

ASTROPEDIA: LONG-TERM ACCESS FOR PLANETARY CARTOGRAPHIC PRODUCTS.

M.S. Bailen, T.M. Hare, and J. Shute, U. S. Geological Survey, Astrogeology Science Center, 2255 N. Gemini Dr., Flagstaff, AZ, 86001 (mbailen@usgs.gov).

Introduction: The USGS Astrogeology Science Center houses a secure long-term access and storage facility for high-level planetary cartographic data products. The products and metadata catalogued in Astropedia [1] (<http://astrogeology.usgs.gov/search>) are relevant to both the planetary science community and the general public. The products indexed in the catalogue are primarily high-level, science-ready products (e.g. derived, value-added, annotated, GIS, or mosaicked products that are not solely based on raw mission data). The typical Astropedia product was not funded for search and storage by a mission nor catalogued by the PDS. These products include globes, geologic maps, historical imagery, mosaics, meeting reports, digital elevation models, landing site maps, and more.

We have completed beta testing on Astropedia and it is now publically available. Since its launch, the search portal has seen a significant increase in traffic and downloads. As the catalogue proves its usefulness to the planetary science community, the USGS Astrogeology Science Center will continue to ingest the highest quality cartographic products. Ingestion has so far centered on products and data produced by the USGS Astrogeology Science Center, but we openly encourage external institutions to submit products and data for inclusion.

Background: Astropedia was initially funded by the 2009 NASA PG&G Planetary Cartography and Geologic Mapping Working Group (PCGMWG) with the objective of developing the following:

Web services for providing modern and efficient means of identification, cataloging, ingestion, and distribution of existing and future planetary cartographic products and information.

The Astropedia search interface was completed on schedule and went live in the spring of 2012. The portal was then made available with full

functionality and a base set of searchable products in the repository. Among the products available were the Mars Viking Hemisphere Point Perspective Mosaics, the Mercury MESSENGER Global Mosaic, the THEMIS Mosaics for the final MSL Candidate Landing Sites, Apollo Lunar-surface Panoramas, and nearly one hundred more USGS Astrogeology products. Additional funding was awarded in 2012 to continue the ingestion process and improve the search interface.

Metadata, Keywords, Ancillary Data and Derived Products: Products ingested into Astropedia are required to include a minimal level of metadata based on the FGDC geospatial metadata standards [2, 3]. For the search interface to be successful, the ingested data products must be well documented, with precise titles and keywords. Astropedia also provides storage and indexing for ancillary products such as product labels, legends, additional geo-spatial information files, processing instructions, and low-resolution thumbnail and browse versions of the products. The catalogue also provides methods of crosslinking to derived and related products contained in the archive, easing the burden of searching for similar products and areas of study.

Architecture: The architecture of Astropedia can be divided into six components (see Figure 1)

1. *Search Form.* This is the main access page for performing Astropedia searches. It allows filtering by keyword, geospatial extents, and various levels of metadata. The form returns paginated search results with links to product detail pages and download options. The form and results pages were written in the open-source Yii PHP Framework [4]. Client-side tasks and asynchronous server calls for these pages were implemented using the open-source JQuery Javascript library.

2. *Product Display Pages.* These pages highlight specific collections of products. They provide introduction text, slideshows, references,

and paginated lists of filtered products. These pages are implemented using the same language and API calls as the Search form.

3. *Search Index*. This is a text-based index of all the files in the repository. It allows quick look ups of products, download links and metadata. Queries were written using the Apache Lucene Query toolset [5]. This toolset is used by many high-profile web applications to perform their real-time searches (e.g., Twitter). We will soon be moving to another search library called SOLR [6], built on top of Lucene. SOLR will allow us to perform more complex, weighted queries.

4. *Storage Repository*. This is a large NFS share used to store the products and data. The repository is place on a RAID 6 redundant disk array [7] and backed up daily. Backups are routinely delivered offsite thus securing the data from catastrophic events. The NFS share is controlled by the open-source, JAVA-based, Alfresco Document Management System [8].

5. *Ingestion Tools*. These are a set of HTTP-accessible scripts written in-house to upload products, parse files for metadata, apply additional metadata using templates, generate thumbnail and browse images, and handle ancillary files and derived products. These scripts were written using Alfresco's JAVA development library and their server-side Javascript API [8].

6. *Web Content Manager*. This is a set of scripts for adding product display pages, news items, and other web content to the main Astrogeology website. The manager was written using the same API as was used for the Ingestion Tools.

References: [1] Bailen M.S. et al. (2012) *Astropedia, a Data Portal for Planetary Science*. LPSC 43, Abs #2478. [2] see <http://www.fgdc.gov/> [3] Hare, T.M., et al. (2011) *FGDC Geospatial Metadata for the Planetary Domain*, LPSC 42, Abs #2154. [3] Hare, T.M., et al. (2007), *Advanced Uses of Open Geospatial Web Technologies for Planetary Data*, LPSC 38, Abs #2364.[4] <http://www.yiiframework.com/> [5] <http://lucene.apache.org/> [6] <http://lucene.apache.org/solr/> [7] <http://en.wikipedia.org/wiki/RAID> [8] <http://www.alfresco.com/>

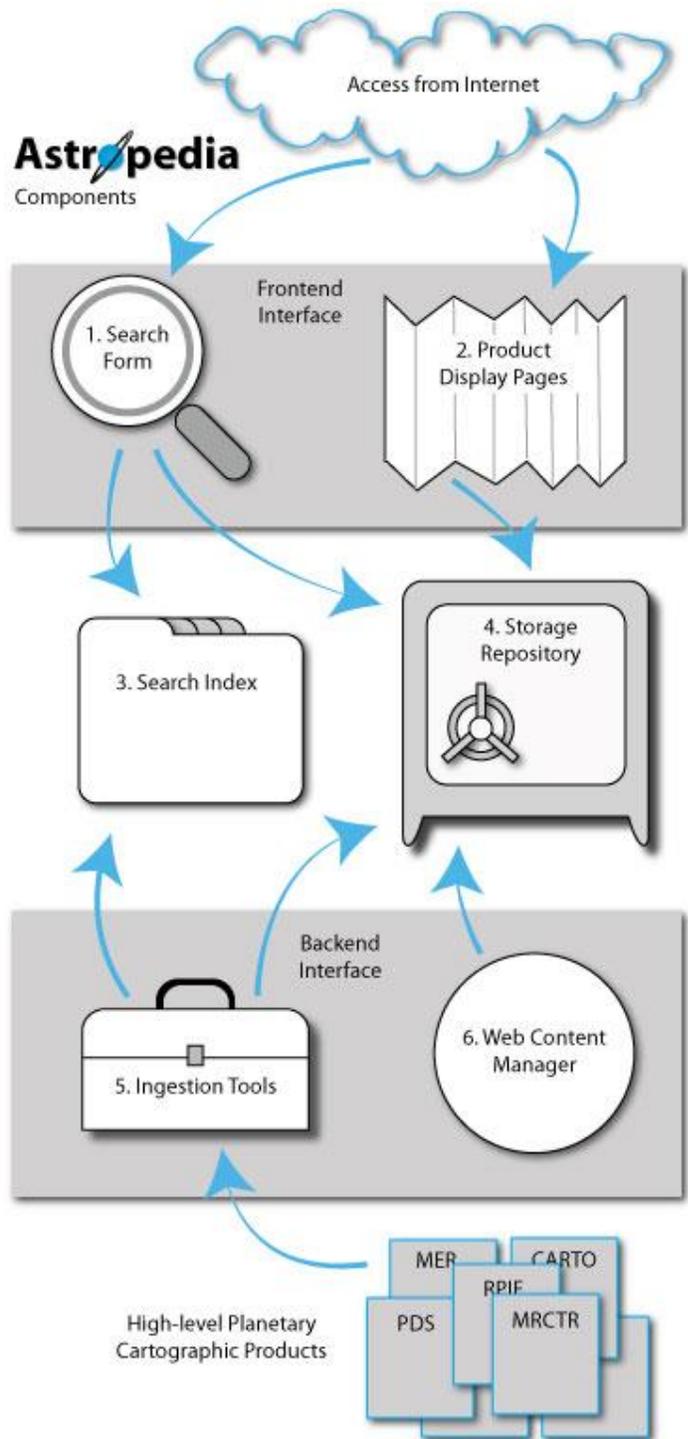


Figure 1. The Astropedia Architecture.