



# ▶ ExoMars

## Two Missions to the Red Planet

### ▶ A big challenge in the scientific field

Through the European Space Agency (ESA) and its top aerospace industries, Europe is getting ready to return to Mars with the ExoMars Program, an important space exploration program strongly supported by the Italian Space Agency (ASI).

The ambitious technological and scientific goals require two missions, one launched two years after the other: the first was launched on 14th March 2016 and the second is scheduled for 2020, Thales Alenia Space is Prime Contractor for both.

The ExoMars Program is developed with international cooperation from the Russian Space Agency, Roscosmos, that provides scientific experiments and equipment and the Proton rockets.

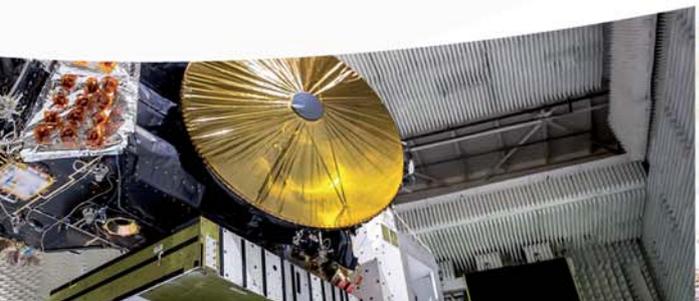


### ▶ Why go to Mars?

To carry out Exobiology research, study the origins, development and distribution of life in the universe and finally confirm the presence of life on the Red Planet.

This is one of the most important scientific questions of our time. The answer lies in studying the atmosphere of the planet, its internal structure and the distribution of ice and minerals

on the surface and the layer just below ground level on Mars. ExoMars will be perfectly capable of testing on site new technologies needed to pave the way to future exploration missions.





## ► 2020 Mission

The second Exomars mission will also be headed by ESA, but with Roscosmos participating to a greater extent than in the previous mission. It will consist of a space vehicle with a Carrier Module (CM) and a Descent Module (DM) whose Landing Platform (LP) will house a Rover that will explore Mars's surface (for 218 Martian days which are approximately 230 Earth days).

The goals of the 2020 mission in brief to:

**Enter** the Martian atmosphere and subsequently descend onto the surface of the Descent Module and its Rover, weighing a total of around 1.6 tons, using the experience gained with the EDM on the 2016 mission.

**Land** the Landing Platform with subsequent exiting of the Rover.

**Explore** a vast area of Mars by carrying out geological/scientific characterization of the surface and subsoil in situ through collection and analysis of soil samples down to 2 meters of depth.

**Search** for present or past forms of life in the soil samples collected and processed on board.

**Perform** a geochemical study of Mars' surface and subterranean environments.

## ► The Role of Thales Alenia Space

Thales Alenia Space Italy is the Prime Contractor and is responsible for all planning on both missions. For the 2016 mission, it developed the EDM module for entry and descent onto Mars and the Trace Gas Orbiter (TGO).

For the 2020 mission, it develops the CM and DM navigation and guidance system on the Rover System project and will integrate and develop the Analytical Laboratory Drawer (ALD).

## ► 2016 Mission

On the first mission, the vehicle sent to the Red Planet will consist of an orbiter module, called the Trace Gas Orbiter (TGO), and an Entry & Descent Module (EDM).

The goals of the 2016 mission in brief are to:

**Land** with a demonstrator capsule of around 600 kg on the planet using a control system based on a radar altimeter and softening the landing with a carbon fibre shock absorbing structure.

**Acquire** the greatest amount of data possible when re-entering the Martian atmosphere.

**Operate** a payload on the surface for a short period of time.

**Observe** the atmosphere and surface of Mars for two years using an orbiter module that orbits the earth at a height of 400 km.

