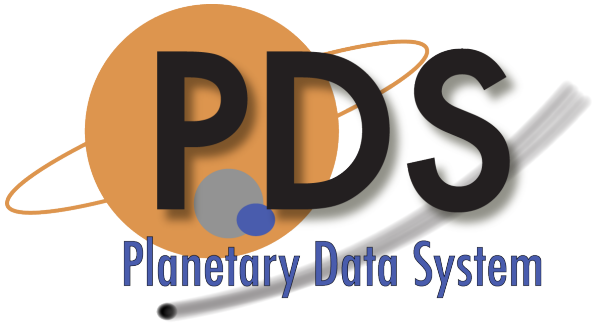

PDS4 Operational Readiness Review

PDS4 MAVEN Support

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Overview

- MAVEN Timeline
- Support Activities
- Meeting Requirements
- Product Distribution

MAVEN Timeline

Date	Event
2013 Nov-Dec	Launch Window
2014 Mar	Final SIS updates due
2014 Sep	Mars Orbital Insertion
2014 Nov	Start of Science Operations (5 weeks after MOI)
2015 Apr	First Data Delivery (6 months after Start of Science Ops)

Support Activities

- Assist mission teams in designing archive.
- Act as advocate for changes to PDS4 Information Model (IM) on behalf of mission.
- Design and develop tools to assist in archive preparation.
- Perform workflow tests to achieve smooth and efficient archiving.

MAVEN Data Types

Instrument	Data Format	PDS4 Object(s)
NGIMS	ASCII Tables	Table_Character
IUVS	FITS	Header, Array_2D, Array_3D
ACC	ASCII Tables	Table_Character
STATIC	CDF	Header, Array_1D, Array_2D
SEP	CDF	Header, Array_1D, Array_2D
SWEA	CDF	Header, Array_1D, Array_2D
SWIA	CDF	Header, Array_1D, Array_2D, Array_3D
LPW/EUV	CDF	Header, Array_1D, Array_2D
MAG	ASCII Tables	Header, Table_Character
SPICE	SPICE Kernels	SPICE_Kernel

Requirements Overview

- Archive products
  - ASCII Table, FITS, CDF, SPICE
- Archive design (SIS)
- Metadata (Labels)
- Review and Acceptance
- Data Search and Delivery

ASCII Table Support

Deliverable	PDS Requirements	PDS Components	Review & Test Cases
MAVEN NGIMS, MAG, ACC products - ASCII tables	Req 1.4 Archiving Standards	Information Model, Schemas, Standards Reference	Standards Review, Build 3b NODEFUNCTION.1

- Described by PDS4 Header, Table_Character objects
- IM is stable and well tested
- Tools
  - Table structure validation (in development)
    - Ames tool (hosted)
    - format transform tool – ditdos/write (PPI)

FITS Support

Deliverable	PDS Requirements	PDS Components	Review & Test Cases
MAVEN IUVS products - FITS files	Req 1.4 Archiving Standards	Information Model, Schemas, Standards Reference	Standards Review, Build 3b NODEFUNCTION.1

- IUVS has agreed to deliver archive compliant FITS
- Data content described with PDS4 Header and Image
- IM is stable and well tested

CDF Support

Deliverable	PDS Requirements	PDS Components	Review & Test Cases
MAVEN STATIC,SEP,SWEA,SWIA, LPW,LPW-EUV products - PDS4 compliant CDF files	Req 1.4 Archiving Standards	Information Model, Schemas, Standards Reference	Standards Review, Build 3b NODEFUNCTION.1

- Instrument teams have agreed to deliver archive compliant CDF (see http://ppi.pds.nasa.gov/doc/cdf/PDS4-Archiving-of-CDF-Files-v3.pdf)
- Data content described with PDS4 Header, Array_1D, Array_2D objects
- IM version 1.0.0.0 requires minor additions to fully support CDF
  - Updates approved by CCB.
  - Additions slated for version 1.1.0.0 of the Information Model.
- Tools
  - CDF metadata reader – pds.cdf.CDF (PPI), cdfdump (GSFC)
  - CDF compliance verification – pds.cdf.Check (PPI)
  - Compliant CDF generation – cdfconvert (GSFC)
  - CDF transformation – CDF to ASCII Table and ASCII Table to CDF conversion (PPI in development)

SPICE Support

- SPICE products are unchanged from their current formats and specifications.
- NAIF is working with the MAVEN project to design their PDS archive products.

Standards Documents

Deliverable	PDS Requirements	PDS Components	Review & Test Cases
Templates for data and documents	Req 1.2.1 PDS will provide examples and suggestions	Samples, Data Provider Handbook, Archive Preparation Guide	Standards Review, Build 3b NODEFUNCTION.1**
Assistance & review of SIS and sample data files	Req 2.4 Peer Review	Peer Review Guideline	Follow the PDS review process

- Archive SIS
  - Primary document for MAVEN archive production
    - Contains all information needed to generate PDS4 compliant data products
  - SIS template based upon: PDS4 Standards Reference, PDS4 Data Providers Handbook, PDS4 Data Dictionary, and PDS4 Information Model Specification
  - Information in the template has remained compliant with subsequent release of the documents
  - MAVEN instrument SIS's are currently under development

PDS Label Support

Deliverable	PDS Requirements	PDS Components	Review & Test Cases
Templates for data and documents	Req 1.2.1 PDS will provide examples and suggestions	Samples, Data Provider Handbook, Archive Preparation Guide	Standards Review, Build 3b NODEFUNCTION.1**
Validation tools for PDS4 standards compliance	Req 1.5.2 PDS will provide tools to validate products against PDS standards	Validate Tools	Build 3b, NODEFUNCTION.2

- Label Templates
  - ATMOS and PPI will provide label templates to the MAVEN instrument teams
    - Draft versions have been generated (using 1.0.0.0 of IM)
    - Data product descriptions provided by instrument teams (working with teams)
    - Will be updated with release of PDS4 IM version 1.1.0.0 (Oct 2013)
- Generation tools
  - XML generation/translation tool (ATMOS), Generate tool (EN), igpp.docgen (PPI)
- Validation tools
  - oXygen, Validate (EN)

Review and Acceptance

Deliverable	PDS Requirements	PDS Components	Review & Test Cases
Final products review and acceptance	Req 2.4 Peer Review, Req 2.5.2 PDS will implement procedures for accepting archival data	Peer Review Guideline, Archive Preparation Guide	Follow the PDS review process

- Will follow established peer review process
  - Follow archive preparation guidelines
  - Check for compliance with MAVEN Archive SIS
  - Confirm science usability

Harvest and Registration

- All bundles, collections and products will be registered in search services.
- PPI has submitted fully compliant PDS4 archive products to EN where they have been successfully registered and harvested.
- PPI has successfully installed and tested a local Registry.
  - Will allow linking to PDS4 registered products at other locations.
- Primary_Result_Summary will enable enhanced discovery.
  - A redesign of Primary_Result_Summary is in the works which promises to work very well for F&P data.

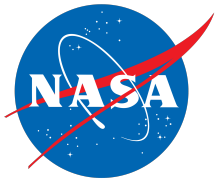
Data Search and Delivery

Deliverable	PDS Requirements	PDS Components	Review & Test Cases
Data distribution to science community	Req 3.1 Search, Req 3.2 Retrieval	Search service (discovery and download)	Build 3b, NODEFUNCTION.4

- Data products will be publicly available through the ATMOS and PPI nodes.
  - Products will be searchable based upon harvested parameters by both EN (Search), and local PPI search services
  - PPI will develop a MAVEN Mission website similar to the ATMOS LADEE prototype.
- Data transformation services
  - ditdos/write (PPI in development; converts tables to VOTable or CDF)
  - CDF to ASCII Tables (PPI in development)
  - Transform tool (EN)
- Visualization
  - Web SPLASH (PPI)
  - Topcat (Astrophysics)
  - Autoplot (Heliophysics)

Summary

- With IM version 1.1.0.0 we will be able to support all planned MAVEN archive products.
  - A revised Primary_Result_Summary would enhance discovery.
- We are preparing label templates for delivery to the instrument teams.
- We are ready to support label generation and validation.
- Harvest and registration services are ready.
- Data search, transformation, and distribution service deployment is on track for MAVEN archiving.



Backup Slides

UCLA

Requirements for Archivable CDF

To ensure data in a CDF file will be in an archivable form

1) Create CDF compliant with version 3.4 or later.
2) Use single file CDF.
3) No compression (file or variable).
4) No fragmented variables (all data for a variable must be contiguous in the file).
5) Use only "zVariables" (also recommended by the CDF standard)
6) All data records are physical (record variance for data variables is "VARY")

To aid in the generation of PDS metadata it is advisable to include

1) CDF Tool compliant metadata.
2) ISTP/IACG compliant metadata.

Primary_Result_Summary

- Designed to enable model-based search on science parameters which are not covered elsewhere in the IM.
  - observation purpose (calibration, engineering, navigation, science)
  - processing level
  - discipline (spectroscopy, imaging, fields, particles, atmospheres, etc.)
  - discipline dependent facets and sub-facets

Support Tool Summary

Need	Tool
Display CDF metadata	pds.cdf.CDF (PPI dev) cdfdump (GSFC dev)
Conforming to CDF Tool/ISTP/ PDS4 requirements	pds.cdf.Check (PPI dev)
Transform to conforming	cdfconvert (GSFC dev)
Generate PDS4 labels	igpp.docgen (PPI dev) + Velocity templates

General Software Summary

Purpose	Tool
Validation	org.nasa.imaging.generate (generate) org.spase.tools.Validator (UCLA) Xmllint (xmllint --schema schema.xsd doc.xml)
Data Transform	Transform (EN) ditdos.write (Tables to VOTable, CDF) (PPI) CDF to ASCII Table (PPI)
Visualization	Web SPLASH (PPI) Topcat (Astrophysics) Autoplot (Heliophysics)