Highlights on the Italian contribution to Space Science

Enrico Flamini
ASI Chief Scientist
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ASI has been created in 1988 merging two experiences: CNRSAS and S. Marco program. Both organization basically devoted to research in space.

This heritage has been maintained although the programs devoted to the applications in space have gradually increased, playing today an important role.

The science programs in ASI follows 3 major branches:

- High Energy Astrophysics and Astroparticles
- Cosmology and Fundamental Physics
- Exploration of the Solar System

Currently ASI has programs either within the mainframe of ESA, either in bilateral cooperation (NASA/RSA/JAXA) or at national level.
Of the more than 35 programs realised by ASI or with an important Italian contribution in this presentation with the intention to show the continuity of the science results over the last 20 years:

1992 Lageos II
1997 Cassini
2005 Mars Reconnaissance Orbiter
2009 Plank

All the above are large missions, however sometimes also a small mission may provide fantastic results as is the case of the ASI mission AGILE.
Recently, using 13 years of data from LAGEOS II, two Italian scientists have published:

“A Accurate Measurement in the field of the general-Relativistic precession of the LAGEOS II Pericenter and new Constraints on Non Newtonian Gravity.”

David M. Lucchesi and Roberto Peron

A new satellite of the same class, called LARES, is now under construction as payload on the first Vega launch. It is conceived mainly to determine the Lens-Thirring effect but it will complement the LAGEOS constellation.
Cassini-Huygens is a joint NASA-ESA-ASI mission devoted to the extended exploration of Saturn and Titan.
B. Bertotti, L. Iess, P. Tortora:

“A test of general relativity using radio links with the Cassini radio spacecraft”


Relativistic frequency shift

\[ y_{gr} = 1 \times 10^{-5} (1 + \gamma) \frac{1}{b} \frac{db}{dt} \]

\[ \approx 8 \times 10^{-10} \text{ for a grazing beam} \]
Encounters T25 and T28

Seas and Islands
North Polar Region Mosaic
Geisers on Enceladus
SHARAD extends the knowledge of planetary surfaces to a third dimension: the depth!

A.Frigeri et al., 2010
Deformation?

No, just clutter!
2009 Launch of Herschel & Planck
The Planck one-year all-sky survey

(c) ESA, HFI and LFI consortia, July 2010
Leonardo Da Vinci 1452-1519

“The Sun does not move... the Earth is not in the center of its motion and it is not the center of the Universe”
Thanks