Ministry of I.C.T

IRANIAN SPACE AGENCY

Project-oriented training and space capacity building in Iran

Behnam Sabouri

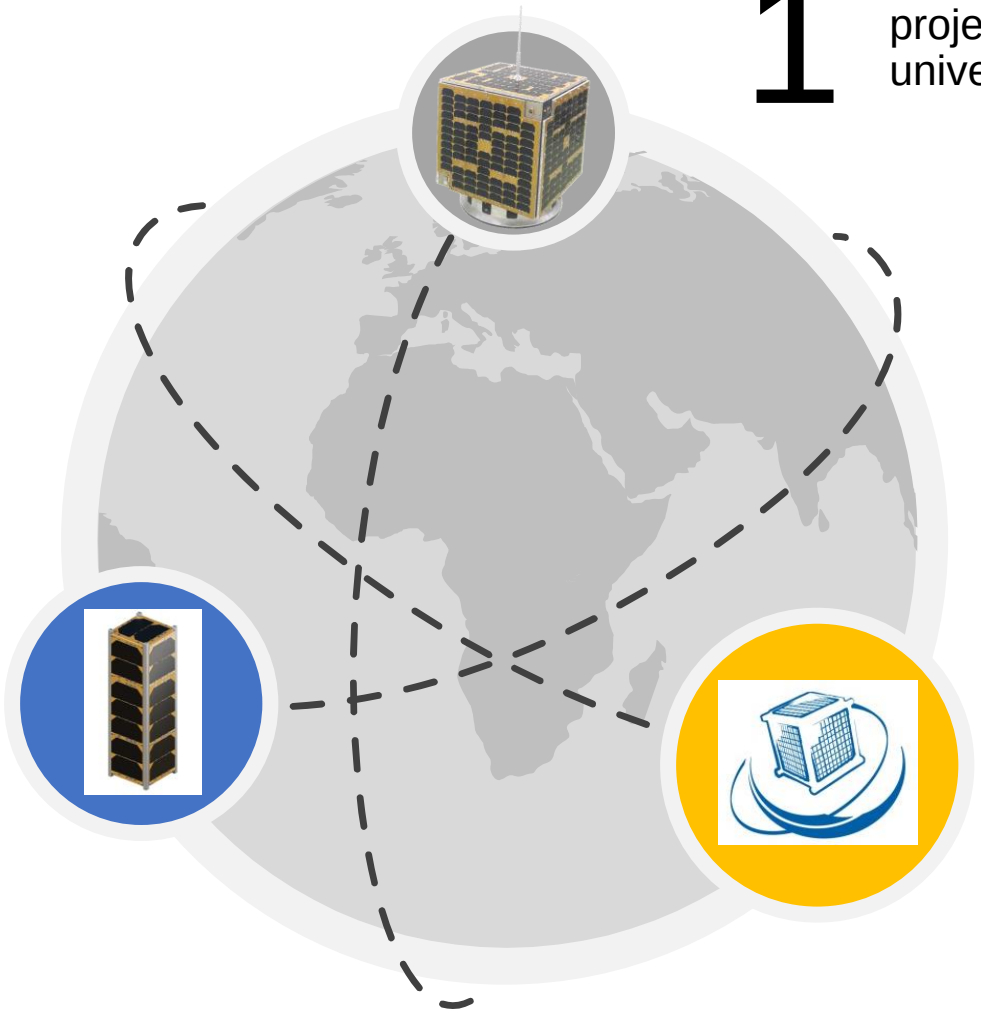
September 29, 2023

30th UN/IAF Workshop on Space Technology for Socio-Economic Benefits, Baku-Azerbaijan, 29 Sep. - 1 Oct. 2023

OUTLINE

Ministry of I.C.T
IRANIAN SPACE AGENCY

1 Three microsatellite projects defined for university students

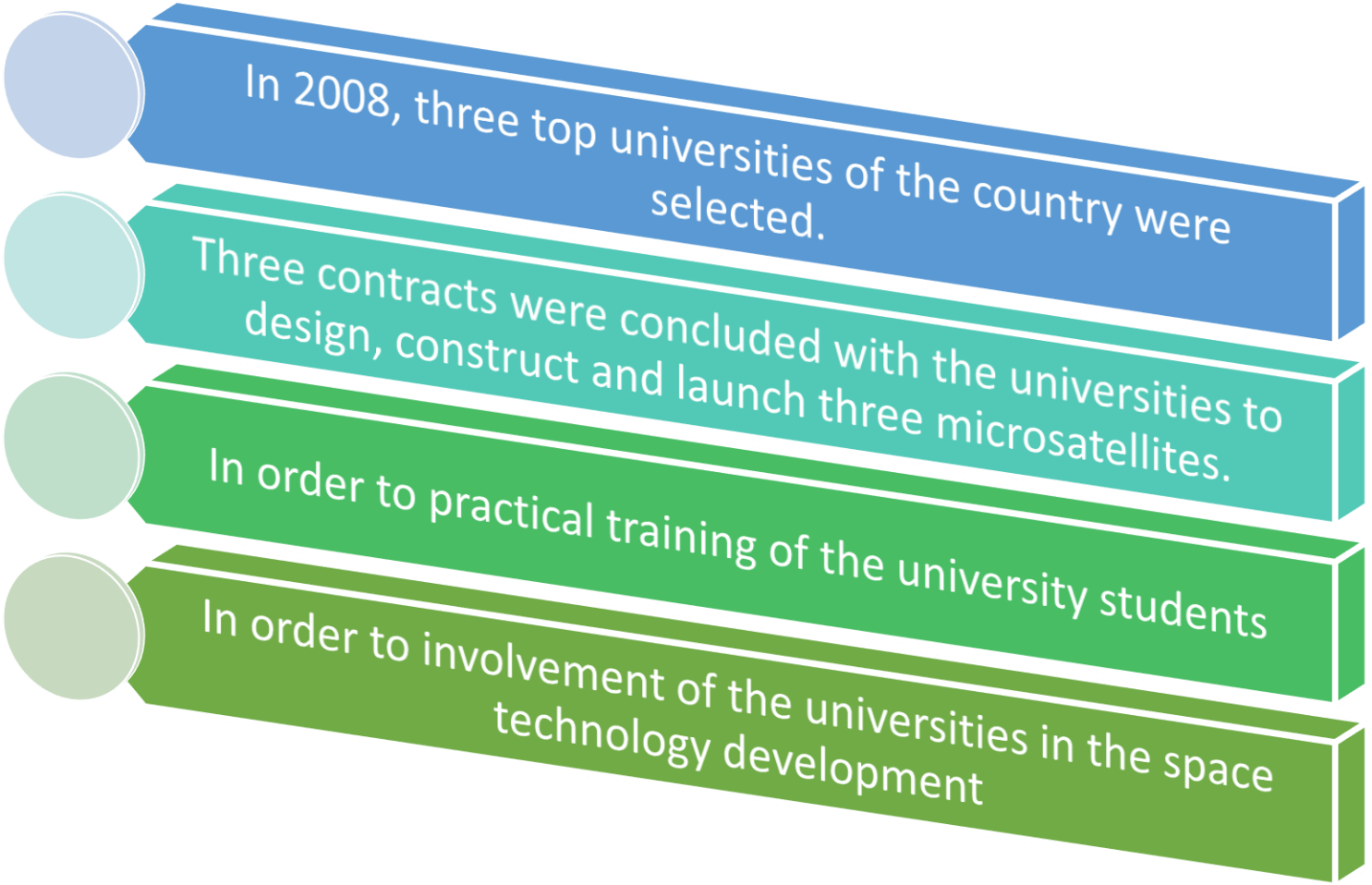


2 National student CubeSat competition

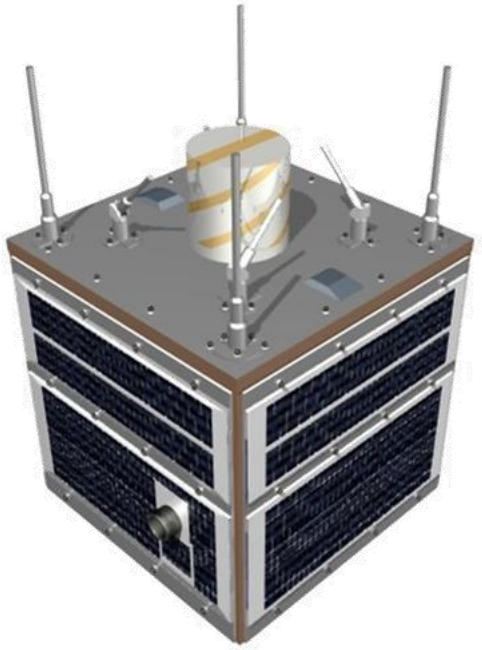
3 International CubeSat competition

Student microsatellites projects

Ministry of I.C.T
IRANIAN SPACE AGENCY



Student microsatellites projects



NAVID (promise) satellite

- Iran university of science and technology (IUST)
- Mission 1: Panchromatic (PAN) imaging
- Mission 2: Broadcasting a message in outer space
- Mass ≈ 50 kg, Dimensions: Cubic, about 50 cm
- Orbit: LEO 274-375 km, inclination=55 deg
- Other developed technologies: Spinning ACS, sensors, actuators, etc.
- **Training of more than 50 students in various space fields**

Student microsatellites projects

DOUSTI (friendship) satellite

- Sharif university of technology (SUT)
- Mission: Multispectral (MS) imaging
- Orbit: LEO 250-310 km, inclination=55 deg
- Mass ≈ 52 kg, Dimensions: Cubic, about 50 cm
- Other developed technologies: 3-axis ACS, heat pipe, iso-grid structure, etc.
- **Training of dozens of students in various space fields**

Student microsatellites projects

PAYAM (message) satellite

- Amirkabir university of technology (AUT)
- Mission 1: PAN and MS imaging
- Mission 2: Space radiation dosimetry
- Mass ≈ 100 kg, Dimensions: Cubic, about 100 cm
- Orbit: LEO 500 km, inclination=55 deg
- Other developed technologies: MLI, S-band telecommunication, etc.
- **Training of dozens of students in various space fields**

National student CubeSat competition

Ministry of I.C.T
IRANIAN SPACE AGENCY

- In February 2016, a student Cubesat competition was initiated by ISA.

Main Technical Requirements			
No.	**Topic**		**Characteristics**
1	Mission	Inter-satellite link availability with the purpose of formation flying	distance from other satellites: 2.5 km
		Air traffic control	ADS-B* (according to ICAO** standard)
		Testing some new technologies in space environment	Teams can propose freely
2	Orbit type		Repeating sun-synchronous and circular
3	Orbit altitude		500-700 km
4	Operational lifetime		1 year

* Automatic Dependent Surveillance

** International Civil Aviation Organization

National student CubeSat competition

Ministry of I.C.T

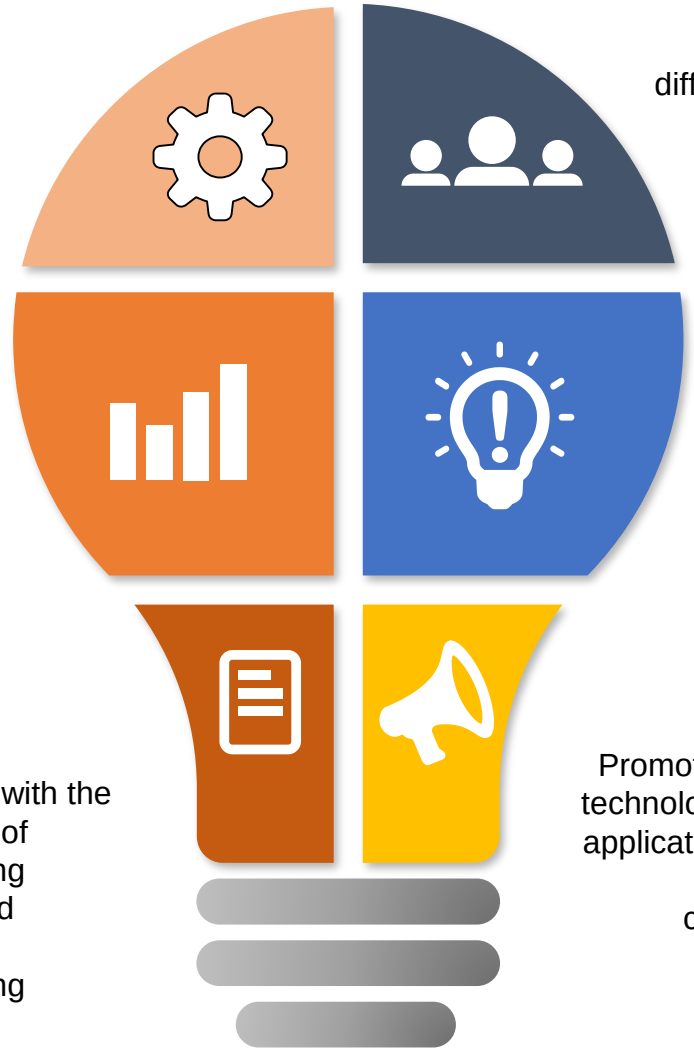
IRANIAN SPACE AGENCY

Main Goals

01 Creating a suitable opportunity for practical training of students

02 Identifying scientific and technical talents in space fields and helping them grow

03 Practical familiarity with the principles of engineering design and system engineering



04 Team work training among students with different academic specialties

05 Creating a suitable opportunity for creativity and innovation of students in the field of space technology

06 Promoting space technology and its applications in the academic community

National student CubeSat competition

Ministry of I.C.T
IRANIAN SPACE AGENCY

- **Proposal submission** • 21 teams (124 persons)
- **Conceptual design** • 14 teams
- **Preliminary design** • 10 teams
- **Detailed design** • 5 teams
- **Engineering model** • 3 teams

Due to the limitations of the domestic launch schedule and the non-availability of foreign launch opportunity at that time, the competition did not continue until the stage of building a flight model.

Main outcomes of student projects & competitions

- ✓ Practical and real projects are a more effective and efficient approach for training university human resources.
- ✓ Some of the students involved in those projects are working in ISA as experts or even at different management levels.
- ✓ Some of the students involved in those projects are working in other government or non-government organizations and institutions active in the space field.
- ✓ Some of the students involved in those projects established their own startups and private companies in the space field and are working in them.
- ✓ The output of defining practical projects for training university students can even be significantly better and higher than the initial expectations.

International CubeSat competition

Ministry of I.C.T
IRANIAN SPACE AGENCY

1) Proposed by Iran to Asia-Pacific Space Cooperation Organization (APSCO)
2) A project under leadership of Iranian Space Agency (ISA) started from Summer 2023
3) APSCO Cubesat Competition (ACC) comprises a comprehensive training and educational program for APSCO Member States' university students
4) A multi-featured program which includes training, designing, building and testing an engineering model of a Cubesat
5) Every member state is entitled to introduce 3 teams to enter the educational and design phases of ACC
6) One student team from each Member State will have the opportunity to enter the engineering model development phase
7) Teams which manage to present satisfactory performance in the tests, will receive full financial support

Thank you for your attention.

saboori@isa.ir