omgprep

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Abstract

The task **omgprep** prepares the OM grism image for detection and extraction of spectra (introduces distortion corrections, properly rotates the image, etc.)

1 Instruments/Modes

Instrument	Mode
OM	IMAGING

2 Use

pipeline processing	yes
interactive analysis	yes

3 Description

This tasks clones the OM Imaging Mode Data Image File with the Grism-1 or Grism-2 filter for subsequent pipeline processing. The image file is prepared for extraction of spectra produced by grisms: first the distortion correction is applied, then the image is rotated by the angle corresponding to the grism filter in order to align spectra with respect to the pixel columns (for optimisation of spectra extraction)

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.

The task first reads the binning factors (BINAX1 and BINAX2) from the FITS header, along with the BPE binning flag (BINBPE) and the x and y size of the OSW window (in centroided pixels) along with the x and y offsets of the window. The pixel coordinates of the OSW source list are then converted to the PIXCOORD reference frame (2048 by 2048 centroided pixels).

The OM optics have a small amount of distortion, and the CAL call omDistortion is used to get the offsets of the pixel position from a linear scale. These offsets are then applied to the pixel positions. A

call to GetPlateScale (CAL) is subsequently used to convert from pixels to radians. The center of the detector, i.e. the position of the OM boresight is pixel 1023.5, 1023.5.

The shift and add process is all performed relative to a reference frame (used to find the tracking stars), so a call to OAL_getAttitude is used, with the time of the reference exposure, to get the spacecraft attitude. The CAL Boresight routine is used to obtain the boresight offset matrix, which is applied to the s/c attitude to get the OM boresight direction. The final section of the code takes the OM OSW image and rotates it in order to align the spectra with respect to the pixel columns.

4 Parameters

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

Parameter	Mand	Type	Default	Constraints
set	yes	string	none	

Input OM image filename (output from **ommodmap**)

ppsoswset	yes	string	none	

PPS OM OSW FITS output image filename

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.

diffBin *(fatal)*
Different binning in x and y directions

RA of OM boresight *(warning)*

corrective action: Information about the Right Ascention of the OM boresight

DECL of OM boresight *(warning)*

corrective action: Information about the Declination of the OM boresight

DETSEC keyword missing *(warning)*

corrective action: Issue a warning about the missing keyword in the input file. DETSEC keyword for output file is not inserted

6 Input Files

1. OM OSW FITS image (as produced by **ommodmap**)

7 Output Files

1. PPS OM OSW FITS image with spectra aligned with the pixel columns.

8 Algorithm

```
subroutine omgprep

   open output file
   read the OSW window parameters, binning factors from header

   call CAL_GetBoresightMat
   call OAL_GetAttitude (with time of reference frame)

   find OM boresight direction
   undistort image

   rotate by the angle corresponding to the grism filter
   write out to a fits file.

   close OSWSL
   close output file

end subroutine  omgprep
```

9 Comments

- none

10 Future developments

Currently the standard CAL procedure for distortion correction is implemented. On the availability of new calibration data related to the additional distortion introduced by the grism filters the distortion correction will be improved.

References