

UNISEC-Global Challenge: 2030-ALL

Rei KAWASHIMA
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

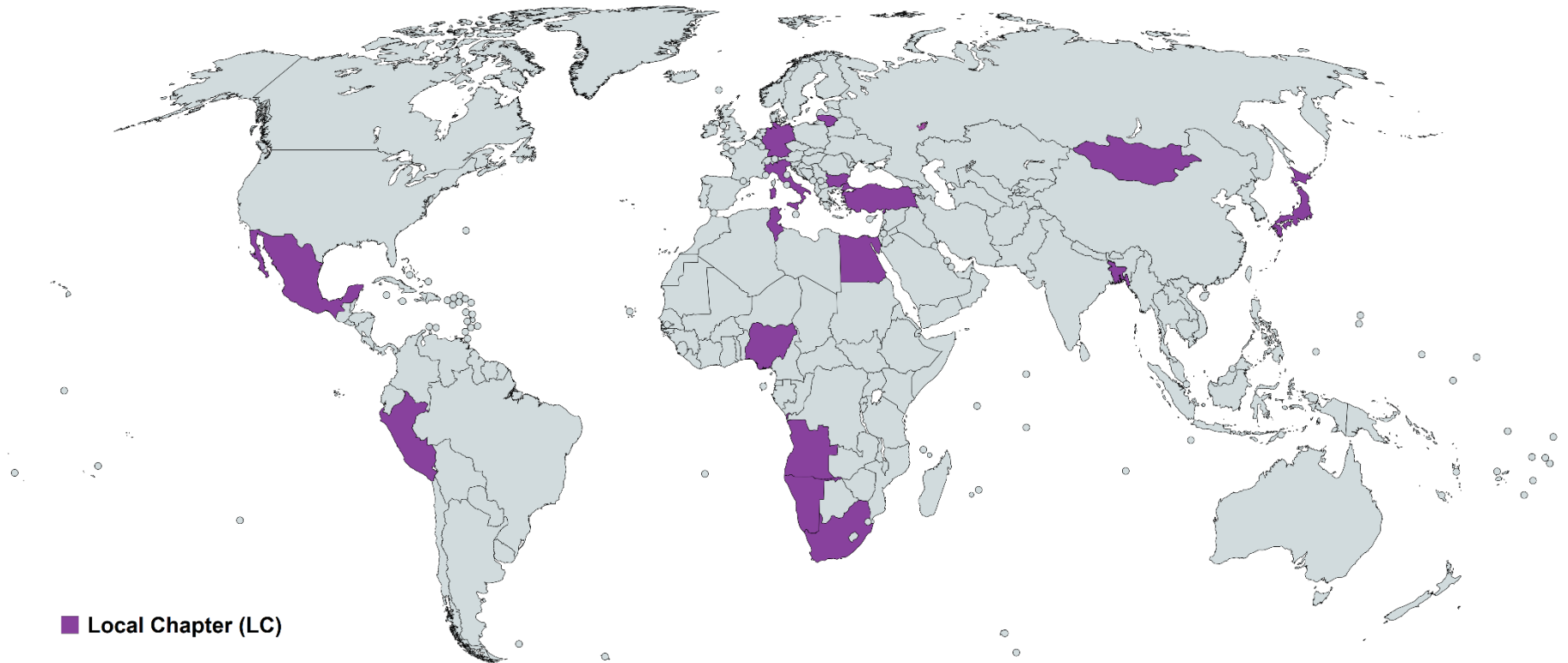
Vision

- 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.

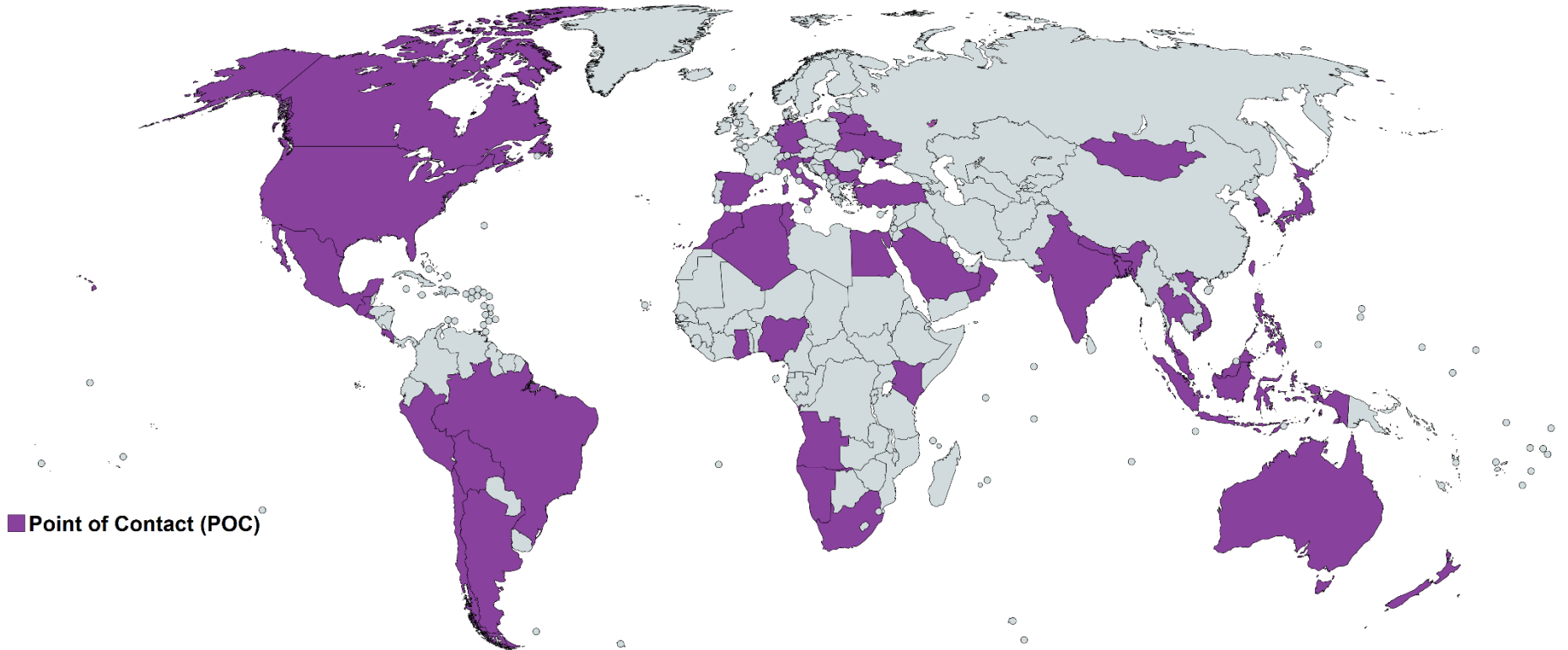
UNISEC-Global Network

Local Chapters (15)

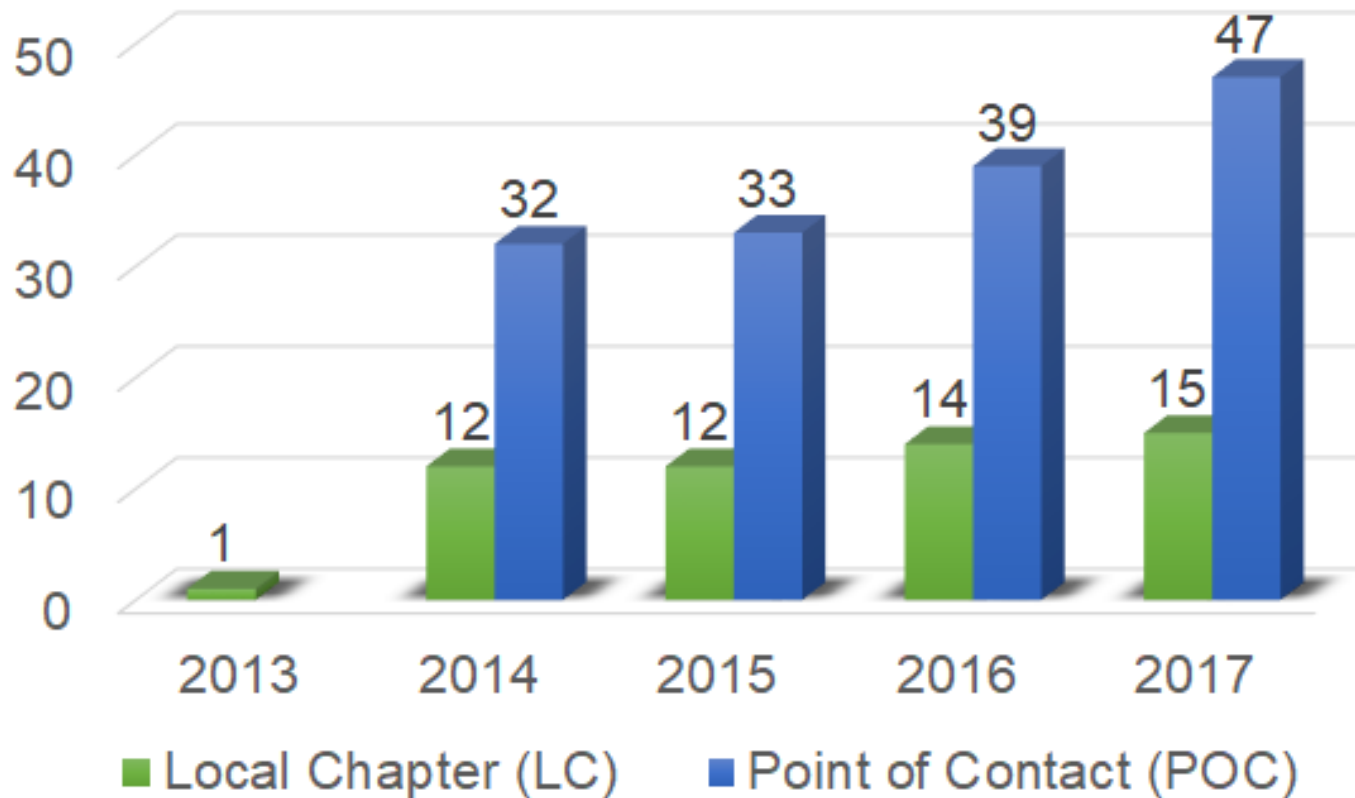


UNISEC-Global Network

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

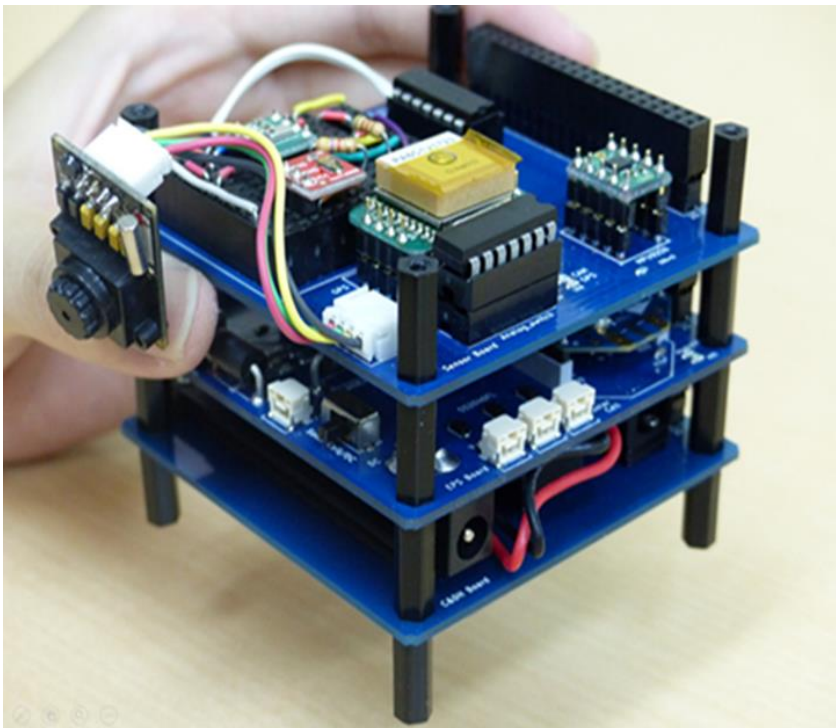
Debris Awareness and
Solutions

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

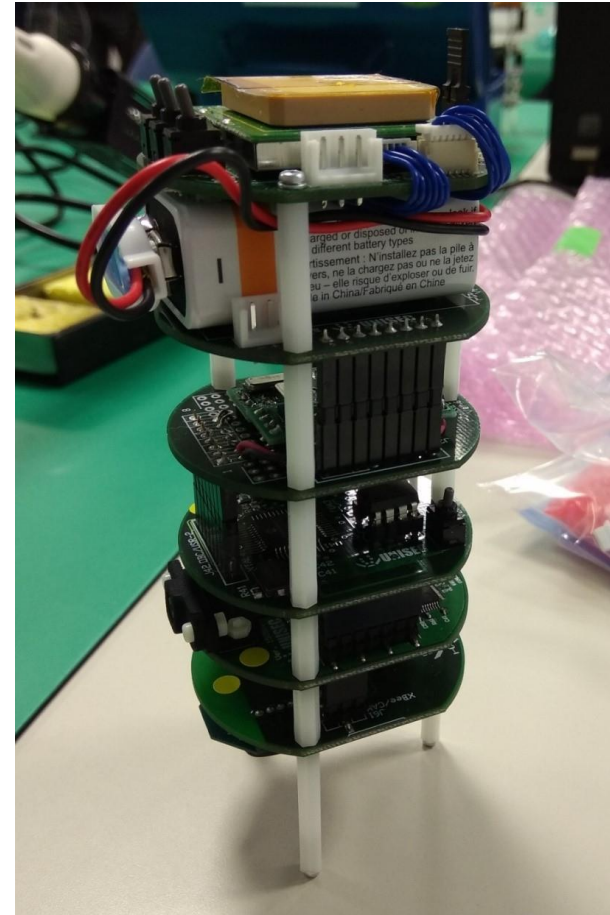
Training Programs: Educational Kits



HEPTA-Sat

(CLTP8-, HEPTA-Sat Training Workshops)

Developed by: UNISEC-Japan



i-CanSat

(CLTP3-7, CTP)

CanSat Leader Training Program (CLTP)



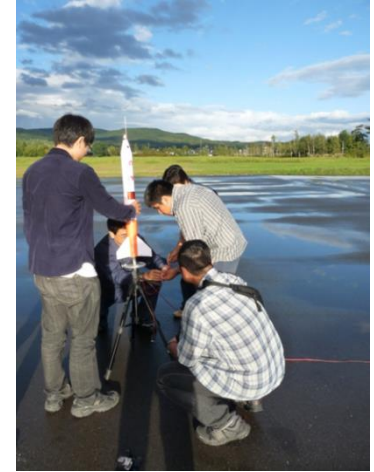
Objective: CLTP is a training program for professors/instructors to learn how to conduct CanSat training by experience. Participants are expected to teach their students after training. It has contributed to capacity building in basic space engineering and technology.

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

6th UNISEC-Global Meeting will be held at ISU in Nov 19-21, 2018.

Join us!



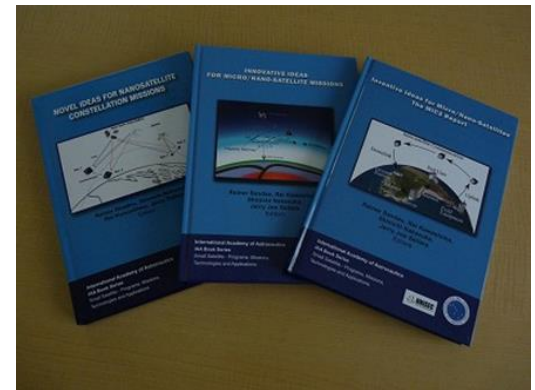
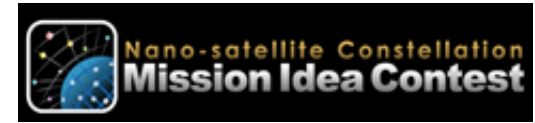
Mission Idea Contest (MIC) for Micro/Nano Satellite Utilization

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

Jun 17

Jul 17

Sep 17

Oct 17

Nov 17

Dec 17

Jan 18

Feb 18

Mar 18

Apr 18

May 18

Jun 18

**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



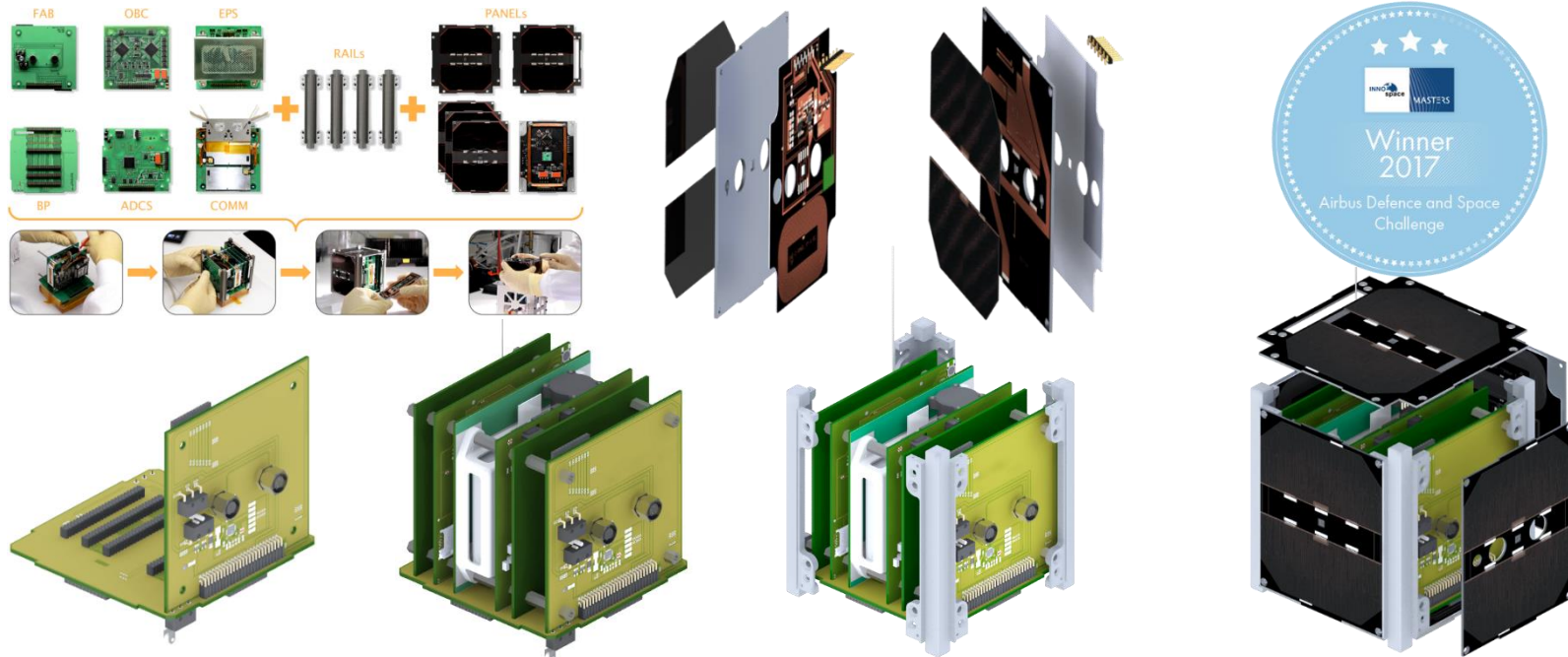
Objectives: Efficient use of *Micro/Nano Satellites*

- 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

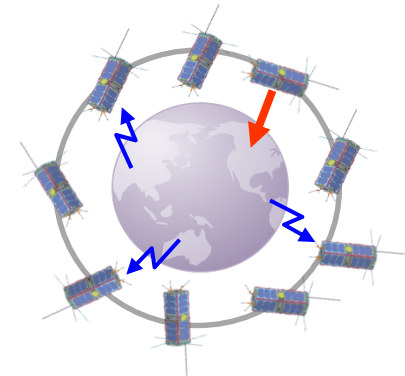
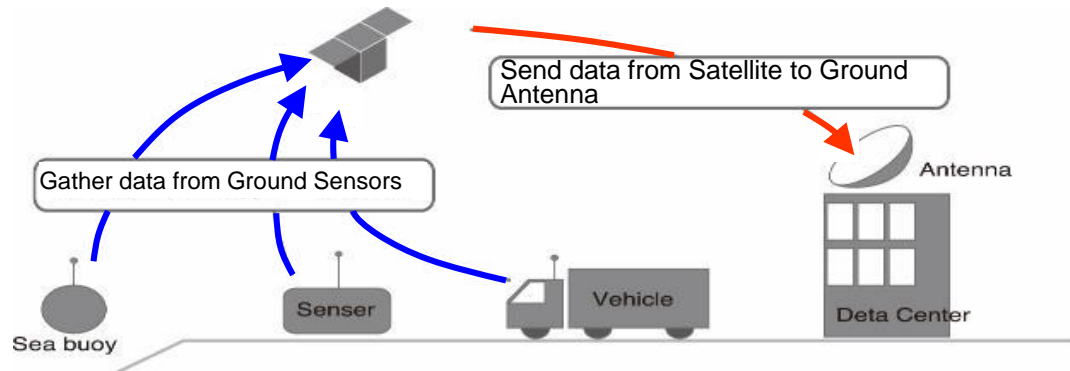
Objective: support international university cooperation by a standard electrical interface suitable for pico-satellites

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(CO₂, 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	

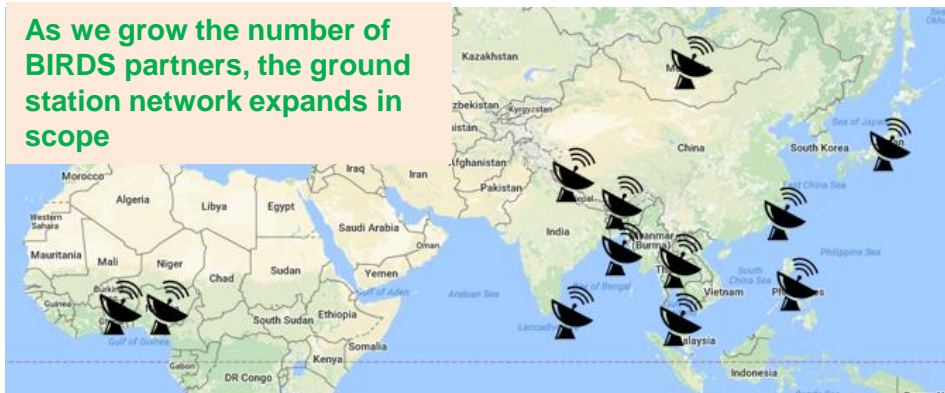
BIRDS Mission Statement

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

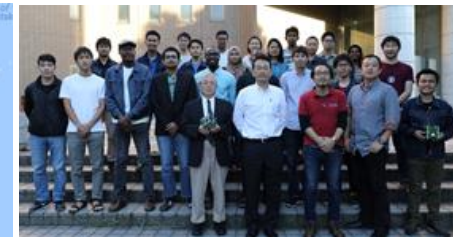


Photo above:
ISS deployment
of BIRDS-1,
CubeSats of
Nigeria and
Bangladesh, on
7 July 2017.

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
- **6th UNISEC-Global Meeting** (Nov. 19-21, 2018)
Venue: International Space University (ISU),
1 Rue Jean-Dominique Cassini, 67400 Illkirch-
Graffenstaden, Strasbourg, France.
 - **5th Mission Idea Contest** (Nov. 19, 2018)



Thank you!



UNISEC-Global Secretariat

C/O UNISEC-Japan,
Central Yayoi 2F, 2-3-2 Yayoi, Bunkyo-ku,
Tokyo 113-0032, Japan
TEL: +81-3-5800-6645
Email: secretariat@unisec-global.org
www.unisec-global.org