THE HRSC EXPERIMENT IN MARS ORBIT: FIRST RESULTS. G. Neukum¹, and the HRSC-Co-Investigator Team, ¹Freie Universitaet Berlin, Germany (gneukum@zedat.fu-berlin.de).

Early January 2004, the ESA Mars Express mission started its science phase in orbit around Mars. Imaging and mapping the Martian surface by the High Resolution Stereo Camera (HRSC) is one of the main goals of Mars Express. The HRSC experiment is a pushbroom scanning instrument with 9 CCD line detectors mounted in parallel on the focal plane. Its unique feature is the ability to nearly simultaneously obtain imaging data of a specific site at high resolution, with along-track triple stereo, with four colours, and at five different phase angles, thus avoiding any time-dependent variations of the observation conditions. An additional Super-Resolution Channel (HRSC-SRC) – a framing device – will yield nested-in images in the meter-range thus serving as the sharpening eye for detailed photogeologic studies. The spatial resolution from the nominal periapsis altitude of 250 km will be 10 m/pixel for the HRSC proper and 2.3 m/pixel for the SRC. During the nominal operational lifetime of the mission of 1 Martian year, it will be possible to cover at least 50% of the Martian surface at a spatial resolution of better than 20 m/pixel. More than 70% of the Martian surface can be observed at a spatial resolution of better than 40 m/pixel, while a few percent of the surface will be imaged at 2 to 5 m/pixel. The HRSC on Mars Express will be able to close the existing gap between medium to low-resolution coverage on the one hand and the very high resolution images of Mars Global Surveyor as well as the in-situ observations and measurements by landers on the other hand. The HRSC on Mars Express will make major contribution to the areas of geosciences, atmospheric sciences, photogrammetry/cartography, and spectrophotometry of Mars. Special emphasis will be put on the evolution of the Martian surface due to volcanic processes and the role of water throughout the Martian history. The instrument will obtain images containing morphologic and topographic information at high spatial and vertical resolution of unique photogrammetric quality allowing the improvement of the Martian cartographic data base down to scales of 1:50,000. By the time of the conference we show first high-resolution color stereo products (3D and perspective views, digital terrain models, video animations) and first results from scientific analysis of the data by the joint work of the international co-investigator team.