

A NEW GEOGRAPHIC INFORMATION SYSTEMS LAB: FACILITIES AND INSTRUCTION AT THE RONALD GREELEY CENTER FOR PLANETARY STUDIES. D. M. Nelson¹ and D. A. Williams¹, ¹School of Earth and Space Exploration, Arizona State University, Tempe, AZ 85287 (DavidMNelson@asu.edu).

Introduction: The NASA Regional Planetary Information Facilities (RPIFs) provide images, literature, and education outreach pertaining to past and existing planetary missions. Over the last two years, we at the Ronald Greeley Center for Planetary Studies (RGCPS), the Arizona State University (ASU) RPIF, have added a Geographic Information Systems (GIS) computer laboratory to our facility. This GIS lab will be maintained by the RGCPS Data Manager, who will also instruct researchers on the use of GIS and image processing software. By providing planetary-based GIS training, we hope to encourage the scientific community to perform planetary research at the RGCPS.

The RGCPS: The RPIFs were established in the 1970s to: 1) archive photographs and literature from active and completed planetary missions, and 2) provide researchers and the public access to the archive for scientific research, future mission planning, and education/public outreach [1]. There are currently 9 US and 7 international RPIFs that continue to provide these services.

The RGCPS, formerly the Space Photography Laboratory (SPL), was established by Professor Ronald Greeley at ASU in 1977 as a branch of the U.S. Geological Survey RPIF [2]. SPL became a full, independent RPIF by 1982, and in 1992 it was moved to a 2740 ft² climate-controlled lab (Figure 1). After the death of Dr. Greeley in 2011, the facility was renamed the “Ronald Greeley Center for Planetary Studies”.

The purpose of the facility has always been to support planetary geology research for faculty, staff, and students, and to promote and disseminate the results of NASA Planetary Science Division missions (especially those associated with ASU, e.g., Mars Pathfinder, Mars Exploration Rovers, Galileo, and DAWN).

GIS At The RGCPS: With the advent of the Internet, many of the image data sets and literature, originally exclusive to the RPIFs, have become available electronically for download. While planetary data have become widely distributed, there is still a strong need for experts to educate potential users regarding planetary image formats and the software needed to ingest and process the data. For example, all planetary image data are archived electronically by NASA through the Planetary Data System (PDS) and freely available to the public. However, the data are not easily viewed by common commercial software (such as Adobe PhotoshopTM). In addition, most image data from planetary missions require a comprehensive database of camera-

pointing information (e.g., SPICE kernels [3]) to correct for geometric distortion and balance photometry. Furthermore, there is a steep learning curve for the software that is used for planetary mapping, such as ArcGISTM [4] (the licenses for which are very expensive), QGIS (a still-developing open-source, multi-platform GIS) [5], and Adobe IllustratorTM (a non-GIS graphic design software).

In early 2014, we began adding a digital planetary GIS laboratory to the RGCPS. There are five dedicated dual-screen GIS workstations with ArcGISTM 10.2 [4] and JMars [6] installed in each of them. In addition, from these workstations researchers have access to ISIS 3 (Integrated System for Imagers and Spectrometers) [7], the de facto planetary image processing software, through an on-site Linux server. Our goal over the next five years is to develop GIS projects for all terrestrial planets, outer planet satellites, and the larger small bodies. The GIS databases in development include Io and Vesta, and, through a collaboration with the RPIF at Cornell University, Titan.

To facilitate training at the RGCPS, we are developing seminar-style classes on planetary GIS. These will consist of three or more hour-long sessions, including: an overview of the basic software components of ArcGISTM, the understanding and integration of image datasets into ArcGISTM, creating and editing vector data files, and projecting planetary datasets onto models of planetary bodies. Advanced seminars will include using ArcGISTM as a planetary research tool, and the development of planetary mapping databases. Initially, these seminars will be made available to students and researchers at ASU, and then eventually for visiting planetary scientists in the American Southwest.

By reinventing the RGCPS as a digital planetary GIS laboratory, our goal is to facilitate planetary research by providing instruction for understanding and processing data from a variety of planetary missions.

References:

- [1] <http://www.lpi.usra.edu/library/RPIF/> [2] http://rpif.asu.edu/wordpress/index.php/rgcps/rgcps_rpif
- [3] ftp://naif.jpl.nasa.gov/pub/naif/toolkit_docs/C/info/intrdctn.html [4] <http://www.esri.com>
- [5] <http://www.qgis.org/en/site/>
- [6] <http://jmars.asu.edu>
- [7] <http://isis.astrogeology.usgs.gov>



Figure 1. The Ronald Greeley Center for Planetary Studies (RGCPS), at Arizona State University. The developing digital planetary GIS laboratory houses several computer workstations, each with licensed versions of ArcGIS, and contain global geodatabases of the terrestrial planets and satellites.