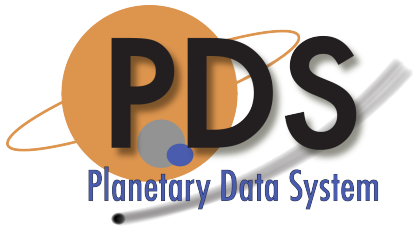
# PDS4 Implementation in the PSA

*PDS Tech Session, Day 1*

*21-September-2016*





# PDS4 Implementation in the PSA

1. Documentation
2. Data Organisation
3. LID conventions
4. PSA Local Schematron / Local Data Dictionaries
5. Mission Area information common across PSA
6. Use of PDS4 Validate Tool
7. Issues found with solutions being worked out with PDS

# PSA Documentation / Schemas

## PSA PDS4 Documentation

- **PSA PDS4 Archiving Guide** + *Annex for each mission with mission-specific rules and conventions*
- **Data Providers to PSA ICD**: Description of interface for deliveries to PSA.

## PSA PDS4 Schemas

- Repository with PSA PDS4 Schematron / LDDs / label templates *(maintained in a PSA Git repository; working on making this available ththe PSA website)*

*→ A review of this by the PDS4 Documentation WG would be very useful*

# Data Organisation

One **PSA Mission Bundle**

- *To hold PSA Schematron(s) / LDDs and context products*

For every Mission:

- **One Mission Bundle**
  - *To hold non-instrument specific data*
- **One Bundle for each Instrument**

# Data Organisation: PSA Bundle

We have defined a standard set of collections:

- document
- context
- xml_schema

# Data Organisation: Mission Bundle

We have defined a standard set of collections:

- document
- context
- miscellaneous[_ancillary]
- spice_kernels (under discussion)
- xml_schema

# Data Organisation: Instrument Bundle

We have defined a standard set of collections:

- data_raw
- data_processed
- data_calibrated
- data_derived
- calibration
- document
- browse
- miscellaneous[_ancillary]
- context (S)
- spice_kernels (S)
- xml_schema (S)

## 3.2.1 Types of Bundles and associated Collections

| ***LID Formation Rule*** *(see section 4)* | ***File Name*** | ***Directory Name*** | **Bundle Entries (Collections)** |
|---|---|---|---|
| ***PSA Bundle*** | | | |
| urn:esa:psa | bundle_psa.xml | psa | • context<br>• xml_schema |
| ***Mission Bundle*** | | | |
| urn:esa:psa:<mission_name> | bundle_<mission_acronym>.xml | <mission_name> | • context<br>• document<br>• miscellaneous_ancillary<br>• spice_kernels<br>• xml_schema |
| ***Instrument Bundle*** | | | |
| urn:esa:psa:<bundle_identifier> | <bundle_identifier>.xml | <bundle_identifier> | • data_telemetry<br>• data_raw<br>• data_processed<br>• data_calibrated<br>• data_derived<br>• browse<br>• calibration<br>• geometry<br>• miscellaneous_ancillary<br>• document<br>• context (S)<br>• spice_kernels (S)<br>• xml_schema (S) |

*Table 3: Data organisation and content according to the type of bundle*

# Data Collection Structure in an Instrument Bundle

**All data raw/calibrated collections in the PSA will be divided into:**

mission phase/

- sub-instrument
- product type (HK / SC)

- Range of days (e.g. YYYYMMDD_YYYYMMDD)
- Range of orbits (e.g. ORBIT_NNNNN_MMMMM)
- Observation campaigns

**<data_raw>**

collection_bc_mpo_mag_data_raw.xml

collection_bc_mpo_mag_data_raw.csv

**necp/**

**cruise/**

vga1/

vga2/

mga1/

**science_phase/**

ORBIT_NNNNN_MMMMM/

Further split of the collection sub-folders is agreed with each PI team and documented in the EAICD (=SIS).

# ExoMars16 Bundles

Index of ftp://psa.esac.esa.int/pub/mirror/ExoMars2016/

Up to higher level directory

**Name**

- em16
- em16_edm_dec
- em16_edm_dre
- em16_tgo_acs
- em16_tgo_cas
- em16_tgo_frd
- em16_tgo_nmd

# ExoMars16 Bundles

Index of ftp://npsa01.n1data.lan/pub/mirror/ExoMars2016/em16_tgo_acs/

Up to higher level directory

| Name | Size | Last Modified |
|---|---|---|
| bundle_em16_tgo_acs.xml | 4 KB | 05/07/16 21:36:00 |
| calibration | | 06/07/16 16:36:00 |
| context | | 06/07/16 16:36:00 |
| data_raw | | 14/07/16 11:48:00 |
| document | | 06/07/16 16:36:00 |
| xml_schema | | 06/07/16 16:36:00 |

# Comparison with MAVEN and LADEE Bundles

http://atmos.nmsu.edu/PDS/data/PDS4/

# Comparison with LADEE Mission Bundle

# Index of /PDS/data/PDS4/LADEE/mission_bundle

| Name | Last modified | Size | Description |
|---|---|---|---|
| Parent Directory | | - | |
| LADEE_Bundle_1101.xml | 2014-09-22 13:08 | 5.0K | |
| context/ | 2014-09-22 09:36 | - | |
| document/ | 2014-09-22 09:36 | - | |
| xml_schema/ | 2014-09-23 10:42 | - | |

## Comparison with LADEE Instrument Bundle

# Index of /PDS/data/PDS4/LADEE/nms_bundle

| Name | Last modified | Size | Description |
|---|---|---|---|
| Parent Directory | | - | |
| bundle_ladee_nms.xml | 2015-10-09 10:19 | 4.7K | |
| calibration/ | 2014-09-08 14:39 | - | |
| context/ | 2014-10-16 09:48 | - | |
| data_calibrated/ | 2015-10-07 10:10 | - | |
| data_derived/ | 2015-11-02 13:55 | - | |
| data_raw/ | 2014-09-08 15:28 | - | |
| document/ | 2016-01-11 15:50 | - | |
| readme.txt | 2015-10-09 10:19 | 4.2K | |
| xml_schema/ | 2014-10-16 09:49 | - | |

# Index of /PDS/data/PDS4/MAVEN

| Name | Last modified | Size | Description |
|---|---|---|---|
| Parent Directory | | - | |
| acc_bundle/ | 2016-05-16 09:11 | - | |
| acc_bundleD4/ | 2016-03-03 12:42 | - | |
| iuvs-kp_bundle/ | 2016-05-27 14:29 | - | |
| iuvs-kp_bundleD4/ | 2016-03-28 16:04 | - | |
| iuvs_calibrated_bundle/ | 2016-05-19 12:30 | - | |
| iuvs_calibrated_bund..> | 2016-03-14 17:05 | - | |
| iuvs_derived_bundle/ | 2016-05-27 11:27 | - | |
| iuvs_derived_bundleD4/ | 2016-03-24 14:21 | - | |
| iuvs_processed_bundle/ | 2016-05-19 13:54 | - | |
| iuvs_processed_bundl..> | 2016-03-14 15:15 | - | |
| iuvs_raw_bundle/ | 2016-05-19 11:55 | - | |
| iuvs_raw_bundleD4/ | 2016-03-14 16:58 | - | |
| ngims_bundle/ | 2016-05-23 10:59 | - | |
| ngims_bundleD4/ | 2016-03-04 13:46 | - | |

# LID Conventions: Bundles

## 4.1 Bundle Identifiers Formation Rule

A unique logical identifier shall be assigned to every bundle generated by a mission. Bundle logical identifiers shall be based on the following definition:

urn:esa:psa:<bundle_identifier>

Where <bundle_identifier> shall take the form of

***<mission_id>[_<instrument_host_id>]_<instrument_id>[_<descriptor>]***

Where:

- ***<mission_id>*** is a fixed part used for all bundles delivered by a mission. The value to be used for each mission is defined in the relevant mission appendix. Where a mission comprises more than one spacecraft, the value should be of the form ***<mission_id>.<instrument_host_id>***, for example **bc.mpo** for BepiColombo Mercury Planetary Orbiter;
- ***<instrument_id>*** is the instrument identifier (when applicable). Instrument identifiers are defined by each mission's SGS and listed in the appendices.
- ***<descriptor>***, details on bundle types/structure and naming conventions are provided in the corresponding mission appendix

# LID Conventions: Collections

## 4.2 Collection Identifiers Formation Rule

A unique logical identifier shall be assigned to every collection generated by a mission. Collection logical identifiers shall be based on the following definition:

***<collection_type>[_<descriptor>]***

Where:

- ***<collection_type>*** is the collection type (see Table 1).
- ***<descriptor>***, details on collection types/structure and naming conventions are provided in the corresponding mission appendix

## 4.3 Product Identifiers Formation Rule

A unique logical identifier (LID) shall be assigned to every product generated by BepiColombo. Logical identifiers are based on the following formation rule:

urn:esa:psa:<bundle_identifier>:<collection_identifier>:**<product_identifier>**::<*version_id*>

The **<product identifier>** is based on the following convention:

***<instrument_acronym>_[<processing_level>]_[<type>]_[<subunit>]_<descriptor>***

[ ] = optional fields

Where:

- ***<instrument_acronym>***, see table further below
- ***<processing_level>:*** Allowed values: tm | raw | par | cal | der (mostly only applicable to primary products: data)
- ***<type>***
  - For primary products, possible split is: hk | sc
  - For supplementary products, specify type: calib | thumb | qla | geo | doc | misc (list controlled by SGS)
- ***<subunit>*** is the sensor / detector / sub-unit identifier (when applicable), see table further below
- ***<descriptor>:*** additional information e.g.
  - observation id
  - observation type
  - measurement type
  - start / stop date (<YYYYMMDDThhmmss> or <YYYYMMDDThhmmss>_<YYYYMMDDThhmmss>; UTC time of the first (and last) measurement in the data product)
  - orbit number (<NNNNN> or <NNNNN>_<MMMMM>; orbit number of the first (and last) measurement in the data product, padded with zeroes)

**IMPORTANT:**

- PDS product labels will have extension ".xml"
- PDS product file extension will depend on the format of the data they contain (".tab", ".fit", ".cdf", ".img")
- Orbit and date may be applicable to certain types of products
- Version is inside the label, follows PDS4 versioning scheme described in section 4.4
- Product identifiers will be used as product filenames (except for context products)
- Logical identifiers shall be lowercase. This restriction does not apply to filenames, PDS4 is case insensitive for filenames.

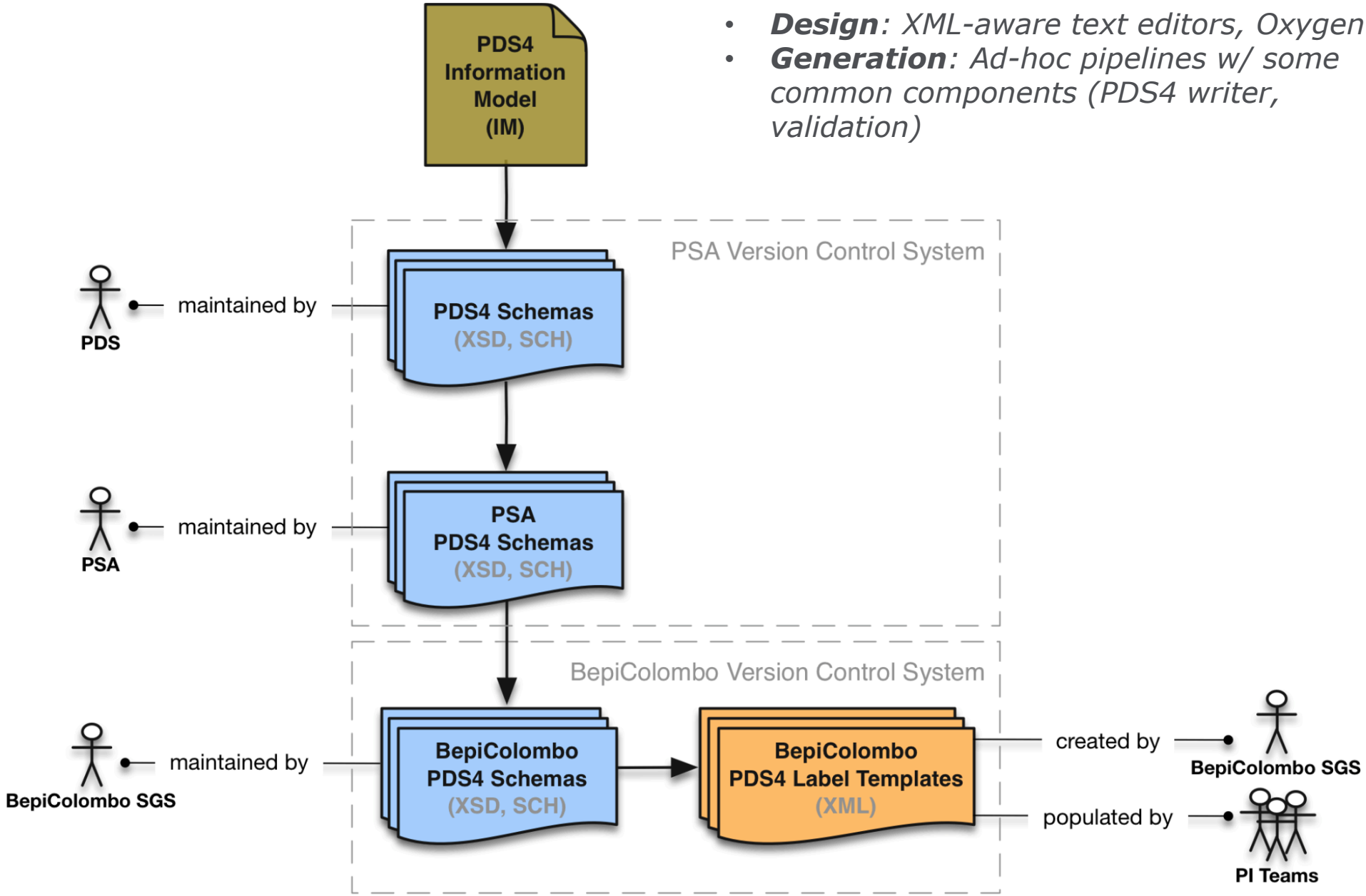
## 3.3 Context Products

Context products describe the mission, the spacecraft, the instruments and any relevant target. Context products are placed in the mission's bundle context collection, generated and managed by the relevant SGS. These products will be included by reference in the instrument bundles i.e. no physical copies of the products are required to be included in the bundle. The different types of context products are described in the table below, with naming conventions for the logical identifiers and filenames.

| *Type* | *LID / Filename* | *Context Area* | *Reference Type* |
|---|---|---|---|
| **Agency** | urn:nasa:pds:context:agency:agency.esa<br>PDS4_agency_ESA.xml | | is_agency |
| **Investigation** | urn:nasa:pds:context:investigation:mission.<mission_id><br>PDS4_mission_<mission_name>.xml | Investigation_Area | is_investigation |
| **Instrument Host** | urn:nasa:pds:context:instrument_host:spacecraft. <instrument_host_id><br>PDS4_host_<instrument_host_id>.xml | Observing_System | is_instrument_host |
| **Instrument** | urn:esa:psa:context:instrument:instrument.<instrument_id>__<instrument_host_id><br>PDS4_inst_<instrument_id>__<instrument_host_id>.xml | Observing_System | is_instrument |
| **Target** | urn:nasa:pds:context:target:<target_type>.<target_name> (LID, if under PDS governance)<br>urn:esa:psa:context:target.<target_name> (LID, if under PSA governance)<br>PDS4_target_<target_name>.xml | Target_Identification | data_to_target |
| **Personnel** | urn:esa:psa:context:personnel:personnel.<person_id><br>PDS4_personnel_<person_id>.xml | | |
| **Resource** | urn:esa:psa:context:resource:resource.<resource_id><br>PDS4_resource_<resource_id>.xml | | |

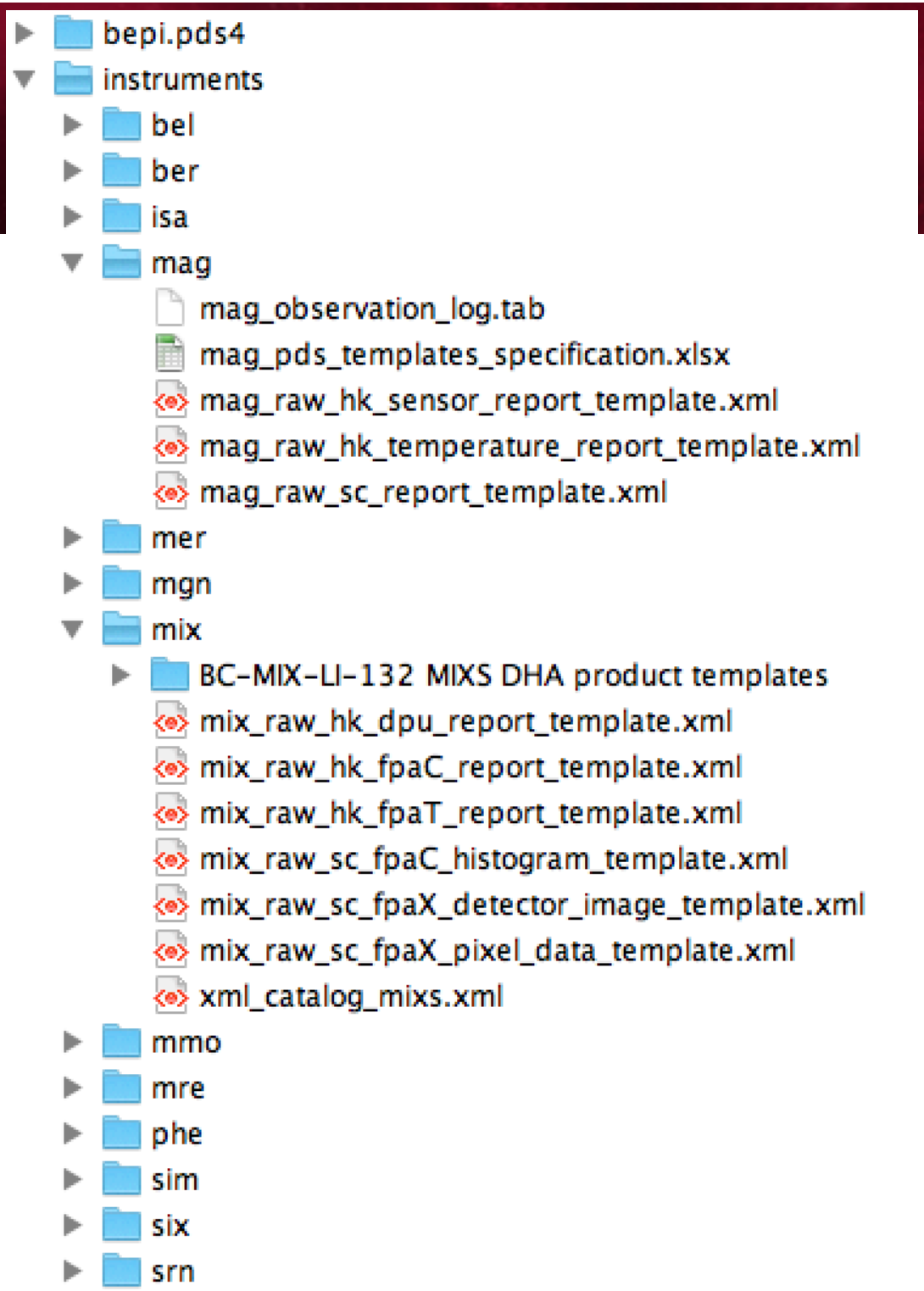
# PSA Schematron and LDDs

- ***Design**: XML-aware text editors, Oxygen*
- ***Generation**: Ad-hoc pipelines w/ some common components (PDS4 writer, validation)*



- psa.pds4
  - pds
    - disp
    - geom
    - img
    - mission
    - particle
    - PDS4_PDS_1201.sch
    - PDS4_PDS_1201.xsd
    - PDS4_PDS_1301.sch
    - PDS4_PDS_1301.xsd
    - PDS4_PDS_1400.sch
    - PDS4_PDS_1400.xsd
    - PDS4_PDS_1500.sch
    - PDS4_PDS_1500.xsd
    - PDS4_PDS_1600.pdf
    - PDS4_PDS_1600.sch
    - PDS4_PDS_1600.xml
    - PDS4_PDS_1600.xsd
  - psa
    - psa_bundle
      - context
        - agency
        - target
        - collection_context.tab
        - collection_context.xml
      - xml_schema
        - collection_xml_schema.tab
        - collection_xml_schema.xml
        - PDS4_PSA_1000.sch
        - PDS4_PSA_LDD_1000.xsd
      - bundle_psa.xml

- bepi.pds4
  - bc_bundle
    - context
    - document
    - miscellaneous
    - xml_schema
      - collection_xml_schema.tab
      - collection_xml_schema.xml
      - PDS4_PSA_BC_1000.sch
      - PDS4_PSA_BC_LDD_1000.xsd
    - bundle_bc.xml
    - readme.txt




*(*) XLS2PDS Tool developed by BepiColombo to convert PDS4 data product description in Excel to XML label template*

# Mission Area Information
## *common across PSA-PDS (CCB-154)?*

```
<Mission_Area>
    <psa:Mission_Information>
        <psa:spacecraft_clock_start_count>TBC</psa:spacecraft_clock_start_count>
        <psa:spacecraft_clock_stop_count>TBC</psa:spacecraft_clock_stop_count>
        <psa:mission_phase_name>Near Earth Commissioning Phase</psa:mission_phase_name>
        <psa:mission_phase_identifier>necp</psa:mission_phase_identifier>
        <psa:orbit_number>0000</psa:orbit_number>
    </psa:Mission_Information>
    <psa:Sub-Instrument>
        <psa:identifier>SINBAD</psa:identifier>
        <psa:name>NOMAD SINBAD</psa:name>
        <psa:type>Spectrometer</psa:type>
    </psa:Sub-Instrument>
    <psa:Quality_Information>
        <psa:quality_flag>flags</psa:quality_flag>
    </psa:Quality_Information>
    <psa:Observation_Context>
        <psa:observation_identifier>54</psa:observation_identifier>
        <psa:instrument_pointing_mode>No Pointing</psa:instrument_pointing_mode>
    </psa:Observation_Context>
    <psa:Processing_Context>
        <psa:processing_software_title>EM16 Data Processing System</psa:processing_software_title>
        <psa:processing_software_version>0.2.2</psa:processing_software_version>
    </psa:Processing_Context>
</Mission_Area>
```

# PDS Schemas / LDDs / LDD Tool

- Our understanding is that only **discipline/domain dictionaries** (developed by PDS) will be imported into master IM; mission/instrument dictionaries are not expected to be imported.
- It would be very useful to keep a copy of all existing mission dictionaries somewhere; the IPDA could be a central place for this (similar to the Tool Registry)
- More documentation on the PDS LDDs would be very useful; difficult to know what and where to use them
  - A list of all existing LDDs with a brief explanation of its purpose would be very useful for the international community, including whether it is intended for use by a specific discipline / type of data / type of instrument, or by a PDS node

# PDS Schemas / LDDs / LDD Tool

- LDDTool to be used by everyone for generation / validation of dictionaries; not only for those to be imported in the PDS4 master IM
- LDDTool not officially released yet but public version available (and using JIRA SCR/SPR mechanism for issue tracking)
- LDDTool also generates some Schematron rules for the dictionary


- **Cartography and Imaging Sciences (img)**
  This directory contains the XML Schema and Schematron files under the Imaging namespace. The ZIP file contains all of the schema files and additional documentation.
  - **Version v1 (1.1.0.0) - November 18, 2013**
    - PDS4_IMG_1100.xsd
    - PDS4_IMG_1100.sch
    - PDS4_IMG_1100.xml
    - PDS4_IMG_1100.zip

- **LADEE (ladee)**
  This directory contains the XML Schema and Schematron files under the Lunar Atmosphere and Dust Environment Explorer mission namespace.
  - **Version v1 (1.1.0.0) - October 1, 2013**
    - ladee_1100.xsd

- **Mission (mission)**
  This directory contains the XML Schema and Schematron files under the Mission namespace. This directory contains sub-directories for each mission.

  - **BOPPS (bopps)**
    The sub-directory for the Balloon Observation Platform for Planetary Science mission namespace.

  - **Insight (insight)**
    The sub-directory for the Insight mission namespace.

  - **LADEE (ladee)**
    The sub-directory for the Lunar Atmosphere and Dust Environment Explorer mission namespace.

  - **MAVEN (mvn)**
    The sub-directory for the Mars Atmosphere and Volatile Evolution mission namespace.
    - **Version v1 (1.0.2.1) - August 16, 2016**
      - PDS4_MVN_1021.xsd
      - PDS4_MVN_1021.sch
      - PDS4_MVN_1021.xml

  - **MGS (mgs)**
    The sub-directory for the Mars Global Surveyor mission namespace.

  - **MPF (mpf)**
    The sub-directory for the Mars Pathfinder mission namespace.

  - **OSIRIS-REx (orex)**
    The sub-directory for the Origins Spectral Interpretation Resource Identification Security - Regolith Explorer mission namespace.

- **MAVEN (mvn)**
  This directory contains the XML Schema and Schematron files under the Mars Atmosphere and Volatile Evolution mission namespace.
  - **Version v1 (1.0.1.1) - May 18, 2015**
    - PDS4_MVN_1011.xsd
    - PDS4_MVN_1011.sch
    - PDS4_MVN_1011.xml

# Available PDS4 Tools

## Software

### Tools

The following software tools are available for use with PDS4 data:

- **Generate Tool**
  Software for generating PDS4 labels from either a PDS3 label or PDS3-specific Document Object Model (DOM) object.

- **Validate Tool**
  Software for validating PDS4 product labels and product data. The associated specific schema for the product label specifies syntactic and semantic constraints. The product label itself specifies the constraints for the data.

- **PDS4 Tools**
  Software for accessing PDS4 data objects including selected transformations to common formats. This software is packaged as a Java library with an example driver program.

- **Transform Tool**
  Software for transforming PDS3 and PDS4 product labels and product data into common formats.

# Use of the PDS Validate Tool

- **Validate Tool package (validate)** as command-line interface to the validation functionality.

- **Core Library package (core)** as Java API interface, which does offer a Java structure interface for returning status and messages.

- Undergoing a change in the next release (Build 7a) because it will be supporting two client interfaces, one GUI and one command-line. Because of this, more of the functionality will be pushed down to the Core Library.
- With the next release, the Core Library will be available on the PDS4 tools page so that it is easier to find. In the meantime, all releases can be found in the FTP site: ftp://pds.nasa.gov/pub/toplevel/2010/preparation/

Currently there is one issue preventing us from using the Core Library API version 1.9.0 (when validating PDS4 labels against schemas previously set using resource URLs within a JAR file; see issue IPDA-PDS4-TOOLS-033). Downgraded to previous version which works fine (1.7.0).

(Under discussion w/ PDS EN)

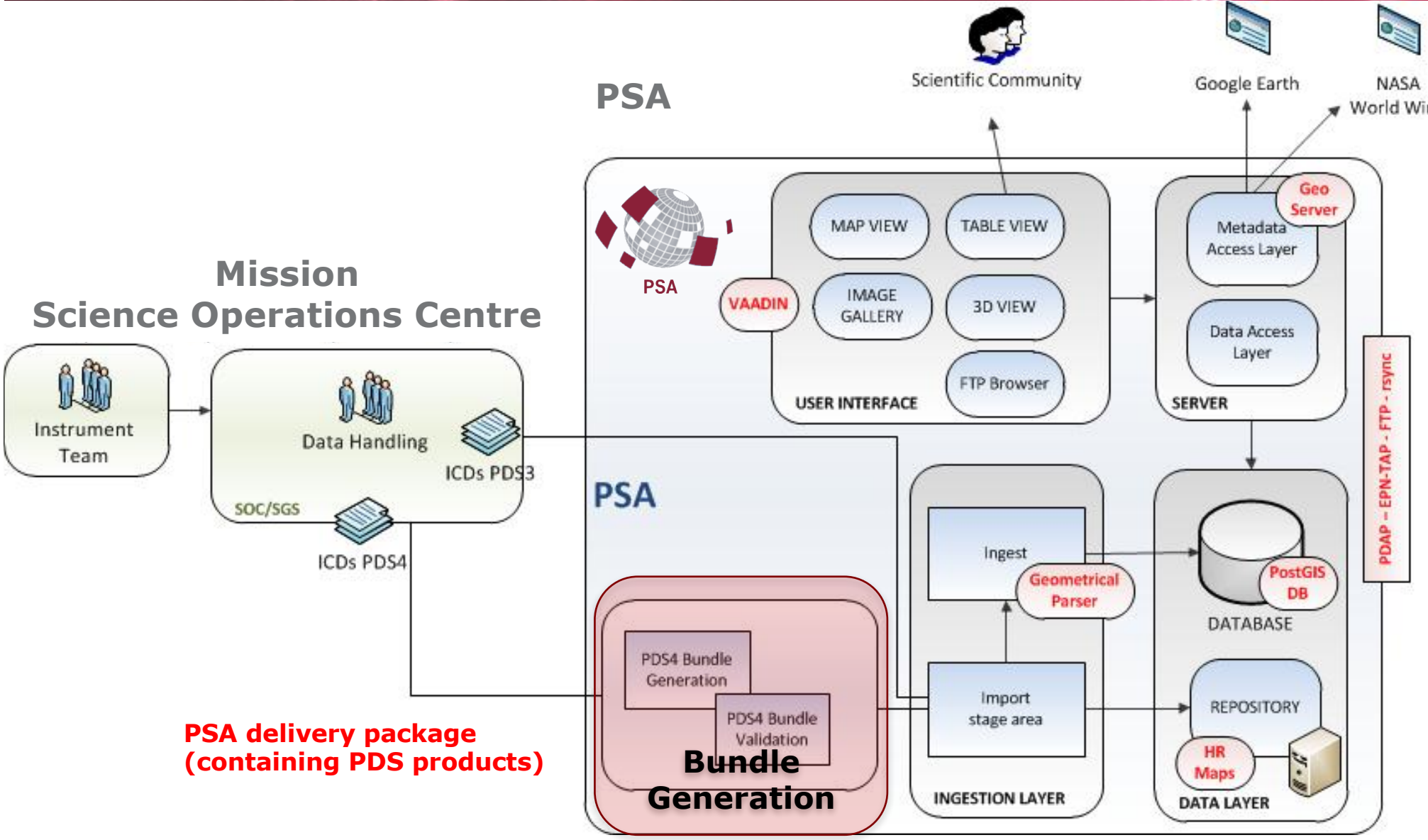
# Accumulating Bundles: Issue with bundle/collection versions

Clarification on bundle/collection versioning recently provided by PDS; PDS versioning scheme is difficult to follow to handle very frequent deliveries (under discussion w/ PDS EN)

Delivery strategy for ExoMars16 and BepiColombo (following Astronomy approach to archiving):

- Use of accumulating bundles
- There could be up to 5 deliveries per day (new/updated products for data collections in the same bundle)
- Deliveries only include basic products; aggregate products (bundle/collection products and structure) are created on-the-fly by the archiving ingestion system.

# Mission to PSA Delivery Strategy / Ingestion



# Ingestion / Distribution Packages

Using delivery packages (Product_SIP with transfer and checksum manifests) for **ingestion** and **distribution** following the Concept document / section 10.

Distribution packages contain (by default) primary and secondary member products.

# Strategy for Handling of Bundle and Collection Versions

**Before:** Collection and bundle version increased for every delivery from SOC to the PSA.

**Now:** Minor version increased every week, and major version increased every month.

(under discussion w/ PDS EN)

# Versioning of Local Schematron / LDDs

mix_raw_sc_fpac_histogram_session00001_obs00001_20320909.xml

```
<?xml version="1.0" encoding="UTF-8" standalone="yes"?>

<?xml-model
    href="http://pds.nasa.gov/pds4/pds/v1/PDS4_PDS_1600.sch"
    href="http://pds.nasa.gov/pds4/geom/v1/PDS4_GEOM_1300.sch"
    href="http://psa.esa.int/psa/v1/PDS4_PSA_LDD_1000.sch"
    href="http://psa.esa.int/psa/bc/v1/PDS4_PSA_BC_1000.sch"
    schematypens="http://purl.oclc.org/dsdl/schematron"?>

<Product_Observational
    xsi:schemaLocation="
        http://pds.nasa.gov/pds4/pds/v1 http://pds.nasa.gov/pds4/pds/v1/PDS4_PDS_1600.xsd
        http://pds.nasa.gov/pds4/geom/v1 http://pds.nasa.gov/pds4/geom/v1/PDS4_GEOM_1300.xsd
        http://psa.esa.int/psa/v1 http://psa.esa.int/psa/v1/PDS4_PSA_LDD_1000.xsd
        http://psa.esa.int/psa/bc/v1 http://psa.esa.int/psa/bc/v1/PDS4_PSA_BC_LDD_1000.xsd"

    xmlns="http://pds.nasa.gov/pds4/pds/v1"
    xmlns:geom="http://pds.nasa.gov/pds4/geom/v1"
    xmlns:psa="http://psa.esa.int/psa/v1"
    xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance">

    <Identification_Area>
        <logical_identifier>urn:esa:psa:bc_mix:data_raw:mix_raw_sc_fpac_histogram_session00001_obs00001_20320909</logical_identifier>
        <version_id>0.1</version_id>
        <title>BepiColombo MPO MIXS-C RAW Science Data Product</title>
        <information_model_version>1.6.0.0</information_model_version>
        <product_class>Product_Observational</product_class>
```

# Versioning of Local Schematron / LDDs

- Version of LDD decoupled from the PDS4 IM version
- Maintained under version control (Git repo) and published when needed by a mission

# PDS4 Common Data Model Upgrades

There are so far no recommendations, best practices, limitations in the PDS4 Standards on how and when to upgrade to a new version of the PDS4 IM.

Use of dictionary stacks.

Impact on the processing & archive systems (critical when operational).

# Target Context Products (from PDS)

PDS master copies: https://starbase.jpl.nasa.gov/pds4/context-pds4/

- PSA will host a copy of these products (replicates, with original LID)
- “rsync” will be used for copying products across (maintained in PSA Git repo and ingested in the PSA bundle as replicates)

# Location: /pds4/context-pds4/context_target/Product/

| Name |
| --- |
| Parent Directory |
| PDS4_target_1P-HALLEY_1_1682_Q1_1.0.xml |
| PDS4_target_1_AURIGAE_1.0.xml |
| PDS4_target_1_CERES_1.0.xml |
| PDS4_target_2P-ENCKE_1_1818_W1_1.0.xml |
| PDS4_target_2_PALLAS_1.0.xml |
| PDS4_target_3_JUNO_1.0.xml |
| PDS4_target_4P-FAYE_1_1843_W1_1.0.xml |
| PDS4_target_4_VESTA_1.0.xml |
| PDS4_target_5_ASTRAEA_1.0.xml |
| PDS4_target_6P-D'ARREST_1_1851_M1_1.0.xml |
| PDS4_target_6_HEBE_1.0.xml |
| PDS4_target_7P-PONNS-WINNECKE_1_1858_E1_1.0.xml |
| PDS4_target_7_IRIS_1.0.xml |
| PDS4_target_8P-TUTTLE_1_1858_A1_1.0.xml |
| PDS4_target_8_FLORA_1.0.xml |
| PDS4_target_9P-TEMPEL_1_1867_G1_1.0.xml |
| PDS4_target_9_METIS_1.0.xml |
| PDS4_target_10P-TEMPEL_2_1873_N1_1.0.xml |
| PDS4_target_10_HYGIEA_1.0.xml |
| PDS4_target_11_PARTHENOPE_1.0.xml |
| PDS4_target_12_VICTORIA_1.0.xml |
| PDS4_target_13_EGERIA_1.0.xml |
| PDS4_target_14_IRENE_1.0.xml |
| PDS4_target_15_EUNOMIA_1.0.xml |

# Target Context Products

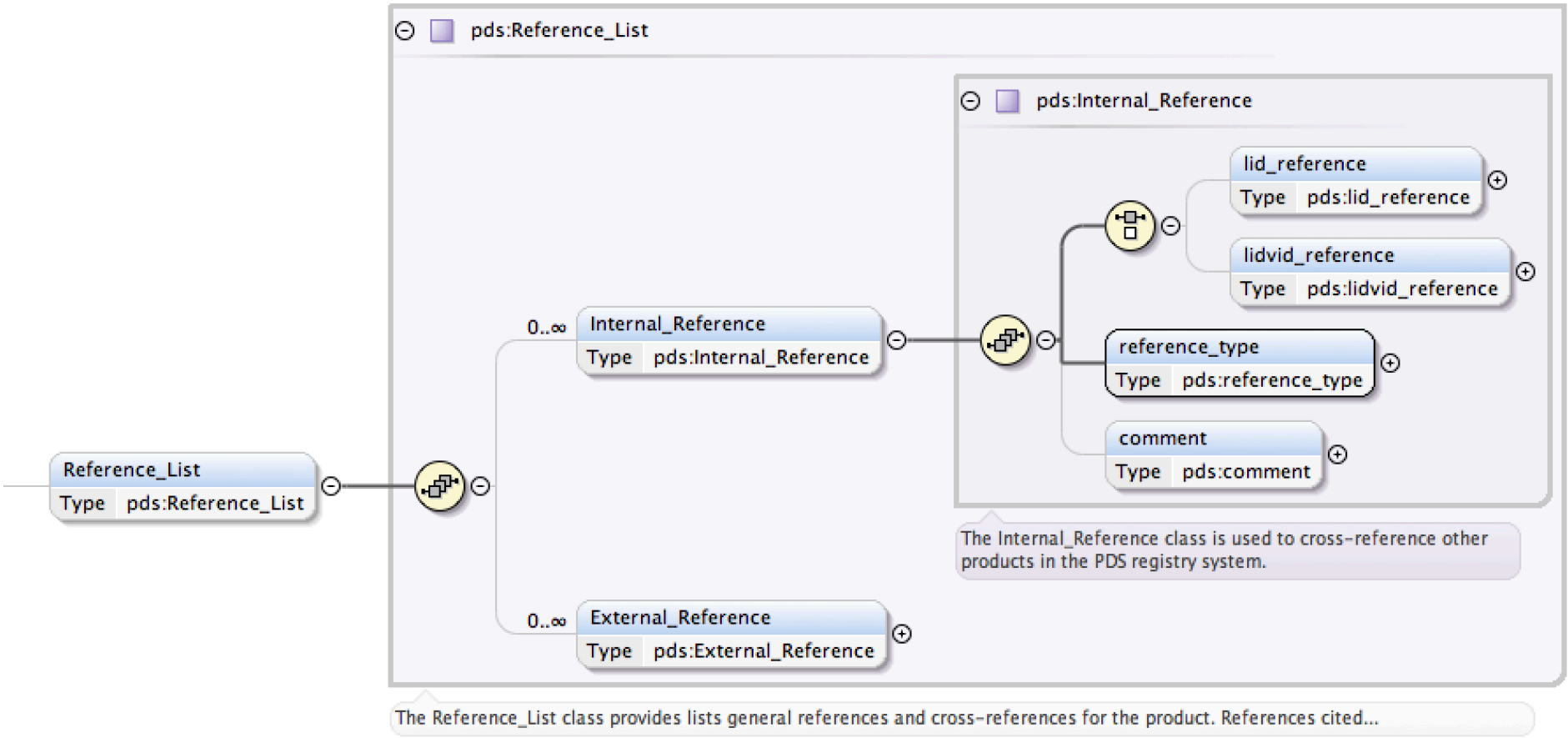
CCB issues to be raised:

1. Missing targets:
    a. Theta CRT = HD100889

2. Missing information in existing targets
    a. Description, coordinates/location, references to IAU

3. No consistent naming convention for Target context products. Some stars such as Alpha_Aur use the constellation names, others such as Vega use Arab names and others use the HD catalogue numbers.

# Traceability of Inputs used for Generation of a Product



# Traceability of Software used for Generation of a Product

```
<Mission_Area>
    <…>
    <psa:Processing_Context>
          <psa:processing_software_title>EM16 Data Processing
     System</psa:processing_software_title>

     <psa:processing_software_version>0.2.2</psa:processing_software_version>
    </psa:Processing_Context>
</Mission_Area>
```

# Traceability of Inputs used for Generation of a Product

How do we track lower level products used to produce higher level products?

- The simplest way is to reference their LIDVIDs but….
  - Take the example of a FREND map which uses all data at Mars
  - 4-6 raw files per day
  - Over 1000 LIDVIDs need to be referenced – too messy

- Approach agreed with PSA PDS4 projects:
  - Use an index file linked to the product label
  - This file will list the LIDVIDs references
  - SW version could also be added
  - We have agreed a PSA level schema for this

# PDS4 Focus / Topics of Interest in the next months

*Priorities fully driven by ExoMars16 needs at the moment*

1. Relevant DDWG / CCB issues under discussion
2. PDS Validate Tool (Sean Hardman, PDS/EN)
3. Geometry (product label + geometry index file)
4. Atmospheres
5. Dictionary Stack concept (Steve Hughes, PDS/EN)
6. LDD Tool
7. Instrument Types
8. Data Quality flags (CCB-142)
9. CDF-A Usage in PDS4 (PDS/PPI, Baptiste Cecconi, JAXA)

# Instrument Types

**CCB-163** - Correct the Instrument.Type enumerated list

*Approved for implementation - Presentation on process for the creation and maintenance of the list.*

IPDA to provide consolidated feedback to the PDS4 CCB with a proposal for updates

Activity under the IPDA PDS4 Implementation project (*led by PSA / Sebastien Besse)*

# Time Attributes ?

Requested by ExoMars RSP (Rover and Surface Platform):

- Mars Local Mean Solar Time (LMST) of Observation (/hrs:mins:sec.msec/)
- Mars Local True Solar Time (LTST) of Observation (/hrs:mins:sec.msec/)

➢ PDS4 Information Model contains two attributes:

  - local_mean_solar_time (Time_Coordinates; but no start/stop)
  - local_true_solar_time (Time_Coordinates; but no start/stop)

- Mission Elapsed Time (MET) of Observation (in Sols:hrs:mins:sec.msec)

➢ Not found in the PDS4 Information Model