

NEW MAP-BASED WEB PORTAL TO ACCESS CARTOGRAPHIC PRODUCTS AT THE USGS ASTROGEOLOGY SCIENCE CENTER. M. S. Bailen, L. D. Montes, T. M. Hare, L.R. Gaddis, J. J. Hagerty. U. S. Geological Survey, Astrogeology Science Center, 2255 N. Gemini Dr., Flagstaff, AZ, 86001 (mbailen@usgs.gov).

Introduction: The USGS Astrogeology Science Center (ASC) provides a venue and centralized repository for multiple, digital planetary data catalogs including the NASA/USGS PDS Cartography and Imaging Science Node Annex (PDS Annex) [1], the NASA/USGS MRCTR GIS Lab collection of GIS-ready planetary geologic maps [2], and the NASA/USGS Regional Planetary Image Facility (RPIF) collection of historical cartographic products [3]. These materials can now be searched by a new map-based web portal (<https://astrogeology.usgs.gov/maps>) with an emphasis on data delivered by the PDS Annex (<https://astrogeology.usgs.gov/annex>). To better explore cartographic products with global coverage, the map portal utilizes a web mapping service (WMS) to provide zooming, and panning capabilities. For regional products, the map portal provides users with the footprint within the context of a basemap of the appropriate target. Not all of the cartographic products that are stored within the catalogs at the ASC have been geo-located (or if the product is global, stored in the WMS), but we plan to progressively add this functionality for all new and legacy products.

Background: The ASC has operated a web-based search portal and online data catalog called Astropedia [4] for over seven years. Astropedia has proven to be a stable platform that provides reliable access to multiple image catalogs and collections stored at the ASC, including the PDS Annex. Despite the fact that many of the stored products contain geospatial metadata, Astropedia previously did not provide map-based searches. The new WMS and map-based web portal is taking full advantage of this geospatial metadata. This capability supplements tools such as the Planetary Image Locator Tool (PILOT, <https://pilot.wr.usgs.gov/>) [5] and the Projection on the Web (POW) tool (<https://astrocloud.wr.usgs.gov/>) [6] that allow users to find and download low-level PDS data and to perform basic image processing using the USGS Integrated Software for Imagers and Spectrometers (ISIS3).

Interface: The search interface (*Figure 1*) for the new map-based web portal is equipped with many features that will benefit the user in locating and characterizing geospatial products in ASC collections. The tool simplifies searches by presenting a chooser based on planetary body in the left panel and search filters on the right panel. Links to additional sources of information (example: Nomenclature and raw PDS image data from a variety of NASA missions) are also visible in the left information panel. In addition, IAU

approved cartographic statistics such as the equatorial radius, maximum elevation, right ascension and declination, are listed for each body when available [7]. Filters in the right panel allow searches by spacecraft, product type, region, and named feature. An additional checkbox restricts the search to GIS-Ready products. Search results are retrieved and placed in the right panel while the total number of search results is reported above. If a product from the list of search results is selected, the web site provides additional details about the product and options for downloading it.

Interactive Map: An interactive map will be made available (see lower left corner of *Figure 1*) when searching for products delivered by the PDS Annex (and possibly other catalogs, depending on the geospatial metadata). The map contains buttons to navigate, enlarge and download the viewed basemap. In the top right corner of the map is a layer selection tool. Following a successful search, the layer selection tool will be populated with the current set of global search results that are retrievable through the WMS. The map is also used to plot bounds for regions, features and selected non-global products. These plots will be displayed in red. The map was built using the Openlayers [8] mapping library and a collection of in-house Javascript libraries to alleviate special challenges associated with planetary mapping (e.g. different coordinate systems, radii, etc.).

Summary: The new planetary geospatial data access portal for the PDS Annex (and other cartographic catalogs at the ASC) now provides improved map-based support for identifying and downloading data products. Please give it a try and provide feedback at the link <https://astrogeology.usgs.gov/contact>.

References: [1] Gaddis, L.R. et al., 2013, Astropedia Annex: a PDS Imaging Node Repository for Geospatial Planetary Research Products. LPSC 44, Abs #2044. [2] Hare, T.M., et al, 2015, Planetary GIS at the U.S. Geological Survey Astrogeology Science Center. Second Planetary Workshop, Abs #7005. [3] Bailen, M.S., et al, 2016. Expanded Access to Historical Cartographic Products at the USGS Astrogeology Science Center. LPSC 47, Abs #1494. [4] Bailen, M.S. et al, 2012. Astropedia, a Data Portal for Planetary Science. LPSC 43, Abs #2478. [5] Bailen, M. et al. 2013. Using the PDS Planetary Image Locator Tool (PILOT) to Identify and Download Spacecraft Data for Research. LPSC 44, abs. #2246. [6] Hare, T.M. et al. 2013. Map Projection Web Service for PDS Images. LPSC 44, abs #2068 [7] IAU Working Group on

Cartographic Coordinates and Rotational Elements.

URL: <https://astrogeology.usgs.gov/groups/iau-wgcre>[8] URL: <http://openlayers.org/>.

The screenshot displays the ASTROPEDIA web portal interface. At the top, the header includes the ASTROPEDIA logo, search filters, and navigation options. The main content area is divided into two columns. The left column features a large image of Mars, a sidebar with 'Mars Cartographic Stats' (Equatorial Radius: 3,396.19 km, Polar Radius: 3,376.2 km, Max Elevation: 22.64 km, Max Depression: 7.85 km, Right Ascension: 317.27 deg, Declination: 54.43 deg, Length of Day: 1.03 days), and a map of Mars with various regions labeled (e.g., Mercurius, Cebrenis, Diaria, Amazonis, Phoenicea, Utopia). The right column lists several data products with their titles, file sizes, and dates:

- Mars HRSC MOLA Blended DEM Global 200m** (application/vnd 1 kB, Sep 24 2017): This data product is a blend of digital elevation model (DEM/DTM) data derived from the Mars Orbiter Laser Altimeter (MOLA) instrument aboard NASA's Mars Global Surveyor spacecraft (MGS), and the...
- MSL Gale Merged Orthophoto Mosaic 25cm Oct. 2016** (image/tiff 4 MB, Oct 20 2016): This basemap was initially created as an assessment tool for the entry, descent, and landing (EDL) analysis conducted by the MSL engineering team to assess Gale crater as a safe landing site for the...
- MSL Gale Merged Digital Elevation Model 1m Oct. 2016** (image/tiff 170 kB, Oct 20 2016): This digital elevation model (DEM) was initially created as an assessment tool for the entry, descent, and landing (EDL) analysis conducted by the MSL engineering team to assess Gale crater as a safe...
- Mars THEMIS Day IR Controlled Mosaic Sinus Sabaeus 30S 00E 100 mpp** (application/vnd 452 MB, Aug 30 2013): This product is a daytime infrared image mosaic generated using Thermal Emission Imaging System (THEMIS) images from the 2001 Mars Odyssey orbiter mission. The mosaic is generated at the full...
- Viking MDIM2.1 Colorized Global Mosaic 232m** (application/vnd 12 GB, Feb 02 2009): This global image map of Mars has a resolution of 256 pixels/degree (approximately 231 m/pixel at...

Figure 1. Screenshot of the new map-based web portal at <https://astrogeology.usgs.gov/maps>.