MAIN RESEARCH ACTIVITIES

- **Satellite systems design**
  - Mission analysis
  - On-board systems/sub-system
  - Ground station operations
  - Data handling and processing

- **Space surveillance systems**
  - Optical observation systems
  - Data analysis
  - Orbit determination
  - Active debris removal systems
• It is a **functional spacecraft**, rather than a payload instrument or component. To fit the definition, the device must operate in space with its own independent means of communications and command.

• **Untrained personnel** (i.e. students) performed a significant fraction of key design decisions, integration & testing, and flight operations.

• **The training of these people was as important as** (if not more important) the nominal “mission” of the spacecraft itself.
CUBESAT DEVELOPMENT

- Design
- Building
- Testing
- Operations
1U Cubesat structure vibration test results
ON-GOING SPACE PROJECTS

- Research programs

- Education programs & International contests/competitions
QB50 PROJECT

QB50 has the scientific objective to study in situ the temporal and spatial variations of a number of key constituents and parameters in the lower thermosphere (90-320 km) with a network of 50 double CubeSats.

URSA MAIOR PAYLOADS

1. A de-orbiting system experiment

2. MEMS MicroThruster Experiment (MEMIT)
EQUO
Equatorial Observatory for Space Debris

Continuous tracking of LEO objects from Italy and Kenya

ALMASCOPE: 2010 Equatorial test campaign
- Telescope - 25 cm f/4 in newtonian configuration
- CCD Kafl600E sensor, 1024x1536 pixels, each pixel is 9x9 micron (total chipsize 9.2x13.8 mm)
- Mount German equatorial
- The field of view is of about 1 degree

LEO High Inclination tracking from Italy and Kenya ( Terminator Shape )
IRIDIUM
Investigating Radiation Impact and Damages In UV-sensitive Materials

SCIENTIFIC GOAL: analyse material degradation after UV exposure and Investigate damages by synergic effects in the stratosphere environment

TECHNICAL GOAL: develop and test a rotating tubular beam, fastening the samples holder, able to maintain the optimal exposition to sunlight during the BEXUS flight
HORUS CAST
The celestial constellation

HORUS cast combine a nadir-pointing camera to off-set nadir optical sensors in order to provide a multiple angle capability for sampling. This architecture scheme is similar to the MISR sensor (Multi-angle Imaging SpectroRadiometer), successfully tested on NASA EOS Terra satellite (total mass 5,190 kg).
CanSat Competition is an annual student design-build-launch competition for space-related topics, organized by The American Astronautical Society (AAS) and American Institute of Aeronautics and Astronautics (AIAA).

Students by S5Lab participate to this competition with the Sapienza Space Team, supported by SASA Sapienza Aerospace Student Association. The 2015 mission simulates a Science Vehicle traveling through a planetary atmosphere sampling the atmospheric composition during descent.
LABORATORY FACILITIES

Electronics development facility

Laboratory milling machine

Laboratory low-vacuum chamber

Workshop
S5Lab Team

- MSc and BSc students:
  - Federica Angeletti
  - Quirino Bellini
  - Salvatore Buonomo
  - Saverio Cambioni
  - Andrea Chiovini
  - Federico Curianò
  - Michele Gaeta
  - Alessandro Gallo
  - Armando Grossi
  - Paolo Marzioli
  - Paolo Panicucci
  - Alice Pellegrino
  - Tullio Petruziello
  - Vito Lamarca
  - Veronica Vilona
  - Federica Zaccardi
  - Giulia Zaccari

- PhD students:
  - Lorenzo Arena
  - Tommaso Cardona
  - Francesco Diprima
  - Gioacchino Scirè
THANKS FOR LISTENING!