

# Vie\_SCHED\_V23

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# Introduction

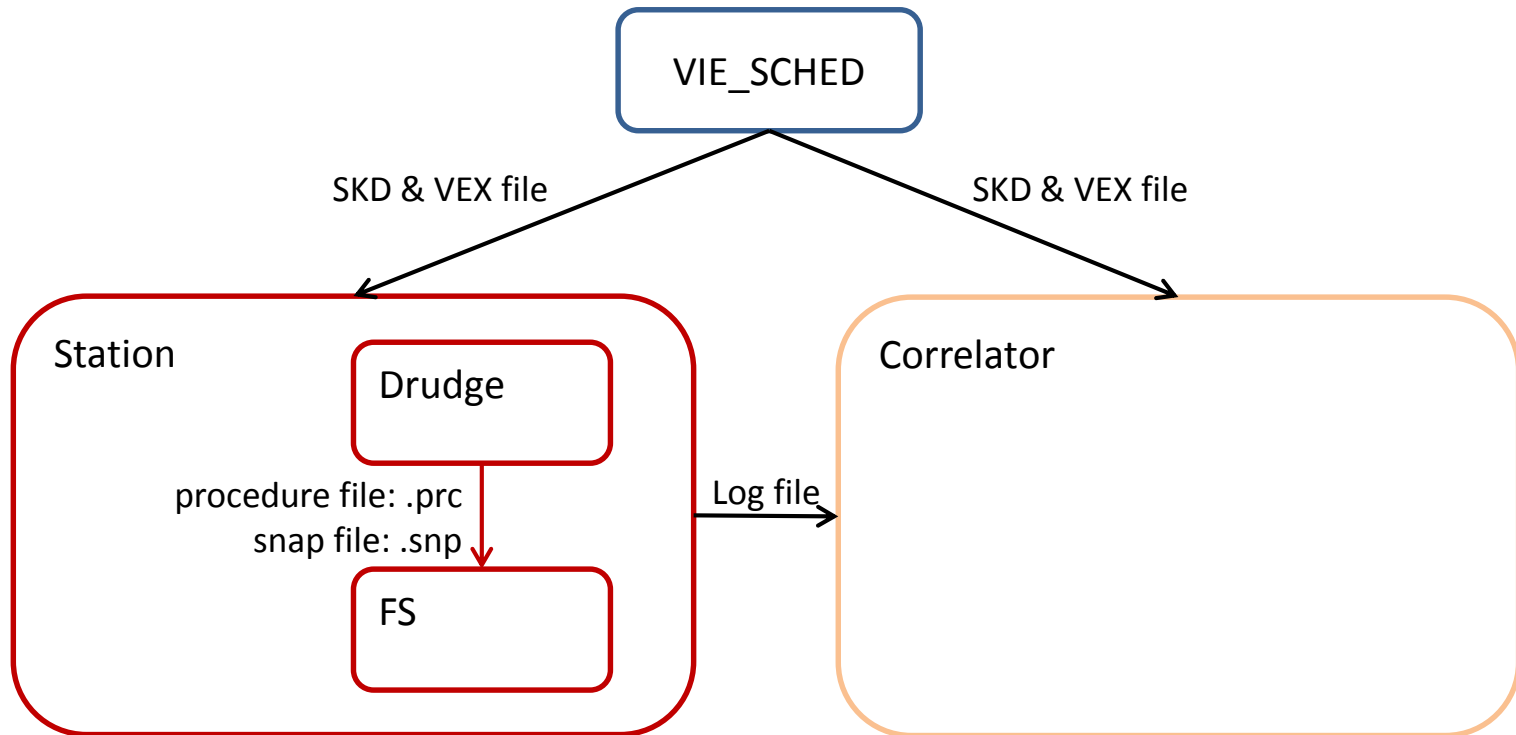
## What is a schedule?

A schedule is basically the observing plan of a session.

- What do we need?
  - Parameters which describe the dish (e.g. dish size, slew speed etc.) and recording hardware (e.g. LO-frequencies)
  - Parameters which describe the sources (e.g. flux density, position)
  - Parameters which describe the setup of the experiment (e.g. frequencies etc.)
- Where do we get it from?
  - All informations are saved in the so called CATALOG files.

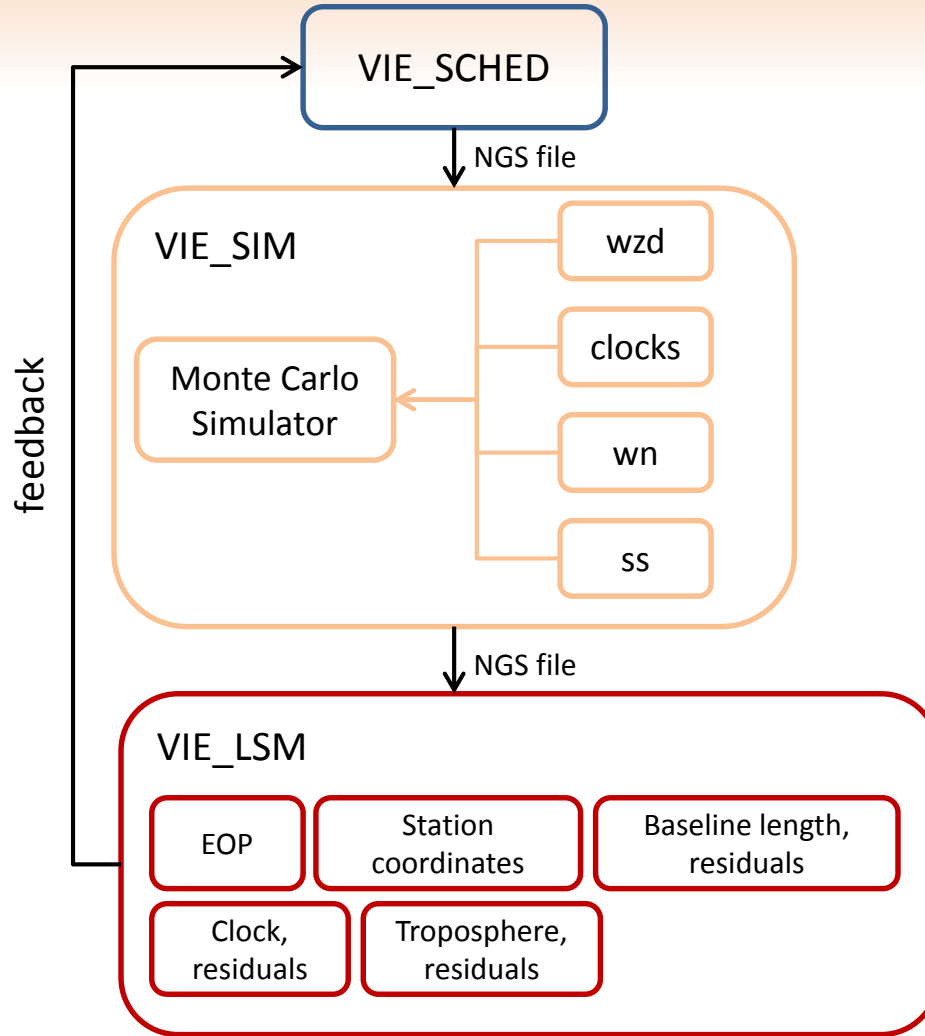
# Purpose of a scheduling program (1)

→ real VLBI experiment



# Purpose of a scheduling program (2)

→ simulation research



VIE\_SCHED

## Scans and observations

### What is a VLBI observation?

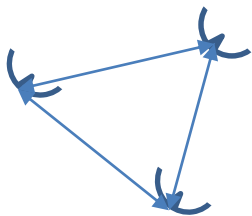
The delay measured on one baseline is called an observation.

### What is a scan?

A scan is a subnetwork of stations observing a source at once.



= 1 scan  
= 3 observations



## Algorithms and models

The length of a scan depends on several station and source specific factors:

$$\text{scanlength} = \left( \frac{1.75 \times SNR_{min}}{F_{obs}} \right)^2 \times \left( \frac{SEFD_1 \times SEFD_2}{2 \times B \times N_{ch}} \right) + \text{CORSYNCH}$$

The time in between scans depends on the slew speed of the antennas and some additive constants.

## Optimization

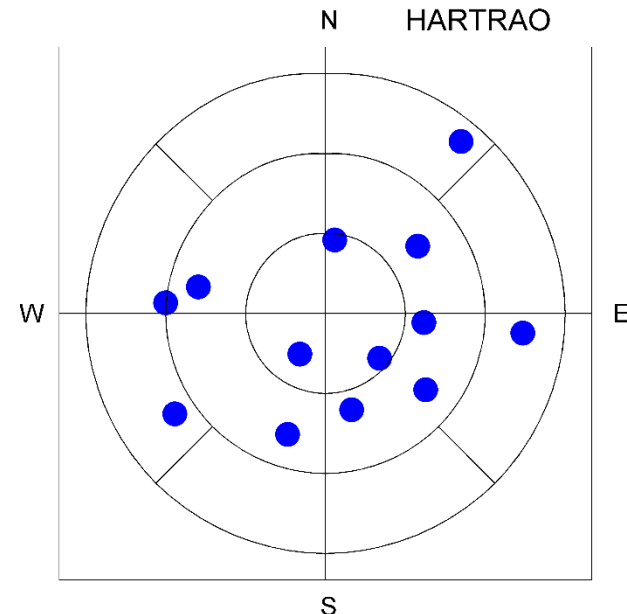
The troposphere is the limiting factor → we need many observations in different directions (uniform sky coverage) to estimate it.

VieVS incorporates two different strategies:

- Station-based scheduling
- Source-based scheduling

## Station-based scheduling strategy

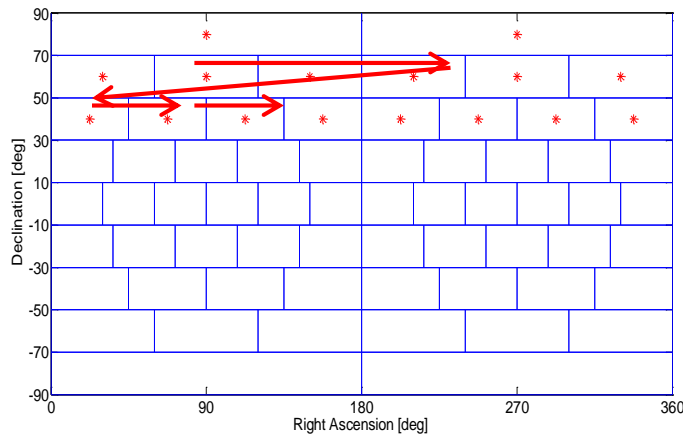
- Classical approach to achieve uniform sky coverage at each station (needed for decorrelation of zwd, clocks and station height)
- Definition of a uniform sky coverage: The sky above the antenna is divided into three different elevation segments: low, middle, and high elevation observations.
- The middle segment is divided into four azimuthal segments and the low segments into eight parts.
- Radio sources from the same segment should not be observed within a certain time interval.
- Time window of sky coverage should correspond to the sampling interval of the estimated parameters





# Source-based scheduling strategy

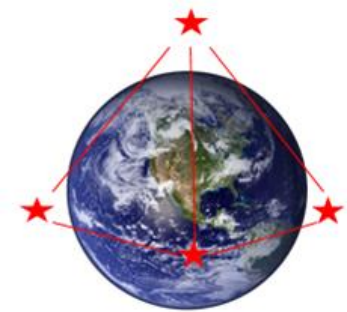
- The source based strategy comes up with the more global station distribution and fast moving antennas
- The schedule program selects radio sources from the catalogue independently of the sky distribution at individual stations
- Different subnets are formed throughout the session in order to optimize geometry and number of observations



- **one** source scheduled each time

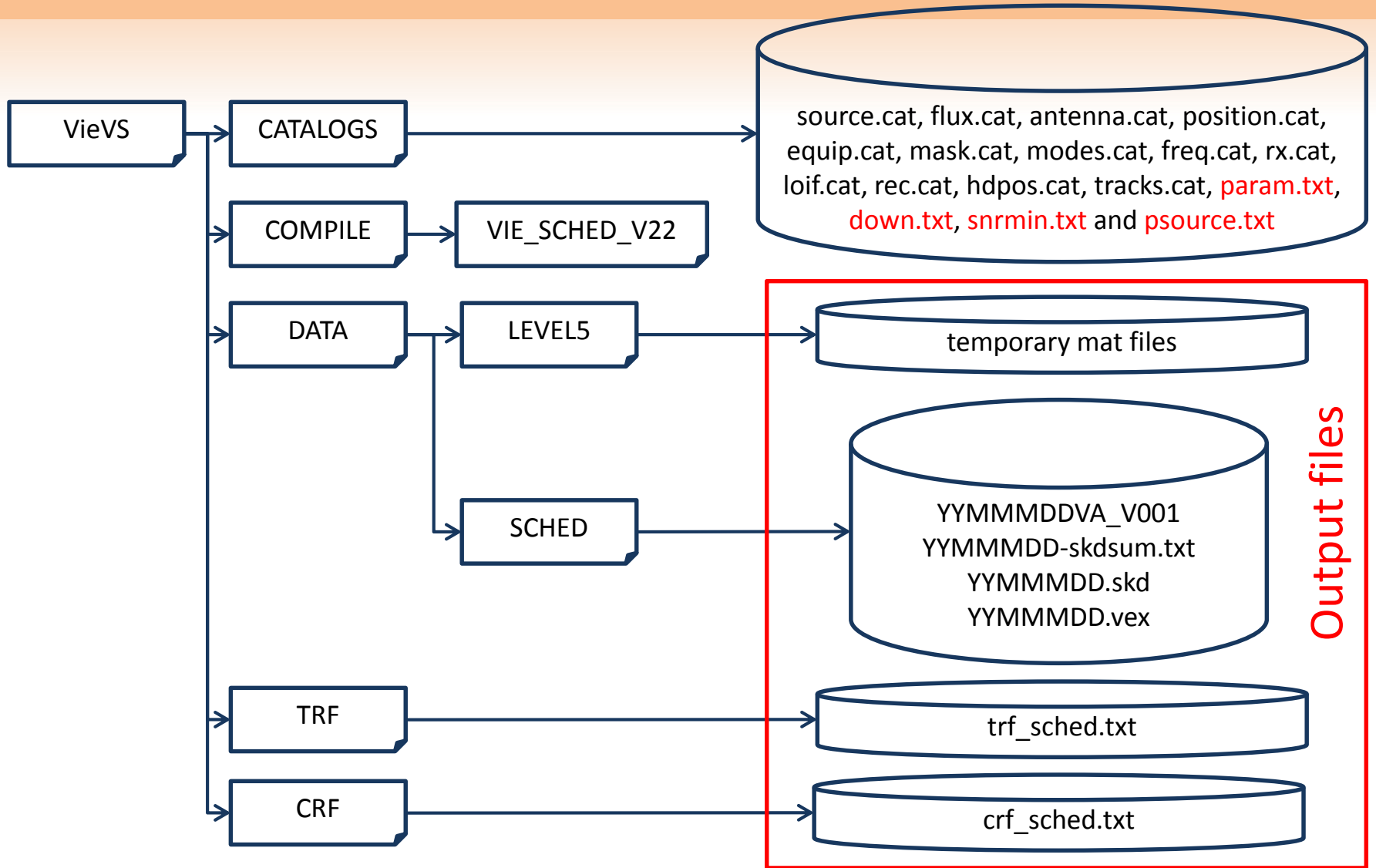


- **two** sources scheduled simult.



- **four** sources scheduled simult.

# The structure of VIE\_SCHED within VieVS



# Additional scheduling options

- Tag-along mode
- Star mode
- Sattelite scheduling → covered later
- Observe particular source
- Schedule Twin telescopes
  - Same source observations
  - Continuous observations
  - Multidirectional observations

Thank you for your attention!