



The performance of HRSC's Super Resolution Channel (SRC)

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The SRC (Super Resolution Channel) is a 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), intended to show details within the large HRSC frames. The operation of SRC is controlled by the HRSC digital unit. 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 time tag and alignment data, and fall nicely into their predicted location within the HRSC context. Using a digital image matcher as a tool for position measurement of features in the images, 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. This value is in good agreement with the nominal focal length, but 1.5% lower than the value that has been directly measured on the ground. However, the effective visibility of details in the SRC images is somewhat reduced over what one would expect: The MarsExpress mission constraints called for a low mass and low power instrument. These requirements resulted in an instrument design relying on thermally balanced conditions. In cases, where the thermal balance cannot be reached, imaging artifacts, such as blurring and "ghosts" have been observed. Camera models and image processing algorithms are currently being studied and tested to remove these artifacts. By the time of writing (January, 2005) SRC has acquired more than 1500 frames, in which the camera has very often captured fascinating details in surface morphology.

The SRC has 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.