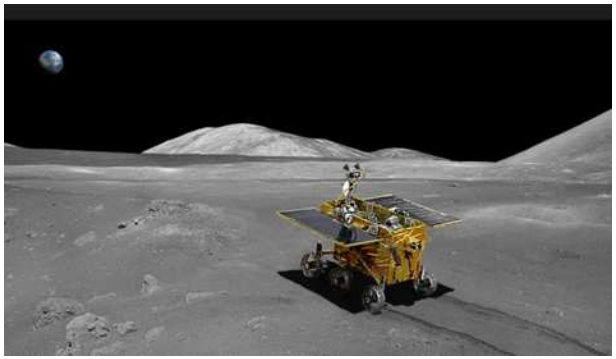
# THE NEWTON PROJECT

**NEWTON** aims at developing a new portable and compact multi-sensor instrument for ground breaking high resolution magnetic characterisation of planetary surfaces and sub-surfaces through the combination of complex susceptibility and vector measurements. The project goes beyond the state-of-the-art technology by introducing magnetic susceptometry as a complement to existing compact vector magnetometers for planetary exploration. With this, **NEWTON** gives the first opportunity to perform high resolution and complete non-invasive in-situ magnetic characterization of planetary surfaces and subsurfaces. This non-invasive characterization provides unique scientific information on some of the main objectives related to the Solar System exploration roadmap such as the intense magnetic crustal anomalies of Mars and the strongly discussed formation of its moons.





# NEWTON CONSORTIUM

NEWTON consortium is comprised by six partners: TTI, leading the project, National Institute for Aerospace Technology Esteban Terradas (INTA) and Polytechnic University of Madrid (UPM) from Spain, University of Trier (UT) and Institut für Industriellen und Geotechnischen Umweltschutz (IGU) from Germany and the Laboratoire de Planétologie et Géodynamique (LPG) from France.

**CONTACT**

**NEWTON Coordinator – TTI**
Laura González
C/Albert Einstein nº14. PCTCAN. Santander. 39011. Spain.
Tel: + 34 942 29 12 12
E-mail: lgonzalez@ttinorte.es

**NEWTON Technical Coordinator – INTA**
Marina Diaz
Ctra Torrejón Ajalvir km 4, 28850 Torrejón de Ardoz. Madrid.
Tel: + 34 91 520 11 83
E-mail: diazma@inta.es

# NEWTON

## NEW portable multi-sensor scienTific instrument for non-invasive ON-site characterisation of rock from planetary surface and sub-surfaces

*A new via in the understanding of Solar System*

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**www.h2020-newton.eu**

# NEW portable multi-sensor scienTific instrument for non-invasive ON-site characterisation of rock from planetary surface and sub-surfaces

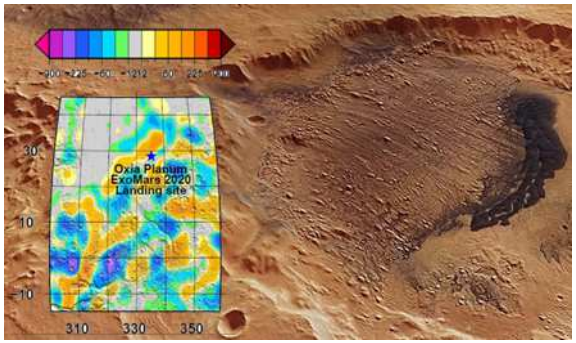
## MOTIVATION

Apart from the Earth, the Moon, Mars, Ganymede and possibly Mercury have an intrinsic magnetic field. On the Moon and Mars, this magnetic field is purely the remanent signature of a past global magnetic field whose characteristics remain partly inaccessible. This is because to date systematic magnetic surveys on Mars, Mercury and the Moon have been only performed by satellites in orbit. Surface measurements were only performed on the Moon during the Apollo era and revealed dramatically varying magnetic fields over kilometre scales.

Worldwide experts in planetary magnetism strongly recommend magnetic prospections on ground with rovers to obtain detailed magnetic signatures and rocks susceptibilities prior to sample-return missions. However, they have not been performed so far for the incompatibility of magnetic instrumentation with the magnetic noise of the landed platforms.

## THE SOLUTION

**NEWTON** project is developing a scientific magnetic multi-sensor instrument for use in space, science and planetary exploration which provides a first opportunity to perform high resolution and complete non-invasive in-situ magnetic characterization of planetary surfaces and subsurfaces.




The **NEWTON** instrument will deliver unique information on the magnetic structure stored during the formation of the measured rocks and thus information on the primigenial global magnetising field. Additionally, **NEWTON** multi-sensor instrument will give information related to the past geological history of the celestial bodies as well as tectonically-induced changes in their orientation and thus on the planet history.

## NEWTON TECHNOLOGY

**NEWTON** project introduces magnetic susceptometry, real and imaginary parts, as a complement to existing compact vector magnetometers for planetary exploration. The novel instrument includes magnetometer, portable susceptometer, innovative power supply system immune to the radiation and sophisticated frequency generation system. The goal of **NEWTON** project is to achieve a TRL6, to make the multi-sensor instrument suitable for boarding on a planetary exploration rover in the short term.

### Expected Impact …

**NEWTON** technological advance will be applied to solve some of the open questions on the crustal evolutions within the Solar System: the disputed origin of high energy cratering, the magnetic signatures of ore formation processes, the highly intense anomalies of Mars and the origin of Phobos and Deimos. The new product provides such an approach to magnetometry, which is also expected to be applied to geophysical engineering like oil and energy industries for a better in-situ interpretation with the consequent time and cost savings.