MIMS – A tool to help identify time-varying processes on the surface of Mars

E. I. Alves (1) and **D. A. Vaz** (1)

(1) Centro de Geofísica da Universidade de Coimbra

Av. Dias da Silva 3000-134 Coimbra, Portugal (davidvaz@net.sapo.pt / Fax: +351 239-793428 / Phone: +351 239-793420)

The amount of scientific data on Mars is no longer manageable by conventional procedures. The image databases have been growing exponentially in size from the 22 Mariner 4 TV pictures to the presently more than 175,000 Mars Global Surveyor Mars Orbital Camera (MOC) images and is certain to grow still with the steady release of MOC, 2001 Mars Odyssey THEMIS and Mars Express HRSC (High-Resolution Stereo Camera) images.

In the context of project MAGIC [1] an attempt is in progress to identify time varying processes on the surface of Mars by comparing images of the same areas that were captured by different missions.

To that purpose, we have developed a data (image) mining relational database software application that includes information on most of the images that were acquired by Mariner 71 (Mariner 9), Viking 1 and 2, Mars Global Surveyor and Mars Odyssey, a present total of 290,214 records. The database, MIMS (Mars Image Mining System), is prepared to include also Mars Express data as soon as they are available.

Each record contains eight fields:

1. *Mission*: three-letter code for mission (MAR, VIK, MGS, ODY and MEX)

2. *Image_Name*: the original image code, with a hyperlink to the URL (Internet Universal Resource Locator, http://... or ftp://...) from whence the image can be retrieved

3. *Date_Acquired*: image date and time of acquisition, in the format yyyy-mm-ddThh:nn:ss

4. *Resolution*: image resolution, in metres per pixel

5. *Centre_Lon*: Martian areocentric East longitude of the centre of the image

6. *Centre_Lat*: latitude of the centre of the image

7. *Comments*: mission team comments on the image, when available

8. *Feature*: the IAU (International Astronomical Union) named feature [2] that is nearest to the centre of the image

The user can query MIMS, with an intuitive windowed point-and-click user-interface. After selecting mission(s) and the worst image resolution desired, the query is performed in one of two modes:

Map mode – where the user enters limiting latitudes and longitudes for the desired study area;

Text mode – where the user enters a keyword to search for in both fields 7. and 8.

Then the user can query the resulting subset for overlapping images. The query selects those pairs whose centres are nearer than a distance that was chosen by the user.

All query results can be exported in ASCII comma-separated text and other common formats. MIMS is prepared to be user-updateable when new data are available but always preserving the integrity of the original database.

Several studies can benefit from this tool: evolution of dust coverage and of dune fields, formation of gullies, cratering, to name but a few. We are certain that MIMS can help to take advantage of the fourty years of Martian imagery that are now available and rapidly growing.

References

[1] – Alves, E.I, et al., Portuguese scientific participation in the Mars Express/Beagle2 mission, Geoph. Res. Abs. 4, EGS02-A-01095, CD-ROM, 2002.

[2] – USGS Gazetteer of Planetary Nomenclature, http://planetarynames.wr.usgs.gov/, 2005.