



TECHNISCHE
UNIVERSITÄT
WIEN
Vienna | Austria

Introduction to VieVS

Matthias Schartner^a, David Mayer^a

^aTU Wien, Department of Geodesy and Geoinformation

What is VieVS?

- VieVS = **Vienna VLBI and Satellite Software**
- State-of-the-art VLBI data analysis software for geodetic applications
 - Main geodetic products: EOP, station coordinates (TRF), source coordinates (CRF)...
 - Many further estimates: geodynamic and atmospheric parameters (ZWD)...
- Written in MATLAB
- Developed at the Department of Geodesy and Geoinformation (Research Group Advanced Geodesy) since 2008, TU Wien

What is VieVS?

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
 - CALC/SOLVE (NASA, GSFC), DOGS_CS (DGFI), OCCAM ...
- Different software packages can validate each other. Helps identifying bugs.
- 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

Why MATLAB?

Advantages:

- Easy to use
- Very convenient IDE (code editor, debugging tools ...)
- Easy to change source code
- Lots of predefined functions/toolboxes (plotting tools ...)
- MATLAB is 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
- Interpreted language → slower than compiled languages (like C++)

Availability and user policy

- VieVS is freely available to registered users
 - Easier to get feedback
 - Easy to spread information about bugs, new updates ...
- For more information, see VieVS homepage
<http://vievs.geo.tuwien.ac.at>
- We are open for cooperation:
 - Modules can be written at other institutions

Modules of VieVS



Module structure of VieVS

- Possibility to run different processing steps separately
- Clear separation of individual tasks
 - good to try different parameterizations for one task
 - easy to add extensions
 - Intermediate results are saved and preserved
- All modules controlled via a common GUI

Modules of VieVS

VIE_SETUP

VIE_SETUP

VIE_SCHED

VIE_INIT

VIE_MOD

VIE_SIM

VIE_LSM

VIE_GLOB

- Graphical User Interface for all modules
- Allows to define all options and parameters
- Plotting tools for data inspection (residuals, estimates, correlation matrices...)

Modules of VieVS

VIE_SCHED

VIE_SETUP

VIE_SCHED

VIE_INIT

VIE_MOD

VIE_SIM

VIE_LSM

VIE_GLOB

- automatic scheduling for VLBI sessions
- manual scheduling for VLBI sessions
- → lecture scheduling

Modules of VieVS

VIE_INIT

VIE_SETUP

VIE_SCHED

VIE_INIT

VIE_MOD

VIE_SIM

VIE_LSM

VIE_GLOB

- reads in data and parameter files
- prepares observations in internal formats
- necessary for VIE_MOD, VIE_SIM and VIE_LSM

Modules of VieVS

VIE_MOD

VIE_SETUP

VIE_SCHED

VIE_INIT

VIE_MOD

VIE_SIM

VIE_LSM

VIE_GLOB

- calculates the theoretical time delay $o - c$
- builds up the partial derivatives A
- contains a variety of different models

Modules of VieVS

VIE_SIM

VIE_SETUP

VIE_SCHED

VIE_INIT

VIE_MOD

VIE_SIM

VIE_LSM

VIE_GLOB

- Simulation of
 - troposphere
 - clock
 - white noise
- writes NGS-files

Modules of VieVS

VIE_LSM



- estimates the unknown parameters with Least Squares Adjustment
 - troposphere
 - clock
 - EOPs
 - station coordinates
 - source coordinates
- possibility to update A scan-wise
- SINEX files

Modules of VieVS

VIE_GLOB

VIE_SETUP

VIE_SCHED

VIE_INIT

VIE_MOD

VIE_SIM

VIE_LSM

VIE_GLOB

- stacking of single sessions
- estimate common parameters
 - TRF
 - CRF



TECHNISCHE
UNIVERSITÄT
WIEN
Vienna | Austria

Lecture Introduction to VieVS

Matthias Schartner^a, matthias.schartner@geo.tuwien.ac.at
David Mayer^a, david.mayer@geo.tuwien.ac.at

^aTU Wien, Department of Geodesy and Geoinformation