



VST-Tube for Transients

User's Manual

A. Grado, F. Getman

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The VST-Tube pipeline has been adapted to process in a fully automatic way VST images. This is particularly useful for those programs where data need to be processed as quick as possible. The images will be stacked to create an astrometric calibrated mosaic for each pointing. In case of multi epochs observations the mosaics for each pointing will be registered in pixels, in this way it is easier to search for variable objects using images subtraction techniques. This requires that you can eventually add or remove whole pointings among epochs but you cannot modify their coordinates. Note that the final images will not be absolute photometric calibrated.

OB requirements

In order to process automatically the VST images a certain number of requirements need to be satisfied. First of all aniello.grado@inaf.it must be delegate for the Phase II data access in the ESO archive to allow the images download.

When you activate your program please drop an e-mail to aniello.grado@inaf.it with some detail on the observations you want to do: number of exposures for each pointing, exptime, filters, number of epochs.

There is a name coding that needs to be adopted. The Target name in the OB must have the form: triggername_ppointingnumber_eeepochnumber.

For example, you may have a name like: S191204r_p2_e3 for the pointing 2 of the epoch 3 of the event S191204r.

Pipeline products

The mosaics produced will have a name of the type: gw_RA_DEC_filter_date-and-time-start-of-processing_p0 like [gw_781_350-r_sdss_05-Dec-2019-20h55m45s_p0](#) where RA and DEC are the coordinate of the pointing center. As soon as the images are processed, they are automatically transferred to the GRAVITOWN server. A new directory with the trigger name will be created in /data01/VSTin where the images will be grouped in directories, one for each epoch (for example /data01/VSTin/S191204r/20191205).

For each mosaic the following files will be produced:

- .cat (sextractor catalog)
- .fits (.mosaic)
- .flag.fits (a mask where each pixel tells how many original pixels have been used, consider that haloes and spikes of saturated masks are included)
- .head (the fits header)
- .README (a readme file where statistical information about input images are reported)
- .reg (a DS9 region file of the saturated stars)
- .weight (mosaic inverse invariance weight map)

Timing

The pipeline checks continuously the ESO archive for new data of a defined PROG-ID. If a new VST observation is done the data are downloaded and a new processing is started as soon as observations (ditherings) of one pointing is completed. To download the data from ESO takes ~ 1 min per mosaic, however as the data on the ESO archive may not be immediately available and after long discussions with the ESO archive people we came to the conclusion that we query the archive every 5 min. This is also because if there is a file that has not yet been fully loaded in the archive and we try to download it, this produces an error and someone at ESO has to check what happened, so they asked to increase the time between two attempts to request the archive which initially was set to 2 min.

Then there is the reduction which takes ~ 15-20 min. In figure 1 is reported an example of the VST-Tube log. As shown, it takes 7 min to create the mosaic and this includes in addition to the swarp time, the time to write all the info in the mosaic, weight and flag headers. Then there are another 5 minutes for the quality control which includes the extraction of the catalog and the creation of masks for the saturated stars.

Pre_reduction ID	19-Jan-2020-18h50m35s
Calibration ID	19-Jan-2020-18h50m35s
Mosaic ID	19-Jan-2020-18h50m35s
Config file	/home/vstuser/vstgw/pipeline_gw.config
Instrument file	/home/vstuser/vstgw/instrument.config
Process Standard	NO
Pre_reduce Science	YES
Process Science	YES
Process Mosaic	YES
Pipeline Start	19-Jan-2020-18:50:35
Time Pre-reduction	00:01:16
Time Weight and Flag on science files 2020-01-18	00:01:17
Time SExtractor on science files 2020-01-18	00:00:25
Time Write Key on science files 2020-01-18	00:00:01
Time Scamp on science files	00:00:30
Time Mosaic	00:07:12
Time Quality Control on Mosaic	00:05:39
Time Pipeline	00:17:53
Pipeline End	19-Jan-2020-19:08:28
Files Calibration dir	0 / 0 MB
Files Pre-reduced dir	384 / 6764 MB
Files Standard dir	0 / 0 MB
Files Science dir	585 / 9367 MB

Figure 1. Output log of the VSt-Tube pipeline