ENHANCEMENTS TO GRIDVIEW: SOFTWARE FOR TOPOGRAPHY DATA ANALYSIS. J. H. Roark[1], [1]Science Systems and Applications, Inc. Code 698, NASA GSFC, Greenbelt, MD 20771, James.H.Roark@nasa.gov

Introduction: Gridview (figure 1) is an IDL software application designed to aid researchers in their efforts to analyze, measure and visualize gridded data products such a planetary topography. While it was specifically designed to be used with Mars Orbiter Laser Altimeter (MOLA) data, it also functions well as a tool for analyzing other gridded data sets. It has been used by researchers and students to study Mars topography, magnetic anomalies and Gamma Ray Spectrometer grids as well as the topography of other planetary objects. It has become a basic tool in the study of visible and buried basins on Mars [1], investigations of the dichotomy boundary [2], measurement of slope [3], and measurement of volcano and crater geometry [4].

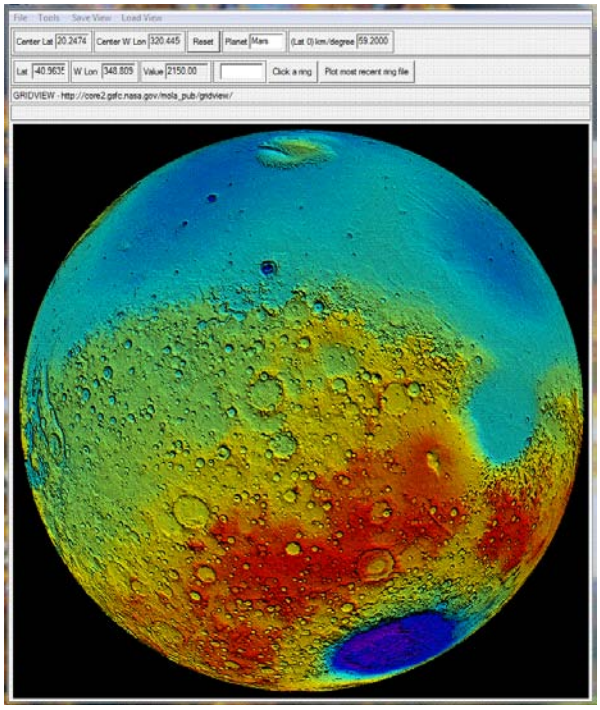

Figure 1. Basic layout of the Gridview application, displaying shaded relief Mars MOLA topographt data.

Recent enhancements to Gridview:

1. User interface updates - options for selecting Lunar, Earth, Mars, or arbitrary planetary dimensions
2. Data handling updates - compatibility with GMT/NetCDF grid formats, and the ability to load MOLA laser count files
3. Measurement capability updates – addition of a distance calculation tool, and the automatic calculation of average elevation values for defined regions when using the area/volume calculation tool
4. Visualization updates - the ability to plot filled basin rings
5. General updates - ported the source code to IDL version 7.0

User interface updates: Gridview has tools that can be used to measure planetary body physical parameters such as distance, height, slope, area, and volume. A key variable in these calculations is planetary size which affects the distance between latitude and longitude values. Gridview was originally designed to work with Mars topography data processed from MOLA laser altimeter data so the value for the diameter of Mars was hard coded into the calculation equations. To accommodate users wishing to use Gridview with data from other planetary bodies, these hard coded values for planetary diameter was changed to a variable that can be set by the user in the "Set Planet Dimensions" tool (figure 2). This enables accurate calculations as well as plotting of crater and basin rings on any sized planet or moon. To make it easier for users to work with Mars, Lunar and Earth data, selectable checkboxes for easily setting to these dimensions were added.

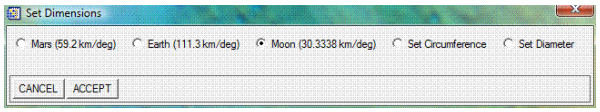

Figure 2. Set Planet Dimension dialog box.

Data handling updates: Gridview was modified to enable the loading of grids in the newer version of the open standard NetCDF (Network Common Data Form) data format that is commonly used in applications such as GMT (Generic Mapping Tools). This format has the advantage of being machine-independent, making it easier to share data. Modifications were also made to enable the loading and visualization of MOLA laser count data that contains the number of observations for each cell used to produce the MEGDR grids available from the PDS Mars Global Surveyor geosciences node [5]. To load the count grids users will be prompted to enter values for the latitude and longitude limits of the grid as well as the map resolution. These values can be found in the label files that accompany the grid files. Once loaded, users can dis-

play the data (figure 3) with a color table that shows the density of count values and use mouse tracking to display the exact count value for the cell under the cursor.

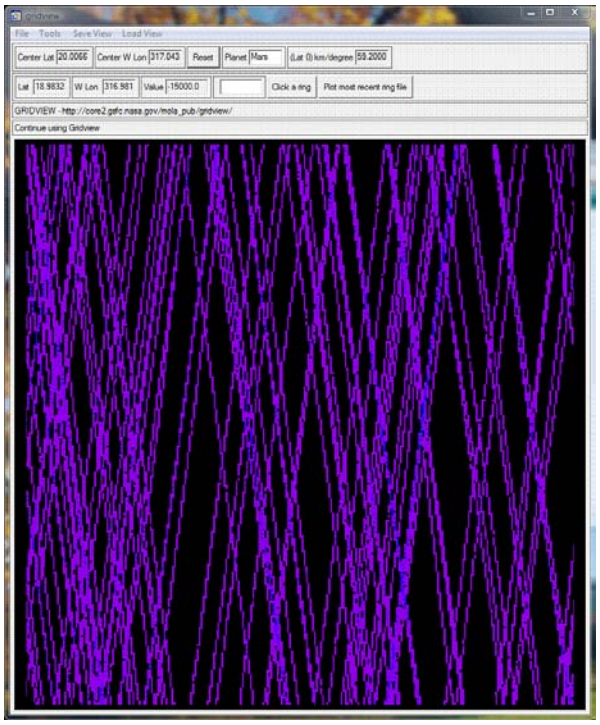

Figure 3. Gridview displaying MOLA count data for a 2 degree square region (19N-21N, 318W-316W). Purple and blue colors show tracks with count values. Black regions show gaps in the data.

Measurement capability updates: A calculation tool was recently added to Gridview to make it easier for users make distance measurements. Once "Calculate Distance" is chosen in the tools menu, the user selects two endpoints for the calculation and the distance is displayed in the information window. In addition, the Area/Volume calculation tool was modified to display the average elevation along with other information such as the minimum and maximum elevation values within a user defined region of interest.

Visualization updates: While Gridview users have always had the ability to plot crater and basin rings drawn as solid, dashed or dotted lines, a new option was added that allows users to plot them as filled rings (figure 4). Users can use the Black rings/White rings toggle in the tools menu to switch between a black and white fill when using standard colortable views.

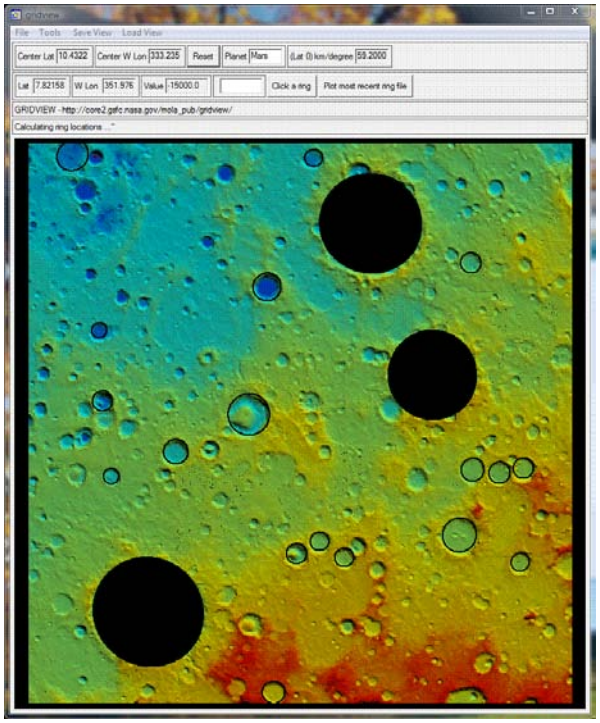

Figure 4. An example of Gridview displaying solid filled and regularly outlined crater rings.

General updates: Gridview was written using the IDL programming language provided by ITT Visual Information Solutions [6]. Unlike previous versions, the most recent version, IDL version 7, uses a new development environment called the IDL Workbench based on the popular, open-source Eclipse framework. The Workbench provides a graphical front-end to IDL and enables sophisticated code management, development, and debugging tools. Using this development environment required porting the Gridview software routines into the new development architecture.

Availability: Gridview is being developed by the Planetary Geodynamics Laboratory at NASA's Goddard Space Flight Center and can be downloaded at http://geodynamics.gsfc.nasa.gov/gridview/. The software can run on any system supported by the IDL virtual machine application supplied by ITT [6].

References: [1] Frey, H. V. et. al. (2007) LPS XXXVIII, Abstract #1353, [2] Frey, H. V. et. al. (2005) LPS XXXVI, Abstract #1407, [3] Enevoldsen, A. A. et. al. (2005) LPS XXXVI, Abstract #1595, [4] Shupack, B. B. et. al. (2006) LPS XXXVII, Abstract #1157 [5] http://pds-geosciences.wustl.edu/missions/mgs/megdr.html. [6] http://www.ittvis.com/ProductServices/IDL.aspx