥ 90% observation optimal
  - Power-Optimized Operations with 90% duty cycle
  - Keep better depth-of-discharge <30% for long maintain life
- Compact 2.4U CubeSat with On-board deep-leaning hardware for real time rover support
- Multi VPU processing runs real time perception (terrain, hazards) to offload rover work loads
- Communication module uses S-band patch array
- Designed specifically to host sustained onboard AI
- Deployable solar arrays optimized for erratic polar illumination to generate 30 W peak power
- **16W average under typical illumination**
- Include ADCS, EPS, Propulsion module
- Use of Scalable Ion Electrospray Propulsion System
- S-iEPS is used for orbital maneuvering and constellation maintenance
- Link budget with slant range 700 – 1708 km
- Antenna gain varies 4 - 6.5 dB, transceiver output with 20 – 33 dBm
- This link margin supports data rate from 500 – 1000 kBd, 62.5 - 125 Kb/s with BSK modulation
- Under misalignment gain ≈ 4 dB, 100 – 500 kbps
- Data transmission is 12.5 - 62.5 kB/s until pointing is corrected
- FSPL is 156.2 - 163.94 dB from slant range
- Inter-Communication has RP (dB) = 122.44 dB
- Signal level is sufficient to achieve and FSPL: 168.44 dB
- Power Management Loop IO (In Operation Phase) and 36 mins nominal operation (180/5)
  - 144 mins charging phase and 66 mins max duration
  - With maximum eclipse time, the consumption will be reduced at –11.9 Wh
- **Near circular orbit with 700 km altitude and 84 deg inclination**
- 700km because higher than typical LLO (100 – 300 km)
- Maintains orbital parameters with minimal correction and supports about 15 years of operation
- Multi-body effects have to be mitigated including Sun, Earth and Solar Radiation Pressure
- **Autonomous network with direct CubeSat to CubeSat and direct CubeSat to Rover data replay**
  - **No mothership needed**



Pictured: Team LPIRSO presenting calculations for polar coverage

- **Insertion/circularization is a Type 2 transfer in elliptical orbit with 100 km x 1200 km (a = 2387 km)**
- Circularization maneuver with single burn at true anomaly 108.34 deg and flight path angle 13.27 deg
- Delta-v required with ≈ 0.326 km/s which is efficient
- CubeSats released sequentially for uniform Polar coverage
- End of life disposal will have final burn to higher stable orbit and for collision avoidance
- Orbital stability will include eccentricity, inclination, argument of periapsis drift and station-keeping Δv
- Mission definition and preliminary design from 2025 – 2026
- Detailed design and prototypes from 2026 – 2027
- Integration, environmental testing, mission simulation from 2027 – 2028
- Launch pathfinder + full constellation deployment in 2029
- **Budget total is €300,000 with hardware €140,000, launch €90,000 and operations €70,000 for 2 years**
- Outsourced assembly, integration and verification: ≈ €435,000 per CubeSat
- Cost-efficient, scalable approach for 5-satellite constellation
- Designed to work in extreme polar conditions, fully autonomous navigation backed by orbital Edge-AI

<u>Q&A Session:</u>

Q: MIC9 Reviewer, Herman Steyn: Have you made calculations for delta v and amount of fuel required for forming the 5-constellation satellite with your propulsion system?

A: Tonklar Khaimuk: *We haven't put this in the initial paper. But, from what we calculated, it's like about 0.326 kilometers per second. Which seems like it didn't use much fuel compared to change in speed. So, I think it will not be at a level that is too heavy to affect the system.*

Q: **MIC9 Reviewer, Herman Steyn: Is the fine pointing of your reaction wheel necessary for a comms mission? And how is the reaction wheel going to absorb the disturbances from the thrustors, and how will you desaturate the wheels?**

A: Tonklar Khaimuk: *Okay, our expander has like 20 decrease coverage, so it is actually fine pointing. But it is accurate in a level for good downlink communication. We have not considered how the prolusion will help in absorbing momentum. We will work on that*

Q: **MIC9 Reviewer, Maximilien Berthet: Can you comment on the feasibility of Hoffman transfer using the low-thrust propulsion system?**

A: Tonklar Khaimuk: *I think our thrusters have few micro micronewtons but if it has high impulse, it should be able to achieve it. But not the same as high velocity output as the proportion. It will take some time to change. From our calculations, it should be viable with control. We should take into account the transfer time.*

Q: **MIC9 Reviewer, Maximilien Berthet: Is the 5 sec latencies good enough?**

A: Tonklar Khaimuk: *Yeah, in normal use cases in Earth navigation it should be around 10 frames per second. From the limit usage in the space, it drops to around 1 frame per second is enough. Because we do not use it as intensely as on Earth, where it has so many objects. So, the frame can drop down a bit. At first, we expected 1* *frame per second, but now from new calculations we cannot achieve it because of communication limitations. So, we drop it to 3 frames per second and from the idea that it can be autonomous, I think it will have some values.*

Q: **MIC9 Reviewer, Maximilien Berthet: How much do you gain from offloading the commuting power vs how much do you lose by having to increase communication power?**

A: ***Tonklar Khaimuk:*** *So, the communication loading on the loads is maximum 10.8W. Plus the application smaller systems, it will reach around 15-20W which is not much compared to the whole big system of the rovers. When the unit of smaller rovers gets smaller, I think that will gain back, but, I have not compared it to bigger rovers which is used in around 800W. Maybe it results in 5 times gain but like it might be more maintained too.*

Q: **MIC9 Reviewer, Richard Long: Could you elaborate on what the performance impact would be if you were to lose one or even two spacecrafts? And what might your recovery strategy be?**

A: ***Tonklar Khaimuk:*** *Okay, our goal is to make a polygon with 5 sides. So, if one of the satellites moves away from its location, the other 4 will work together to maintain the same position and connection with the rover. Each one knows each other so, there will be some algorithm to hold this polygon to be always the same.*

Q: **MIC9 Reviewer, Richard Long: Is there a risk of loss of acquisition time, window where no satellites can provide some communication link?**

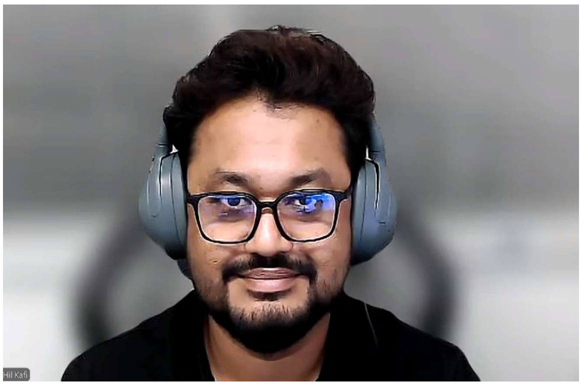
A: ***Tonklar Khaimuk:*** *Yeah, so, at this altitude, 1 rover can only see 2 complementary satellites. Then, if we still have a connected chain with 3 of them out of 5 it still works. Because we have 5 vertex and if we still have a connected vertex, it will still be performing. We need to somehow keep the connecting vertex to make it still perform.*

Q: **UNISEC Participant: How was the cost calculation performed?**

A: ***Tonklar Khaimuk:*** *We combined the whole stack system price. We combined the prices by looking at the possible numbers from original sources. But it is all estimated.*

4 VISTA-PIPR Virtual Immersive Sensing and Terrain Analysis for Polar Ice Prospecting Rover, MIC9

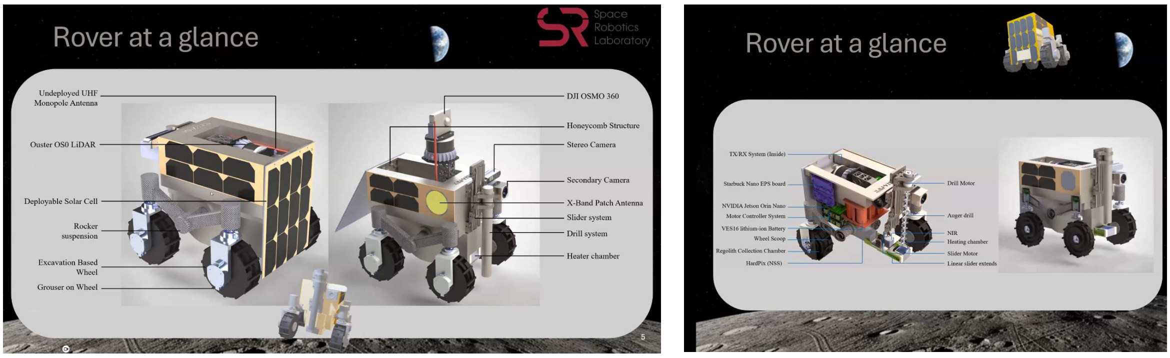
Abdulla Hill Kafi, Kyushu Institute of Technology



Pictured: Mr Abdulla during his presentation

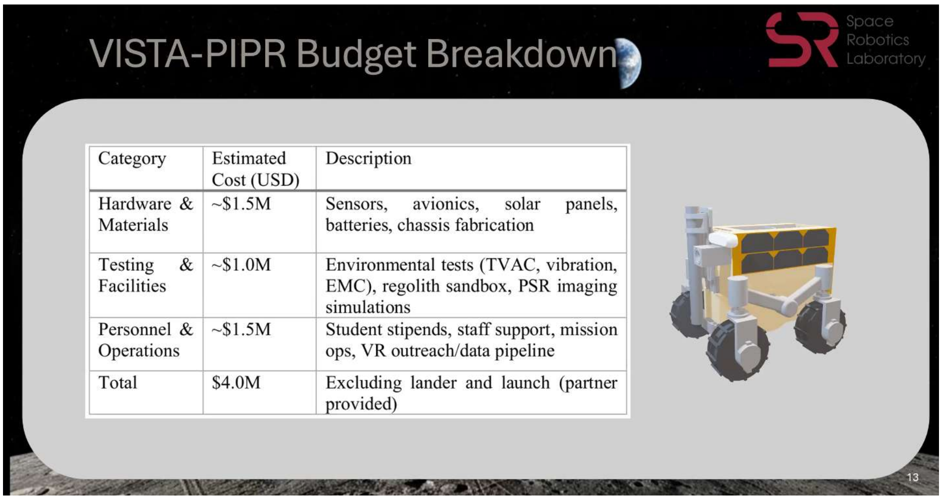
Highlights:

- Moon rover target to find water on moon, encourage sustainable space exploration
- **Mission objectives is to map subsurface ice**
- **Rover will find signs of Hydrogen or Oxygen**
- Ground truth for Artemis-class ISRU planning
- Detect and map >= 1 wt% H to ~30cm across ~500 m^2
- Immersive VR Models with 360-view of terrain
- **Digital twin with <= 10 cm horizontal / <= 5 cm vertical errors**
- Validate extraction after searching, collection is necessary
- **Multi-site survey by moving the rover at least 500 m**
- Target more than 5 distinct sites (rims, PSR edges, slopes, plains)
- Autonomy demo through OBC will support the autonomy demo, mostly obstacle detection
- Meta-reinforcement learning, hazard avoidance and re-planning,
- Execute 1 autonomous evacuation + analysis cycle
- **Rover size 35 x 30 x 30 cm with 4WD/4WS, individual motor in each wheel**
- Grouser wheels (20 - 25 degrees slopes) with weight: 9.79 kg
- OBC: Jetson Orion Nano (~10 W, ~70 TOPS), multi-bus (I2C)
- Mast: 120 MP RGB + 32-ch LiDAR (360 x 30 degrees, <= 10 Hz)
- Localization: VIO + LiDAR SLAM, error of about 5 cm per traverse
- Scientific payload includes mini neutron spectrometer (Thermal/epithermal)
- Near-IR spectrometer (1.3 - 2.5 micrometer) for H_2O/OH bands
- Sample drill (<= 30 cm), sealed micro-oven (150-200 degree Celsius)
- Reduceing the weight of the rover with honeycomb structure
- Simulated results they maintain adequate strength
- GaAs solar (tilt-adjustable) ~ 30 W peak for power generation
- **UHF rover and lander communication in 435 MHz**
- **Data rate is 32-128 kbps and 0.5-2.0 km LOS**
- Lander and Earth in X-band with >= 256 kbps via DSN-class ground
- Data is >= 1.6-6.4 GB return over 14 days
- Concept of Operation include deployment, communication link, navigation, survey and prospecting
- Sampling and analysis if hydrogen >1% wt, drill upto 30 cm
- IR spectrometer measure hydrogen and measure released volatiles (water vapor)
- **Data Transmission will relay high-priority science data first**
- Landing site/ Targeted site will be shackleton rim
- Polar regions have higher possibility of water elements
- Because its the shadow review, from literature review/ orbitors and other rovers
- Extended illumination on ridges proximity to PSRs for hydrogen sensing and context imaging
- Impact beyond a single mission
    - Immersive public access to the south pole
    - **Equitable STEM inspiration**
    - High res mapping for Artemis era
    - Share datasets and lower barriers for space startups
- **Top risks include LiDAR failure, communication loss, power shortfall and sampler issues**



Pictured: VISTA-PIPRover's external diagram (left) and internal diagram (right)

- Implementation Plan (Month 32 Plan)
    - Phase 1, Months 1-7 (System Requirement Review)
        - Requirements, prototype breadboard test and CAD/thermal structure analysis
    - Phase 2, Months 7-13(Preliminary Design Review)
        - Subsystem design, analog sandbox builds and autonomy testbed, VR Digital Twin
    - Phase 3, Months 15- 25 (Critical Design Review)
        - **EM, autonomy software, secure long-lead flight parts**
    - Phase 4 and 5, Months 25-36 (Flight Readiness Review and Launch Readiness Review)
        - **FM, testing, dust/regolith chamber test mission rehearsals, FRR**
        - Lander integration and fit checks, comms validation with GS, LRR
        - Full mission simulations and lander integration and fit checks



Category	Estimated Cost (USD)	Description
Hardware & Materials	~$1.5M	Sensors, avionics, solar panels, batteries, chassis fabrication
Testing & Facilities	~$1.0M	Environmental tests (TVAC, vibration, EMC), regolith sandbox, PSR imaging simulations
Personnel & Operations	~$1.5M	Student stipends, staff support, mission ops, VR outreach/data pipeline
Total	$4.0M	Excluding lander and launch (partner provided)

Pictured: Mr. Abdhulla presenting budget breakdown of the rover

5 Announcement and Acknowledgment

Ms. Haruka Yasuda, UNISEC-Global

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

Highlights:

- **The 11th UNISEC-Global Meeting Completed**
    - Was held on November 1 – 4, 2025
    - Venue: The University of Tokyo, Japan
    - Was successful, recording and slides available here
    - https://unisec-global.org/meeting11.html

- **The Mission Idea Contest Completed**
    - The 9th Mission Idea Contest: to the Moon

        - Theme: Lunar Mission
        - https://www.spacemic.net/
        - 25 abstracts were submitted from 14 countries
        - 10 finalists and 4 semi-finalists were selected
    - **Important Completed Dates:**
        - Full Paper submission : August 25, 2025 (Finalists and Semi-finalists)
        - Final Presentation was on : November 1, 2025 held at the 11th UNISEC-Global Meeting in Tokyo
        - Contact: info@spacemic.net

- **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 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
    - The IoT workshop was held on November 2 at the 11th UNISEC-Global Meeting
    - Contact: iot@unisec-global.org

- **Next Venue Announcement**
    - **The 12th UNISEC-Global Meeting**
    - To be held online
        - To facilitate all POC and students from all local chapters to participate
        - Details will be announced later
    - In person **POC** gathering at Antalya, Türkiye, afternoon
    - **October 4, 2026,** in conjunction with IAC (T.B.D)
    - **15th Nano Satellite Symposium to be held at Tainan, Taiwan**
    - November 8 – 12, 2026, with
        - PreMIC10
        - 2nd IoT Workshop
        - 3rd Deep Space Workshop

- **CLTP15 (CanSat/ CubeSat Leader Training Program)**
    - Completed: August 18 – 28, 2026
    - Venue: Nihon University, Chiba, Japan
    - Application will start in January 2026
    - Contact : secretariat@cltp.info

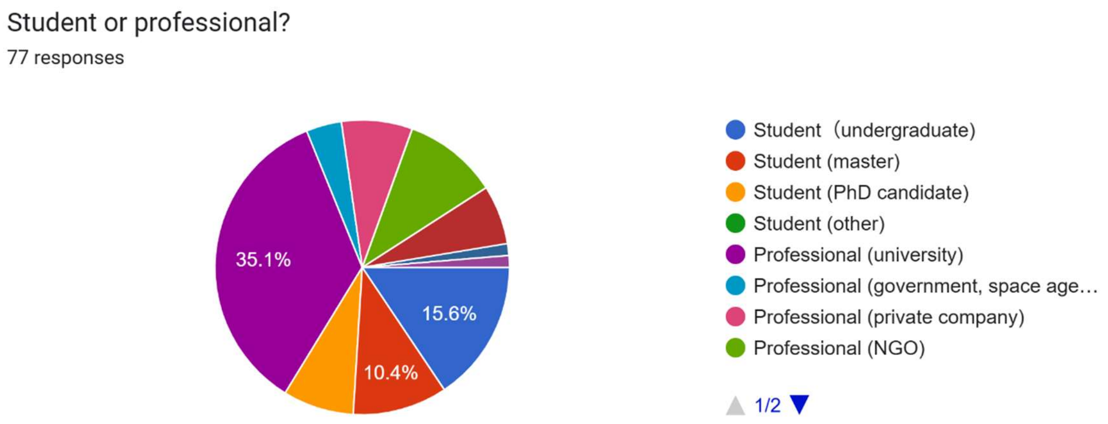
- **Launch Opportunity: J-Cube**
    - Special Discounted opportunities
    - 1U, 2U, 3U, deployment from International Space Station
    - Collaborate with UNISEC-Japan's University
    - Technical support will be provided
    - Contact: info-jcube@unisec.jp ,
      http://unisec.jp/serviceen/j-cube

- **Next Virtual Meeting**
    - Date: December 20, 2025
    - Theme: T.B.D
    - Host: T.B.D

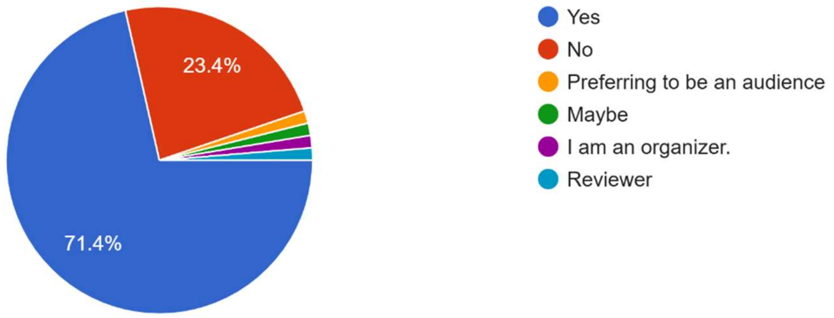
6 Participant Statistics

77 registered participants from 38 countries and regions for the 62nd Virtual UNISEC-Global Meeting.

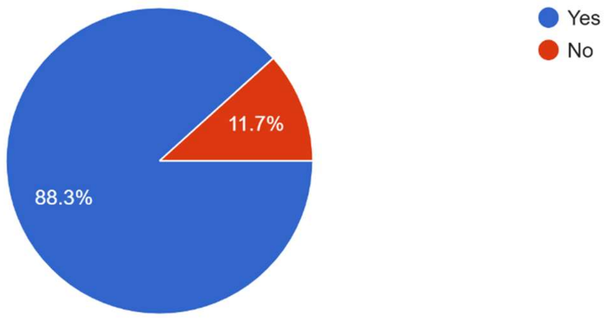
Country/Region	Registrants	Country/Region	Registrants
Argentina	1	Nepal	4
Australia	1	Nigeria	3
Austria	2	Paraguay	1
Bangladesh	1	Philippines	4
Belarus	1	Portugal	1
Bulgaria	5	Rwanda	1
Burkina Faso	3	Somalia	1
Canada	1	Uganda	1
Chile	1	South Africa	1
Colombia	1	Taiwan	3
Cote d'Ivoire	2	Tanzania	1
Dominican Republic	1	Thailand	2
Egypt	5	Turkey	1
Finland	1	UAE	1
India	5	Uganda	1
Japan	7	UK	2
Korea	2	Uruguay	1
Malaysia	1	USA	3
Mexico	1	Zambia	3



Are you interested in joining Mission Idea Contest?
77 responses



Have you participated in the UNISEC-Global Meeting previously?
77 responses



Thank you