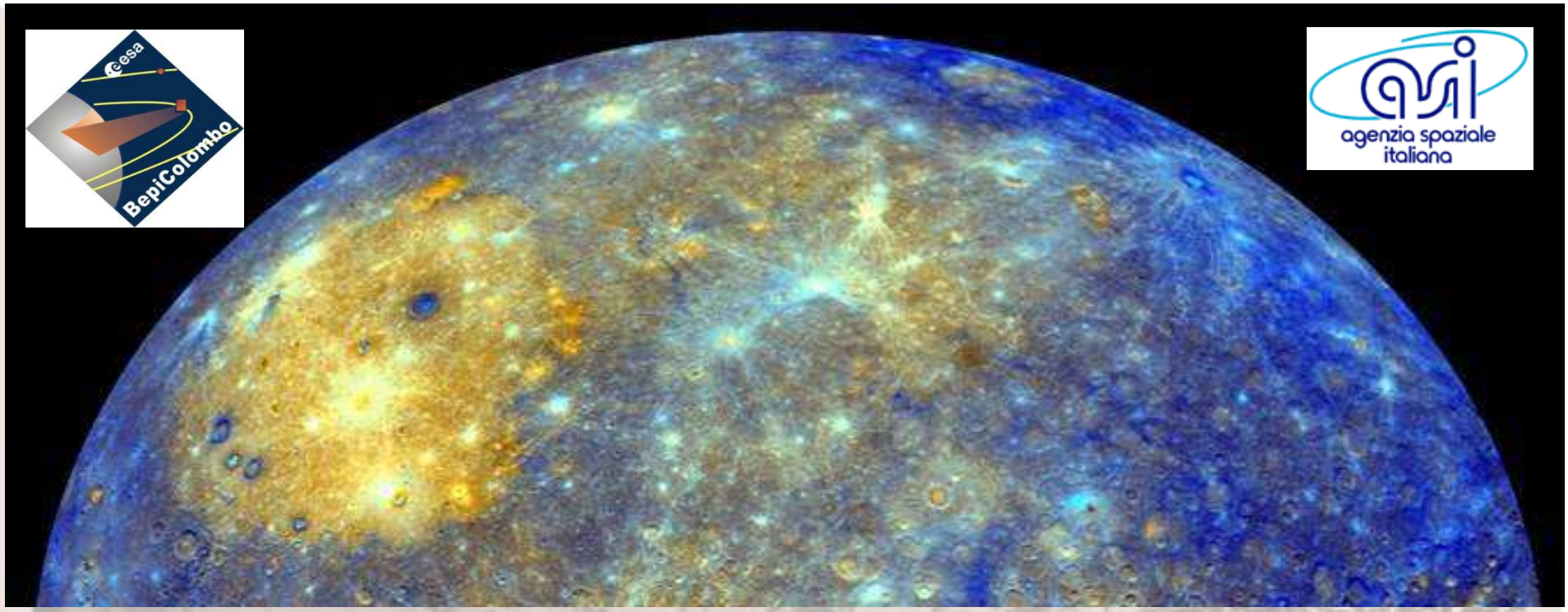


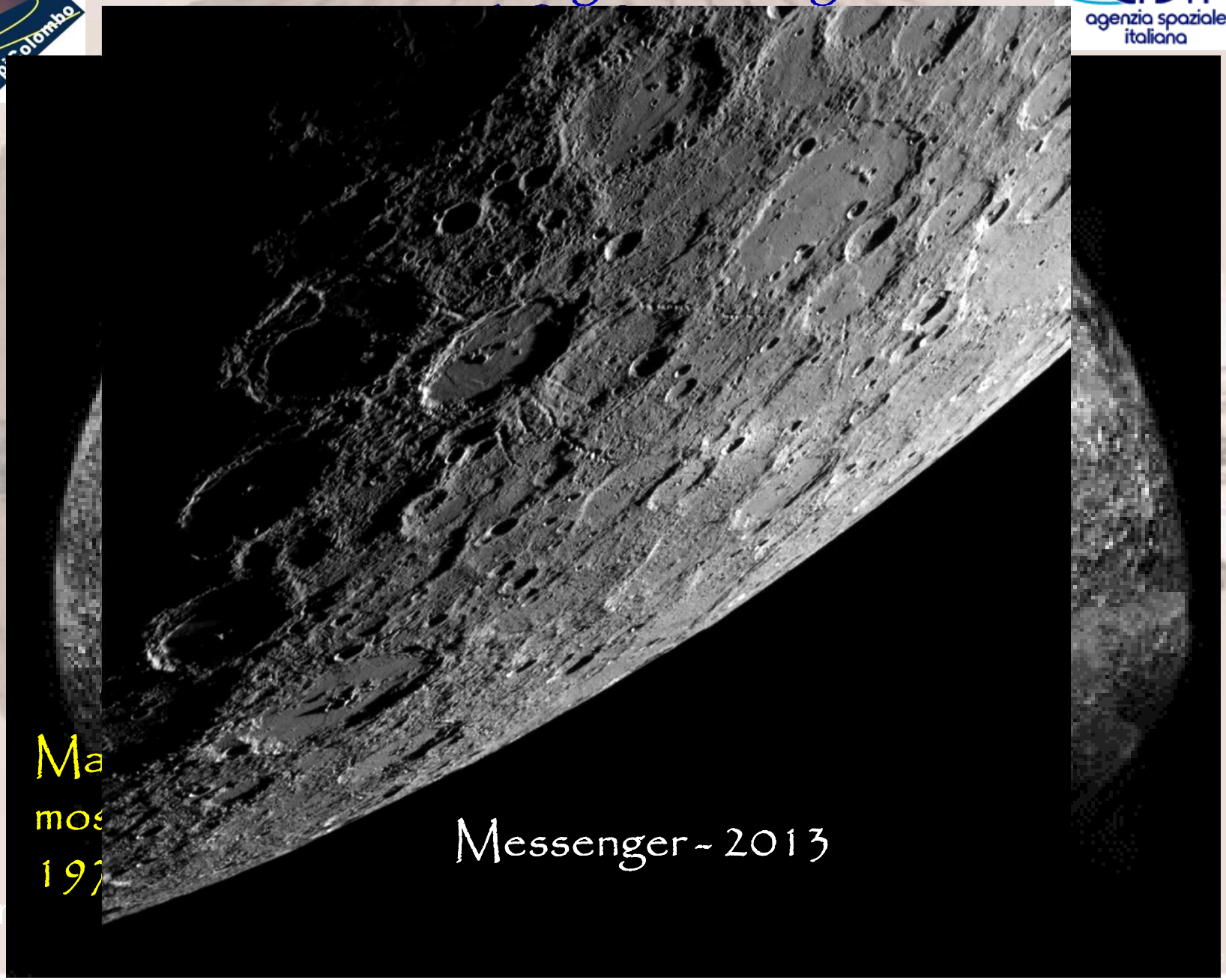
The Italian Scientific contribution to the BepiColombo Mission

COPUOS
Vienna – 11-6-2015

Enrico Flamini
Chief Scientist
Agenzia Spaziale Italiana

The Schiaparelli's Mercury

Mercury Today



Messenger - 2013

Ma
mos
19

Giuseppe (Bepi) Colombo

Letters to Nature

Nature **208**, 575 (6 November 1965) | doi:10.1038/208575a0

Rotational Period of the Planet Mercury

G. COLOMBO

1. University of Padova, Italy, and Smithsonian Astrophysical Observatory, Cambridge, Massachusetts.

letters to nature

Nature **206**, 1240 (19 June 1965); doi:10.1038/2061240a0

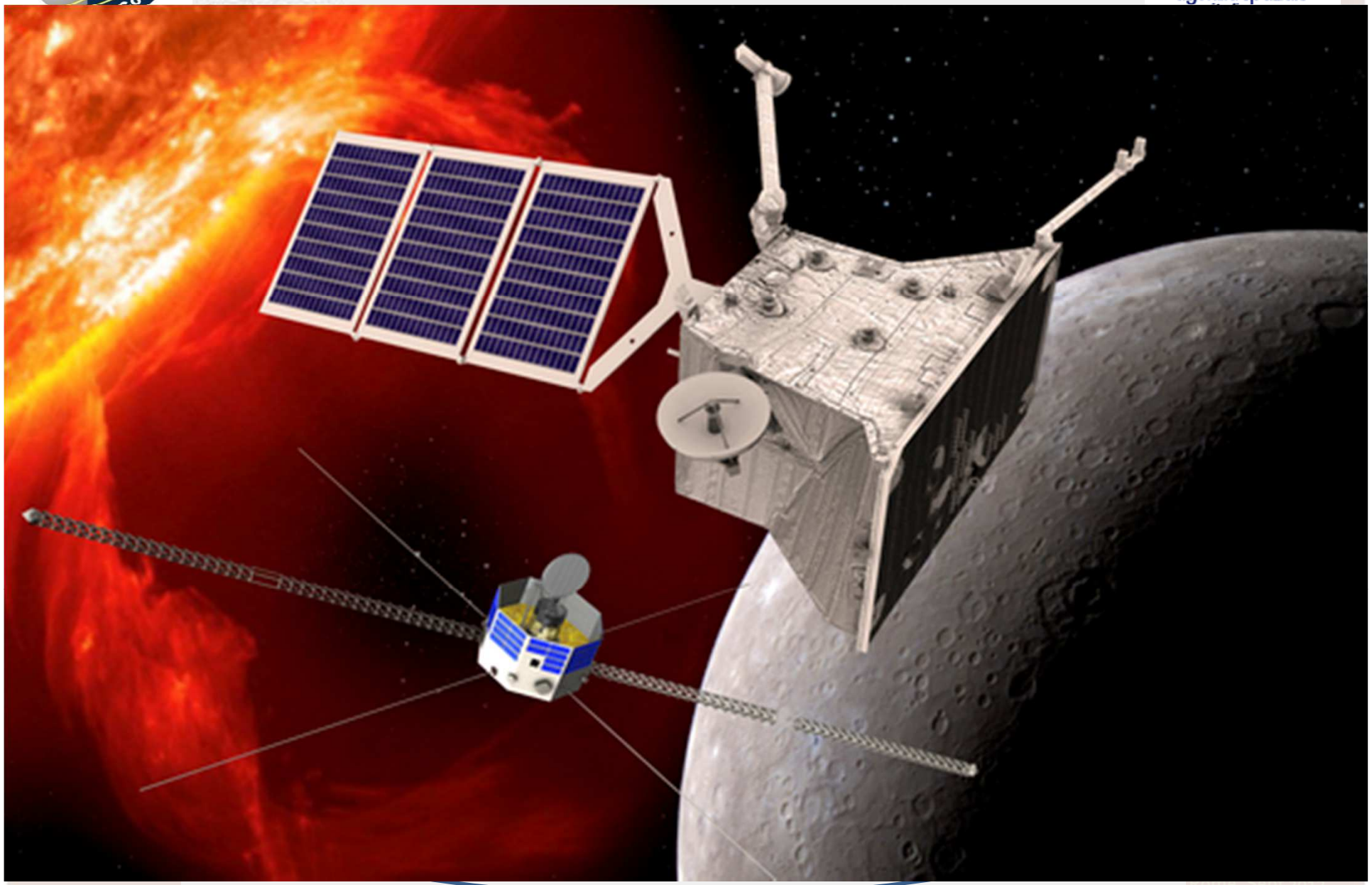
A Radar Determination of the Rotation of the Planet Mercury

G. H. PETTENGILL & R. B. DYCE

Cornell-Sydney University Astronomy Center, Arecibo Ionospheric Observatory, Arecibo, Puerto Rico.

- **Bepi Colombo demonstrated the dynamical stability of the planetary orbit in a resonance 3:2.**
- **He was also the man, after G. A. Crocco, behind the idea of multiple fly-byes, taking advantage of the 2:1 resonance between the orbital period of the probe and Mercury.**

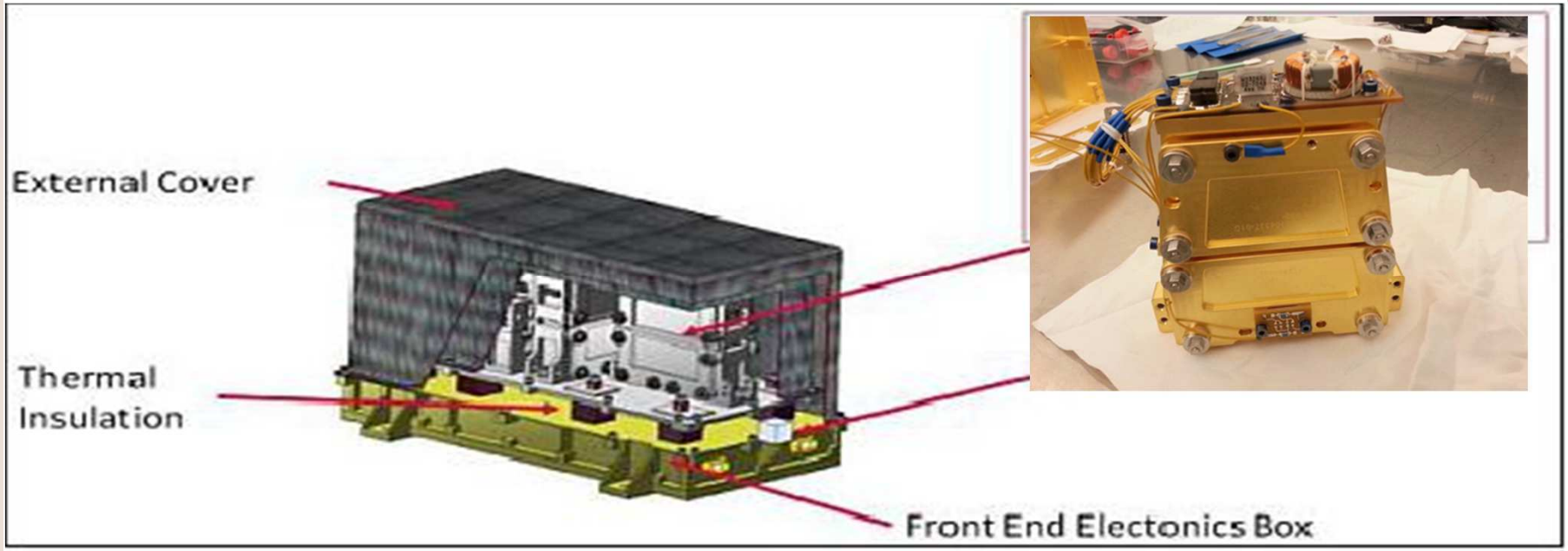
BepiColombo Payload



ISA
Italian Spring Accelerometer

Scope : Measure of non-gravitational accelerations of the spacecraft
For fundamental Physics Study

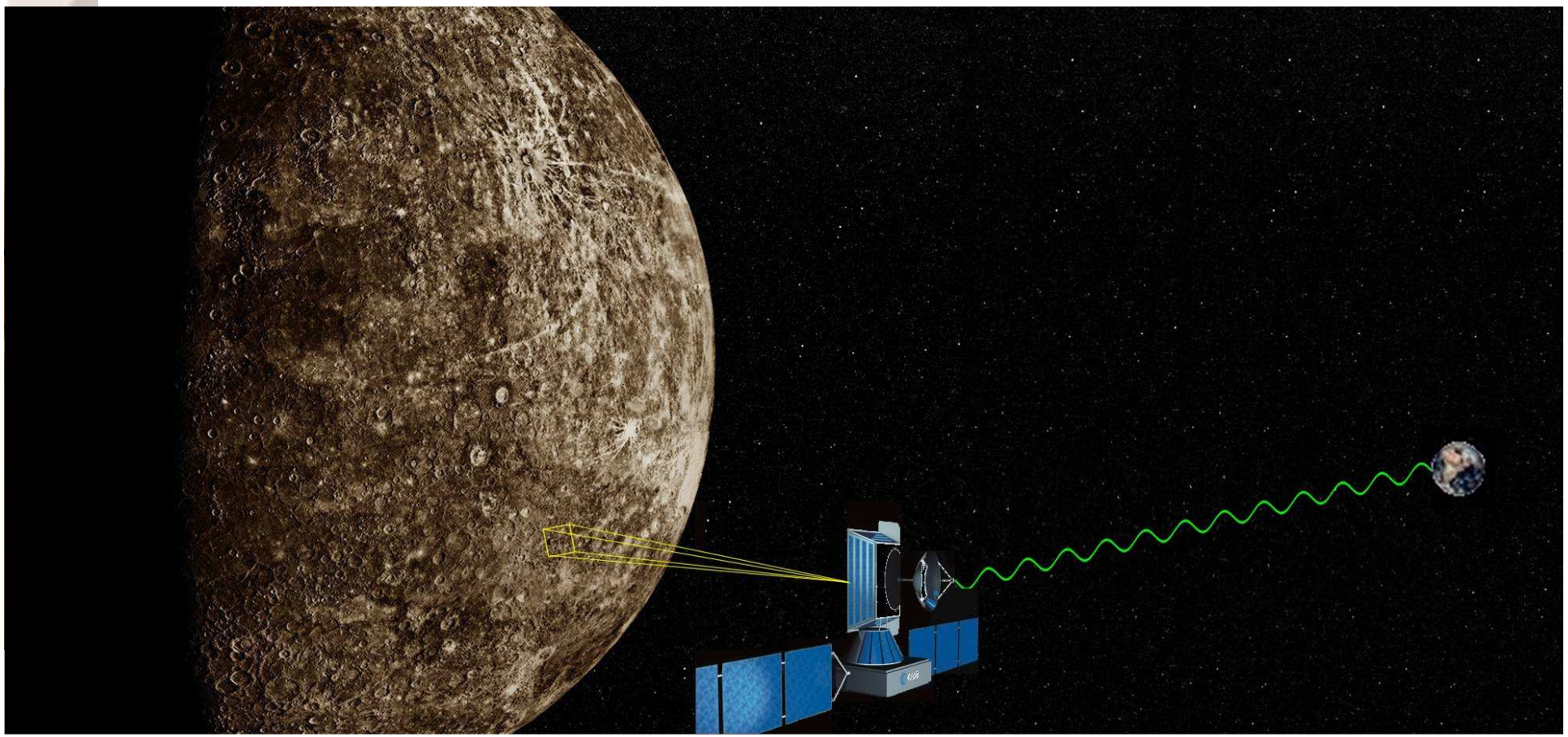
– Tri-axial ultra sensitive accelerometers package with very high thermal stabilityity – high performance thermal control – mK operating range;



MORE

Mercury Orbiter Radio Science Experiment

Core and mantle structure, Mercury orbit, fundamental science, gravity field.



SERENA

Search for Exospheric Refilling and Emitted Natural Abundances

SERENA: Study of composition, distribution, source and sink processes of the neutral and charged particle environment.

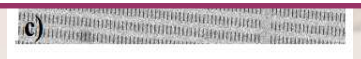
Serena is composed by 4 Units

***ELENA** investigates the Hermean escaping neutral gas (strongly linked to its surface), and the processes responsible of such a population;*

***STROFIO** investigates the exospheric gas composition.*

***PICAM** investigates the extension, composition, and velocity distribution of the exo-ionosphere, and the photo-ionization rate of neutrals.*

***MIPA** investigates the plasma precipitation toward the surface and ions energized and transported throughout the environment of Mercury;*

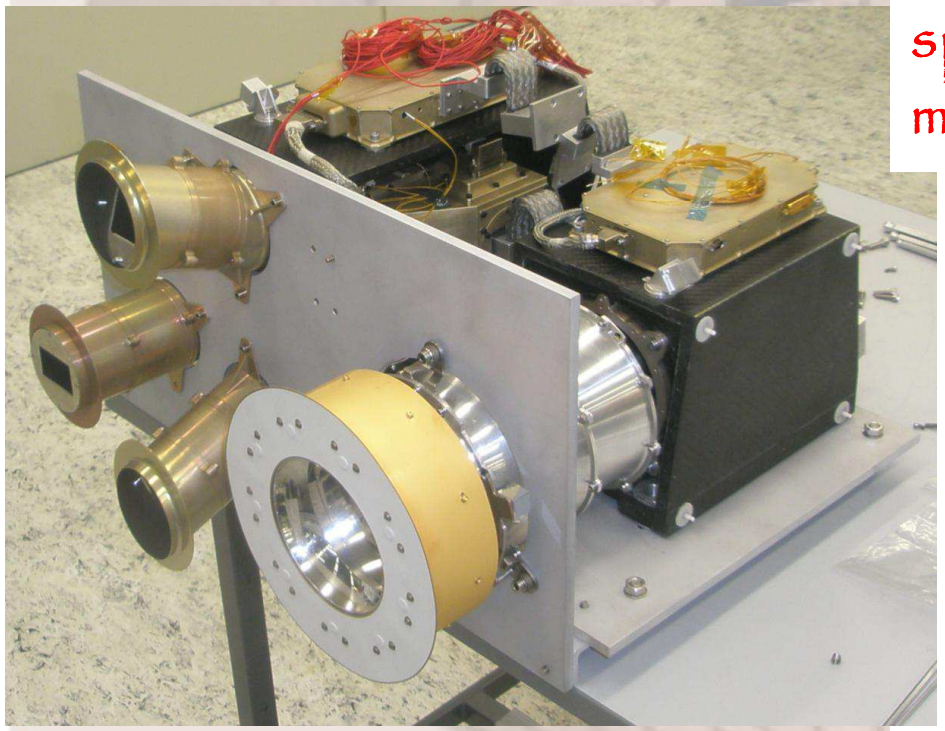


SIMBIO-SYS

Spectrometers and Imagers for MPO

BepiColombo Integrated Observatory ~

In cooperation with CNES

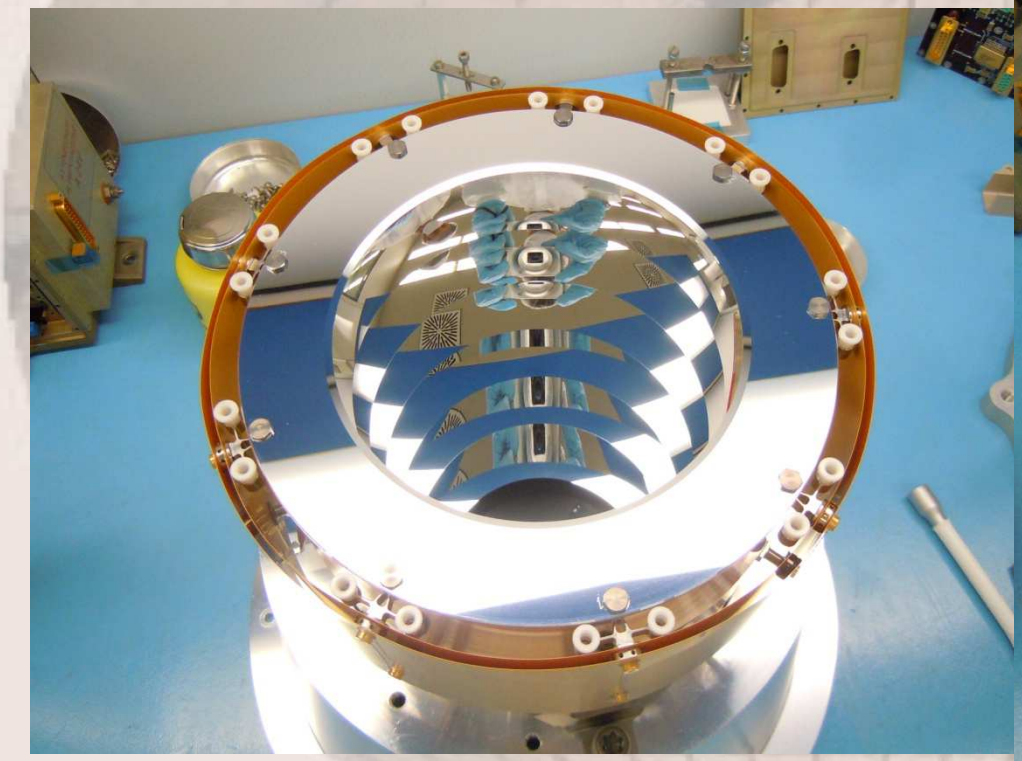


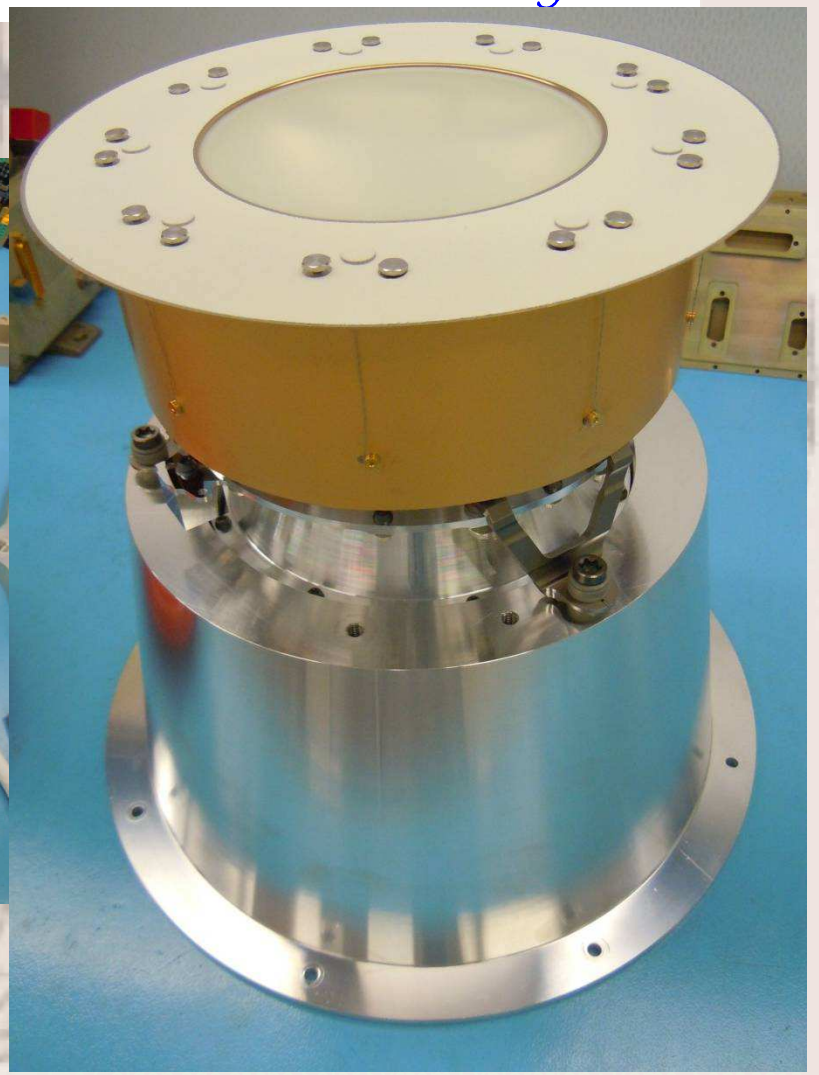
Optical high resolution and stereo imaging, Near-IR (<2.0μm) imaging spectroscopy for global mineralogical mapping.

- Complex architecture, incorporating three different channels.
- High Spatial resolution >5m, real Stereo imaging, IR spectroscopy
- High performances (spatial resolution, sensitivity, bandwidth, spectral bands) within mass and volume reduced;
- State of the art detectors

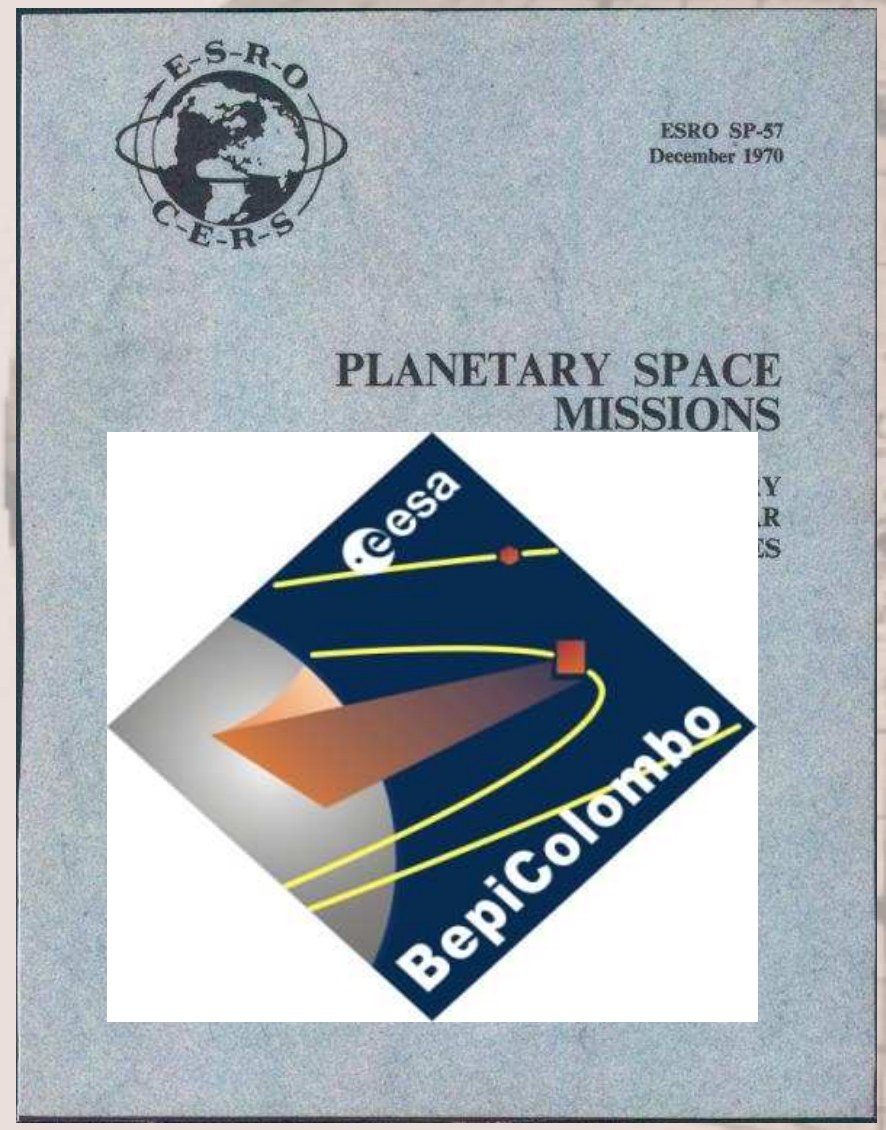
SIMBIO-SYS

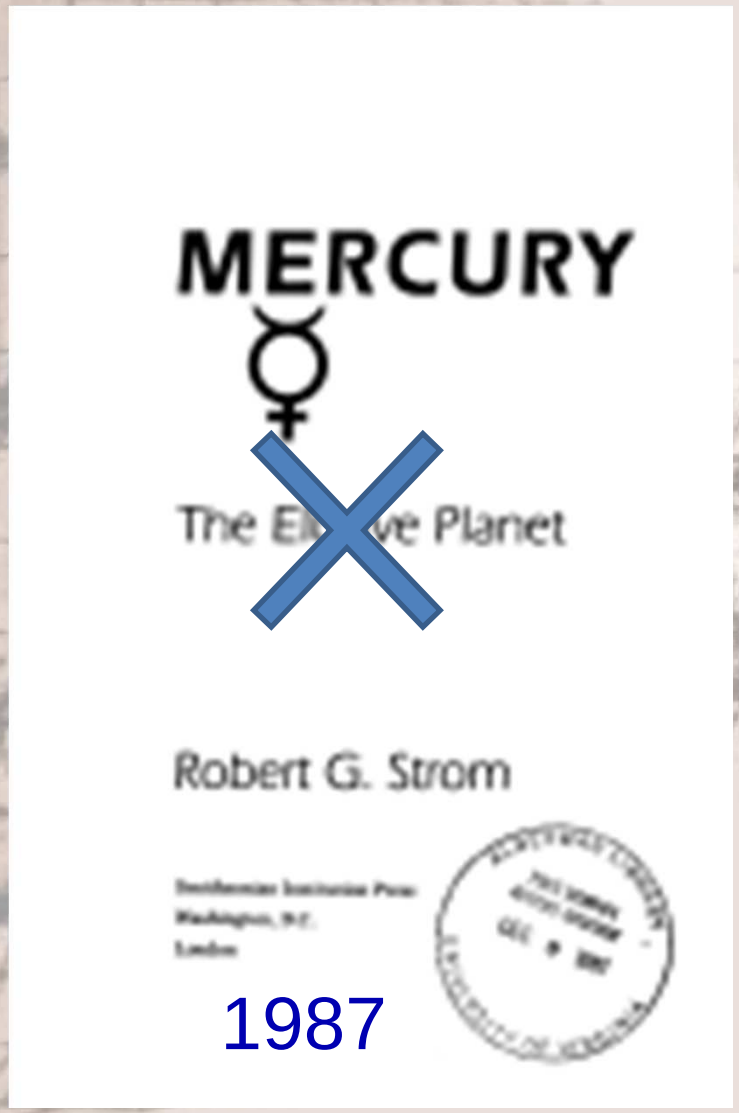
Stavroudis Baffle : a key element to allow the optical performances in the hot thermo-optical environmet of Mercury.





Mercury: the elusive planet?






Thanks