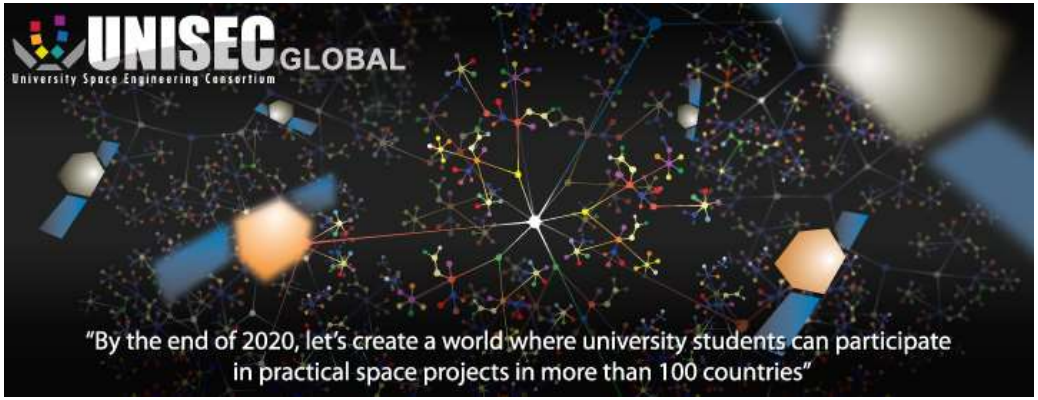
Introduction to UNISEC-Global



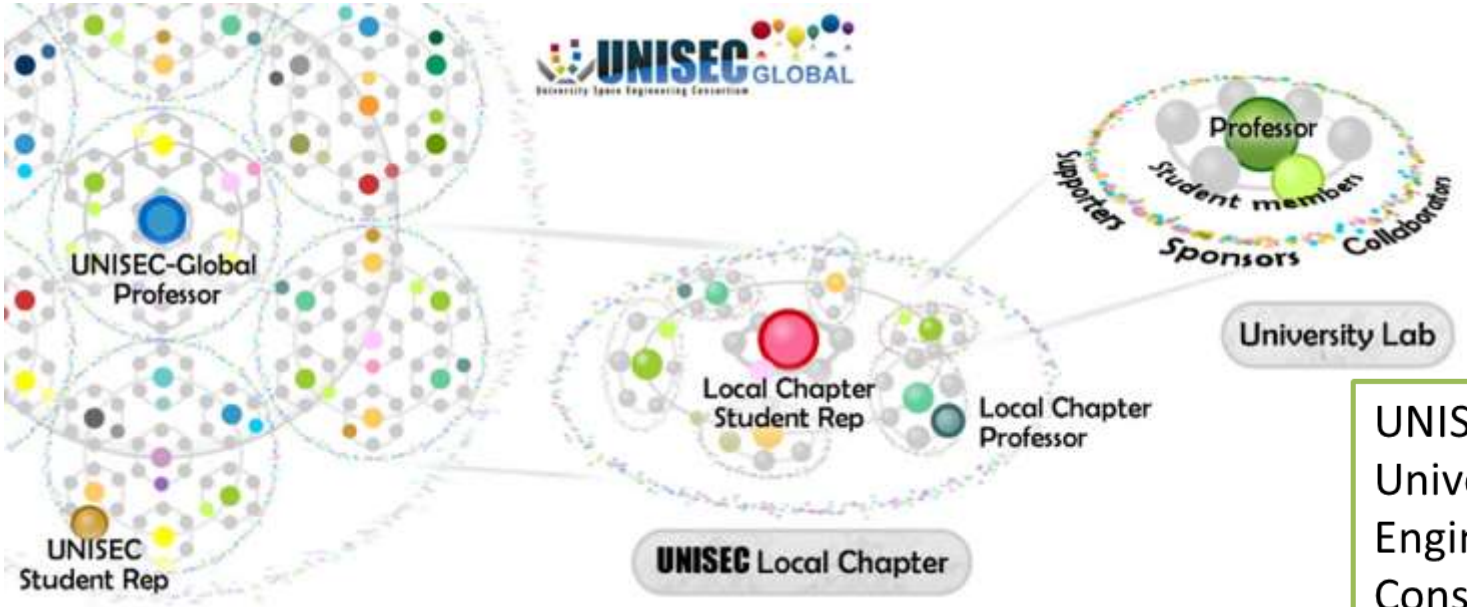
March, 2017
UNISEC-Global

Outline

- What is UNISEC-Global?
- Background
- Activities of UNISEC-Global
- Future plan
- Conclusion

What is UNISEC-Global?

- UNISEC-Global is an international community to facilitate/promote university students' practical space development activities worldwide.
- UNISEC-Global is a consortium of Local Chapters.
- A UNISEC Local Chapter is a consortium of university members which consist of professor and students in each country/region.



UNISEC stands for University Space Engineering Consortium

Background - UNISEC (Japan)

- UNISEC: “University Space Engineering Consortium”
  - UNISON: UNISEC Student Organization
  - UNISAS: UNISEC Alumni Organization
- NPO/NGO to facilitate/promote university level students’ practical space development activities, such as designing, manufacturing and launching small satellites and hybrid rockets.
- Established in 2002
- 71 laboratories/groups from 50 universities
- 923 student members and 277 individual supporters 17 corporate supporters
- 3 pillars: Human resource development, Technological development, Outreach

Achievement of UNISEC-Japan

41 university satellites launched in 12 years

From CanSat to CubeSat, Nano-Satellite

From Educational purpose to Practical application

UNISEC GLOBAL
University Space Engineering Consortium

UNISEC Local Chapters

POCs in 39 regions: Australia, Bangladesh, Brazil, Bulgaria, Canada, Costa Rica, Egypt, Germany, Ghana, Guatemala, Indonesia, Italy, Japan, Kenya, Korea, Lithuania, Mexico, Mongolia, Morocco, Nepal, New Zealand, Nigeria, Peru, the Philippines, Saudi Arabia, Singapore, Samara (Russia), Slovenia, Spain, South Africa/Angola/Namibia, Taiwan, Thailand, Tunisia, Turkey, Ukraine, USA.

14 Local Chapters and 1 Association of Local Chapters have been acknowledged.

Vision 2020-100

- *"By the end of 2020, let's create a world where university students can participate in practical space projects in more than 100 countries."*

14 Local Chapters were established and **39 Points of Contact** are working for the 5th UNISEC-Global Meeting

Activities of UNISEC-Global

How can we facilitate activities worldwide?

- Training Program
  - CanSat Leader Training Program (CLTP)
- Contest
  - Micro/Nano Satellite Mission Idea Contest
  - Debris Mitigation Competition
- UNISEC-Global Meeting

CanSat Leader Training Program (CLTP)

CLTP is a training program for professors/instructors to learn how to conduct CanSat training by experiencing. It has contributed to capacity building in basic space technology.

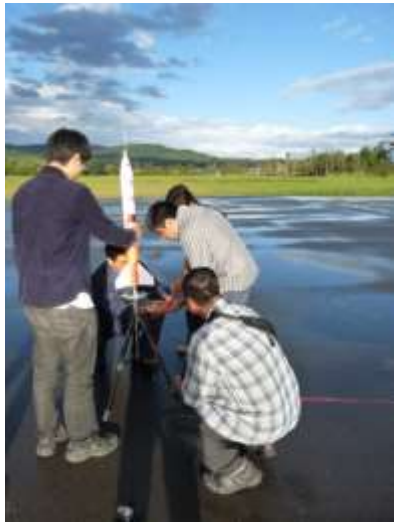
CLTP will enable participants to do the following:

- Experience the whole cycle of CanSat development including sub-orbital launch experiments through hands-on training.
- Conduct CanSat program in their countries for senior-high school and undergraduate university students.
- Join “international CanSat education network”

CanSat Manufacturing

Vibration Test

Paper craft Rocket



Launch Experiment

CLTP History & Participants

64 participants from 32 countries

CLTP1 (Wakayama Univ. in Feb-March, 2011)
12 participants from 10 countries, Algeria, Australia, Egypt, Guatemala, Mexico, Nigeria, Peru, Sri Lanka, Turkey (3), Vietnam.

CLTP2 (Nihon Univ. in Nov-Dec, 2011)
10 participants from 10 countries, Indonesia, Malaysia, Nigeria, Vietnam, Ghana, Peru, Singapore, Mongolia, Thailand, Turkey.

CLTP3 (Tokyo Metropolitan Univ. in July-August, 2012)
10 participants from 9 countries, Egypt (2), Nigeria, Namibia, Turkey, Lithuania, Mongolia, Israel, Philippines, Brazil.

CLTP4 (Keio Univ. in July-August, 2013)
9 participants from 6 countries, Mexico(4), Angola, Mongolia, The Philippines, Bangladesh, Japan.

CLTP5 (Hokkaido Univ. in Sept 8-19, 2014)
7 participants from 5 countries, Korea (2), Peru, Mongolia, Mexico (2), Egypt.

CLTP6(Hokkaido Univ. in August 24-Sept4, 2015)
8 participants from 8 countries, namely Angola, UN(Austria), New Zealand, Tunisia, Turkey, Egypt, Bangladesh, Mexico

CLTP7 (Hokkaido Univ. in Sep 21-Oct 1, 2016)
8 from 7 countries, namely Egypt, Myanmar, Peru, Nepal (2), Mongolia, Serbia, Dominican Republic

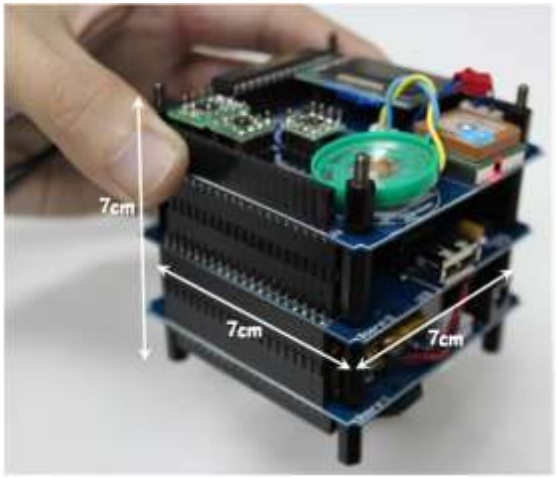
Post- CLTP Activities

- CLTP (teaching professors) in Turkey and Mexico
- CTP (teaching students) at universities in Egypt, Ghana, Peru, Mexico, Mongolia, Nigeria and the Philippines, etc.
- National CanSat Competitions in Lithuania, Mongolia, Turkey, Peru, etc…
- Participation in the international CanSat Competition from Egypt, Peru, Mongolia, Turkey, Guatemala, etc…

The 5th CanSat Training Program in Egypt

New challenge in CLTP8

- New training tool “HEPTA-Sat”
- Team up with Japanese students
  - an international participant and a Japanese student will make a team and work with one HEPTA-Sat.
- Hands-on training: September 7-16, 2017 at Nihon University, Chiba
- E-learning: August, 2017
- **Application deadline: March 31**



http://www.CLTP.info

Mission Idea Contest (MIC)

- MIC is a contest to propose new applications of Micro/Nano-Satellite with less than 50kg in weight.
- MIC has been conducted 6 times, including 2 pre-workshops.
- Three books were published as a part of the IAA book series.
- Regional coordinators from 41 countries around the world.

The Pre-5th Mission Idea Contest workshop will be held during UNISEC-Global Meeting in Dec2-4, 2017 in Rome, Italy.

http://www.spacemic.net/

New Challenge in PreMIC5

Local Competitions are held in several regions, and the winners will get together and make presentation in the PreMIC5 workshop in Rome, Italy.

	Abstract due	Final presentation	Venue
Japan	May 18, 2017	July 22, 2017	Kyushu Institute of Technology
Mexico	May 17, 2017	Sep 6, 2017	Universidad de Guadalajara, CUCEI campus
Germany	July 17, 2017	Sep 13-14, 2017	Würzburg University
Italy	Sep 30, 2017	Nov 30, 2017	Sapienza – University of Rome

http://www.spacemic.net/

Debris Mitigation Competition (DMC)

- 1st Competition was held as “Deorbit Device Competition” in Oct 20, 2016 in Bulgaria to propose technical approaches for deorbit devices that fits CubeSat to prevent space debris.
- It was expected to increase awareness for sustainable and harmonious space development.
- 22 applications from 15 countries.
- 1st place: Japan, 2nd Places: Poland and USA

2nd Debris Mitigation Competition(1)

- **Objectives:**

To facilitate the sharing of innovative solutions for debris mitigation and developing effective post-mission disposal (PMD) and/or active debris removal (ADR) device that can be demonstrated and validated with a micro satellite.

- **Important Dates**

January 27, 2017 : Call for papers
June 15, 2017 : Abstracts submission due
August 30, 2017 : Notification for acceptance
October 20, 2017: Full Papers submission due
December 5, 2017: Final presentation in Rome, Italy

2nd DMC Requirements

- Propose a post-mission disposal (PMD) or active debris removal (ADR) device that satisfies the following requirements:
- The device must be designed for the removal of a potentially non-cooperative lean satellite of 50 kg mass and maximum dimension of 1 meter. Total mass of a satellite and device can exceed 50 kg.
- The device will enable the satellite to re-entry within 11 years (i.e. one solar cycle) after activating. You can use any systems such as thruster, tether, membrane or electric propulsion.
- The device will be activated at 00:00:00 UTC, January 1, 2020 with the following orbit element:

Semi-major axis	7128 km
Orbital inclination	98.4 degree
Eccentricity	0.001
R.A.A.N	30 degree
Argument of Perigee	210 degree
Mean Anomaly	190 degree

2nd DMC Evaluation Criteria

- The proposed deorbit device is evaluated according to the following criteria:
- Originality (20)
- Cost (20)
- Technical feasibility (20)
- Effectiveness (10)
- Reliability (10)
- Debris risk (10)
- Impact on/for satellite (10)

UNISEC-Global Meeting

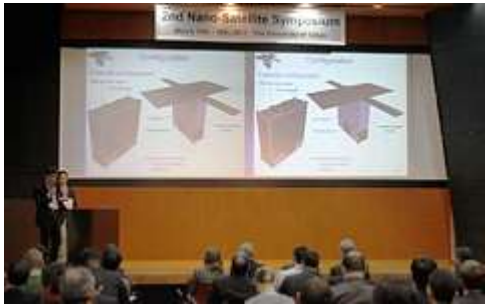
- The UNISEC-Global Meeting is an annual gathering to expand university community beyond Japan which intends to promote practical space projects at university level.
- It started in 2013, and was organized 4 times.
- As of Feb 2017, 14 local chapters have been acknowledged.
- The meeting includes Local Chapter activities report, Group discussion, Student Session, Competitions and Acknowledgement of new local chapter.

5th UNISEC-Global Meeting

- Venue: Sapienza – Università di Rome, Italy
- Dates: December 2 (Sat) - 4(Mon), 2017
  - 2nd Debris Mitigation Competition
  - Pre-MIC5 workshop
  - Local Chapter Report
  - Student Session (UNISON-Global)
  - Group Discussion
  - Acknowledgement of New Local Chapters

Nano-satellite Symposium

- It covers all fields of nano-satellite with less than 50 kg in weight.
- Speakers will make academic presentations about missions, application, technology, infrastructure (launch, legal aspects, education, etc.) and so on.
- The past symposiums had been held 7 times.
- The 8th symposium will be held as one of the programs at the 30th International Symposium on Space Technology and Science (ISTS) in Japan and the 9th one planned in Australia.



Future Plans

- Apply for Permeant Observer of the Committee on the Peaceful Uses of Outer Space (COPUOS)
- Localization of CanSat Leader Training Program
  - Textbook translation into various languages.
    - Wider people will get benefits in learning basic space technology
  - Introductory demonstration of training tools (i-CanSat, HEPTA-Sat)
- Possible Global nano-satellite project
  - Water quality monitoring with Nano-satellites
    - One of ten topics for Group Discussion held on Oct 22, 2016 in UNISEC-Global Meeting
  - Earthquake Precursor Investigation project
    - Proposed and awarded the second places in MIC2 and MIC4

Join us!

Welcome on board as

- Point of Contact for Local Chapter
- Regional Coordinator for Mission Idea Contest
- CLTP localization project participant
- CLTP participant
- PreMIC5 Local Competition organizer/participant
- 5th UNISEC-Global Meeting participant
  - December 2-4, 2017 in Rome, Italy
- Future Host for UNISEC-Global Meeting
- Or as new role that you create….

Contact

UNISEC-Global Secretariat

C/O UNISEC-Japan,
Central Yayoi 2F, 2-3-2 Yayoi, Bunkyo-ku,
Tokyo 113-0032, Japan
TEL: +81-3-6231-4404
Email : secretariat@unisec-global.org
www.unisec-global.org