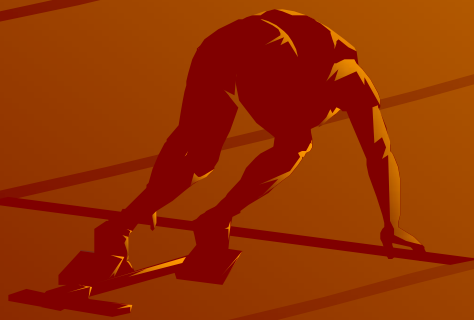




# OSA in parallel threads





# Step 1: Command Line

- ✦ To run OSA in parallel threads you need to use command line mode
- ✦ To start analysis in command line mode you have to set environment variable COMMONSCRIPT to 1. Do this with following line:

```
setenv COMMONSCRIPT 1
```

# Command Line: OSA brief info

- ✦ Instead of using GUI you have alternative of using command line.

- ✦ Do

```
/virgo/scripts/login
```

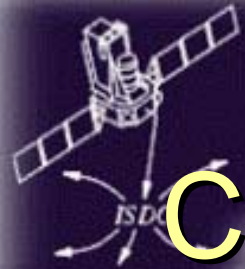
- ✦ And run

```
ibis_science_analysis \
```

(don't forget '\' character)

# Command Line: OSA brief info

- ◆ `IBIS_II_ChanNum=3 \`
  - *number of energy ranges*
- ◆ `IBIS_II_E_band_min="20 60 120" \`
  - *energy bands minimum limits*
- ◆ `IBIS_II_E_band_max="60 120 200" \`
  - *energy bands maximum limits*
- ◆ `ogDOL="./og_ibis.fits[1]" \`
  - *show OSA where the pointer to observation group is*
- ◆ `SWITCH_disablePICSIT=yes \`
  - *you must turn off PICSIT*
- ◆ `CAT_refCat="$ISDC_REF_CAT[ISGRI_FLAG==1]" \`
  - *point OSA to catalogue and select only sources detected by ISGRI*
- ◆ `IBIS_NoisyDetMethod=0 \`
  - *only normal noisy pixels detection*
- ◆ `startLevel="COR" \`
  - *start your analysis from the energy correction level...*



# Command Line: OSA brief info

- ◆ `endLevel="IMA" \`
  - ...until the image reconstruction level
- ◆ `OBS1_SearchMode=3 \`
  - software will search for all catalogue sources plus
- ◆ `OBS1_ToSearch=30 \`
  - 30 brightest sources in the field of view
- ◆ `OBS1_MinCatSouSnr=5 \`
  - with detection significance higher than 5 for catalogue sources
- ◆ `OBS1_MinNewSouSnr=7 \`
  - and 7 for new sources
- ◆ `OBS1_SouFit=1 \`
  - position of all the catalogue sources will be fixed
- ◆ `OBS1_DoPart2=0 \`
  - mosaic will not be made
- ◆ `OBS1_ExtenType=3 \`
  - one true exposure map is created for the last energy band and saved in the last extension of `isgri_sky_ima.fits`



## Step 2: Learn to run scw per scw

- ✦ Instead of creating a single observation group for the whole set of science windows you can create separate observation group for each science window
- ✦ Save science windows list from Archive Browser
- ✦ use the `foreach` command

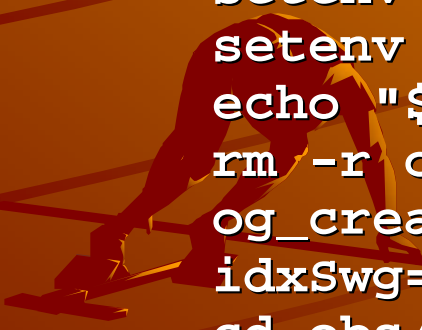
## Step 2: Learn to run scw per scw

- ◆ But just before create the folder for the log files so that later we could easily trace the errors:

```
mkdir scwlogs
```

- ◆ Run `foreach` cycle

```
foreach fn ( `your_scw_list.txt` )  
setenv REP_BASE_PROD $PWD  
setenv fs `echo "$fn" | cut -c 10-21`  
echo "$fn" > tmp  
rm -r obs/$fs  
og_create baseDir="." instrument=ibis \  
idxSwg=tmp ogid=$fs  
cd obs/$fs  
setenv COMMONLOGFILE +ibis_"$fs".log  
setenv COMMONSCRIPT=1
```





# Step 2: Learn to run scw per scw

```
ibis_science_analysis ogDOL="./og_ibis.fits[1]"\  
  SWITCH_disablePICsIT=yes \  
  startLevel="COR"\  
  endLevel="IMA" \  
  CAT_refCat="$ISDC_REF_CAT"\  
  IBIS_II_ChanNum=3 \  
  IBIS_II_E_band_min="20 60 120"\  
  IBIS_II_E_band_max="60 120 200"\  
  OBS1_SearchMode=3\  
  OBS1_ToSearch=25\  
  OBS1_DoPart2=0  
mv ibis_"$fs".log ../../scwlogs  
cd ../../  
rm tmp  
end
```







## Step 3: Mosaic image

- ◆ Now you have image in each separate scw group.
- ◆ To combine them into one mosaic you have to run `ibis_science_analysis` on one machine in one of the OGs with parameter `OBS1_DoPart2=2`
- ◆ But (!) before you have to show OSA where each scw IS and make the chosen OG to point to all other OGs!
- ◆ Choose where to run and save the chosen OG



# Step 3: Mosaic image (tricks before start osa)

- ◆ echo '\*\*\*' Making dol file ...
- ◆ rm -f dol.txt
- ◆ foreach fn (`cat \$1 | awk -FV/ '{print \$3}' | cut -b1-12`)
- ◆     echo `pwd` /obs/\${2}\${fn}/scw/\${fn}.001/swg\_ibis.fits'[1]' >>
- ◆     dol.txt
- ◆ end
  
- ◆ echo '\*\*\*' Index creation ...
- ◆ cp dol.txt \$REP\_BASE\_PROD/obs/SN1006003000160010
- ◆ cd \$REP\_BASE\_PROD/obs/SN1006003000160010
- ◆ txt2idx element="dol.txt" index="index\_comb.fits[1]"
  
- ◆ echo '\*\*\*' Sorting index ...
- ◆ fsort index\_comb.fits[1] SWID
  
- ◆ echo '\*\*\*' Substituting OG index file ...
- ◆ cp \$REP\_BASE\_PROD/modfile `pwd`
- ◆ fmodtab og\_ibis.fits+1 MEMBER\_LOCATION modfile
- ◆ fdelrow og\_ibis.fits+1 2 1 N Y
  
- ◆ echo Removing catalogue ...
- ◆ rm -f isgri\_catalog.fits



## Step 3: Mosaic image

- ◆ Run OSA with same parameters as before, but in the chosen OG dir and with `OBS1_DoPart2=2` and `startLevel="CAT_I"`:
- ◆ 

```
ibis_science_analysis  ogDOL="./og_ibis.fits[1]"\  
  SWITCH_disablePICsIT=yes \  
  startLevel="CAT_I"\  
  endLevel="IMA" \  
  CAT_refCat="$ISDC_REF_CAT"\  
  IBIS_II_ChanNum=3 \  
  IBIS_II_E_band_min="20 60 120"\  
  IBIS_II_E_band_max="60 120 200"\  
  OBS1_SearchMode=3\  
  OBS1_ToSearch=25\  
  OBS1_DoPart2=2
```



## Step 4: Spectra

- ◆ Copy back saved earlier OG dir and save OG where you have run mosaic with all its results.
- ◆ Prepare catalogue with sources to extract the spectra from (no more than 30 sources, max number with higher significance than of desired object).
- ◆ Run `foreach` command again for spectra retrieval

```
foreach fn ( `your_scw_list.txt` )
  setenv REP_BASE_PROD $PWD
  setenv fs `echo "$fn"|cut -c 10-21`
  cd obs/$fs

  setenv COMMONLOGFILE +ibis_"$fs".log
  setenv COMMONSCRIPT=1
```



# Step 4: Spectra

```
ibis_science_analysis \  
  ogDOL="./og_ibis.fits[1]" \  
  SWITCH_disablePICsIT=yes \  
  CAT_refCat="$ISDC_REF_CAT[ISGRI_FLAG==1]" \  
  SCW2_cat_for_extract="specat.fits[1]" \  
  startLevel="BIN_S" \  
  endLevel="SPE" \  
  IBIS_II_ChanNum=3 \  
  IBIS_II_E_band_min="20 60 120" \  
  IBIS_II_E_band_max="60 120 200" \  
  OBS1_SearchMode=3 \  
  OBS1_ToSearch=25 \  
  OBS1_DoPart2=2  
  
end
```



## Step 5: pick the spectra up

- Copy back the directory with the results of image mosaic step, but do not delete the outcome of spectra retrieval step.

- Change to this OG directory and run

```
spe_pick group="og_ibis.fits[1]" \  
source="OBJECT" rootname="OBJECT"
```



## Step 6: results

- ✦ Outcome of `spe_pick` task will be the following files:
  - OBJECT\_single\_arf2.fits
  - OBJECT\_single pha2.fits
  - OBJECT\_sum\_arf.fits
  - OBJECT\_sum pha.fits
- ✦ OBJECT\_sum pha.fits is the combined spectrum of your OBJECT
- ✦ Copy  
\$REP\_BASE\_PROD/ic/ibis/rsp/isgr\_rmf\_grp\_0017  
.fits to the dir where you have file with combined spectrum of your OBJECT and fit is with XSPEC.



# Parallelism

- ◆ You have a few opportunities to run OSA in parallel threads:
  - run it on one machine in scw per scw mode: you will not benefit in speed but you will protect your run from crush because of one or more corrupted ScWs
  - run it via ssh on different machines: repeat the above steps on all accessible machines; you will benefit in speed, but you might get lost in all your tasks, so take care!
  - run it using PBS, the best way to do it, but requires a separate setup procedures





**Thank you for attention**

