THE PDS GEOSCIENCES NODE ARCHIVES DATA FROM MARS AND LUNAR MISSIONS. S. Slavney, E. A. Guinness, and T. C. Stein, McDonnell Center for the Space Sciences, Washington University, 1 Brookings Drive, Campus Box 1169, St. Louis, Missouri, 63130, Susan.Slavney@wustl.edu.

Introduction: The Geosciences Node of NASA’s Planetary Data System (PDS) is working with several NASA lunar and Mars missions, current and future, to ensure that quality science data archives are produced and made available to the user community.

Background: The Geosciences Node is one of several discipline-oriented nodes of the PDS which serves both producers and users of planetary science data. The Geosciences Node works directly with the mission instrument teams to help them design and document their data products. The Node receives data during the mission, archives it for the long term, and provides public online access to its holdings.

Mars and Lunar Data Holdings: Science payloads on lunar and Mars missions typically include a suite of instruments that collect several different types of data sets. The Geosciences Node is responsible for archiving the data sets that are related to the study of surfaces and interiors of terrestrial planets, including geology, geophysics, and geochemistry data. These types of data include reflectance spectra, thermal inertia, gamma ray spectra, neutron spectra, Mössbauer spectra, alpha particle X-ray spectra, radar, laser altimetry, and radio science data.

Figure 1 shows a timeline of deliveries from all lunar and Mars missions that the Geosciences Node is working on. The Mars Global Surveyor (MGS) orbiter mission has been archiving data with PDS since 1999. Now that contact with MGS has been lost, the final deliveries of MOLA, TES, and Radio Science data will be made to the Geosciences Node by July 2007. The 2001 Mars Odyssey orbiter, now in its second extended mission, delivers GRS and Radio Science data every three months, and deliveries will continue until early 2009 unless the mission is further extended.

The two Mars Exploration Rovers (MER) are now well beyond 1000 sols (Martian days), though the original mission plan was for 90 sols. Data from the rovers’ many instruments are delivered every 90 sols, roughly every three months.

In addition to data from NASA missions, the Geosciences Node also hosts copies of data sets from the European Space Agency’s Mars Express mission, by special agreement with ESA.

Data from New and Upcoming Missions: The Mars Reconnaissance Orbiter (MRO) began its primary mapping mission in November 2006. PDS has been conducting delivery tests with MRO instrument teams in preparation for the first data release in June 2007. The Geosciences Node will archive data from the imaging spectrometer (CRISM), the shallow radar instrument (SHARAD), and the radio science experiment. The CRISM Spectral Library, a collection of Mars-analog laboratory spectra, is already available on the Geosciences Node web site [Table 1].

The Phoenix Lander will be launched in August 2007 and arrive at Mars in May 2008. Data from its Thermal and Evolved Gas Analyzer (TEGA) and the Microscopy, Electrochemistry, and Conductivity Analyzer (MECA) experiments will be archived at the Geosciences Node beginning in December 2008.

The Mars Science Laboratory (MSL) is the next...
Mars rover. It is scheduled to be launched in fall 2009 and will carry several science experiments. The Geosciences Node will archive data from the Alpha Particle X-ray Spectrometer (APXS), the Chemistry and Micro-Imaging experiment (ChemCam), the Chemistry and Mineralogy XRD/XRF (CheMin), the Dynamic Albedo of Neutrons (DAN), and the Sample Analysis at Mars (SAM) experiment, a mass spectrometer, laser spectrometer and gas chromatograph. MSL also carries several cameras, a radiation detector, and a meteorological station.

NASA’s exploration of the Moon resumes with the launch of the Lunar Reconnaissance Orbiter (LRO) in October 2008. LRO data to be archived at the Geosciences Node include data from a laser altimeter (LOLA), neutron detector (LEND), radiometer (Diviner), and synthetic aperture radar (Mini-RF). The first LRO data will be released in April 2009. Piggybacking on the LRO launch vehicle is the LCROSS experiment (Lunar Crater Observation and Sensing Satellite), which will drop an empty fuel tank onto the lunar surface and observe the impact with a suite of cameras and spectrometers, before impacting itself.

In addition to NASA missions, the Geosciences Node is also working with the Mini-RF radar instrument team on the Indian lunar orbiter Chandrayaan-1, which will be launched in September 2007, to archive its data at the Geosciences Node.

Where to Get the Data: All data archived within PDS are available to the public. The Geosciences Node maintains its holdings online at its web site, http://pds-geosciences.wustl.edu/. The site allows the user to browse through data sets sorted by planet and mission, and to download selected data products. Announcements of new data releases are shown in the “What’s New” section of the home page. Interested users may sign up for email notification of new releases of data sets by using the Subscription Manager service on the PDS web site, http://pds.nasa.gov/.

Tools for Data Search and Access: The PDS web site offers a data search capability for all PDS holdings, including those at the Geosciences Node. See the Data Search service at http://pds.nasa.gov. The Geosciences Node provides additional specialized search services for particular data sets.

The Odyssey Gamma Ray Spectrometer (GRS) data sets can be queried using a web interface provided by the GRS Data Node, a satellite of the Geosciences Node, at http://grspds.lpl.arizona.edu/. The interface allows the user to create custom-generated GRS data products for a specified time or altitude-longitude range.

The MER Analyst’s Notebook at http://pds-geosciences.wustl.edu/meran/ provides a wealth of detail for science users interested in Mars Exploration Rover data. The Notebook integrates raw and derived science data with daily mission activity plans, site and traverse maps, quick-look data, and other resources. There are plans to create Analyst’s Notebooks for the Phoenix and MSL missions.

The CRISM Spectral Library is a collection of laboratory spectra of Mars-analog materials developed by members of the MRO CRISM Science Team. The Library is accessible via a web interface at http://pds-geosciences.wustl.edu/missions/mro/spectral_library.htm. Spectra may be selected, plotted online, and downloaded.

The Orbital Data Explorer (ODE) is a tool currently in development at the Geosciences Node for conducting searches of orbital data sets, beginning with the Mars Reconnaissance Orbiter data and later adding data from other Mars missions and lunar missions. It will enable cross-instrument and eventually cross-mission searches by time, latitude, and longitude, using a map-based user interface.

Contact Information: The Geosciences Node welcomes questions and comments from the user community. Please send email to geosci@wunder.wustl.edu.

Table 1. Links mentioned in this abstract

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