



# **Student Small Satellite Project and Future Initiatives for Young Generation Capacity Building**

**Dr. Mohammad Ebrahimi Seyedabadi**

Director-General, Education and Training Department

**Asia-Pacific Space Cooperation Organization**  
[www.apsco.int](http://www.apsco.int)

# APSCO: Multi-Lateral Cooperation in the Asia-Pacific Region



*Member States*

*Associate Member*

*Signatory State*

*Observer State*

**Vast Geographical Area**

**Large Population**

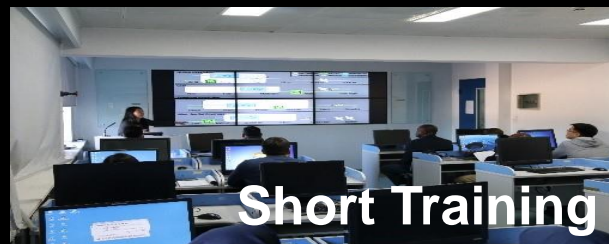
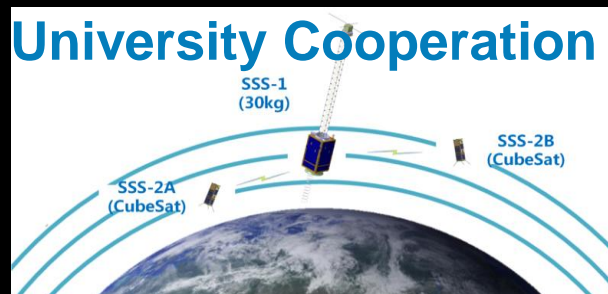
**Mostly Developing Countries**

**Prone to Natural Disasters**

**Exploiting Space Needs High Technology, Risk and Investment**

# Education and Training Programs of APSCO

- Full Scholarship Support (235 Masters & 75 Doctors)
- Top Aerospace schools in China: Beihang, NPU & HIT
- Student Small Satellite (SSS) Program
- APSCO Cubesat Competition (ACC) Project



- Space Science Schools
- Space Innovation Contest
- APSCO Microsatellite Contest
- On-line, On-site, Centralized Trainings
- More than 2,000 trainees from 32 Asia-Pacific and 5 African countries

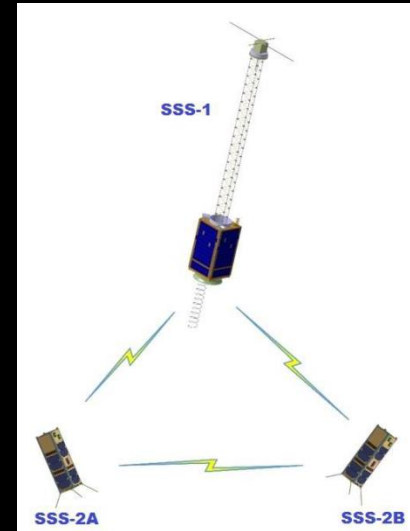
# University Cooperation Framework

## ✓ Educational Hands-on Projects

- To train students for satellite engineering through hands-on practical training;
- Universities will be able to
  - ✓ Develop their own space education system;
  - ✓ Build their own capability to develop small satellites;
  - ✓ Develop their own payload/subsystem integrated on the satellite(s);
  - ✓ Build their own capability to operate satellites and/or process image/data.
- ✓ **APSCO Student Small Satellite (SSS) Project**
- ✓ **APSCO Cubesat Competition (ACC) Project**

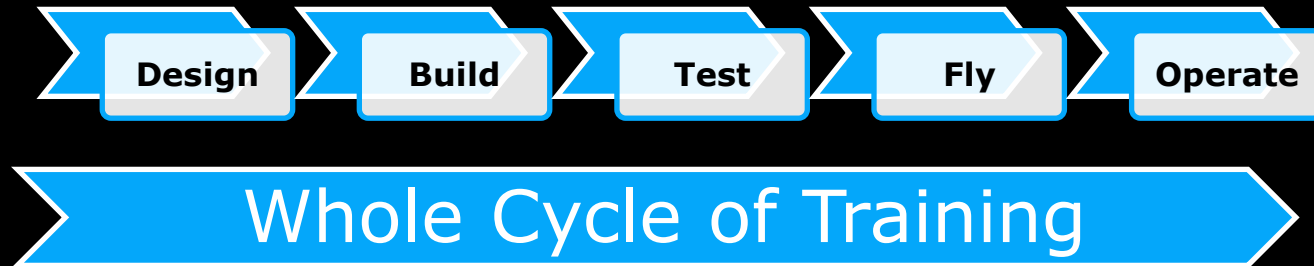
# APSCO Student Small Satellite (SSS) Project

APSCO SSS Project Consists of a 1 Microsat (SSS-1) and two Cubesats (SSS-2A and 2B)



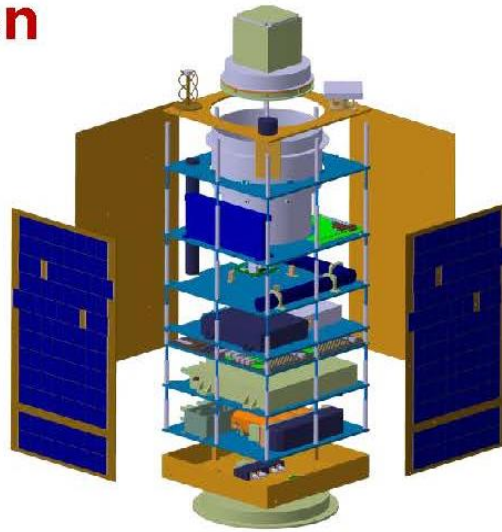
## APSCO Student Small Satellite (SSS) Project

- A **Basic Activity** of APSCO, kicked-off in December, 2016.
- Launch service was provided by **CNSA** .
- Universities of all Member States joined the program: **Bangladesh, China, Mongolia, Iran, Pakistan, Peru, Thailand and Turkey.**
- **Beihang University** was identified as the Leading University.

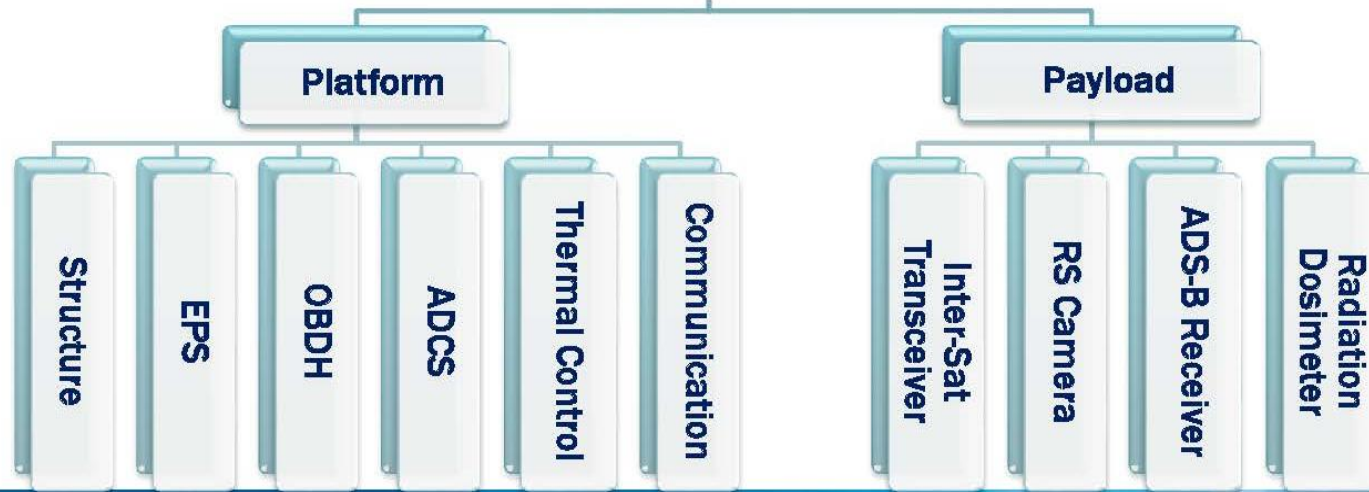


# SSS-1 Configuration

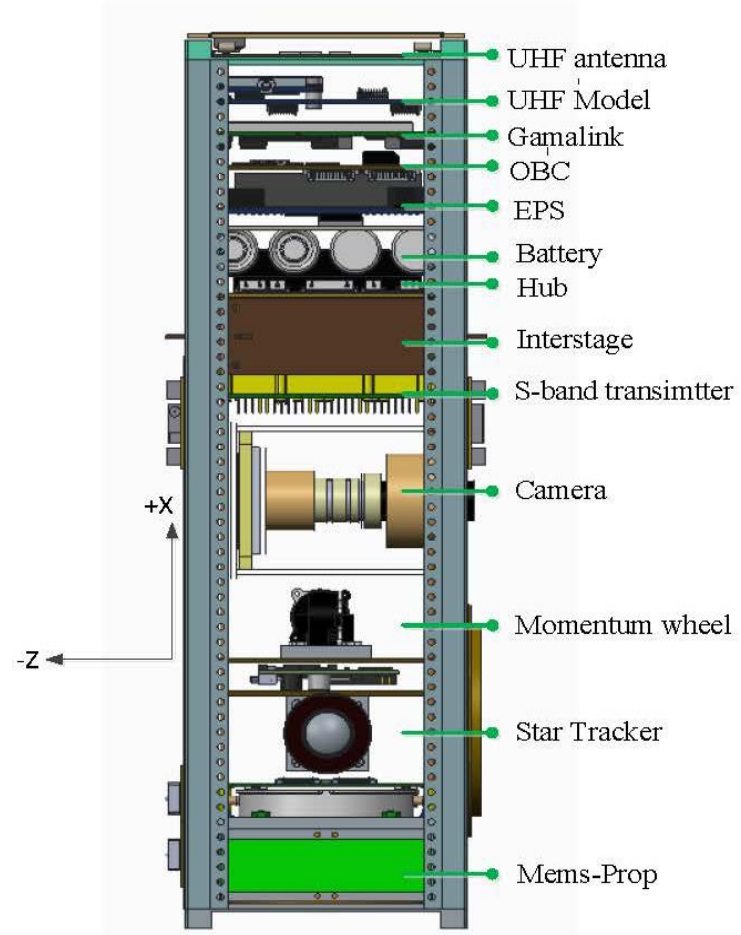
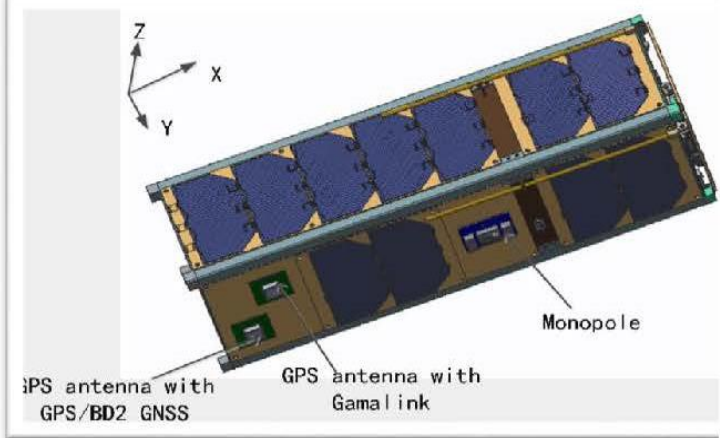
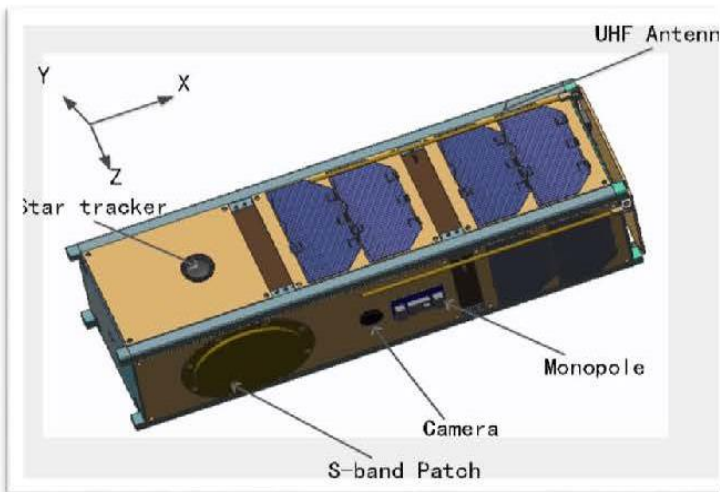
- Main/Sub-sat, Coilable Mast
- GaAs Solar Array + Li-ion Bat
- ARM Processor with CAN Bus
- Passive + Active (MTQ, RW)
- Passive(MLI) + Active(Heater)
- S-band TRX + UHF/VHF TRX



- Inter-Sat Transceiver
- Remote Sensing Camera
- ADS-B Receiver
- Radiation Dosimeter

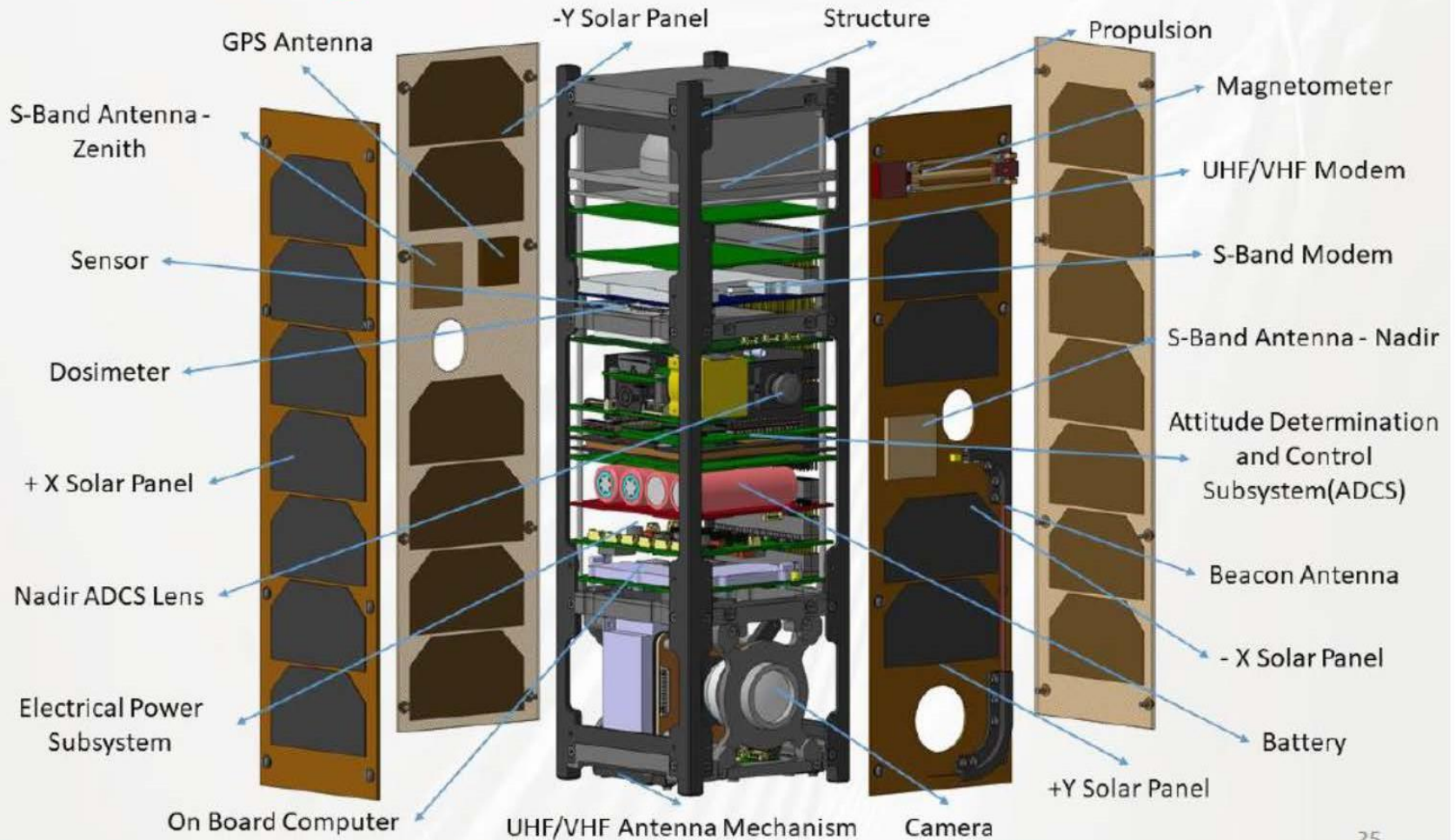


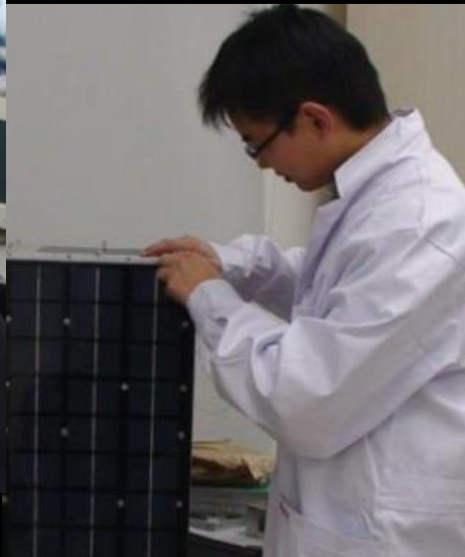
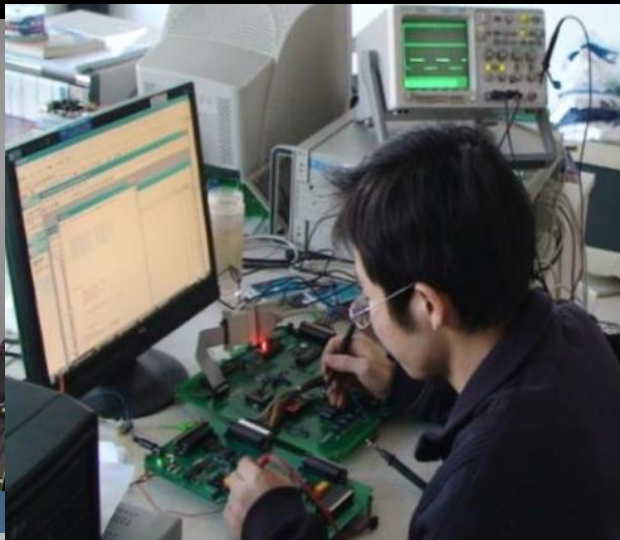
# SSS-2A Configuration





# SSS-2B Configuration





# Educational Programs of SSS Project

## Multilayer training program

### Selection of Student Teams

- Designation of the Universities joining this program
- Nomination of student teams by universities
- Each MS can nominate a student team including 2-10 students

### Training Material Sharing

- System level training materials by Leading University
- Subsystem level training materials by subsystem developers
- All students get a copy of training materials

### Training Opportunities

- Microsatellite Technology MASTA (Master Degree)
- 4 students and 1 faculty member per MS join each summer camp (2017-2018-2019)
- Subsystem developers provide hands-on training for students
- Satellite Integrators provide hands-on training on AIT for students

### Training Costs

- APSCO covered travel and accommodation costs for MS students
- China fully supported MASTA students through government scholarships
- Other MS are encouraged to provide similar opportunities

## ✈️ MASTA Program

- Training the students to put the knowledge and skills into practice.
- Encouraged to be carried out in Team to provide a chance to complete a task with teammates for developing the teamwork spirits.
- Conduct experiments to verify their ideas with the facilities of BUAA-Sat project.



# The Summer Camp Sequence



**1<sup>st</sup> Summer Camp - 2017**  
Design and team-work  
APSCO & Beihang University (China)



**2<sup>nd</sup> Summer Camp - 2018**  
Manufacturing and test  
APSCO & Middle-East Technical University (Turkey)

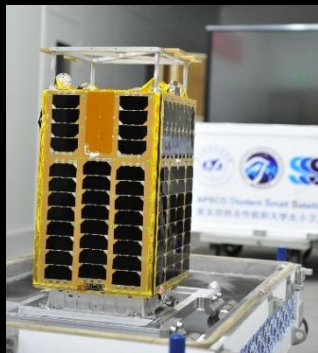


**3<sup>rd</sup> Summer Camp - 2019**  
AIT and operations  
APSCO & Shanghai Jiao Tong University (China)

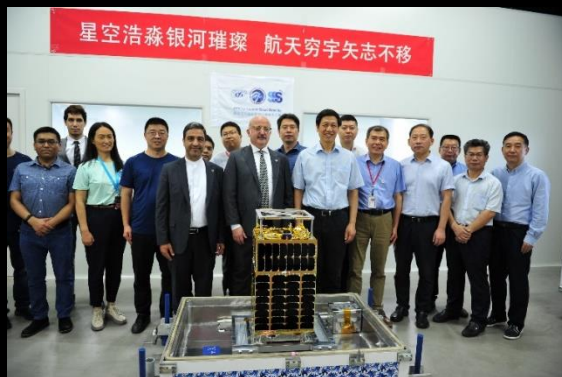
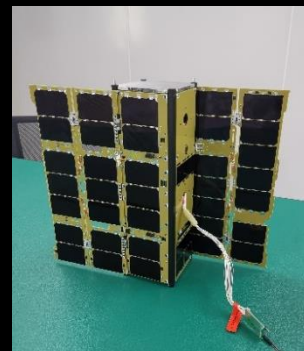
# SSS Project: Launch Preparation

- At the end of September 2021, SSS-1 and SSS-2A have both finished AIT and transferred to the launch site for final test and have been prepared to be launched.

## SSS-1



## SSS-2A



# SSS Project: Launch Preparation



# SSS Project: Launch operation

**Time: 18:51 Beijing Time**

**Date: 2021, October 14**

**Location: Tiayuan Satellite Launch Center, China**





## Ongoing and Future Activities



**Testing and Launch of SSS-2B**



**APSCO Cubesat Competition (ACC) Project**

# APSCO Cubesat Competition (ACC) Project

**Phase zero:**  
Preparation and  
team formation  
*10 months*

- Management entities are formed.
- Member states are informed of the competition and introduce their teams.
- Introduction and promotion webinar is held.
- On-line training course 1 is held

**Phase A:**  
Design  
*14 months*

- Teams with verified mission enter this phase.
- Participating teams design their cubesat.
- On-line training courses 2 and 3 are held.
- One team from every member state proceed to detailed design.
- Summer camp is held.

**Phase B**  
EM  
development  
*12 months*

- Engineering models are developed and tested.
- Participating teams from APSCO MS are paid for EM development.
- Final competition convention is held.



- A**ctive Involvement in international space affairs
- P**eaceful use of outer space
  - S**haring knowledge and experiences
- C**ollaborative gains with its Member States
- O**pen worldwide to international space communities

# THANK YOU