



HRSC on MEX - Operational Data Processing from Raw Data to Digital Terrain Models

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The HRSC onboard Mars Express is a multi-line pushbroom scanner which provides image data from 5 panchromatic stereo channels and 4 spectral bands (Neukum et al, 2004). A completely automated ground data processing line has been developed in the past years and is being applied on a routine base for each MEX orbit. It comprises the conversion of the original data stream transmitted to ground to de-compressed data (Level-1 data), the radiometric correction of the image data based on calibration information (Level-2 data) combined with orbit and pointing information for each image line, and a first rectification to standard scales of up to 12.5 m/pixel (Level-3 data) using a-priori topography information as defined by the MGS MOLA instrument.

Level-2 and Level-3 data of HRSC's Super Resolution Channel (SRC) in scales of up to 2.5 m/pixel complete the HRSC capabilities. Thus, Level-2 and Level-3 are ready for distribution to the HRSC Co-Investigator team within one day after data acquisition.

A standard Level-4 generation is started after completion of Level-2 data in order to derive HRSC digital terrain models in a standard 200 m grid. These DTMs are finally used for the generation of orthoimages of all 4 spectral bands and the high-resolution nadir channel. This standardized processing provides 3D and image data products within a few days after data acquisition for first science analyses. Based on nominal pointing and reconstructed orbit information the standard Level-4 data products comprise a mean absolute accuracy of a few hundred meters for planimetry

and of better than 100 m for height.

Reference:

Neukum, G., Jaumann, R. and the HRSC Co-Investigator Team, 2004. HRSC: The High Resolution Stereo Camera of Mars Express. ESA Special Publications SP-1240.