

**The LPI Regional Planetary Image Facility.** M. A. Hager, P. D. Spudis, D. P. Bigwood, L. S. Chappell, and S. N. Cherry, *Lunar and Planetary Institute, Houston TX 77058*

The Regional Planetary Image Facility (RPIF) at the Lunar and Planetary Institute (LPI) was one of the first in the network, and its holdings and practices helped to set a standard for RPIF community service in subsequent years. Here we describe our plan for the next five years to maintain our standards of service and new directions we have undertaken to better serve both the planetary science community and the public at large.

All RPIF facilities have both standard holdings and specialized collections unique to their history, location, and situation. We believe that this is a strength of the RPIF network, allowing rapid and immediate access to planetary data for each facilities' serviced communities and supporting access to obscure and/or historical data and archival information through the RPIF networking capability.

#### *The core RPIF function*



RPIF libraries are expected to provide access to image and map data from all of the American lunar and planetary missions of the last 50 years. These data include

hardcopy paper and film positives, negatives, and mosaics; digital copies of select products are being continually added. Older, analog data are maintained under non-archival conditions for routine access, and multiple copies ensure against damage and wear under normal use and can be accessed by multiple users. Maps and derived products are kept for general reference in addition to numerous documents describing space missions, instruments, experiments, operational records, and results. Moreover, the questions and guide interested users to the correct data and rudimentary information on its use and interpretation.

The LPI intends to continue to provide these core services. Our collection encompasses all of the standard products of missions from the early 1960s to the present. Mission holdings from Ranger through Viking consist of paper, film, and digital copies of all primary mission image data and derived products. Data for missions since Viking are held primarily in digital form, with selected prints and maps of derived products, both published and unpublished. We maintain complete sets of Lunar Orbiter and Apollo images and maps and have stereo viewers and a light table for photo analysis and interpretation. For digital data, computer workstations, large format HDTV units with web interface, and an ArcGIS workstation within the RPIF can access and display a wide variety of new digital data for searching, browsing, selection, and study.

The LPI RPIF has a long tradition of communication, education, and public outreach efforts, and we will continue

these initiatives. We were instrumental in establishing the RPIF and LPI Facebook pages and have established a presence on several other social media networks. Although the majority of social media followers are from the United States and other RPIF countries, we also have followers from many other nations, including Australia, Argentina, Poland, and the Philippines. We evaluate these efforts on a continuing basis and adjust efforts to improve our reach. The LPI RPIF contains numerous educational books, wall charts, pictures, models, videos, and activities to support the education and public engagement efforts of the Institute and the local community. The LPI RPIF serves as the host for the RPIF Network website, event calendar, and resources (<http://www.lpi.usra.edu/library/RPIF/>).

The RPIF hosts the annual LPI Summer Interns, Solar System Exploration Research Virtual Institute (SSERVI)



Exploration Science Summer Interns, students from local institutions, and visitors from around the world. One unique program is a partnership with the Lund University School of Architecture and School of Industrial

Design. Students and their professors attend lectures, consult with specialists, research materials in the LPI RPIF and Library, and develop concepts and designs for possible application on future spaceflight missions. The students have opportunities to interact with engineers and scientists as they describe the challenges of spacecraft and mission design and human spaceflight. Results from the students' work are presented at the NASA Johnson Space Center and displayed in the LPI RPIF. We will continue to work with students and serve as a local office for LPI visitors and other data users within and outside of NASA research programs.



#### *LPI-specific RPIF functions*



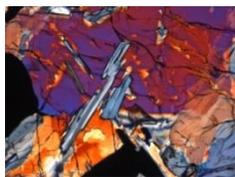
The LPI holds a unique role in the RPIF network as the facility most closely associated with the NASA Johnson Space Center and its associated human spaceflight programs, from Project Mercury through the current ISS expeditions. The LPI holds special expertise with regard to the Moon and the collection of lunar data from robotic and human missions, including information on the

lunar sample collection which makes up the bulk of our unique collections. In addition to the actual lunar mission data, we maintain a large collection of supporting information and studies, including Apollo experiment reports, mission plans, transcripts, debriefs, and advanced studies to support future human and robotic exploration of the Moon.

We serve as a primary reference site for a wide variety of lunar science and exploration data and reports. The current LPI website contains an abundance of Apollo mission studies and planning documents, including strategic exploration studies and plans. We have completed a funded project to digitize and make available through the RPIF the Apollo Lunar Surface Experiment Package (ALSEP) instrument support data, including ~700 documents with ~40,000 pages of instrument descriptions and operating history [1, 2]. This collection is now available through the new Universities Space Research Association (USRA) Houston repository database (<http://www.lpi.usra.edu/lunar/ALSEP/>). The second phase of this project will include materials scanned from the federal archive.

We have expanded the book and document collection to include digital versions of early, hard-to-locate reports, including the U.S. Geological Survey Annual Progress Reports and the Interagency reports upon which much Apollo mission planning was based. We will pursue new opportunities to leverage the LPI RPIF assets to expand access to planetary data in useful formats.

We have created an online digital archive of lunar maps, images, and reports (<http://www.lpi.usra.edu/lunar/>) and will add to this collection as resources permit. We have created one of the largest lunar sample digital archives available (<http://www.lpi.usra.edu/lunar/samples/atlas/>) and will revise



and add to this collection as contributors become more familiar with it and donate their data for inclusion. The online lunar atlas and map collections form the nucleus for online data access through our RPIF

([http://www.lpi.usra.edu/lunar/lunar\\_images/](http://www.lpi.usra.edu/lunar/lunar_images/)). We will add new data sources to these online atlases, including digital Lunar Orbiter frames created by the Lunar Orbiter Image Recovery Project (LOIRP) effort, digitized Lunar Surveyor images, maps, support materials, and selected products from more recent lunar missions, including Chandrayaan-1, Kaguya, and Lunar Reconnaissance Orbiter (LRO).



The Clementine Mapping Project (<http://www.lpi.usra.edu/lunar/tools/clementine/>) is an interactive data tool that has proven to be both enormously popular and useful to the planetary science community. This tool allows maps of surface spectral reflectance and

composition to be easily specified and made with a few clicks and an internet connection. We plan to expand this tool into a more general mapping tool to take advantage of the newer, high-resolution lunar data sets provided by Chandrayaan, Kaguya, and LRO. In addition, new types of supporting geochemical and geophysical data, including currently difficult to access gamma-ray data from Lunar Prospector, will also be included in the expansion of this mapping tool. These additions would allow the overlay of multiple data sets, such as elemental content and gravity, to the existing mapping capability for images and topography.

#### Summary

In the coming years, the LPI RPIF will continue its traditional service role as a planetary data library and expand its reach through new technologies, making obscure but useful data sets available to a wider user community. New initiatives in digitizing old lunar data have made valuable resources more widely available. We have extended the reach of the RPIF through social networking and have made exciting new discoveries of planetary science more widely available to the educational community and the general public. We will be working with LPI partner New Media Consortium to extend our social media effort further. Leveraging our in-house resources and expertise, ArcGIS training workshops will be organized for the lunar and planetary community. In the coming years, we will continue these existing efforts and develop new products and tools utilizing mission data to better serve the planetary science community and NASA.

References: [1] Nagihara, S. et al. (2014) LPSC 45, abstract #1153. [2] Nagihara, S. et al. (2015) *LEAG*, abstract #2019.