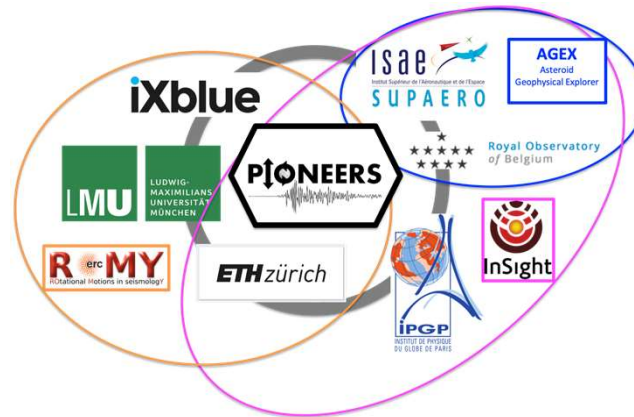


What do terrestrial planets and asteroids look like inside?

PIONEERS consortium

ISAE SUPAERO	France (project lead)
iXblue	France
ETH	Switzerland
LMU	Germany
IPGP	France
ROB	Belgium

Partners from 4 European countries gather their expertise from a variety of disciplines in research and industry, having participated in space missions at the frontier of planetary science.



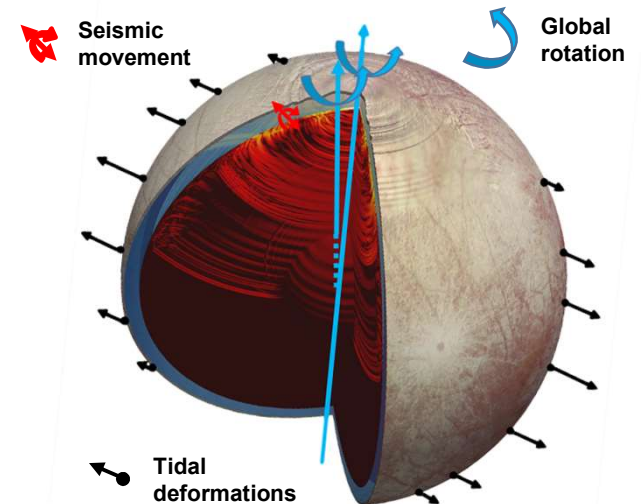
www.H2020-pioneers.eu

This project has received funding from the European Union's H2020 Research and Innovation programme under the grand agreement N° 821881



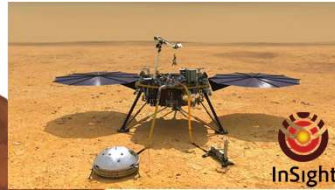
Planetary Instruments based on Optical technologies for an innovative European Exploration using Rotational Seismology

Probing the interior of Solar System bodies



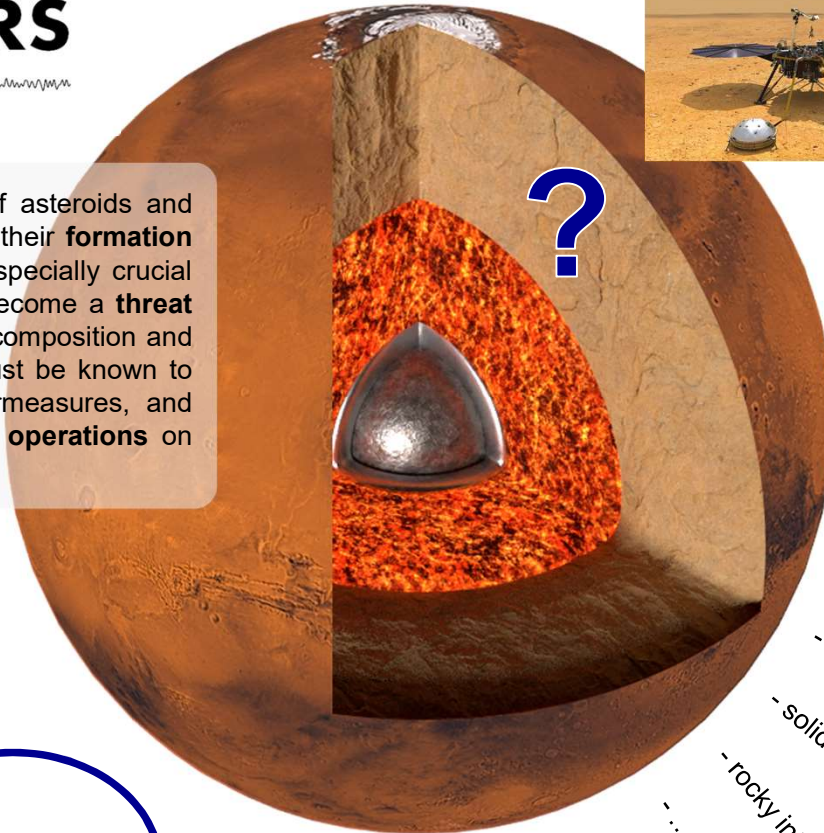
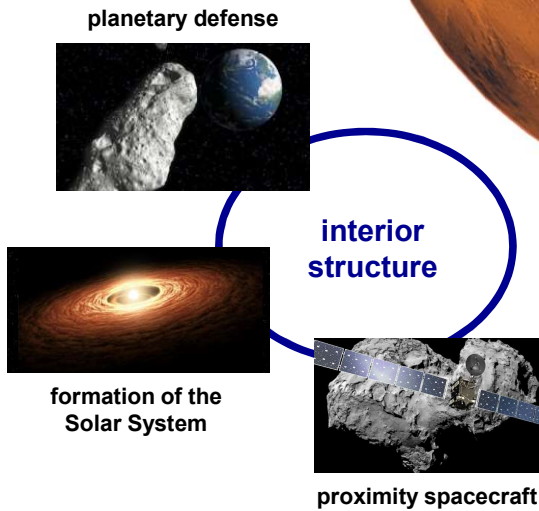
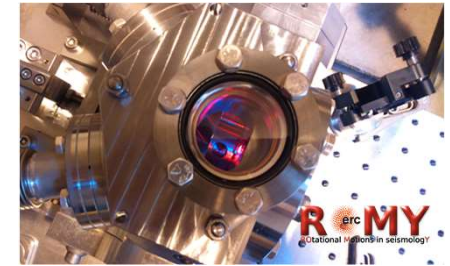
PIONEERS

The **interior structure** of asteroids and planets gives insight into their **formation and evolution**. This is especially crucial for asteroids that could become a **threat to life on Earth**. Interior composition and mechanical properties must be known to develop effective countermeasures, and safely perform **proximity operations** on asteroids with spacecraft.



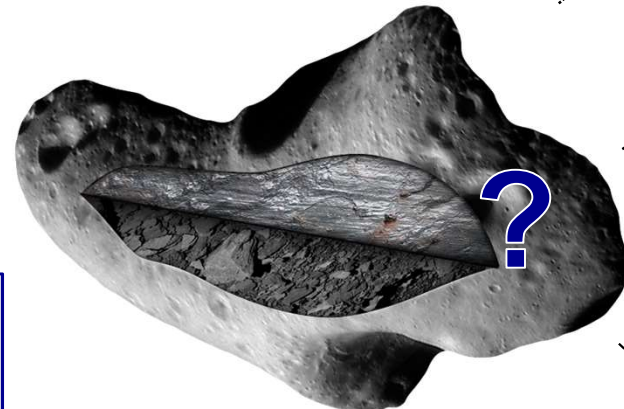
The **PIONEERS** next generation planetary ground motion instrumentation uses **optical fiber sensors** to deliver performance 100x better than existing space seismometers.

Advancing technology from the **InSight** mission on Mars and from the **ROMY** project on Earth

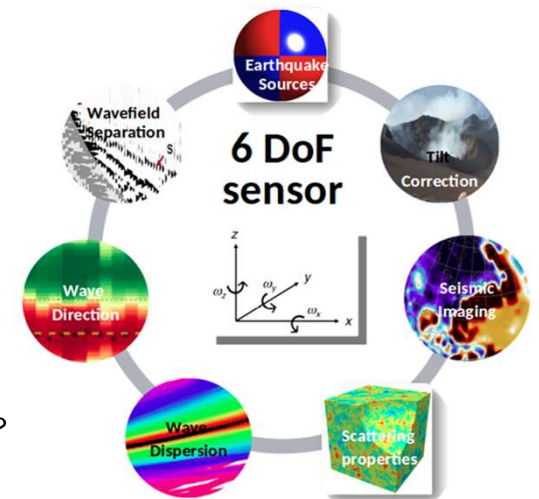


- liquid core?
- subsurface ocean?
- solid core?
- rocky interior?
- ...?

The new instrumentation measures all **six degrees of freedom (6-DOF)**: x, y, z translations and ω_x , ω_y , ω_z rotations. This returns information **equivalent to small seismic arrays**.



- macro porosity?
- rubble pile?
- micro porosity?
- ...?



The **PIONEERS** innovative 6-DOF sensors are first of their kind and will demonstrate technology in space that does not exist yet for Earth.

Learn more on www.H2020-pioneers.eu