EROS: A SELF-GUIDED TOUR. R. W. Gaskell, Planetary Science Institute, 1700 E. Fort Lowell, Suite 106, Tucson, AZ 85719, rgaskell@psi.edu.

Introduction: For several years, I have been modeling the shape and topography of asteroid 433 Eros, using stereophotoclinometry [1,2] to construct digital topography and relative albedo maps (L-maps) of varying resolution. This ensemble of over 9000 L-maps, representing almost 90 million surface vectors and over 21000 NEAR images, completely tiles the body at a resolution of 6 m/pixel.

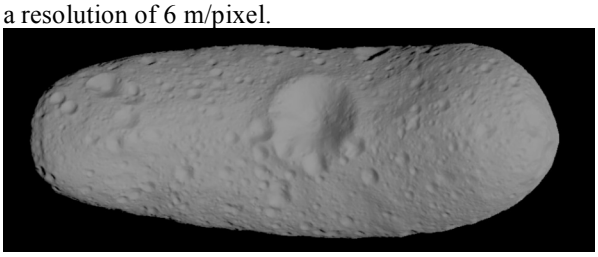

Figure.1. Eros shape model

The ensemble has been used to construct a 1.57 million vector model with an average resolution of about 30 meters. This will soon be available through the PDS. However, the full data set has not been distributed due to the lack of a suitable interface. A new stand-alone software and data package has now been constructed. It allows a user to study any part of Eros' suface. The underlying data set consists of 1536 DTMs at a nominal resolution of 5 m. Periodic updates will be distributed as more images are processed.

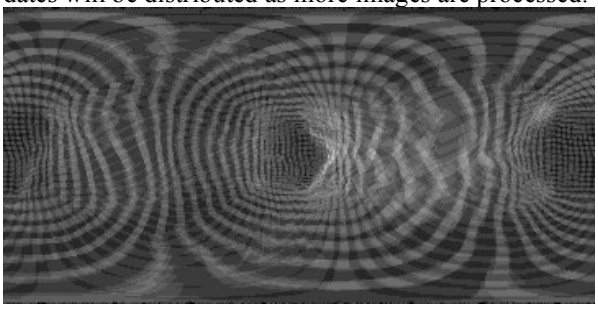

Figure 2. Lat/Lon coverage of data set.

Mapmaker: The program MAPMAKER uses this set to produce a variety of output maps tailored to the user's needs. A location on Eros can be specified in any of three ways - by latitude and longitude, by its location in one of ten sample images such as Fig.1, or by its location in a high resolution map, either one of the set displayed in Fig. 2 or one constructed by the user. The user also specifies the size, resolution , and a name for the new map. The program then produces a new map with the same file format as the reference maps and gives the user the option of creating any of six output images. The images are in PGM or PPM format, readable with many applications including GraphicConverter on the Mac and XV on Unix/Linux machines. The PGM files have text headers contining ancilliary information. The current list of output maps show the Laplace filtered heights ($\nabla^2 h$), the EW gradient of the height (which looks like a real image), 8 or 16 bit digital height maps relative either to a best fit plane (DTM) or the mean equipotential geoid (DEM), and shaded relief DTM and DEM with color coded heights superimposed on the gradient display. Several other programs are included in the package. One makes it possible to visualize a map, either from the underlying data set or created by the user. Two others are useful for manipulating the Eros shape and geoid models, which are also part of the input data set.

Example: Using the crater Psyche in Fig. 1 as the central point, a 513x513 map at 15 m resolution is constructed. Fig. 3. shows the resulting shaded DEM. According to the DEM header, the low and high points are 1685 m and 82 m below the geoid respectively.

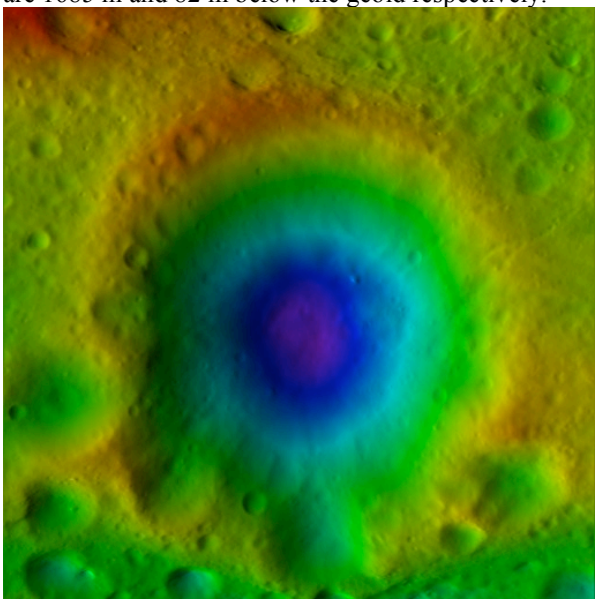

Figure 3. Geoid-relative shaded relief of Psyche.

Goals: It is hoped that distribution of this preliminary software will stimulate suggestions for its improvement. Such a package is envisioned as a way of making high-resolution topographic data accessible for small bodies like Eros, or larger ones such as Mercury and the Moon.

References: [1] Gaskell, R.W., et al. (2007) *LPS XXXVIII,* Abstract #1333. [2] Gaskell, R.W. (2005) AAS_05_289

Acknowledgement: This work is supported by NASA's Discovery Data Analysis Program.