

# UNISEC-Global Challenge: 2030-ALL

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*UNISEC-Global*

Vienna, Austria, June 26, 2018.

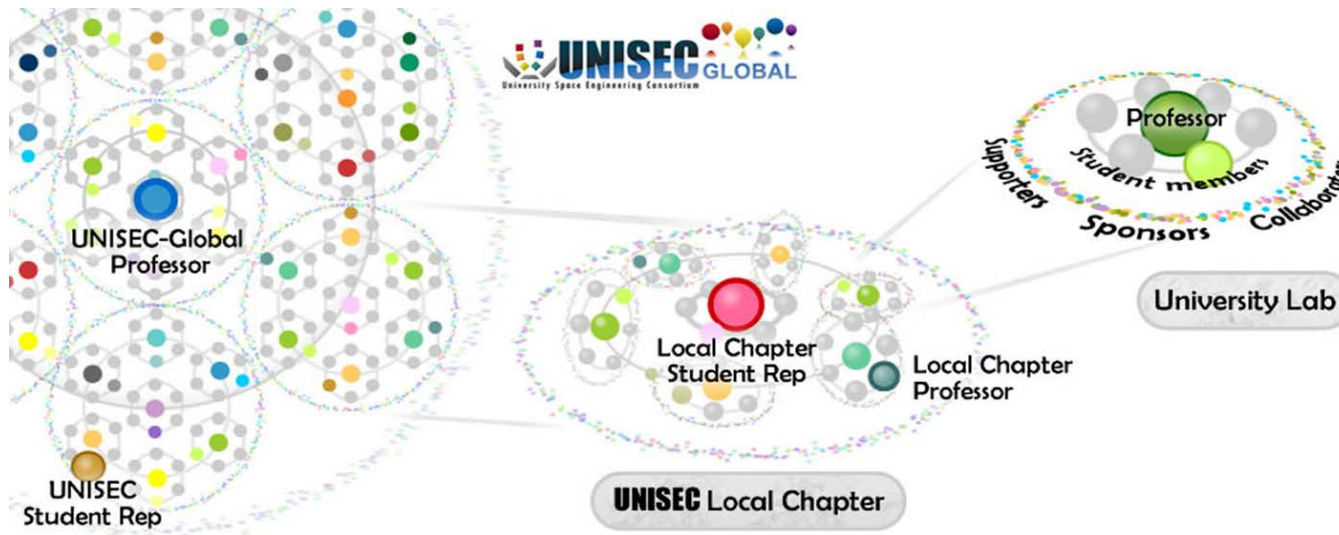
United Nation Committee on the Peaceful Uses of Outer Space (UNCOPUOS)

# Outline

- Background
  - What is UNISEC-Global?
  - Vision 2030-ALL
  - UNISEC-Global Network
- UNISEC Approach
  - Training Program
  - Space Engineering Forum, Conferences
  - Debris Awareness and Solutions
  - Global Projects
- Conclusion
- Upcoming Events in 2018

# What is UNISEC-Global?

- **UNISEC-Global** is an **international nonprofit, nongovernmental organization**, consisting of local-chapters across the world.
- Since its **establishment in November 2013**, it has provided an annual forum, training programs, competitions.
- In 2017, it was accepted as **permanent observer by UNCOPUOS**.
- Its **primary objective** is to help create a world where space science and technology is used by individuals and institutions in every country, rich or poor for peaceful purposes and for the benefit of humankind.



UNISEC stands for  
University Space  
Engineering  
Consortium

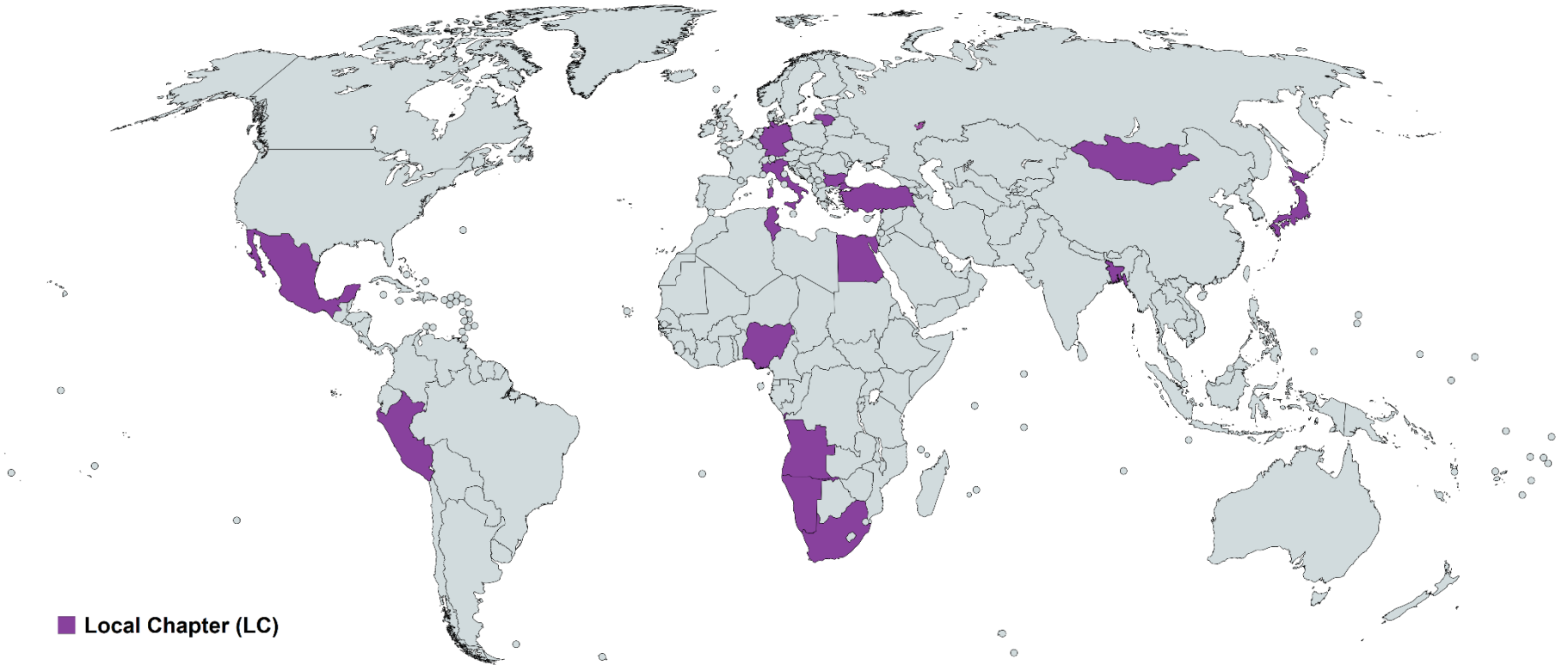
# Vision

- 2020-**100** (initial)
  - *“By the end of 20**20**, let’s create a world where university students can participate in practical space projects in more than **100** countries.”*
- 2030-**ALL** (revised)
  - *“By the end of 20**30**, let’s create a world where university students can participate in practical space projects in **all** countries.”*

**Key principle of the 2030 Agenda for Sustainable Development : No one will be left behind.**

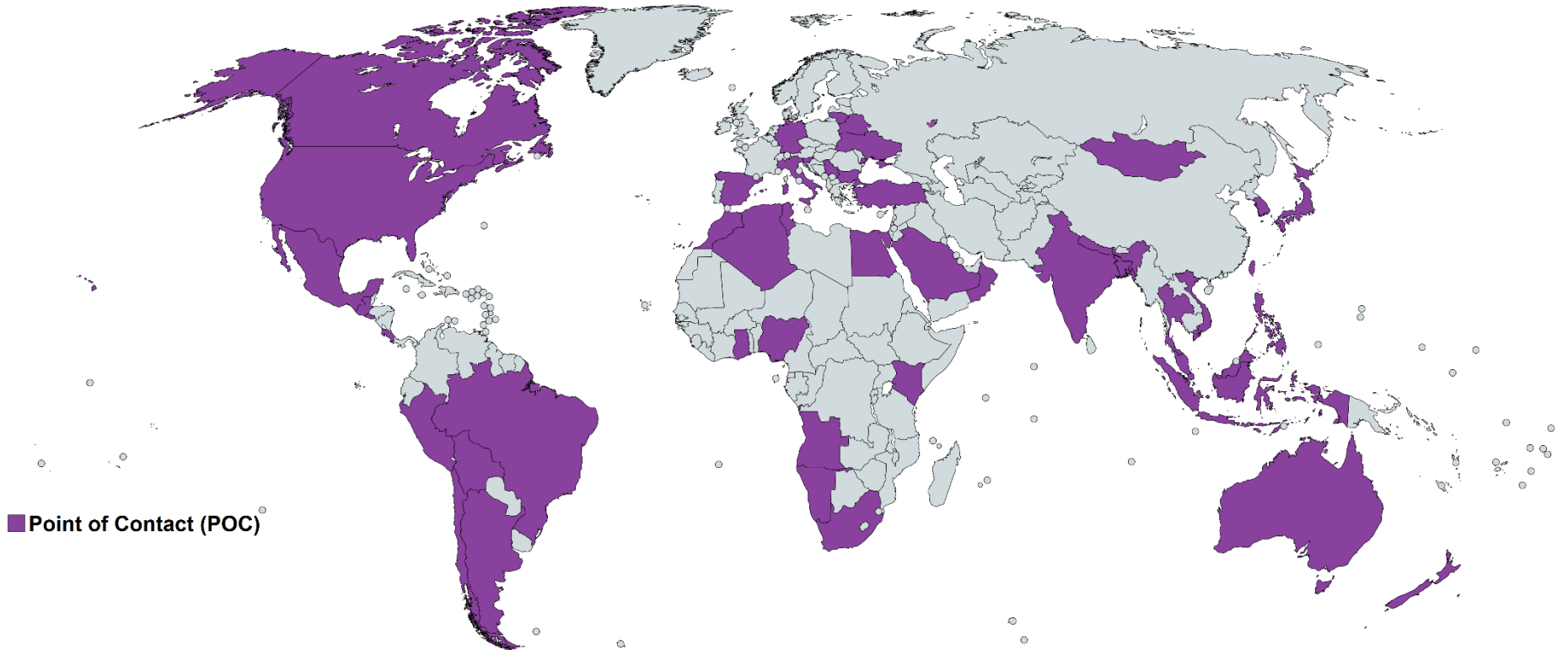
# UNISEC-Global Network

## *Local Chapters (15)*

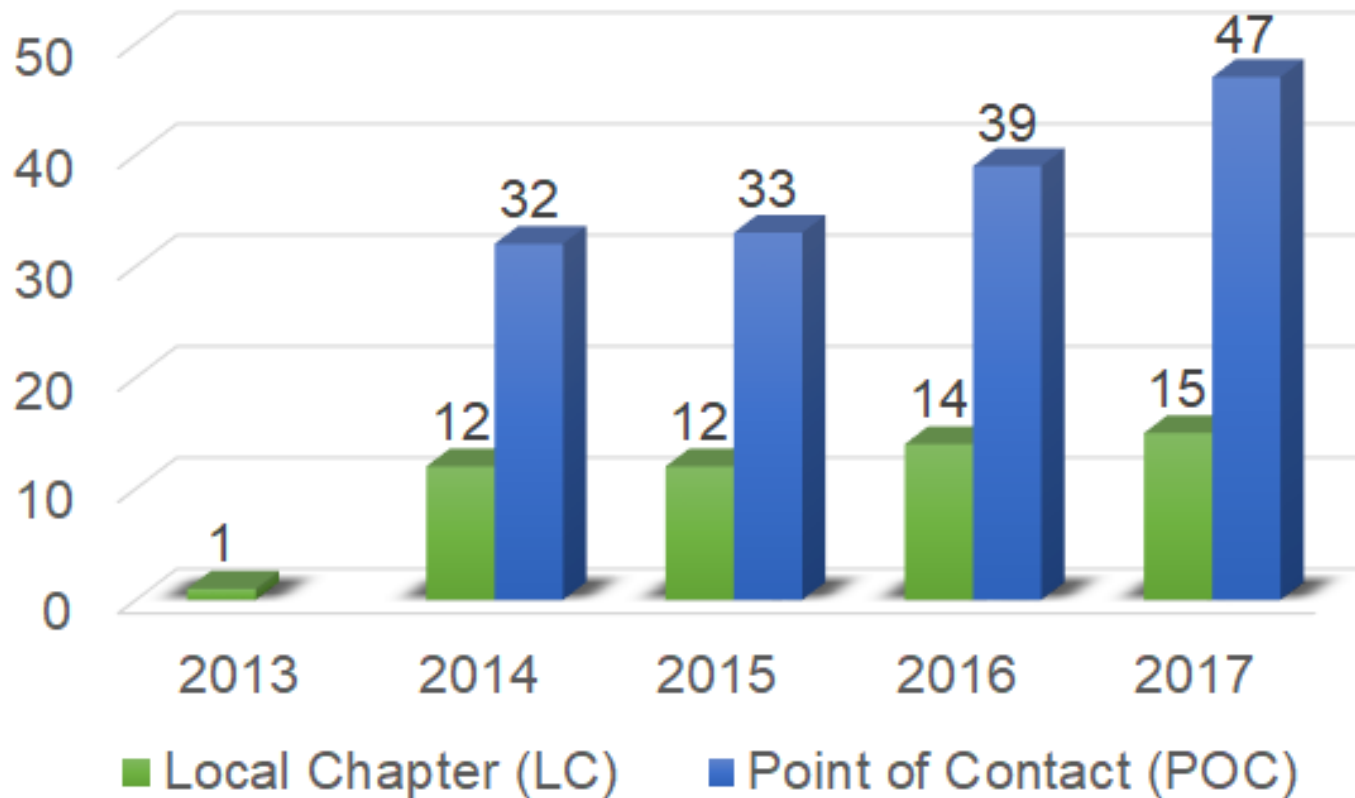


# UNISEC-Global Network

## *Point of Contact (47)*



# UNISEC-Global Network



# UNISEC-Global's Approach

Training Program  
HEPTA-Sat Training  
CanSat Leader Training Program

Forum, Conferences  
UNISEC-Global Meeting  
Nano-satellite Symposium

Vision 2030-ALL

Debris Awareness and  
Solutions

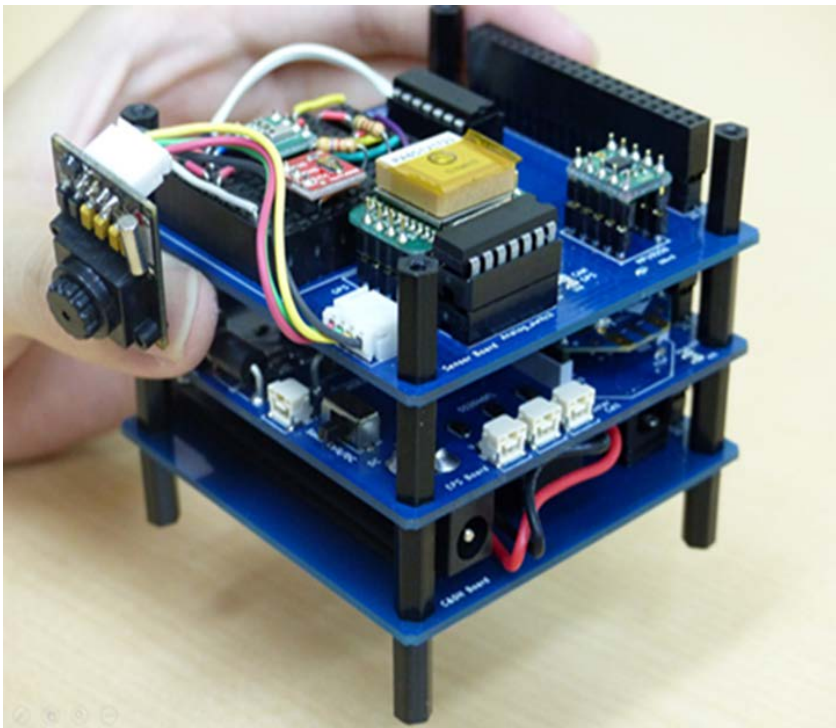
Debris Mitigation Competition  
IAA Study Group: Post Mission  
Disposal for Micro and Smaller  
Satellites – Concept and Trade  
Studies

Global Project

Mission Idea Contest for  
Micro/Nano Satellite Utilization  
UNISEC – Global Project



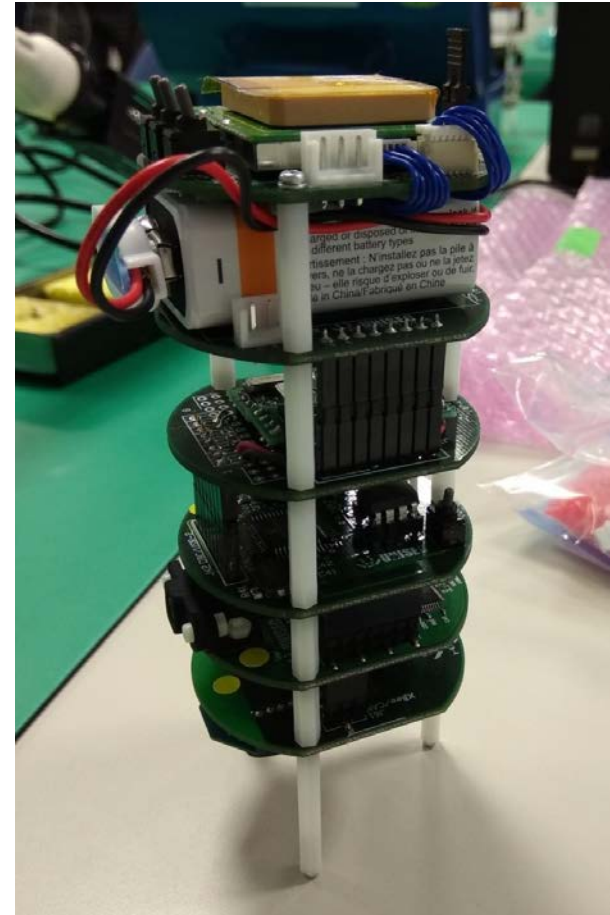
# Training Programs: Educational Kits



**HEPTA-Sat**

(CLTP8-, HEPTA-Sat Training Workshops)

*Developed by: UNISEC-Japan*



**i-CanSat**

(CLTP3-7, CTP)

# CanSat Leader Training Program (CLTP)



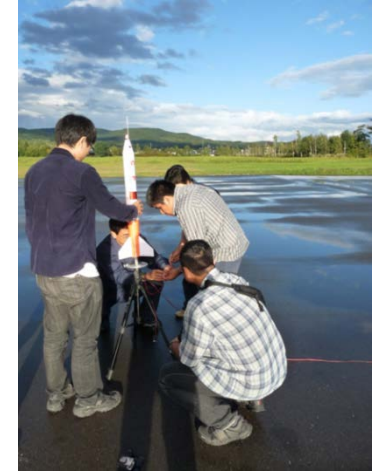
**Objective:** CLTP is a training program for professors/instructors to learn how to conduct CanSat training by experience. Participants are expected to teach their students after training. It has contributed to capacity building in basic space engineering and technology.

**Launched:** October 2010

**Offered:** Annually

**Graduated:** 73 participants from 34 countries

**CLTP9 will be held in August 20-31, at Nihon University, Japan**



Launch Experiment



CanSat Manufacturing



Testing



Paper Craft Rocket



# UNISEC-Global Meeting



- **Objective:** The UNISEC-Global Meeting is an annual gathering to get together to exchange knowledge, information, experiences on practical space projects and activities. The meeting includes Local Chapter activities report, Group discussion, Student Session, Competitions and Acknowledgement of new local chapter.
- **Launched:** November 2013
- **Conducted:** Annually

**6<sup>th</sup> UNISEC-Global Meeting will be held at ISU in Nov 19-21, 2018.**

***Join us!***



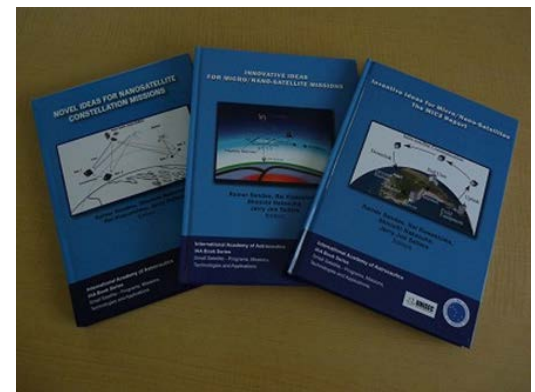
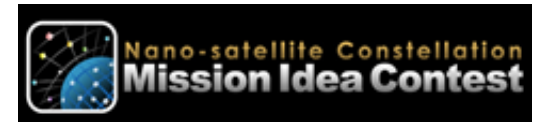
# Mission Idea Contest (MIC) for Micro/Nano Satellite Utilization

**Objective:** The Mission Idea Contest (MIC) is encouraging aerospace engineers, college students, consultants, and anybody interested in space to share their ideas on how to use micro/nano/pico satellites, and provides opportunities to present their ideas and gain attention internationally.

**Launched:** June 2010

**Conducted:** Annually as PreMIC or MIC

- Regional coordinators from 41 countries
- Four books were published as a part of the IAA book series.



# Debris Mitigation Competition(DMC)



- **Objective:** To facilitate the sharing of innovative solutions for debris mitigation and developing effective deorbit devices that can be demonstrated and validated with Micro/Nano-Satellites. It is also expected to increase awareness of debris problems among satellite developers and university students.
- **Launched:** November 2015
- **Conducted:** Annually



# IAA-Study Group (IAA-SG 4.23)

- **Title of Study:** Post Mission Disposal for Micro and Smaller Satellites – Concept and Trade Studies
- **Members:**
  - **Chairs:** Darren McKnight (USA), Toshiya Hanada (Japan), Alex da Silva Curie (UK), and Peter Martinez (South Africa)
  - **Secretary:** Rei Kawashima (Japan)
  - **Experts :** IAA members and non IAA members
- **Overall Goal:** Provide framework for a practical implementation to assure compliance with Space Debris Mitigation guidelines for micro and smaller satellites.
- **Target Communities:** Universities, micro/nano/pico-satellite manufacturers, and new spacefaring entities
  - UNISEC-Global will help disseminate the information and recommendation.

# Recent Activities' Timeline

CLTP-8



HEPTA-Sat Training in Bulgaria



5th UNISEC-Global Meeting Pre Fifth MIC 2nd DMC



iCanSat Training in Namibia



First IAA-SG 4.23 Meeting



UNISEC-Global application To UNCOPUOS



HEPTA-Sat Training in Nepal



HEPTA-Sat Training During UN Workshop



UNISEC Presentation at Fifty-Fifth session of STS-UNCOPUOS)

HEPTA-Sat Training in UAE



UNISEC-Global presentation at UNCOPUOS



# UNISEC-Global Projects

- A. Global Antenna Sharing Project (Kyushu Institute of Technology and Istanbul Technical University)
- B. Standardization of electrical interface Project (Wurzburg University)
- C. Store & Forward Constellation (University of Tokyo)
- D. Global University Space Debris Observation Network (GUSDON) (Sapienza University of Rome)
- E. BIRDS project (Kyushu Institute of Technology)



# Global Antenna Sharing Project



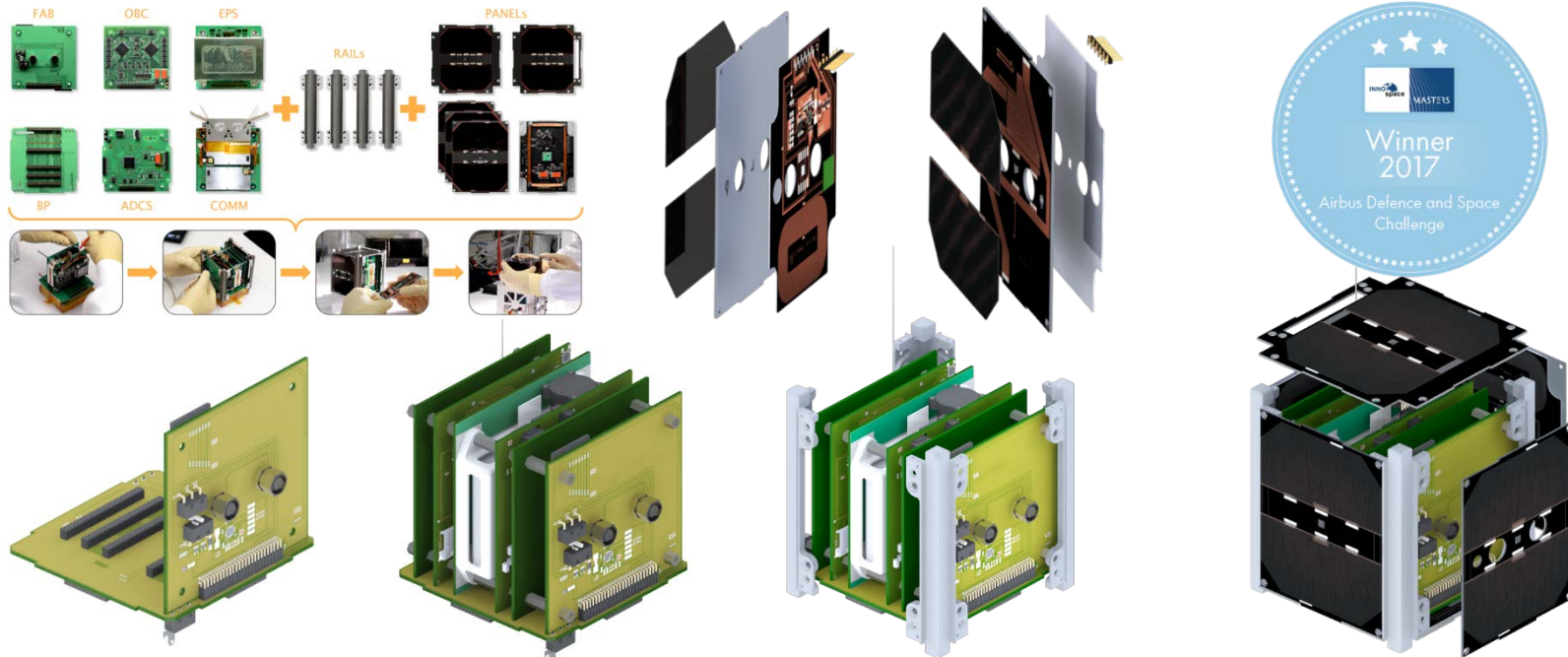
## Objectives: Efficient use of *Micro/Nano Satellites*

- Sharing resources
- Helping less developed institutions to reach higher levels
- Increased usage time of expensive systems (ground stations)
- Better use of systems
- Use a cloud-based software platform that connects satellite operators with antenna owners, solving both the problem of insufficient satellite access time and unused antenna idle time.

# Standardization of electrical interface

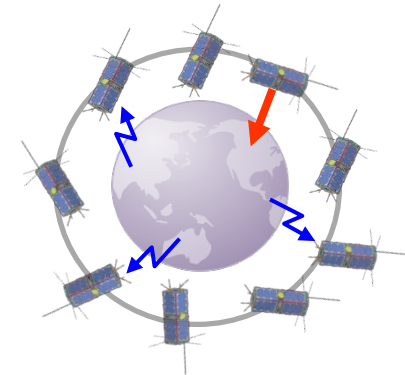
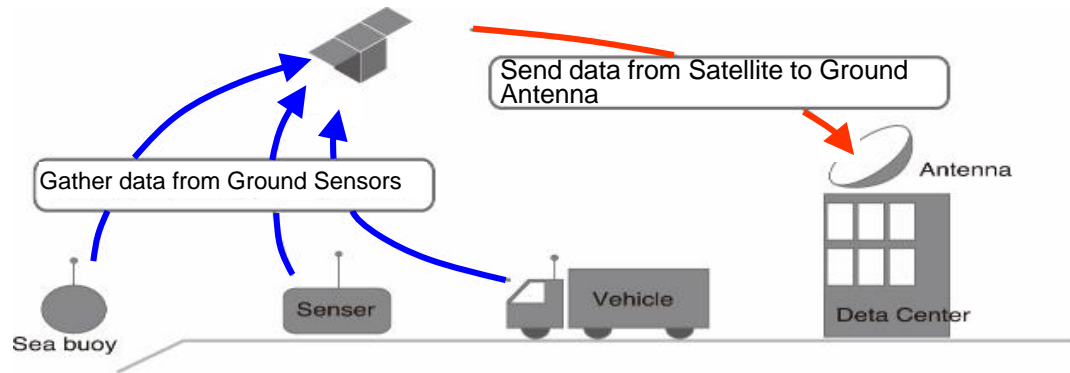
**Objective:** support international university cooperation by a standard electrical interface suitable for pico-satellites

**Advantages:** modular and flexible satellite system design, no harness



Electrical Interface Standard Allows to Combine Components from Different Partners  
Free documentation: <http://unisec-europe.eu/standards/bus>

# Store & Forward Constellation



- Ground or buy sensors to measure, satellites to collect data that downlinked to ground stations at low bit rate
- **Proposal is to build a constellation of CubeSats for the mission.** Each country/university can contribute with their own satellite and get frequent access of sensor data through the constellation
- What to measure
  - Water quality, water level, soil, environment(CO<sub>2</sub>, gas), car velocity(traffic jam), ship route(oceanic current), ground movement(earthquake)
  - Competitive where no mobile infrastructure, dangerous areas, etc.

# Global University Space Debris Observation Network (GUSDON)



SAPIENZA  
UNIVERSITÀ DI ROMA

Prof. Dr. Fabio Santoni



- Space debris observation is very important to improve the knowledge of the environment and prevent collisions in orbit with active spacecraft
- Orbit determination of space debris is extremely sensitive to the number and geographical distribution of measurements
- Basic, but still useful measurements can be obtained using affordable equipment, within typical university research budgets
- Sapienza University of Rome developed an extensive experience in optical space debris observation and already established collaboration with other Universities in this field
- A Global University Space Debris Observation Network could be established among Universities within UNISEC
- The main objective of the network is to foster student awareness of the global space debris problem, in a global international collaboration

# The BIRDS project



Working with UNISEC-Global and the UN to implement *Space Engineering Capacity Building*



	Launch	Deployment	Status	Participating countries
BIRDS-1 (5 sats)	summer of 2017 (3 June 2017)	summer of 2017 (7 July 2017)	All in orbit	Japan, Ghana, Mongolia, Nigeria, Bangladesh
BIRDS-2 (3 sats)	summer of 2018 (28 June 2018)	summer of 2018	Awaiting launch	Bhutan, Malaysia, Philippines
BIRDS-3 (3 sats)	2019	2019	Under development	Japan, Sri Lanka, Nepal
BIRDS-4 (? sats)	2020	2020	Being organized	

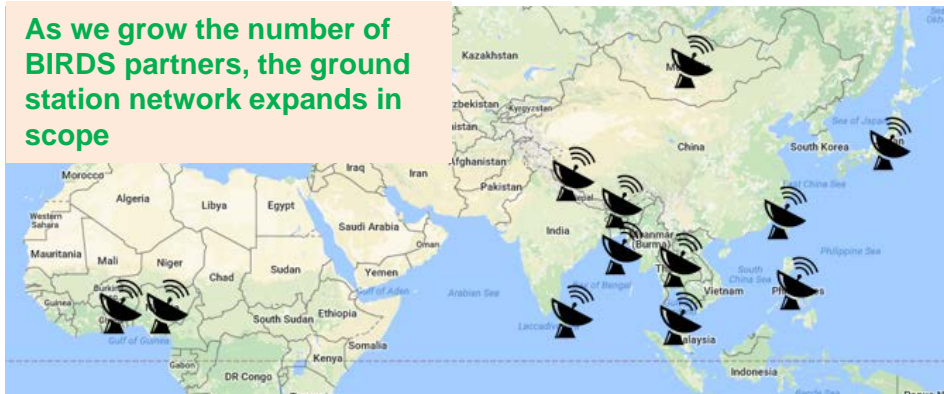
## BIRDS Mission Statement

Make the first step toward creating an indigenous space program by designing, building, testing, launching, and operating, the first satellite for participating nations.



Photo above: ISS deployment of BIRDS-1, CubeSats of Nigeria and Bangladesh, on 7 July 2017.

As we grow the number of BIRDS partners, the ground station network expands in scope



The BIRDS Ground Station Network



← all BIRDS members (on 4-Oct-2017)

Archive of the "BIRDS Project Newsletter"  
<http://birds1.birds-project.com/newsletter.html>

# Conclusion: UNISEC-Global Approaches *to achieve 2030 Vision*

- **Training Programs**
  - CLTP: Offered Annually
  - HEPTA-Sat: Offered On Demand by UNISEC-Japan
  - The International Summer Space School: Offered by UNISEC-Samara and IAF
- **Space Engineering Forums for students and Professionals**
  - UNISEC-Global Meeting
  - Nano-Satellite Symposium
- **Debris Awareness and Solution**
  - DMC
  - IAA Study Group
- **Space Projects (from Mission Idea to Real Projects)**
  - Mission Idea competition
  - UNISEC-Global Projects

**Education is a Key**

# Upcoming Events in 2018

- **CLTP9** (August 20-31, 2018)  
Venue: Nihon University, Chiba, Japan.
- **Samara Summer Space School** (Aug 19-Sep 1, 2018)  
Venue: Samara, Russia
- **6<sup>th</sup> UNISEC-Global Meeting** (Nov. 19-21, 2018)  
Venue: International Space University (ISU),  
1 Rue Jean-Dominique Cassini, 67400 Illkirch-  
Graffenstaden, Strasbourg, France.
  - **5<sup>th</sup> Mission Idea Contest** (Nov. 19, 2018)



# Thank you!



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