TECHNISCHE UNIVERSITÄT WIEN
Vienna University of Technology

Introduction to VieVS 2.3

Hana Krásná

What is VieVS?

- VieVS = **Vie**nna **V**LBI **S**oftware
- A state of the art, geodetic VLBI data analysis software package
- Written in Matlab
- Since 2008 it is developed at the Department of Geodesy and Geoinformation (Research Group Advanced Geodesy), Technische Universität Wien
- Close cooperation with former colleagues

- Current reference:

Böhm J., S. Böhm, T. Nilsson, A. Pany, L. Plank, H. Spicakova, K. Teke, H. Schuh (2012).

The New Vienna VLBI Software VieVS. Proceedings of the 2009 IAG Symposium,

Series: International Association of Geodesy Symposia. Vol. 136. Geodesy for Planet Earth. Steve Kenyon, Maria Christina Pacino and Urs Marti (Eds.). ISBN 978-3-642-20337-4. pp. 1007-1011. DOI: 10.1007/978-3-642-20338-1_126 .

Why did we develop VieVS?

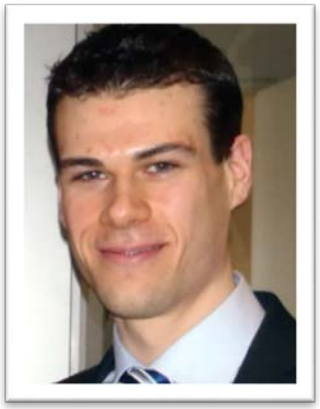
- Important that there exist several different types of VLBI analysis software
- Different software packages can validate each other. Helps identifying bugs etc.
- Analysts have a choice of what to use
- VLBI2010 / VGOS put new demands and challenges on the VLBI analysis software
- We want to have a VLBI software which is easy to use:
  - BSc, MSc, and PhD students can easily learn it and use it
  - Should be easy to add new models etc. for special investigations
  - Graphical User Interface (GUI)
  - Should have a clear structure

Who develops VieVS?

- **current members** of the VLBI group at the Technische Universität Wien:





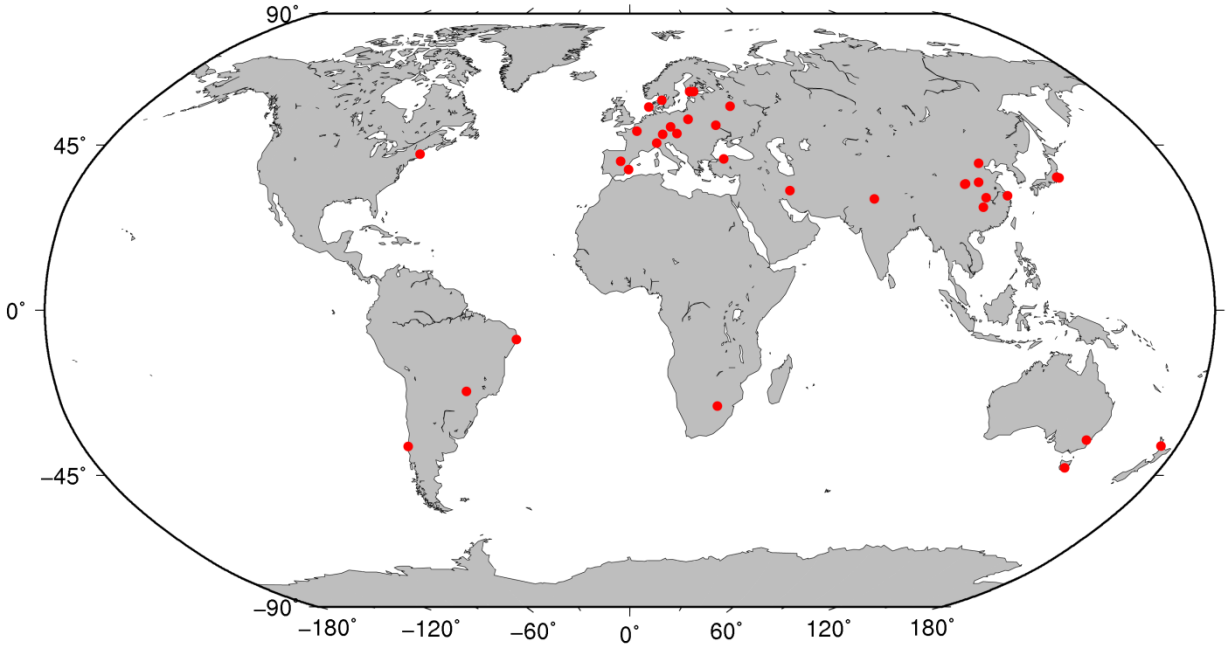





- **former members** of the VLBI group at the TU Wien
- contributions from many **external partners** from international universities worldwide

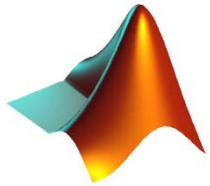
VieVS development

- Development started in 2008 **7 years ago**
- First version released in the end of 2009 (In the first version many parts were based on OCCAM. Now almost every subroutine is written from scratch)
- Current Version 2.3 was released in December 2015
- Freely available to registered users: http://vievs.geo.tuwien.ac.at
- Currently registered users from ~50 institutions worldwide



Why Matlab

- Advantages:
  - Easy to use
  - Easy to change source code
  - Good tools for plotting etc.
  - Matlab available on all major operating systems (Windows, Linux/UNIX, Mac OS)



- Disadvantages:
  - Matlab is an expensive commercial software

    (VieVS is in principle working on GNU Octave, but without GUI and it is much slower; Qt Interface (V. Choliy))
  - Slower than C++ or Fortran. Not a major problem.

System Requirements

- MATLAB 7.6 (R2008a) or later.
- About 10 GB of disk space, including all data files
  (NGS files 1979-now: ~9 GB, source code: <10 MB)
- Should work with any operating system able to run the chosen MATLAB version (tested on Windows and Linux)
- Possible to run on older MATLAB versions or the free counterpart GNU-Octave if the Graphical User Interface is not used – not tested conceptually within our group

Policy

- VieVS is freely available to registered users:
  - Easier to get feedback
  - Easy to spread information about new updates, bugs, etc.
  - Nice to know how many and who are using the software

- For information, see VieVS homepage http://vievs.geo.tuwien.ac.at

- We are open for cooperation:
  - Modules etc. can be written at other institutions

Downloading and installing VieVS

- Send a letter to Johannes Böhm (signed by the head of your institution) where you describe for which purposes you would like to have access to VieVS (scientific and non- commercial only)

- VieVS can be downloaded using ssh/sftp from the server:

  vievs.hg.tuwien.ac.at

- or from the VieVS website:

  http://vievs.geo.tuwien.ac.at/

  --> Get VieVS

- Log in as user *users* and download the **VieVS directory.**

Downloading VieVS using rsync

- On Unix/Linux systems, VieVS can easily be downloaded using the rsync command:

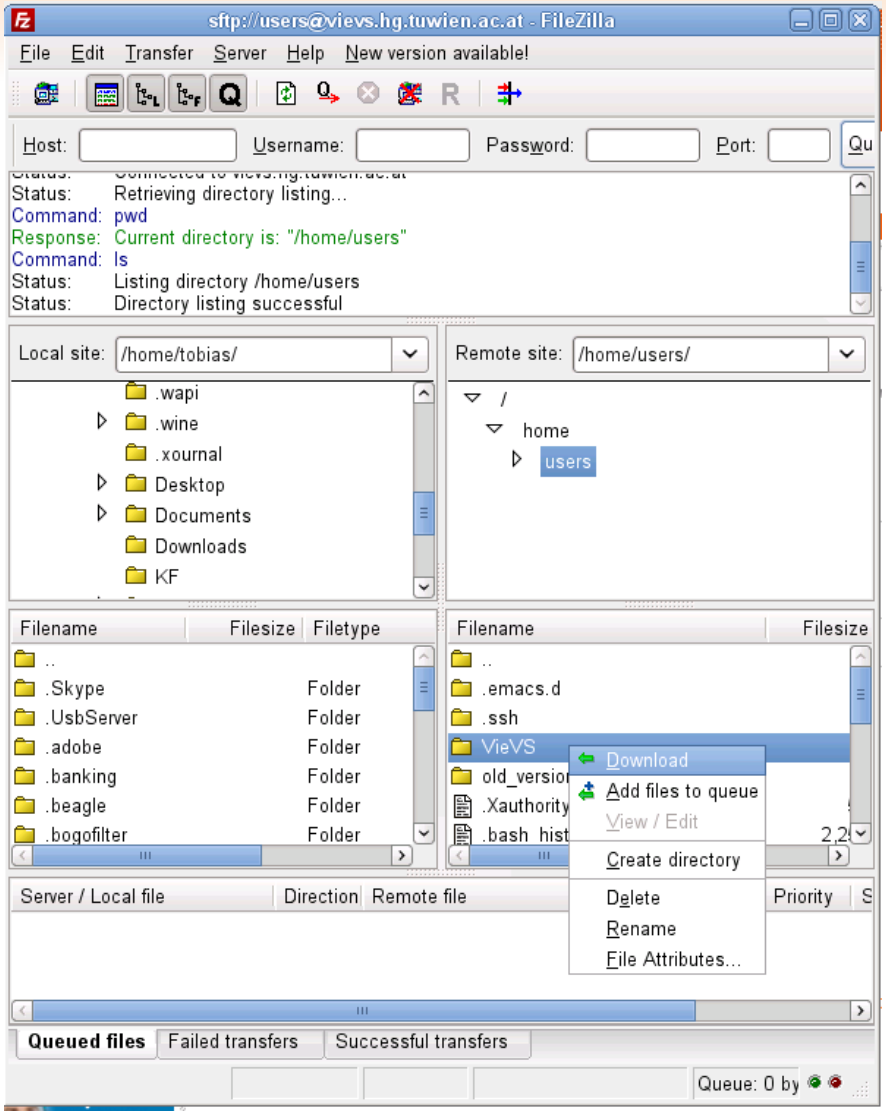
  rsync –aL users@vievs.hg.tuwien.ac.at:VieVS

- The same command can also be used to update your VieVS installation

- To skip the NGS files (e.g. slow connections):

  rsync -aL --exclude 'DATA/NGS/*‘ users@vievs.hg.tuwien.ac.at:VieVS

Downloading VieVS using an sftp/scp client



- Log in to *vievs.hg.tuwien.ac.at* with your favourite sftp client (e.g.Filezilla).
- Download the **VieVS** directory

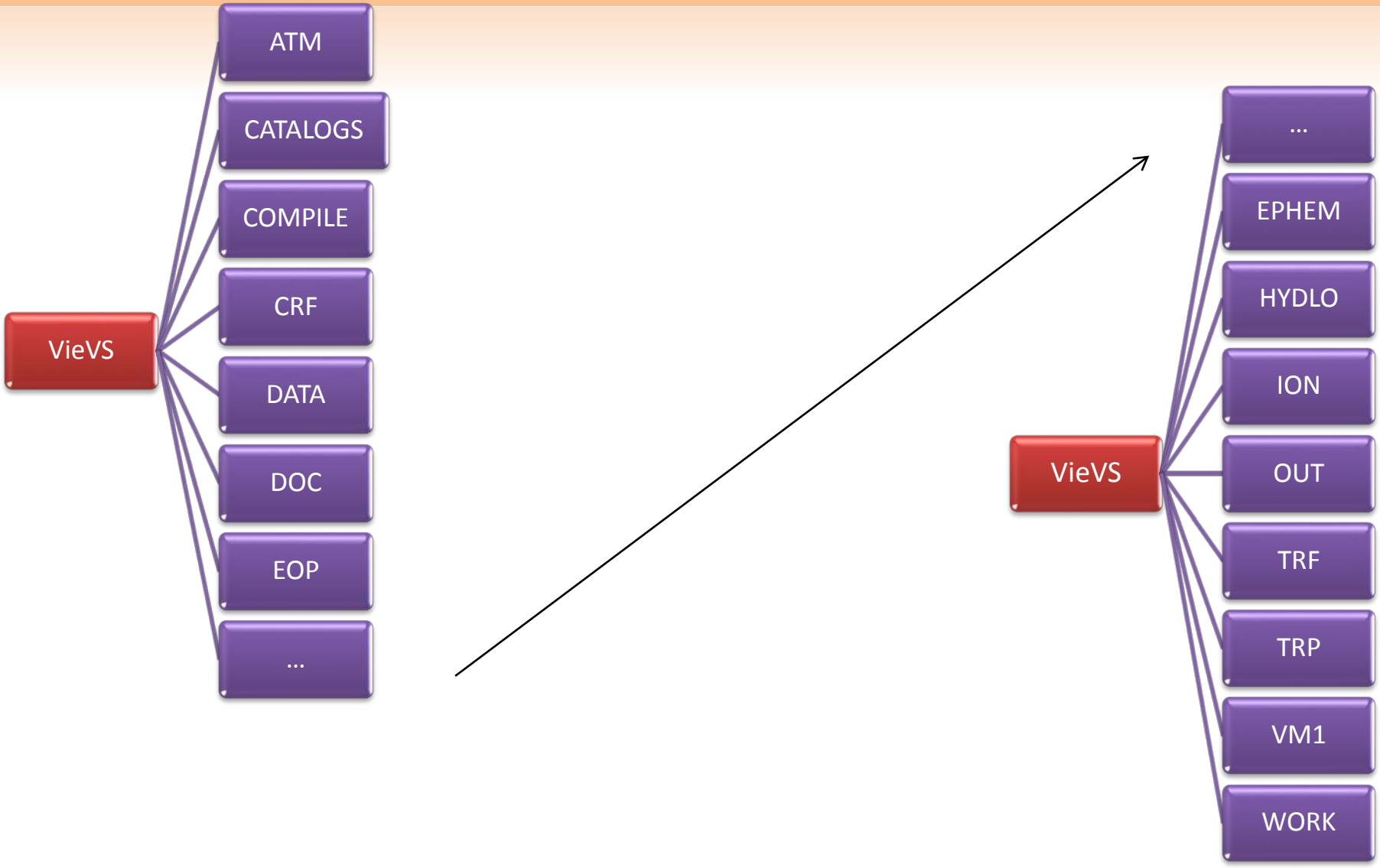
Updating VieVS

- Regularly updates (to be able to analyze the latest sessions):
  - **VieVS/DATA/NGS/**
  - **VieVS/ATM/ , VieVS/VM1/**
  - **VieVS/EOP/**
  - **(VieVS/HYDLO/** - not updated automatically on the server**)**

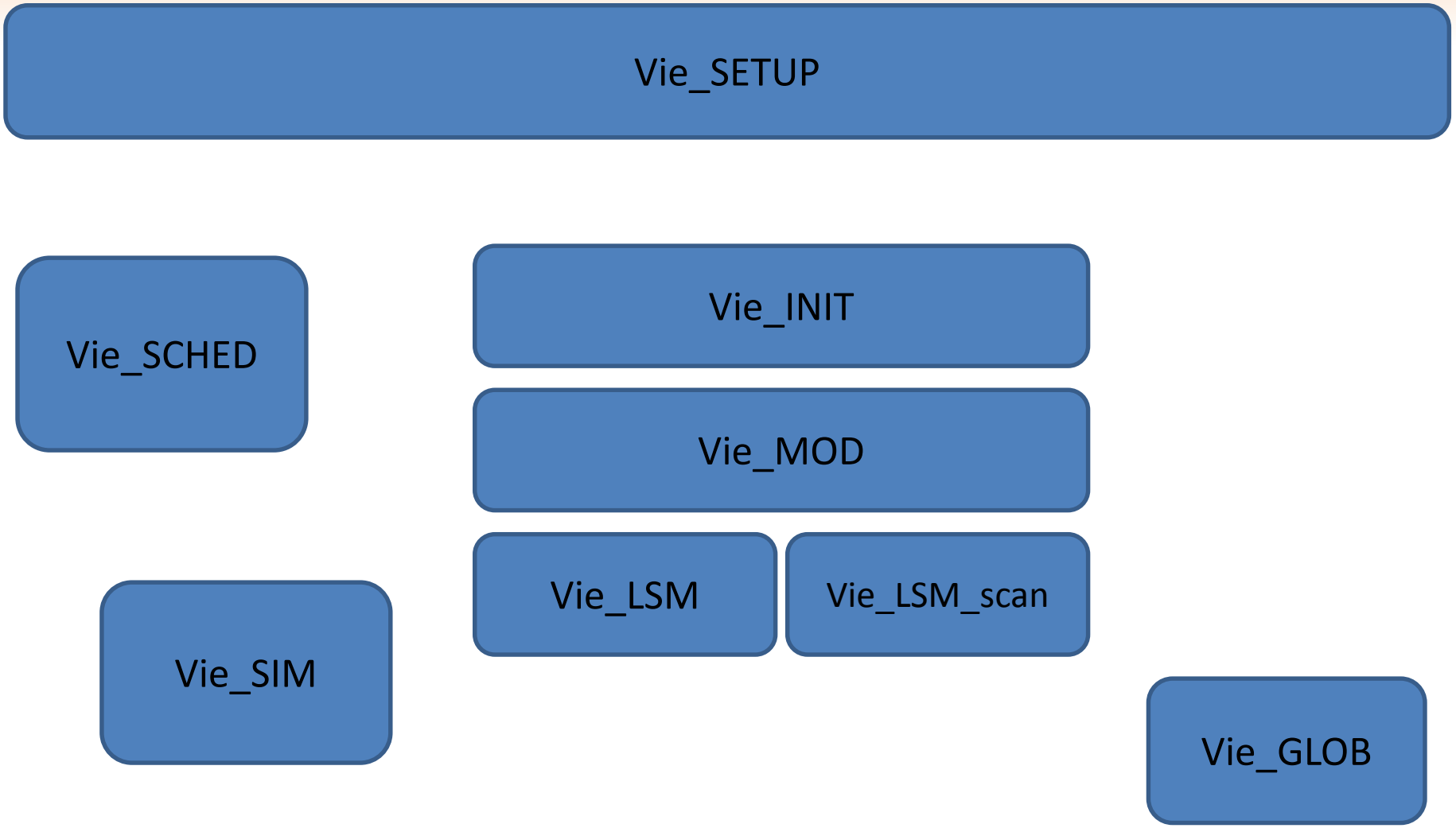
- For a session with a new station or source
  - check for updated **superstation.mat** file in **VieVS/TRF** and/or updated **supersource.mat** file in **VieVS/CRF**

- When a new VieVS version is released:
  - **VieVS/COMPILE/**
  - **VieVS/OUT/**
  - **VieVS/WORK/**
  - Possible other directories... Preferably the whole VieVS directory.

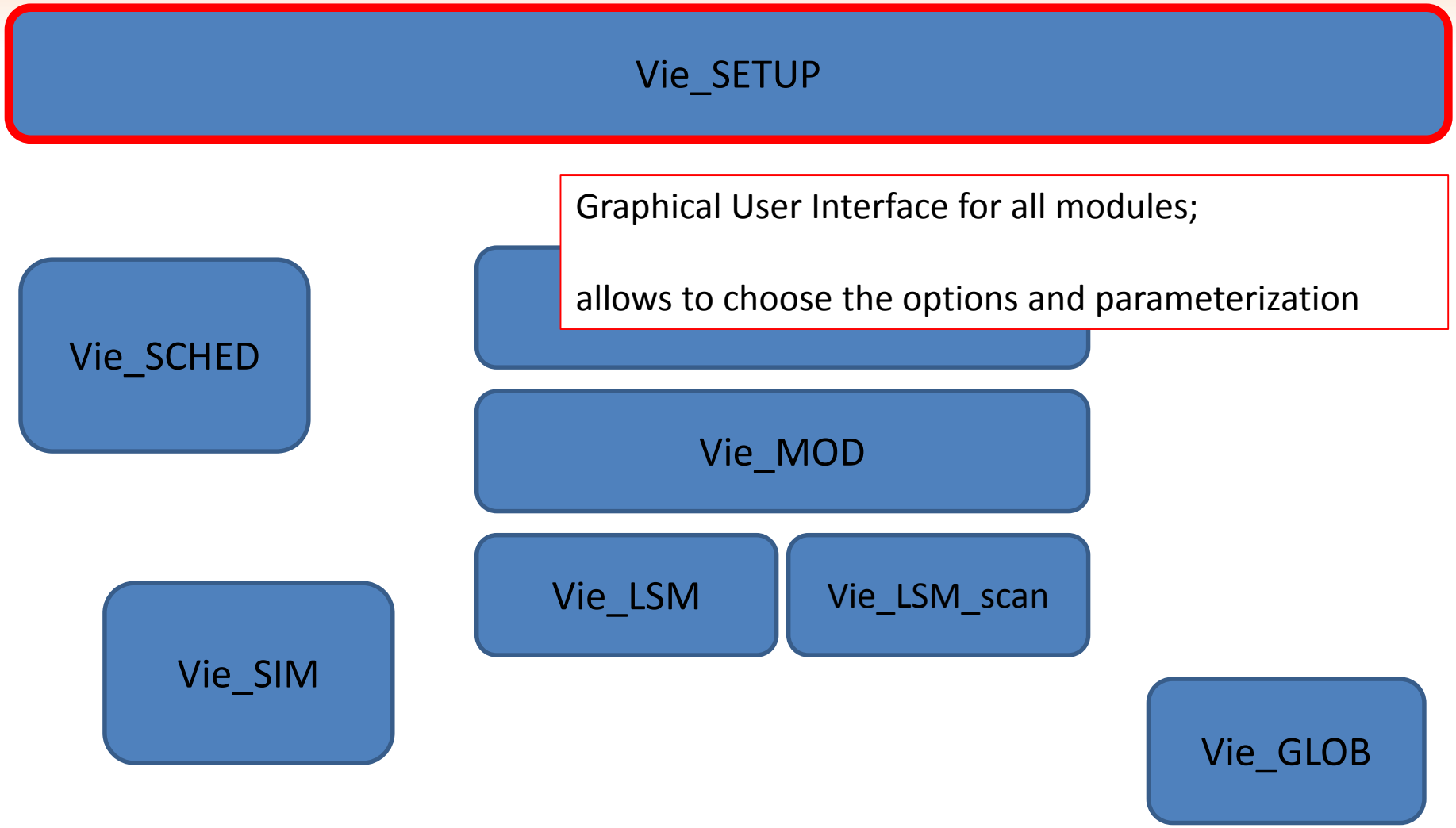
VieVS directories



Modules of VieVS

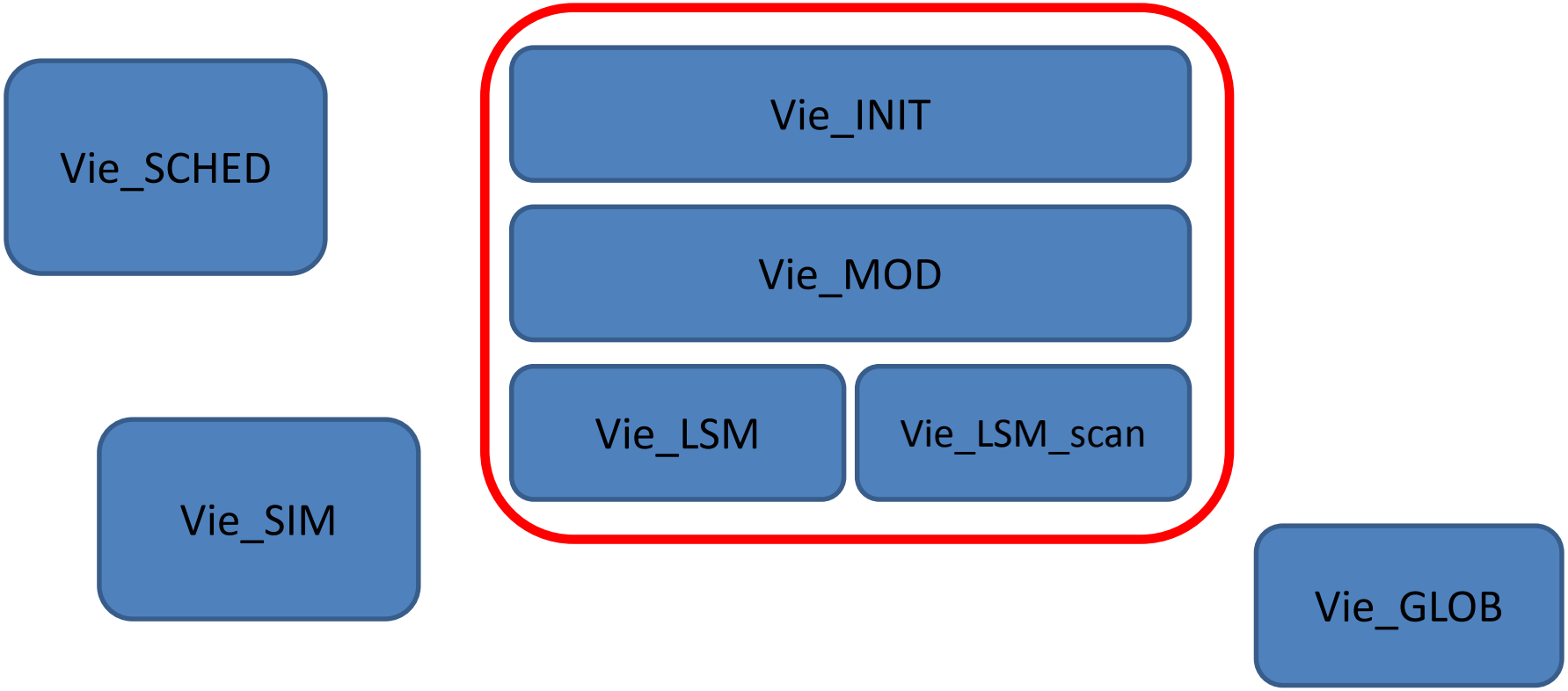


Modules of VieVS

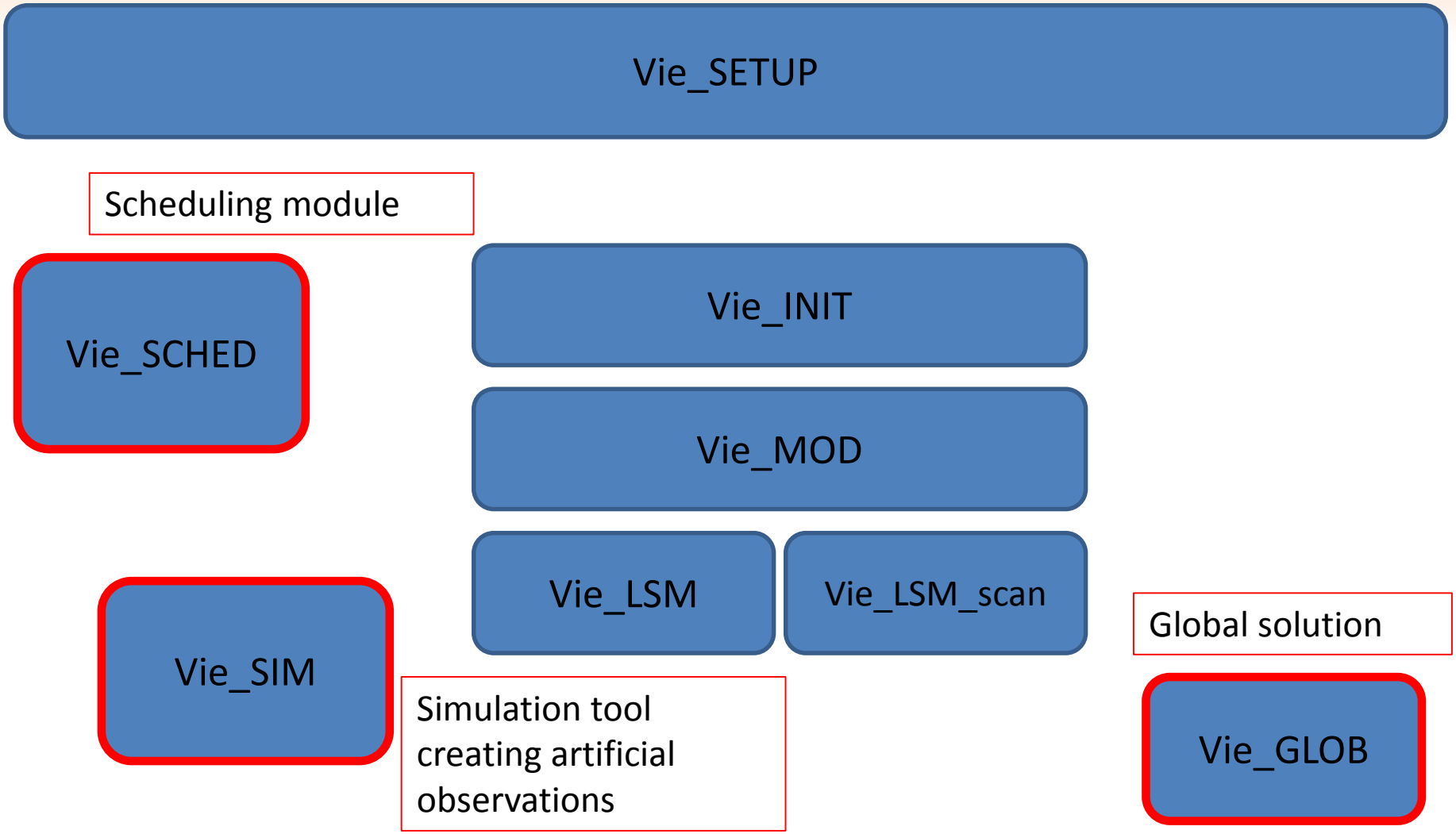


Modules of VieVS

The 3 core modules for analyzing a session
Vie_INIT- reads in data
Vie_MOD - calculates the theoretical time delay and builds up the partial derivatives
Vie_LSM – estimates the unknown parameters with Least Squares
Vie_LSM_scan – similar to Vie_LSM but uses a scan-wise update of the A matrix
(useful for large sessions)

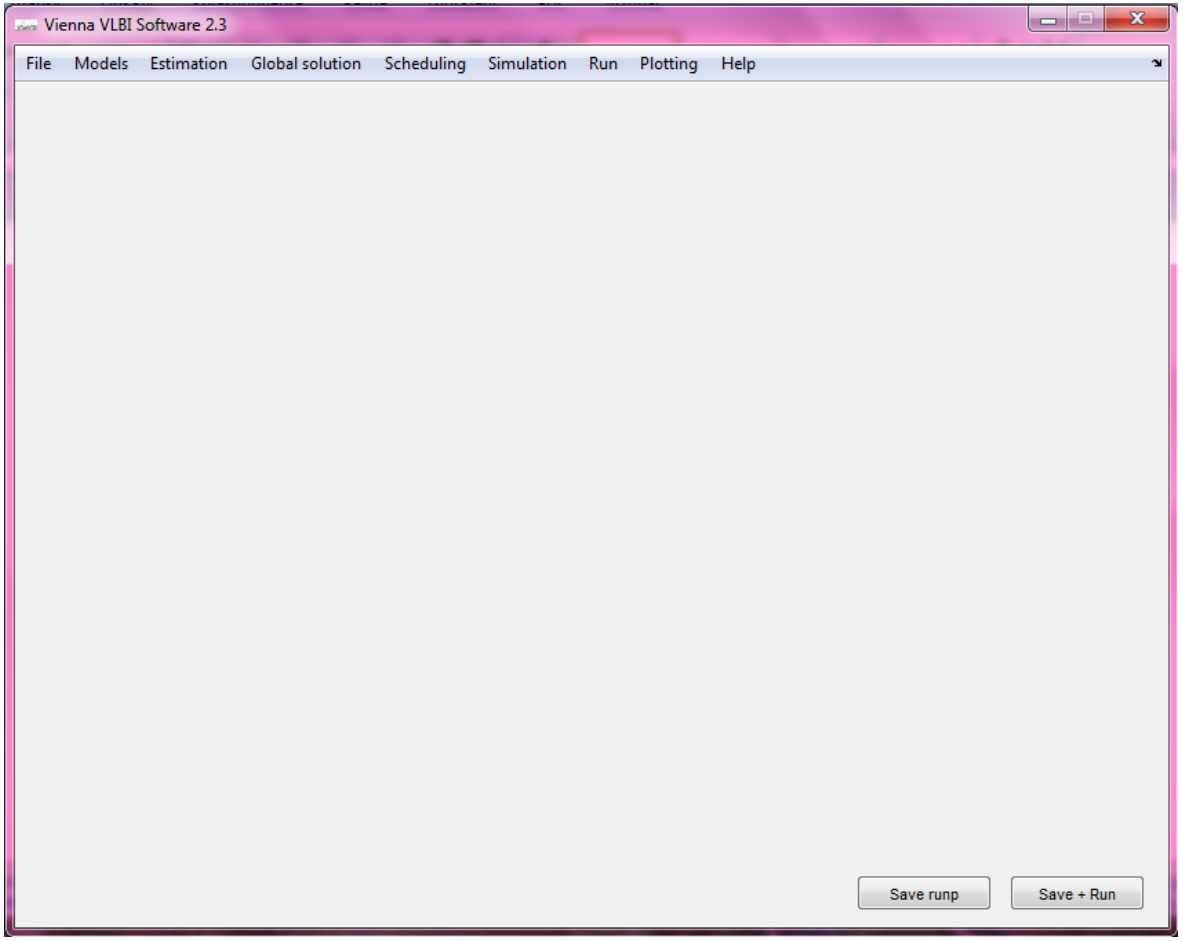


Modules of VieVS



How to start VieVS

- Start MATLAB
- Change directory to **VieVS/WORK/**
- Start VieVS with the command: *vievs*
- The VieVS GUI will now appear



Running VieVS in batch mode

- Run: ***vievs('batch')***
- The processing starts directly, GUI is not displayed
- Requires that all option files (process list, parameter files, runp) have already been created (e.g. from a previous run)

What is new in the 2.3 Version

- vgosDB-ready
  new data format (netCDF) incorporated
- ray-tracing: ray-traced delays for all VLBI observations
- correction for source structure (in coop. with UTAS)
  the simulator newly includes the effect of source structure which can also be corrected for in the analysis
- refined scheduling for satellite observations
- tidal ERP variation coefficients in global solution

Thank you for your attention!