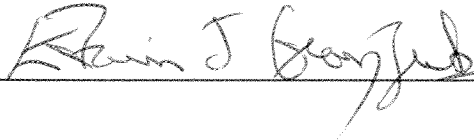


**Memorandum of Understanding
Between
The Planetary Data System
And
The National Space Science Data Center**

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I. 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. It has become a precept 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 National Space Science Data Center (NSSDC) to facilitate data access and utilization in those respective disciplines. One of these is the Planetary Data System (PDS).

NSSDC is responsible for top-level data management functions that span all Space Science (SS) programs in the Science Mission Directorate (SMD) and scientific disciplines and for selected discipline-specific responsibilities to be defined by mutual agreement between the NSSDC and the relevant SMD program division.

As an active archive within the NASA archive environment, the PDS has primary responsibility for the collection of lunar and planetary digital data (including satellites, smaller bodies and planetary rings, planetary plasma interactions and interplanetary dust of the solar system — but hereafter referred to merely as planetary data), the definition of its content, its validation and catalog management.

This Memorandum of Understanding identifies the roles of NSSDC and the PDS in preserving and facilitating access to data acquired by NASA planetary missions.

II. INTRODUCTION

A. PURPOSE

The purpose of this document is to describe the roles of the PDS and NSSDC in acquiring, archiving, and distributing planetary data. This document sets the general constraints on the interfaces between the two organizations.

B. SCOPE

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

C. AUDIENCE

The following groups are the intended audience for the document:

1. Staffs of the PDS and NSSDC.
2. Those who are preparing planetary science data, such as Principal Investigators, planetary missions, and data restorers.
3. Those who want to access planetary science data, including NASA planetary scientists and other domestic and foreign scientists.
4. NASA Headquarters personnel who manage and provide the operating funds for NSSDC and PDS.
5. Managers of institutions participating in NSSDC or PDS activities.
6. Members of other data centers.
7. PDS and NSSDC advisory groups.

D. SUMMARY

The following are the key components of the MOU:

1. The PDS will serve as the point of entry for planetary data into the NASA archive environment.
2. The NSSDC shall maintain and coordinate broad data standards for data management and archiving which are appropriate to most or all disciplines and recommend, maintain and monitor implementation of minimum NASA data standards.
3. 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.
4. The PDS serves as the primary interface with the planetary data producers, obtaining the data and checking them for correctness of format and content. The data products are then passed on to NSSDC for “deep-archiving” along with appropriate catalog and ancillary information.
5. The NSSDC shall maintain and operate the NASA Master Catalog (which is to be inclusive of all NASA Space and Earth science data regardless of the discipline data system where they reside.) The PDS shall support the population of the Master Catalog, an electronic catalog of all data holdings in the archive. PDS Discipline Nodes will each maintain a catalog of data holdings and this information will be made available to NSSDC to aid in populating the Master Catalog at NSSDC.

6. The NSSDC shall maintain a deep archive of all planetary data designated for indefinite archiving in HQ/SMD planetary-approved Project Data Management Plans (PDMPs) (or equivalent documents), and shall assure the continued existence/readability of such data until/unless HQ/ SMD planetary declares such data to be disposable.
7. The PDS is intended to serve planetary scientists sponsored by SMD, primarily for digital data. As a practical matter, the PDS is thereby the primary source of digital data for all scientists.
8. NSSDC serves the scientific community primarily for special products, including but not limited to analog products, large-volume distributions, and pre-PDS planetary holdings. NSSDC also serves the planetary community's needs for digital data by being the long-term backup for PDS.

E. MOU REVIEW PROCEDURES

This MOU will be reviewed periodically by both NSSDC and the PDS to determine each organization's compliance with the MOU as it exists at the time. Any statements in the MOU in conflict with the current policy and procedures of NSSDC 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 NSSDC or 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 NSSDC and PDS policies and procedures.

Any conflicts or discrepancies related to the roles of the NSSDC and PDS shall be resolved by the Head of the NSSDC and the Chief Scientist for the 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.

III. PROJECT INTERFACE

The PDS will serve as the point of entry for planetary data into the NASA archive environment. The PDS will maintain a Mission Interface which is responsible for negotiating individual Project Data Management Plans and Archive Plans with the projects which at least satisfy the SMD Policy on Science Data Management. In most cases, the PDS will have signature authority over the Project Data Management Plans and Archive Plans. In cases where the PDMP specifies certain products will be archived at NSSDC, then both NSSDC and PDS will sign the document.

A copy of all active mission data products that enter the NASA archive environment through the PDS Mission Interface will be validated and passed on to NSSDC for long term archive. These data products shall be specified in pre-launch PDMPs and Archive Plans signed by NASA Headquarters and may include raw science data, ancillary data, organized higher level

data products agreed upon by the Project's Science Steering Group, 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 data restored from past planetary missions.

PDS and NSSDC will agree on and document the terms covering the transmission of archive products from PDS to NSSDC such as media type, volume and frequency of delivery.

IV. CATALOG

The PDS will maintain a catalog of its planetary data holdings. This catalog will be multi-layered with the high level catalog residing at the Engineering Node and the lower level, more detailed, catalogs residing at the Discipline Nodes. This multi-layered PDS catalog will be accessible by NSSDC.

NSSDC will maintain and make available to the general community appropriate information relevant to planetary data in its own information systems. NSSDC will maintain a multidisciplinary NASA Master Catalog which will include limited information about PDS holdings. Appropriate descriptive information from the high level PDS catalog will be sent to NSSDC's Master Catalog. NSSDC will provide instructions to PDS on submitting data and will review PDS entries in the Master Catalog. NSSDC will also maintain electronic links into the PDS catalogs from the Master Catalog. For each new data set sent to NSSDC, PDS will also send a completed data set description template to be used by NSSDC in populating the NSSDC Master Catalog at the data set level.

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

All changes to be made to the Master Catalog that will require the PDS to develop and/or modify its operational system shall first be coordinated with the PDS.

V. DATA

The PDS shall strive to coordinate and share archive tasks with the NSSDC and flight projects to do the best possible job with the available resources. Therefore, the management of planetary data will be a cooperative effort involving the PDS, NSSDC and flight projects. Each organization will have responsibilities concerning the preparation, storage, and distribution of the data.

A. DATA PREPARATION

1. **Mission Data:** As described in Section III, the PDS is responsible for maintaining the Mission Interface. All NASA mission data will enter the NASA archive environment through the PDS under the Project Data Management Plans and Archive Plans negotiated with each of the projects. The PDS will verify the correct format,

completeness, 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, and continuity of the catalog data. Part of the data preparation process includes populating the PDS catalog with the new information. It will be the responsibility of the PDS to monitor project compliance to the negotiated Project Data Management Plans and report cases of non-compliance to NASA SMD planetary management as requested.

2. **Restored Data:** The restoration of old planetary data sets will be coordinated and overseen by the PDS. The normal procedure for data restoration will be initiated by a Discipline Node or proposal to the PDS for the establishment of a Data Node which will exist for a short period (a year or two) for the sole purpose of reformatting and documenting the data set. The restoration process will be sponsored by the appropriate Discipline Node and the resulting data set will be validated by a peer review process. As with mission data sets, the restored data sets will result in an update of the PDS catalog. The data flow will be into the PDS under the appropriate Discipline Node, even though the pre-restoration location of the data set may be NSSDC. In cases where NSSDC has the opportunity to restore planetary data sets, it is important that the PDS be involved in the selection of which data sets are to be restored, consistent with the priorities set by the PDS.

B. 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 NSSDC. The NSSDC shall maintain a deep archive of all planetary data designated for indefinite archiving in SMD planetary-approved Project Data Management Plans (PDMPs) (or equivalent documents), and shall assure the continued existence/readability of such data until/unless HQ/SMD planetary declares such data to be disposable. When practical, affordable and necessary, NSSDC will create a duplication set that will be used in creating data copies for requestors, thereby minimizing use of the archive set.

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 sets will be used to support ongoing research carried out by and through the Discipline Nodes. The research effort will, from time to time, result in new, derived or restored data sets which will be available through the PDS. The data sets themselves need not be stored elsewhere in the PDS or NSSDC while they are in preparation.

C. DATA DISTRIBUTION

The distribution of digital planetary data is primarily the responsibility of PDS. NSSDC will be the exclusive distributor of pre-PDS data and non-digital data (photo products and videos) archived at NSSDC. For data archived through PDS, NSSDC will provide to users only

data that can be delivered as a direct copy of media, such as DVD or CD or DLT, already archived at NSSDC. NSSDC will respond to requests from PDS nodes for delivery of occasional large-volume data sets. 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 NSSDC, 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 planetary-supported scientist (initiated from within the PDS) or from another individual. (The non-NASA planetary-supported scientist may initiate a request in NSSDC).

Neither NSSDC nor the PDS is capable of easily fulfilling requests which involve large amounts of data or large quantities of expert support for the manipulation of data. The NSSDC has well-established charging methods which will be implemented for large requests of planetary data. This holds even if the request is initiated by a scientist supported by NASA SMD Planetary Science Division. The PDS does not currently have a charging mechanism for requests which involve large resource expenditures. Therefore, it is anticipated that an exchange of services between NSSDC and the PDS can be arranged to satisfy occasional resource-intensive requests.

Both the PDS and NSSDC will fulfill requests using NSSDC standard media as appropriate, including magnetic tape, optical disks, or electronic distribution under standard protocol.

As the PDS releases new products for archive, these products will be transmitted to NSSDC in a mutually agreed manner. For data releases on CD, DVD, or similar media, the PDS shall provide NSSDC with a set of these volumes. For data to be sent electronically or via "data bricks", the details of such transfer shall be devised and agreed upon by the PDS and NSSDC. These shall include quality assurance and remote storage of backups by NSSDC.

VI. USER SUPPORT SERVICES

The PDS is chartered primarily to service the planetary scientists supported by NASA SMD planetary, 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 through the NSSDC.

Both NSSDC and the PDS will supply users access to catalogs of the planetary data and will support the browse and query of these catalogs.

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.

VII. TECHNOLOGY DEVELOPMENT

It is in the interest of both the PDS and NSSDC to continue to develop data management, storage, presentation, computation, and communication technologies as well as standards to better serve the scientific community. Lead roles should be negotiated by NSSDC and PDS (or another Discipline Data Center [DDC]) for particular types of developments for which PDS is especially suited; and these should be put to use in the overall NASA Distributed Data System environment as appropriate.

Approved late February 2009 by PDS MC on an e-mail vote (8-1-0)