Planetary Data System

Data Product Design Tool Use Cases

DRAFT
October 13, 2006
Version 0.100610013

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JPL D-xxxxx

CHANGE LOG

Revision	Date	Description	Author
Start Draft	2006–09–08	First Draft	S. Hughes
	2006–09–22	Second Draft	S. Slavney
	2006–10–02	Third Draft	M. Rose (incorporating J. Hughes comments, too)
	2006-10-06	Fourth Draft	S. Hughes incorporating review comments.

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1 Introduction

The purpose of this document is to capture use case scenarios for the PDS data product label design tool. These use cases have been derived from the PDS level three requirements and additional candidate requirements provided by the PDS Geosciences Node.

Scope: This tool is only for label design and is not intended to generate multiple labels in production mode. In particular the tool will generate a label template that is compliant with the latest PDS standards and data dictionary using an interactive label editor that gets input from the user, the PDS data dictionary, and the PDS standards, and outputs a PDS label template file that can be used in the creation of PDS data product labels. The user does not need to be a PDS expert because the tool guides the user through the label creation process.

2 Actors

An actor is a user who is involved in any step of the design of a PDS data product label. The following actors are referenced or implied in the PDS data product label design use cases.

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.

3 Definitions

The following terms are used in the use case scenarios.

Actors. An actor is a person, organization, or external system that plays a role in one or more interactions with your system

Data Element – A term that has been defined for use in PDS data product labels or catalog templates and that has been defined in a PDS data dictionary. Also known in the PDS as a keyword.

Data File – A storage entity containing one or more data objects; for example, an image or an image plus a header.

Data Object – A contiguous sequence of bits, e.g., an image.

Data Object Description – An ODL description of a data object.

Data Product – A data product label and one or more data objects.

Data Product Label – One or more data object descriptions. Also known as a PDS Label.

Keyword – A term that has been defined for use in PDS data product labels or catalog templates and that has been defined in a PDS data dictionary. Also known as a data element.

Label Template – An ODL specification that represents a model for a data product label and that can be used for the creation of data product labels either manually or using an automated tool.

PDS Node – Any PDS node including science discipline nodes, support nodes, or data nodes.

Project File – A file in which the design tool saves the state of the user's work so that it can be resumed in a later session. The state includes the locations of label templates and data dictionaries in use, including local and working data dictionaries.

Sequence - An imagined or projected sequence of events, esp. any of several detailed plans or possibilities.

Specific Label Object Definition – A PSDD definition to be used for label validation that defines a product label as a specific object with no optional sub-objects or keywords allowed.

Use cases - A use case describes a sequence of actions that provide something of measurable value to an actor.

Working Data Dictionary - A data dictionary with the same structure as a local data dictionary that is created and managed by the design tool for the purpose of collecting objects, keywords, and keyword values that are not present in either the PSDD or a local data dictionary.

4 Requirements

The following level three requirements relate to PDS data product label design and are referenced in the use cases.

1.2.1   PDS will provide examples and suggestions on organization of data products, metadata, documentation and software

1.2.2   PDS will provide expertise in applying PDS standards

1.2.3   PDS will provide expertise to support the design of scientifically useful archival data sets

1.3.3   PDS will provide criteria for validating archival products.

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

1.5.1   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

1.5.3   PDS will provide tools to assist data producers in submitting products to the PDS archive

5 Use Cases

Each use case describes a sequence of steps where one user (actor) or a group of users are involved in the design, creation, or editing of data product labels. These use cases have been extracted from the PDS level three requirements and from a draft set of design tool requirements submitted by the PDS Geosciences Node. These use cases will subsequently aid in the formulation of detailed tool requirements.

5.1 User designs a new product label template with no example inputs

Actors: Data Designer, Data Archivist

Description: A user designs a new PDS data product label template without basing it on any existing label or data product.

PDS Requirements: 1.2.1, 1.2.2, 1.2.3, 1.3.3, 1.4.1, 1.4.2, 1.4.3, 1.5.1, 1.5.2, 1.5.3

Sequence:
1.   Optionally, user specifies location of PSDD and all relevant local data dictionaries. (Requirement note: The tool uses a default data dictionary if none is specified.)
2.   User requests to create a new label template.
3.   User optionally specifies the type of data file to be described. (e.g. ASCII Table)
4.   System creates new label template with minimally required components and displays to User, indicating required and optional fields.
5.   User modifies and saves a label template by doing any of the lower-level use cases in section 6, as many times as desired and in any order.
6.   If there are unsaved changes to the label template or the project file, the System asks the user whether to save the files before exiting.

5.2 User designs a new product label template by referencing an existing product label

Actors: Data Designer, Data Archivist

Description: A user designs a PDS data product label template by referencing a pre-existing product label as a basis for the new label's design.

PDS Requirements: 1.2.1, 1.2.2, 1.2.3, 1.3.3, 1.4.1, 1.4.2, 1.4.3, 1.5.1, 1.5.2, 1.5.3

Sequence:
1. Optionally, user specifies location of PSDD and all relevant local data dictionaries.
2. User selects an existing attached or detached product label as a basis for the design of a new label.
3. System copies the existing product label and displays to User as a label template, indicating required and optional fields.
4. User modifies and saves a label template by doing any of the lower-level use cases in section 6, as many times as desired and in any order.
5. If there are unsaved changes to the label template or the project file, the System asks the user whether to save the files before exiting.

5.3 User designs a new product label template to describe an actual data file.

Actors: Data Designer, Data Archivist

Description: A user designs a new PDS data product label template, allowing the tool to assist by analyzing an existing data file. For example the tool analyzes an example data file to determine the positions and characteristics of columns within a table. A pre-existing label is not referenced by the tool.

PDS Requirements: 1.2.1, 1.2.2, 1.2.3, 1.3.3, 1.4.1, 1.4.2, 1.4.3, 1.5.1, 1.5.2, 1.5.3

Sequence:
1. Optionally, user specifies location of PSDD and all relevant local data dictionaries.
2. User requests to create a new label template based on a data file, and selects the data file to use.
3. System ignores any attached label if one exists.
4. User optionally specifies the type of data file to be described. (e.g. ASCII Table).
5. System reads data file to determine its format (table or spreadsheet only) and either creates new label template with minimally required components plus column definitions and

displays to User, indicating required and optional fields, or displays an error saying that the format cannot be determined from the data file.
6. User modifies and saves a label template by doing any of the lower-level use cases in section 6, as many times as desired and in any order.
7. If there are unsaved changes to the label template or the project file, the System asks the user whether to save the files before exiting.

5.4 User designs a new product label template to describe an actual data file by referencing a label for a similar data file.

Actors: Data Designer, Data Archivist

Description: A user designs a new PDS data product label template by basing it on both an existing data file and an existing data product label for a similar type of file.

PDS Requirements: 1.2.1, 1.2.2, 1.2.3, 1.3.3, 1.4.1, 1.4.2, 1.4.3, 1.5.1, 1.5.2, 1.5.3

Sequence:
1. Optionally, user specifies location of PSDD and all relevant local data dictionaries.
2. User selects an existing data file that needs a label and an existing data product label for a similar type of data file as a basis for the design of a new label template.
3. System copies the existing label to form the new label template.
4. System displays the new label template and indicates required and optional keywords.
5. User modifies and saves a label template by doing any of the lower-level use cases in section 6, as many times as desired and in any order.
6. If there are unsaved changes to the label template or the project file, the System asks the user whether to save the files before exiting.

5.5 User continues the design of a product label template

Actors: Data Designer, Data Archivist, Data Preparer

Description: The user continues the design of a data product label template by opening a project file and editing a previously created label template.

PDS Requirements: 1.2.1, 1.2.2, 1.2.3, 1.3.3, 1.4.1, 1.4.2, 1.4.3, 1.5.1, 1.5.2, 1.5.3)

Sequence:
1. Optionally, user specifies the location of a previously saved project file.

2. System loads the project file and displays label template.
3. User modifies and saves a label template by doing any of the lower-level use cases in section 6, as many times as desired and in any order.
4. If there are unsaved changes to the label template or the project file, the System asks the user whether to save the files before exiting.

5.6 User requests label template validation report

Actors: Data Designer, Data Archivist, Data Preparer

Description: The user requests a label template validation report that includes a list of items to be addressed in order to make the label template compliant. This capability does not duplicate the label validation tool report since the label template is not a valid product label. It has fields that need to be filled in. (1.3.3, 1.5.2)

Sequence:
1. The user requests a label template validation report, that includes but is not limited the following items.
   a. Keyword not found in the data dictionary
   b. Standard value not found in the data dictionary
   c. Objects not found in the data dictionary
   d. Missing components of objects (i.e. a keyword is not present that should be present)
   e. Invalid components of objects (i.e. a keyword is present that should not be present)
   f. Type checking on keyword values.
   g. Definitions of keyword found in data dictionaries.

6 Lower-Level Use Cases

Use cases in this section are not normally used by themselves, but as steps while performing the higher-level use cases in section 5.

6.1 Adding a Data Object Description to a Label Template

Actors: Data Designer, Data Archivist

Description: The user adds a new data object description to a label template by selecting from a context-sensitive list or specifying a new data object description manually. (e.g. Add a PDS TABLE object description.)

Sequence:
1. User selects a location within the label template to add a data object description.
2. System displays a list of data object descriptions appropriate for that location.
3. User either selects data object description from the list or specifies new data object description manually.
4. System inserts the new data object description, including required and optional keywords, into the label template and displays the result.

6.2 Adding a Keyword to a Label Template

Actors: Data Designer, Data Archivist

Description: The user adds a keyword to a label template, either selecting from a list of data dictionary keywords or entering a new keyword.

Sequence:
1. User selects a location within the label template to add a keyword.
2. System presents user with a list of data dictionary keywords, constrained by the objects currently in the label template. Within the implicit file objects, the tools understands several logical keyword groupings based on location, and constrains the keywords accordingly. (e.g. Identification keywords vs Descriptive keywords.
3. User either selects from list or enters a keyword manually.
4. If user adds a keyword that is not in the PSDD or the specified local data dictionaries, the keyword is added to the working data dictionary automatically by the tool.

6.3 Changing the Value of a Keyword

Actors: Data Designer, Data Archivist, Data Preparer

Description: The user changes the value of a keyword within a label template.

Sequence:
1. User selects the value s/he wants to change.
2. System supplies a list of acceptable values, if appropriate.
3. User selects a value from the list supplied or types in a value.
4. System flags the value as not valid, if keyword has a list of acceptable values and value is not in that list.
5. System flags the value as "unit override", if unit specification entered does not match the unit specification defined for this keyword in the data dictionaries.

6.4 Getting Table or Spreadsheet Format from a Data Product

Actors: Data Designer, Data Archivist

Description: The user asks the system to look at an existing TABLE or SPREADSHEET data product and figure out the format.

Sequence:
1. User selects an existing data product from which to extract table or spreadsheet column information.
2. System reads the data product and inserts a new spreadsheet or table object matching the column formats, if possible, or displays an error saying the format cannot be determined from the data product.

6.5 Removing an Object

Actors: Data Designer, Data Archivist

Description: The user removes an object from a label template.

Sequence:
1. User selects an existing object to remove.
2. System removes the object from the label template.

6.6 Removing a Optional Keyword

Actors: Data Designer, Data Archivist

Description: The user removes an optional keyword from a label template.

Sequence:
1. User selects an optional keyword to remove.
2. System removes the optional keyword from the label template.

6.7 Saving a Label Template

Actors: Data Designer, Data Archivist, Data Preparer

Description: The user saves a label template as an ASCII text file with the extension "tbd".

Sequence:
1. User specifies the location of a label template file to create.
2. User optionally requests that the label template be reformatted for readability. (i.e. Pretty Print option).
3. System writes the label template to the file.
4. System writes project state information to the associated project file.

6.8 Saving a Project File

Actors: Data Designer, Data Archivist, Data Preparer

Description: The user requests that the tool save the current state of the design tool as a project file.

Sequence:
1. User specifies the location of a project file to create.
2. System writes the current state of the design tool to the file, including locations of all attached data dictionaries, the location of the working data dictionary, label template validation results, and a specific label object definition file.

6.9 Making a Label Attached or Detached

Actors: Data Designer, Data Archivist

Description: The user specifies whether the label is to be "attached" or "detached" and checks for the appropriate keywords.

Sequence:
1. User specifies that label is to be attached or detached.
2. If the user specified "attached," System adds keywords needed for attached labels, if necessary, and inserts appropriate values to indicate that the actual values should be filled in when the template is used to create an attached label.
3. If the user specified "detached," System removes keywords that are specific to attached labels, if necessary.

6.10 User Specifies Planetary Science Data Dictionary Location

Actors: Data Designer, Data Archivist

Description: The user specifies or changes the location of the Planetary Science Data Dictionary (PSDD) to be used for validation during the design of label templates.

Sequence:
1. User provides the location of the Planetary Science Data Dictionary (PSDD).
2. System remembers the PDS Data Dictionary location.
3. System highlights keywords and values in the current label template that are not valid according to the newly selected PSDD and any previously selected local data dictionaries.

6.11 User Specifies or Removes Local Data Dictionary Location

Actors: Data Designer, Data Archivist

Description: The user specifies, changes, or removes the location of a local data dictionary in a list of local data dictionaries to be used during the design of label templates.

Sequence:
1. User requests one of the following operations:

- User selects an additional local data dictionary to use
- User changes the location of a local data dictionary
- User asks that a local data dictionary be removed from the set in use.

2. System updates its state information.

6.12   Creating or Updating a Working Data Dictionary

Actors: Design Tool

Description: The design tool creates or updates a Working Data Dictionary to hold objects and keywords that are not currently present in either the active PSDD or any specified local data dictionaries.

Sequence:
1. User specifies location of a new or existing Working Data Dictionary.
2. System creates a Working Data Dictionary file if it does not already exist.
3. System inserts entries in the Working Data Dictionary for objects, keywords and values in the label template that do not exist in the PSDD or in specified local data dictionaries.
4. System saves the location of the Working Data Dictionary as part of its state information.