

THE NASA REGIONAL PLANETARY IMAGE FACILITY NETWORK: A GLOBALLY DISTRIBUTED RESOURCE FOR THE PLANETARY SCIENCE COMMUNITY. J. J. Hagerty¹, R. C. Anderson², S. Byrne³, M. Hager⁴, A. Hayes⁵, R. Jaumann⁶, P. Mougini-Mark⁷, J-P. Muller^{7,8}, P. H. Schultz⁹, J. Spray¹⁰, T. Watters¹¹, and D. A. Williams¹², ¹USGS, Astrogeology Science Center, Flagstaff, AZ 86001; ²Jet Propulsion Lab, California Institute of Technology, Pasadena, CA; ³Lunar and Planetary Lab, Univ. of Arizona, Tucson, AZ; ⁴Lunar and Planetary Institute, Houston, TX; ⁵Cornell Univ., Ithaca, NY; ⁶DLR, Institute of Planetary Research, Berlin, Germany; ⁷Hawaii Institute Geophysics and Planetology, Univ. of Hawaii, Honolulu, HI; ⁸Mullard Space Science Lab, Univ. College London, London, UK; ⁹Brown Univ., Providence, RI; ¹⁰Planetary and Space Science Centre, University of New Brunswick, New Brunswick, Canada; ¹¹Center for Earth and Planetary Studies, National Air and Space Museum, Smithsonian Institution, Washington, DC; ¹²School of Earth and Space Exploration, Arizona State Univ., Tempe, AZ. Email: jhagerty@usgs.gov.

Introduction: NASA's Regional Planetary Image Facilities (RPIFs) are planetary data and information centers located throughout the United States, in Canada, and overseas. The U.S. locations are currently co-funded by NASA and their host institutions [1]. A network of these facilities was established in 1977 to "maintain photographic and digital data as well as mission documentation. Each facility's general holdings contain images and maps of planets and their satellites taken by NASA Solar System exploration spacecraft. These planetary data facilities, which are open to the public, are primary reference centers for browsing, studying, and selecting planetary data including images, maps, supporting documentation, and outreach materials. Experienced staff at each of the facilities can assist scientists, educators, students, media, and the public in obtaining materials for their own use" [2].

The network of RPIFs has expanded to nine U.S. facilities and seven facilities in other countries. The first RPIF to be established outside of the U.S. was in the United Kingdom in 1980, at University College London (UCL), and since then RPIFs have been set up in Canada, France, Germany, Israel, Italy, and Japan. Through its longevity and ability to adapt, the RPIF Network has leveraged its global reach to become a unique resource covering 60 years of international planetary science.

Historically the Network nodes have had an institutional focus, whereby they provided resources to local and regional clients, and communicated with other nodes only when the need arose. Using this methodology, the nodes of the RPIF Network, hereafter referred to as RPIFN, have combined to serve an average of ~65,000 people per year since 2000 (**Fig. 1**). However, with the advent of simpler and more wide-ranging forms of data transfer and data sharing, our aim is to allow the nodes to operate together to provide the planetary science community and the public with greater access to 1) archived mission products (e.g., maps, photographs, films, and documents); 2) mission-enabling documentation and software (e.g., data on previous mission design, development, implementation, and evaluation); 3) science and public research

and training support for complex mapping software, and 4) outreach experiences and capabilities. Each node of the Network has unique capabilities and resources that meet one or more of the above criteria; however, by linking the nodes through a collaborative Network, it is now possible to provide a more diverse array of materials to a wider array of users, especially to those in the planetary science community.

Five Year Plan: The role of the RPIF Network is evolving as key historical planetary data sets are converted to digital files and are made available online. Instead of trying to compete with vast array of materials housed in digital servers (i.e., the PDS, whose goal is to focus on serving more technically oriented NASA-funded users), *the RPIF Network will serve as a valuable resource for specialized knowledge and services that will make it possible to remove the barriers associated with locating, accessing, and exploiting planetary science data, particularly derived data products. The goal of the Network is to provide support and training to a broad audience of planetary data users.*

The RPIF Network nodes will continue to serve as reference centers that are needed for preserving and accessing derived products from past, present, and future Solar System exploration missions. In an effort to meet the planetary science community's evolving needs, we aim to achieve the following primary goals:

1. Maintain and improve the foundation that has been established over the past four decades so as not to lose critical, historical information and to meet the Federal mandate for data discovery and transparency [i.e., 3]. This goal will be aided by a systematic effort to scan and digitize fragile materials as a means of increasing access and preserving the materials. It should be noted that due to the vast volume of materials in our collections, the digitization of all files will require a time-intensive and concerted effort.
2. Help users to locate, access, visualize, and exploit planetary science data. In an effort to make this possible, RPIF personnel are being trained in the use of common planetary data sets and processing

tools such that they can assist researchers with locating and using planetary data. Many of the facilities have begun to establish Guest User Facilities that allow researchers to use and/or be trained on GIS equipment and software as well as other specialized equipment like Socet Set/GXP workstations. Another tool that is being used in this effort is the Magic Planet data visualization system from Global Imagination (**Fig. 2**). Each US facility as well as the UK facility, now has one of these globes, which will make it easier for researchers to visualize and work with global remote sensing data sets.

3. Improve the connection between the Network nodes while also leveraging the unique resources of each node. To achieve this goal, each facility will develop and share searchable databases of their entire collections, enhanced by the development of robust metadata.
4. Communicate more effectively and regularly with the planetary science community in an effort to make potential users aware of resources and services provided by the Network.

By achieving these goals, we will introduce new users to data products from past, current, and new missions. The underlying premise of data needs for users of the RPIF Network (whether hard copy or digital) is that research and discovery does not end with each mission, but continues for generations to come. As such, the RPIF Network provides the bridge between generations as one phase of exploration ends and another begins.

In summary, over the next five years the RPIF Network will continue its traditional service as a source of derived data products and expand its reach through new technologies by making obscure, but critical data sets available to a wider user community. New initiatives in digitizing hard copy data will make valuable resources widely available and provide a mechanism for long term preservation as required by the Federal government [i.e., 3]. It should be noted that digitization of all photographic imaging data at the same resolution as the original cannot be fully achieved except at large cost; therefore, access to hard copy materials remains necessary. Consequently, the distributed reference collections held by the RPIFs remain an important and accessible resource. By leveraging the expertise and resources of the RPIF Network, NASA will be able to make the exciting new discoveries of planetary science more widely available, which will allow the Network to better serve NASA, the planetary science community, and the general public.

For more information, or to request materials, please contact any of the RPIFs listed below. Addi-

tional, detailed information can also be found at <http://www.lpi.usra.edu/library/RPIF>.

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References: [1] Shirley and Fairbridge, eds. (1997) *Encyclopedia of Planetary Sciences*, Chapman and Hall, London, 686; [2] Muller and Grindrod (2010) *European Planetary Science Congress 2010*, 883; [3] Holdren, J.P. (2014), Improving the Management of and Access to Scientific Collections, *Memo. for the Heads of Executive Depts. and Agencies*, Executive Office of the President, Office of Science Technology and Policy.



Figure 1. Each RPIF serves a wide range of users including faculty, staff, students, and visitors.



Figure 2. Magic Planet data visualization system from Global Imagination. A new visualization tool for global planetary data.