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HRSC on MarsExpress: the Performance of the Camera's Super Resolution Channel (SRC)

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The Mars Express spacecraft entered Mars orbit in December 2003, and the onboard HRSC (High Resolution Stereo Camera) has been mapping the surface of the planet, since. HRSC produces large-format images (5100 pixels wide, up to 300,000 pixels long) in 3-D and color. Though the SRC (Super Resolution Channel) comes as a part of the HRSC experiment, it is practically a separate 1024 x 1024 framing camera, equipped with a Matsutov-Cassegrain telescopic lens for imaging at highest resolution (up to 2.3 m/pix from the nominal pericenter height of 250 km). The goal of the camera, which is controlled by the HRSC digital unit, is to show details within the large HRSC frames. Normally, images are obtained as a series with approx. 5% overlap during an HRSC image sequence. The SRC images are mosaicked on the ground using nominal orbit and alignment data, and fall nicely into their predicted location within the HRSC context. We estimate that the magnification factor of SRC with respect to HRSC is 4.33, corresponding to an SRC effective focal length of 974.5 mm, although the effective visibility of details in the SRC images is somewhat reduced over what one would expect. By the time of writing (February, 2005) SRC has acquired more than 1800 frames, in which the camera has very often captured fascinating details in surface morphology. The SRC has also proven to be very useful for statistics of small craters and for astrometric observations of Phobos. The poster will give an update on SRC performance results reported earlier and will show more examples of recently obtained data.

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