Status and plans for the future of the Vienna VLBI and Satellite Software (VieVS 3.0)

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Introduction

The Vienna VLBI Software VieVS has been developed by the VLBI group at the Vienna University of Technology since 2008. VieVS is designed for the analysis of geodetic VLBI observation data as well as for scheduling and simulation of different VLBI sessions. The software incorporates the latest IERS Conventions and uses the concept of continuous piecewise linear offsets at integer hours for the parameter setup, consistent with the terms of reference of the GGOS. We present the status of the software focusing on the capabilities of the newest release 3.0.

VieVS structure
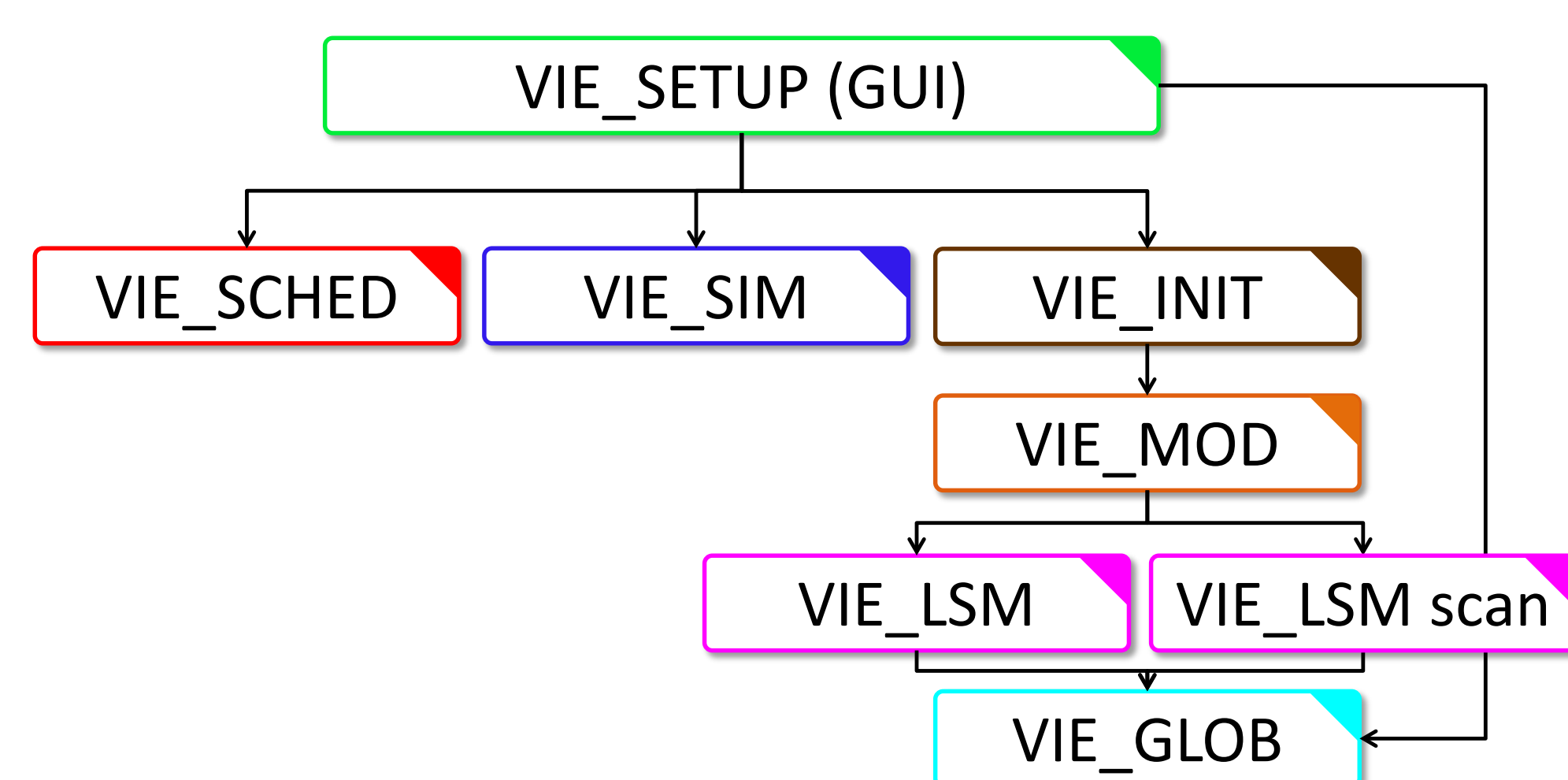
VIE_SETUP
- The processing setup is realized in one common graphical user interface (GUI).
- Start single session solution as well as single modules (scheduling, simulation, global solution).

VIE_SCHED
- Scheduling of observations → ngs-files for simulation, skd-files for antenna steering.

VIE_SIM
- Simulation of observations from real sessions or sessions scheduled with VIE_SCHED.

VIE_INIT
- Reading of observations, station coordinates and velocities, source coordinates.
- Removing of outliers and bad observations, exclusion of stations, sources or baselines.

VIE_MOD
- Calculation of theoretical delay and partial derivatives.
- Accounting for station corrections.

VIE_LSM & VIE_LSM scan
- Computation of least squares adjustment (inversion of whole design matrix or scan-wise update of normal equation matrix).
- Setup and storing of normal equations for global solution.

VIE_GLOB
- Stacking of single session normal equations to obtain global parameters.

VieVS features

Session analysis

Single session analysis:
- Select session and parameters via a simple GUI.
- Estimate Parameters as continuous piecewise linear offsets

Multi session analysis:
- Analysis of a predefined process list with the same parameterisation

Correct for source structure

vgosDB-ready

Ray-traced delays for all VLBI observations

Delay model and dedicated file format for VLBI observations of near-field target

Scheduling and simulation

- Refined scheduling for satellite observations
- New graphical user interface to create schedules manually or semi-manually
- Possibility to automatically create multiple schedules with different parametrization and multicore support
- New graphical user interface to analyze schedules
- New optimization parameters, which can improve the schedule significantly
- New independent checking tool, which verifies the computed schedule
- New astronomic scheduling optimization strategy: star scheduling mode

Simulation

- deeper integration of the scheduling and simulation module in the present architecture of VieVS
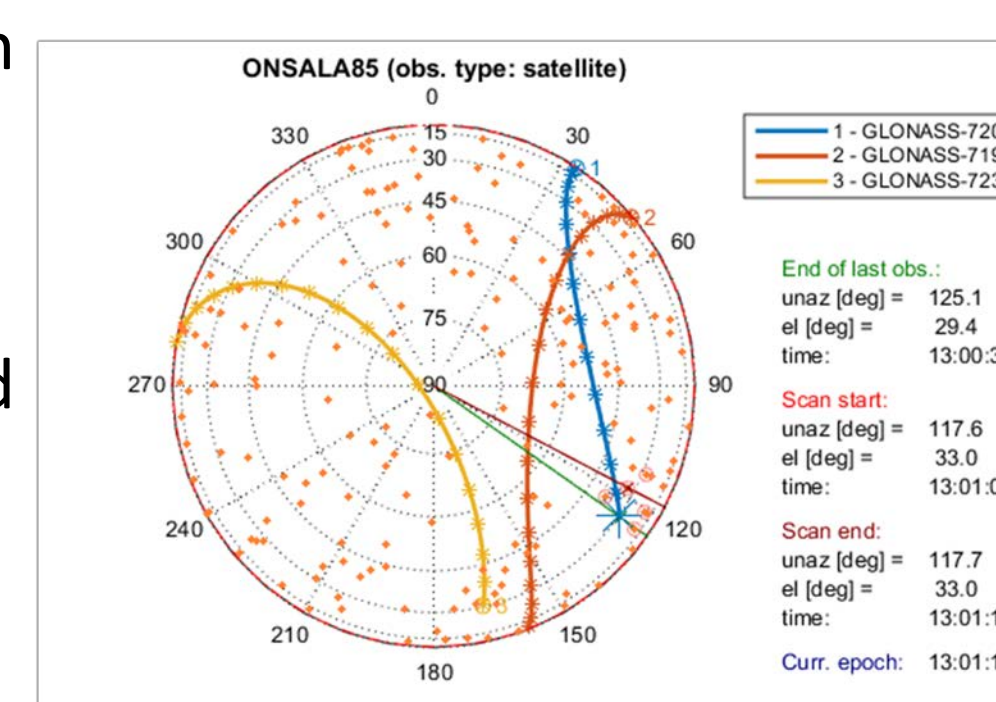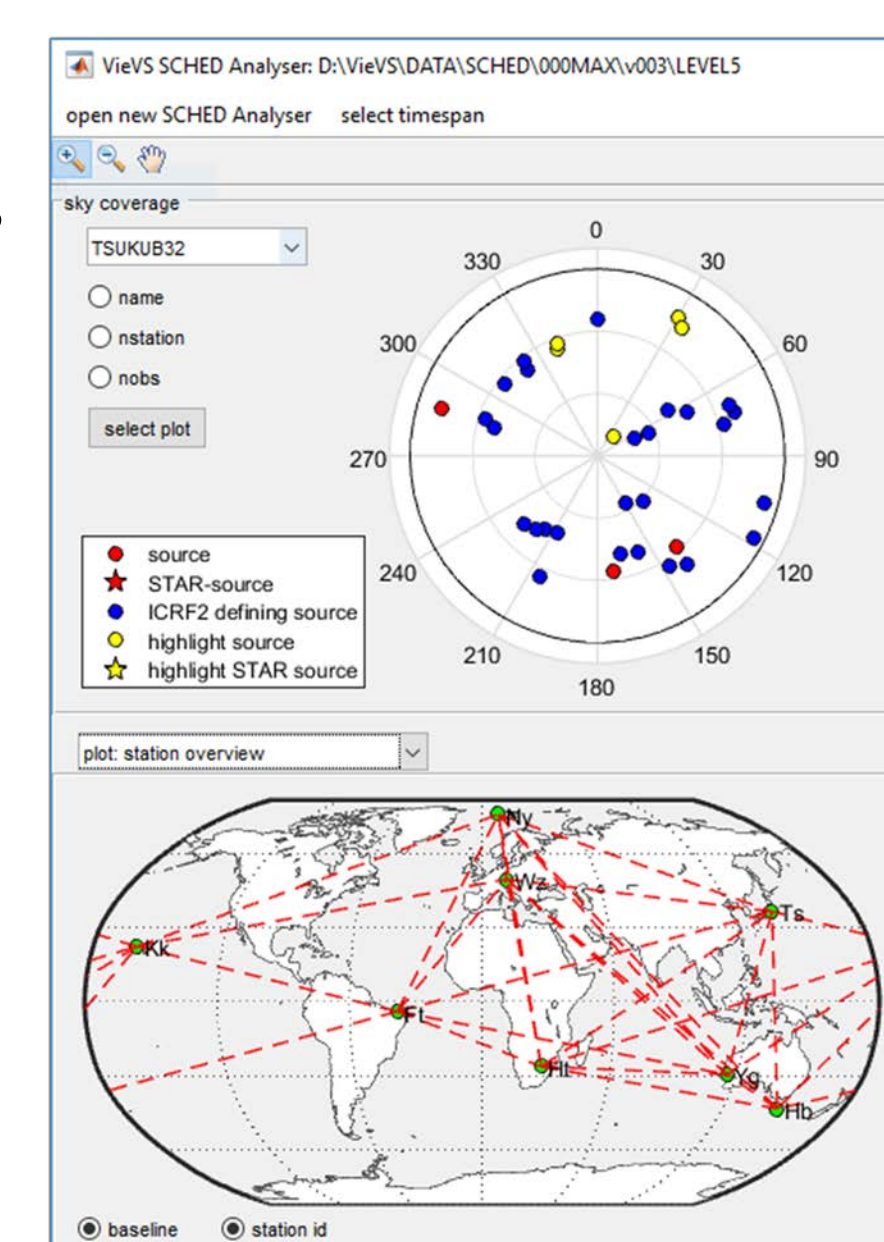
Global Solution

Estimate parameters which are common to all VLBI sessions
- Tidal ERP terms
- Station coordinates and velocities (TRF)
- Source coordinates (CRF)
- Earth orientation parameters (EOP)

Backwards solution for reduced parameters:
- Tropospheric delays, gradients
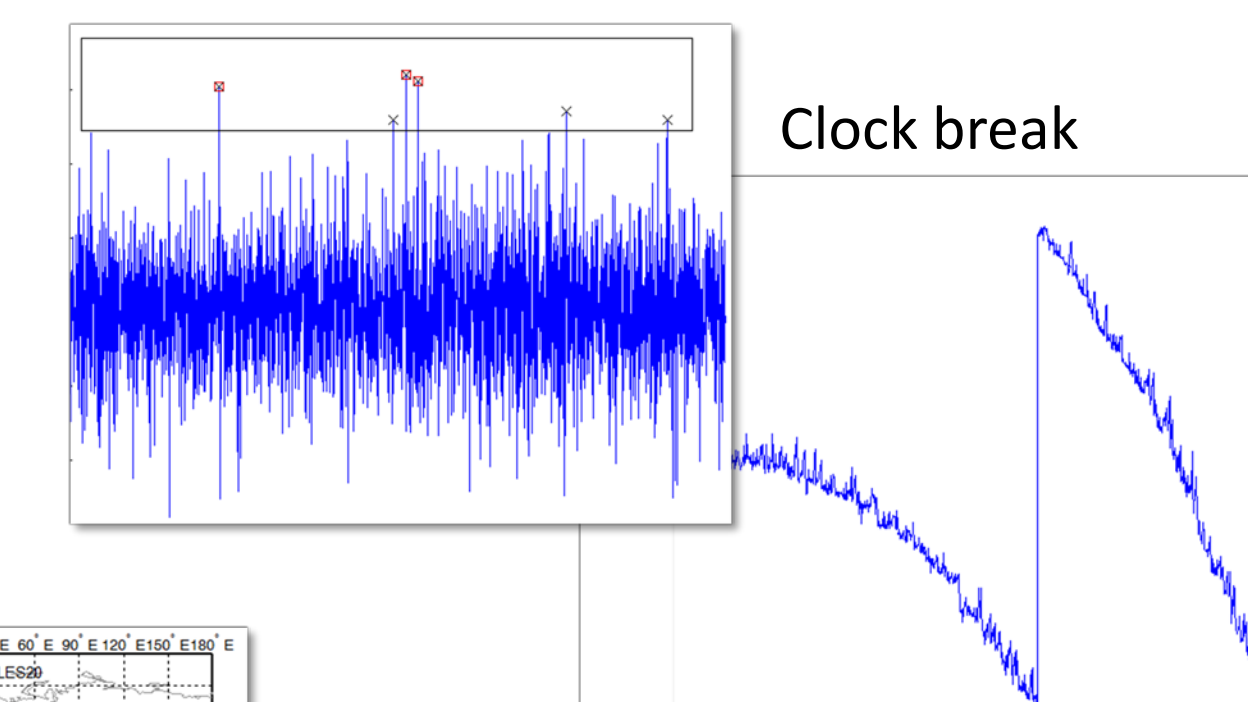- Station and source coordinates
- EOP
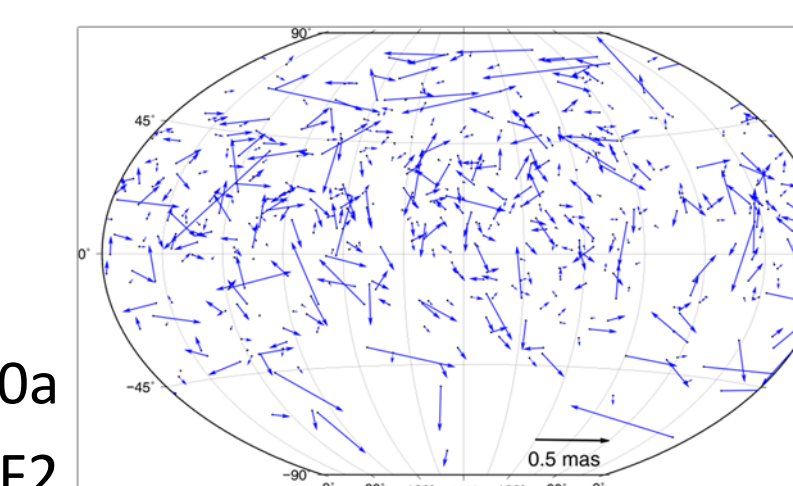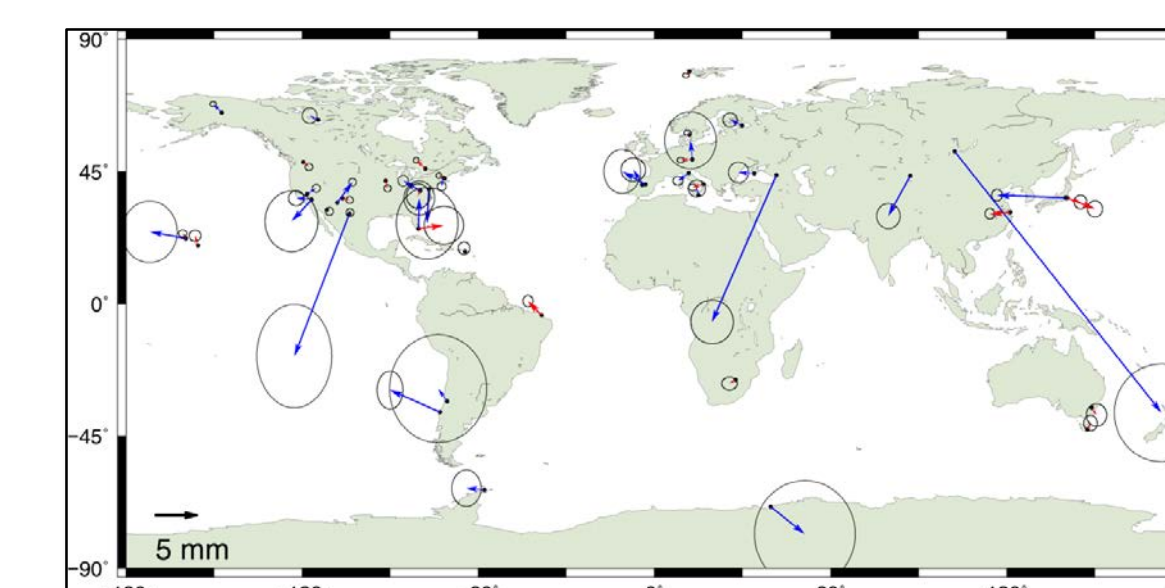
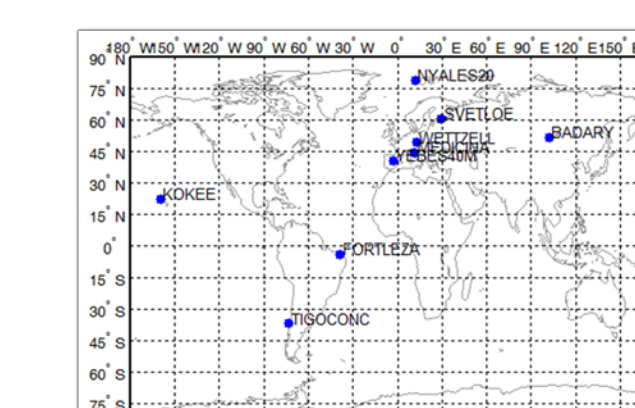Source positions in VieCRF10a
w.r.t. ICRF2

Plotting tool

- Plot residuals and parameters per station, baseline etc.
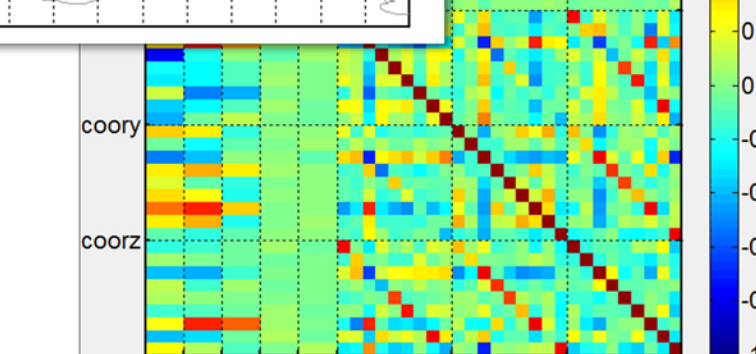- Interactive selection of outliers and clock breaks
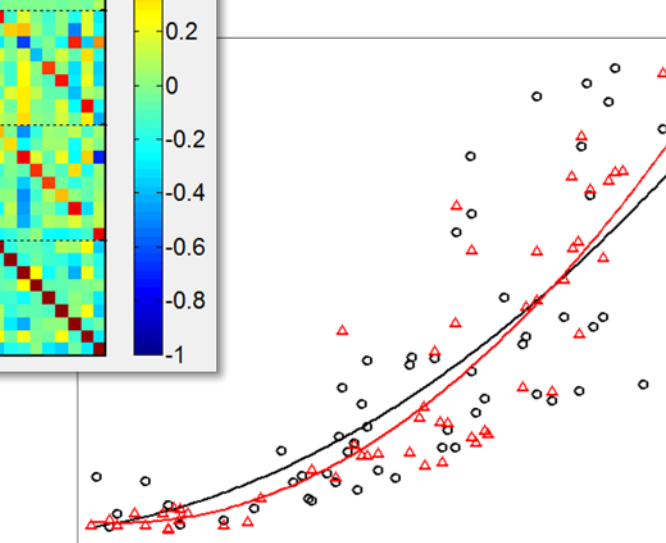- Analyse sessions
- Plot network
- Plot correlation matrices
- Plot baseline length repeatability

How can I become a user?

- VieVS is available free of charge for registered users.
- Registration: If you want to have access to VieVS, take a look at the requirements for external users and 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.
- The requirements for external users and a template for the application can be downloaded from the VieVS webpage (http://vievswiki.geo.tuwien.ac.at/) under the heading "Get VieVS".
- Reference: J. Böhm, S. Böhm, T. Nilsson, A. Pany, L. Plank, H. Spicakova, K. Teke, H. Schuh. The new Vienna VLBI Software VieVS, in Proceedings of IAG Scientific Assembly 2009, International Association of Geodsy Symposia Series Vol. 136, edited by S. Kenyon, M. C. Pacino, and U. Marti, pp. 1007-1011, 2012.

Future plans

Addition of a SLR module in VieVS

- Single SLR analysis
- Combined solution of SLR and VLBI data

CONTACT

http://vievswiki.geo.tuwien.ac.at/doku.php
For upcoming dates and news have a look at our website

USER WORKSHOP

The next VieVS user workshop will be held in September 2017 in Vienna!

System requirements

- MATLAB 7.6 (R2008a) or later.
- About 7.5 GB of disk space, including all data files
- Should work with any operating system able to run this MATLAB version (tested on Windows and Linux).