Vienna VLBI Software -
Current release and plans for the future

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8th IVS General Meeting
March 2-7, 2014, Shanghai, China
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
  – ...

International Earth Rotation and Reference Systems Service
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
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/
Thanks for your attention!