Geophysical Research Abstracts, Vol. 9, 09388, 2007
SRef-ID: 1607-7962/gra/EGU2007-A-09388

The Camera for Dawn - Design and Expected Results

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The Dawn Discovery Mission to asteroids (4)Vesta and (1)Ceres is scheduled to launch on June, 2007. The Framing Camera (FC) is one of the experiments onboard and will serve as scientific multispectral imager as well as optical navigation camera during the approach and orbital phases. The FC is a German contribution to the mission, and has been developed and built by a consortium led by MPS, Lindau, in co-operation with DLR, Berlin and IDA, Braunschweig. The FC, which relies on components with proven flight heritage, consists of two identical cold-redundant units, for increased reliability. The optics is based on a refractive design, has an numerical aperture f:8 and projects a FOV of approximately 5° onto the detector. A filterwheel houses 8 filters (one of which is clear) covering the wavelength range from 430 to 980 nm. The detector is a frame-transfer 1024x1024 front-illuminated CCD which supports fast electronic shuttering and exposure times ranging from 1 ms to 3.5 h. The DPU, which is implemented as a LEON core on an FPGA, controls the CCD camera, stores the images on an 8 Gbit rad-hard dRAM buffer, performs image pre-processing and compression and provides the interface to the spacecraft.

During the global mapping phase the FC will image the asteroids' surfaces with a spatial sampling of 70 m/pixel at Vesta and 130 m/pixels at Ceres in at least three spectral channels. During the low orbit phase, selected regions will be imaged with an enhanced resolution, reaching 18 m/pixel and 67 m/pixel at Vesta and Ceres, respectively. The FC will provide a detailed description of the shape, rotational state

and topography of the target bodies. It will enable studies of the surface processes and of the crater distribution. In combination with the radio science experiment, the FC will contribute to the determination of the gravity fields and of the densities of the asteroids. In combination with VIR-the mapping spectrometer, and GRaND-the gamma ray and neutron detector, the FC will explore the relationship between togography and composition, and look for evidence of planetary processes, including volcanism, space weathering, and water on Vesta, and evidence of differentiation, tectonism, aqueous alteration and space weathering on Ceres.