omprep

January 12, 2017

Abstract

This tasks interacts directly with the ODF files, cloning the input and modifying it for subsequent processing by the pipeline tasks.

1 Instruments/Modes

Instrument	Mode
OM	FAST
OM	IMAGING
OM	TRACKING

2 Use

pipeline processing	yes
interactive analysis	yes

3 Description

This tasks clones the following OM ODFs for subsequent pipeline processing: OM Imaging Mode Data Image File (two copies made), OM Fast Mode Event List File and the OM Tracking History Data Auxiliary File.

Values for additional FITS header keywords necessary for the creation of SSC Data products by subsequent pipeline tasks are taken directly from the OM Priority Window Data Auxiliary File, the OM Periodic and Non-Periodic Housekeeping Files and from the OM Observation Summary File through the ODF Access Layer(OAL) and stored in the Primary Header of the output files.

For Fast and Tracking Modes, the data stored in the input ODFs is transfered to the output files with no alteration. For Imaging Mode, data stored in the ODF Image Array as 32 bit integer numbers is stored as 32 bit real numbers in the Primary Array of the output file.

For Fast and Imaging Modes a MODES extension is added containing science window details.

4 Parameters

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

Parameter	Mand	Type	Default	Constraints

set	yes	string	none	

name of input ODF to be cloned

nphset	yes	string	none	

name of OM Non-Periodic Housekeeping File

pehset	yes	string	none	

name of OM Periodic Housekeeping File

wdxset	yes	string	none	

name of OM Priority Window Data Auxiliary File

outset	yes	string	none	

name of output file

modeset	no	integer	0	0–3

specifies whether being run in imaging mode (0), fast mode (1), slew mode (2) or tracking mode (3)

rawattitude	no	integer	0	0–2

specifies whether the attitude data is taken from the file specified by using the current setting of the system variable SAS_ATTITUDE (attitude history file, ATH, or raw attitude file, RAF) or from the RAF file, averaging its values for the first 20 seconds of observation (1) or for the entire exposure time (2)

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.

Bad File Type *(fatal)*
Could not find any required extension blocks in set <set>. Critical details for the exposure can not be determined.

Wrong Mode *(fatal)*
OM ODF file was not taken in any of imaging, fast or tracking modes and therefore can not be processed

Invalid filter string *(fatal)*
The indicated filter is a bad/unrecognized filter position in housekeeping. Later tasks will not be able to determine filter dependent calibration details.

getstartendexp_mod *(fatal)*
The given exposure does not exist in the list of exposures for this observing mode. The exposure time could not be determined.

X Image size computed from BINPE, WINDOWDX and BINAX1 does not equal NAXIS1 *(fatal)*
There is an inconsistency between the image array X dimension (NAXIS1) and the raw window X dimension (WINDOWDX) in the file header. This may arise from incorrect values for the BPE binning parameter (BINBPE) and/or the BINAX1 binning parameter, or the WINDOWDX value itself.

Y Image size computed from BINPE, WINDOWDY and BINAX2 does not equal NAXIS2 *(fatal)*
There is an inconsistency between the image array Y dimension (NAXIS2) and the raw window Y dimension (WINDOWDY) in the file header. This may arise from incorrect values for the BPE binning parameter (BINBPE) and/or the BINAX2 binning parameter, or the WINDOWDY value itself.

(N) Negative pixel values encountered *(warning)*
The input image contains N pixels with negative values
corrective action: Reset to zero

ZERODRIFT *(warning)*
No tracking history data is available for this exposure. No onboard shift-and-add corrections will have been made and no tracking corrections can be later applied to the bad-pixel map, mod-8 noise or flatfield procedures
corrective action: No tracking history corrections can be applied by later tasks.

Exposure time is zero- calculating it from the summary file *(warning)*
In the case of imaging or fast mode files, no EXPOSURE keyword was found in the header. In the case of tracking files, this keyword is not expected. In both cases, an attempt is instead made to extract the exposure time from the actual start and end exposure times in the summary file
corrective action: Exposure time will be derived from the summary file

6 Input Files

1. ODF OM Imaging Mode Data Image file/ODF OM Fast Mode Event List/ODF OM Tracking History Data Auxiliary File
2. ODF OM Non-Periodic Housekeeping File
3. ODF OM Periodic Housekeeping File
4. ODF OM Priority Window Data Auxiliary File

7 Output Files

1. Pipeline Prepared OM Imaging Mode Data Image File / OM Fast Mode Event list file / OM Tracking History Data Auxiliary File

8 Algorithm

```
subroutine omprep

  Read in parameters.
  Read in ODF Image / Event List / Tracking History Data Auxiliary file.
  Determine file type from file name in primary header.

  Read in keywords and data from input file.

  IF OM Imaging Mode Data Image file.

    Get a handle on the image array extension.
    Read in the image array extension keywords.
    Get a pointer to the image.
    Get the dimensions of the image.

  IF OM Fast Mode Event List file.

    Get a handle on the event list binary table extension.
    Read in the event list binary table extension keywords.
    Get handles and pointers on the event list binary table extension columns.
    Get the number of rows in the event list binary table extension.

  IF  OM Tracking History Data Auxiliary file.

    Get a handle on the event list binary table extension.
    Read in the tracking history binary table extension keywords.
    Get handles and pointers on the tracking history binary table extension columns.
    Get the number of frames in the tracking history binary table extension.

  IF Incompatible file.

    call fatal("badFileType", "Value for keyword FILENAME is incompatible")

  ENDIF

  Extract exposure from header. If not present, use mssllib routine to extract
  start and end time of exposure from the observation summary file via
  getstartendexp(nphSet, expNumber ,OBTstart, OBTend ,dateObs ,dateEnd ,filterString)
  in which case exposure = obtEnd - obtStart
  Also get filter information from summary file and check validity.


  Read in OM ODF Priority Window Data Auxiliary file.
  Determine file type from file name in primary header.
  Get a handle on the window data binary table extension.
  Get binAx1 from SWP1 and binAx2 from SWP2.
  sciWin numbering system still not settled. May add sampling time and bfast ID to event list.
  Release handles on data.

  IF Incompatible file call fatal("badFileType", "Value for keyword FILENAME is incompatible")

  Open the ODF. call OAL_openODF(trim(odfDir))
  Get the proposal info. from observation summary file.  call OAL_proposalInfo(propInfo)

  Write out OM image / event list / tracking history intermediate output filename.
  Write keywords to outFile.
  Gets attitude information via oal
%  Write CONTENT keyword to outFile.
%  Write RA_SCX, DEC_SCX and PA keywords.
  Write further keywords to outfile.
  Write data to outFile.

  IF OM Imaging Mode Data Image file
    Convert Image from int32 data in odf to real32 data for output.
  ENDIF

  IF NOT OM Tracking History Data Auxiliary file
  Add a MODES extension, detailing the science window parameters.

  Release handles on data.

end subroutine  omprep
```

9 Comments

- This task is necessary to ensure that globally used keywords (such as BINBPE) appear in the FITS image at an early stage, reducing the strict task ordering that would be required if such keywords were written by a specific task. It is also a logical step to have these keywords written at one point in the pipeline.

10 Future developments

References