Validation Tool - Phase II
Use Cases and Requirements

Technical Face-to-Face

Pasadena, California

Oct 24-25, 2006

http://pds.nasa.gov

Use Cases and Capabilities Discussion

Agenda - Tuesday October 24

Check-in Visitor Control	8:30 AM
Introduction, logistics, agenda review	9:00 AM – 9:15 AM
VTool - Phase I status, standards issues, etc for planning Phase II	9:15 AM – 10:00 AM
BREAK	10:00 AM – 10:15 AM
VTool - Phase II use case/capabilities discussion	**10:15 AM – 11:30 AM**
LUNCH	11:30 AM – 1:00 PM
VTool - Phase II requirement identification and discussion	**1:00 PM – 2:30 PM**
VTool - Phase II summary actions, timeline and release scoping	**2:30 PM – 3:15 PM**
BREAK	3:15 PM – 3:30 PM
Label design tool - Use case/capabilities discussion	3:30 PM - 5:00 PM
Adjourn	5:00 PM

Topics

- Introduction
- Level 3 Requirements
- Use Cases

Introduction

- Background
  - The PDS Management Council on October 5, 2005 at the Management Council face-to-face meeting directed the development of a tool to support PDS label and product validation.
  - The release of the first phase of that tool is expected in Jan 2007.
  - The second phase will extend the functionality of the tool to cover other aspects of validation.
- Scope
  - Present possible areas where validation could be extended.
  - Ensure that these are the areas of interest and prioritize them accordingly.

Level 3 Requirements

- The following level three requirements relate to the validation of data products and are referenced in the use cases.
- 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.

Summary of Use Cases

- Each use case describes one or more scenarios where a user (actor) or a group of users:
  - Want to validate a PDS data dictionary.
  - Want to validate a generic data object as part of a PDS data product (versus just the label).
  - Want to validate a specific data object as part of a PDS data product with Node developed software.
  - Want to validate a catalog template.
  - Want to validate a PDS volume.
  - Want to access documentation.
- These use cases have been derived from the PDS level three requirements and from information gleaned during Phase I development of the Validation Tool.
- These use cases will subsequently aid in the formulation of a more detailed set of level four requirements.

Use Case Discussion

- Are these use cases representative of the way your node would like to see the validation tool extended?
- Does anything need to be added, deleted, or clarified, before we can derive requirements from these use cases?
- The remaining slides contain the use cases and some background material, to be used to aid the requirements definition.

UC-1: Validate Data Dictionary (1 of 2)

- Actors: Data Designer, Data Archivist, Data Preparer
- Description: A user wants to validate the PSDD or one or more local data dictionaries. (1.5.2)
- Scenario:
  1. The user readies the PSDD and local data dictionaries to be validated.
  2. The user executes the tool and specifies the appropriate set of input parameters (e.g. configuration information, PSDD, local data dictionaries, report file, etc).
  3. The user reviews the validation report for indications of anomalies in the data dictionaries.
- Alternative: At step 3, an anomaly is detected in the PSDD.
  a. The user informs EN of the anomaly.
- Alternative: At step 3, an anomaly is detected in a local data dictionary.
  a. The user corrects the errant portion(s) of the local data dictionary.
  b. Return to the primary scenario at step 2.

UC-1: Validate Data Dictionary (2 of 2)

- Background
  - While developing the Validation Tool it became very apparent that we need a tool to validate data dictionaries.
  - The primary reason is because the current PSDD is/was riddled with ODL and other typographical errors.
  - The secondary reason is to enable a higher level of product validation.
- Proposed Effort
  - The majority of this effort centers around the standards.
  - Need to revisit the standards with regard to:
    - Element, object and group definition standards.
    - Data type support and type checking.
  - The tool itself is essentially complete assuming the standards don't change drastically.
  - Additional work would include:
    - Modifications corresponding to any standards changes.
    - Enhanced messaging and reporting along the lines of product validation.
    - Develop a separate command-line interface (DTool).

UC-2: Validate Generic Data Object (1 of 2)

- Actors: Data Designer, Data Archivist, Data Preparer
- Description: A user wants to validate a generic (e.g. TABLE, SPREADSHEET, IMAGE, etc.) data object as part of a PDS data product. (1.5.2)
- Scenario:
  1. The user readies the PDS data products (data objects and labels) to be validated.
  2. The user readies the PSDD and local data dictionaries to be used in validating the data products.
  3. The user executes the tool and specifies the appropriate set of input parameters (e.g. configuration information, input file(s), PSDD, any local data dictionaries relevant to validating the input file(s), report file, etc).
  4. The user reviews the validation report file for indications of anomalies in the data products.
- Alternative: At step 4, an anomaly is detected in a data product.
  1. The user corrects the errant portion(s) of the data product.
  2. Return to the primary scenario at step 3.

UC-2: Validate Generic Data Object (2 of 2)

- Background
  - This capability was originally planned for the initial release of the tool.
  - Because of this, much of the software infrastructure is in place to support the capability.
- Proposed Effort
  - The EN will provide software for validating generic data objects such as TABLE, SPREADSHEET, IMAGE, etc.
  - Develop a prioritized list of data objects to drive requirements definition and implementation.

UC-3: Validate Specific Data Object (1 of 2)

- Actors: Data Designer, Data Archivist, Data Preparer
- Description: A user wants to validate a specific (e.g. MY_TABLE, etc.) data object as part of a PDS data product with Node developed software. (1.5.2, 1.5.4)
- Scenario:
  1. The user configures the Validation Tool for, or otherwise installs, the Node developed software for validating a specific data object.
  2. The user readies the PDS data products (data objects and labels) to be validated.
  3. The user readies the PSDD and local data dictionaries to be used in validating the data products.
  4. The user executes the tool and specifies the appropriate set of input parameters (e.g. configuration information, input file(s), any data dictionaries relevant to validating the input file(s), report file, etc).
  5. The user reviews the validation report file for indications of anomalies in the data products.

UC-3: Validate Specific Data Object (2 of 2)

- Alternative: At step 1, the software is delivered to the EN for incorporation into a Validation Tool release.
  a. Return to the primary scenario at step 2.
- Alternative: At step 5, an anomaly is detected in a data product.
  a. The user corrects the errant portion(s) of the data product.
  b. Return to the primary scenario at step 4.
- Background
  – It is assumed that the EN will be unable to develop validators for every data object in existence due to schedule and budget limitations.
  – This capability provides the means for the Nodes to contribute their data expertise to the effort.
- Proposed Effort
  – The EN will provide a software interface for plugging in EN or Node developed software for validating generic and specific data objects. See class diagram in the backup slides.
  – The EN will provide documentation for developing these software modules.

UC-4: Validate Catalog Template (1 of 2)

- Actors: Data Designer, Data Archivist, Data Preparer
- Description: A user wants to validate one or more PDS catalog templates. (1.5.2)
  - Templates include: mission, instrument host, instrument, target, personnel, reference, image_map_projection, software, inventory, nssdc, housekeeping and volume.
- Scenario:
  1. The user readies the catalog templates to be validated
  2. The user readies the PSDD and any local data dictionaries to be used in validating the catalog templates.
  3. The user executes the tool and specifies the appropriate set of input parameters (e.g., configuration information, input file(s), PSDD, any local data dictionaries relevant to validating the input file(s), report file, etc).
  4. The user reviews the validation report file for indications of anomalies in the catalog templates.
- Alternative: At step 4, an anomaly is detected in a catalog template.
  a. The user corrects the errant portion(s) of the catalog template.
  b. Return to the primary scenario at step 3.

UC-4: Validate Catalog Template (2 of 2)

- Background
  - Validation of catalog templates is very similar to PDS labels, but
  - It's not clear (to the development team) that template files follow the same set of rules as labels.
- Proposed Effort
  - Need to determine the rules for catalog template validation and capture them as level 5 requirements.
  - Software developed for this effort should integrate easily into the automated catalog ingestion effort that is on the horizon.

UC-5: Validate Volume (1 of 2)

- Actors: Data Designer, Data Archivist, Data Preparer
- Description: A user wants to validate a PDS volume. (1.5.2)
- Scenario:
  1. The user readies the PDS volume to be validated.
  2. The user readies the PSDD and local data dictionaries to be used in validating the volume.
  3. The user executes the tool and specifies the appropriate set of input parameters (e.g., configuration information, input file(s), PSDD, any local data dictionaries relevant to validating the input file(s), report file, etc).
  4. The user reviews the validation report file for indications of anomalies in the volume.
- Alternative: At step 4, an anomaly is detected in the volume.
  a. The user corrects the errant portion(s) of the volume.
  b. Return to the primary scenario at step 3.

UC-5: Validate Volume (2 of 2)

- Background
  - Although, volumes are defined in the Standards Reference, there appears to be anecdotal evidence that the standards are not always followed when preparing volumes.
  - A possible impact on this effort, is the work with NSSDC and how volumes may be redefined to support the concept of a virtual volume.
  - This effort also corresponds with an award fee criteria item:
    - Define requirements for a Volume Validation Tool (as discussed at 6/1/2006 telecon) – due 3/15/2007
- Proposed Efforts
  - Need to determine the rules for volume validation and capture them as level 5 requirements.

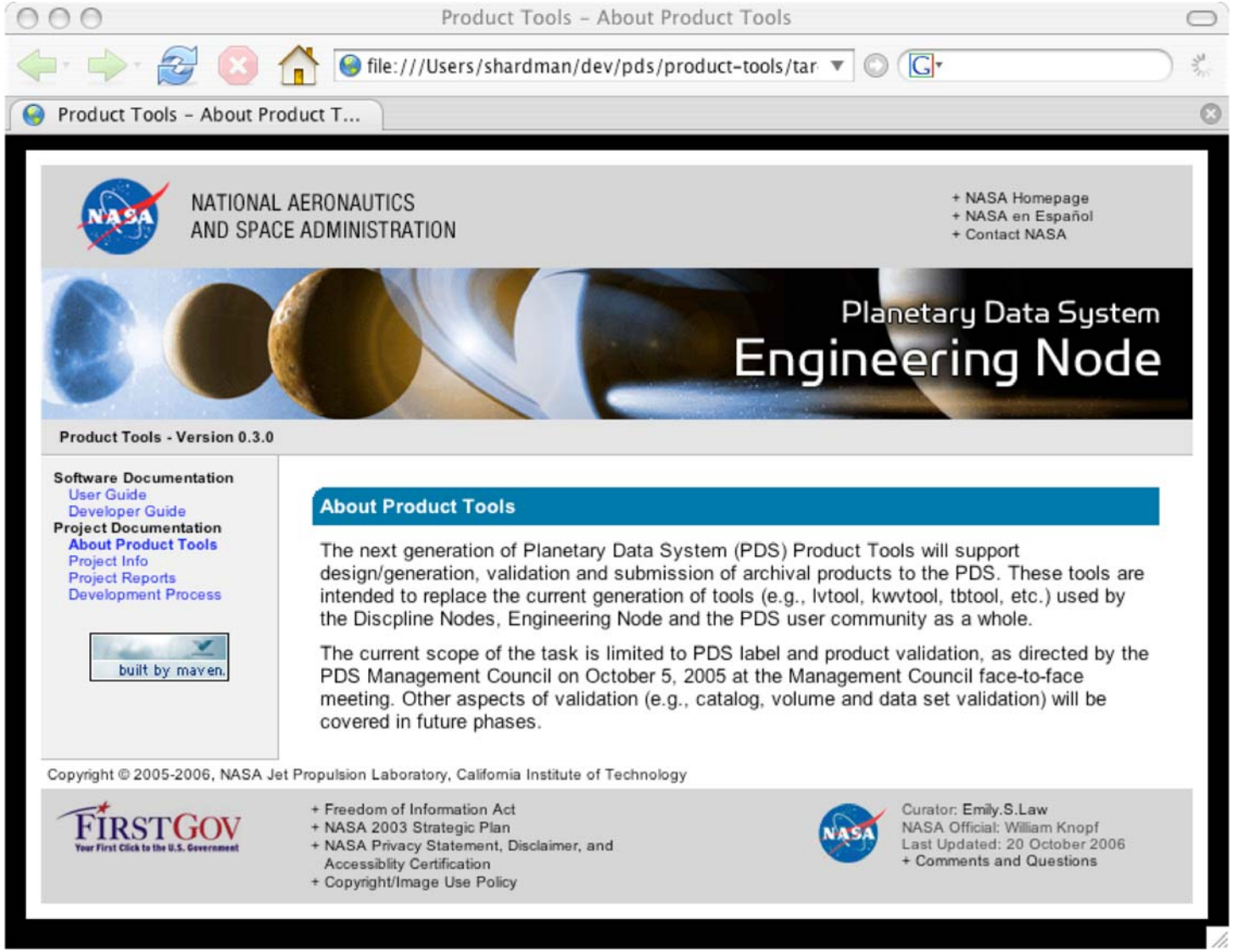
UC-6: Access Documentation (1 of 3)

- Actors: Data Designer, Data Archivist, Data Preparer
- Description: A user wants to review the documentation for installing, using, and interfacing with a tool. (1.5.4)
- Scenario:
  1. The user accesses the documentation supplied as part of the distribution package.
  2. The user reviews the documentation and smiles knowing that all questions, concerns, and issues are but a paragraph away from being resolved.
- Alternative: At step 1, the user accesses the documentation from the Engineering Node web site (same look and feel).
  a. Return to the primary scenario at step 2.

UC-6: Access Documentation (2 of 3)

- Background
  - Tool documentation for the legacy tools is somewhat lacking and inconsistently formatted.
- Proposed Effort
  - Generate documentation for new tool development that is consistently formatted and web-based.
  - The documentation will be accessible from the Engineering Node web site as well as being included in the software distribution.
  - The documentation will reside with the software under Configuration Management control.

UC-6: Access Documentation (3 of 3)



Requirements Identification Discussion

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Topics

- Introduction
- Level 4 Validation Requirements

Introduction

- Current state of level 4 requirements for validation:
  - A minimal set were provided in the Validation Tool Requirements document.
  - Strictly provided as a transition between the L3's and L5's.
- Due to the underwhelming response that has been received for these requirements, we thought they should be addressed officially.
- Derive from the level 3 requirements:
  - 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.
- A proposed set of requirements have been unknowingly provided by Dick Simpson, gleaned from an e-mail sent to me back in April.
  - I made a couple of tweaks here and there.

Level 4 Validation Requirements (1 of 2)

- **L4.VAL.FR.1** - The tool(s) shall determine whether components of an archive comply with PDS standards.
- **L4.VAL.FR.2** - Compliance tests shall be possible on any component defined in the PDS Standards Reference, including (but not limited to) data products (including labels and objects), files, directories, data sets, and volumes.
- **L4.VAL.FR.3** - It shall be possible to validate single items (e.g., a stand alone label), groups of items (e.g., a data product with multiple objects), or entire structures (e.g., data sets and volumes).
- **L4.VAL.FR.4** - It shall be possible to validate components against requirements and limitations listed in the PDS Standards Reference.

Level 4 Validation Requirements (2 of 2)

- **L4.VAL.FR.5** - It shall be possible to validate objects and elements against requirements and limitations listed in the Planetary Science Data Dictionary.
- **L4.VAL.FR.6** - The results of each validation run will be reported in a form which is either human- or machine-readable (selected by the user).
- **L4.VAL.FR.7** - The documentation …

- Should catalog templates be mentioned specifically?
- Should validation of data dictionaries be mentioned?

Backup Slides

Definitions

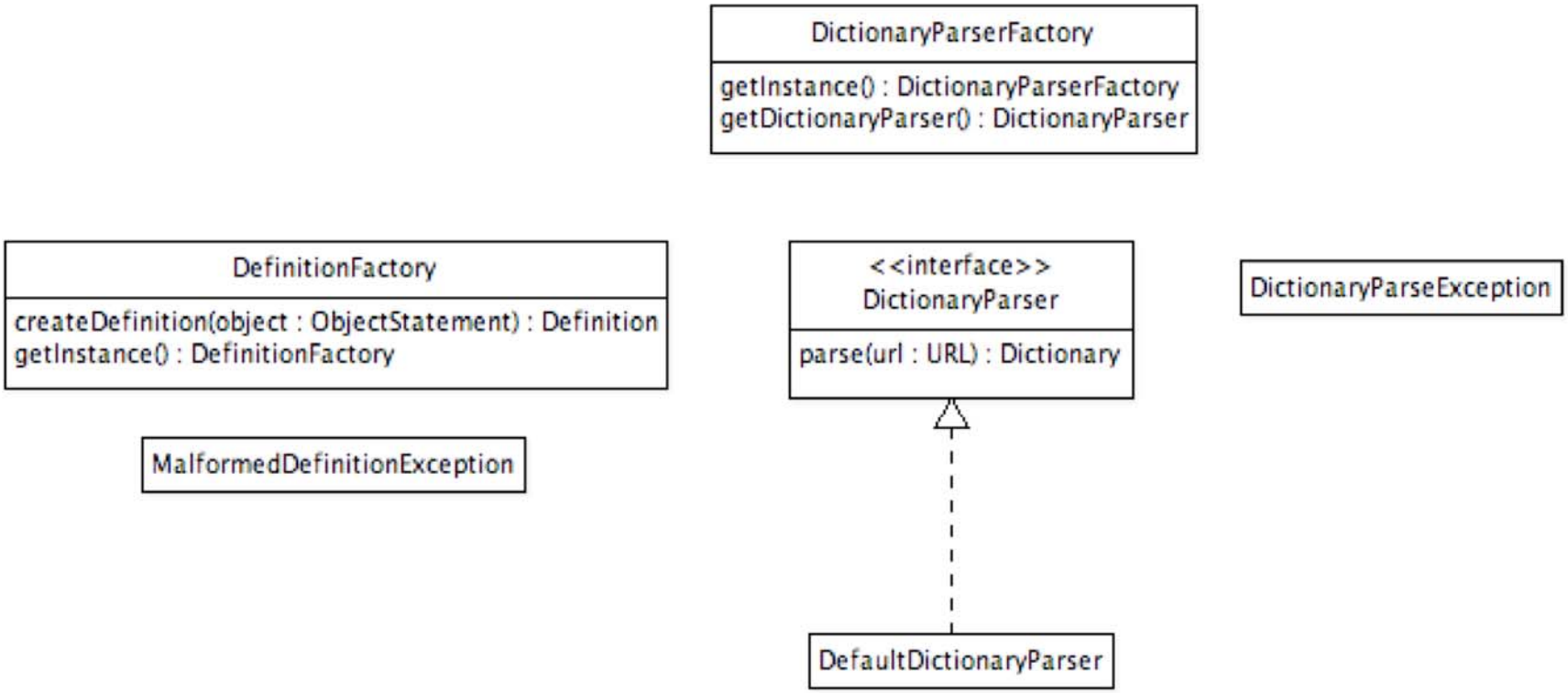
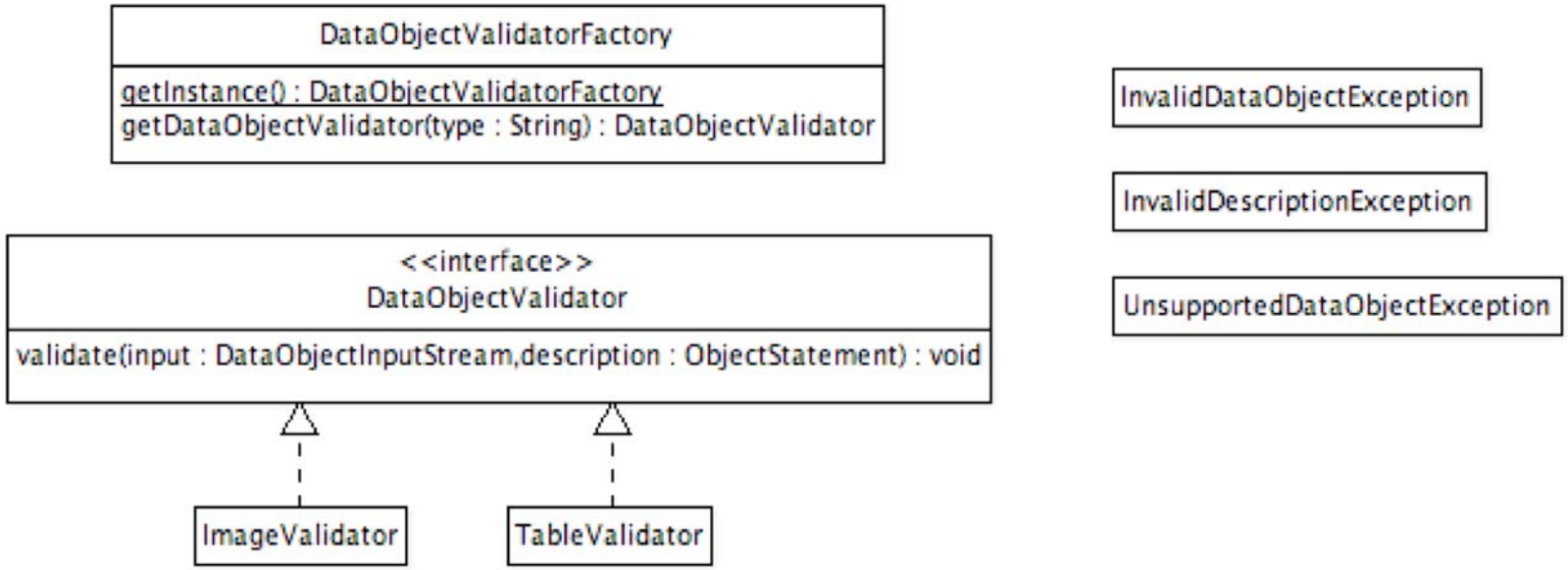
The following definitions are used in the use case scenarios.

- Actor - An actor is a person, organization, or external system that plays a role in one or more interactions with your system.
- PDS Node - Any PDS node include science discipline nodes, support nodes, or data nodes.
- Use Case - A use case describes a sequence of actions that provide something of measurable value to an actor.

Use Case Actors

- Data Archivist – A staff member of a PDS Discipline Node, Data Node, or the Engineering Node who reviews, accepts, and archives data sets and volumes into the PDS.
- Data Designer – A Planetary Scientist or a member of a Mission Proposal Team, Mission Flight Project, Campaign, or Experiment who contributes to the design of data sets and volumes.
- Data Preparer – A Planetary Scientist or a member of a Mission Proposal Team, Mission Flight Team, Campaign, or Experiment who prepares data sets and volumes for submission to the PDS.

Data Dictionary Validation



Data Object Validation