Geophysical Research Abstracts,
Vol. 10, EGU2008-A-09775, 2008
SRef-ID: 1607-7962/gra/EGU2008-A-09775
EGU General Assembly 2008

The High-Resolution Channel (HRC) of the ExoMars PanCam – Science and Technology

N. Schmitz (1), A. Coates (2), A. Griffiths (2), E. Hauber (1), R. Jaumann (1), H. Michaelis (1) and the ExoMars PanCam Team

(1)Institute of Planetary Research, DLR, 12489 Berlin, Germany, (2) UCL, Mullard Space Science Laboratory, Surrey, UK (nicole.schmitz@dlr.de / Phone: +49-30-67055 456)

The ExoMars mission as the first element of the ESA Aurora program is scheduled to be launched to Mars in 2015. Part of the Pasteur Exobiology Payload onboard the ExoMars rover is a Panoramic Camera System ('PanCam') being designed to obtain high-resolution colour and wide-angle multi-spectral stereoscopic panoramic images from the mast of the ExoMars rover. The PanCam instrument consists of two wide-angle cameras (WACs), which will provide multispectral stereo images with 34° field-of-view (FOV) and a High-Resolution Channel (HRC) to provide monoscopic 'zoom' images with 5° field-of-view.

Scientific goals include fulfilling the digital terrain mapping requirements of the mission as well as providing multi-spectral geological imaging, colour and stereo panoramic imaging, water vapour abundance and dust optical depth measurements. The dedicated high-resolution channel, provided by DLR/IPF in Berlin, allows for zooming into wide angle panoramas as well as image mosaiking and furthermore enables high resolution imaging of inaccessible locations on crater walls and in valleys and to observe retrieved subsurface samples before ingestion into the Sample Preparation and Distribution System (SPDS) of the Pasteur payload. Combined with a 'Rover Inspection Mirror' (RIM), placed towards the end of the robotic arm, engineering (and public relations) images of the rover (front, sides, and underside) as well as views of the rover wheels for soil mechanics science or views of the underside of overhanging rock formations could be acquired.

To serve the scientific goals the PanCam High-Resolution Channel (HRC) will utilize an active pixel sensor (APS) with 1024 x 1024 pixels. A dedicated focus mechanism will allow image acquisition from distances within the near field (>1m) to infinity. The spatial resolution of this camera (IFOV) is 13 times that of the WACS at about 85 μrad/pixel. The HRC is expected to weigh 300g and consume 0.9 W of power. The colour capability of the HRC is provided by 'stripe' interference filters, each directly bonded over part of the active area of the APS. Thus, with the limited number of colours required, the additional moving parts of a filter wheel mechanism are not necessary – instead for colour acquisition the camera head has to be moved to mosaic each colour swath across the detector FOV.

The HRC will take individual images or series of images intended for mosaiking and can operate either autonomously or directly in combination with WAC. Dedicated imaging sequences will include single images (RGB colour) for $\sim$7x zoom in to an interesting region of a WAC panorama as well as image mosaics (e.g. RGB colour at 4 x 4 positions with 10-20% overlap between image pairs – i.e. 16.3º x 16.3º FOV for 15% overlap) for $\sim$7x zoom of a larger region. Images acquired both in Martian morning and afternoon will allow the observation of all visible surfaces without shadowing.