High - Level Postgraduate Advanced Course in Aerospace Engineering

Established by

Italian Ministry of Foreign Offices

Directorate General for Development Cooperation
Task Force Iraq

(Min. Massimo Bellelli)

And

School of Aerospace Engineering

(Prof. Filippo Graziani and Paolo Teofilatto)

The Promoters

Cooperazione Italiana allo Sviluppo
Ministero Affari Esteri

General Direction for Development Cooperation

Exigui numero sed vivida virtus

School of Aerospace Engineering

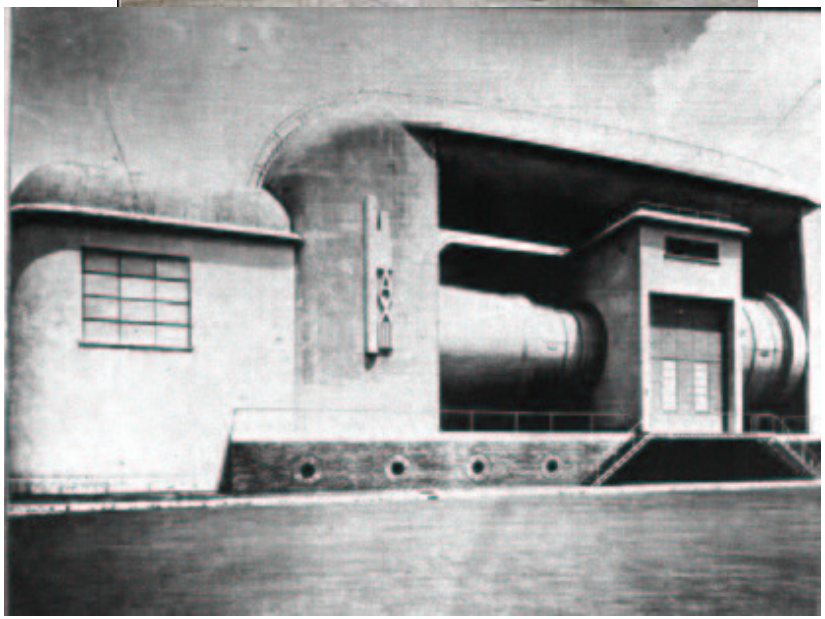
Established since 1926

The Aeronautical time

from the airship to airplane (1926-1950)

(***Aeronautical Engineering laurea course***)

Direzione Superiore Studi ed Esperienze Guidonia (1935-1943)



Conto Corrente con la Posta

GAZZETTA UFFICIALE

PARTE PRIMA DEL REGNO D'ITALIA

o LXVII — Roma — Venerdì, 22 ottobre 1926 — Numero 246

Numero di pubblicazione 2069.

REGIO DECRETO-LEGGE 20 agosto 1926, n. 1760.

Istituzione della Scuola d'ingegneria aeronautica presso la Regia scuola d'ingegneria di Roma.

Art. 1.

E' istituita presso la Regia scuola d'ingegneria di Roma una Scuola d'ingegneria aeronautica.

Essa ha per fine di promuovere il progresso della scienza e dell'arte aeronautica e di fornire la preparazione scientifica e tecnica per la professione d'ingegnere aeronautico e per la carriera del corpo del Genio aeronautico.

The Aerospace time

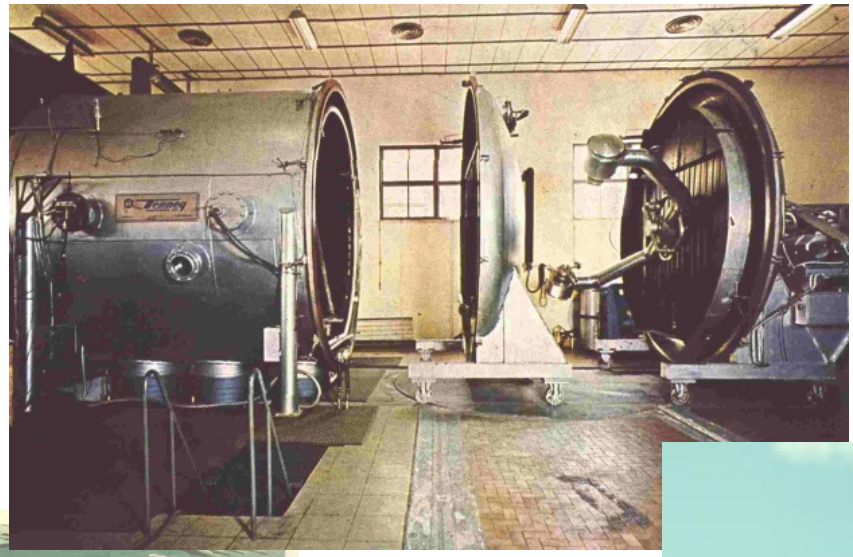
from the rocket to the satellite (1957- 2010)

(Aerospace Engineering laurea course)

San Marco project (1960-1988),

Centro Ricerche Aerospaziali (Urbe Airport),

Broglio Space Center (Malindi , Kenya)



Since 1990 an educational program has been established at the Scuola di Ingegneria Aerospaziale for didactical purposes

The tradition of manufacturing and launching satellites is still continuing at the Scuola di Ingegneria Aerospaziale even if in smaller “scale”. The Gruppo di Astrodinamica dell’Università degli Studi “la Sapienza” (G.A.U.S.S.) has promoted since the early 90’ the **UNISAT Program** for educational purposes in order to involve directly the students in the design and realization of “ university microsatellites” launched from the Baikonour (Kazakistan) cosmodrome using the DNIEPR L.V.. A Space Debris optical observations program **(SPADE Program)** is also operative. A space culture dissemination in the High-School has been promoted for six years in the **ALERE FLAMMAM Program** by the course “Astronautica in Classe”.

A short history of UNISAT program

1990 -Theoretical studies on building low-cost microsatellites at university

A few people trusted it was possible that students could design and manufacture microsatellites using commercial off-the-shelf components)

1995 - First founding of UNISAT program from Italian Ministry of University

Building of ground station (SPIV)

2 young researchers of University of Rome at Stanford University

1997 - Starting design and manufacturing of UNISAT

2000 - Launch of UNISAT

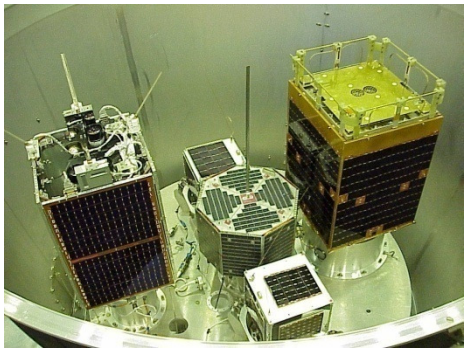
2002 - Launch of UNISAT-2

2004 - Launch of UNISAT-3

2006 - Launch of UNISAT-4

2011 - Launch of EDUSAT_it

UNISAT microsatellites

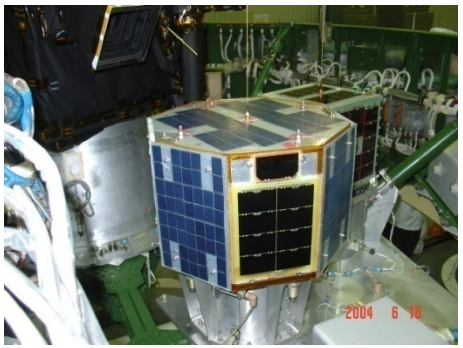


Unisat

26 September 2000

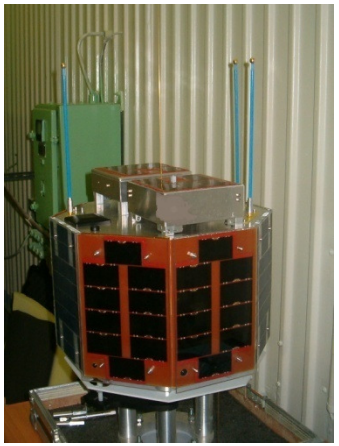
Unisat-2

20 December 2002



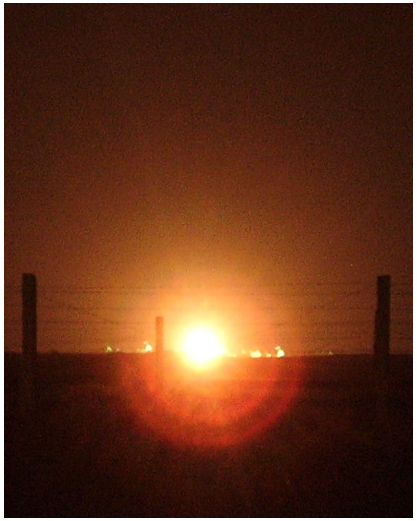
Unisat-3

29 June 2004



Unisat-4

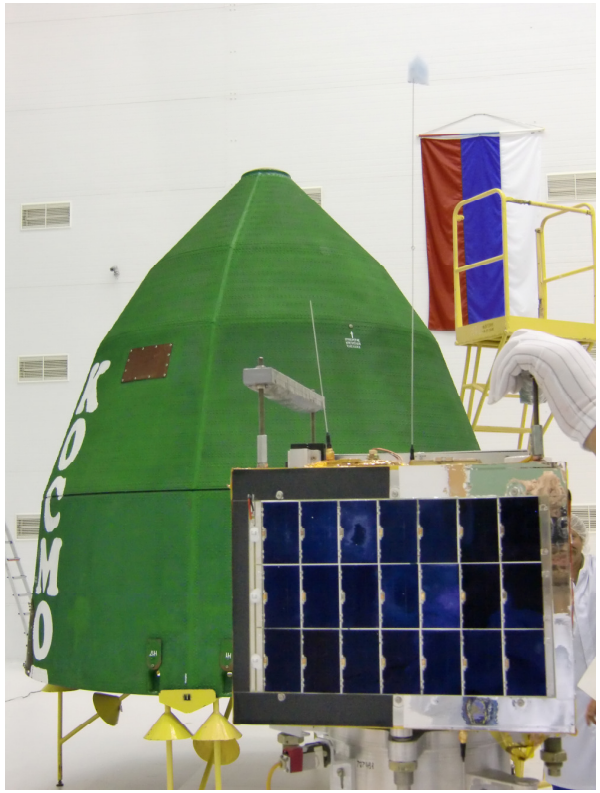
26 July 2006



AFTER THE LAUNCH

EduSat

Educational Satellite for High School Students



Payload designed by high school students:

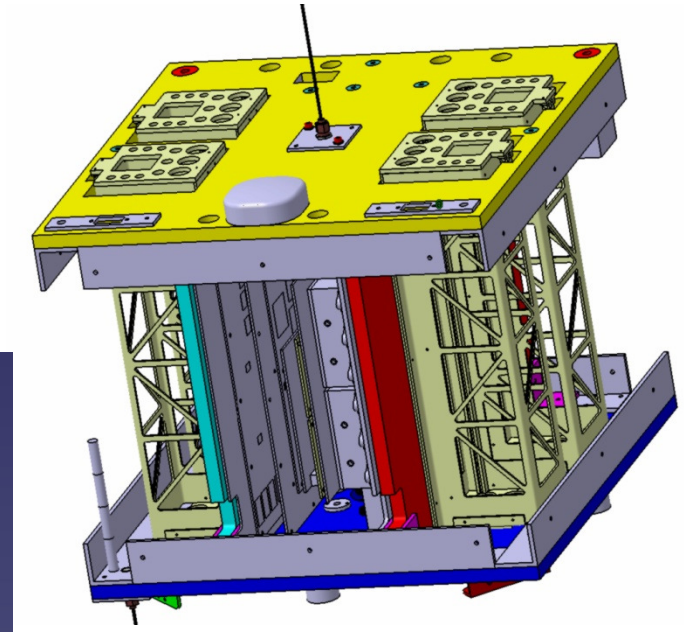
- Temperature sensor
- Sun sensor (manufactured by IMT)
- Solar Pannel
- Electronic device to storage data

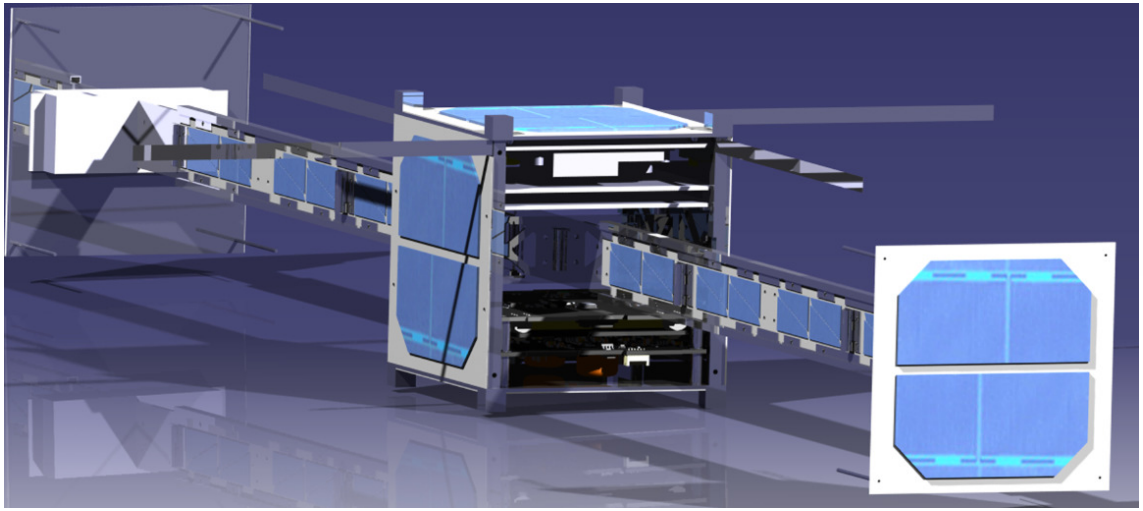
Succesfully launched August 17, 2011
from Yasny L.B. by DNEPR L.V.

Financial support by Italian Space Agency (ASI)

Cubesats at School of Aerospace Engineering

- Morehead – Roma Fempto Orbital Deployer
- To be tested on EduSat launch
- Two pocket-cubes realised by students from an italian and a slovenian high school





The UniCubeSat of the Scuola di Ingegneria Aerospaziale:

launched in the Vega Maiden Flight February 17, 2012

High - Level Postgraduate Advanced Course in Aerospace Engineering

Objectives of the Course

- **The specific area of interest is that of microsatellites**, where the School of Aerospace Engineering of Rome boasts a considerable experience. Through the classes focused on theoretical aspects of aerospace engineering and through the practical activity in the School laboratories, each student will be finally able to contribute in the building a microsatellite with a weight up to 10 kg), with the perspective of launching and inserting it in orbit.

At the end of the graduate-level course, each student will be able to:

- contribute to design not only aerospace systems but also robotic and automatic systems, even in the context of industrial processes control
- contribute to several space mission tasks, such as ground support, satellite telemetry and tracking, signal and data processing
- support the transfer of technological solutions of aerospace engineering to alternative contexts, such as civil and mechanical engineering
- acquire software competencies in scientific and design tools such as Cad, Catia, Matlab, Simulink, which are widely used by the scientific community all over the world
- organize and manage contacts with other people and institutions that share the same interests in aerospace engineering, possibly in the context of international work groups

PROGRAM OF THE LECTURES

CYCLE 1 - (16 credits) : May 20, 2012 - July 8, 2012
Space Missions for Telecommunications and Earth Observation
Flight Mechanics Laboratory
CYCLE 2 - (credits 16) : September 3, 2012 - 21 October, 2012
On board Electronics
Electronics Laboratory
CYCLE 3 - (16 credits) : January 7, 2013 - February 24 , 2013
Space Power Systems
Power System Laboratory
CYCLE 4 - (credits 16) : February 25, 2013 - April 14 , 2013
Attitude Control
Aerospace structures and Thermal Analysis
CYCLE 5 - (credits 12) : April 15, 2013 - June 2 , 2013
Telecommunications and Earth Observation Systems
Attitude Control Laboratory
Or
Optical Sensor Laboratory
CYCLE 6 - (credits 10) : June 3, 2013 - July 21, 2013
Space Structure Laboratory
Or
Ground Station and Telecommunications Laboratory

Cultural Visits

- June 2, 2012: Roman Forum
- June 16, 2012: Celio e Aventino
- June 30, 2012: Roma Barocca
- July 7, 2012: Villa Adriana
- September 22, 2012: Florence
- October 13, 2012: Tusculum

- October 2, 2012: 65° International Astronautical Congress, Napoli
- October 4, 2012: 65° International Astronautical Congress, Napoli
- February 1, 2013: CIRA, Capua
- March 11, 2013: Thales Alenia Space, via Tiburtina , Roma
- April 15, 2013: MBDA Italia, Fusaro Plant
- May 13, 2013: Telespazio, Fucino Plant
- June 10, 2013: Italian Space Agency, Roma

Final Comments

- Traditionally, the educational programs of the School of Aerospace Engineering are strongly coupled with the technology development and experimental activity.
- The manufacturing of a microsatellite allows the students to have a full view on a concrete project, thus developing their skill as S**ystem Engineers**
- With the fundamental support of the DGCS – Task Force Iraq the educational program of the School of Aerospace Engineering is offered to 15 students from Iraq.
- Generally cooperation effort is devoted to the support in areas of emergency and first aid. On the other hand this course is an important example of the cooperation between Italy and emerging countries in the field of high education and training in a sector, such as aerospace engineering, which is strategic for the technology development in the medium/long term.
- This activity is finalized to the development of an Aerospace College in Iraq also with the aim to spread the know how of aerospace engineering in a large aerea of the arabic world.
- This project can be regarded as an example to promote similar activities between the School of Aerospace Engineering of Rome and other emerging countries.