

THE INTERNATIONAL PLANETARY DATA ALLIANCE. S. Slavney¹, R. Beebe², D. Crichton³, S. Hughes³, J. Zender⁴, ¹Washington University, 1 Brookings Drive, Campus Box 1169, St. Louis, Missouri, 63130, Susan.Slavney@wustl.edu, ²New Mexico State University, Dept. of Astronomy, P.O. Box 30001, MSC 4500, Las Cruces, New Mexico, 88003, rbeebe@nmsu.edu, ³Jet Propulsion Laboratory, 4800 Oak Grove Drive, Pasadena, California, 91109, Daniel.J.Crichton@jpl.nasa.gov, Steve.Hughes@jpl.nasa.gov, ⁴ESA/ESTEC/SCI-SO, Keplerlann 1, NL-2200AG Noordwijk, jzender@rssd.esa.int.

Introduction: The International Planetary Data Alliance (IPDA) is a joint effort by national space agencies, research institutions, and universities to enable global access and exchange of high quality planetary science data, and to establish archive standards that make it easier to share the data across international boundaries.

History: The IPDA began as a group of data engineers and scientists from the National Aeronautic and Space Administration (NASA) Planetary Data System (PDS) and the European Space Agency (ESA) Planetary Science Archive (PSA) who wanted a way to allow a user looking for planetary data to query both the PDS [1] and PSA [2] online catalogs at the same time. Each agency's catalog of its science archives has a web-based interface for searching and the capability to accept queries from software applications. While there has been a long relationship between PDS and PSA to use the PDS data standards for building PDS-compatible data archives, there has been no way to submit the same query to both systems to allow researchers to find and download the individual data holdings from the agency archives. The Planetary Archive Interoperability Working Group was formed to define a data access protocol that would allow query and retrieval of data from both systems, seamlessly integrated into their existing interfaces, and to demonstrate the use of this protocol by implementing a simple proof-of-concept prototype. The working group wrote a White Paper [3] describing the protocol and plans for its implementation. Both the PDS and the PSA developed client prototypes that demonstrated the ability to query and download data holdings across system and international boundaries. These prototypes demonstrated that science data residing in different agency systems could be linked together, rather than copied and re-managed locally in each agency system.

During this effort the working group recognized the need for both agencies to agree on a minimum set of standards for their archives on which to base the data access protocol. These standards included the use of simple Internet mechanisms to query the metadata about datasets and data products managed within different archive systems. In addition, because each system used the PDS data standard for documenting and

organizing its archive, they had the key element for interoperability.

It became apparent that maintaining a set of common standards would benefit NASA, ESA and other organizations interested in producing and using planetary data. With the rapid expansion of spaceborne activity, the interest in a set of standards for data modeling, description, and access is increasing. In response to queries from other organizations, the working group decided to broaden its focus to address archive standards as well as the technical issues involved in data exchange, and to expand its membership by inviting participation from other agencies, thus forming the International Planetary Data Alliance

The first face-to-face meeting of the IPDA took place in autumn 2006, at the European Space Research and Technology Center (ESTEC), Noordwijk, The Netherlands. Participants attended from the Japan Aerospace Exploration Agency (JAXA), the China National Space Administration (CNSA), and the Russian Space Agency (RAS), as well as from ESA and NASA. A consensus was reached to create the International Planetary Data Alliance, and ways of working and representation were discussed and agreed on. The Indian Space Research Organization (ISRO), the German Space Agency (DLR), the Italian Space Agency (ASI) and the French Space Agency (CNES) were invited to join the alliance, and their confirmation is pending. An official structure, including a Steering Committee, was set up, and individual agency needs and commitments were discussed. It was agreed that a method of operation must be defined and that the IPDA should move forward to establish core standards to allow individual agencies to generate PDS compatible data sets and develop their archives within the constraints of their agencies. It was agreed that the PDS data standards should be used as a starting point for generating these core standards, given the agency constraints for developing new standards and the widespread use of the PDS data standards by the PDS and PSA.

Current and Future Activities: The IPDA's purpose is to serve as a standards body and clearinghouse for:

- Specifying international standards for planetary science data archiving
- Providing guidance on protocols for interchange of planetary science data
- Creating demonstrative implementations of cross-institution and cross-discipline systems and components that achieve correlative results in scientific discovery.

As the IPDA progresses, much of the future challenges relate to developing a set of high level standards that can be negotiated and agreed to at an international level. Given the diversity of all the teams, the IPDA has decided to establish projects that will be conducted electronically allowing for teams around the world to communicate. Each project will have an appointed project leader who will report to the IPDA Steering Committee.

To date, five projects have been formed:

- The IPDA Operational Procedure Project is defining the procedure under which the Steering Committee and the individual projects shall work in the future.
- The Interoperability Prototype Project continues the work begun by the original Interoperability Working Group. It focuses on specifying access protocols [4] and creating prototype implementations of them.
- The IPDA Core Requirement Identification Project is collecting requirements for IPDA archives in an effort to define a core set of archive standards and an overall IPDA data model.
- The COSPAR Project is identifying the necessary steps to join COSPAR and is preparing the required documentation and presentations.
- The IPDA Charter Project is extending an existing draft charter to incorporate contributions from new member agencies.

Membership: Membership in the IPDA includes space agencies, scientific research institutes, universities and other organizations that are involved in the production or curation of scientific data relevant to the world-wide planetary science community. The IPDA Steering Committee consists of two members from each agency. With nine member agencies—ESA, NASA, RAS, JAXA, CNRS, ISRO, DLR, CNES, and ASI—a total of 18 members form the Steering Committee. The members assigned to Projects are proposed by the Steering Committee, but are not limited to the member agencies; any interested person from a space agency, scientific research institute, university or other

organization that is involved in the production or curation of scientific data relevant to the world-wide planetary science community can participate in an IPDA Project. Member agencies are expected to fully participate in the IPDA activities and provide the commensurate level of support for defining and implementing the IPDA standards.

More information is at the IPDA web site, <http://planetarydata.org>, including a form to contact the IPDA by email.

References: [1] PDS Home Page, <http://pds.nasa.gov>. [2] PSA Home Page, <http://www.rssd.esa.int/index.php?project=PSA>. [3] Osuna P. et al. (2005) NASA-PDS/ESA-PSA Planetary Data Interoperability White Paper, <http://planetarydata.org/documentation/>. [4] Osuna P. and J. Selgado (2006), NASA/ESA Planetary Data Interoperability, <http://planetarydata.org/documentation/technical-recommendation-tr/>.