PDS Review
Rosetta/Cosima

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Summary

- CODMAC Level 2 data
- COSIMA In-Flight and 67P Data thru March 2015
  - data includes calibration data
- finding data of interest is unnecessarily complicated

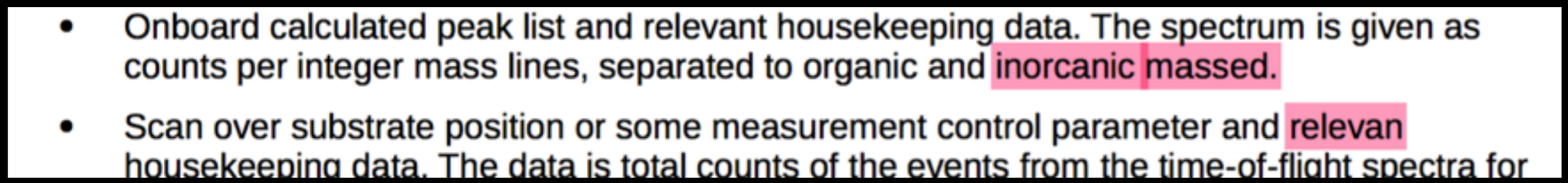
Major Issues

- Files identified in <xxx_substrate_hist tables> are sometimes missing:

- e.g. cs_1d0_20141005t043347_sp_p.tab listed in cs_1d0_substrate_hist.tab

Minor Issues

- Many spelling errors in the SIS:



- Onboard calculated peak list and relevant housekeeping data. The spectrum is given as counts per integer mass lines, separated to organic and inorcanic massed.
- Scan over substrate position or some measurement control parameter and relevan housekeeping data. The data is total counts of the events from the time-of-flight spectra for

and in tables (even the PI's name is sometimes misspelled (e.g. in dataset.cat)

Minor Issues

- Peak table should be explained better:

For the peak lists, the separation between organic and inorganic peaks is done according to the following formula:

Starting from the integer mass (M), the bin interval for the

- inorganic ions: M*1.0003 - Δm ... M*1.0003
- organic ions: M*1.0003 ... M*1.0003 + Δm

where Δm = 0.2

Minor Issues

- Column names are sometimes confusing

cosima_spectrum_peaks.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                     = COLUMN
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                     = COLUMN
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                     = COLUMN
```

cosima_spectrum_data.fmt

```
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 0.000000001953125 SECONDS"
END_OBJECT                     = COLUMN

OBJECT                         = COLUMN
  COLUMN_NUMBER                = 2
  NAME                         = MASS_COUNT
  DATA_TYPE                    = ASCII_INTEGER
  START_BYTE                   = 8
  BYTES                        = 10
  FORMAT                       = "I10"
  DESCRIPTION                  = "TIME INTEGRAGED MASS COUNT AT THE TIME STEP"
END_OBJECT                     = COLUMN

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                     = COLUMN
```

Usability

- 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
```

Just out of interest:
The spectra look weird