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VIRTIS observation of Mars during the Rosetta Mars swing by

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The 25th of February 2007 the Rosetta probe, on its way to the comet Churyumov-Gerasimenko, shall perform a gravitational assist with Mars. The Mars Swing-By (MSB) is one of the 4 planetary fly-bys that will allow the probe to achieve the correct trajectory to the comet. The VIRTIS instrument will be allowed to perform a fairly extensive coverage of Mars during the MSB although, regrettably, due to several S/C constraints and to the geometry of the encounter, operations are not allowed at closest approach.

The observations are split in a pre-swing-by activity phase lasting about 4h at a range variable from 250.000 to 120.000 km, with a ground resolution between 60 and 30km, and with a constant phase angle of 15degrees; the favourable approach geometry will allow to perform hyperspectral imaging of the overall visible side of the Martian disk, as well as high resolution spectroscopy of the atmosphere. The post-swing-by observations shall start at a much closer distance (40.000 km) but with a less appealing phase angle of 155 degrees; main tasks in this second part shall be the study of the limb atmospheric emission (a sampling through the atmosphere at limb, with a resolution of about 15 km will be possible) as well as an analysis of the surface cooling, in the 5micron spectral region, as tracked features move into the night side.

Taking advantage of the high spectral resolution ($\lambda/\Delta\lambda$ >1500) of the VIRTIS-H channel and of the mapping capability of the VIRTIS-M channel, the observations shall be used to: 1) Perform a detailed study of the fluorescent emission bands of carbon dioxide at 4.3 micron, their dependence with the thermal structure and solar zenith angle, and with the altitude variations; 2) Determine the ozone atmospheric

abundance through the study of the molecular oxygen dayglow at 1.27 micron; 3) Retrieve the abundances of minor atmospheric constituents (H20 at 0.84 and 1.13 micron and CO at 2.35micron); 4)Retrieve the surface material properties through the study of the surface thermal inertia.

The talk shall briefly overview the planning and the scientific objectives, and describe the main scientific outcomes of the observations.