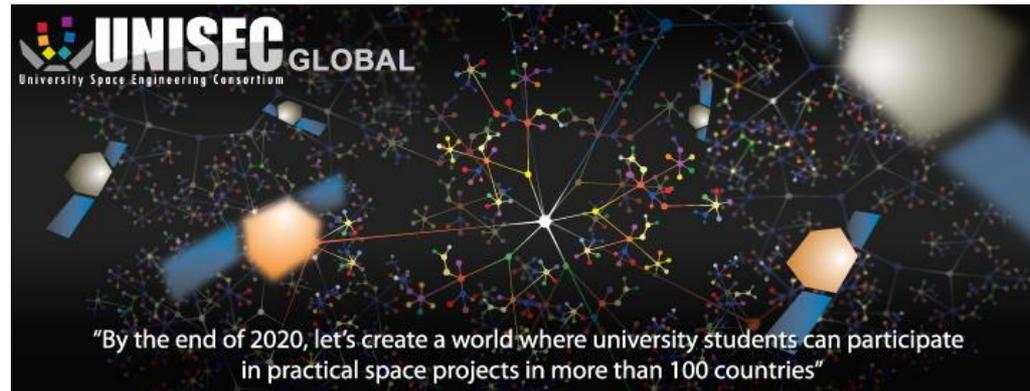


# Contribution of UNISEC-Global to Capacity Building in Space Engineering

*Application for Permanent Observer*



June 8 , 2017, Vienna  
Rei Kawashima, UNISEC-Global  
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The 60<sup>th</sup> session of the Committee on the Peaceful Uses of Outer Space

# Outline

- Background –UNISEC-Japan
- UNISEC-Global: An overview
- Activities
  - Training Program
  - Contests
  - Conferences/Workshops and Meetings
- History of Activities
- Local Chapter Activities
- Upcoming Activities in 2017
- Possible Contributions to UN/COPUOS

# 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 276 individual supporters 17 corporate supporters (as of March, 2017)
- 3 pillars: Human resource development, Technological development, Outreach



# Achievement of UNISEC-Japan

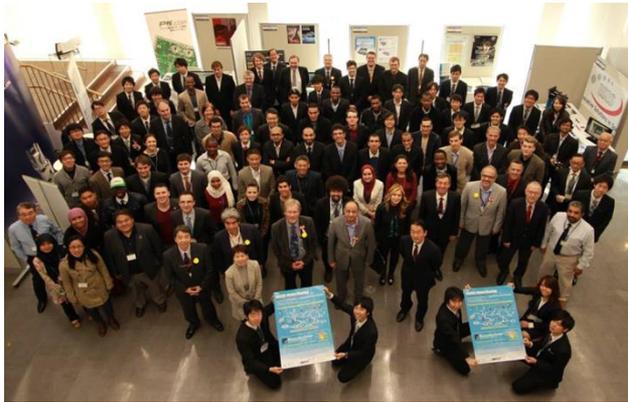
## more than 40 university satellites launched in 15 years



From CanSat to CubeSat, Nano-Satellite  
From Educational purpose to Practical application

# 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.”*



How to start/implement practical space engineering education can be transferred to existing universities anywhere.

# What is UNISEC-Global?

- **UNISEC-Global** is an international nonprofit, non-government organization, consisting of local-chapters across the world.
- Since its establishment in **November 2013** in Japan, it has provided an annual forum to promote practical space development activities at university level.
- 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

# UNISEC Local Chapters

POC 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 and Vietnam



(Local Chapter in Red)

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

# Activities of UNISEC-Global

*How can we facilitate activities worldwide?*

- **Training Program**

- CanSat Leader Training Program (CLTP)



- **Competition**

- Micro/Nano Satellite Mission Idea Contest
- Debris Mitigation Competition



- **Conferences, workshops, and meetings**

- UNISEC-Global Meeting
- Nano-satellite Symposium



# CanSat Leader Training Program (CLTP)

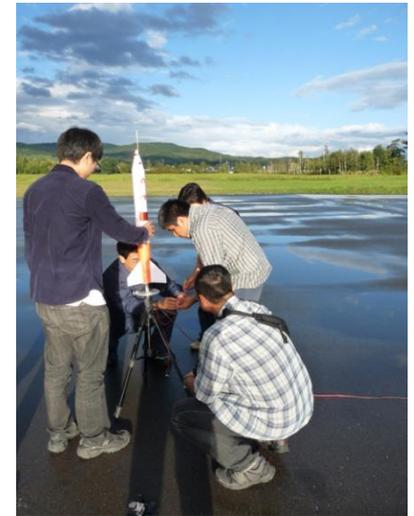


**Objective:** CLTP is a training program for professors/instructors to learn how to conduct CanSat training by experience. Participants are expected to teach their students after training. It has contributed to capacity building in basic space engineering and technology.

**Launched:** October 2010

**Offered:** Annually

**Graduated:** 64 participants from 32 countries



Launch Experiment



CanSat Manufacturing



Vibration Test



Paper craft Rocket

# CLTP History & Participants

## CLTP1 (Wakayama Univ. in Feb-March, 2011)

64 participants from 32 countries

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)

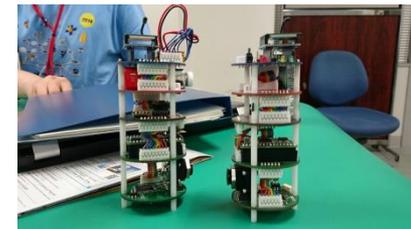
7 participants from 5 countries, Korea (2), Peru, Mongolia, Mexico (2), Egypt.

## 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



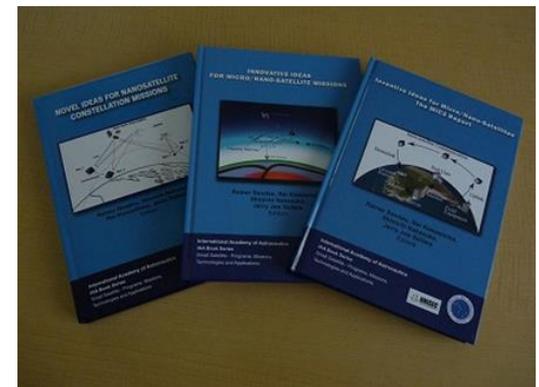
# Mission Idea Contest (MIC)

**Objective:** The Mission Idea Contest (MIC) is providing aerospace engineers, college students, consultants, and anybody interested in space with opportunities to present their creative ideas and gain attention internationally. The primary goal of MICs is to open a door to a new facet of space exploration and exploitation.

**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.



# New Challenge in PreMIC5



The Pre-5th  
**Mission Idea Contest Workshop**  
Micro/Nano Satellites for Global Sustainable Development

- Local Competitions are held in several regions, and the winners will get together and make presentation in the PreMIC5 workshop in Rome, Italy.
- Applicants need to be aware that the missions should satisfy any of the [UN Sustainable Development Goals](#) in PreMIC5.

	Abstract due	Final presentation	Venue
Japan	May 31, 2017	July 22, 2017	Kyushu Institute of Technology
Mexico	June 17, 2017	Sep 6, 2017	CUCEI, Universidad de Guadalajara
USA	May 28, 2017	July 31, 2017	University of Colorado
Germany	July 17, 2017	Sep 13-14, 2017	University of Würzburg
Italy	Sep 30, 2017	Nov 30, 2017	Sapienza- University of Rome

# 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 increasing awareness of debris problems among developers and university students.
- **Launched:** November 2015
- **Conducted:** Annually



# 2<sup>nd</sup> Debris Mitigation Competition



- The **objective** is 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.
- **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:

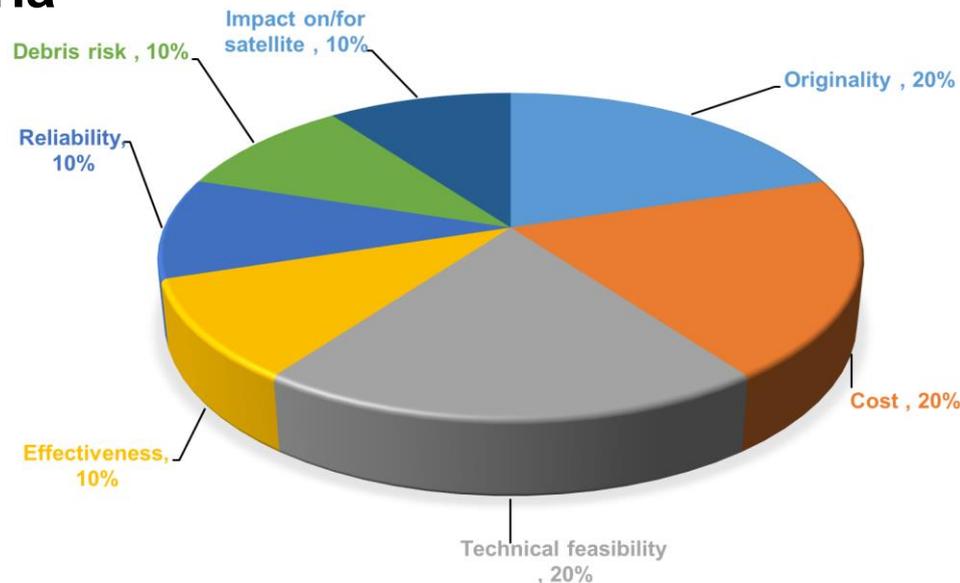
<b>Semi-major axis</b>	7128 km
<b>Orbital inclination</b>	98.4 degree
<b>Eccentricity</b>	0.001
<b>R.A.A.N</b>	30 degree
<b>Argument of Perigee</b>	210 degree
<b>Mean Anomaly</b>	190 degree

# 2<sup>nd</sup> Debris Mitigation Competition

- **Timeline**



- **Evaluation Criteria**



# UNISEC-Global Meeting

- **Objective:** The UNISEC-Global Meeting is an annual gathering to expand university community beyond Japan which intends to promote practical space projects at university level. The meeting includes Local Chapter activities report, Group discussion, Student Session, Competitions and Acknowledgement of new local chapter.



- **Launched:** November 2013
- **Conducted:** Annually

*As of June 2017, 14 local chapters have been acknowledged.*



# Nano-satellite Symposium



- **Objective:** To present and discuss all aspects of micro/nano/pico-satellites including architecture, component technologies, guidance / navigation / control, infrastructure, such as ground station systems and launch opportunity, applications and missions, regulatory issues and.
- **Launched:** February 2010
- **Conducted:** Annually
- The 6<sup>th</sup> and 8<sup>th</sup> symposiums are held as one of the programs at the 30<sup>th</sup> and 31<sup>st</sup> International Symposium on Space Technology and Science (ISTS), respectively, in Japan and the 9<sup>th</sup> symposium planned to be held in Australia.



# History of Activities

Year/Activity	CLTP <small>Cansat Leader CLTP Training Program</small> 	DMC/DDC  Debris Mitigation Competition	MIC  Nano-satellite Constellation Mission Idea Contest	Nano-satellite Symposium 	UNISEC-Global Meeting 
2010				1 <sup>st</sup>	
2011	1 <sup>st</sup> and 2 <sup>nd</sup>		1 <sup>st</sup>	2 <sup>nd</sup> and 3 <sup>rd</sup>	
2012	3 <sup>rd</sup>		2 <sup>nd</sup>	4 <sup>th</sup>	
<b>2013</b> 	<b>4<sup>th</sup></b>		<b>Pre 3<sup>rd</sup></b>	<b>5<sup>th</sup></b>	<b>1<sup>st</sup></b>
2014	5 <sup>th</sup>		3 <sup>rd</sup>		2 <sup>nd</sup>
2015	6 <sup>th</sup>		Pre 4 <sup>th</sup>	6 <sup>th</sup> (ISTS30)	3 <sup>rd</sup>
2016	7 <sup>th</sup>	1 <sup>st</sup>	4 <sup>th</sup>	7 <sup>th</sup>	4 <sup>th</sup>
<b>2017</b>	<b>8<sup>th</sup></b>	<b>2<sup>nd</sup></b>	<b>Pre 5<sup>th</sup></b>	<b>8<sup>th</sup> (ISTS31)</b>	<b>5<sup>th</sup></b>

UNISEC-JAPAN

UNISEC-GLOBAL

# Local Chapter Activities

- **National CLTP**
  - Mexico and Turkey
- **CanSat Training Program (CTP)**
  - Egypt, Ghana, Mexico, Mongolia, Nigeria, the Philippines and Peru
- **National CanSat Competition**
  - Lithuania, Mexico, Mongolia, Peru, Philippines and Turkey.
- **Local Mission Idea Contest (PreMic5)**
  - Japan, Mexico, Italy, Germany, USA
- **Other international conference, seminar, workshop**
  - Samara Summer Space School “Future Space Technologies and Experiments in Space” (Samara, Russia)
  - Pina-Workshop (Germany)



# UNISEC-Global and Possible Contribution to Capacity Building



# Upcoming Events in 2017

- **CLTP8** (Sep 7-16)

Venue: Nihon University, Chiba, Japan.

- **5<sup>th</sup> UNISEC-Global Meeting** (Dec 2-4)

Venue: Sapienza – Università di Rome, Italy

– **Pre Workshop for 5<sup>th</sup> Mission Idea Contest**

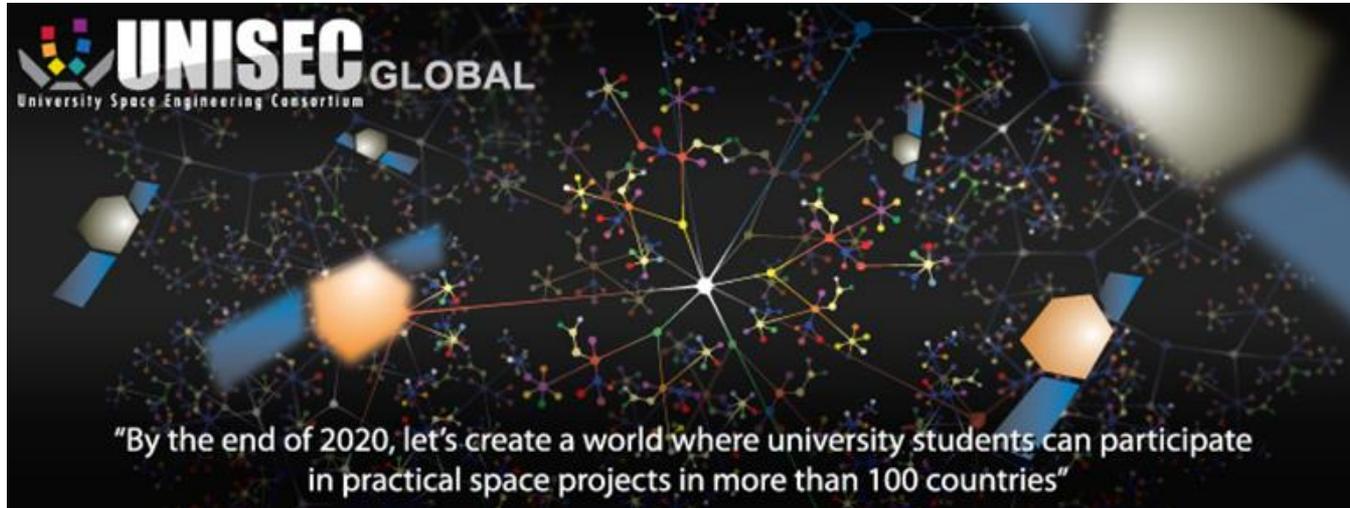
**Abstract due: Mexico: June 17, Germany: July 17, Italy: Sep 30**

– **2<sup>nd</sup> Debris Mitigation Competition**

**Abstract due: July 25, 2017**



# Contact



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