UPLOADING AND VIEWING IMAGES IN JMARS USING THE CUSTOM MAP UPLOAD TOOL. M.
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Introduction: JMARS (Java Mission-planning for Analysis and Remote Sensing) users have long been able to upload their own data into the application through the use of the custom map tool, but as technology has evolved, users found themselves working with larger and more complex datasets that no longer fit into what once seemed like appropriate limitations. At the request of NASA Headquarters, we have recently completed an effort to allow users to upload larger maps in additional file types and formats. This functionality is available today, with plans for additional enhancements to come over the next few years.

JMARS is a planetary Geographic Information System that was developed by Arizona State University's Mars Space Flight Facility. JMARS was originally developed as a mission planning and data analysis tool for NASA orbiter and researchers but it was released to the public in 2003 [1].

JMARS provides functionality to view data for Mars, the Moon, Vesta, Ceres, Mercury etc. Users can also upload custom maps for any of these bodies. Supported datasets include thousands of global maps and millions of individual images collected from various NASA instruments including THEMIS, HiRISE, CTX, CRISM, and SHARAD. JMARS allows users to upload and view their own raster maps within the context of the already available data.

The custom map upload tool allows map uploads that are both georegistered and those that are not. The custom map process allows users to effortlessly ingest their data without the concerns of projection transformations or file conversions.

Updating Custom Maps: Before the effort to revamp custom maps began, uploading personal raster images had some restrictions within the tool. With the advances in technology and newer libraries, the custom map tool now allows larger images to be uploaded, additional file formats to be read and more projection transformations. Previously, the upload process had a one gigabit limitation on uploads. The current upload process not only allows larger images to be uploaded but it can also upload and handle BigTiff files. Another update to the tool involved better handling of feedback to the user. This feedback involved informing the user of errors, processing stages and map metadata.

Image Upload Formats: The custom map tool uses GDAL (Geospatial Data Abstraction Library) for image processing. Currently, JMARS supports uploading many image formats including: JPEG, GeoTiff/Tif, PNG, Image, GIF, ISIS Cube (version 2 and 3), JPEG2000, VICAR, PBM, PGM, PPM, BigTiff and FITS.

Uploading Options: Users have three different upload options (Figure 1). "Manual Uploads" require users to enter the corner points of the image, and an upload name at minimum. Other optional metadata includes an ignore value, units, description, links, citations and keywords.
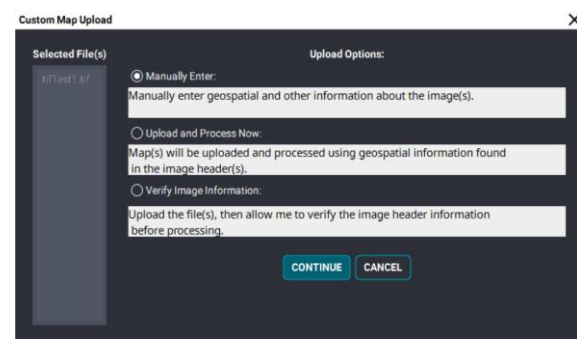

Figure 1: Custom Map Upload options

The next upload option is "Upload and Process Now". This option requires that the image is geospatially registered. The header must contain a projection, geographic coordinate system and corner points. With the "Upload and Process Now" option, the user does not need to be concerned with projection transformations. The transformation, if necessary, is done automatically. Additional metadata can also be added to the image after the upload is successful.

The last upload option is the "Verify Image Information". This allows the image header to be read before the uploading process begins. After the header is successfully read, the user can alter any header information, add metadata, or upload the image with the current header information.

User Interface: The new user interface has been updated to create a more user friendly and intuitive experience. The "Upload" section has two tables (Figure 2). The first table represents images that are currently processing or ready to be verified. The table can be customized to show or hide columns such as the name of the image, the image identification number, stage, status, notes, etc.
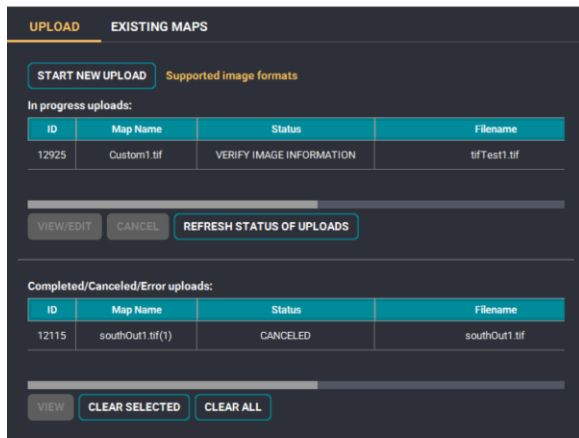
Figure 2: Custom Map Upload tab shows the new user interface

The second table shows images with a completed, canceled or error status. If a map fails to upload, the map will be represented in the Completed/Cancelled/Error table. The image row will have an error message to give insight on the failure (Figure 3).

Figure 3: The Completed/Canceled/Error table showing multiple maps with different status'.

The "Existing Maps" section allows users to view maps they have uploaded or maps that have been shared (Figure 4). The table allows many different filter options. The filters can display maps that are shared, shared with them, have certain keywords, etc. The existing maps table also allows column information to be shown or hidden. A few of these columns are corner points, projection information, citations, abstracts and more.
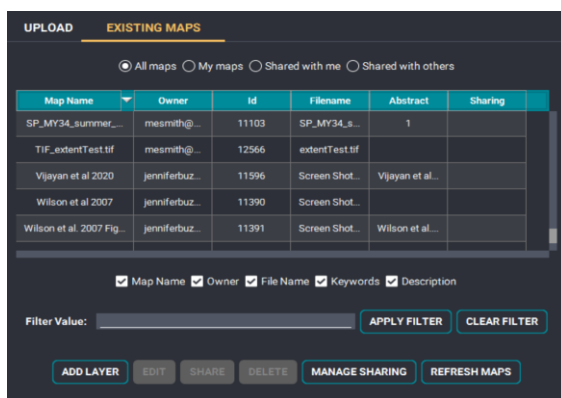

Figure 4: The existing tab table shows successfully uploaded images.

Additional processing: After a map is successfully uploaded, metadata can be altered or added. In addition to metadata, the image can be reprocessed with updated corner points if necessary.

Projections: The JMARS projection is an oblique cylindrical projection. If a map is uploaded in a different projection, the map will be converted from the source projection to the JMARS projection. In order to have a successful coordinate transformation, the source image must have a projection and geographic coordinate system registered with GDAL. The entire process is done automatically and allows users the ease of uploading images without dealing with the complexities of projection transformations.

Shared Maps: Successfully uploaded maps can be shared with other users. Groups can also be created that contains one or more JMARS users. This allows maps to be shared with many users at once. Once a map is shared with another JMARS user, that map can be viewed. When shared, the map can be viewed by provided users but only the owner of the map can edit it. The original map owner can stop sharing the map with anyone at any time.

Conclusion: The custom map upload process was developed to allow users to view their own images in JMARS. While the upload process has been updated to run more efficiently, enhancements will continue.

Additional Information: The JMARS team can be reached at jmars@help.asu.edu for help or additional questions.

JMARS 5 can be downloaded at jmars.mars.asu.edu/download.

References: [1] Christensen P. R. et al.(2009) *JMARS – A Planetary GIS*, *EOS Trans., AGU, 90(52), Fall Meet.Suppl,* Abstract #IN22A-06.