

The ESA/NASA ExoMars Trace Gas Orbiter

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The European Space Agency (ESA), in close cooperation with NASA, has established the ExoMars Programme to investigate the Martian environment and habitability, and to demonstrate new technologies paving the way for a future sample return mission. Within this programme, the first proposed mission consists of an ESA spacecraft that will carry an Entry, Descent and Landing Demonstrator. It will be launched in January 2016 with a NASA supplied Atlas V rocket. The scientific goals of the mission are to study Martian atmospheric trace gases, with a focus on chemical species that could reflect the existence of extant active processes (geological or biological). More specifically, the mission will detect the chemical compounds, characterise their spatial and temporal variability and localise their sources on the surface. Five instruments (see table) will be accommodated on the orbiter to achieve these objectives. Following an aerobraking phase, the scientific mission is expected to begin in spring 2017 for a period of at least one Martian year. The presentation will focus primarily on the description of the mission, responsibilities between ESA and NASA, payload, timelines and milestones.

Instrument name	Short description	Participating countries
Mars Atmospheric Trace Molecule Occultation Spectrometer	An infrared spectrometer coupled with a solar imager to detect very low concentrations of molecular constituents of the Martian atmosphere and map their distribution from solar occultations.	United States of America, Canada
Nadir and Occultation for MArs Discovery	A spectrometer suite, covering a wide range of wavelengths (infrared, ultraviolet and visible), to identify the components of the Martian atmosphere.	Belgium, Italy, Spain, United Kingdom, United States of America, Canada.
ExoMars Climate Sounder	An infrared radiometer to provide daily global measurements of temperature, pressure, dust, ice, and water vapour in the atmosphere to aid the analysis of the spectrometer data.	Belgium, Italy, Spain, United Kingdom, United States of America, Canada.
Mars Atmospheric Global Imaging Experiment	A wide-angle multi-spectral camera to provide global images in support of the other instruments.	United States of America, Belgium, France, Russia.
High-resolution Stereo Colour Imager	A camera designed to take three-dimensional images of active processes (such as volcanism) that occur on the Martian surface and that are thought to release gases that could provide evidence of possible life on Mars.	United States of America, Switzerland, United Kingdom, Italy, Germany, France.