

## Summary.

Processing of large volumes of data is required nowadays to advance our understanding of processes on planet Mars. I will discuss technologies and tools which allow rapid data reduction and preparation for scientific analysis. Examples include data from Mars Global Surveyor and Mars Odyssey missions.

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Currently there are two robotic spacecraft operating at Mars. Both carry imaging instruments. Mars Global Surveyor Mars Orbiter Camera (MOC) images have very high resolution (1-5m/pixel). THERmal EMISSION imaging System (THEMIS, on Mars Odyssey spacecraft) operates in visual (18m/pixel) and thermal IR wavelengths (100m/pixel). In this presentation I will discuss two projects related to analysis, visualization and understanding of these datasets and their significance in our knowledge about Mars.

The main goal of project related to the MOC dataset is to derive Digital Elevation Models (DEMs) of Mars from stereo pair images taken by the MOC camera. These DEMs are now used for slope analysis in the potential MER landing site areas. MOC has been operational since 1998 and acquired more than 100000 images to date.

THEMIS camera has started operating in early February 2002. I will discuss a geometrical processing (optical distortion correction and orthorectification) pipeline for these images. The final products are THEMIS mosaics at 100m/pixel in the IR. The latest mosaics will be presented.

Finally there are very exciting opportunities of merging these two datasets. I will present visualizations and area mosaics combining MOC and THEMIS images. I will also discuss science questions that can be addressed employing datasets from these two instruments, especially concentrating on data from the polar regions of Mars. This research will lead to better understanding of the formation history of Martian polar ice caps.

I have employed a number of software tools to produce mosaics and perform analysis. Standard database interface tools (Perl DBI) are used to retrieve data from the MOLA database and identify MOC or THEMIS images of interest. Database server is MySQL. Orthorectification process and projection is carried out in VICAR, with active use of SPICE kernels to recover spacecraft position and orientation. Projected data is exported to GeoTIFF format and then final scientific analysis is performed in ArcView Geographical Information System (GIS).

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