

HRSC on Mars Express – A new Era in Planetary Cartography

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The *High Resolution Stereo Camera* (HRSC) on Mars Express provides multispectral digital image data of high resolution (up to 10 m) as well as systematic stereo coverage of the Martian surface. The HRSC images are processed systematically to various data levels. Based on these products, large-scale topographic and thematic image maps are generated. The main goal is the production of the *Topographic Image Map Series Mars 1:200,000* which covers the planets surface in 10,372 individual map sheets.

A sophisticated cartographic concept was developed and forms the basis for the Topographic Image Map Series for the Red Planet. The basic principles of this map series have already been defined for the Mars96 mission [2]. The Martian reference body for planimetry is a rotational ellipsoid defined by the International Astronomical Union (IAU) as the *Mars IAU 2000* ellipsoid. An areoid (Martian geoid) is defined as the topographic reference surface for heights. Equal-area map projections are used for compiling the *Topographic Image Map Mars 1:200,000*. Because of its useful mathematical and graphical properties, the *Sinusoidal* projection is applied to map sheets between 85° north and 85° south. For mapping the polar regions the *Lambert Azimuthal* projection was selected.

A cartographic softwaresystem, the Planetary Image Mapper (PIMap) has been developed at the Technical University of Berlin [1]. It comprises all cartographic processing steps such as compilation and nomenclature of the map content (including contour lines), generation and placement of graphical elements including the map frame and all necessary marginal elements for every single map sheet.

The *Topographic Image Map Series Mars 1:200,000* is realized in a close co-operation between the German Aerospace Center (DLR) in Berlin-Adlershof, providing the photogrammetric processing, and the Technical University Berlin, responsible for all cartographic aspects. Numerous image maps have already been produced mainly for scientific purposes by the authors. The generation of different thematic image maps, in the first instance geological maps, is currently underway. Thus, the mission has already opened a new era of high resolution topographic and thematic mapping of Planet Mars.

References

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- [2] H. Lehmann, F. Scholten, J. Albertz, M. Wählich, G. Neukum, *Mapping a Whole Planet – The New Topographic Image Map Series 1:200,000 for Planet Mars*. ISPRS, Vol. XXXI, B 4, Vienna (1997).