Example Namespace

NASA Planetary Data System

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USER GUIDE

The Commercial Lunar Payload Services Mission Dictionary (clps:) contains classes, attributes and rules specific to the CLPS missions and their instruments.

PDS4 Commercial Lunar Payload Services Mission Dictionary User's Guide
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INTRODUCTION

1. Purpose of this User's Guide

- This User's Guide provides an overview of the CLPS Mission Data Dictionary. It details how to include the dictionary in a PDS4 label, describes the organization of classes and attributes, provides definitions of the classes and attributes, and lists examples of labels that use it.

1. Audience

- This User's Guide should be useful to data providers intending to archive CLPS data with PDS as well as PDS Nodes who are working with these data providers.

OVERVIEW OF THE CLPS MISSION DICTIONARY

The CLPS Mission Dictionary contains classes, attributes, and rules specific to the CLPS missions and their instruments. Steward: Jennifer Ward, PDS Geosciences Node, geosci@wunder.wustl.edu

HOW TO INCLUDE THE CLPS MISSION DICTIONARY IN A PDS4 LABEL

The dictionary consists of a set of files with names in the form PDS4_CLPS_xxxx_yyyy.ext, where

- xxxx = the PDS4 Information Model version, e.g. 1J00

- yyyy = the CLPS Mission Dictionary version, e.g. 1000

and the file extensions are

- .csv = A comma-separated value table of dictionary attributes

- .JSON = The dictionary contents in JSON format

- .sch = The dictionary "rules" as an XML Schematron file

- .txt = The report generated when the dictionary was built

- .xml = The PDS4 label that describes this set of files

- .xsd = The dictionary contents as an XML schema file

Only the schema and Schematron files are needed for validating a PDS4 label.

The latest version of this dictionary may be found on the PDS web site at https://pds.nasa.gov/datastandards/dictionaries/index-missions.shtml#clps.

The following is an example showing the use of this dictionary in a PDS4 label.

```
<?xml version="1.0" encoding="UTF-8"?>
<?xml-model href="https://pds.nasa.gov/pds4/pds/v1/PDS4_PDS_1J00.sch" schematypens=
→"http://purl.oclc.org/dsdl/schematron"?>
<?xml-model href="https://pds.nasa.gov/pds4/mission/clps/v1/PDS4_CLPS_1J00_1000.sch"␣
→schematypens="http://purl.oclc.org/dsdl/schematron"?>
<Product_Observational xmlns="http://pds.nasa.gov/pds4/pds/v1"
    xmlns:clps="http://pds.nasa.gov/pds4/mission/clps/v1"
    xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
    xsi:schemaLocation="http://pds.nasa.gov/pds4/pds/v1          https://pds.nasa.
→gov/pds4/pds/v1/PDS4_PDS_1J00.xsd
                       http://pds.nasa.gov/pds4/mission/clps/v1  https://pds.nasa.
→gov/pds4/mission/clps/v1/PDS4_CLPS_1J00_1000.xsd">
```

The following is an example showing the location of the CLPS dictionary classes and attributes in a PDS4 label.

```
<Observation_Area>
    ...
      <Mission_Area>
```

```
      <clps:CLPS_Parameters>
        <clps:CLPS_Delivery_Information>
          <clps:nasa_delivery_name>
          <clps:vendor>
          <clps:vendor_mission_name>
          <clps:lunar_lander_name>
          <clps:project_scientist>
        </clps:CLPS_Delivery_Information>
        <clps:CLPS_Observation_Information>
          <clps:release_number>
          <clps:product_type>
          <clps:mission_phase_name>
          <clps:spacecraft_clock_start>
          <clps:spacecraft_clock_stop>
          <clps:spacecraft_clock_partition>
          <clps:producer_institution_name>
        </clps:CLPS_Observation_Information>
      </clps:CLPS_Parameters>
    </Mission_Area>
      ...
```

The namespace for the CLPS Mission Dictionary is http://pds.nasa.gov/pds4/mission/clps/v1, abbreviated "clps:".

ORGANIZATION OF CLASSES AND ATTRIBUTES

See the schematic for a visual representation of the classes and attributes.

Below is a list showing the hierarchy of classes in order of appearance in the PDS4 label. See the Definitions section for complete definitions.

- CLPS_Parameters class
  - CLPS_Delivery_Information class
  - CLPS_Observation_Information class

Below are lists showing the hierarchy of class attributes in order of appearance in the PDS4 label. See the Definitions section for complete definitions.

4.1 CLPS_Parameters Class

- CLPS_Delivery_Information class
- CLPS_Observation_Information class

4.2 CLPS_Delivery_Information Class

- nasa_delivery_name
- vendor
- vendor_mission_name
- lunar_lander_name
- project_scientist

4.3 CLPS_Observation_Information Class

- release_number
- product_type
- mission_phase_name
- spacecraft_clock_start
- spacecraft_clock_stop

- spacecraft_clock_partition

- producer_institution_name

DEFINITIONS

Classes (in alphabetical order)

CLPS_Delivery_Information

- The CLPS_Delivery_Information class provides information about a CLPS delivery.

- Minimum occurrences: 1

- Maximum occurrences: 1

CLPS_Observation_Information

- The CLPS_Observation_Information class provides information about a science observation.

- Minimum occurrences: 0

- Maximum occurrences: 1

CLPS_Parameters

- The CLPS_Parameters class is a superclass containing all CLPS mission classes.

- Minimum occurrences: 1

- Maximum occurrences: 1

Attributes (in alphabetical order)

lunar_lander_name lunar_lander_name identifies the name of the lunar lander.

- PDS4 data type: ASCII_Short_String_Preserved

- Valid values:

    - Nova-C Lunar Lander - Nova-C Lunar Lander.

    - Peregrine Lunar Lander - Peregrine Lunar Lander.

    - Blue Ghost Lander - Blue Ghost Lander.

    - Griffin Lunar Lander - Griffin Lunar Lander.

    - SERIES-2 Lunar Lander - SERIES-2 Lunar Lander.

- Minimum occurrences: 1

- Maximum occurrences: 1

- Nillable: No

mission_phase_name The mission_phase_name identifies a time period within the mission.

- PDS4 data type: ASCII_Short_String_Preserved

- Valid values:

    - CRUISE AND APPROACH - The cruise and approach phase takes place between launch and entry into Lunar Orbit. "Cruise" is also referred to as "Transit" by some CLPS Vendors. This phase also includes Lunar Orbit Insertion (LOI). Some data products may be generated during this time.

    - DESCENT AND LANDING - The descent and landing phase begins when the Lunar Orbit Phase is over, and the spacecraft has begun maneuvers to land on the Lunar surface. This phase includes Powered Descent (PDI/PD) and Deorbit Decent and Landing (DDL).

    - LUNAR ORBIT - The Lunar Orbit phase begins when the spacecraft enters orbit around the moon. This phase includes Low Lunar Orbit (LLO). The phase ends when the Descent and Landing phase begins.

    - SURFACE MISSION - The surface mission phase is the time from arrival on the moon through the end of the mission. Depending on the mission, this may (or may not) include operations into the lunar night.

    - TEST, DEVELOPMENT, and CALIBRATION - The test, development, and calibration mission phase refers to the pre-launch period and consists of data processing software development and testing, and instrument calibration. Some products generated during this phase may not be a part of the final PDS archive but may be used for testing and peer review.

- Minimum occurrences: 0

- Maximum occurrences: 1

- Nillable: No

nasa_delivery_name nasa_delivery_name identifies the delivery name assigned by NASA.

- PDS4 data type: ASCII_Short_String_Collapsed

- Valid values:

    - TO_2IM - NASA Task Order 2IM.

    - TO_2AB - NASA Task Order 2AB.

    - TO_PRIME1 - NASA Task Order PRIME1.

    - TO_19D - NASA Task Order 19D.

    - TO_20A - NASA Task Order 20A.

    - TO_CP11 - NASA Task Order CP11.

    - TO_CP12 - NASA Task Order CP12.

    - TO_CS3 - NASA Task Order CS3.

    - TO_CP21 - NASA Task Order CP21.

    - TO_CP22 - NASA Task Order CP22.

- Minimum occurrences: 1

- Maximum occurrences: 1

- Nillable: No

producer_institution_name The producer_institution_name specifies the identity of the facility or institution that produced the product.

- PDS4 data type: ASCII_Short_String_Preserved

- Minimum occurrences: 0

- Maximum occurrences: 1

- Nillable: No

product_type The product_type element identifies a group of data products within a collection that have some property in common, such as processing level, resolution, or instrument-specific setting.

- PDS4 data type: ASCII_Short_String_Collapsed

- Valid values:

  - NSS_ENG_CAL - Time sequenced NSS engineering data (engineering units: voltages, circuit board temperatures; high voltage and discriminator threshold settings).

  - NSS_ENG_RAW - Time sequenced NSS engineering data (raw engineering: encoded parameters that are translated to engineering units by processing).

  - NSS_SCI_CAL - NSS processed neutron count rates and affiliated instrument data (time stamped).

  - NSS_SCI_RAW - NSS raw neutron count rates and affiliated instrument data (time stamped).

- Minimum occurrences: 0

- Maximum occurrences: 1

- Nillable: No

project_scientist The project_scientist element identifies the name of the delivery's Project Scientist.

- PDS4 data type: ASCII_Short_String_Preserved

- Minimum occurrences: 1

- Maximum occurrences: 1

- Nillable: No

release_number release_number is the identifier of a scheduled release of data from PDS. The first data release has release_number "0001". The release_number for a given product is always the first release in which it appears, and does not change if the product is revised later.

- PDS4 data type: ASCII_Short_String_Collapsed

- Minimum occurrences: 0

- Maximum occurrences: 1

- Nillable: No

- Minimum characters: 4

spacecraft_clock_partition The spacecraft_clock_partition provides the clock partition active for the spacecraft_clock_start and spacecraft_clock_stop attributes. This attribute may be used when the spacecraft_clock values do not include a partition number.

- PDS4 data type: ASCII_Integer

- Minimum occurrences: 0

- Maximum occurrences: 1

- Nillable: No

- Minimum value: 1

spacecraft_clock_start The spacecraft_clock_start attribute provides the value of the spacecraft clock at the beginning of a time period of interest.

- PDS4 data type: ASCII_Short_String_Collapsed

- Minimum occurrences: 0

- Maximum occurrences: 1

- Nillable: No

- Minimum characters: 1

- Maximum characters: 19

- Pattern: ([1-9]/)?[0-9]{1,10}(.[0-9]{1,9})?

spacecraft_clock_stop The spacecraft_clock_stop_count attribute provides the value of the spacecraft clock at the end of a time period of interest.

- PDS4 data type: ASCII_Short_String_Collapsed

- Minimum occurrences: 0

- Maximum occurrences: 1

- Nillable: No

- Minimum characters: 1

- Maximum characters: 19

- Pattern: ([1-9]/)?[0-9]{1,10}(.[0-9]{1,9})?

vendor The vendor element identifies the company responsible for delivering the payload to the lunar surface.

- PDS4 data type: ASCII_Short_String_Preserved

- Valid values:

  - Astrobotic - Vendor is Astrobotic.

  - Draper - Vendor is Draper.

  - Firefly Aerospace - Vendor is Firefly Aerospace.

  - Intuitive Machines - Vendor is Intuitive Machines.

- Minimum occurrences: 1

- Maximum occurrences: 1

- Nillable: No

vendor_mission_name vendor_mission_name identifies the name given to the mission by the CLPS vendor.

- PDS4 data type: ASCII_Short_String_Preserved

- Valid values:

  - Blue Ghost 1 - Mission is Blue Ghost 1 (BG1).

  - Griffin Mission One - Mission is Griffen Mission One (GM1).

  - Intuitive Machines Mission 1 - Mission is Intuitive Machines Mission 1 (IM1).

  - Intuitive Machines Mission 2 - Mission is Intuitive Machines Mission 2 (IM2).

  - Intuitive Machines Mission 3 - Mission is Intuitive Machines Mission 3 (IM3).

  - Peregrine Mission 1 - Mission is Peregrine Mission 1.

- Minimum occurrences: 1

- Maximum occurrences: 1

- Nillable: No

EXAMPLES

Example PDS4 label snippet for CLPS NSS calibrated engineering data product:

```
<Mission_Area>
  <clps:CLPS_Parameters>
   <clps:CLPS_Delivery_Information>
     <clps:nasa_delivery_name>TO_2AB</clps:nasa_delivery_name>
     <clps:vendor>Astrobotic</clps:vendor>
     <clps:vendor_mission_name>Peregrine Mission 1</clps:vendor_mission_name>
     <clps:lunar_lander_name>Peregrine Lunar Lander</clps:lunar_lander_name>
     <clps:project_scientist>Paul Niles</clps:project_scientist>
   </clps:CLPS_Delivery_Information>
   <clps:CLPS_Observation_Information>
     <clps:release_number>0001</clps:release_number>
     <clps:product_type>NSS_ENG_CAL</clps:product_type>
     <clps:mission_phase_name>SURFACE MISSION</clps:mission_phase_name>
     <clps:producer_institution_name>Applied Physics Laboratory</clps:producer_
→institution_name>
   </clps:CLPS_Observation_Information>
  </clps:CLPS_Parameters>
</Mission_Area>
```

‹MY_FIRST_LDD›

REQUIRED

Submitter: Jane Doe

My first class

7.1 ‹my_first_attribute›

REQUIRED

Submitter: Jane Doe

My first attribute

7.1.1 Subheader 3

More details

Subheader 4

More Details