From CLTP1 to CLTP14: A 15-Year Journey in Space Engineering Education

Participant • Teaching Assistant • Educator

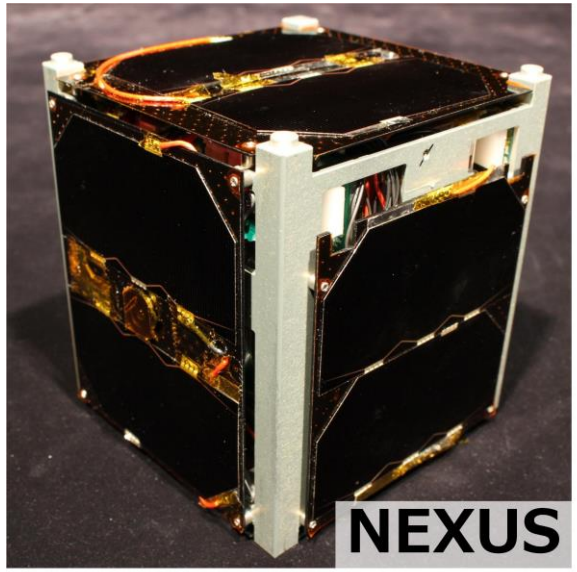
Mohammed Khalil Ibrahim, Ph.D.
Professor and Chairman
Aerospace Engineering Department
Egypt-Japan University of Science and Technology (E-JUST)
Alexandria, Egypt.

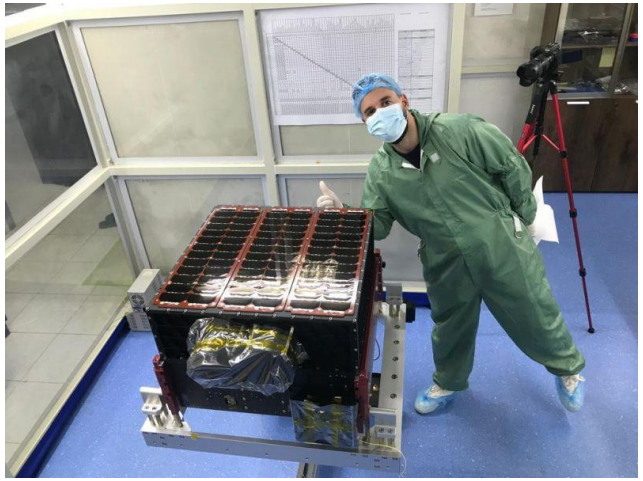
68th Virtual UNISEC-Global Meeting

Self-Introduction

- **Professional Career**
  - B.Sc. in AE 1991 (Cairo University)
  - M.Sc. in AE 1996 (Cairo University)
  - Ph.D. in AE 2002 (Nagoya University, Japan)
  - Assistant Professor (2003-2008)
  - Associate Professor (2009-2013)
  - Professor (2014 – Present)
  - Deputy Executive Director of the Egyptian Space Agency EgSA (September 2019- July 2022)
  - Sabbatical (MHI, Volvo, NU, KFUPM, Nihon U./UNISEC, E-JUST)
  - Founder of Space Systems Technology Lab. @ Cairo University in 2011.
- **Research Interest**
  - High Speed Aerodynamics, Aeroacoustics, and Micro/Nano-Satellite Developments

First CLTP in Japan (Feb-March 2011) @ Wakayama University





NEXSat-1 @ EgSA

NEXUS 1U CubeSat Launched in January 2019
@ Nihon University (2016-2017)

“When I joined CLTP1, I thought I was attending a short satellite training program. I never imagined that 15 years later, CLTP would still be shaping my career, my teaching philosophy, and my international collaborations”

2011 → CLTP1 (Participant)

2011 → CLTP2 (Observer)

2016 → CLTP7 (Participant)

2017 → CLTP8 (Teaching Assistant)

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University Space Engineering Consortium

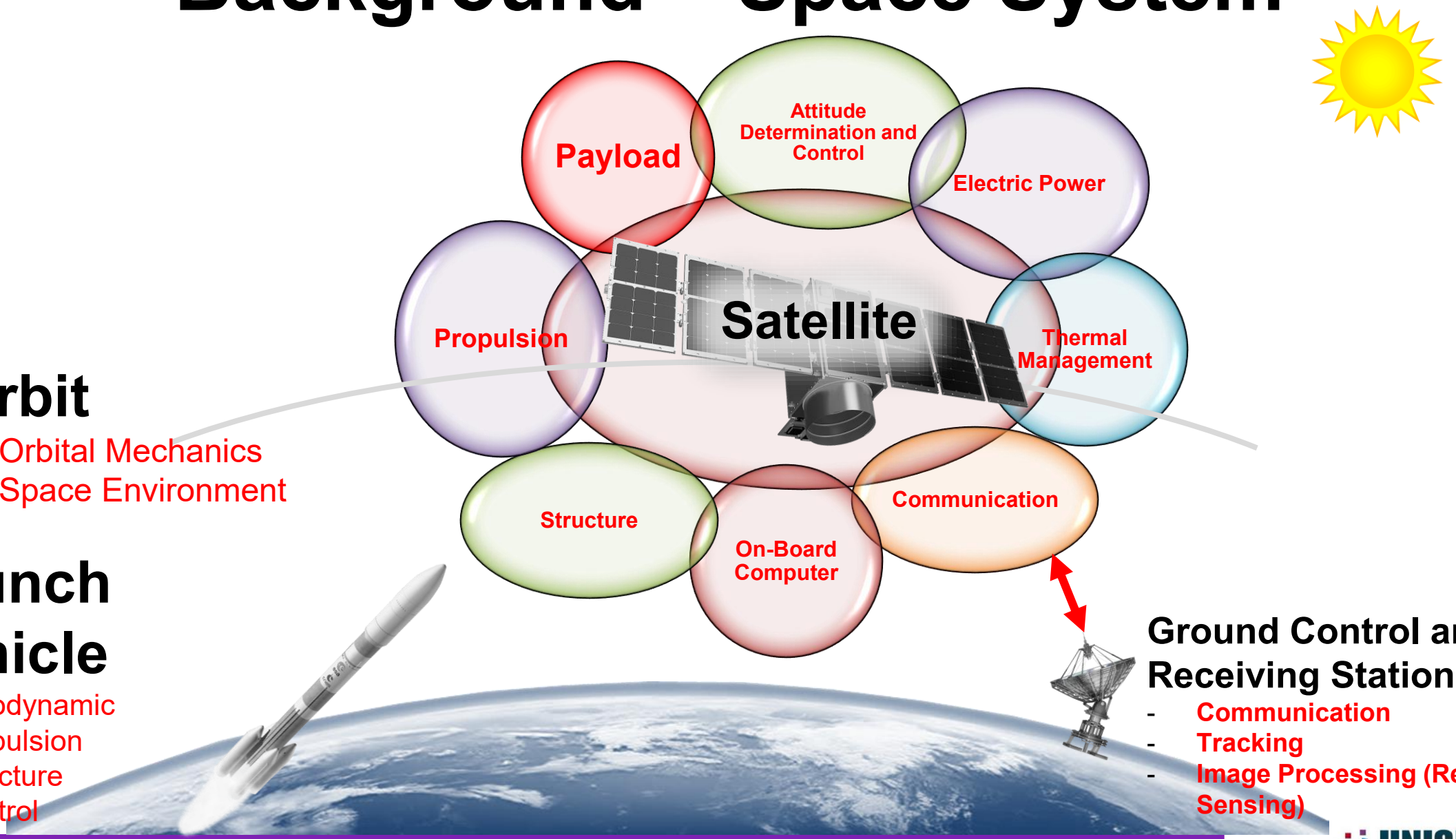
Background - CLTP

The CubeSat/CanSat Leader Training Program (CLTP) is a training course that was established for participants to experience the entire cycle of CubeSat/CanSat development from the design to launch of model rockets. Through the program, you will learn the space technology and teaching methods utilized in space engineering.

Intended Learning Outcomes of CLTP

- Realizing the Vision of UNISEC-Global, "*By the end of 2030, let's create a world where university students can participate in practical space projects in All countries*"
- Experience the whole AIT (Assembly, Integration, and Testing) processes of an educational satellites.
- Develop and realize a payload subsystem.
- Practice teaching of educational satellite engineering to a group of people with different background.
- Disseminate the CubeSat/CanSat technical knowledge to his/her local community (Localize the CLTP)

Background – Space System



Orbit

- Orbital Mechanics
- Space Environment

Launch Vehicle

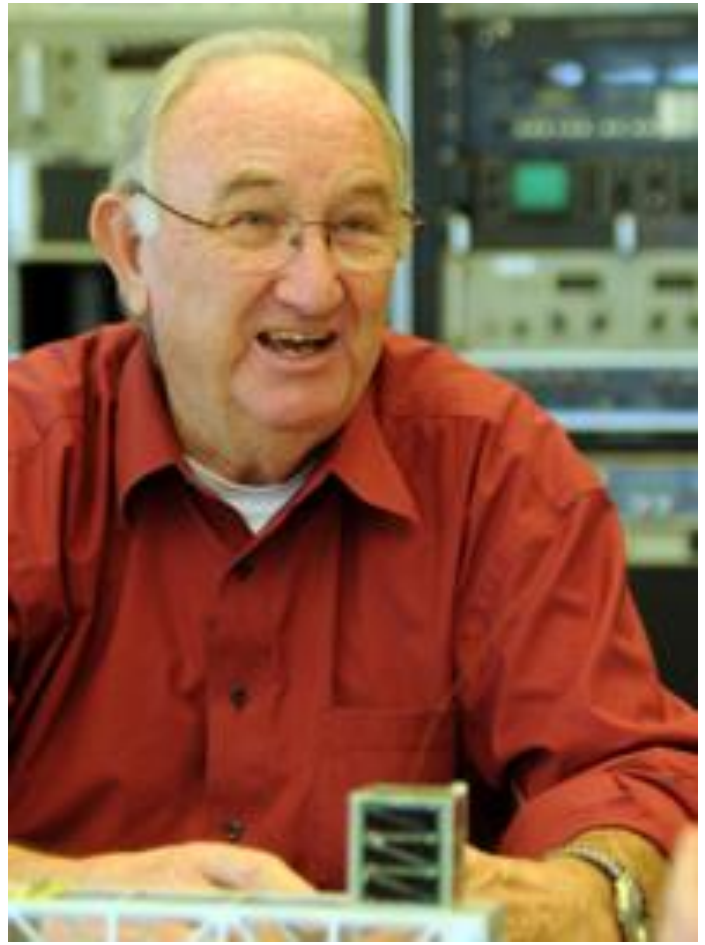
- Aerodynamic
- Propulsion
- Structure
- Control

Ground Control and Receiving Station

- Communication
- Tracking
- Image Processing (Remote Sensing)

Background: Idea of CanSat

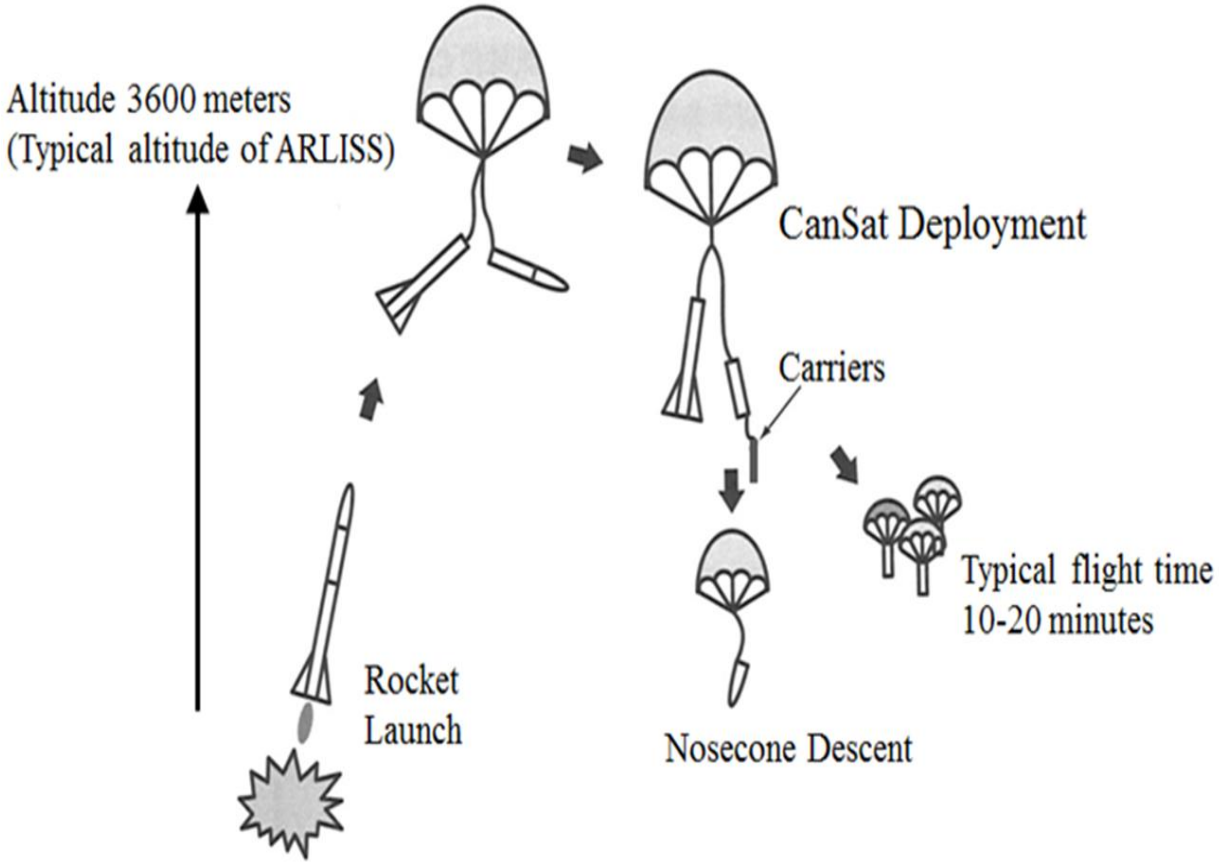
- Proposed in 1998 Prof. Bob Twiggs of Space Development Laboratory of Stanford University
- Student made satellite
- Suborbital launch experiment called ARLISS (A Rocket Launch for International Student Satellites)



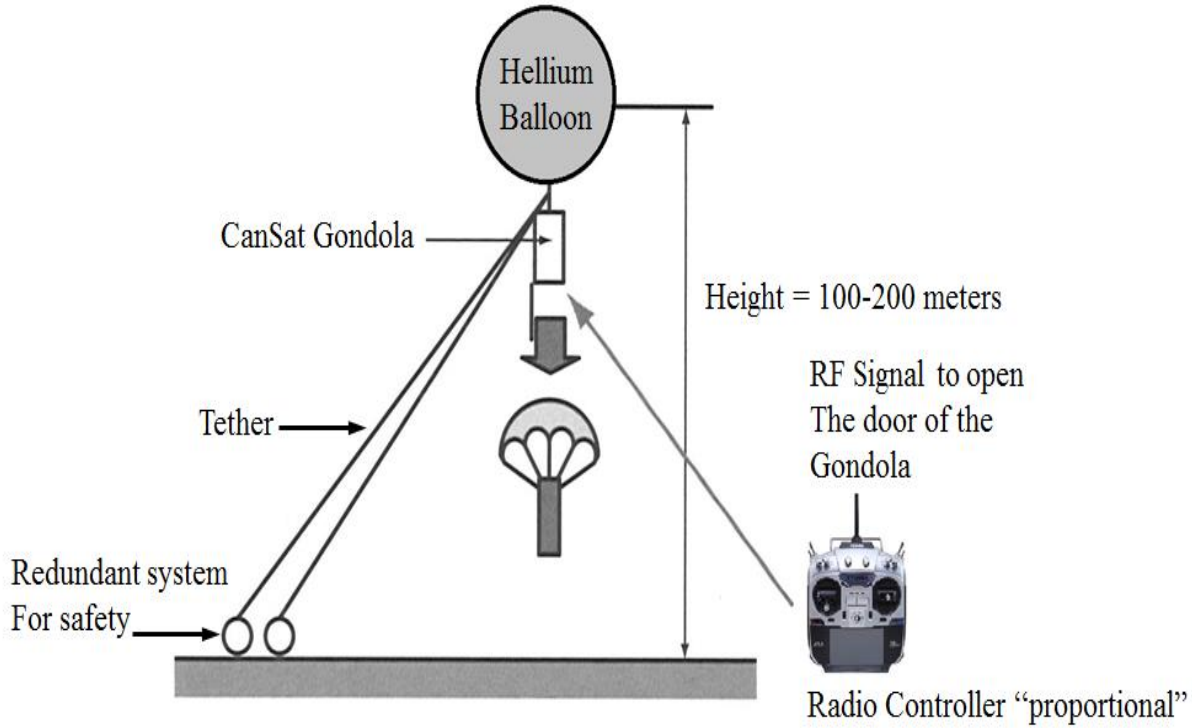
Background: CanSat

*The **CanSat** provides an affordable way to acquire the students with the basic knowledge to many challenges in building a satellite. Students will be able to design and build a small electronic payload that can fit inside a coke can. The CanSat is launched and ejected from a rocket or a balloon. Using a parachute, the CanSat slowly descends back to earth performing its mission while transmitting telemetry. Post launch and recovery data acquisition will allow the students to analyze the cause of success and/or failure.*

Background: CanSat Mission

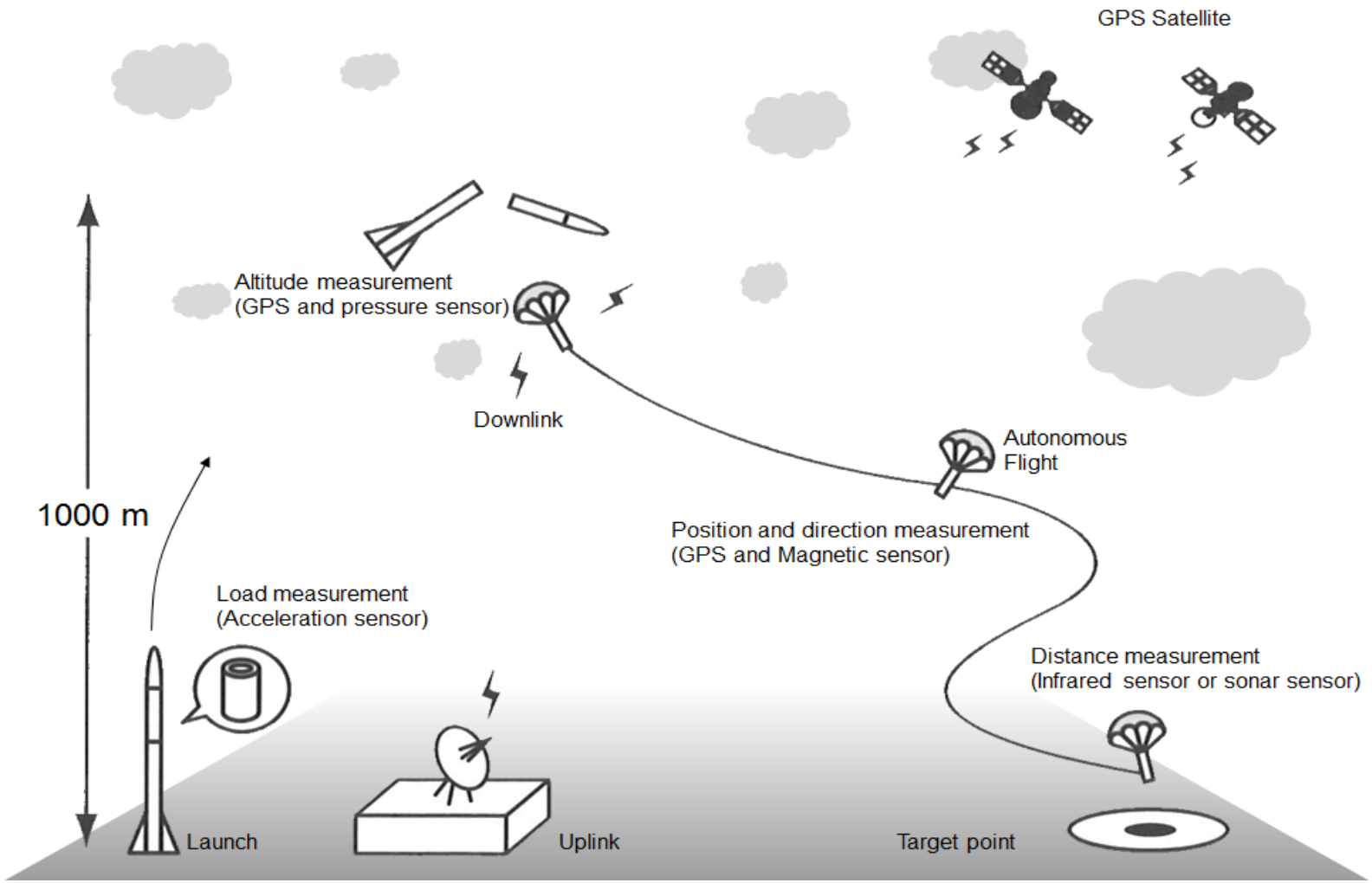


A Rocket Launch for International Student Satellite (ARLISS)



CanSat Launch using Ballons

Background: Come Back CanSat Mission



Background: CanSat Vs Satellite

Category	Subsystem/Test	Educational	Flight Model
Subsystems	EPS	○	○
	Communication	○	○
	ADCS	△	○
	C&DH	○	○
	Structure	○	○
	Thermal	×	○
Testing	Vibration	○	○
	Thermal	△	○
	Thermal Vacuum	×	○
	Radiation	×	○
Time	Development	0.25-6 months	1-2 years
	Operation	5-600 seconds	0.5 – 5 years

Background: When it is started!

Ms. Rei Kawashima Visit to Cairo University in February 2010

The Beginning: CLTP1

CLTP1: Wakayama University, February 12 – March 18, 2011

The Beginning: CLTP1

- Training Program Coordinator: **Prof. Hiroaki Akiyama, Wakayama University, Japan.**
- Teaching Philosophy: **"Animal Spirit"** ***A teaching philosophy emphasizing passion, initiative, and hands-on learning***
- Contents: **On-site set of lectures + Hands-on training**
- Duration: **Feb 12, 2011 – Mar. 18, 2011**
- Participants: **12 Participants; (Turky (3), Egypt (1), Bangladesh (1), Vietnam (1), Guatemala (1), Algeria (1), Australia (1), Mexico (1), Nigeria (1), Peru(1).**
- Education Platform: **Build from Scrateh (Basic CanSat + Comeback CanSat)**

Prof. AKIYAMA Hiroaki
Wakayama University
CLTP1

The CLTP1 Experience

Feb. 12, 2011

Feb. 18, 2011

Mar. 10, 2011

Mar. 11, 2011

Mach 15, 2011
(cancelled)

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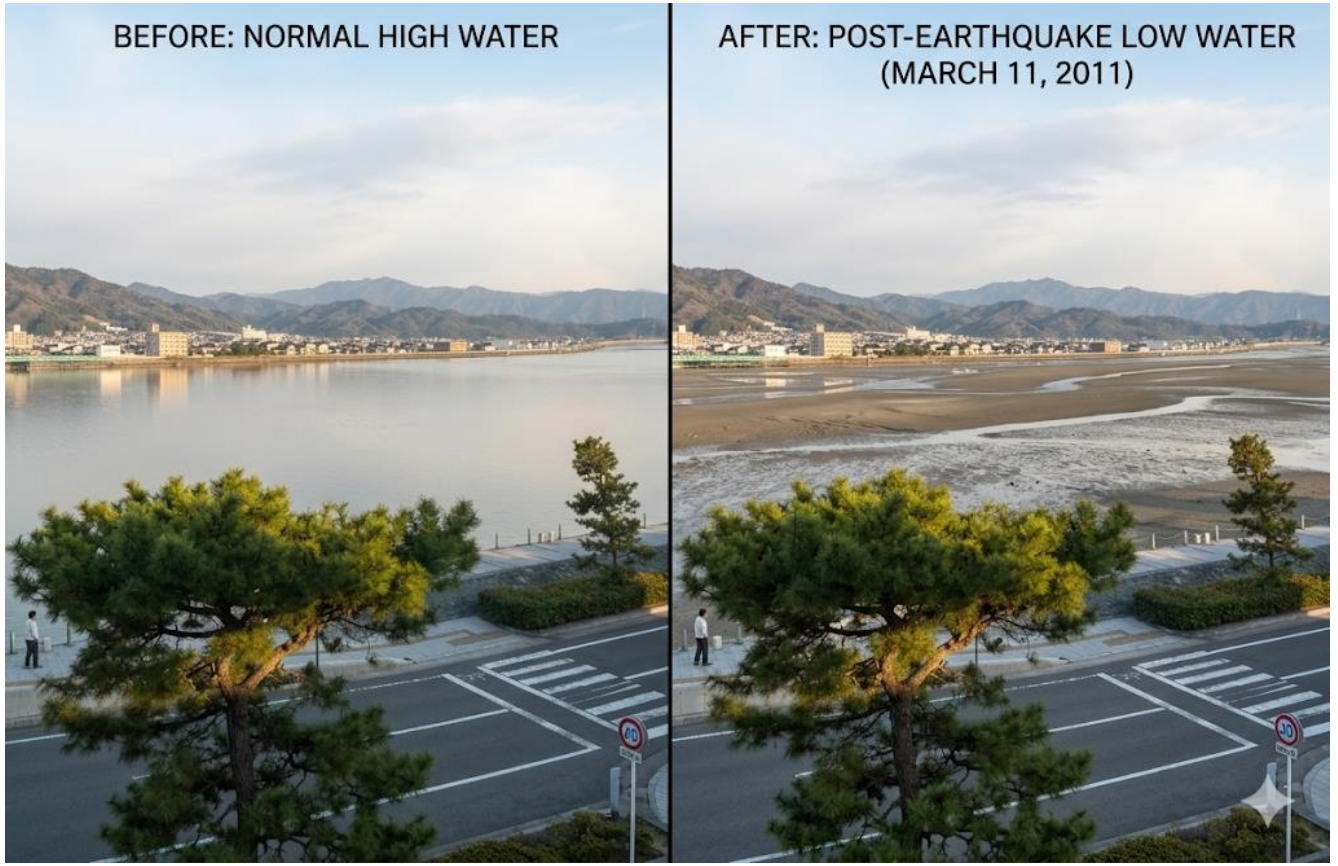
Going to Tokyo!

Celebration of the conclusion of CLTP1 and prepare to go to Tokyo for Comeback Mission Launch

Fukushima Earthquake During CLTP1



Even during this difficult period, I witnessed extraordinary resilience, professionalism, and kindness from the Japanese people and the CLTP organizers.

In Memory of Prof. Esaú Vicente-Vivas

RIP Prof. Esaú Vicente-Vivas. (November 2015)
National University of México (UNAM)

CLTP was not only about satellites and engineering.
It was also about people, friendships, and shared experiences that remained with us throughout our lives.
We respectfully remember our CLTP1 colleague and friend, Prof. Esaú Vicente-Vivas who passed away in November 2015

CLTP1: Reflections

- Developed a strong systems engineering mindset through hands-on experience
- Gained deep insight into practical satellite engineering and AIT processes
- Inspired a long-term commitment to hands-on, project-based education
- Initiated the localization of CanSat training programs (CTP) in Egypt
- Established the Space Systems Technology Laboratory at Cairo University
- Built confidence in tackling complex engineering challenges
- Strengthened teamwork and international collaboration skills
- Acquired a global perspective on space education and cooperation

CLTP7 Participation

- Training Program Coordinator: **Prof. TOTANI Tsuyoshi, Hokkaido University, Japan.**
- Contents: **Online set of lectures (home) + Hands-on training (Japan)**
- Duration: **Sep 21, 2016 – Oct. 1, 2016**
- Participants: **9 Participants; (Nepal (2), Egypt (2), Myanmar (1), Serbia (1), Dominican Republic (1), Mongolia (1), Peru(1).**
- Education Platform: **iCanSat Training Kit**

Prof. TOTANI Tsuyoshi
Hokkaido University
CLTP 5, 6, and 7

CLTP Evolution (CLTP1-CLTP6)

CLTP1, 2011

CLTP2, 2011

CLTP3, 2012

CLTP4, 2013

CLTP5, 2014

CLTP6, 2015

CLTP7, 2016

The CLTP7 Experience (Movie)

CLTP 8: Participation as TA

- Training Program Coordinator: **Prof. Masahiko YAMAZAKI, Nihon University, Japan.**
- Contents: **Online set of lectures (home) + Hands-on training & Teaching practice (Japan)**
- Duration: **Sep 21, 2016 – Oct. 1, 2016**
- Participants: **8 Participants; (Nepal (1), Egypt (1), Bolivia (1), El Salvador (1), Malaysia (1), Japan (2), Turkey(1).**
- Education Platform: **Hepta-Sat Training Kit**

Prof. Masahiko YAMAZAKI
Nihon University, Hepta-Sat
CLTP 8, 9, 10, 11, 12,, 13 and 14

CLTP Evolution (CLTP1-CLTP14)

CLTP1 , 2011

CLTP2 , 2011

CLTP3 , 2012

CLTP4 , 2013

CLTP5 , 2014

CLTP6 , 2015

CLTP7 , 2016

CLTP8 , 2017

CLTP9 , 2018

CLTP1 0, 2019

CLTP1 1, 2022

CLTP12, 2023

CLTP13, 2024

CLTP14, 2025

CLTP Educational Satellite Kits

Build CanSat From Scratch
CLTP1 & CLTP2

iCanSat (AIT and payload)
CLTP3, 4, 5, 6, and 7

HEPTA-Sat (AIT and payload)
CLTP 8, 9, 10, 11, 12, 13, and 14

My Engagement in CLTP Programs

Cycle	CLTP Evolution	My Role
CLTP1	**Build CanSat**	**Participation**
CLTP2	**Build CanSat**	**Observer**
CLTP5-6	iCanSat	Moderator of Online Lecture series
CLTP7	**iCanSat**	**Participation and Moderators of Online Lecture series**
CLTP8	**Hepta-Sat**	**Teaching Assistant and Moderator of Online Lecture series**
CLTP9-CLTP14	Hepta-Sat	Moderator of Online Lecture series

Participated on-site

CLTP Graduates

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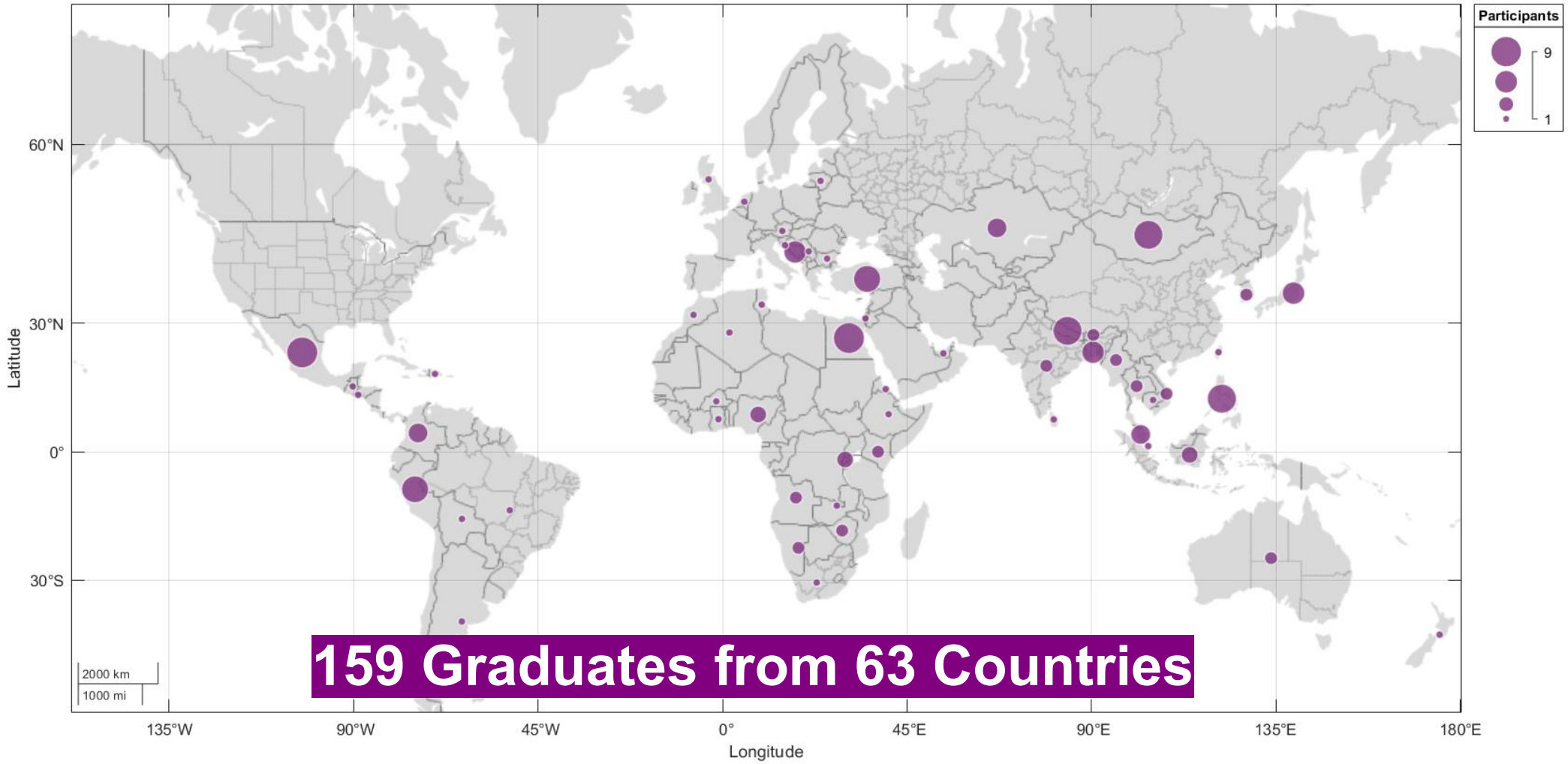
University Space Engineering Consortium

CLTP Participants Distribution



159 Graduates from 63 Countries

History of CLTP - Managers

Prof. Shinichi NAKASUKA,
UoT

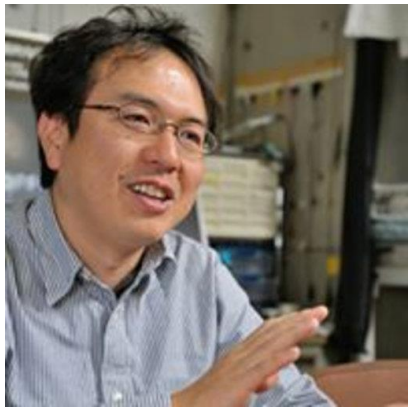
Ms. Rei KAWASHIMA,
UNISEC-Global

Prof. Yasuyuki MIYAZAKI
Nihon University & JAXA,
CLTP2

Prof. Harunori NAGATA
Hokkaido University

Prof. Toshinori KUWAHARA
Tohoku University

Prof. AKIYAMA Hiroaki
Wakayama University
CLTP1



Prof. Hironori SAHARA
TUM, iCanSat, CLTP3

Prof. Seiko SHIRASAKA
Keio University, CLTP4

Prof. TOTANI Tsuyoshi
Hokkaido University
CLTP 5, 6, and 7

Prof. Hiraku SAKAMOTO
TITECH

Prof. Masahiko YAMAZAKI
Nihon University, Hepta-Sat
CLTP 8, 9, 10, 11, 12, 13 and 14

Bringing CLTP Philosophy Back Home

- Space Systems Technology Laboratory @ Cairo University
- Hands-on education and Project based Learning (EgSACanSat and SpaceKeys @ EgSA)
- CanSat Training Program (2011 – Present)
- CubeSat workshops
- Mentoring students
- Project-based learning

EgSA CanSat

Support three levels of applications:

- Plug and Play
- SW Development
- Payload Development

High Schools Students
Space Amateurs

100 Kit

2021

UNISEC GLOBAL
University Space Engineering Consortium

EgSA SpaceKeys (Educational CubeSat)

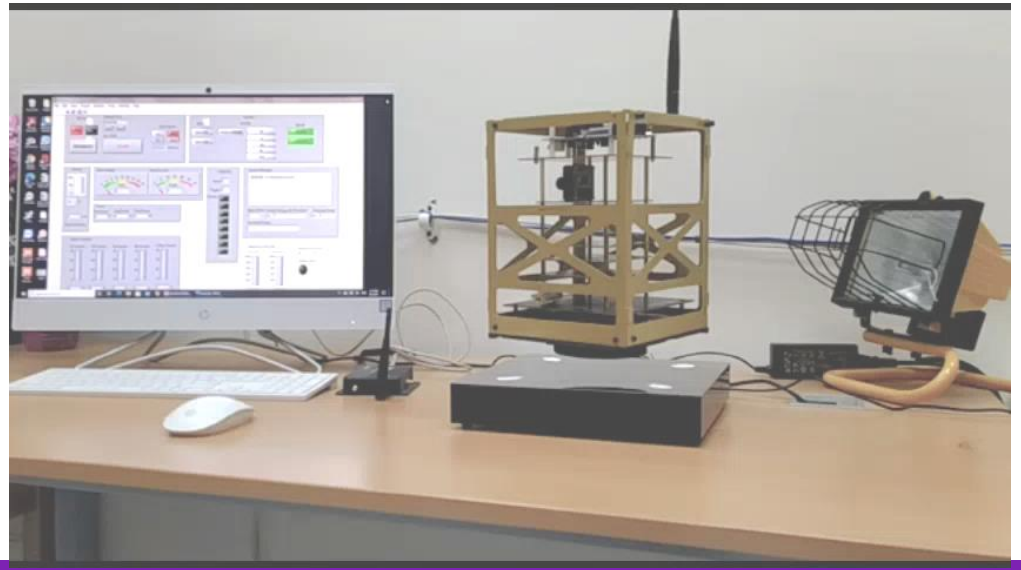
Space Science & Technology Related Colleges And High Schools

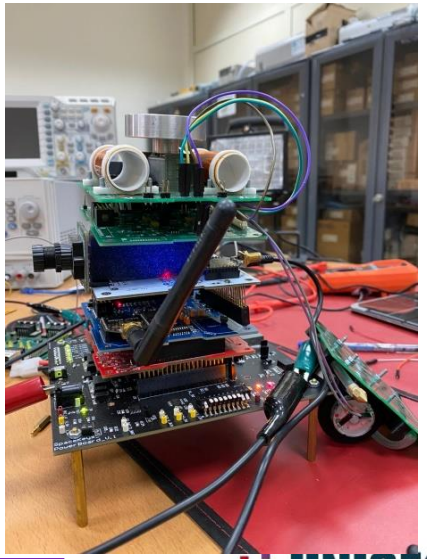
6 Countries

2021

25 Universities (32 Faculties)
1 School

40 Kits





Current Activities

- Founder and Chairman of the Aerospace Engineering Department at E-JUST
- Leading spacecraft systems education with a focus on hands-on learning
- Organizing and delivering CubeSat and CanSat training programs
- Supervising student satellite projects and research activities
- Promoting international collaboration in space engineering education
- Advancing aerospace education initiatives across academic and research institutions

Current: CubeSat Training Workshop at E-JUST

STDF/JSPS Funded CubeSat Workshop at EGYPT-JAPAN University of Science and Technology (Feb. 1-5, 2026)

Advice to Future Participants

- Start with simple, practical aerospace projects (e.g., CanSat, Mission Idea Contest)
- Engage actively in all program activities and take initiative in learning
- Embrace international collaboration and learn from diverse perspectives
- Ask questions, explore ideas, and challenge yourself continuously
- Maintain long-term connections within the CLTP and UNISEC community
- Apply your knowledge locally and contribute to developing space education in your country

As CLTP celebrates its 15th anniversary, I am honored to have witnessed its evolution from the very beginning. The impact of CLTP will continue through every participant who carries its spirit forward.