

Local Chapter Activity Report

at the 9th UNISEC–Global Meeting

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History of Local Chapter Activities

Established in *2014 by 4 Universities*

- Participated in all UNISEC-Global Meetings since establishment
- Organized UNISEC-Global Meeting (and Pre-MIC) in Rome in 2017
- Participated in MIC and Pre-MIC in 2015, 2016 (HORUS), 2017 (MICROTOM), 2018 (HEMERA), 2019 (MARGE and HVBM), 2023 (MOTHS and CROSSEYE)
- Organized UNISEC Virtual Global Meeting in June 2023
- Wide heritage of spacecraft and CubeSat launch with companies, Italian Space Agency and Universities

Initiatives:

- GUSDON (Global University Space Debris Observation Network)
- INCAVE – NEW! Will talk about that tomorrow...

UNISEC-Global Activities in 2022-23

- . Points of Contact: 2 (Fabio Santoni and Paolo Marzioli)
- Member Universities: 4
- Students: around 50
- Professors: 7
- Others: interest of companies, government and space agencies for international cooperation

Highlights:

- **Virtual Global Meeting June 2023**
- **Collaboration with UNISEC-Nepal**
- **GreenCube digipeater**
- **SIMBA and Internet-of-Things**
- **New Student Point of Contact for UNISON-Italy**
- **Student activities within ESA projects: ROMULUS launch and new RETINA mission**
- **Capacity building training in Kenya (WildTrackCube-SIMBA) and Dominican Republic and Panama**

Virtual Global Meeting June 2023

- UNISEC Italy has organized the Virtual Global Meeting of June 2023, with speakers from:
 - Italian Space Agency
 - University of Naples «Federico II»
 - Sapienza University of Rome (+ talk on exchange with Kyutech)



34th Virtual UNISEC-Global Meeting
Hosted by UNISEC-Italy

Speakers & Topics:

- Rei Kawashima** (UNISEC-Global): Opening remark
- Dr. Paolo Marzioli** (Sapienza University of Rome): From caves to space: the S5Lab student experiments in stratosphere and cave analog missions
- Giulio Mattei** (Sapienza University of Rome): Student exchange program between Sapienza and Kyutech: Diary of an experience away from home
- Prof. Alfredo Renga** (University of Naples "Federico II"): CubeSat Mission Concepts and Preliminary Design at UniNA : from Education to research
- Dr. Marta Del Bianco** (Italian Space Agency (ASI)): Human space exploration: using CubeSats as scientific platforms and technological demonstrators.
- Yudai Etsunaga** (Kyushu Institute of Technology): PER ASPERA AD ASTRA: Student and Experimental Activities within the New Space Scenario

Host: UNISEC-Italy
Time: 22:00-24:00(JST)
June 17, 2023

Register Now! <http://www.unisec-global.org/virtual-meeting.html>



- The initiative has obtained a good success with many participants

Collaboration with UNISEC-NEPAL

- Visit in January 2023 to seek collaboration with joint optical observatories – GUSDON Project
- Joint application to a call for proposals at Sapienza
- One student from Space Foundation Nepal joined Sapienza S5Lab



GreenCube digipeater

- The GreenCube (born as follow-up of the MICROTOM MIC project) digipeater is still active in MEO (launched 16 months ago) and supporting the radio amateur QSOs

- Radioamateurs are now challenging themselves in achieving the highest distance contact – record is 13000 km – radio amateurs are optimizing below-the-horizon and < 1 degrees operations



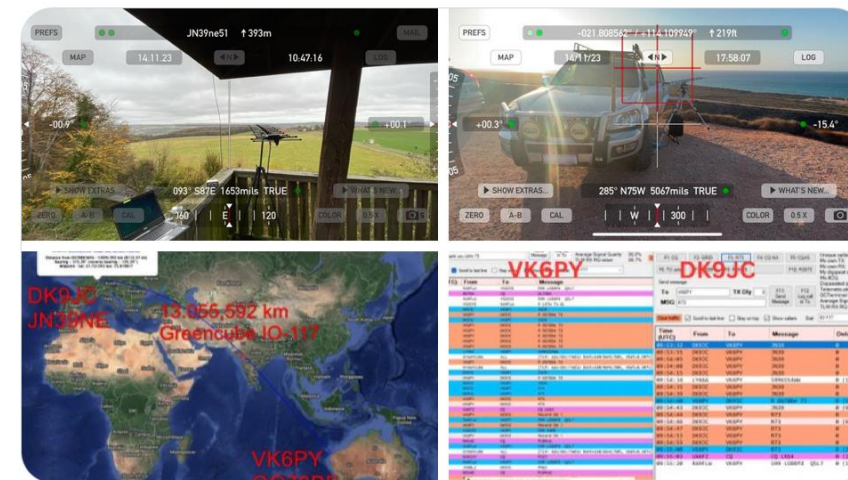
DK9JC 🛰️📡 @DK9JC · 14/11/23

Thank you so much, Mark @vk6py in Australia

🇺🇸 for the QSO on IO-117 #Greencube 📡.

The **distance** was an incredible 13.055,592km (8.112,368 miles) 📏. QSO was done before 0 deg elev. 💪 Top of the tower and 15 ele Diamond yagi. 🍾🎉🎊

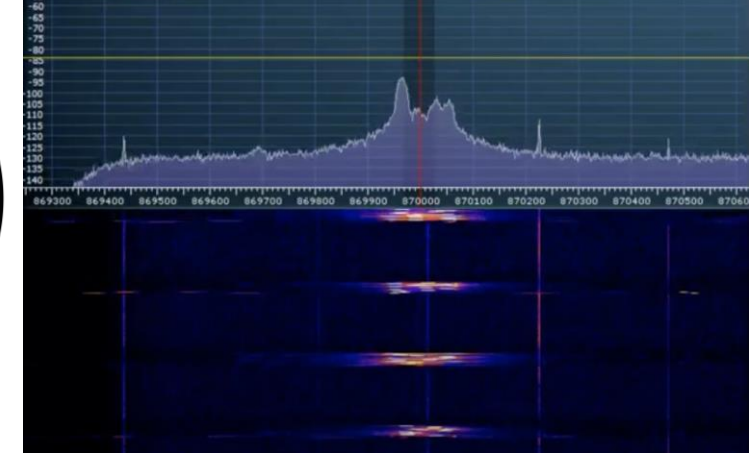
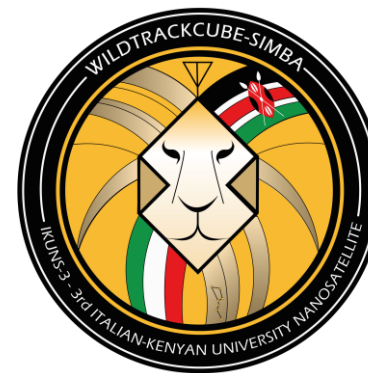
@S5Lab @oz9aar SW @PRStoetzer @amsatdl @AMSAT



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SIMBA IoT Payload

- The SIMBA IoT payload belonging to Sapienza University of Rome is fostering collaboration initiatives for development of IoT payloads to communicate with the satellite
- While optimization operations are ongoing with the payload logics, new mission profiles have been evaluated for potential IoT missions
- A second IoT mission will be launched in 2024 in collaboration with industry



Capacity Building: Kenya

- Capacity Building training in Nairobi and Malindi completed between 6 and 16 November 2023
- Scope: training on IoT, SDR, satellite design, demonstrations with SIMBA



Capacity Building: Panama and Dominican Republic

- New project on 1U CubeSat development started by IILA (Italian Latin American International Organization)
- Target: development of satellites in 2024 and potential launch window in 2025
- Held ground station training in Rome in October 2023 (2 weeks)



ROMULUS Launch

- The Sapienza students experiment «ROMULUS» for REXUS/BEXUS Programme has been launched on 25 September 2023
- The project has been developed by 12 students
- A new REXUS/BEXUS Project named RETINA has been proposed for the new REXUS call, with the endorsement of the Italian Space Agency



Future plans: UNISEC project and new student representative

INCAVE Project:

New UNISEC-Global Proposal for
Experiments in Analog Missions



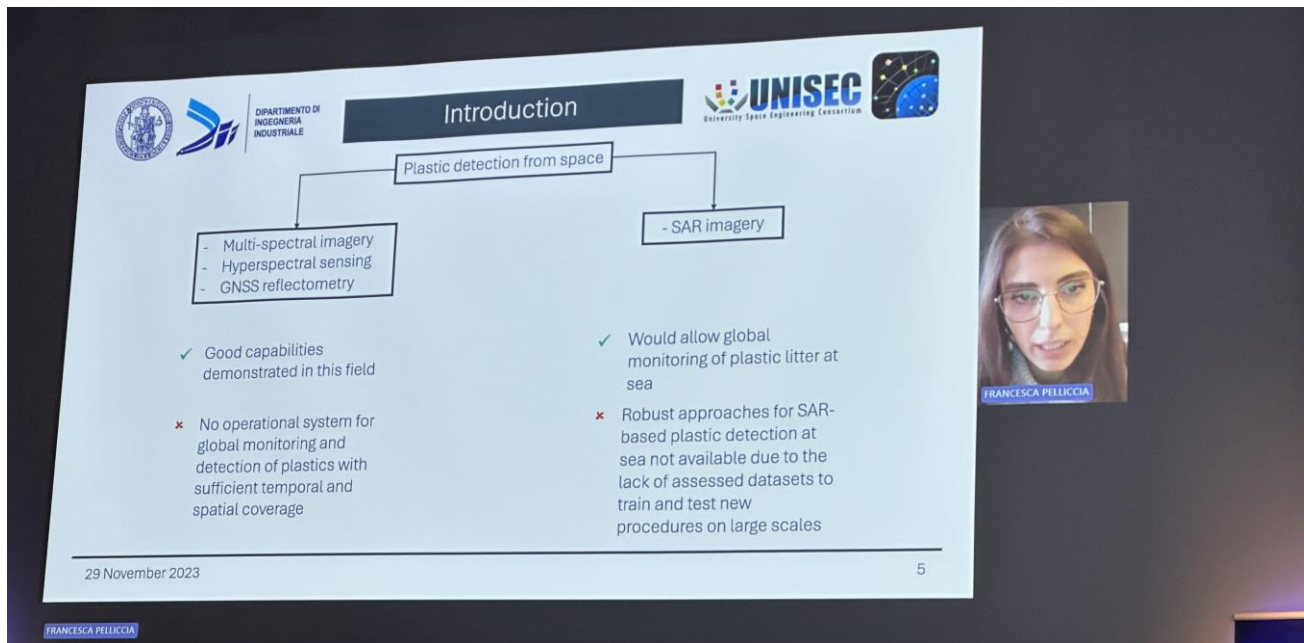
New Student Representative

Michela Boscia
PhD Student, Sapienza University of Rome



Future Plans: Participation in MIC

This year: MOTHS and CROSSEYE – Sapienza University of Rome and University of Naples «Federico II»



Introduction

Plastic detection from space

- Multi-spectral imagery
- Hyperspectral sensing
- GNSS reflectometry

- SAR imagery

✓ Good capabilities demonstrated in this field

✗ No operational system for global monitoring and detection of plastics with sufficient temporal and spatial coverage

✓ Would allow global monitoring of plastic litter at sea

✗ Robust approaches for SAR-based plastic detection at sea not available due to the lack of assessed datasets to train and test new procedures on large scales

29 November 2023

FRANCESCA PELLICCIA



We plan to continue our involvement in MIC as it helps students develop their projects in a structured way and it trains them to hands-on tasks and team working

Thank you for your attention!



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9th UNISEC Global Meeting
Tokyo, Japan, 29 November – 01 December 2023