ASI activities for implementing LTS guidelines

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Italian Space Agency (ASI)

National space programs started in early 1950

First IT satellite, San Marco 1, was launched in space in 1964

ASI was established in 1988 to coordinate and support the national space activities. Three sites: Rome HQ, Matera Space Geodesy Center and "Luigi Broglio" Space Center in Malindi (Kenya)

ASI supports national industry and scientific research on space technologies, such as launchers and human spaceflight, Earth observation, Solar System exploration and observation of the Universe

ASI implements the National Space Policy coordinated by an *ad-hoc* Inter-ministerial Committee under the Prime Minister's Office (2018)

Long-standing international collaborations in space sector

- IT is a founding member COPUOS (1959)
- IT is a founding member of ESA (1975)
- ASI is the National entity designed to coordinate the Italian collaborations with European and international partners in the space field
- National coordination of EU space programs
- Supporting bi-lateral and multi-lateral agreements with other space agencies

Policy and regulatory framework for space activities

(A.2,A.4, A.5)

- Applied standards:
  - Consultative Committee for Space Data Systems (CCSDS)
  - European Cooperation for Space Standardization (ECSS)
  - International Organization for Standardization (ISO)

- Since 2014 ASI keeps the National Register of all launched space object and notifies each new object to UN. The Register itself and the overall registration activities are under reorganization

- The efficient use of radio frequencies is regulated by the Minister of Economic Development , following the guidelines of the International Telecommunication Union (ITU)

Safety of space operations and international cooperation

(B.1, B.2, B.3, B.6, B.7,B.9, C.1, C.2, C.4)

- ASI supports sharing information on space debris in international contexts
- **European Space Surveillance and Tracking (EU SST)** Consortium, with the National Institute for Astrophysics and MoD
- **Inter-Agency Space Debris Coordination Committee (IADC)**
- **ESA Space Safety Programme (S2P)** for space debris, Near-Earth Objects and Space Weather

Case Study

"Promote the collection, sharing and dissemination of space debris monitoring information"

(B.3)

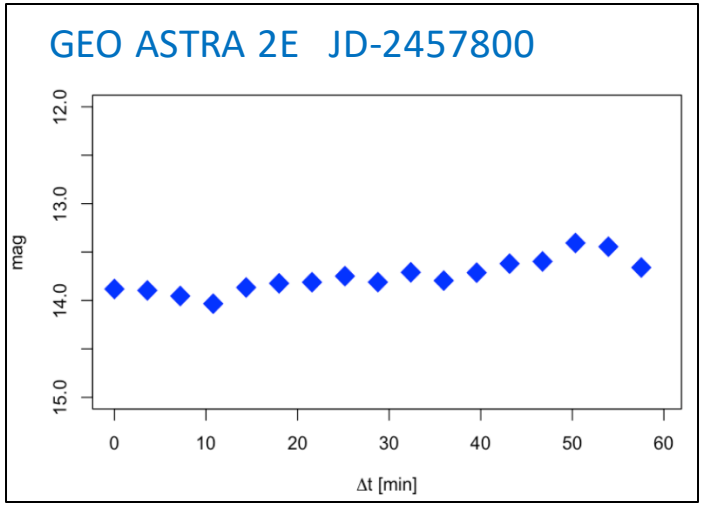
ASI promotes data collection of space debris through an Agreement with the National Institute for Astrophysics (INAF)

Other National Research Institutes and Universities are also involved

Data collection	• Optical sensors • Radar sensors
Analysis of information	• Observational data • Laboratory measurements comparison • Simulated data comparison
Dissemination	• European and international level

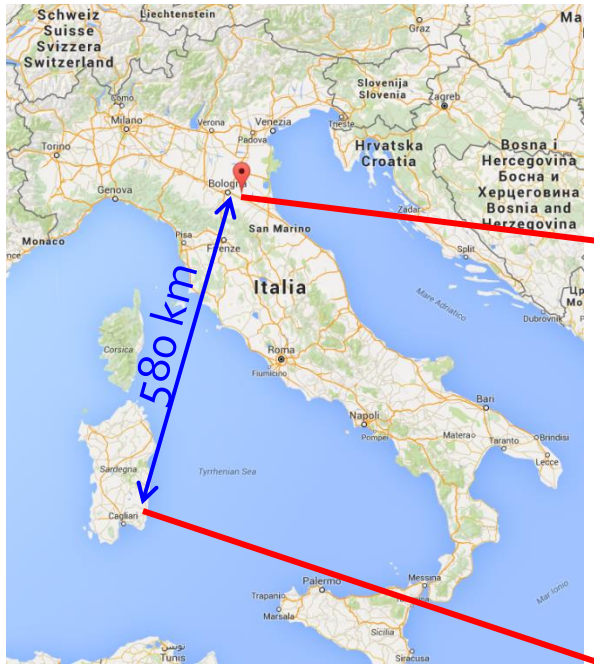
Optical sensors

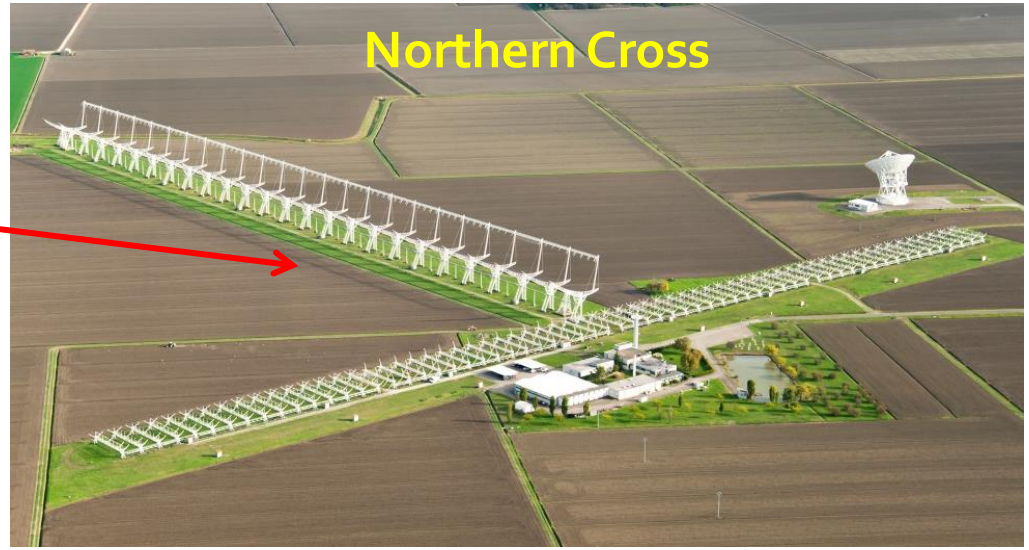
- SPADE (SPAce DEbris) optical telescope is located at the Matera Space Geodesy Center of ASI
  - Large Field-of-View of 84 arcmin and a resolution of 1.22 arcsec/pixel
  - Devoted to collect data to provide orbital solution of LEO objects
- Other multi-band telescopes are also used to provide information on GEO objects' composition and surface materials



Radar sensors

- The INAF "Northern Cross" radio-telescope is located in the Northern Italy
- It allows to observe both in tracking and survey modes the LEO region up to 10 cm at 1000 km
- Bi-static configuration with MoD emitter in Sardinia Island





Data analysis and comparison

- Investigations comprise both optical and radar simulations, as well as:
  - Break-up model simulations
  - Re-entry data analysis and theoretical models
  - Laboratory spectroscopic measurements
  - Orbital simulation and evolution of space debris population

Dissemination

(B.3, C.1, C.2, C.4)

- Space debris information are shared by ASI in the context of international projects

- Capacity building:
  - national scientists are involved in international Committees (e.g. COSPAR Committee on Space Debris, IAF Committee on STM, etc.)
  - international cooperation are carried out thanks to the involvement of national scientists (e.g.. H2020 EU projects)

- ASI supports academic seminars as well as educational and outreach activities on space debris

END