



Leonardo technology to help tease out Martian secrets

Leonardo plays a leading role in the ExoMars programme, a collaboration between the European Space Agency (ESA) and Russia's Roscosmos, with the fundamental contribution of the Italian Space Agency (ASI) - that also developed with the National Institute for Nuclear Physics (INFN) the INRRI instrument (INstrument for landing-Roving laser Retroreflector Investigations - with a number of scientific objectives including the search for alien life, past or present. Other goals include understanding the geochemical composition of the planet, learning more about the planet's environment and geology and identifying potential risk factors for future manned missions.

The programme is divided into **two missions**. In **2016**, the first mission will see the Trace Gas Orbiter (TGO) module enter into orbit around Mars to investigate the presence of methane and other gases present in the atmosphere as possible signs of alien life. Just prior to reaching orbit, the spacecraft will release an Entry and Descent demonstrator Module (EDM) – named Schiaparelli –, containing a weather station and other instruments. A second mission, following in **2020**, aims to land a vehicle on Mars which will be able to explore the planet's surface performing research including soil analysis. The 2020 mission will consist of a carrier module and a descent module, the latter of which will include a landing platform housing the Mars Rover.

Leonardo has a primary role in ExoMars

Thales Alenia Space Italy has been awarded the leadership role on both missions by the ESA and will take overall responsibility for all mission equipment. For ExoMars 2016, Thales Alenia Space has built the EDM module in its Turin facility and the TGO orbiter at its site in Cannes. For the 2020 mission, Thales Alenia Space Italy is in charge of developing the navigation and guidance system for the carrier module and descent module, as well as designing the rover system and building an Analytical Laboratory (ALD), to be integrated onto the rover.

Leonardo's Airborne and Space Systems Division will also have technology on-board the 2016 mission having supplied photovoltaic power generators, the units that will process and distribute electric power throughout the satellite (the PCU – Power Conditioning Unit - and PCDU – Power Control and Distribution Unit) and two electric power distribution boards for the EDM module's CTPU (Central Terminal and Power Unit). All these electronics equipments are from the company's Nerviano site. From the company's Campi Bisenzio facility, Leonardo has supplied the star trackers (AA-STR) for the Trace Gas Orbiter and the core of the CASSIS optronic observation system. For the 2020 mission, Leonardo's Nerviano site will provide the photovoltaic assemblies which will power the spacecraft and rover and will produce the special drill, funded by ASI (Agenzia Spaziale Italiana - Italian Space Agency), which will, for the first time, dig down into the Martian surface to a depth that could reveal past or current signs of life. Inside the drill will be Leonardo's MA_MISS spectrometer (Mars Multispectral Imager for Subsurface Studies) from the company's Campi Bisenzio site, which will analyse the geological and biological properties of the soil under the surface of Mars.



Finally, **Telespazio** is responsible for the development of several key systems of the ExoMars Ground segment, among others the Mission Control System (MCS) – that will monitor and control the TGO, allowing mission operation teams to manage the system throughout the life of the mission - and of the infrastructure that will provide the rover control centre with the necessary communications to conduct the operations. Telespazio staff forms a large part of the ESOC Teams, being involved in pre-launch activities, LEOP and routine operations.