

INTRODUCTION TO THE SCIENCE ON THE MARS EXPRESS MISSION

Agustin Chicarro[1]

[1] ESA, ESTEC

The ESA Mars Express mission will be launched in June 2003 from Baikonur onboard a Russian Soyuz/Fregat rocket. The mission comprises an orbiter spacecraft to be placed in a quasi-polar elliptical martian orbit, with closest approach of 250 km and a mission lifetime of one martian year (687 days), and the small Beagle-2 lander to arrive at Isidis Planitia in December. In addition to studying the surface, subsurface and atmosphere of Mars, the main themes of the mission are the identification of water and of possible signs of past life in the history of the planet. The specific scientific objectives of the orbiter are: global high-resolution imaging with 10 m resolution and imaging of selected areas at 2 m/pixel, global IR mineralogical mapping, global atmospheric circulation study and mapping of the atmospheric composition, sounding of the subsurface structure down to the permafrost, study of the interaction of the atmosphere with the surface and with the interplanetary medium as well as radio science. The goals of the Beagle-2 lander are: geology, geochemistry, meteorology and exobiology of the landing site, using robotic devices such as a 'mole' capable of subsurface sampling. The scientific payload on the orbiter includes a Super/High-Resolution Stereo Colour Imager (HRSC), an IR Mineralogical Mapping Spectrometer (OMEGA), a Planetary Fourier Spectrometer (PFS), a Subsurface-Sounding Radar Altimeter (MARSIS), an Energetic Neutral Atoms Analyser (ASPERA), an UV and IR Atmospheric Spectrometer (SPICAM) and a Radio Science Experiment (MaRS). The Beagle-2 lander includes a suite of imaging instruments, organic and inorganic chemical analysis, robotic sampling devices and meteorological sensors. In addition to relaying the data from the Beagle-2 lander to Earth, Mars Express will also service landers and rovers from other agencies during its nominal/extended lifetime. The ground segment includes the ESA station at Perth, Australia, and the mission operations centre at ESOC. International collaboration is very much valued to diversify the scope and enhance the scientific return of the mission, and in particular close cooperation between the Japanese Nozomi mission and Mars Express, since both the orbits and the scientific investigations are very complementary to each other.

For more details on the Mars Express mission and its Beagle-2 lander:

<http://sci.esa.int/marsexpress/> and <http://www.beagle2.com/>