Introduction to UNISEC-Global

Nov 18, 2014, the 2nd UNISEC Global Meeting, Kitakyushu, Japan

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UNISEC University Space Engineering Consortium

Outline

- Welcome !
- Background of UNISEC-Global
- Examples of UNISEC International Programs
- UNISEC-Global
  - Vision and mission
  - Status quo
  - Local Chapter
  - Challenges and Opportunities

Welcome to The 2nd UNISEC-Global Meeting

- Venue: Kyushu Institute of Technology, Fukuoka, Japan
- Date: Nov 18-20, 2014
- Program includes:
  - 18th : Student Session, Opening Session
  - 19th : Mission Idea Contest , Japanese Garden Tour, Reception
  - 20th : Special lecture (ROSETTA), Small group discussion, Acknowledge ceremony of new Local Chapter of UNISEC
- Associated events
  - Nov 15(Sat)-16(Sun) : Satellite Testing Tutorial
  - Nov 17(Mon)-18(Tue) : International Workshop on Small Satellite Standardization (Open session on 17th, Closed session on 18th)

http://unisec-global.org/

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
- 61 laboratories/groups from 43 universities
- 768 student members and 285 supporters
- 3 pillars: Human resource development, Technological development, Outreach

Background: CanSat 1998~

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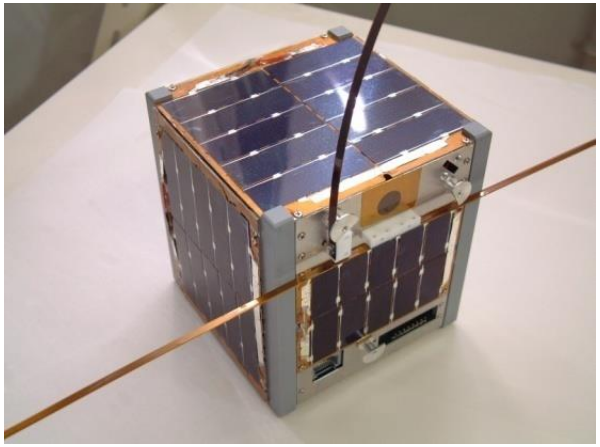
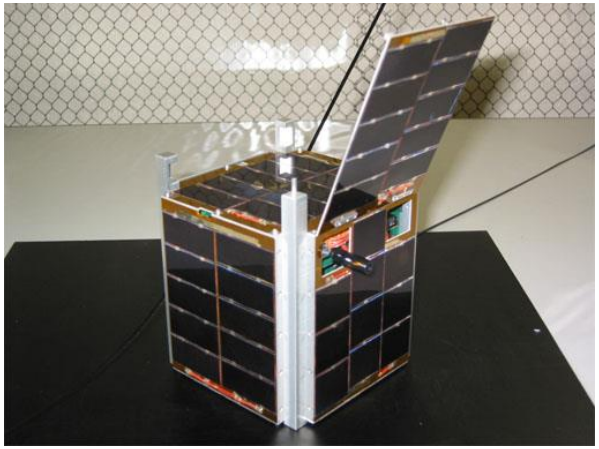
Background: CubeSat 1999~

- Successful CubeSat launch in 2003
  - University of Tokyo
  - Tokyo Institute of Technology





Achievements

About 30 university satellites launched in 12 years

From CanSat to CubeSat, Nano-Satellite

From Educational purpose to Practical application

Achievements (human resource development)

- Provide many engineers/researchers who have
  - Project management skills
  - Proficient knowledge of satellite/rocket and their subsystem design and manufacturing
  - Systems engineering and integration
  - “Guts” to tackle challenging problems
- to space development field in Japan as well as many other technological areas such as car, aircraft plant, electrics/electronics, construction, etc.

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."*

When several UNISEC-xxx have been established, let's establish "UNISEC-Global" to facilitate and support the activities of local chapters.

1st UNISEC Global Meeting

Establishment of the UNISEC-Global has been announced.

Nov 23-24, 2014, University of Tokyo
112 participants from 31 countries

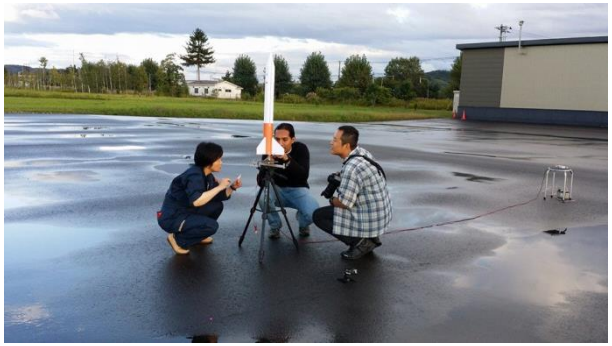
Examples of UNISEC International Programs

CanSat Leader Training Program (CLTP)
Mission Idea Contest (MIC)

1) CanSat Leader Training Program (CLTP)

CLTP started in 2011 to contribute to capacity building in space technology and to improve teaching methods in space engineering education.

- Short hands-on training enables participants to experience whole cycle of CanSat development including sub-orbital launch experiments
- Participants are expected to teach their students CanSat program in their countries
- Aiming at “international CanSat education network”
- **“Give a man a fish and you feed him for a day. Teach him how to fish and you feed him for a lifetime.”**



http://www.cltp.info

CLTP Participants

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

12 participants from 10 countries, namely Algeria, Australia, Egypt, Guatemala, Mexico, Nigeria, Peru, Sri Lanka, Turkey, Vietnam.

CLTP2 (**Nihon Univ. in Nov-Dec, 2011)**

10 participants from 10 countries, namely Indonesia, Malaysia, Nigeria, Vietnam, Ghana, Peru, Singapore, Mongolia, Thailand, Turkey.

CLTP3 (Tokyo Metropolitan Univ. in July-August, 2012)

10 participants from 9 countries, namely Egypt (2), Nigeria, Namibia, Turkey, Lithuania, Mongolia, Israel, Philippines, Brazil

CLTP4 (Keio Univ. in July-August, 2013)

9 participants from 6 countries, namely Mexico(4), Angola, Mongolia, Philippines, Bangladesh, Japan

CLTP5 (Hokkaido Univ. in Sept, 2014)

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

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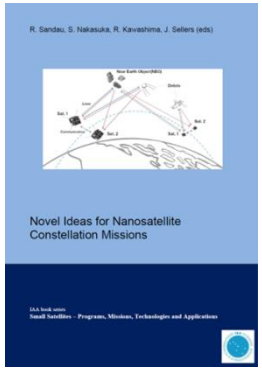
Post- CLTP Activities

- CLTP (teaching professors) in Turkey with 12 professors, and in progress in Mexico.
- CTP (teaching students) at universities in Egypt, Ghana, Peru, Egypt, Mexico, Mongolia 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…

CLTP6 will be held in September in 2015, at Hokkaido University.

2) Mission Idea Contest (MIC) for Micro/nano satellite utilization

- Objective: Encourage innovative exploitation of micro/nano-satellites to provide useful capabilities, services or data.
- Regional coordinators: 33 regions
- MIC1 in Tokyo, March 14, 2011
- MIC2 in Nagoya, Oct. 10, 2012
  - 72 applications from 31 countries
  - Publication in cooperation with IAA
- PreMIC3 in Tokyo, Nov. 23, 2013
  - 22 applications from 15 countries
- **MIC3 final presentation will be held on Nov 19.**



http://www.spacemic.net

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Mission Idea of MIC3 Finalist

Title of Proposal from MIC3 finalists
A Concept for a Microgravity Experiment Recoverable Satellite "MERS"
Utilizing Nano Satellites for Water Monitoring for Nile River
TwinCube – Proposal for Tether Supported Plasma Measurement 3-Unit CubeSat
Lunar Relativistic Positioning System (LRPS) for Human Exploration
Moon-sighting satellite "Otsukimi"
A nano-satellite constellation for tracking and monitoring endangered wildlife in developing countries.
CubeSat amateur laser communicator with Earth to Moon orbit data link capability
Clouds Height Mission
Piezo-active Suspension system for Space Interferometry and Broadband Communications
Africa Nano3: Leveraging NANOscience, NANOtechnology and NANOsatellites for Africa-centred connectivity solutions

Features : Vision, Mission, Structure, Implementation
Status-quo of UNISEC-Global
UNISEC-Global : Challenges and Opportunities

Vision

- The Global University Space Engineering Consortium (UNISEC-Global) envisions a world where space science and technology are used by individuals and institutions in every country, rich or poor, and offers opportunities across the whole structure of society – whether academic, industrial or educational – for peaceful purposes and for the benefit of humankind.

MISSION

The UNISEC-Global will create an environment that will promote the free exchange of ideas, information and capabilities relating to space engineering and its applications, especially for young people, including those in developing countries and emerging economies.

Conditions of UNISEC Local Chapter

1. A Local Chapter is called UNISEC-XXXX.
2. A Local Chapter selects a responsible person and a student representative.
3. A Local Chapter secures two or more than two universities as its membership.
4. Each university has a responsible teaching staff (at a professor level) and a student representative, together with a list of student members.
5. A member fee for the local chapter is important to keep a sense of belonging and is fixed accordingly. It may be possible to waiver its fee for a while if needed.
6. A website of the local chapter is recommendable for publishing its activities.
7. Each local chapter has to report its local activities annually to UNISEC-Global secretariat for archival purposes.

UNISEC facilitates collaboration

- UNISEC facilitates collaboration between professors and students by a rule that each university member must have a leading professor and student representative(s) selected among student members.
- UNISEC-global facilitates collaboration among universities by a rule that two or more two more universities must join to establish a local chapter.

Status Quo

POCs in 32 regions, namely, South Africa, Angola, Namibia, Egypt, Ghana, Kenya, Nigeria, Tunisia, Bangladesh, Korea, Mongolia, the Philippines, Taiwan, Thailand, Turkey, Australia, Indonesia, Saudi Arabia, Canada, USA, Guatemala, Mexico, Peru, Brazil, Bulgaria, Italy, Samara (Russia), Switzerland, Germany, Slovenia, Lithuania and Japan. (Poland is in process)

Application for Local Chapter: Bangladesh, Egypt, Germany, Italy, Lithuania, Nigeria, North-Mexico, Tunisia, Turkey, Japan, Samara, South African Region

Examples of Local chapters' activities (Japanese case)

- Distribute R&D funds from companies and government
- Engage UNISEC members with space companies (technical/component/facility support, consulting)
- Work on legal issues (frequency band, etc.)
- Work on safety issues
- Find launch opportunities
- Technology exchange and joint development/purchase
- Symposium/workshop/study group and conference
- Local outreach activities

Merits and Difficulties in establishment of Local Chapters

Merits

- Promote the collaboration and teamwork.
- Collaboration among local institutes in local chapters can increase the possibility to secure funding from the governmental research and educational funding agencies.
- Increase the awareness about space and space education.
- Dissemination of useful technical information among the local chapters.
- Motivate university students to participate in real space projects.
- Capacity building for national space projects.

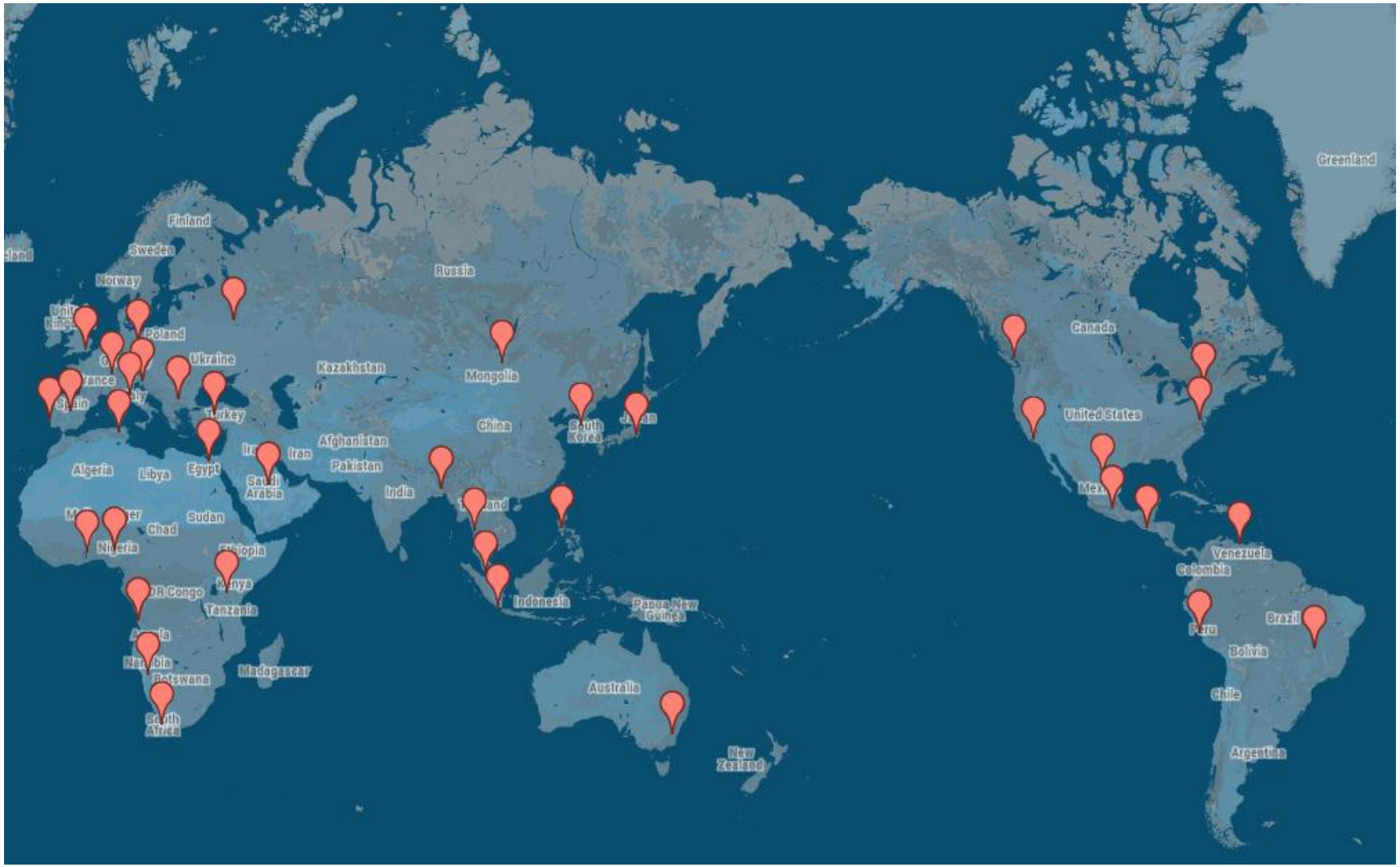
Difficulties

- Lack of funds.
- Individualistic culture.
- Limited space engineering community.
- Lack of expertise in the field of space engineering.
- Lack of collaboration between institutes and industry.
- Lack of managerial staff.
- Political instability

Our thoughts on Local Chapter

- We are not in a rush to establish a local chapter, rather we would be going in a steady direction.
- The setup of a local chapter would be dependent on how much need there is towards UNISEC in the region or the country. In other words, it may be advisable to establish a local chapter when they recognize its needs or merits by taking into consideration the development of the region/country.
- Moreover, we should be flexible about the size of a local chapter which manages a specific area, a country or the one with more than a country.

UNISEC-Global Point of Contact (32 regions)



Opportunities and Challenges of UNISEC-Global

Opportunities

- Promote collaborative projects between its members
- Expose local activities and experiences to other UNISEC-Global members.
- Exploit new peaceful ways for utilizing space systems
- Develop new teaching technique for practical space engineering to university students.

Challenges

- Securing a stable income to maintain its role and accommodate any future expansion.
- Working with multicultural environment.
- Overcome technology export restrictions imposed by region/country.

Local Chapter and UNISEC-Global

- UNISEC can be described as a node of a large network.
- The node is the local chapter of UNISEC in each region/country and the networks that manage the communication between the nodes and addition of new nodes to achieve the designated activities is the UNISEC-Global.

What are we facilitating to create?

- Future Engineers
  - Who can Bridge between “Dream” and “Reality” with knowledge, technology and “something invisible.”
- Network
  - Which enables members to share knowledge and experiences and to contact each other without much efforts.
- Community and Platform
  - Where knowledge is archived, effective space engineering education methods are sought and collaborative projects are proposed and **realized.**

Contact

UNISEC-Global Secretariat

c/o University Space Engineering Consortium

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