

Summary of IERS Retreat

Thomas Herring.

IERS Retreat Agenda

Thursday May 23, 2013

8:50-9:00 *Welcome and Retreat outline*

Thomas Herring.

9:00-10:30 Session 1: *towards “real-time” products*

Harald Schuh and Jens Wickert

10:30-11:00 Break

11:00-12:30 Session 2: *Rigorous combined products* Part A

Zuheir Altamimi, Manuela Seitz and Richard Biancale

12:30-14:00 Lunch

14:00-15:30 Session 2: *Rigorous combined products* Part B

Zuheir Altamimi, Manuela Seitz and Richard Biancale

15:30-16:00 Break

16:00-17:30 Session 3: *Long-term stability and parameterization of the reference frame.*

Xavier Collilieux and Daniela Thaller

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Friday May 24 2013

9:00-10:30 Session 5: *EOP prediction improvements.*

Brian Luzum and Christian Bizouard

10:30-11:00 Break

11:00-12:30 Session 6: *Unification of product formats*

Thomas Herring and Laurent Soudarin

12:30-14:00 Lunch

14:00-15:30 Sessions 4+7: *New Products and Mechanisms for IERS evolution*

Tonie van Dam Bernd Richter and Chopo Ma

15:30-16:00 Break

16:00-17:30 *Summary and Recommendations*

Discussion by all

Session 1: *Move towards “real-time” products*

Harald Schuh and Jens Wickert

- Evolution of systems eVLBI and GPS Realtime and their interaction.
- There will be expected IVS performance improvements as VLBI2010 systems are deployed. Potential for multistation 1-hr solution in near real-time.
- ILRS has 2-day latency (95% data in 1-hr).
- Potential for significant improvements by combining IGS ultra-rapid and VLBI intensives. Berne + BKG plan research into GPS/VLBI coupled analyses.
- There should be an assessment of the IGS requirements for EOP needed for realtime to allow real-time PPP millimeter accuracy.
- The IGS Real-time project could potential return accurate EOP in realtime. Ask IGS to look at. This type of product will require a format that allows real-time dissemination.
- For the current system, there are concerns about bad EOP estimates getting through VLBI analyses and effecting the EOP predicts done by the Rapid Service Product Center.

Session 2: *Rigorous combined products* Part A
Zuheir Altamimi, Manuela Seitz and Richard Biancale

- *ICRF consistency issues (adherence to IAG/IAU resolutions)*
- ICRF consistency with ITRF and EOPs. Question if radio sources are needed in operational generation of ITRF. Consensus was that the ICRF is decoupled enough for this not be needed but question should be more fully addressed.
- ITRF working group to clarify consistency implementation and quantify level of consistency needed.
- Evaluate impact of polar motion from IGS instead of IVS both for impact on values and sigmas when the ICRF is determined. Groups that can do these studies are encouraged to do this.
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Session 2: *Rigorous combined products* Part A

Zuheir Altamimi, Manuela Seitz and Richard Biancale

- *Rigorous combination for day-to-day EOP*
- Rapid service: Consensus was the rapid EOP are generated with such slow latency (4-times per day, 10 minute run times) than not enough time (with current systems) would be available.
- Evaluate impact of rigorous combination by EOP Product Center: Work together to compare C04 and ITRF recovered EOP.
- Alignment of EOP series: Better reporting of biases to see how large they are these days with all techniques using ITRF2008.
- The VLBI Intensives could have more consistent bias because single baseline is used as opposed to 24-hr VLBI sessions which use different stations on different days (impact on biases is from non-linear station motions). Polar motion fixed to Bulletin-A. Study should evaluate the impact of adding GPS gradient and atmospheric delays to the analysis of the VLBI intensives.
- Differences between IGS ultras and finals EOP cause problems with blend in the rapid products and these biases should be looked at IGS.

Session 2: *Rigorous combined products* Part A
Zuheir Altamimi, Manuela Seitz and Richard Biancale

- *Combination at observation level (COL):*
- Progress has been slow and will continue to be slow. Clear summary of the impact of observation level combinations (mainly common tropospheric parameters, orbits for altimeter satellites) would be useful.
- Suggestion that ITRF2013 submission of COL solutions to be compared to regular ITRF solutions would also allow assessment of the potential of COL improvements.

Session 3: *Long-term stability and parameterization of the reference frame.*

Xavier Collilieux and Daniela Thaller

- ITRF parameterization: Consistency between the different technique analyses even if not clear for some techniques (e.g. jumps to earthquakes and anthropogenic effects).
- For ITRF solution: Exclude non-linear sites but keep in time series analyses.
- Parameterization need to be decided to be consistent between techniques and user's must understand what has been done. New parameterizations for SINEX (e.g. log post-seismic functions) will be needed, interface to SINEX WG.
- Mean loading correction to be added to SINEX and method needs to be defined (SINEX WG).
- GGFC to compare existing loading models to assess the level of difference between the different centers.
- Discontinuities analysis to assess which equipment generated the best geodetic result. Request IGS examine antenna effects and assess the level of systematic phase residuals at GNSS site.
- Allow easy access to positions residuals from individual centers contributing to ITRF combinations by service (TC AC to arrange; even with SINEX available, time series files are easier to examine).

Session 4: *Next Generation of models and Center-of-Mass products*

Tonie van Dam and Richard Gross

- Determination of a geocenter motion model that can be used to relate center of figure to center of mass. It is not clear that such a model can be generated. Model being worked on at the moment. GGFC to review current status. LEO orbits are effected by these motions. Conventions center is currently developing this model. Care will be needed here to avoid double bookkeeping when geocenter model and interaction with geophysical fluid effects are included in the analysis.
- Short period diurnal and semidiurnal EOP model still needs improvement (ocean current contribution).
- Long period secular motion of Z-component for center of mass can be seen but the interpretation of cause is not clear currently (curvature over 20-years in similar to annual amplitude).
- Model for long period motion of the mean pole for use in the pole tide correction many need updating for recent mean pole deviation. This issue is also related to C21/S21 changes with time.

Session 5: *EOP prediction improvements.*

Brian Luzum and Christian Bizouard

- EOP realtime data transfer data protocol will be need in the future (rather than current flat-ASCII file).
- Data formats for machine readability
- Reduced latency of last data point
- Improved accuracy of last data point.
- Long-term prediction of when leap-second will occur.
- Improved accuracy of AAM and OAM with improved update schedule (6hrs versus 24-hrs). GGFC to be asked to look into this.
- Ensemble average of predictions for long term.

Session 6: *Unification of product formats*

Thomas Herring and Laurent Soudarin

- Benefits of common formats and data types to be included were discussed. Rate estimates in polar motion (LOD already) are not in every analysis. When rates are included, correlation between epoch value and rate should be included and would allow effective mean epoch of pole determination can be determined (issue of data distribution during day for DORIS and SLR specifically).
- Date style and resolution: currently on day boundary; will need to change for higher temporal resolution EOP and time system (UTC vs GPST).
- File content for different systems (not all EOPs available for all systems)
- Common format for data and combined EOP to allow easy comparison
- EOP rates in files and need for correlation to epoch value when included.
- Evolution to web 2.0 standards to allow web service access and analysis of data.
- Leap second file in machine readable form. Paris Observatory has such files but these can not be found on the Leap second page of the Paris Observatory web site <http://hpiers.obspm.fr/eop-pc/index.php?index=leapsecond&lang=en>

Session 7: *Mechanisms for IERS evolution*

Bernd Richter and Chopo Ma

- Current terms of reference were reviewed and update to these will need to be addressed by the DB.