

Mars Express and Venus Express operations extended

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Venus Express is making unprecedented studies of the largely unknown phenomena taking place in the Venusian atmosphere. Its suit of instruments is also digging into the interaction between the solar wind and the planetary environment. Finally, the mission is also gathering glimpses about the planet's surface, strictly coupled with the dense atmosphere. Credits: ESA - AOES Medialab

ESA's Mars Express and Venus Express missions, to explore our nearest neighbour planets Mars and Venus respectively, will continue to operate until early-May 2009. The decision was unanimously taken by ESA's Science Programme Committee last Friday.

The Science Programme Committee recognised the outstanding legacy that Mars Express and Venus Express are building for future generations

of scientists, and noted the invaluable heritage that these missions are leaving to future missions to these planets. The decision to extend the two missions will allow to continue the exploitation of their unique potential.

So far, both missions have allowed an amazing amount of scientific discoveries of the highest quality. Both spacecraft are equipped with a suite of sophisticated scientific instruments - many of which share a common design and the same scientific teams, and the prime objective of both the missions is a comprehensive study of the respective planets at outstanding spatial and spectral resolution.



Mars Express left Earth for Mars on 2 June 2003. It reached destination after a 6-month journey, and it is making a thorough investigation of the planet since early 2004. Credits: ESA - D. Ducros

The extension of the Mars Express and Venus Express operations will not only allow to complete the coverage carried out during the scientific phases that took place so far, but will also sustain the synergy that is

being created in the interpretation of the data sets collected from both missions. Furthermore, their operational synergies have allowed for substantial cost reductions not possible when operating just one of these missions.

The scientists involved can now not only focus on planet-specific results, but focus on comparative planetology to provide new solid arguments for the current theories of planetary formation and evolution, for the conditions favourable for life to emerge in the Solar System, and for the interaction of terrestrial planets' environment with the solar wind.

Mars Express – the present and the future

Mars Express's watch-word is 'global mapping', at unprecedented resolution, of surface, subsurface and atmosphere of Mars, with particular emphasis on the search for water in its various states and on the search for signs of biological processes.

Results achieved by Mars Express so far include the evidence of volcanic, fluvial and glacial activity on Mars from very early in its history until very recently – possibly still going on today; the first ever sub-surface radar sounding of another planet, that led to the discovery of underground water-ice and of buried impact basins; the first comprehensive study of the mineralogical composition of the planets surface, which provided the first mineralogical evidence for the past history of water on Mars – now known with certainty to have been very abundant in the early epochs; the detection of methane in the atmosphere as a possible 'tracer' of present life on Mars or as an indicator of present volcanism; the first global measurements of the ozone levels on day- and night-sides; the existence of mid-latitude auroras on Mars; the first detailed and quantitative indications of the atmospheric escape processes - just to mention a few.

For Mars Express, a major remaining goal to be achieved is the completion of global coverage in general terms. The mission's unique capability to produce high-resolution, stereo images in colour for geological interpretation, its capability to study the surface roughness and mineralogy, and the capability to probe at unique depths the subsurface of areas of interest as far as water and ice are concerned, makes Mars Express the ideal 'tool' to select candidate landing sites for future missions, especially valuable when the maximum possible coverage will have been reached thanks to the extended mission. Because Mars Express instruments are also largely complementary to the instruments of other missions to Mars, the data set obtained by this mission becomes even more important.

Venus Express – looking further

Venus Express is still only half-way through its (initially planned) nominal mission, but has already revealed features never detected in such detail before. These include the huge, 'double-eyed' atmospheric vortex at Venus South Pole and its 3D structure varying with the altitude, the first solid indications of the complex structures and sub-structures that characterise the thick and noxious atmosphere of the planet and its complex cloud and wind systems. These are also being studied at low altitudes, down to the surface, thanks to the first systematic exploitation ever of the so-called 'infrared windows' present in the atmosphere.

Venus Express' results also include preliminary important measurements of the atmospheric chemistry and temperature, and the analysis of the atmospheric escape processes in combination with the action of the solar wind, fundamental to understand the water history and the evolution of the planet's atmosphere.

Venus Express' extension will allow to achieve a global coverage of the atmosphere of this planet, so similar and at the same time so different

from Earth. It will also allow to completely address, thanks to a thorough analysis of surface temperature and chemistry maps, the question on whether Venus is a planet still geologically and volcanically active.

Thanks to its extension Venus Express will also be able to continue the first extensive study of the strong green-house effect on the planet – a subject extremely interesting for planetary climate experts, and an important element of comparison for the evolution of the green-house effect on Earth.

Mars Express was launched on 2 June 2003 and reached Mars 6 months later. It started its scientific observations in early 2004. The mission was already extended until end-October 2007, and will now operate for almost two more Earth-years.

Venus Express was launched on 9 November 2005 and arrived to its destination after a five-month journey. It started its scientific phase in early June 2006. Initially planned to operate until end-September 2007, the mission will now take advantage of the extension of its operations for almost two further Earth-years.

Source: ESA

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