Memorandum of Understanding
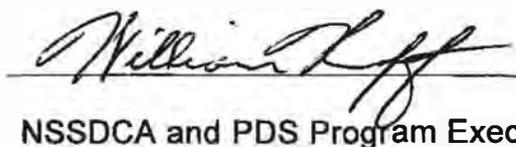
Planetary Data System and NASA Space Science Data Coordinated Archive

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1 PROLOGUE

Effective data management is necessary to maximize the science output from NASA missions. Such data management provides scientists the ability to locate and access needed data and to obtain information and software required to make the data useful. The ongoing precept is that data should be managed as close to the data producing science community as possible. To this end, NASA has established a number of discipline-oriented active archives to augment the NASA Space Science Data Coordinated Archive (NSSDCA) to facilitate data access and utilization in those respective disciplines. One of these is the Planetary Data System (PDS).

The NSSDCA was created in 1966 as NASA's only archive for space and Earth science data. It is presently responsible for top-level data management functions that span all Space Science programs in the Science Mission Directorate (SMD) scientific disciplines, and for selected discipline-specific responsibilities to be defined by mutual agreement between the NSSDCA and the relevant SMD program division. Since the mid-1990's, the NSSDCA has maintained the permanent, deep archive for the PDS.

The PDS was established in 1990. As an active archive within the NASA SMD environment, the PDS is responsible for the acquisition, management, dissemination and preservation of lunar and planetary digital data -- including data pertaining to moons and planetary rings, smaller bodies such as comets and asteroids, planetary plasma interactions, and interplanetary dust of the solar system -- from NASA planetary missions, astronomical observations, and laboratory measurements, hereafter referred to merely as planetary data. The PDS is also responsible for the definition, documentation, and validation of the contents of its archive and the management of its catalog.

2 INTRODUCTION

2.1 PURPOSE

The purpose of this Memorandum of Understanding (MOU) is to describe the roles of the PDS and NSSDCA in acquiring, archiving, preserving, restoring, and distributing planetary data. This document sets the general constraints on the interfaces between the two organizations.

2.2 SCOPE

The scope of this MOU covers areas of operation where there is joint responsibility between the PDS and NSSDCA or where, despite apparent ambiguities, there is a sole responsibility of one or the other. Other documents exist that describe the full range of operations of each organization.

2.3 AUDIENCE

The following groups are the intended audience for the document:

a. Staffs of the PDS and NSSDCA.

b. Those who are preparing planetary science data, such as Principal Investigators, planetary missions, and data restorers.

c. Those who want to access planetary science data, including NASA planetary scientists, other domestic and foreign scientists, educators, and the general public.

d. NASA Headquarters (HQ) personnel who manage and provide the operating funds for NSSDCA and PDS.

e. Managers of institutions participating in NSSDCA or PDS activities.

f. Members of other data centers.

g. PDS and NSSDCA advisory groups.

This document will be posted on at least these public websites:

- NSSDCA, http://nssdc.gsfc.nasa.gov/archive/mou/, and
- PDS Project Office, http://mgmt.pds.nasa.gov/documents.html.

This document will also be available on the private PDS Management Council website, http://atmos.nmsu.edu:8080/myapp-0.1-dev/login.jsp.

2.4 SUMMARY

The following are the key components of the MOU:

a. The PDS will serve as the point of entry for validated, digital planetary data into the NASA SMD archive environment.

b. The NSSDCA shall maintain and coordinate broad data standards for data management and archiving that are appropriate to most or all disciplines and recommend, maintain and monitor implementation of minimum NASA data standards.

c. The PDS shall be responsible for establishing and maintaining data standards, data structures, and data formats which are appropriate for use by the Planetary Science community.

d. The PDS serves as the primary interface with planetary data producers, obtaining the data and capturing fixity (i.e., checksums), and checking the data for correctness of format and content. The data products are then passed on to the NSSDCA for permanent deep archiving along with appropriate context and ancillary products which PDS has also validated.

e. The NSSDCA shall maintain and operate the NSSDCA Master Catalog, which is inclusive of all NASA space science data regardless of the discipline data system where

they reside. The PDS shall support the population of the NSSDCA Master Catalog, an electronic catalog of all data holdings at the NSSDCA. The PDS Engineering Node will maintain a high-level Registry of all data collections in the PDS archive, and this information will be made available to the NSSDCA to aid in populating its Master Catalog.

f. The NSSDCA shall maintain a deep archive of all planetary data designated for indefinite preservation as specified in NASA HQ/SMD planetary-approved Data Management Plans (DMP) or equivalent documents. The NSSDCA shall also assure the continued existence/readability of such data until/unless HQ/SMD planetary declares such data to be disposable. However, the NSSDCA shall remove older media, such as CD-ROMs, from its holdings as it receives newer electronic replacements (duplicates) of those data from PDS. Upon receipt of notice from the appropriate PDS Discipline Node, the NSSDCA shall remove from its holdings electronic collections that have been replaced or superseded by newer versions.

g. The NSSDCA shall indefinitely accept data formatted under both the PDS3 and PDS4 Standards into its deep archive. As PDS data in older formats (PDS3 and before) are supplanted by versions in PDS4 format, NSSDCA, in consultation with the relevant PDS Discipline Node(s), may remove the older format.

h. The PDS is intended to serve planetary scientists sponsored by the NASA SMD, primarily for planetary digital data. As a practical matter, the PDS is thereby the primary source of digital data for these scientists.

i. The NSSDCA serves the scientific community primarily for special products, including but not limited to analog materials and pre-PDS planetary holdings. The NSSDCA also serves the planetary community's needs for digital data by being the long-term backup for the PDS.

j. The NSSDCA shall annually report the status of its PDS holdings to the PDS Project Office. The PDS shall annually report projected two-year transfers and remaining data to be transferred to the Head of the NSSDCA.

2.5 MOU REVIEW PROCEDURES

Both the NSSDCA and PDS will periodically review this MOU for compliance. Any statements in the MOU in conflict with the current policy and procedures of the NSSDCA or the PDS will be identified. The reasons for these discrepancies will be reviewed and either the MOU or the operational policies and procedures of the NSSDCA or the PDS will be changed to reflect a resolution of this discrepancy. These changes may be necessary if either organization is unable to comply with the MOU or the statements in the MOU no longer reflect current NSSDCA and PDS policies and procedures.

The Head of the NSSDCA and the Chief Scientist for the PDS shall resolve any conflicts, discrepancies, or other matters arising from unforeseen circumstances that are related to the roles of the NSSDCA and PDS. In the event that resolution is not possible at this level, the matter will be elevated to NASA Headquarters where the appropriate program sponsors can resolve the issue.

3 PROJECT INTERFACE

The PDS will serve as the point of entry for planetary data into the NASA SMD archive environment. The PDS will maintain a Mission Interface that is responsible for negotiating DMPs with the projects that satisfy the SMD Policy on Science Data Management. The PDS will also maintain a similar Program Interface to planetary researchers producing archival data under NASA SMD projects that typically require a DMP, for example Research Opportunities in Space and Earth Sciences (ROSES). In most cases, the PDS will have signature authority over the DMPs.

A copy of all active mission and program data products that enter the NASA archive environment through the PDS Mission and Program Interfaces will be validated and passed on to the NSSDCA for long-term archive. These data products shall be specified in pre-launch DMPs signed by NASA Headquarters and may include raw science data, ancillary data, organized higher level data products agreed upon by the relevant personnel of the Project, and individual reduced data sets deemed important by individual investigators as well as all relevant documentation.

The PDS will also be the archive entry point for all digital data restored from past planetary missions.

The PDS and NSSDCA will agree on and document the terms covering the transmission of archive products from the PDS to the NSSDCA such as electronic transfer media, volume and frequency of delivery.

Reporting between the PDS and NSSDCA is beneficial for integrity and planning purposes. The NSSDCA shall report annually on the status of its PDS holdings, summarized as presentation early in the PDS meeting (calendar) year. The PDS shall predict annually, by Node, the volume of data to transfer to the NSSDCA for two years out and estimate the volume of any known, remaining data to be transferred, and then report this information to the NSSDCA early in the calendar year.

4 REGISTRY/CATALOG

The PDS will maintain a registry of its planetary data holdings including context information. This registry will be multi-layered with the high-level collection registry residing at the Engineering Node and the lower level, product-oriented registries residing at the Discipline Nodes. The high-level registry will be accessible by the NSSDCA.

The NSSDCA will maintain and make available to the general community appropriate information relevant to planetary data in its own information systems. The NSSDCA will maintain the multidisciplinary NSSDCA Master Catalog that will include information about PDS holdings held by the NSSDCA. Appropriate descriptive context information from the high-level

PDS Registry will be sent to or made available to the NSSDCA's Master Catalog. The NSSDCA will provide instructions to the PDS on submitting data and will review PDS entries in its Master Catalog. The NSSDCA will also maintain electronic links into the PDS data holdings from the Master Catalog. For each new data collection sent to the NSSDCA, PDS will also make available a completed data collection description to be used by the NSSDCA in populating the its Master Catalog at the data collection level.

The NSSDCA shall coordinate its Master Catalog design evolution to meet mutual budget and system scope constraints.

The PDS and NSSDCA will work together to ensure changes to either system will not negatively impact the other system. All changes to be made to the NSSDCA Master Catalog that will require the PDS to develop and/or modify its operational system shall first be communicated with the PDS. All changes to be made to the high-level PDS Registry or PDS3/PDS4 Standards that will require the NSSDCA to develop and/or modify its operational system shall first be communicated with the NSSDCA.

5 DATA

The management of planetary data will be a cooperative effort involving the PDS, NSSDCA and data producers. Each organization will have responsibilities concerning the preparation, storage, and distribution of the data.

5.1 DATA PREPARATION

5.1.1 Mission and Program Data

As described in Section 3, the PDS is responsible for maintaining the Mission and Program Interfaces. All NASA mission and program data will enter the NASA archive environment through the PDS under the DMPs negotiated with each of the projects. The PDS will verify the correct format, completeness, fixity (i.e., checksums), and continuity of the data and will monitor the validity and content of the incoming data. The PDS will also verify the correct format, completeness, fixity (i.e., checksums), and continuity of the context data. Part of the data preparation process includes populating the high-level PDS Registry with new information. It will be the responsibility of the PDS to monitor project compliance to the negotiated DMPs and report cases of non-compliance to NASA SMD planetary management as requested.

5.1.2 Restored and Improved Data

The archiving of old or improved planetary data collections will be coordinated and overseen by the PDS. Each data collection resulting from a restoration will be validated by the PDS through a peer review process. As with mission archives, restored data collections will result in an update of the high-level PDS Registry. The data flow will be into the PDS under the appropriate

Discipline Node, even though the pre-restoration location of the data collection may be NSSDCA. For cases where the NSSDCA has the opportunity to restore planetary data collections, the NSSDCA will consult with the PDS about the selection of which data are to be restored, consistent with the priorities set by the PDS.

The NSSDCA will periodically review older (pre-PDS) planetary data holdings to identify potential candidates for removal as restored and/or improved data products are received. The NSSDCA will coordinate the removal of identified products with the relevant Discipline Node(s).

5.2 DATA STORAGE

Most planetary data will be stored in more than one location. The location of the deep archive for the long-term preservation of planetary data will be the NSSDCA either at NASA Goddard Space Flight Center or a geographically separated location.

The concept for the PDS Discipline Nodes includes the provision for the maintenance of a working set of all data considered to be relevant to that particular discipline at the Discipline Node. The working data will be used to support on-going research carried out by and through the Discipline Nodes. The research effort will, from time to time, result in new, derived or restored data collections that will be available through the PDS. The data collections themselves need not be stored elsewhere in the PDS or NSSDCA while they are in preparation.

5.3 DATA TRANSFER

The PDS will transmit data from its on-line archive to the NSSDCA in a mutually agreed-upon manner. For PDS3-formatted data sets, the PDS shall continue to send the data electronically or via hard disks as previously devised and agreed upon by the PDS and the NSSDCA in 2010. For PDS4-formatted data releases, the PDS shall allow the NSSDCA to electronically pull the data from repositories at the Discipline Nodes and context information from the high-level PDS Registry at the Engineering Node. In both cases, the NSSDCA shall report the status of archived (ingested) products to the relevant Discipline Node, perform quality assurance and data integrity checks, and generate at least one copy for off-site storage.

5.4 DATA DISTRIBUTION

The distribution of digital planetary data is primarily the responsibility of the PDS. The NSSDCA will be the exclusive distributor of pre-PDS data and non-digital (analog) data archived at the NSSDCA. For data archived through PDS, the NSSDCA will provide to users only data that were received from PDS on hard media, such as DVD or CD, and already archived at the NSSDCA. The NSSDCA will refer users to the appropriate Discipline Node for data archived electronically. The NSSDCA will respond to requests from the PDS Nodes for delivery of data for disaster recovery or data integrity issues. For all other requests, and particularly for all

requests that require insight into the scientific content of the data or packaging in units smaller than those delivered to the NSSDCA, PDS will be the sole supplier of data.

These distribution guidelines hold regardless of the source of the request of the data, whether from a NASA SMD Planetary Science Division supported scientist (initiated from within the PDS) or from another individual. (A scientist not supported by NASA SMD Planetary Science Division may initiate a request in the NSSDCA.)

The NSSDCA has well-established charging methods that will be implemented when necessary for requests for planetary data. This holds even if the request is initiated by a scientist supported by the NASA SMD Planetary Science Division. The PDS does not currently have a charging mechanism for requests that involve large resource expenditures. Therefore, it is anticipated that an exchange of services between the NSSDCA and PDS can be arranged to satisfy occasional resource-intensive requests.

6   USER SUPPORT SERVICES

The PDS is chartered primarily to serve the planetary scientists supported by the NASA SMD Planetary Science Division, although when resources permit the PDS will serve non-SMD planetary scientists and other planetary users in the U.S. and international community. All users can access planetary data in the PDS through the NSSDCA for resource-intensive requests.

Both the NSSDCA and PDS will supply all users, irrespective of their location or funding, access to their respective catalogs/registries of planetary data and will support the browse and query of these catalogs/registries.

Planetary data analysis support is the responsibility of the PDS. As such the PDS Discipline Nodes will have data, hardware and software tools, and data management capability to support the analysis of planetary data. The Discipline Nodes will provide the technical and scientific expertise required to use the PDS and to answer questions concerning the data.

7   TECHNOLOGY DEVELOPMENT

It is in the interest of both the PDS and NSSDCA to continue to develop data management, storage, presentation, computation, and communication technologies as well as standards to better serve the scientific community. Findings should be shared between the PDS and NSSDCA and should be put to use as appropriate.

History:
10 May 2016: Distributed 02 May 2016 version to PDS MC for final review and email vote.
13 May 2016: Added period to end of first paragraph in Section 5.2; revised doc date to 13 May.
19 May 2016: Approved unanimously by PDS MC via email vote.