

VGOS Data Processing Overview

VGOS Correlation Workshop

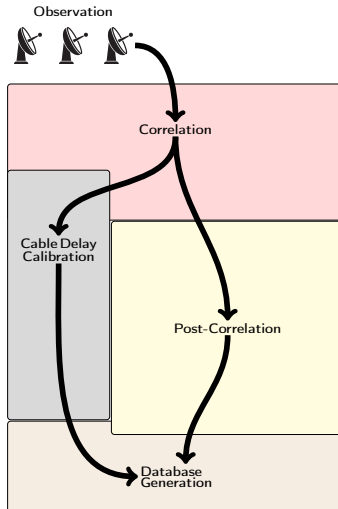
MIT Haystack Observatory

May 9, 2019

Basic Steps

- Observation
- Correlation and phase-cal. extraction
- Post-processing (Fringe-fitting and Calibration)
- Cable delay calibration (*proxy* cable-cal. if needed)
- Database Generation

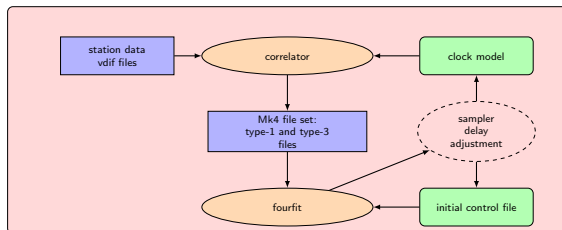
★ These steps are not quite as loosely coupled as they may seem.



Basic Elements

- Station data and logs
- Configuration (.vex)
- Configuration (.v2d)
- Setting clocks
- Running DiFX
- Running difx2mark4

Data Flow

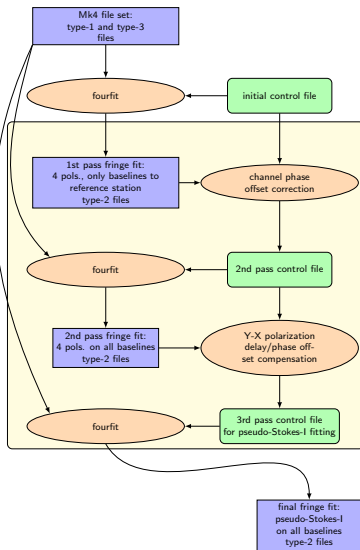


Post-correlation processing

Basic Elements

- Correct non-linear phase across bands for each station.
- Compensate for phase/delay differences between Y-X polarizations.
- Generate experiment control file for fourfit.
- Pseudo-Stokes-I fringe-fitting w/ ionosphere using fourfit.

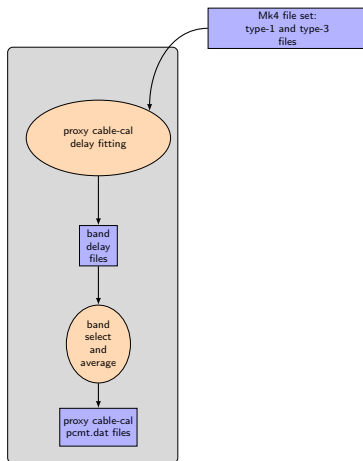
Data Flow



Basic Elements

- Stations with hardware cable-calibration
 - Extract cable-delay directly from station logs.
- Proxy-cable calibration
 - Fit phase-cal. data to estimate delays for each band-polarization.
 - Select band-pol. and average delays.

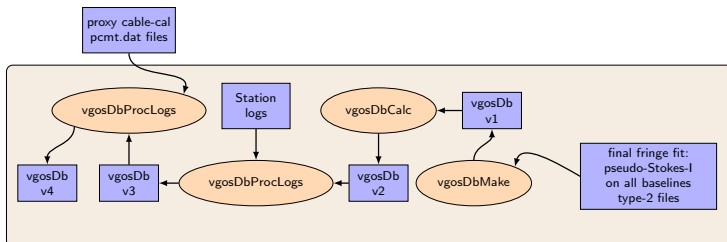
Data Flow



Basic Elements

- Extract and convert Mk4 type-2 data: vgosDbMake.
- Append delay model: vgosDbCalc.
- Import station log and (proxy) cable-calibration data: vgosDbProcLogs.

Data Flow



- Data quality needs to be monitored throughout the process.
- At the correlation stage, we are mainly concerned with:
 - Data format and configuration
 - Station clocks
- At the post-processing stage, we are mainly concerned with:
 - tuning channel phase corrections
 - phase/delay offsets between polarizations
 - station phase-cal behavior
 - consistency of station behavior in comparison to last session

Putting it all together

