

PDS Review

COSIMA

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Summary

- CODMAC Level 2 data
- COSIMA In-Flight and 67P Data until end of mission
 - Single gigantic archive
 - Volume includes calibration data
- Finding data of interest is unnecessarily complicated
- Documentation is brief and very technical

RID: Major

- The PDS Volume is excessively large:
 - Compressed tar Archive: 35 GB
 - Uncompressed tar much larger
- Archive is borderline useless

RID: Minor

- Column names are sometimes confusing

cosima_spectrum_peaks.fmt

cosima_spectrum_data.fmt

```
OBJECT                = COLUMN
  COLUMN_NUMBER       = 1
  NAME                = INDEX
  DATA_TYPE          = ASCII_INTEGER
  START_BYTE         = 1
  BYTES               = 5
  FORMAT              = "I5"
  DESCRIPTION         = "INTEGER MASS. IF HIGHER THAN 300, THEN THE
                        INTERVAL FROM PREVIOUS VALUE TO CURRENT
                        VALUE"
END_OBJECT
OBJECT                = COLUMN
  COLUMN_NUMBER       = 2
  NAME                = INORGANIC_COUNT
  DATA_TYPE          = ASCII_INTEGER
  START_BYTE         = 7
  BYTES               = 10
  FORMAT              = "I10"
  DESCRIPTION         = "INORGANIC PEAK HEIGHT COUNT. IF MASS INDEX
                        IS HIGHER THAN 300, THEN THE SUM OF
                        ORGANIC AND INORGANIC COUNTS FOR THE
                        INTERVAL FROM PREVIOUS INDEX"
END_OBJECT
OBJECT                = COLUMN
  COLUMN_NUMBER       = 3
  NAME                = ORGANIC_COUNT
  DATA_TYPE          = ASCII_INTEGER
  START_BYTE         = 18
  BYTES               = 10
  FORMAT              = "I10"
  DESCRIPTION         = "ORGANIC PEAK HEIGHT COUNT. IF MASS INDEX
                        IS HIGHER THAN 300, THEN THE SUM OF
                        INORGANIC AND ORGANIC COUNTS FOR THE
                        INTERVAL FROM PREVIOUS INDEX"
END_OBJECT
```

```
OBJECT                = COLUMN
  COLUMN_NUMBER       = 1
  NAME                = INDEX
  DATA_TYPE          = ASCII_INTEGER
  START_BYTE         = 1
  BYTES               = 6
  FORMAT              = "I6"
  DESCRIPTION         = "TIME OF FLIGHT TIME STEP INDEX.
                        TIME STEP IS 0.00000001953125 SECONDS"
END_OBJECT
OBJECT                = COLUMN
  COLUMN_NUMBER       = 2
  NAME                = MASS_COUNT
  DATA_TYPE          = ASCII_INTEGER
  START_BYTE         = 8
  BYTES               = 10
  FORMAT              = "I10"
  DESCRIPTION         = "TIME INTEGRATED MASS COUNT AT THE TIME STEP"
END_OBJECT
OBJECT                = COLUMN
  COLUMN_NUMBER       = 3
  NAME                = MASS_NUMBER
  DATA_TYPE          = ASCII_REAL
  START_BYTE         = 19
  BYTES               = 10
  FORMAT              = "F10.5"
  DESCRIPTION         = "CALIBRATED MASS NUMBER AT THE TIME STEP"
END_OBJECT
```

Usability

- Current gigantic archive size cannot be handled by common users
- User will be mostly interested in mass spectra of dust particles but there is no “central hub”
- To find such data the user needs to scan each target directory individually
- ...and even this is challenging

How to find genuine dust spectra

- Scan the xxx_substrate_hist.tab for <GRAINS> rows
- Extract from the corresponding <GRAINS> tables the scanning time and the location on the substrate
- Scan the xxx_substrate_hist.tab for <SPECTRUM> rows obtained after the scanning time obtained within the geometric boundaries of the identified particle
- Extract the spectrum from the corresponding spectrum table

How to find genuine dust spectra

2014-278/06:54:53...2014-278/06:55:18	x: 1752... 1752	y: 6942... 6942	# of Spectra: 0
2014-278/06:54:53...2014-278/06:55:18	x: 1428... 1442	y: 6168... 6140	# of Spectra: 0
2014-278/06:54:53...2014-278/06:55:18	x: 1470... 1470	y: 6223... 6223	# of Spectra: 0
2014-278/06:54:53...2014-278/06:55:18	x: 1675... 1675	y: 5681... 5681	# of Spectra: 0
2014-278/06:54:53...2014-278/06:55:18	x: 1758... 1758	y: 5681... 5681	# of Spectra: 0
2014-278/06:54:53...2014-278/06:55:18	x: 1445... 1445	y: 4449... 4449	# of Spectra: 0
2014-278/06:54:53...2014-278/06:55:18	x: 1722... 1722	y: 4434... 4434	# of Spectra: 0
2014-278/06:54:53...2014-278/06:55:18	x: 1690... 1690	y: 3685... 3685	# of Spectra: 0
2014-278/06:54:53...2014-278/06:55:18	x: 1801... 1801	y: 3740... 3740	# of Spectra: 0
2014-278/06:54:53...2014-278/06:55:18	x: 1382... 1382	y: 3258... 3258	# of Spectra: 0
2014-278/06:54:53...2014-278/06:55:18	x: 1631... 1631	y: 3090... 3090	# of Spectra: 0
2014-278/06:54:53...2014-278/06:55:18	x: 1785... 1785	y: 3449... 3449	# of Spectra: 0
2014-278/06:54:53...2014-278/06:55:18	x: 1473... 1473	y: 2190... 2190	# of Spectra: 0
2014-278/06:54:53...2014-278/06:55:18	x: 1667... 1681	y: 2216... 2203	# of Spectra: 0
2014-278/06:54:53...2014-278/06:55:18	x: 1693... 1805	y: 2188... 1925	# of Spectra: 28

The spectra look weird:

The Users Need Help to Make Sense of Them

... The data have been automatically processed from raw data. Care should be taken in spectrum analysis, the housekeeping values for operating voltages should be checked for possible anomalies. Some of the operations during the calibration were really outside of normal instrument operation.

The mass scale of the spectra is automatically calculated onboard COSIMA and is not valid for scientific analysis. No dead time correction is made...

