Mars 2020 Project

Software Interface Specification (SIS)
PDS Camera Archive Bundle Structure

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DOCUMENT CHANGE LOG

Version	Change	Date	Affected portion
0.1	Initial draft	2020-08-30	All

TBD ITEMS

Item	Section(s)	Page(s)
All yellow background text in this document	All	

ACRONYMS AND ABREVIATIONS

Acronym	Meaning
ACI	Autofocusing Context Imager (SHERLOC camera)
ASCII	American Standard Code for Information Interchange
EDR	Experiment Data Record
FDR	Fundamental Data Record
HTML	Hypertext Markup Language
IDS	Instrument Data System (at JPL)
IM	Information Model
JPL	Jet Propulsion Laboratory
LID	Logical Identifier
LIDVID	Versioned Logical Identifer
MCC	Micro-Context Camera (PIXL camera)
MEDA	Mars Environmental Dynamics Analyzer
MIPL	Multimission Instrument Processing Laboratory
MSL	Mars Science Laboratory
MSSS	Malin Space Science Systems
NASA	National Aeronautics and Space Administration
ODL	Object Description Language
OPGS	Operational Product Generation Subsystem
PDF/A	PDF for Archive
PDF	Portable Document Format
PDS	Planetary Data System
PDS4	Planetary Data System Version 4
PNG	Portable Network Graphics
PIXL	Planetry Instrument for X-ray Lithochemistry (Mars 2020 instrument)
RDR	Reduced Data Record
RTE	Return to Earth (Helicopter camera)
SOAS	Science Operations Analysis Subsystem
SHERLOC	Scanning Habitable Environments with Raman & Luminescence for Organics & Chemicals (Mars 2020 instrument)

SIS	Software Interface Specification
SOL	Mars Solar Day
SuperCam	(name) Mars 2020 instrument
TBD	To Be Determined/Delivered
TDR	Tile Data Record
URN	Uniform Resource Name
VICAR	Video Image Communication And Retrieval
VID	Version Identifier
Watson	(name) SHERLOC camera
XML	eXtensible Markup Language

GLOSSARY

Many of these definitions are taken from Appendix A of the PDS4 Concepts Document, https://pds.nasa.gov/datastandards/documents/concepts. The reader is referred to that document for more information.

Archive – A place in which public records or historical documents are preserved; also the material preserved – often used in plural. The term may be capitalized when referring to all of PDS holdings – the PDS Archive.

Attribute – A property or characteristic that provides a unit of information. For example, 'color' and 'length' are possible attributes.

Basic Product – The simplest product in PDS4; one or more data objects (and their description objects), which constitute (typically) a single observation, document, etc. The only PDS4 products that are *not* basic products are collection and bundle products.

Bundle Product – A list of related collections. For example, a bundle could list a collection of raw data obtained by an instrument during its mission lifetime, a collection of the calibration products associated with the instrument, and a collection of all documentation relevant to the first two collections.

Class – The set of attributes (including a name and identifier) which describes an item defined in the PDS Information Model. A class is generic – a template from which individual items may be constructed.

Collection Product – A list of closely related basic products of a single type (e.g. observational data, browse, documents, etc.). A collection is itself a product (because it is simply a list, with its label), but it is not a *basic* product.

Data Object – A generic term for an object that is described by a description object. Data objects include both digital and non-digital objects.

Description Object – An object that describes another object. As appropriate, it will have structural and descriptive components. In PDS4 a 'description object' is a digital object – a string of bits with a predefined structure.

Digital Object – An object which consists of real electronically stored (digital) data.

Identifier – A unique character string by which a product, object, or other entity may be identified and located. Identifiers can be global, in which case they are unique across all of PDS (and its federation partners). A local identifier must be unique within a label.

Label – The aggregation of one or more description objects such that the aggregation describes a single PDS product. In the PDS4 implementation, labels are constructed using XML.

Logical Identifier (**LID**) – An identifier which identifies the set of all versions of a product.

Versioned Logical Identifier (LIDVID) – The concatenation of a logical identifier with a version identifier, providing a unique identifier for each version of a product.

Manifest - A list of contents.

Meshes – Also known as terrain models, meshes are high level products containing geometric description of the surface consisting of triangles, with image texture attached to each triangle.

Metadata – Data about data – for example, a 'description object' contains information (metadata) about an 'object.'

Object – A single instance of a class defined in the PDS Information Model.

PDS Information Model – The set of rules governing the structure and content of PDS metadata. While the Information Model (IM) has been implemented in XML for PDS4, the model itself is implementation independent.

Product – One or more tagged objects (digital, non-digital, or both) grouped together and having a single PDS-unique identifier. In the PDS4 implementation, the descriptions are combined into a single XML label. Although it may be possible to locate individual objects within PDS (and to find specific bit strings within digital objects), PDS4 defines 'products' to be the smallest granular unit of addressable data within its complete holdings.

Tagged Object – An entity categorized by the PDS Information Model, and described by a PDS label.

Registry – A data base that provides services for sharing content and metadata.

Repository – A place, room, or container where something is deposited or stored (often for safety).

Version Identifier (VID) – Consist of major and minor components separated by a "." (M.n), and identify a specific version of a product.

VICAR – Image processing system created and maintained at the JPL Multimission Image Processing Lab (MIPL). VICAR is used to create most of the image products in this archive. VICAR is available open source; see https://www-mipl.jpl.nasa.gov/vicar_open.html .

XML – eXtensible Markup Language.

XML schema – The definition of an XML document, specifying required and optional XML elements, their order, and parent-child relationships.

XML Schematron – A set of rules used to validate an XML document.

1 Overview

1.1 Purpose and Scope

This software interface specification (SIS) describes the format and content of the bundles containing Camera data for the Mars 2020 Project.

This document specifically describes the PDS data archive bundle and collections in which data products, documentation, and supporting material are stored. This document is intended for the scientists who will analyze the data, including those associated with the project and those in the general planetary science community. It describes how the data is organized within the PDS bundle. It does *not* describe the products themselves. For details about the products, see the Mars 2020 Software Interface Specification (SIS): Camera Instrument Experiment Data Record (EDR) and Reduced Data Record (RDR) Data Products (called "Camera SIS, see Applicable Document 5).

1.2 SIS Contents

This SIS discusses standards used in generating the data products and software that may be used to access the products. The data structure and organization are described in sufficient detail to enable a user to locate desired data products and their associated files within the archive bundle.

Appendices include a list of cognizant persons involved in generating the archive.

1.3 Applicable Documents

1. Planetary Data System Standards Reference, version 1.14.0, May 22, 2020.

2. Planetary Data System (PDS) 4 Data Dictionary Document, Abridged, version 1.14.0.0, June, 2020.

3. Planetary Data System (PDS) PDS4 Information Model Specification, version 1.14.0.0, June, 2020.

4. Data Provider's Handbook, Archiving Guide to the PDS4 Data Standards, version 1.14.0, May 19, 2020.

5. Mars 2020 Software Interface Specification: Camera Instrument Experiment Data Record (EDR) and Reduced Data Record (RDR) Data Products, version 1.0, Sep 1, 2020.

The PDS4 Documents 0 through 4 are subject to revision. The most recent versions may be found at http://pds.nasa.gov/pds4. Document 5 is included as part of this archive.

1.4 Audience

This document serves as an Archive Bundle SIS, describing the structure and content of the archive in which the data products, documentation, and supporting material are stored. It does not describe

the format and content of Mars 2020 camera data products in detail – that information is addressed in the Camera SIS (Applicable Document 5). This SIS is intended to be used both by the instrument teams in generating the archive, and by data users wishing to understand the format and content of the archive. Typically these individuals would include scientists, data analysts, and software engineers.

2 Mars 2020 Camera Data Products

2.1 Data Product Overview

The Mars 2020 camera raw and derived products are described in detail in the Mars 2020 Camera SIS (Applicable Document 5).

2.2 Data Processing Levels

Data processing levels mentioned in this SIS refer to PDS4 processing levels. Table 1 provides a description of these levels along with the equivalent designations used historically in other systems, particularly when describing data products for cameras on landed/rover missions.

PDS4 processing level	PDS4 processing level description	NASA Level (used in PDS3)
Telemetry	Telemetry data with instrument data embedded. PDS does not archive telemetry data.	
Raw	Original data from an instrument. If compression, reformatting, packetization, or other translation has been applied to facilitate data transmission or storage, those processes are reversed so that the archived data are in a PDS approved archive format. Often called EDRs (Experimental Data Records).	0
Partially Processed	Data that have been processed beyond the raw stage but which have not yet reached calibrated status. These and more highly processed products are often called RDRs (Reduced Data Records), but some EDRs are also in this category.	1A
Calibrated	Data converted to physical units, which makes values independent of the instrument. Often called RDRs.	1B
Derived	Results that have been distilled from one or more calibrated data products (for example, maps, gravity or magnetic fields, or ring particle size distributions). Supplementary data, such as calibration tables or tables of viewing geometry, used to interpret observational data should also be classified as 'derived' data if not easily matched to one of the other three categories. Often called RDRs.	2+

Table 1: Data processing level definitions

3 Camera Archive Organization, Identifiers and Naming Conventions

This section describes the basic organization of the Mars 2020 camera raw, partially processed, calibrated and derived data archived under the PDS4 Information Model (IM) (Applicable Documents 0 through 4), including the naming conventions used for the bundle, collection, and product unique identifiers.

3.1 The Mars 2020 Camera Bundles

The highest level of organization for a PDS4 archive is the bundle. A bundle is a set of one or more related collections which may be of different types. A collection is a set of one or more related basic products which are all of the same type. Bundles and collections are logical structures, not necessarily tied to any physical directory structure or organization.

The Mars 2020 camera data is divided into 5 bundles, as listed in Table 2. There are three types of bundles, as described below.

The Engineering Camera, Mastcam-Z, and Helicopter bundles are standalone bundles. These bundles contain all the Engineering Camera, Mastcam-Z, and Helicopter Camera data, respectively.

The mars2020_imgops bundle contains the image data for the SHERLOC (ACI and Watson), PIXL (MCC), and SuperCam (RMI) cameras, as processed by the Mars 2020 image operations team (IDS – Instrument Data System). The data products in this bundle are included *by reference* in the instrument bundles (mars2020_sherloc, mars2020_pixl, mars2020_supercam) using the PDS "secondary collection" mechanism. Thus the data logically appears both the camera "imgops" bundle and in the instrument-specific bundle, but it is physically only stored in the "imgops" bundle. Note that the imgops bundle also includes data processed by the SHERLOC team; camera data processed by the PIXL or SuperCam teams appears in their respective image bundles (only). See the Bundle SIS's for those bundles for details.

The MEDA Skycam data appears in the mars2020_meda bundle. It is fully part of the MEDA bundle (described by the MEDA Bundle SIS) but is also included here due to its similarity to all the other cameras' data.

All of the image bundles described here except MEDA are maintained at the PDS Cartography and Imaging Sciences node. MEDA is maintained at the Atmospheres node. The instrument bundles for SHERLOC, PIXL, and SuperCam are maintained at the Geosciences node.

Bundle Name	Instrument Bundle Name	Image Collection Name	Description
mars2020_ecam	n/a	data	Engineering Camera data (hazcams, navcams, EDL cameras, LVS camera, CacheCam)
mars2020_mastcamz	n/a	data	Mastcam-Z data
mars2020_helicam	n/a	data	Helicopter Camera data (Heli Nav, Heli RTE)
mars2020_imgops	mars2020_sherloc	data_watson_imgops	SHERLOC Watson data, from both JPL-IDS and instrument team
mars2020_imgops	mars2020_sherloc	data_aci_imgops	SHERLOC ACI data, from both JPL-IDS and instrument team
mars2020_imgops	mars2020_pixl	data_mcc_imgops	PIXL MCC data, from JPL-IDS
mars2020_imgops	mars2020_supercam	data_rmi_imgops	SuperCam RMI data, from JPL-IDS
mars2020_meda	n/a	data_skycam	MEDA SkyCam data, from JPL-IDS. Bundle also contains the rest of the MEDA data.

Table 2: Mars 2020 Camera Bundles

3.2 Collections in the Camera Bundles

Collections consist of basic products that are related. The Mars 2020 Camera Bundles each include the data collections listed in Table 3 (below). These collections include both scientific and non-scientific data products.

The name of the data collection varies per bundle; see Table 2.

The data collection for images contains all of the PDS processing levels: Raw, Partially Processed, Calibrated, and Derived. The Camera SIS lists what the processing levels are for each product type.

Collection Logical Name	Collection Type	Description
browse	Browse	"Quick look", possibly compressed versions of the science data products. The browse versions of data products are not science quality.
calibration	Calibration	Calibration reports and files needed for calibration of camera data
See Table 2, column 3	Data	The actual scientific data products for the camera. See the Data Organization section for a description of how the data will be organized into sub-directories.
document	Document	Contains documents which are useful for understanding and using the data. This collection includes the Camera SIS (Applicable Document 5), and any additional documentation the Mars 2020 team wishes to include. Documentation files are PDF-A, plain text or HTML format to be PDS-compliant.
miscellaneous	Miscellaneous	This collection includes the Apache Velocity templates used to generate the PDS4 labels from the VICAR/ODL header labels.

Table 3: Collections in the Mars 2020 Bundle

3.3 Data Organization

The data directory contains all files from the data collection. These are organized by sol, category, and instrument. The data directory organization directly mirrors the operational directory structure used by Mars 2020, which facilitates use of operations tools on the PDS archive, as well as the creation and validation of the archive. See Appendix B for the full directory structure of the bundles, outside of the data directory.

```
.. <data_collection_name>/
.... sol/
...... <sol_number>/
........ <team>/
.......... <category>/
............ <instrument>/
```

Where:

"data_collection_name" is the name of the collection, from Table 2.

"sol_number" is the Mars day since landing (landing day is sol 0). The sol_number is a 5-digit, zero-filled, decimal number (e.g. 00001).

"team" is the name of the team generating the products. The name is "ids" for products generated by the IDS team at JPL. The name "soas" is used for products generated by the science teams (Mastcam-Z and SHERLOC).

"category" is one of: edr, fdr, rdr, tdr, where edr contains all data products in the EDR category (raw and some partially processed); fdr contains the "fundamental" data record, which is a consistently formatted product regardless of how the image was sent; rdr contains most Partially Processed and all Calibrated, and Derived products, and tdr is analogous to fdr for engineering camera tile data (see the camera SIS).

"instrument" is the instrument, which is one of: cachecam, edl, fcam, heli, lvs, meda, ncam, pixl, rcam, shrlc, scam, zcam, mosaic, mesh. Most of those are instrument types. Mosaic contains all mosaics for any instrument, mesh contains all terrain meshes for any instrument.

3.4 Products in the Mars 2020 Bundles

A PDS product consists of one or more digital objects and an accompanying PDS4 label file, which provides identification and description information for labeled objects. Documents are also considered products, and have PDS4 labels just as data products do. In addition, collections and even the bundles are considered products and have PDS4 labels.

3.4.1 Logical Identifiers

Every product in PDS is assigned an identifier, which allows it to be uniquely identified across the system. This identifier is referred to as a Logical Identifier (LID). A LIDVID (Versioned Logical Identifier) includes product version information, and allows different versions of a specific product to be referenced uniquely. A product's LID and VID (Version Identifier) are defined as separate attributes in the product label. LIDs and VIDs are assigned by PDS and are formed according to the conventions described in the LID Formation and VID Formation sections below. The uniqueness of a product's LIDVID may be verified using the PDS Registry and Harvest tools.

3.4.2 LID Formation

LIDs take the form of a Uniform Resource Name (URN). LIDs are restricted to ASCII lower case letters, digits, dash, underscore, and period. Colons are also used, but only to separate prescribed components of the LID. Within one of these prescribed components dash, underscore, or period are used as separators. LIDs are limited in length to 255 characters.

Mars 2020 Camera LIDs are formed according to the following conventions:

- Bundle LIDs are formed by appending a bundle specific ID to the base ID:

  urn:nasa:pds:<bundle ID>

  Example: urn:nasa:pds:mars2020_ecam

  The <bundle ID> must be unique across all PDS data archive bundles. See Table 2.
- Collection LIDs are formed by appending a collection specific ID to the collection's parent bundle LID:

  urn:nasa:pds: <bundle ID>:<collection ID>

  Example: urn:nasa:pds:mars2020_ecam:data

  Because the collection LID is based on the bundle LID, the only syntactic condition is that the <collection ID> must be unique across the bundle. Thus collection LIDs are unique across PDS. Collection IDs correspond to the collection type (e.g. "browse", "data", "document", etc.).
- Basic product LIDs are formed by appending a product specific ID to the product's parent collection LID:

  urn:nasa:pds: <bundle ID>:<collection ID>:<product ID>

  Because the product LID is based on the collection LID, the only additional syntactic condition is that the <product ID> must be unique across the collection.

  For the Mars 2020 data and browse collections, the <product ID> is generated as follows:

  - Convert the product filename to lowercase.
  - Remove the version number if present (last character of filename, before extension).
  - Remove the .VIC or .IMG extension for images only.

  Note that non-image files and image files other than .VIC or .IMG (e.g. .PNG) retain their extension to preserve uniqueness across multiple file types using the same base name (e.g. mosaic ancillary files or mesh OBJ files).

  For example:

Filename:

`NLG_0022T0668847813_870ECM_N0010000NCAM00160_01_2I3J01.IMG`

LID :

`urn:nasa:pds:mars2020_ecam:data:`
`nlg_0022t0668847813_870ecm_n0010000ncam00160_01_2i3j`

Filename:

`ZR0_0200T0648036352_101ECM_N0010000XXXX00000_028100J01.obj`

LID:

`urn:nasa:pds:mar2020_mastcamz:data:`
`zr0_0200t0648036352_101ecm_n0010000xxxx00000_028100j.obj`

For the `calibration` collection, the same rules apply, except there is no version number to remove.

For the remaining collections, the <product ID> is set to be the same as the data file name, with or without the extension, depending on the collection.

3.4.3 VID Formation

Product Version IDs consist of major and minor components separated by a "." (M.n). Both components of the VID are integer values. The major component is set based on the operations pipeline version ID assigned to the product. This value is extracted from the last two characters of the ops product filename. For Mars 2020 cameras, the minor version is always "0". Thus the complete VID for all Mars 2020 camera products is "n.0".

3.4.4 File Naming Convention

The file naming convention for Mars 2020 camera products is described in the File Naming section of the Camera SIS (Applicable Document 5).

3.4.5 PDS4 Labels

Each Mars 2020 camera data product has an accompanying PDS4 label. PDS4 labels are ASCII text files written in the eXtensible Markup Language (XML). Product labels are detached from the files they describe. There is one label for every product. A product, however, may consist of one or more data objects. The data objects of a given product may all reside in a single file, or they may be stored in multiple separate files, in which case the PDS4 label points to all the files. An example of this in Mars 2020 is mesh products, which consist of a tuple of (.obj, .mtl, .png) files, with a single (.xml) label file. Another example is JPEG EDRs, which consist of the primary data file (ECM type) and a copy of the original JPEG stream as sent by the spacecraft (EJP type) as a supplemental product. A PDS4 label file usually has the same name as the data product it describes, but always with the extension ".xml". In the case of images (.VIC or .IMG) and documentation/bundle files, ".xml" will replace the filename extension (e.g. PRODUCT_A.IMG will have the label file PRODUCT_A.xml). For most other files, the ".xml" is appended (e.g.

PRODUCT_A.obj has the label PRODUCT_A.obj.xml). The `calibration` collection has special rules, see the relevant Appendix in the Camera SIS (Applicable Document 5).

The Mars 2020 image data files are in VICAR format with attached labels in both VICAR and ODL format (see Section 3.2 of the Camera SIS (Applicable Document 5). The metadata found in these VICAR labels are used as the inputs to generate both the ODL and the PDS4 labels, which are detached XML files. The images are thus simultaneously valid as both VICAR (data file only), ODL (PDS3 format without specifically being approved as PDS3), and PDS4 (data file plus label) products. Because the VICAR label is used to generate the ODL label, which is then used to generate the PDS4 label, the semantic contents of all three labels are identical.

Documents are also considered products, and have accompanying PDS4 labels.

For the Mars 2020 mission, the structure and content of PDS labels will conform to the PDS master schema and Schematron based upon the PDS Information Model (Applicable Document 3). In brief, the Schema is the XML model that PDS4 labels must follow, and the Schematron is a set of validation rules that are applied to PDS4 labels. In addition to the PDS master schema documents, there are discipline- and mission-specific XML schema and Schematron documents, which provide additional governance over the products in this archive. The PDS Validate Tool should be used to validate the structure and content of the product labels. In brief, the Schema is the XML model that PDS4 labels must follow, and the Schematron is a set of validation rules that are applied to PDS4 labels.

A list of the XML Schema and Schematron documents associated with this archive are provided in Table 4. Also shown is the namespace used in the label when referencing that dictionary.

Namespace	XML Document	Steward	Product LID
(n/a)	PDS Core Schema/Schematron	PDS	urn:nasa:pds:system_bundle:xml_schema :pds-xml_schema
img:	Imaging Dictionary Schema/Schematron	Imaging Node	urn:nasa:pds:system_bundle:xml_schema :img-xml_schema
geom:	Geometry Dictionary Schema/Schematron	Geosciences Node	urn:nasa:pds:system_bundle:xml_schema :geom-xml_schema
cart:	Cartography Dictionary Schema/ Schematron	Imaging Node	urn:nasa:pds:system_bundle:xml_schema :cart-xml_schema
proc:	Processing Information Dictionary Schema/ Schematron	Imaging Node	urn:nasa:pds:system_bundle:xml_schema :proc-xml_schema
disp:	Display Information Dictionary Schema/Schematron	Imaging Node	urn:nasa:pds:system_bundle:xml_schema :disp-xml_schema
msn:	Mission Information Dictionary Schema/Schematron	Imaging Node	urn:nasa:pds:system_bundle:xml_schema :msn-xml_schema
msn_surface:	Surface Mission Information Dictionary Schema/Schematron	Imaging Node	urn:nasa:pds:system_bundle:xml_schema :msn_surface-xml_schema
img_surface:	Surface Imaging Dictionary Schema/ Schematron	Imaging Node	urn:nasa:pds:system_bundle:xml_schema :img_surface-xml_schema
msss_cam_mh:	MSSS Camera Mini-Header Dictionary Schema/Schematron	Imaging Node	urn:nasa:pds:system_bundle:xml_schema :msss_cam_mh-xml_schema
mars2020:	Mars 2020 Misson-Specific Dictionary Schema/Schematron	Geosciences Node	urn:nasa:pds:system_bundle:xml_schema :mars2020-xml_schema

Table 4: Mars 2020 Schema and Schematron documents

4 Mars 2020 Archive Bundle Product Formats

Data that comprise the Mars 2020 raw data archive are formatted in accordance with PDS specifications (see Applicable Documents 0 through 4). This section provides details on the formats used for each of the products included in the archive.

4.1 Science Data Product Formats

The telemetry, raw, partially processed, calibrated and derived data products are described in the Mars 2020 Camera SIS (Applicable Document 5).

4.2 Document Product Formats

Documents in this archive are provided as PDF/A (www.pdfa.org/download/pdfa-in-a-nutshell) or as plain ASCII text if no special formatting is required. Figures that accompany documents are provided as TIFF, GIF, JPEG, or PNG files. HTML versions of some documents are provided in addition to the PDF/A version.

4.3 Calibration Product Formats

Products in the Calibration collection include documents (PDF/A or plain ASCII text), and image files, similar in format to the science data products.

4.4 Browse Product Formats

Products in the Browse collection do not contain any scientifically useful information that is not found in the Data collection, and conform to a well-documented standard in current use (PNG). This data is not archival data, and thus may become outdated.

Appendix A Support staff and cognizant persons

Mars 2020 IDS Team			
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Table 5: Archive support staff

Appendix B Bundle Directory Structure

This section provides a simple outline of the bundle directory structure.

```
<bundle_name>
├─── browse
|   └── sol
|       └── <sol_number>
|           └── <team>
|               └── edr
|                   └── <inst>
|               └── fdr
|                   └── <inst>
|               └── rdr
|                   └── mosaic
├─── calibration
├─── <data_collection_name>
|   └── sol
|       └── <sol_number>
|           └── <team>
|               └── <category>
|                   └── <instrument>
├─── document
├─── miscellaneous
```

For example:

```
mars2020_imgops
├─── browse
|   └── sol
|       └── 00620
|           └── ids
|              └── edr
|                 └── shrlc
|                 └── pixl
|                 └── scam
|              └── fdr
|                 └── shrlc
|                 └── pixl
|                 └── scam
|              └── rdr
|                 └── mosaic
├─── data_rmi_imgops
|   └── sol
|       └── 00620
|           └── ids
|              └── edr
|                 └── scam
|              └── rdr
|                 └── scam
|                 └── mesh
|                 └── mosaic
├─── data_watson_imgops
|   └── sol
|       └── 00620
|           └── ids
```

```
|               └── edr
|                   └── shrlc
|               └── rdr
|                   └── shrlc
|                   └── mesh
|                   └── mosaic
├──── data_aci_imgops
|   └── sol
|       └── 00620
|           └── ids
|               └── edr
|                   └── shrlc
|               └── rdr
|                   └── shrlc
|                   └── mesh
|                   └── mosaic
├──── data_mcc_imgops
|   └── sol
|       └── 00620
|           └── ids
|               └── edr
|                   └── pixl
|               └── rdr
|                   └── pixl
|                   └── mesh
|                   └── mosaic
├──── document
├──── miscellaneous
```