odffix

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Abstract

Given any number of ODF components, odffix creates the corresponding ODF summary file. At the same time it creates also some of the auxiliary files needed to make the ODF and CAL access layers work.

1 Instruments/Modes

Instrument	Mode
n/a	n/a

2 Use

pipeline processing	no
interactive analysis	yes

3 Description

odffix can be used with any set of correctly named ODF components to generate some of the ODF files usually unavailable when simulating data (because scisim does not have the required satellite data, for instance) but required to make use of the SAS calibration and ODF access layers. **odffix** also generates the ODF summary file.

odffix can only handle one ODF at a time. This means that all the ODF components must have names starting with the same revolution and proposal identifier (`RRRR_PPPPPPOOLL`, in the language of the ODF interface control document [1]). If components from several ODFs are found, only those from the first ODF found are used. A warning is issued, and the extraneous components are ignored.

In the current implementation **odffix** creates the following auxiliary ODF components:

- time correlation file

  The time correlation file contains 2 entries, one second apart. No delay is introduced between earth received time and on-board time.

- attitude history file

  The attitude history file. Fixed pointing. It is possible to set the right ascension, declination, and position angle of the observation via the parameters *ra*, *dec*, and *posangle*.

  Note the attitude history file is generated only if it does not exist already. If one such file exists, **odffix** assumes that it was created by scisim. A warning is issued, to indicate a possible problem.

  If the attitude history file exists, **odffix** will extract the pointing information from it if `findnominalpointing` is true. This is now the default mode of operation. **odffix** assumes that the nominal pointing coordinates are those contained in the first record of the attitude history file.

- EPIC MOS periodic house keeping file
- EPIC PN main and additional periodic house keeping files
- OM periodic housekeeping file

  This file contains two columns, `PARAM44` and `PARAM48`.

- OM priority window data auxiliary file

  If the file exists, it is not re-created. Rather, a warning is issued. This is needed to cope with the export of ODF-like files from the SOC PMS system.

- OM tracking history data auxiliary file

  If the file exists, it is not re-created. Rather, a warning is issued. This is needed to cope with the export of ODF-like files from the SOC PMS system.

- reconstructued orbit file

  This is an empty data file. When the OAL detects an empty orbit file, it simulates orbit data.

- ODF summary file

3.1 Compliance with the ODF interface control document

Of the files generated, only the ODF summary file is fully compliant with the ODF interface control document. For the other files, only those components required by the ODF and calibration access layers of the XMM SAS are generated. **odffix** aims to make it possible to run SAS tasks on pseudo-ODFs, not to generate full-blown ODFs. In practice this means that **odffix** generates files with structures that are a subset of those described in the ODF interface control document.

4 Parameters

This section documents the parameters recognized by this task (if any).

Parameter	Mand	Type	Default	Constraints
odfdir	no	string	.	must exist

Name of the directory containing a set of correctly named ODF components.

ra	no	real	0.	[0, 360]

right ascension (satellite pointing) in degrees for the observation. This is used in the attitude history file.

dec	no	real	0.	[-90, 90]

declination (satellite pointing) in degrees for the observation. This is used in the attitude history file.

posangle	no	real	90.	[-180,180]

astronomical position angle (satellite pointing, as defined in the XMM scisim) in degrees for the observation. This is used in the attitude history file.

findnominalpointing	no	boolean	yes	

Extract nominal pointing from existing attitude history file?

filter	no	string	UNKNOWN	

Extract filter keyword from the AUX files if it exists. If not, it is set to UNKNOWN (Mainly used for SciSim data).

5 Errors

This section documents warnings and errors generated by this task (if any). Note that warnings and errors can also be generated in the SAS infrastructure libraries, in which case they would not be documented here. Refer to the index of all errors and warnings available in the HTML version of the SAS documentation.

NoOdfComponent *(error)*
odffix could not find any dataset resembling an ODF component.

InvalidRevolutionIdentifier *(error)*
odffix found a possible ODF dataset with a revolution identifier that is not a positive integer. Most likely the revolution identifier is an alphanumeric string. This is not compliant with the ODF Interface Control Document, and is known to cause problems in some parts of the SAS.

UnknowOdfFileType *(error)*
odffix could not convert the name of the file to a known ODF file type.

InvalidFilterName *(error)*
odffix Filter name found in the AUX files is not correct.

DefaultPointing *(warning)*
odffix could find a wayt to extract the pointing information from the ODF.
corrective action: Use a default pointing. Use `ra` and `dec` to specify the pointing information.

MultipleODF *(warning)*
Files belonging to more than one ODF were found in the directory.
corrective action: Ignore ODF components that belong to a different ODF.

missingAttribute *(warning)*
odffix could not one attribute in the dataset. Usually this is a `DATE-XXX` attribute.
corrective action: **odffix** ignores the problem and tries its best to find a correct date to assign to the ODF. The ODF components without valid `DATE-XXX` attributes are still listed in the ODF summary file. Thisis not a problem when using ODF components generated with scisim, as they always contain the appropriate date attributes. When using **odffix** on "home brewn" ODF components the user should check that the generated files make sense, i.e. they contain sensible `DATE-OBS` and `DATE-END` attributes. If this is not the case, the individual ODF components should be edited to contain DATE-OBS and DATE-END.

NegativeDuration *(warning)*
The observation duration appears to be less than 0*s*. Something may be wrong with the `DATE-XXX` attributes read from the ODF constituents.
corrective action: Continue, but the resulting ODF summary file may be invalid.

DefaultDuration *(warning)*
No meaningful `DATE-XXX` pair was found in any of the data sets. This can cause **odffix** to exit with an out of memory error, as it tries to allocate an inordinate amount of memory for the time correlation file. To prevent this from happening, when sucha condition is detected the duration of the observation is hardcoded to be 3600 s.
corrective action: Continue. The observation start date is set to *now*, and the observation duration is set to 3600 s.

LongObservation *(warning)*
The calculated observation duration is excessively long (value indicated). This may indicate a problem with the DATE-XXX attributes from the ODF components, and also leads to the generation of very large files by **odffix**.
corrective action: None.

AttitudeHistoryFileExists *(warning)*
odffix has detected a pre-existing attitude history file.
corrective action: Because the pre-existing file could have been generated by scisim, a new attitude history file will not be created.

OMTrackingHistoryDataFileExists *(warning)*
odffix has detected a pre-existing OM tracking history data file.
corrective action: Because the pre-existing file could have been generated by the SOC PMS system, a new file will not be created.

OMPriorityWindowDataFileExists *(warning)*
odffix has detected a pre-existing OM priority window data file.
corrective action: Because the pre-existing file could have been generated by the SOC PMS system, a new file will not be created.

invalidDateString *(warning)*
A dataset contains a date string that cannot be interpreted.
corrective action: The dataset is not used to calculate the observation duration and start/stop time.

6 Input Files

1. any number of ODF components, as long as they are correctly named.

7 Output Files

1. ODF summary file
2. Attitude history file
3. EPIC MOS periodic housekeeping file (only if any EPIC MOS data files were found)
4. EPIC PN periodic housekeeping file (only if any EPIC PN data files were found)
5. Time correlation file
6. OM periodic housekeeping file (only if any OM data files were found)
7. OM priority window data auxiliary file (only if any OM data files were found)

8 Algorithm

```
task odffix

  scan odfdir for ODF components

  extract from the ODF components the start/stop date for the observation

  generate AHF
  generate TCF
  generate housekeeping files (EPIC MOS and PN, RGS, OM)
  generate OM housekeeping

  rescan odfdir to update file list

  generate ODF summary file
```

9 Comments

- the code to generate the OM auxiliary and house keeping files is taken from the test harness of **omichain**.

10 Future developments

- More housekeeping files will probably need to be created in order to satisfy the eventual needs of the XMM pipeline.
- It should be possible to enter the obervation duration as a parameter, instead of coding a default value of 3600 s.
- It should be possible to indicate whether the various housekeeping files should be overwritten if they exist already (in case of export from the XMM PMS).

References

[1] ESA. XMM Interface Control Document: Observation and Slew Data Files (XSCS to SSC) (SciSIM to SOCSIM). Technical Report XMM-SOC-ICD-0004-SSD Issue 2.5, ESA/SSD, June 2000. Found at the URL: ftp://astro.estec.esa.nl/pub/XMM/documents/odf_icd.ps.gz.