

DART Data Review: DRACO

Didymos Reconnaissance and Asteroid Camera for OpNav

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Overview

- This is a mixed dataset of commissioning and cruise and simulation data prepared for the asteroid encounter in 2022.

Instrument	Data Set ID	Contents
DART DRACO	urn:nasa:pds:dart:data_dracocal::1.0	Draco Calibrated Data Collection for the Didymos Reconnaissance and Asteroid Camera for OpNav (DRACO) instrument
	urn:nasa:pds:dart:data_dracoddp::1.0	Draco Derived Data Collection for the Didymos Reconnaissance and Asteroid Camera for OpNav (DRACO) instrument
	urn:nasa:pds:dart:data_dracoraw::1.0	Draco Raw Data Collection for the Didymos Reconnaissance and Asteroid Camera for OpNav (DRACO) instrument
	urn:nasa:pds:dart:document_draco::1.0	Documentation for the Didymos Reconnaissance and Asteroid Camera for OpNav (DRACO) instrument

- The bundle is prepared in PDS4 standard.
- My second time review DRACO. Some lien from 2021 review are not solved.
- This review focused on the data and documents
- Data reviewing tools include Oxygen XML Editor, Diff Files, DS9 and python pds4 tools, “pds4_tools.read” and “pds4_tools.view” .

The cal_files directory contains subfolders, with the appropriate inputs located in each directory.

Documents

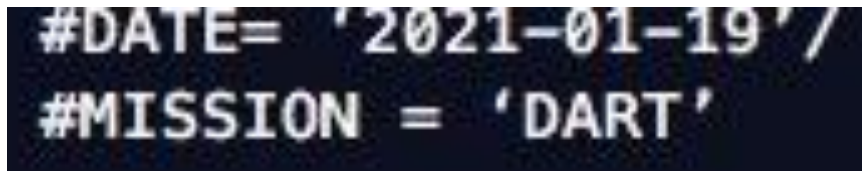
Cal_files:

```
badPixelMap/  
biasFrames/  
darkCurrent/  
flatFields/  
mocParameters/  
onboardCalTable/  
radiometricLUT/  
rdidymos/
```

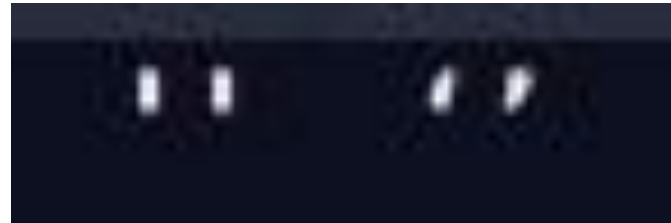
Different from cal_file data bundle
(old lien)

With each new delivery, the DRACO IS will make a folder called YYYYMMDD within each of the above directories and put the new calibration inputs in those location. The pipeline uses the files in the folder with the latest date. Prior to delivery, the DRACO IS updates the value of the CALSTART keyword to be the time when the pipeline should begin using the new file.

- In the CAL pdf, the calibration file updates are explained, but for the team in flight user. For general data user, we just need to know which calibration file to pick from the bundle after a bunch of deliveries. I suggest explain that.
- In “../data_dracocal/calibration/”, weird apostrophe mark is used in the csv files.



```
#DATE= '2021-01-19' /  
#MISSION = 'DART'
```



Documents: SIS

- I/F is not a unit.
- LON:Degrees east E W? Or 0-360?
- No discussion about the **error** of the data especially the calibrated data

Table 5. Description of image backplanes

Plane Number	Plane Name	Description	Units
1	Pixel value	Pixel values of the calibrated image	I/F
2	X coordinate	X coordinate of the intercept with the surface of an asteroid in body-fixed reference frame	km
3	Y coordinate	Y coordinate of the intercept with the surface of an asteroid in body-fixed reference frame	km
4	Z coordinate	Z coordinate of the intercept with the surface of an asteroid in body-fixed reference frame	km
5	Latitude	Planetocentric latitude	degrees
6	Longitude	Planetocentric longitude	degrees east
7	Radial distance	Radial distance from the asteroid center of figure	km

DATA

- All images can be viewed and opened correctly. (python fits and pds4_viewer)
- Include "error image" extensions with standard deviation error and data quality flags to aid analysis. (old lien)
- FITS header cards are copied from raw to calibrated data. Remove those that are not necessary. Do all those track ID relate to scientific applications?(old lien)

The screenshot displays the PDS4 Viewer interface. At the top, a window titled "PDS4 Viewer - Data Structure Summary for '/Users/zouxd/Downloads/sharing/data_dracocal/cruise/2022/022/dart_0380520865..." shows a table with the following columns: Index, Name, Type, Dimension, and View. The table contains one entry: Index 1, Name 'dart_0380520865_14915_01_rad', Type 'Array_2D_Image', and Dimension '1024 X 1024'. The 'View' column has buttons for 'Label', 'Table', and 'Image'.

Below this, another window titled "PDS4 Viewer - Label View" is open, showing a "Label" for the selected image. The label text includes:

```
Array_2D_Image
local_identifier: dart_0380520865_14915_01_rad
offset: 23040
axes: 2
axis_index_order: Last Index Fastest

Element_Array
data_type: IEEE754MSBSingle
unit: W*m**-2*s*r**-1*nm**-1

Axis_Array
axis_name: Line
elements: 1024
sequence_number: 1






Axis_Array
axis_name: Sample
elements: 1024
sequence_number: 2

Special_Constants
missing_constant: 1E10
invalid_constant: -1E09
not_applicable_constant: -1E10
high_instrument_saturation: 1E09
```

At the bottom of the label view, there are search and match case options. To the right, a third window titled "PDS4 Viewer - Image 'dart_0380520865_14915_01_rad'" shows a dark image with a color scale at the bottom ranging from 1.71e-06 to 2.68e-05.

DATA

- The data in “data_dracoddp/” is sample, should be marked somewhere.
- Two copies of fits file and xml set are the same simulated data but the one in a folder named final, I suppose, is the improved version. The old version should be removed.
- The XML file of the geo data can't be validated:

Info	Description – 3 items	Resource
 	E [Xerces] Failed to read schema document 'https://pds.nasa.gov/pds4/mission/dart/v1/PDS4_DART_1E00_1000.xsd', because 1) could not find the document;...	Resource – Not available
 	W [Xerces] Failed to read schema document 'https://pds.nasa.gov/pds4/mission/dart/v1/PDS4_DART_1E00_1000.xsd', because 1) could not find the document...	dart_0717892213_00...
	dart_0717892213_00957_01_geo.xml, schema "PDS4_DISP_1B00.xsd", "PDS4_GEOM_1E00_1810.xsd", "PDS4_DART_1E00_1000.xsd", "PDS4_PDS_1E00.xsd" (2 items)	
 -	E [Schematron 1.5] 404 Not Found for: https://pds.nasa.gov/pds4/mission/dart/v1/PDS4_DART_1E00_1000.sch	PDS4_DART_1E00_10...

Lien from last review

*.xml

- Please change

urn:nasa:pds:context:target:asteroid.didymos

to

urn:nasa:pds:context:target:asteroid.65803.didymos

- Only bundle.xml and collection*.xml have a lid_reference to the target.

We suggest that all labels, especially data labels, have such.

caibration/

- If this directory contains calibration files while

draco/final/calibrated/ contains calibrated data files, then the two sets

of files probably should not share the same collection.xml and collection LID

urn:nasa:pds:dart:dracocal

and that

1) this directory should have its own collection.*,

2) collection.xml and all the files in this directory would have LIDs

beginning with something like

urn:nasa:pds:dart:calibration

3) bundle.xml should correspondingly add

<lid_reference>urn:nasa:pds:dart:calibration</...>

<reference_type>bundle_has_calibration_collection</...>

document/.../*.xml (many, but not all)

- Please add lid_references to investigation, instrument_host, instrument,

and target if applicable, as the other labels do.