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Science definition progress of ESA's ExoMars mission

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Establishing whether life ever existed, or is still active on Mars today, is one of the outstanding scientific questions of our time. In order to timely address this important goal, within the framework of its Aurora Exploration Programme, the European Space Agency (ESA) plans to launch the ExoMars mission in 2013.

ExoMars will deploy a Rover carrying a comprehensive suite of analytical instruments dedicated to exobiology research: the Pasteur payload. The Rover will travel several kilometres searching for traces of past and present signs of life. It will do this by collecting and analysing samples from within surface rocks and from the subsurface, down to a depth of 2 m. The very powerful combination of mobility and access to subsurface locations, where organic molecules may be well-preserved, is unique to this mission.

The ExoMars Rover mission will be complemented by a small Geophysics & Environment Package (GEP), presently under study for accommodation on the landing platform.

In its Baseline configuration, the ExoMars mission contains two other elements: a Carrier and a Descent Module. The Carrier will bring the Descent Module to Mars and release it from the hyperbolic arrival trajectory. The Descent Module's objective is to safely deploy the Rover and the GEP —developing a robust Entry, Descent and Landing System (EDLS) is another fundamental goal of this mission. The mission's data relay capability will be provided by a NASA orbiter.

However, ESA is also studying the possibility to upgrade the mission to a more powerful launcher. In this case, ExoMars would include an Orbiter (instead of the Carrier). The Orbiter would provide an independent communications capability and accom-

modate a modest (∼30 kg) scientific payload. The Descent Module would likely be released “from orbit,” resulting in reduced landing risk and better targeting accuracy.

In both cases, latitudinal bands between –15º and 45º can be targeted for landing, ensuring that the mission is flexible enough to accommodate interesting new sites based on latest available data from on-going Mars orbital missions.

ESA is presently performing the ExoMars Payload Confirmation Review (PCR), which defines the instrument baseline for the mission configurations under consideration.

In the near future, the following two important science definition activities will be undertaken: a Call for Instrument Proposals to define the payload for the possible ExoMars Orbiter; and the first ExoMars Landing Site Selection conference.

This paper will briefly present the mission objectives, the progress in the Rover and GEP instrument evaluation process, and describe the timeline for the Orbiter instrumentation and landing site selection work.