

Input files

All the input files of VIE_SCHED are located in the *VieVS/CATALOGS/* directory, which consist of catalog system files (`{.cat}` files) and local control files (`.txt` files). The directory (path for the input files) and file names are fixed in VIE_SCHED and should not be changed.

Catalog system files

VIE_SCHED reads catalog system files for the selection of sources, stations, and observing modes when creating a schedule for a VLBI experiment. The catalog system files are ASCII files controlled and maintained at the Goddard Space Flight Center (GSFC) and are available via an anonymous ftp (<ftp://gemini.gsfc.nasa.gov/pub/sked/catalogs/>). The catalog files on the server contain more or less old information on sources, antennas, and equipments. These files should be updated by copying the latest versions via ftp to your local *VieVS/CATALOGS/* directory whenever a change is announced. The information on the catalog files and the fields therein are described in the documentation which can be found at: <ftp://gemini.gsfc.nasa.gov/pub/sked/docs/>. Table below lists all the catalog files and their contents. The VIE_SCHED program can be either run for simulation research or real VLBI experiment. The last column in the Table lists the designated use of each catalog file.

Type	File Name	Contents	Used for
Sources:			
	source.cat	source positions	simu + real
	flux.cat	source fluxes	simu + real
Stations:			
	antenna.cat	antenna information	simu + real
	position.cat	station x,y,z locations	simu + real
	equip.cat	equipment IDs	simu + real
	mask.cat	horizon and coordinate masks	simu + real
Observing modes:			
	modes.cat	observing modes	simu + real
	freq.cat	frequency sequences	real
	rx.cat	receiver setups	real
	loif.cat	station LO and IF setups	real
	rec.cat	recording modes	real
	hdpos.cat	head offsets	real
	tracks.cat	standard recorded tracks	real

For simulation studies, the catalog files might need to be extended by virtual stations at different locations and of different quality (station specifications). The task of editing the catalog file should be given great care, since the catalog file are connected and there are cross references to other catalogs within some of the catalog files. Matching is done by name or by code which is required to be unique within a file. Therefore the order of the entries is not relevant. To change some catalog entries for real VLBI experiments, we refer to the catalogs manual for detailed format descriptions.

The next section outlines how to change information on sources, stations, and observing modes for simulation research.

How to change information on sources

The IAU names (and other common names) in the *source.cat* file are used to find matching entries in the *flux.cat* file. To change the list of available sources, one has to edit the *source.cat* file. Source names refer to the given IAU names (and other common names) and positions are defined in right ascension and declination. Then edit the *flux.cat* file to enter the source fluxes and models with matching names. If you make a change in the *source.cat* file or the *flux.cat* file, you must delete the current *source.mat* file (located in *VieVS/DATA/LEVEL5/*) before running VIE_SCHED, or simply check *Create and use new source file* at the VieVS GUI at *Scheduling/Minor parameters*. Then the new information on sources can be read and used by VIE_SCHED, otherwise the old information on sources saved in the *source.mat* file will be loaded into VIE_SCHED. If no flux value is available for a given source, the source will not be used for the schedule.

How to change information on stations

VIE_SCHED reads the antenna names in the *antenna.cat* file to find the corresponding entries in the *position.cat*, *equip.cat*, and *mask.cat* catalog files. Since the four catalogs are linked by the antenna name it must be unique in each catalog. You can edit the ASCII catalog files and change the parameters following the original version. If you want to comment (e.g. before or after your new/revised entry to indicate what you changed and why) use '*' at the beginning of the line. To add a new station locally, you need the steps below to make sure all of the necessary catalogs and important parameters are updated.

- **Step 1:** Edit the *antenna.cat* file to add the new antenna information including the 8-character antenna name, axis type, slewing rate, constant, and limits for axis.
- **Step 2:** Edit the *position.cat* file to enter the new position using the same antenna name..
- **Step 3:** Create a new entry in the *equip.cat* file. The SEFD information of stations will be used to calculate the scan length automatically.
- **Step 4:** Create a new entry in the *mask.cat* file if the station has a horizon mask. This step is not necessary for the scheduling procedure.

If there are missing values for an antenna, this antenna will be excluded from the schedule and VIE_SCHED will issue a warning message and proceed. Hence care has to be taken to ensure that the antenna parameters are complete.

How to change information on observing modes

All the possible observing modes for scheduling are listed in the *modes.cat* file. Be careful that the number of channels, sample rate, and 1 or 2 bit quantification are specified for this observing mode, which will be used for the calculation of the scan length. The completeness of the information on observing modes is checked at the beginning of the scheduling. VIE_SCHED will not continue if the observing mode is not complete.

Local control files

Besides the catalog system files, several local control files are read and used by VIE_SCHED. Out of the four files described below, only the *param.txt* file is a required input for VIE_SCHED, while the other are optional and are only included if they are needed.

param.txt file

VIE_SCHED automatically chooses scans using a rule-based approach. The major selecting options such as the network, session time, scheduling strategy (source-based strategy or station-based strategy) can be specified in GUI of VIE_SCHED. The various minor scheduling parameters are listed and set by the user in the *param.txt* file. For example, generally speaking, you do not want to observe the same source twice in a short interval. This leads to a rule saying “*don't observe a source if it has been observed in the last X minutes*”, where X can be set by the user in the *param.txt* file. The Table below presents an overview of each of the minor scheduling options and a brief description.

Option	Description
PARA.RATE1A	default Acceleration of the AZ/HA axis [deg/s ²] (⚠ can be overwritten in <i>acceleration.cat</i>)
PARA.RATE2A	default Acceleration of the EL/DC axis [deg/s ²] (⚠ can be overwritten in <i>acceleration.cat</i>)
PARA.MARGEL1	Marge for the AZ/HA axis [deg]
PARA.MARGEL2	Marge for the EL/DC axis [deg]
PARA.MIN_SRCRP	The interval which specifies that the same source will not be observed twice [min]
PARA.SOURCE	Time for the antenna to settle down after slewing and before observation start time [sec]
PARA.TAPETM	Time for the tape after slewing and before observation start time [sec]
PARA.IDLE	Time allowed for idling after slewing and before observation start time [sec]
PARA.CALIBRATION	Time allowed for calibration after slewing and before observation start time [sec]
PARA.MAXSLEWTIME	Maximum time to allow an antenna to slew [sec]
PARA.MAX_WAIT	Maximum time to wait for a slow antenna [min]
PARA.CORSYNCH	Time to allow the correlator to synchronize tapes [sec]
PARA.MAX_SCAN	Maximum allowable scan time [sec]
PARA.MIN_SCAN	Minimum allowable scan time [sec]
PARA.FILLINMODE	Use fill-in mode (0/1/2/12)
PARA.FILLENDT	Maximum time for the end time of fill-in scan [min] (⚠ not used!)
PARA.SCREEN	Print processing information on screen (1/0)
PARA.MIN_STANUM	Minimum station number per subcon
PARA.MIN_STASCAN	Minimum station number per scan
PARA.MIN_STANUM_FI	Minimum station number for fillin-mode
PARA.SUBNETTING	ONLY STATION BASED! (1/2) 1: 1 scan per subcon, 2: up to 2 scans per subcon
PARA.SKYDT	The interval for calculation of sky coverage [min]

Option	Description
PARAMIN_SRC2ANG	Minimum angle between two sources observed simultaneously [deg]
PARASORTNUM	Minimum angle between two sources observed simultaneously [deg] (⚠ not used!)
PARAFORSI	check for source structure study (⚠ might work but not maintained anymore)
PARAUPSTA	increase the opportunity for scheduling (⚠ might work but not maintained anymore)
PARADOWNSTA	decrease the opportunity for scheduling (⚠ might work but not maintained anymore)
PARASRCFRINGE	source used for fringe check (⚠ might work but not maintained anymore)
PARASTARMODE	use STAR mode (only for station based optimization)
PARASTRONGANT	Name of strong antenna
PARACADENCE	STAR modus on every n'th scan
PARASCANDURA	The default scan length [sec], used in SKD file '\$PARAM' (⚠ no influence on schedule)
PARATRACKSMODE	The formatter mode, used in SKD file '\$CODES' (⚠ no influence on schedule)
PARACORRELATOR	Correlator code, used in SKD file '\$PARAM' (⚠ no influence on schedule)
PARA_OBSMODE_NAME	Name of observation mode defined in the catalog file "mode.cat"
PARASCHEDULER	Name of institution that created the schedule (⚠ no influence on schedule)
PARA_WEIGHT_NUMBER_OF_OBS	weight factor for number of baselines
PARA_WEIGHT_SKY_COVERAGE	weight factor for sky coverage
PARA_WEIGHT_SCAN_END_TIME	weight factor for scan end time

acceleration.cat file

In this file you can specify station depending accelerations. This accelerations will overwrite the global acceleration given in the *param.txt* file.

down.txt file

Frequently a station is unavailable for some part of the session. The most common, although not the only, reason is that it is participating in an intensive session. The *down.txt* file is used to indicate when some stations are unavailable for observing during a session. The scheduler specifies an interval when a station or subnet is unavailable ("down"), and VIE_SCHED will automatically ignore these stations during this interval. A station can have multiple downtimes in a schedule.

snrmin.txt file

The minimum SNR targets for all stations are specified on the GUI of VIE_SCHED. In practice, some

antennas are weaker, i.e. larger SEFD, so they will be given a lower minimum SNR target on all baselines involving this single station by band. The *snrmin.txt* file, if present, overrides the values from the GUI.

psource.txt file

As it is said above, VIE_SCHED is developed for geodetic VLBI experiments. On the other side, we are always observing new sources or particular sources with the VLBI technique. The *psource.txt* file is used to list the astrometric sources and set the observation density target. This function should work but might not be the best option to add particular sources because of its limitations.

⚠ It should work but is no longer maintained and tested. Use it with care!

source_star.cat file

List of all Sources which should be observed in STAR-mode. Basically same format as *source.cat* file.

sweight.txt file

In here, you can give sources a higher or lower weight. This means that these sources are more/less likely to be observed.

tagalong.txt

Stations listed here are included to the schedule as *tagalong* stations.

twin.txt

Stations listed here are used as twin/multiple antenna stations.

⚠ This function is currently no longer maintained and might not work properly.

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