

The School of Aerospace Engineering of Roma: from Aeronautics to Astronautics



Exigui numero sed vivida virtus

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SAPIENZA University of Rome*

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The history of the School of Aerospace Engineering:

Aeronautical time: from the airship to airplane
(*Aeronautical Engineering laurea course*)
(1908-1950), Guidonia

Aerospace time: from rocket to satellite
(*Aerospace Engineering laurea course*)

San Marco project (1960-1988),
Centro Ricerche Aerospaziali (Urbe Airport),
Malindi (Kenya)

The UNISAT program for student education (since 1990) at the Scuola di Ingegneria
Aerospaziale, launches from Baikonour

Astronautical time: Humans in Space (present days)
(*Astronautical Engineering laurea course*)

Proposal for the institution of the **JOINT SAN MARCO ASTRONAUTICAL CENTER**

Aeronautical time



Conto Corrente con la Posta

GAZZETTA UFFICIALE

PARTE PRIMA DEL REGNO D'ITALIA

no LXVII Roma — Venerdì, 22 ottobre 1926 Numero 246

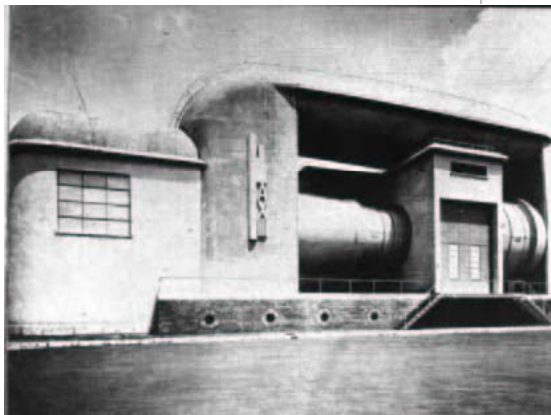
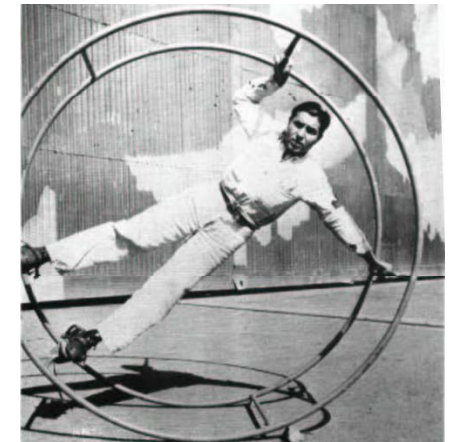
Numero di pubblicazione 2069.

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.



Airship N1
Gaetano Arturo Crocco
Vigna di Valle-Roma-Vigna di Valle,
31 October 1908



Italian Air Force





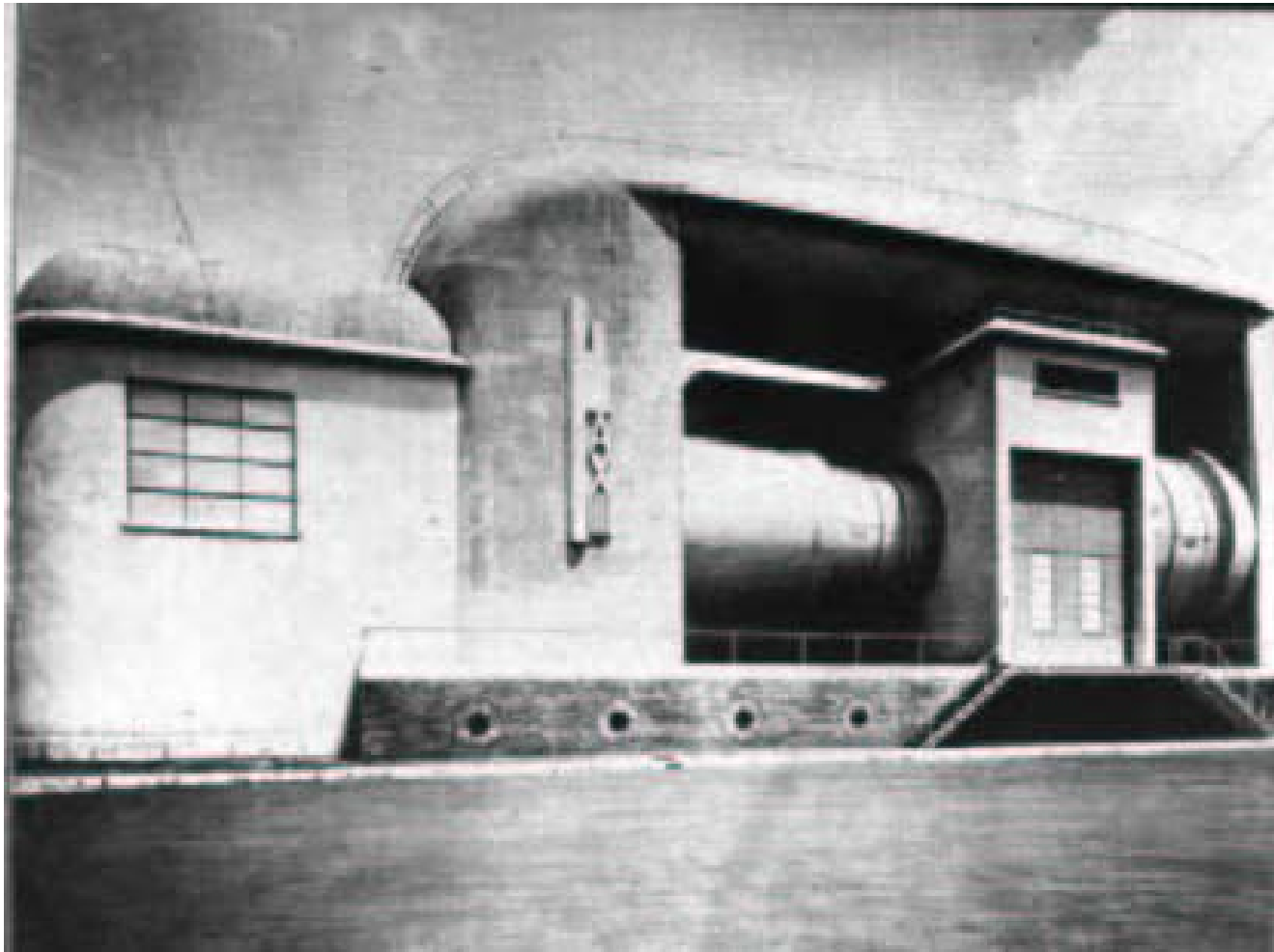
Schneider Cup (1913 -1931)



Atlantic Flight (1933)

Guidonia 1935-1943





Wind tunnel, Operative since 1913 at the Centro Sperimentale, Lungotevere Michelangelo



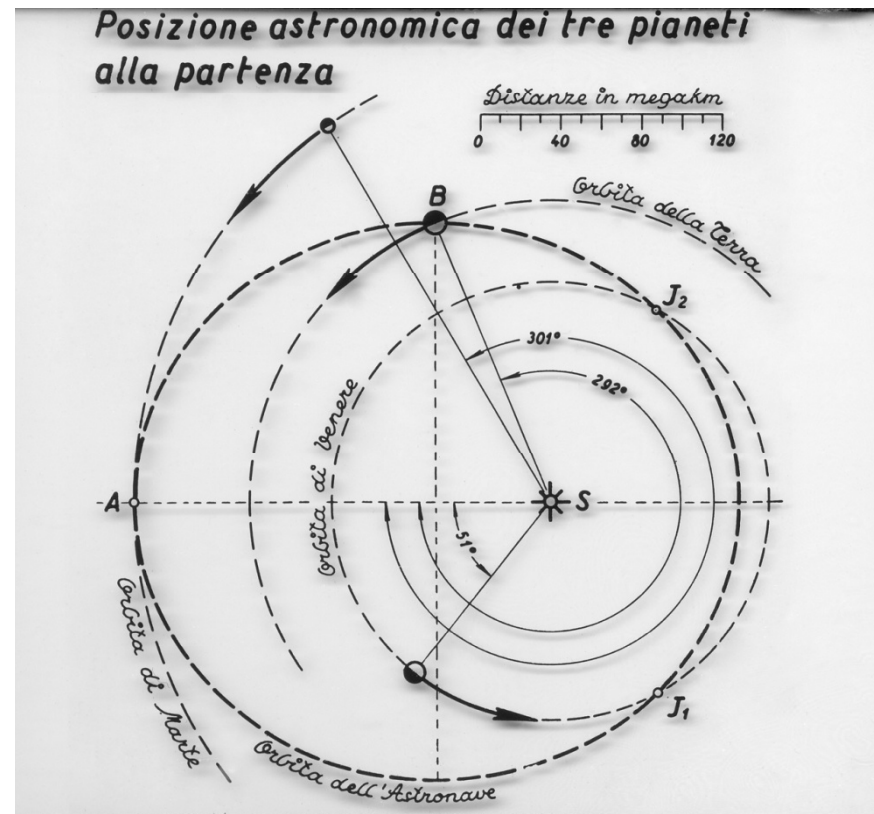
Gaetano Arturo Crocco

**1956 : One-Year Exploration Trip Earth-Mars-
Venus-Earth
Roma, VII IAF**

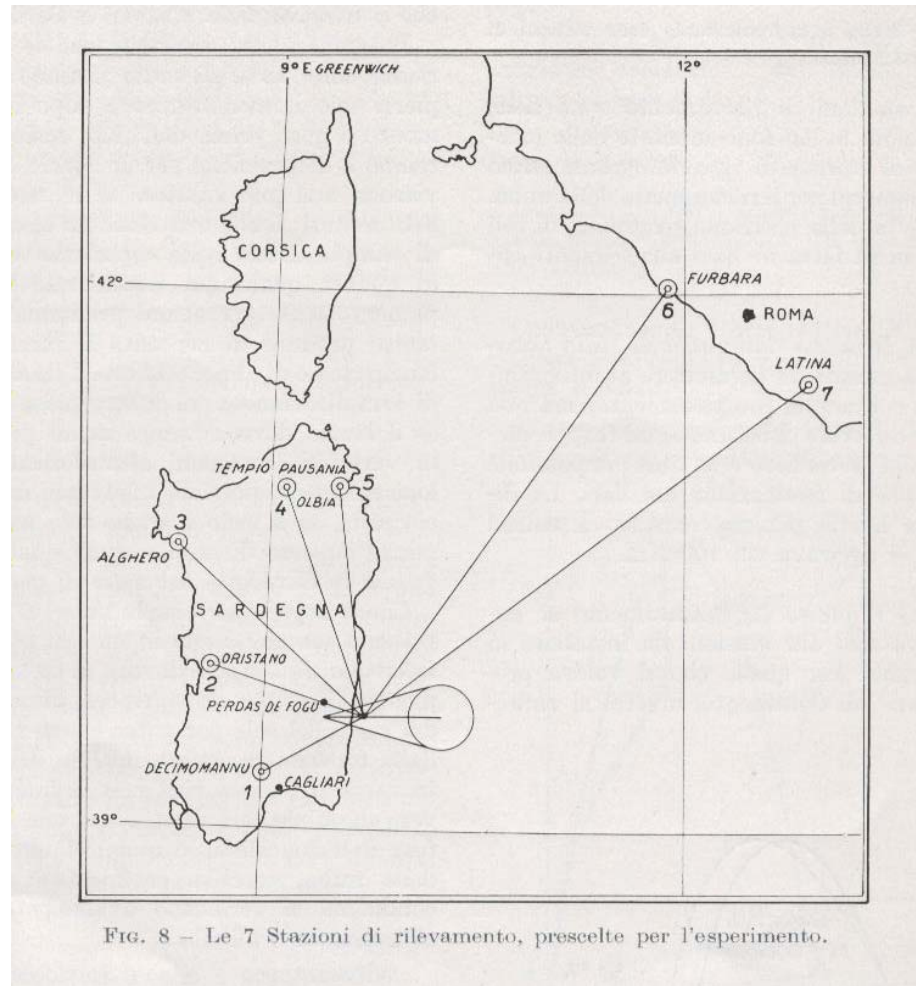
1950 and 1951: Course on superior Ballistic (CIBS)

(Rocketry and Astronautics)

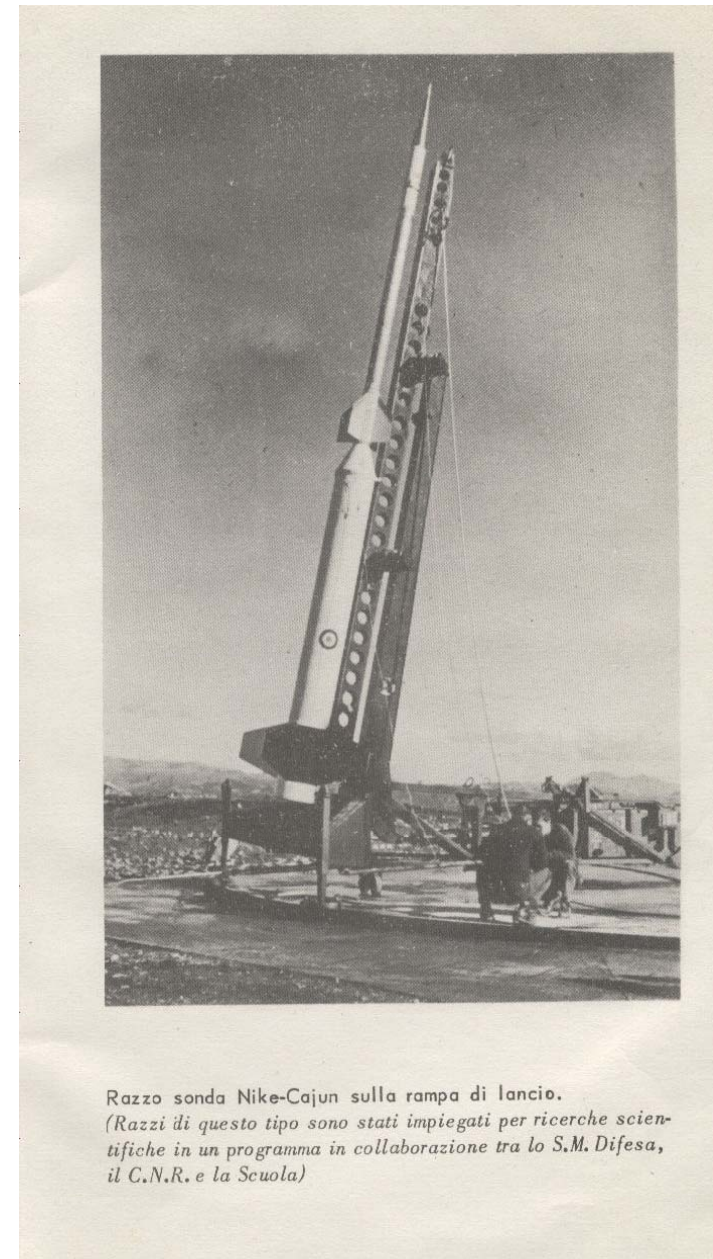
- Satellites and trajectories
- Re-entry for manned missions



1956: Luigi Broglio responsible of the Reparto Studi Direzione Armi e Munizioni



Poligono di Salto di Quirra



“Here it is the man of the space”

(Theodor Von Karman to Broglio, 1958)

“..., in order to create a school, a culture, a technology I have left the well known aeronautic field, to step in a new world that I completely ignored

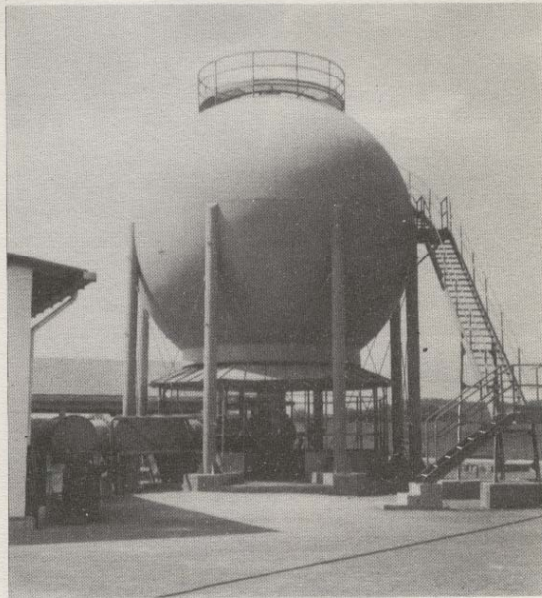
Luigi Broglio

Translated from an interview given in october 1996, published in “ Nella nebbia, in attesa del sole”, Giorgio di Bernardo Nicolai, Di Renzo Editore, 2005 p. 9.

1958: **Rocket course (2 years)**

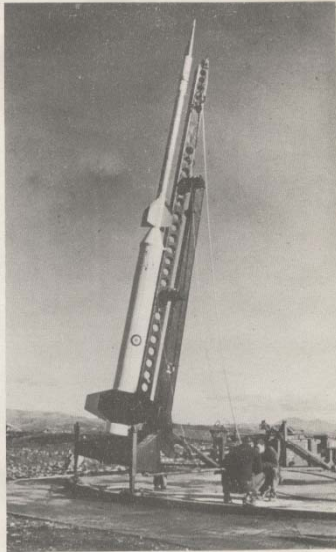
1961- 62: **The Scuola di Ingegneria Aeronautica became the Scuola di Ingegneria Aerospaziale**

Centro Ricerche Aerospaziali

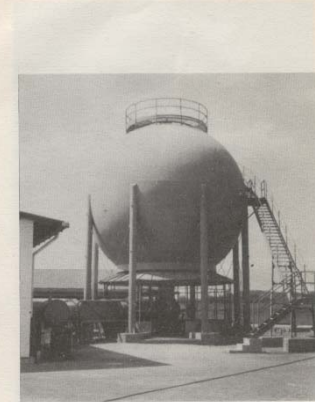
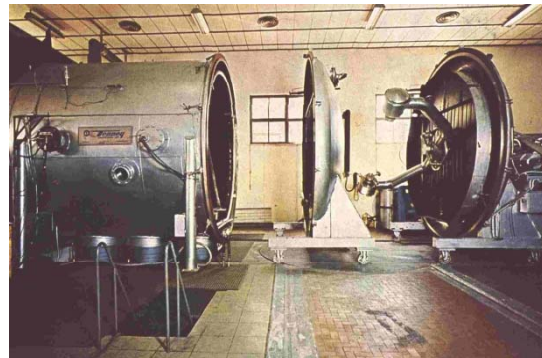
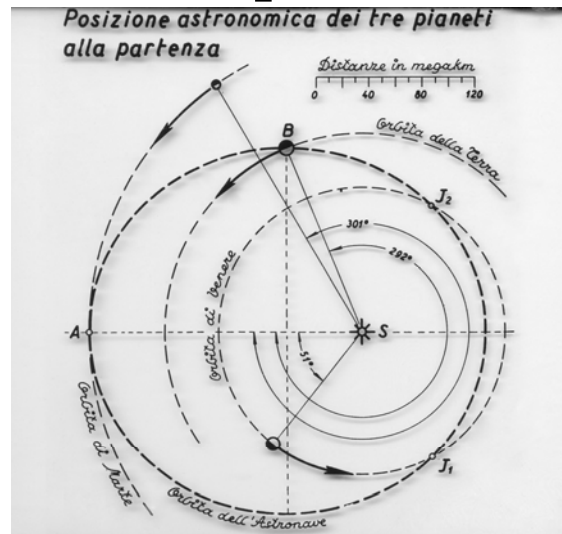


Centro Ricerche Aerospaziali.
Particolare dell'impianto del vuoto delle gallerie ipersoniche
M8 e M12.

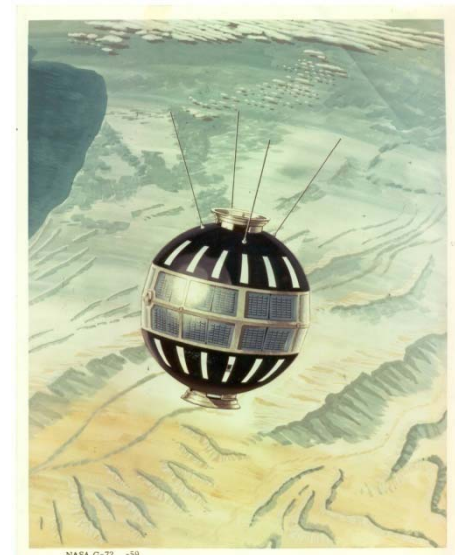
Aerospace time

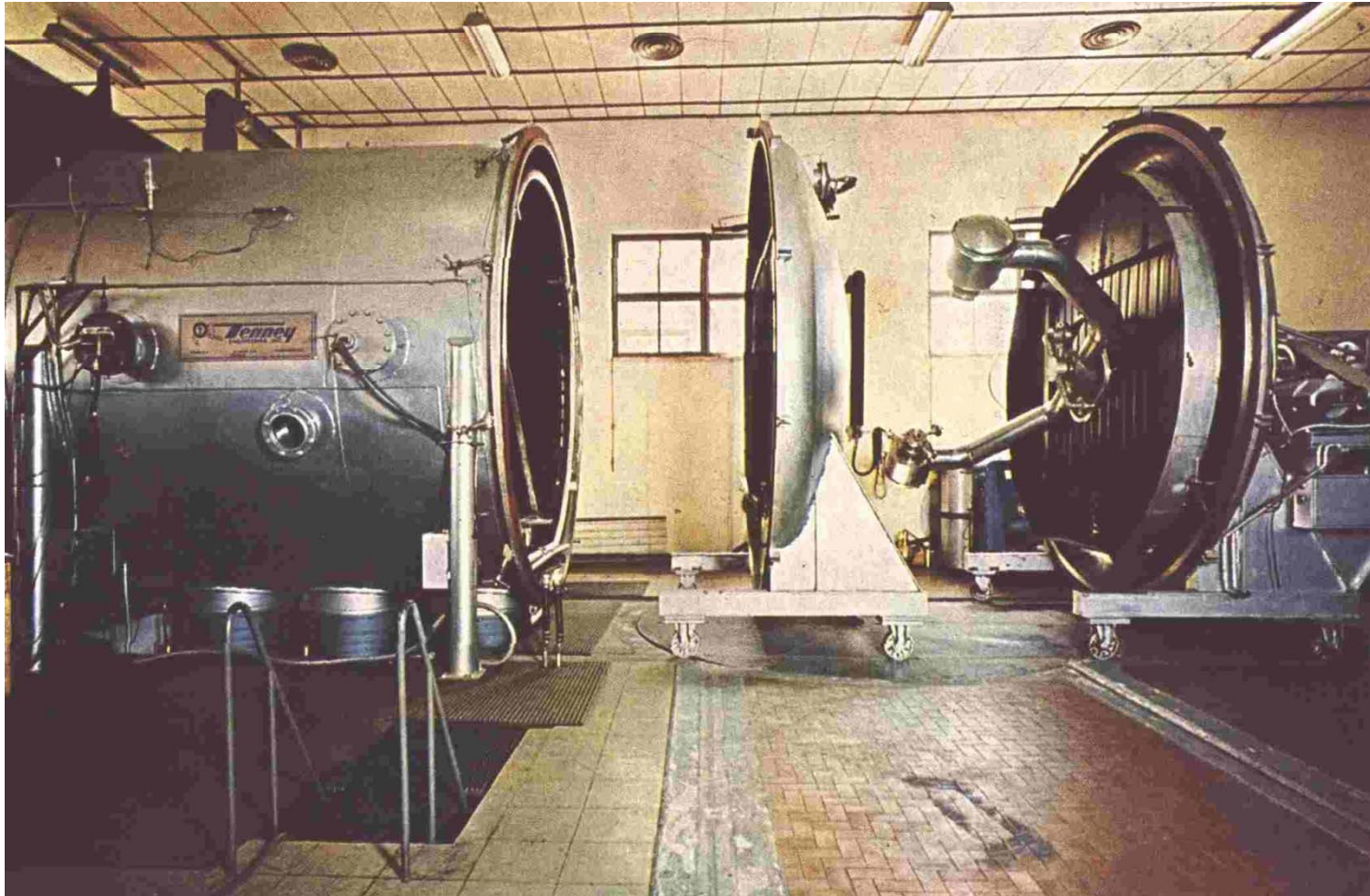


Razzo sonda Nike-Cajun sulla rampa di lancio.
(Razzi di questo tipo sono stati impiegati per ricerche scientifiche in un programma in collaborazione tra lo S.M. Difesa, il C.N.R. e la Scuola)



Centro Ricerche Aerospaziali.
Particolare dell'impianto del vuoto delle gallerie ipersoniche M8 e M12.





**Space simulator of the Centro Ricerche Aerospaziali
Roma, Via Salaria (Aeroporto dell'Urbe) anni '60**



NASA G-72 -59

Satellite S. Marco 1

15 December 1964

S. Marco Platform 1966 ...



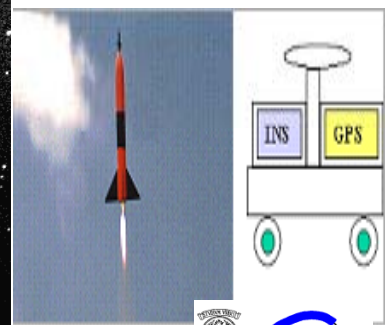
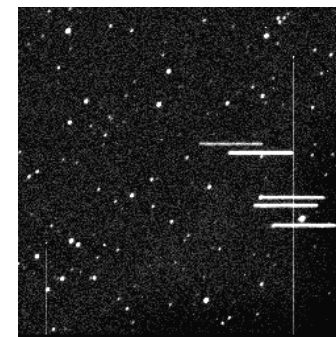
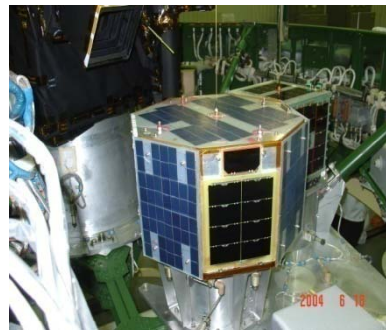
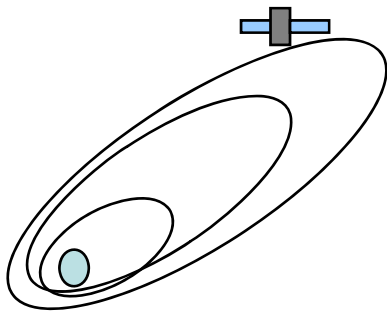
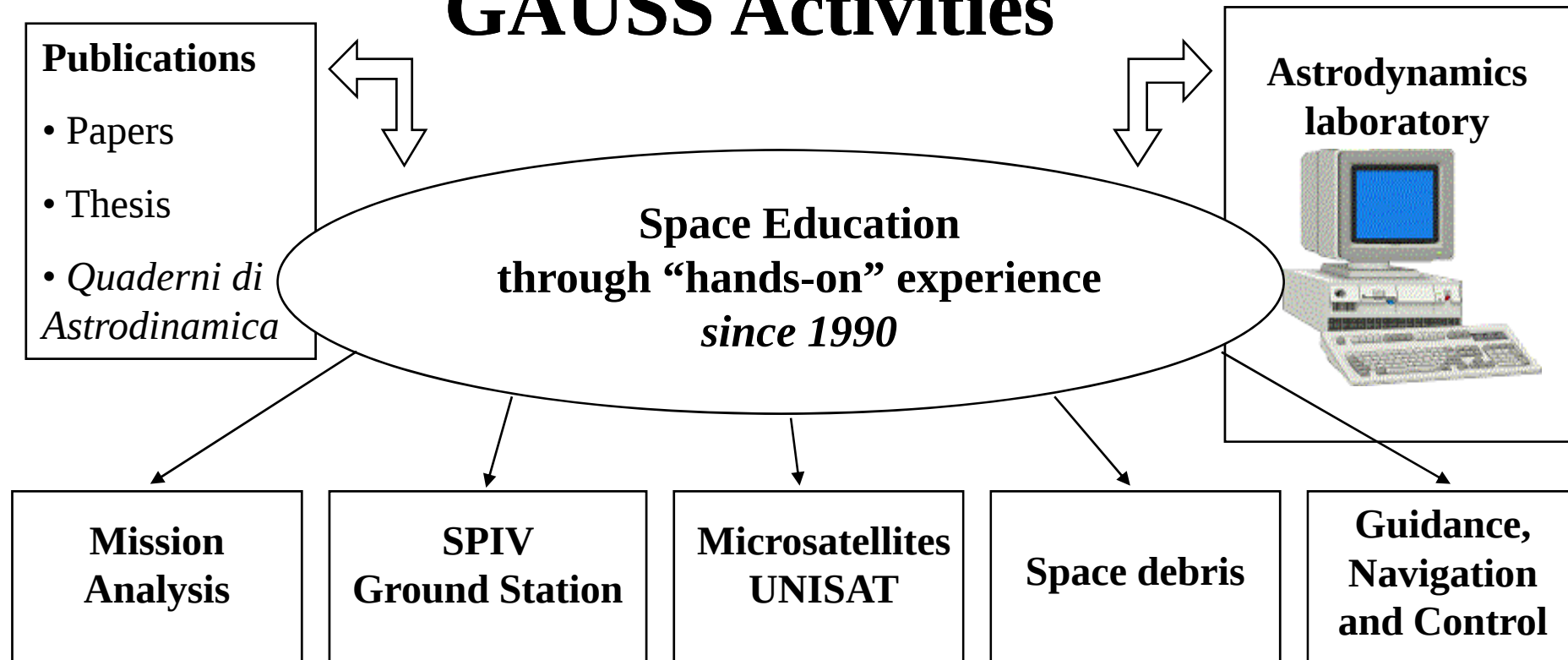
... Sea Launch 1996



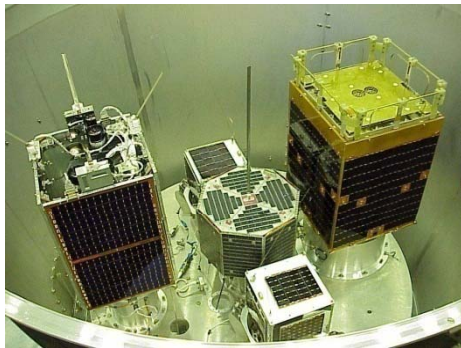
Launch from Wallops Island launch site(USA)	
15 december 1964	San Marco 1

Launches from the San Marco launch site		
Date	Satellite	Payload and aims
26 april 1967	San Marco 2	High atmosphere studies
12 december 1970	Small Astronomy Satellite (SAS) 1, noto come Uhuru	X rays sources
24 april 1971	San Marco 3	High atmosphere studies
15 november 1971	Small Scientific Satellite (SSS) 1	Electric and magnetic fields in the Van Allen belts
15 november 1972	SAS 2	gamma rays sources
18 february 1974	San Marco 4	High atmosphere studies
15 october 1974	UK-5	X rays sources
8 may 1975	SAS 3	
25 march 1988	San Marco 5	
20 sounding rockets were also launched from the San Marco launch site, 7 sounding rockets were launched in february 1980 during a Sun eclipse well visible from Kenia.		

GAUSS Activities



UNISAT Microsatellites



Unisat

26 September 2000



Unisat-2

20 December 2002



Unisat-3

29 June 2004

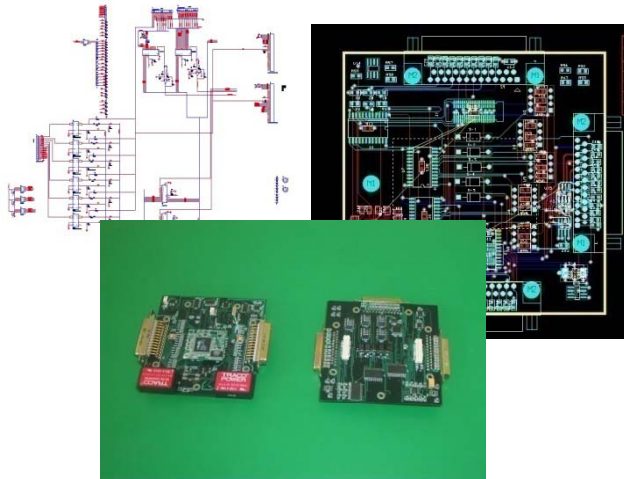


Unisat-4

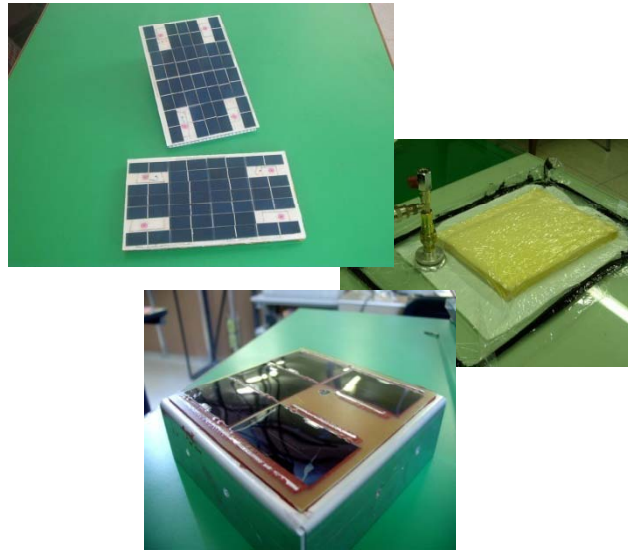
26 July 2006



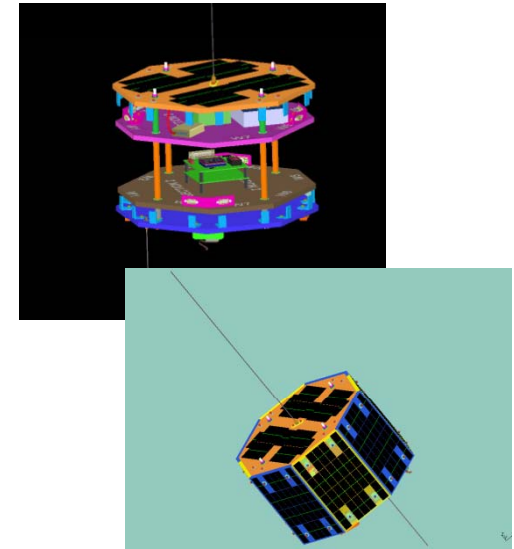
Design and realization of electronic boards



Solar arrays manufacturing



Structure design and manufacturing



Ground tests, integration, launch and operation in orbit



Integration at the Baikonour Cosmodrome



Satellite Integration

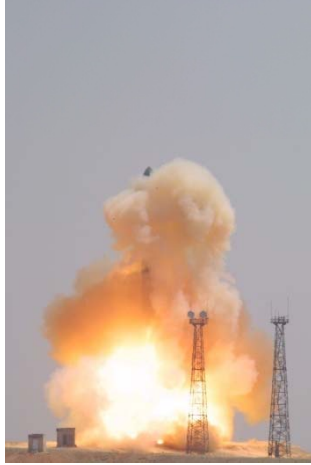


Launch Silos



UNISAT-3 Launch



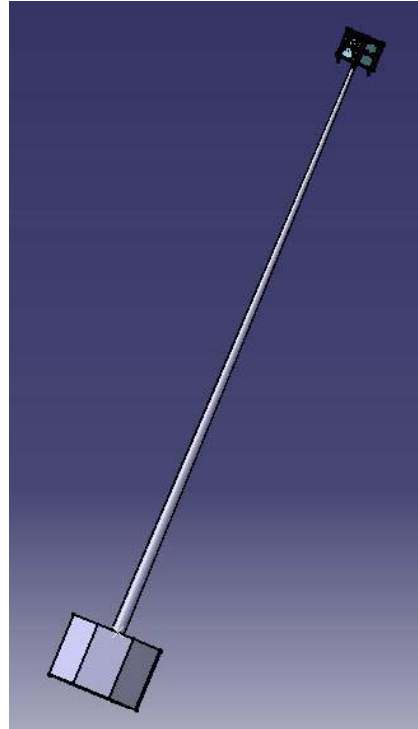


Launch teams

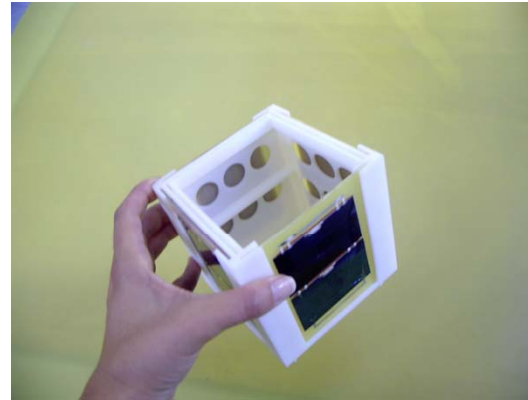


Present projects

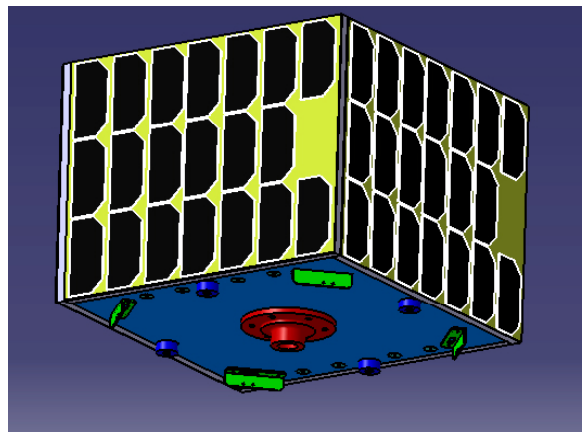
UNISAT -5 (SIA)



UNICubeSAT (ESA)



EDUSAT (ASI)



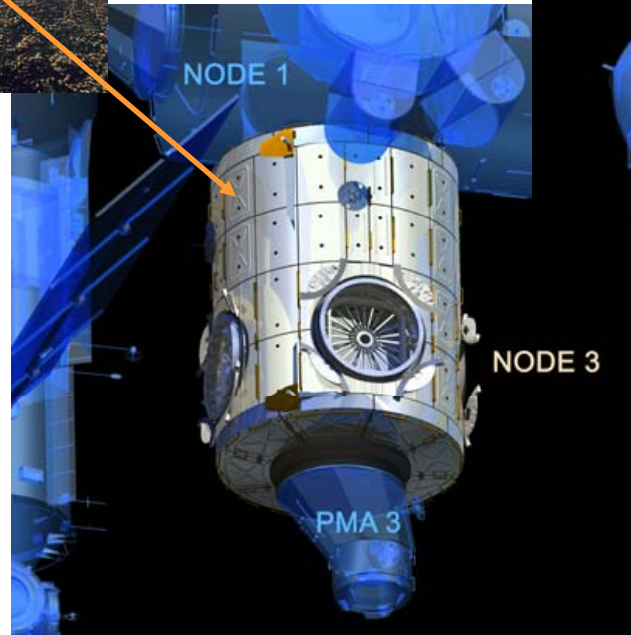
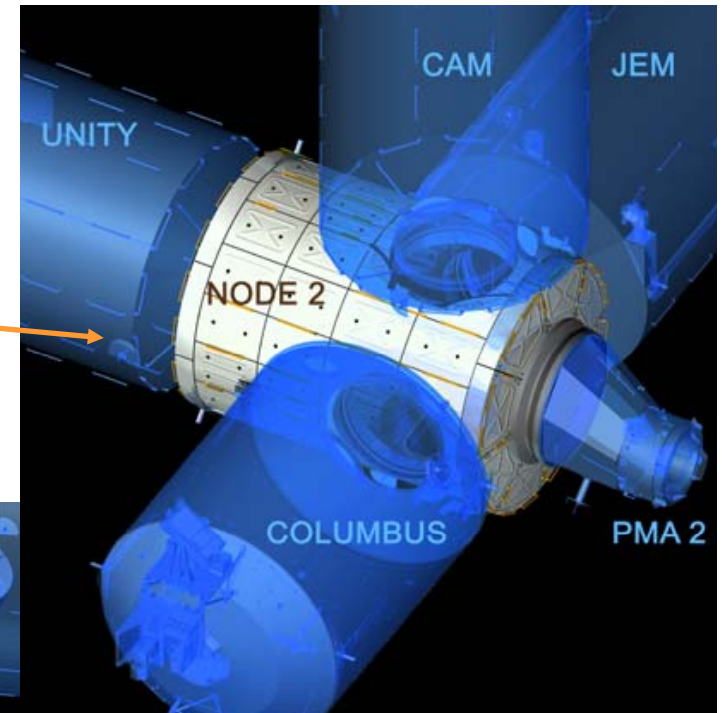
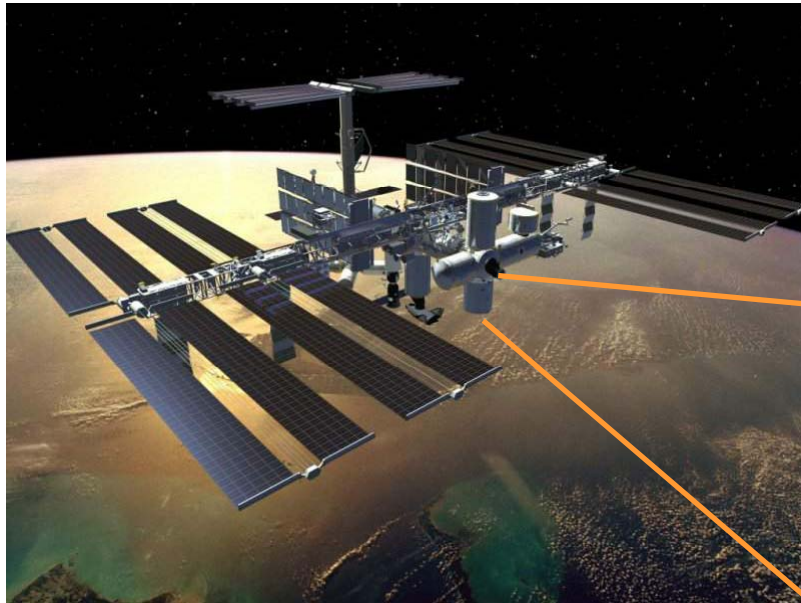
Astronautical time

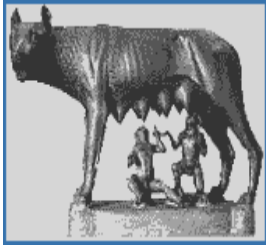
Il Momento Astronautico

“Penso che lo spazio sia il futuro imprescindibile dell'umanità.
Occorre osservare che l'astronautica è oggi simile ad un bambino che
muove i suoi primi passi.
Nessuno sa cosa farà questo bambino quando sarà grande...”

Luigi Broglio (1911-2001)

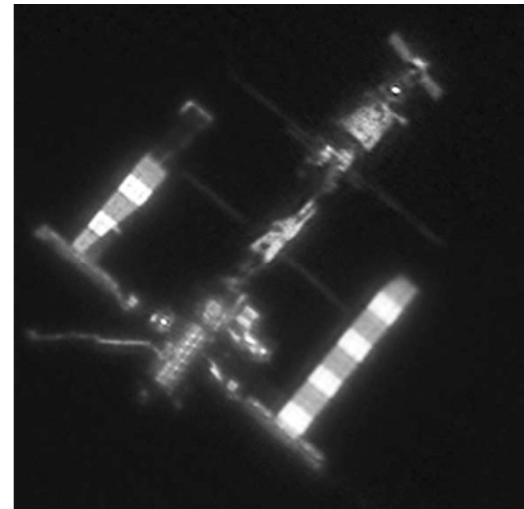
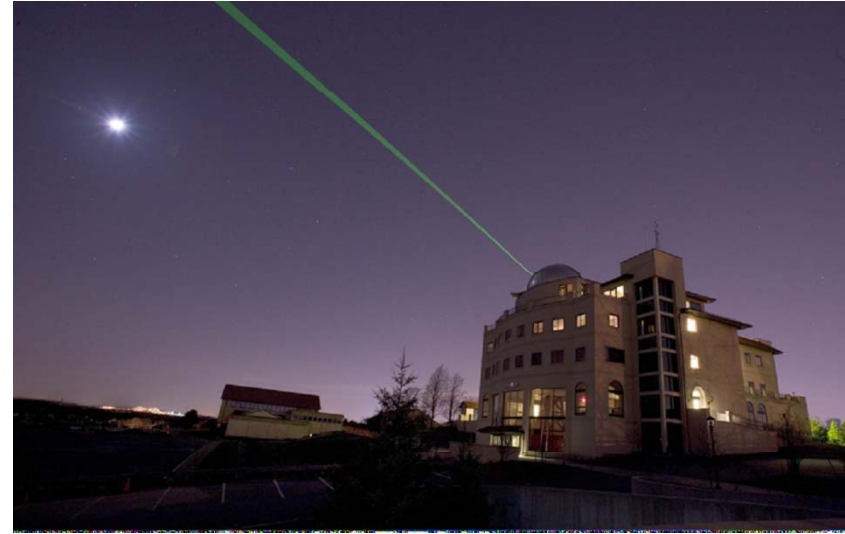
NODE 2-3 INTERNATIONAL SPACE STATION





SPQR

Specular Point-like Quick Reference: ENEIDE mission



Enflatable systems : space hotels!



**NASA and Bigelow Aerospace
project for a space hotel**



**A space hotel designed by Shimizu
Corporation of Tokio**

Space tourism and suborbital flights

The english businessman Richard Branson, holder of the Virgin Inc., founded a company for suborbital touristic flights: the Virgin Galactic. This is a spaceship which flies at 100 kilometers height without entering in orbit.



Virgin Galactic has got more than 100 reservations

Mission duration: 90 minutes



**Anousheh Ansari-
Space Adventures,
2006**

Astronautics

It includes the life sciences (biology, physiology, medicine) , technology, psychology and sociology related to space exploration.

(NASA/ SP-2004-6113 *Bioastronautics Roadmap,2005*)

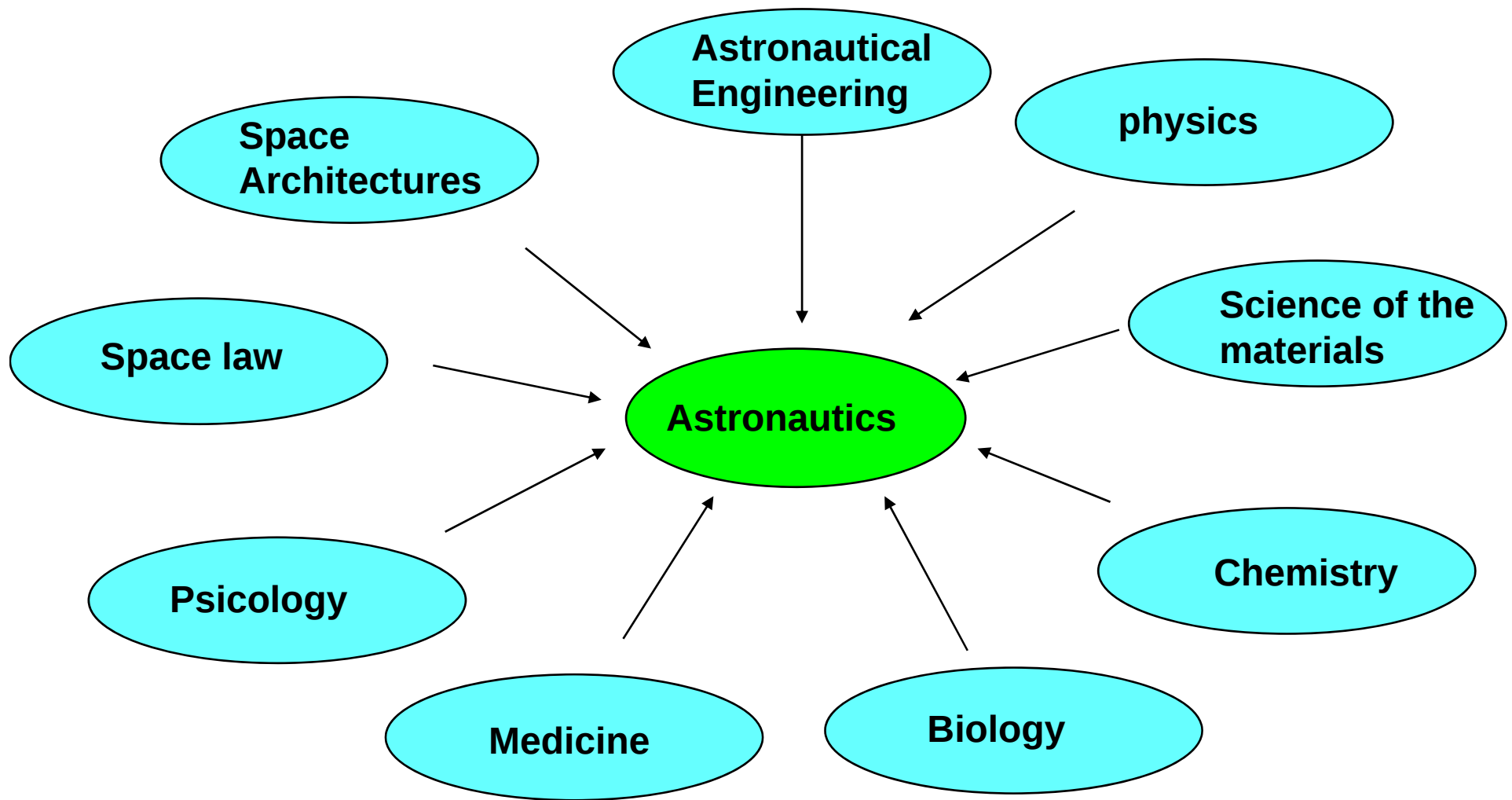


System Environment – vehicle – Human being

- Characteristics and functions
- Requirements
 - Reliability
 - Safety
 - Human factor

Many interactions exist in Astronautics among Physics, Space Flight Mechanics, Medicine, Mission analysis, Structure Designing. In a few time, a new professional figure will be required, capable to examine how the “space environment” and its physiological-medical effects influence the system, dynamic and structural design of the space vehicle.

Paolo Santini



EDUCATION

at the

Scuola di Ingegneria Aerospaziale

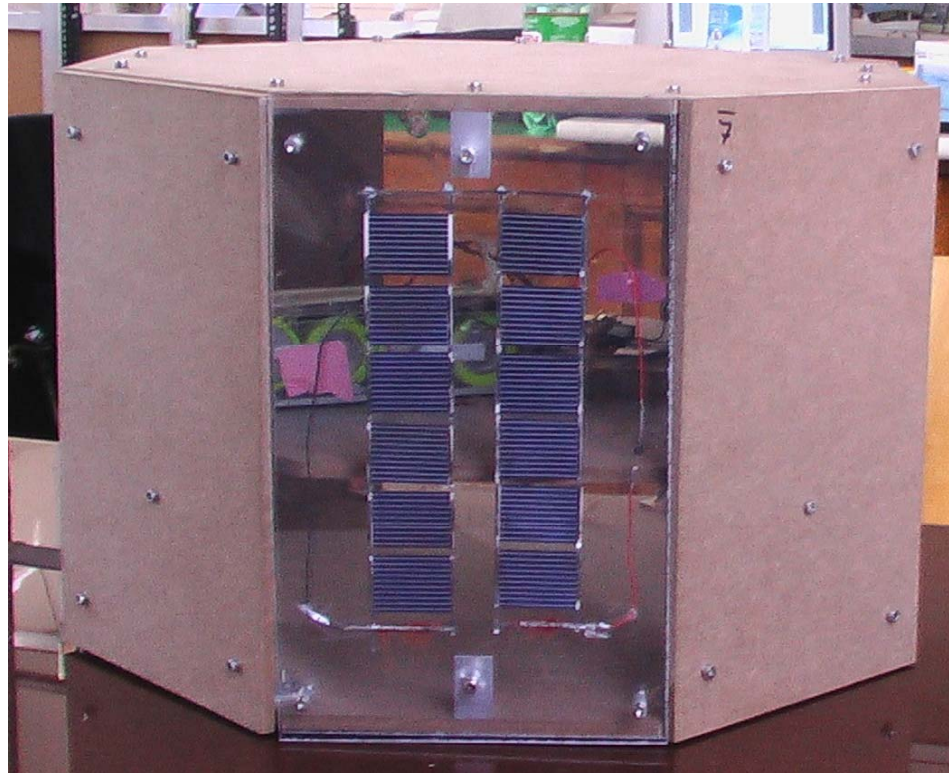
Laurea courses in Astronautical Engineering

PhD in Aerospace Engineering

Master Courses

Astronautics in classroom (Liceo Seneca) for the Astronautical culture dissemination

ASTRONAUTICA IN CLASSE (Liceo L. A. Seneca)



OPORTET ALERE FLAMMAM



A PROPOSAL

. ***...since...***

- The European space agency (ESA) pushes the Scuola di Ingegneria Aerospaziale dell'Università di Roma to establish an Astronautical Center in Rome for the education of technicians, pilots, scientists and private space-flights participants (“space tourists”).
- Two centers for professional astronauts training exist in Germany (Colonia) and Russia (Star City) but it does not exist a center for the training of not-professional astronauts or cosmonauts involved in human activities in space.
- ***.....we propose.....***

The institution of the

JOINT ASTRONAUTICAL CENTER SAN MARCO (JACSM)

Participants:

ITALIAN AIR FORCE (A.M.)

ITALIAN SPACE AGENCY (ASI)

UNIVERSITY OF ROME “LA SAPIENZA”

SCUOLA DI INGEGNERIA AEROSPAZIALE

DIPARTIMENTO DI INGEGNERIA AEROSPAZIALE E ASTRONAUTICA (sezione ASTRONAUTICA)

CENTRO RICERCHE PROGETTO SAN MARCO