

## Apollo Lunar Sample Photograph Digitization Project Update

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**Introduction:** This is an update of the progress of a 4-year data restoration project effort funded by the LASER program to digitize photographs of the Apollo lunar rock samples and create high resolution digital images and undertaken by the Astromaterials Acquisition and Curation Office at JSC [1]. The project is currently in its last year of funding.

We also provide an update on the derived products that make use of the digitized photos including the Lunar Sample Catalog and Photo Database[2], Apollo Sample data files for GoogleMoon[3].

**Status of the Photo Digitization Activity:** Upon completion of the third year of work on this project, we have completed scanning almost 32,000 photos, an increase of close to 14,000 photos over the previous year. Based on the latest adjusted inventory of lunar photos, this puts the photo scanning at 81% completion, with around 7,400 photos left to scan.

A comprehensive data cleanup effort was undertaken to take advantage of newer database querying capabilities that allowed for better identification and deletion of duplicate photo numbers. This activity uncovered a large number of duplicates due to the fact that photo numbers were originally compiled from data packs by rock number and some photos showed more than one rock at a time. The photo totals for Apollo 12, 15, and 17 were most affected by this problem. Apollo 11 and 14 numbers, on the other hand, actually increased from the previous inventory as many photos that had been unclassified on the original list were able to be correctly classified after inspection, and additional photos were uncovered during the review of sample data packs.

The following table summarizes the photo verification and scanning status. The table shows latest adjusted inventory based on the data verification done in the database and through visual inspection of the photos, as well as the number of images that have been scanned and added to the database. Numbers were also adjusted to exclude photos that had been ordered based on the recorded numbers in the data packs and that proved, on visual inspection, to be unrelated to the sample and/or mission in the record.

**Table 1. Inventory and Processing Status of Apollo Sample Photographs.**

Mission	Inventory	Scanned	% Complete
Apollo 11	2612	2603	99%
Apollo 12	5277	5228	99%
Apollo 14	5472	3421	62%
Apollo 15	9580	9335	97%
Apollo 16	8938	5730	64%
Apollo 17	7518	5736	76%
<b>Totals</b>	<b>39,397</b>	<b>32,053</b>	<b>81%</b>

**Lunar Sample Catalog & Photo Database:** The most important goal of this project is to make the images readily available to the public and specifically the lunar science community. The Lunar Sample Catalog & Photo Database was published to the Astromaterials Curation website in November 2010. Since its initial deployment, the online catalog database has been re-worked to extend the original functionality.

The searchable database interface provides the ability to search for information about lunar samples by many criteria: sample generic, mission, collection station or landmark, rock classification, and public display samples. For each sample, you can see details about the sample, photos, and a list of all available catalogs on our website that reference the sample and, where available, links to the data in the Lunar Sample Compendium [4]. The latest version includes the ability to search photos by photo number, as well as, provide for advanced photo search capability based on the type of photo and related sample information. Other changes include the ability to display photo search results as a table or as a photo gallery for browsing. Photos are printable and downloadable as print-quality high resolution JPEG photos.

The database user interface has also been significantly improved. Based on user feedback, we added the ability to bookmark search lists, sample details, and photo details and access them later directly through a specific URL without having to redo searches. This also allows users to navigate back and forth through the browser interface. We also revamped the photo viewing area to allow viewing more photos on the same browser window.

**Photo Availability:** Digitized photos are currently available through the Lunar Sample Catalog and Photo Database Search Interface on the Apollo Lunar Samples section of the Astromaterials Curation website at: <http://curator.jsc.nasa.gov/lunar/samplecatalog/>.

Tiff files are available by request from: Nancy S. Todd, Astromaterials Curation Database Curator, by phone at 281-483-9243 ([nancy.s.todd@nasa.gov](mailto:nancy.s.todd@nasa.gov)) or by email at [JSC-ARES-LunarRequests@mail.nasa.gov](mailto:JSC-ARES-LunarRequests@mail.nasa.gov).

In the future, the photos will also be available as PDS-compliant archives and will be served and maintained by the PDS Imagery Node in Flagstaff, AZ [5].

**Apollo Sample Data for Google Moon:** Last year, we reported the completion of the Apollo 15 and 16 data layers for use within the Google Earth/Moon application and were in the process of developing data for the Apollo 17 Lunar samples. The Apollo 17 mission data file is almost complete; all the data and galleries have been created. The remaining activity for Apollo 17 is setting the spatial coordinates of samples within mission EVA collection stations to enable their display within Google Moon. We hope that with the increased availability of high-resolution surface photography for the Apollo sites, we will be able to complete the remaining work for this mission.

Data files for selected Lunar rocks from Apollo missions 15 and 16 are available as kmz files for use with the Google Moon application. The kmz files are available for download from the Curation website [6] at :

<http://curator.jsc.nasa.gov/lunar/moon/>.

#### **References:**

- [1] Lofgren, G.E. et al. (2011) *LPS XLII*, Abstract #.
- [2] *Lunar Sample Catalog and Photo Database*, <http://curator.jsc.nasa.gov/lunar/samplecatalog/>.
- [3] Dawson, M. D. and Todd, N. S. (2011) *LPS XLII*, Abstract #1783.
- [4] Garcia, P. A. et al. (2011) *LPS XLII*, Abstract #2310.
- [5] Meyer, C., *Lunar Sample Compendium*, <http://curator.jsc.nasa.gov/lunar/compendium.cfm>
- [6] *Astromaterials Acquisition and Curation Website*, <http://curator.jsc.nasa.gov>.

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