

SUMMIT pipeline summary

Aim:

Produce a "high" quality calibrated image from science data using as much data as possible

How:

Pipeline waits until

- observation is 90% complete, **or**
- scan pattern complete, **or**
- the time elapsed since a map was made previously exceeds a limit, **or**
- observation completes

Notes

- In practice a new map is usually made every 2 to 10 minutes, depending on observation type (DAISY maps made more often)
- New data will arrive as a map is being made and the pipeline will process **all** of the new data once the map is made (no data are omitted)
- Uses the default `dimconfig.lis` config file
 - calibrators use `dimconfig_bright_compact.lis`
 - pointing/focus use specialized configs optimized for the SUMMIT pipeline
- Creates a co-added image as the observation progresses (if applicable) **and** coadds images across observations to improve signal-to-noise
- Applies most recent flatfield to new raw data if not making a map this time round (saves some time when map-making)
- Displays most recent map and coadd using `Gaia` (updated when new map is made)
- Pointing and focus maps and all focal-plane mosaics are displayed using `Kapview` (`KAPPA display`)
- Calculates pointing and focus offsets (but these are not used by the TSS)
- Maps calibrated in mJy/beam using default FCFs
- FCFs are calculated from observations of calibrators for comparison
- Tonight page shows most recent map and updated coadd

Where:

- 450 um: `sc2dr1`
 - `/jcmtdata/reduced/dr1/scuba2_450/YYYYMMDD`
- 850 um: `sc2dr3`
 - `/jcmtdata/reduced/dr3/scuba2_850/YYYYMMDD`

Output files:

Maps

- sYYYYMMDD_NNNNN_XXX_cal.sdf
 - most recent map for current observation
- gsYYYYMMDD_NN_XXX_mos.sdf
 - coadded map for current target (may include data from multiple observations)
 - NN will be the number of the first observation in the coadd
- sYYYYMMDD_NNNNN_XXX_reduced.sdf
 - most recent map for pointing source
- gsYYYYMMDD_NN_XXX_reduced.sdf
 - coadded map for pointing source
- gsYYYYMMDD_NN_XXX_foc.sdf
 - output cube from focus observations (Az-El-SMU, viewable in Gaia)

where YYYYMMDD is the current UT date, NNNNN is the zero-padded observation number (e.g. 00036), NN is the non-zero padded observation number (e.g. 36) and XXX is the wavelength (either 850 or 450). The "g" prefix indicates a "group" product.

Logfiles

- log.noise
 - estimate of noise (mJy/beam) in current group coadd
- log.nefd
 - estimate of NEFD, effective NEFD and extrapolated zenith NEFD (in mJy/beam. \sqrt{s}) from current map
- .oracdr_PID.log
 - Pipeline log file (PID is the ORAC-DR process ID)
- log.fcf
 - Flux conversion factors derived from calibrators
- log.beam
 - Beam size derived from fits to calibrators
- log.pointing
 - Pipeline estimate of pointing offsets (arcsec)
- log.focus
 - Pipeline estimate of best-fit SMU position
- log.bolonoise
 - Bolometer noise (in pA/ $\sqrt{\text{Hz}}$) and effective NEP (in W/ $\sqrt{\text{Hz}}$)
- log.flatfield
 - Responsivity statistics from flatfield solutions (A/W)

Other data files

- sYYYYMMDD_NNNNN_SSSS_XXX_respMos.sdf
 - responsivity focal-plane mosaic (flatfield)
- sYYYYMMDD_NNNNN_SSSS_XXX_noimos.sdf
 - time-domain noise (2-10 Hz) focal-plane mosaic
- snxYYYYMMDD_NNNNN_SSSS_flat.sdf
 - flatfield solution (1 per subarray)
- snxYYYYMMDD_NNNNN_SSSS_rawflat.sdf
 - raw flatfield for use in map-making

where (as before)

- YYYYMMDD = current UT date
- NNNNN = zero-padded observation number
- SSSS = zero-padded subscan number
- XXX = wavelength
- snx = subarray identifier (e.g. s8a)

Monitoring the pipeline

- Important/useful results in **green** (some in **yellow**)
 - number of bolometers from flatfield
 - pointing/focus estimates
 - NEFD
- Warnings in **cyan**
- Errors in **red**
- Watch for:
 - large changes in the number of bolometers
 - blank pixels at the source centre (pointing/focus)
 - FCFs wildly different from defaults and/or discrepant effective beam areas
 - number of bolometers in map
 - map appearance - streaks, obvious patterns