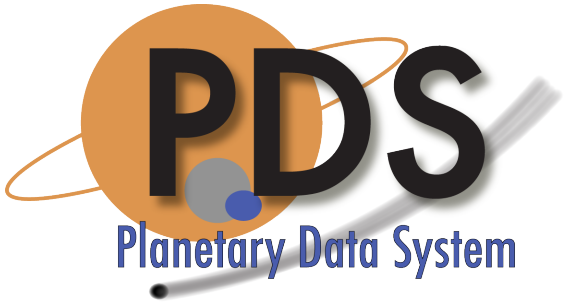

PDS4 Operational Readiness Review

PDS 1/2/3 Requirements

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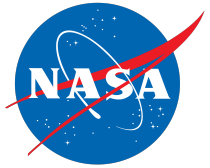


Overview

- PDS has an approved set of level 1, 2 & 3 requirements (latest modification, March 2010)
- PDS has level 4 requirements traced to each subsystem/component
- For LADEE and MAVEN, Reta Beebe will show the tracing of commitments to the requirements.

Requirements Levels

- Level 1 - NASA HQs requirements for PDS (Negotiated with NASA HQ). These requirements are reviewed yearly and constitute the agreement between PDS and NASA HQs for implementation and operations of the PDS.

- Level 2 - PDS MC derived requirements on PDS from the Level 1 requirements. These provide further specification for the Level 1 requirements. They are developed and approved by the PDS Management Council. They are placed under CM by the PDS MC.

- Level 3 - PDS System Level requirements (top-level). These requirements serve as a broad set of requirements governing PDS as a system. The Engineering Node leads development of these requirements with participation from the PDS MC. These requirements are approved by the PDS Management Council and serve as the top-level of requirements for implementation. They are placed under CM by the PDS MC.

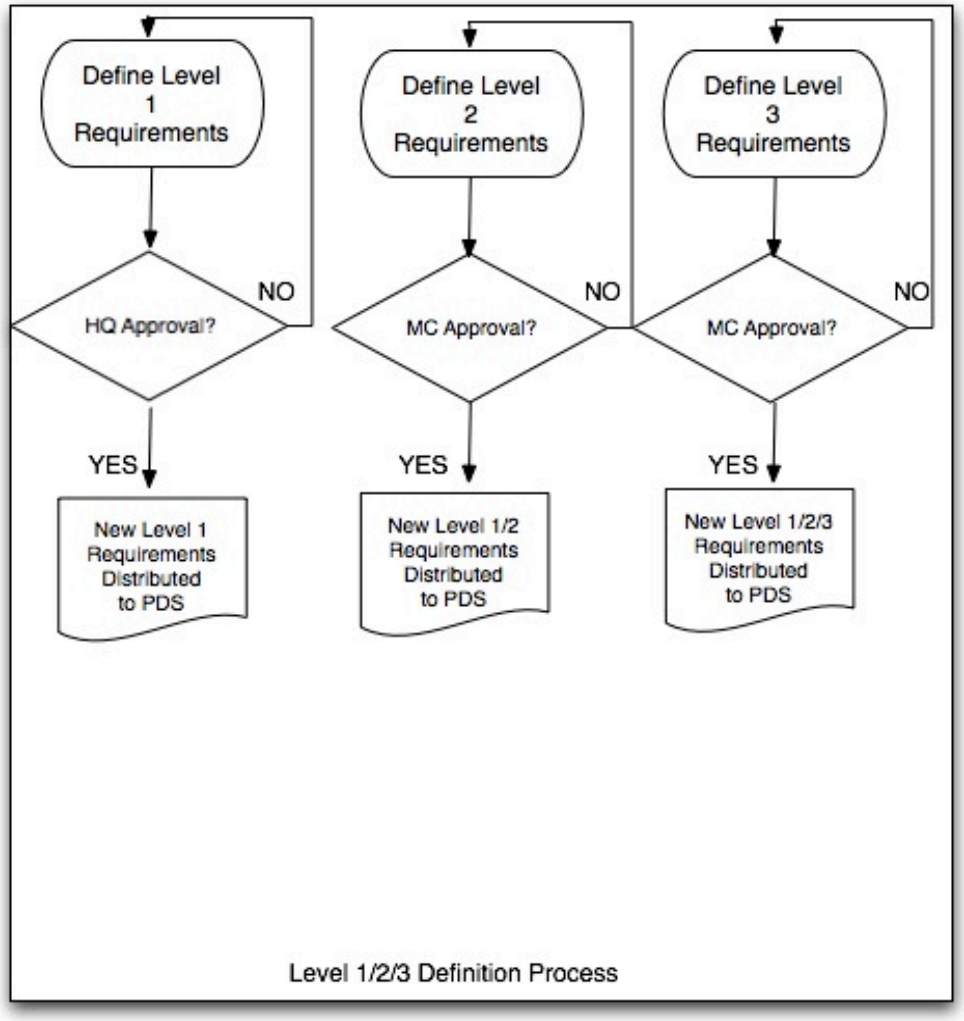
Requirements Levels

- Level 4 - Subsystem/Component/Tool top-level requirements.
  These requirements serve as the top level of requirements for any tool, component or subsystem. The Engineering Node leads development of the requirements with participation from PDS nodes. The requirements are negotiated with and distributed to PDS. They are placed under CM at the Engineering Node.

- Level 5+ - Subsystem/Component/Tool Detailed Requirements.
  These requirements serve as implementation-level requirements for a tool, component or subsystem. They are used to further specify the functional capabilities of a new tool, component or subsystem in order to complement the development effort. The requirements are negotiated with and distributed to PDS. They are placed under CM at the Engineering Node.

PDS Requirements Approval

- Level 1 - NASA HQs requirements for PDS (Sponsor Level)
- Level 2 - MC derived requirements on PDS from the sponsor (MC Level)
- Level 3 - PDS System Level requirements (top-level)
- Minor editorial and maintenance changes approved by PDS Program Manager and Program Scientist. Additional requirements at levels 1/2/3 approved by MC with Level 1 concurrence at HQ.



Level 1/2/3 Definition Process

Level 1 Requirements

1. PDS will provide expertise to guide and assist missions, programs, and individuals to organize and document digital data supporting NASA's goals in planetary science and solar system exploration

2. PDS will collect suitable and well-documented data into archives that are peer reviewed and maintained by members of the scientific community

3. PDS will make these data accessible to users seeking to achieve NASA's goals for exploration and science

4. PDS will ensure the long-term preservation of the data and their usability

Level 2 Requirements

1.1 Single Point of Contact: PDS will provide a single point of contact to each mission, program, agency, or individual (i.e., data providers) wishing to submit archival data

1.2 Expert Help: PDS will provide expert help in designing archival data sets

1.3 Plans and Documents: PDS will assist data providers in developing archive plans, interface documents, validation procedures, and delivery schedules for PDS approval

1.4 Archiving Standards: PDS will have archiving standards for planetary science data

1.5 Archiving Tools: PDS will have tools to assist data producers in assembling, validating, and submitting archival products

Level 2 Requirements (cont…)

2.1 Solicit: PDS will seek complete and comprehensive archives from data providers consistent with interests and resources available.

2.2 Receive: PDS will receive, acknowledge and track data submissions.

2.3 Validation: PDS will validate data submissions to ensure compliance with standards.

2.4 Peer Review: PDS will conduct peer reviews of all data submissions to ensure completeness, accuracy, and scientific usability of content.

2.5 Acceptance: PDS will accept or reject submitted data.

Level 2 Requirements (cont...)

2.6 Catalog: PDS will maintain a catalog of accepted archival data sets.

2.7 Storage: PDS will provide appropriate storage for its archive.

2.8 Architecture: PDS will maintain a distributed architecture based on scientific expertise.

2.9 External Controls: PDS will adhere to applicable federal statutes, NASA policies and Memoranda of Understanding with other organizations.

Level 2 Requirements (cont…)

3.1 Search: PDS will allow and support searches of its archival holdings

3.2 Retrieval: PDS will facilitate transfers of its data to users

3.3 Services: PDS will provide value added services to aid in using archive products.

4.1 Long-Term Preservation: PDS will determine requirements for and ensure long-term preservation of the data

4.2 Long-Term Usability: PDS will establish long-term usability requirements and implement procedures for meeting them

Key Requirements: Archive Standards

1.4 Archiving Standards: PDS will have archiving standards for planetary science data

1.4.1 PDS will define a standard for organizing, formatting, and documenting planetary science data

1.4.2 PDS will maintain a dictionary of terms, values, and relationships for standardized description of planetary science data

1.4.3 PDS will define a standard grammar for describing planetary science data

1.4.4 PDS will establish minimum content requirements for a data set (primary and ancillary data)

1.4.5 PDS will, for each mission or other major data provider, produce a list of the minimum components required for archival data

1.4.6 PDS will develop, publish and implement a process for managing changes to the archive standards

1.4.7 PDS will keep abreast of new developments in archiving standards

Key Requirements: Tools

1.5 Archiving Tools: PDS will have tools to assist data producers in assembling, validating, and submitting archival products

1.5.1 PDS will provide tools to assist data producers in generating PDS compliant products

1.5.2 PDS will provide tools to assist data producers in validating products against PDS standards

1.5.4 PDS will provide documentation for installing, using, and interfacing with each tool

Key Requirements: Cataloging

2.6 Catalog: PDS will maintain a catalog of accepted archival data sets.

2.6.1 PDS will develop and publish procedures for cataloging archival data

2.6.2 PDS will design and implement a catalog system for managing information about the holdings of the PDS

2.6.3 PDS will integrate the catalog with the system for tracking data throughout the PDS

Key Requirement: Architecture

2.8 Architecture: PDS will maintain a distributed architecture based on scientific expertise

2.8.1 PDS will maintain a distributed archive where holdings are maintained by Discipline Nodes, specializing in subsets of planetary science

2.8.2 PDS will maintain a distributed catalog system which describes the holdings of the archive

2.8.3 PDS will provide standard protocols for locating, moving, and utilizing data, metadata and computing resources across the distributed archive, among PDS nodes, to and from missions, and to and from the deep archive

2.8.4 PDS will work with other space agencies to provide interoperability among planetary science archives

2.8.5 PDS will provide an integrated on-line interface that provides information about and links to its data, services, and tools

2.8.6 PDS will implement common and discipline-specific services within the distributed architecture

2.8.7 The PDS architecture will enable non-PDS developed tools to access PDS holdings and services

2.8.8 The PDS architecture will enable computational services on selected archival products

Key Requirements: Search & Retrieval

3.1 Search: PDS will allow and support searches of its archival holdings

3.1.1 PDS will provide online interfaces allowing users to search the archive

3.1.2 PDS will provide online interfaces for discipline-specific searching

3.1.3 PDS will allow products identified within a search to be selected for retrieval

3.2 Retrieval: PDS will facilitate transfers of its data to users

3.2.1 PDS will provide online mechanisms allowing users to download portions of the archive

3.2.3 PDS will provide mechanisms to ensure that data have been transferred intact

Key Requirements: Services

3.3 Services: PDS will provide value added services to aid in using archive products.

3.3.1 PDS will provide expert help in use of data from the archive

3.3.2 PDS will provide a capability for opening and inspecting the contents (e.g. label, objects, groups) of any PDS compliant archival product

3.3.3 PDS will provide tools for translating archival products between selected formats

3.3.4 PDS will provide tools for translating archival products between selected coordinate systems

3.3.5 PDS will provide tools for visualizing selected archival products

3.3.6 PDS will provide a mechanism for notifying subscribed users when a data set is released or updated

3.3.7 PDS will solicit input from the user community on services desired

Summary

- PDS has developed a set of level 1/2/3 requirements which serves as the defining requirements, by the PDS MC, for the system
- Beebe will show mapping of commitments from LADEE and MAVEN to requirements that are needed to support the mission
- Hardman will show mapping of those requirements to software components for LADEE and MAVEN
- Hughes will show mapping of those requirements to standards for LADEE and MAVEN.
- Law will show traceability of test cases to requirements.