

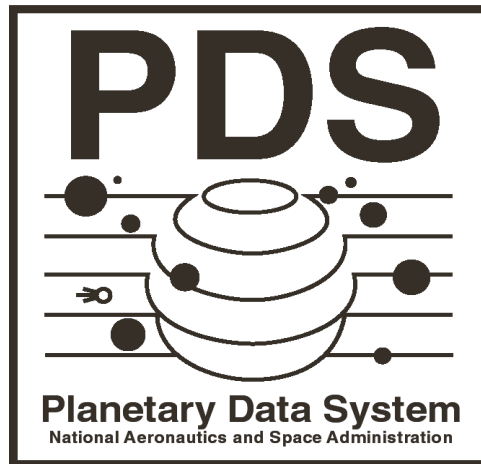
# **Planetary Data System**

## **Data Integrity Level 4 Requirements**

DRAFT

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**Version 0.3**



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## CHANGE LOG

<b>Revision</b>	<b>Date</b>	<b>Description</b>	<b>Author</b>
Version 0.1	October 5, 2006	Requirements based on use cases from the Data Integrity WG	D. Crichton
Version 0.2	October 19, 2006	Update based on Data Integrity WG comments	D. Crichton
Version 0.3	November 13, 2006	Update based on Tech Session review. This includes renumbering of requirements.	D. Crichton

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## 1.0 INTRODUCTION

### 1.1 Purpose

The PDS Management Council formed a working group (WG) at the August 2006 meeting that has put together a set of guiding use cases along with the level 4 requirements identified in this document. Data integrity, as it is used within this document, will have the following broad meaning:

1. The condition in which data are identically maintained during any operation, such as transfer, storage, and retrieval.
2. The preservation of data for their intended use.

### 1.2 Scope

The scope of this document is on identifying requirements that address file corruption during the preservation and transfer of data to and from PDS. Data accountability for files and collections is also a critical function necessary to verify the integrity of collections such as volumes. PDS currently plans to address integrity of collections as part of the end-to-end tracking subsystem engineering.

### 1.3 Notation

The numbering of the requirements in this document will be formatted as **LX.DI.X**, where:

- **LX** represents the requirements level where X is a number.
- **DI** is an acronym representing the data integrity requirements section for the specified level.
- **X** is a unique number for the type of requirement.

Following the text of a requirement may be a reference to the requirement from which it was derived. The reference will be in parenthesis.

A paragraph following a requirement, which is indented and has a reduced font size, represents a comment providing additional insight for the requirement that it follows. This comment should not be considered part of the requirement for development or testing purposes.

### 1.4 Audience

This document is written for the PDS Technical Staff in response to the Management Council directive to form a Data Integrity WG and identify the Level 4 requirements.

### **1.5 Controlling Documents**

[1] Planetary Data System (PDS) Level 1, 2 and 3 Requirements, May 26, 2006.

### **1.6 Applicable Documents**

[2] Planetary Data System (PDS) Standards Reference, March 20, 2006, Version 3.7, JPL D-7669, Part 2.

[3] Planetary Science Data Dictionary Document, August 28, 2002, Planetary Data System (PDS), JPL D-7116, Rev E.

[4] Planetary Data System Data Integrity Use Cases Document, September 26, 2006, DRAFT.

### **1.7 Document Maintenance**

This document and the requirements specified herein will be kept under configuration control with any modifications submitted to the Management Council for approval.

## **2.0 LEVEL 3 REQUIREMENTS**

- 2.5.1 PDS will develop and publish procedures for accepting archival data
- 2.5.2 PDS will implement procedures for accepting archival data
- 2.5.3 PDS will inform a data provider why a rejected archival product does not meet archiving standards
- 2.6.1 PDS will develop and publish procedures for storing archival data
- 2.6.2 PDS will maintain appropriate storage for the PDS archive
- 3.2.3 PDS will provide mechanisms to ensure that data have been transferred intact. (Note that 3.2.1 and 3.2.2 specify that mechanisms must be available to transfer data to users both online and offline.)
- 4.1.2 PDS will develop and implement procedures for periodically ensuring the integrity of the data.
- 4.1.3 PDS will develop and implement procedures for periodically refreshing the data by updating the underlying storage technology.
- 4.1.4 PDS will develop and implement a disaster recovery plan for the archive
- 4.1.5 PDS will meet U.S. federal regulations for preservation and management of the data through its Memorandum of Understanding (MOU) with the National Space Science Data Center (NSSDC)

### 3.0 LEVEL 4 REQUIREMENTS

This section details the level 4 requirements for Data Integrity. These requirements are derived directly from the level 3 requirements [1] and the associated Data Integrity Use Cases [4].

**L4.DI.1-** PDS will only accept data files that are not corrupted.

**L4.DI.2** - PDS will provide procedures for verifying whether a data submission has not been corrupted. (2.5.1, UC-1)

**L4.DI.3** - PDS will ensure that a *PDS Data Node* verifies their data submissions are not corrupted prior to submission to a PDS Node. (2.5.2, UC-4)

**L4.DI.4** - PDS will ensure that archival data to be delivered between *PDS Discipline Nodes* has not been corrupted prior to transfer (2.5.2, UC-8)

**L4.DI.5** - PDS will ensure that data submitted from a data provider have not been corrupted (2.5.2, UC-1)

**L4.DI.6** - PDS will ensure that data submitted from a *PDS Data Node* have not been corrupted (2.5.2, UC-4)

**L4.DI.7** - PDS will ensure that archival data transferred between *PDS Discipline Nodes* have not been corrupted (2.5.2, UC-8)

**L4.DI.8** - PDS will require a data provider, PDS Data Node, or PDS Discipline Node to resubmit data that have been corrupted during transfer (2.5.3, UC-1, UC-4, UC-8)

**L4.DI.9** - PDS will ensure that a user receiving data from the PDS can verify the data have been successfully transferred (3.2.3, UC-2)

**L4.DI.10** - PDS will periodically verify that data holdings have not been corrupted based on a schedule determined by the PDS Management Council (4.1.2, UC-5)

**L4.DI.11** - PDS will verify that data holdings are not corrupted prior to migrating to another medium (4.1.3, UC-6)

**L4.DI.12** - PDS will ensure that data migrated from one medium to another have been successfully migrated and not corrupted during the transfer (4.1.3, UC-6)

**L4.DI.13** - PDS will ensure that the archival data holdings, to be submitted to the deep archive (NSSDC) for preservation, are not corrupted (4.1.5, UC-3)

**L4.DI.14** - PDS will request the deep archive (NSSDC) to verify that the archival data holdings submitted to the NSSDC have been received intact (4.1.5, UC-3)

**L4.DI.15** - PDS will ensure that the archival data holdings recovered from the deep archive (NSSDC) are not corrupted (4.1.5, UC-7)



## **4.0 RELATED REQUIREMENTS FROM PDS DATA INTEGRITY USE CASES**

The following requirements were derived from the data integrity use cases. They have been allocated to other functional areas within the PDS design).

PDS will ensure that they have an accessible backup copy of their archive holdings (4.1.4, 2.6.1, 2.6.2, UC-5) [*Allocated to disaster recovery*]

PDS will develop a plan for recovery of missing or corrupted files on existing media (4.1.4, UC-5) [*Allocated to disaster recovery*]

PDS will ensure that all data holdings received from the Data Providers are accounted for (2.2.2) [*Allocated to tracking*]