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An overview of science operations and of results from the Mars Express investigations of the Martian moons Phobos and Deimos

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Abstract

The Mars Express spacecraft is in orbit around the red planet since 25 December 2003, with the main objectives of global investigations of the planet. The mission has provided a comprehensive and multidisciplinary view of Mars, including the surface geology and mineralogy, the subsurface structure, the state of the interior, the climate's evolution, the atmospheric dynamics and composition, and the upper atmosphere. In addition, and given its elliptic orbit, regular flybys of the Martian moons allowed unique observations and measurements to be made.

This paper gives an overview of the executed flybys in term of distances and geometrical conditions. Science highlights are presented. These include the most precise measurement of the mass of Phobos, the first radar echo, the sharpest images ever acquired, unique information on the solar wind interaction with Phobos, spectra covering the ultraviolet, visible and infrared range. Scientific priorities for the next flybys in the Mars Express extended mission are outlined.