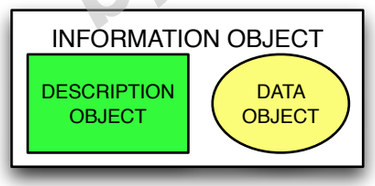
The PDS Information Model

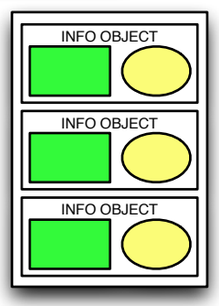
PDS4 standards are built on an underlying, rigorously defined data model.*

Within the data modeling world, all things are treated as one of three types of data object: *physical* (planets, spacecraft, instruments), *digital* (images, tables, documents, software), or *conceptual* (missions, observing campaigns, academic institutions, cartographic projections).

A data object, accompanied by a description of that object, is called an *information object*.



One or more information objects, whose description objects are stored together in a single file, constitute a *product*. We refer to the file containing the description objects as a label.



Attributes describe a data object. A set of attributes defines a *class*. All PDS4 classes and attributes are listed in the PDS Data Dictionary.**

*The PDS Info Model complies with ISO 14721:2003.
**The PDS Data Dictionary complies with ISO/IEC 11179.

Three Types of Products

Basic product - the smallest unit of data registered and tracked in the PDS (images, tables, documents, SPICE files)

Collection product - a list of related basic products of similar type (all raw images from a single instrument, all documents from a mission)

Bundle product - a list of related collections.

Fundamental Data Structures

Digital objects are constructed from one of four fundamental data structures recognized in PDS4:

Array - a homogeneous *N*-dimensional array of scalars (images, spectral qubes)

Table - a set of repeating heterogeneous records of scalars (binary and/or character fixed-length tables)

Parsable Byte Stream - a stream of bytes that can be interpreted using simple parsing rules defined by a widely recognized standard (text files, XML files, CSV tables)

Encoded Byte Stream - data which must be interpreted according to a set of limited, PDS-authorized encoding standards; used primarily for documentation and browse files (PDF files, JPEG images, MPEG movies)

How Do I Get Started?

The following documents present further details about archiving in PDS4:

Introduction - Summarizes the function of each document in the PDS4 document set. Suggests a strategy for using them.

Data Standards Concepts - Introduces the key PDS4 concepts.

PDS4 Jumpstart Guide - Provides an introduction to PDS4 in terms familiar to users of PDS3.

Data Provider's Handbook - Guides data providers step-by-step through the process of creating an archive.

Standards Reference - Expresses the data model in plain language; provides rules for creating PDS4 archives.

Data Dictionary - Defines all PDS4 classes and attributes.

Enhanced Glossary - Defines terms used across all PDS4 documents.

Examples - Depict real-life products created using PDS4 standards.

Visit the PDS web site at:

http://pds.nasa.gov/

or contact the PDS Operator at:

pds_operator@jpl.nasa.gov

Specific terminology used in this guide subject to change.

Coming October 2011

A Quick Start Guide to Archiving with the Planetary Data System

The Planetary Data System (PDS) archives and distributes scientific data from NASA planetary missions, astronomical observations, and laboratory measurements. The PDS is sponsored by NASA's Science Mission Directorate. Its purpose is to ensure the long-term usability of NASA data and to stimulate advanced research.

This brochure provides a brief introduction to the concepts and terminology associated with archiving data in accordance with the latest update to the PDS archiving standards, and directs data providers and users to sources of further information.

Under PDS4, description objects are expressed using eXtensible Markup Language (XML). XML Schema Documents (XSDs) for a variety of archiving classes are available from the PDS as templates for product design.

A (Simplified) Sample Label

```
<?xml version="1.0" encoding="UTF-8"?
<Product_Array_2D_Image xmlns="http:
 <Identification_Area>
  <logical_identifier>URN:NASA:PDS:XY
  <version_id>1.0</version_id>
  <Subject_Area>
  ...
 <Cross_Reference_Area>
  <Product_Reference_Entry>
   <lidvid_reference>URN:NASA:PDS:XYZ
   <ref_association_type>has_browse</
  </Product_Reference_Entry>
  ...
 <Observation_Area>
  <start_date_time>2011-03-02T08:42:5
  <Node_Area>
   <Camera_Parameters_CCD>
    <filter_name>red</filter_name>
    ...
  <Mission_Area>
 <File_Area>
  <File>
   <file_name>c032159.img</file_name>
   <local_identifier>IMAGE</local_ide
  </File>
  <Array_2D_Image base_class="Array_B
   <axes>2</axes>
   <encoding_type>BINARY</encoding_ty
   <Array_Axis>
    <elements>512</elements>
    ...
  </Array_2D_Image>
 </File_Area>
```

The bundle XML label file contains a list, in XML format, of the member collections that constitute the bundle. An optional README file provides a general overview of the bundle.