Vienna VLBI Software -
Current release and plans for the future

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Vienna VLBI Software (VieVS)

- VLBI data analysis software
- Developed since 2008 at TU Vienna
- Important contributions from other groups worldwide
- Version 2.1 (release in Summer 2013)
- Freely available to registered users
- http://vievs.geo.tuwien.ac.at
Written in Matlab: Pros and Cons

- Easy to understand/use/modify
- Many built-in functions
- Graphical User Interface

- Slow
- Expensive (! Octave)
• One common GUI, including plotting tools
• Separate **batch mode** to be used after the setup
Calculation of Theoreticals and Partials

- IERS Conventions
  - A priori EOP at 0 UT
- Playing ground for model testing
  - Ray-traced delays
  - Empirical Earth rotation models
  - Loading models
  - ...
Piece-Wise Linear Offsets (PWLO)

- PWLO possible for all parameters
- Station and source coordinates also possible as offsets
- No rates!
- PWLO at integer hours
  - .. intervals 5 minutes to 2 days
- Constraints to estimate offsets

\[ x_i = x_1 + \frac{(t-t_1)}{(t_2-t_1)}(x_2 - x_1) \]
Scheduling

- Implementation of source-based scheduling approach
- Tag along mode

2 sources simultaneously

CONT11 simulations (Sun et al. 2014)
Scheduling

- Scheduling of real sessions extremely beneficial
  - thanks to Goddard! (John, Dirk, Ed, ..)
  - 7 R&D sessions in 2012
  - AUSTRAL sessions since July 2013 (AUST10)
  - Continuous AUST campaign in Nov/Dec 2013

- Master students at Onsala working on twins
  - plans for schedules with two twins: Ho/Hb - Ha/Ht

Many updates with VieVS 2.2
Simulations

- Create simulated observations
- Write NGS files
- Simulate
  - Tropospheric delays
  - Clock errors
  - Measurement noise
  - Source structure

See presentation by Stas Shabala

(Shabala et al. 2014)
AUST Campaign (1)

• 15 Sessions from 28 Nov to 15 Dec 2013
  – with Hb, Ht, Ke, Yg, Ww
  – to demonstrate the capabilities of the telescopes in the South
  – to investigate source structure effects on geodetic parameters

• Alternate observations of 8 "good" (SI 1) and 7 "bad" (SI 4) sources
AUST Campaign (2)

- Source structure simulator (30 realizations)

See poster by Jim Lovell
Global Solution

• Multi-session combination
  – TRF, CRF, EOP
  – Contribution to ITRF2013

• Geodynamical parameters
  – FCN period, Love and Shida numbers

(Krásná et al. 2014)
Spacecraft Tracking

• VLBI observations to satellites
  – scheduling, simulations, processing

• Ongoing activity
  – Difficult to add to the operational version of VieVS

See e.g. presentation by Hellerschmied et al.

(Plank et al. 2014)
Future Plans

• Kalman filter (@ GFZ)
• Scheduling (continue)
• Satellite observations (continue)
• Geophysical parameter estimation (e.g. galactic rotation)
• ICRF3
• ...

See e.g. presentation by Karbon et al.
Future Plans

- Implement VGOS-DB format
- Qt Interface (V. Choliy) & Octave
  - to remove MatLab dependency
VieVS User Workshop

- 5th User Workshop scheduled for 17-18 Sep 2014
- With new version VieVS 2.2
- Everybody is welcome!

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