



### ITRF2008 evaluation

The final ITRF2008 will be decided in mid-May and released by the end of May or early June. The two candidate ITRF2008 submissions will be evaluated until next October and the results should be presented at the Commission 1 meeting in Paris (REFAG, Oct. 4-8, 2010).

- ASI Report (Sciarretta): Evaluation of ITRF2008P in terms of helmert parameters and 3-D wrms of the coordinate residuals in comparison with the results from SLRF2005. The new ITRF is performing better, above all in the years not contributing to ITRF2005.
- DGFI Report (Kelm): Evaluation of ITRF2008P and ITRF2008D. Significant difference between SLRF2005 and the two ITRF2008 submissions. No significant difference between ITRF2008P and ITRF2008D except variance factors of VCE (*not clear why, it is currently under investigation*).
- GFZ Report (Koenig): They have started to use ITRF2008P in the Lageos-1 analysis. Some problems with the SINEX file and discontinuities. It seems slightly better for orbit computation (about 80% of the arcs). Epoch block in ITRF2008P, a note to Zuheir will be sent to ask him a change in the next release of ITRF2008.
- GRGS Report (Deleflie): Lageos-1 and Lageos-2 orbit analysis using the ITRF2005 and ITRF2008P from 1995 to 2009. Analysis of ILRS v24 for 1993-2009, helmert parameters; better consistency with ITRF2008P. It is noted that this analysis includes modelling of annual gravity variations, which are not included in the standard ILRS products. Station position series wrms have a better stability in the 3 components. Big improvement for 7810 and 7403. Change in the weekly solution, from mid-May the constraint on UT1 will be removed.
- NSGF Report (Appleby): No comparison done, the new ITRF2008P will be used in the QC analysis.
- JCET Report (Pavlis): Orbital re-analysis and new normal equations using ITRF2008P, RMS is roughly 1 mm better. Recent years (past 2006 and especially past 2008) show increasingly better fits due to improved velocity estimation.

### Benchmark process

BKG is under evaluation, the blind test will be done by ASI CC. DGFI already made a first evaluation and will send his report to Erricos. After the blind test, BKG will start to send both solutions for a test period (roughly one month, less if the CC decide that the contributions are acceptable).

### **Data handling and corrections**

The files are available on the web. They are maintained by DGFI and ACs are responsible to check them routinely. ITRF discontinuities are written into the file. Exertier points to the problem of a clock change at the stations, a report must be given, a site log change needed.

**NOTE:** *On this issue it is noted that the ILRS/CB along with the Network & Engineering WG are working to create a standard procedure to be followed by the stations in reporting upcoming changes in their systems, to be reviewed by a "board" and then decide whether a change in the SOD is warranted or not. The event will be announced in any case by email using several of the ILRS mailing lists.*

### **Station qualification**

A number of stations were qualified last year, the next one is Concepcion. Discussion on the length of time needed to qualify a station. Instead of the time taken for testing, a minimum number of acceptable Lageos passes is to be considered: 20 good passes are considered the minimum number necessary to draw conclusions and qualify a station.

### **UAW2009**

*Action item for ILRS/AC: to include atmospheric loading in the modelling and to estimate low degree harmonics as part of the official weekly product.*

GFZ has a defined format for the series for the atmospheric pressure loading, JCET uses the series from Jean-Paul Boy based on ECMWF input: they will be sent to the AWG. The atmospheric loading cannot be included in the present weekly product because the data from ECMWF are not available until long after the actual date needed; it was decided to generate another product, delayed by one week (or as long as needed) after the operational product, with the atmospheric modelling included. It is suggested that the DAILY product be elevated at the level of the "official" operational product and a delayed weekly solution with appropriate delay to allow the inclusion of atmospheric modelling and the estimation of the 2x2 harmonics.

Atmospheric loading is not modelled in Satan.

A pilot project will be established with a re-analysis of two years of data, 2008 and 2009.

Low degree harmonics: Bernese s/w cannot handle the gravity estimation. The new parameters (2x2 gravity field) will be included when all the SW will be able to handle it. This should be completed though no later than the end of the summer (2010).

Range bias combination: a uniformity of range bias estimation practice needs to be agreed within the AWG. ASI will compile a report on the present situation of the bias reported in the weekly products. Only after the uniformity is reached amongst ACs, the range bias combination can be implemented and tested.

SLR tracking of GNSS: intensive campaigns for a couple of months, requirement should be received from the GNSS community, Daniela Thaller is in charge of that.

### **T2L2**

(Exertier) Follow-on mission of one year to make experiment of ground-to-ground time transfer for European stations. A campaign was made with Borowiec, Grasse, Koganei, Paris not really successful because of weather. CNES will pay for the transport of instrument among the stations for calibration.

As an example, a pass is shown in terms of time walk as function of energy, 60 ps rms of the residuals. A new, upcoming campaign will take advantage of the relocation of a maser standard at Grasse and there are hopes for a more successful second campaign.

The data in CRD format and the SW for data analysis will be available on the web. The data are also available at EDC.

### **San Fernando barometer issue**

A drift in the pressure sensor from 2006 to the end of 2009. They have provided a model to correct the data, it will be included in the AWG handling/correction file once finalized by the San Fernando group.

### **Normal point construction**

Torrence, on behalf of the CB, proposes a protocol to be reviewed by the AWG: normal point when 100 FR data have been accumulated or the maximum NP interval is exhausted, whichever comes first.

Appleby shows the tracking made in two hours on April 14<sup>th</sup>, dividing the passes in 1 mm NP, NP with less than 100 obs and NP with more than 100 obs. The choice of “100” successful returns assumes that the single shot precision is about 10 mm, so that the NP precision would be 1 mm if all 100 were used to form it. It is pointed out that the single shot precision of a system is a function of the mode the system operates under and the engineering characteristics of that system. It is pointed out that for low energy systems (e.g. NGSLR), the single shot RMS may be as high as 25 mm on LAGEOS, which implies that a lot more than 100 successful single shots should be collected. This implies that each system in the network must define their own standards in forming these NP data consistently, with the goal being to achieve 1 mm NPs. Investigation must be done on the usefulness to have more than one NP for one pass. Koenig says that the pass coverage will be essential when using SLR for orbit determination in combination with GPS. Once the NP recipe is agreed upon, the “choreography of the tracking data” should be examined next. Guidelines should be identified and a number of simulations must be done to demonstrate the appropriate operational concept.

### **New product, models, conventions**

Daily product: feedback from USNO using the weekly solution and the time series coming from the 6<sup>th</sup> day of the week sent with the daily solution, over 2 months.

An effort will be made to reduce by one day the latency of the daily product by making the solutions and combinations on the same day. **When should be start this? July 1<sup>st</sup>?**

Orbits: new ORBEX from IGS to be used in future (if adopted by IGS).

### **Improvement in official product**

CRD validation: June 30<sup>th</sup> is the deadline to switch to the new format. From July on, the data delivered in old CSTG format will be converted in the new CRD format by the operational centers.

COM corrections: tables of the correction for Lageos and Etalon are available. The table will be updated (action item G. Appleby) with the indication of the periods in which the correction is applicable, wherever necessary, and with the old stations. This must be available prior to the end of summer for testing and implementation in fall.

### **Schedule of the new models**

The inclusion of the new models will be made in the future reanalysis. By that time, the pilot projects and the test on the new models will be completed.

### **Status report of the ILRSA weekly product**

Main topics:

- GA and DGFI LOD are not used in the combined solution as their performance with respect to reference values (USNO finals.daily) show a clear periodic signature (GA) and too high a scatter (DGFI). **We need a resolution here!**

- **There are some ACs delivering loose constrained solutions (NSGF, BKG, DGFI) with a rather TIGHT looseness degree in the rotations of the order of 1-2mas: a small loosening is added for homogeneity with the other loosely constrained solutions. GRGS solution has a severe, hidden, constraint on the z-rotation, not removable by means of the information provided in the SINEX file. Presently, a loosening is added to solve the problem; GRGS, however, is working to remedy that.**
- **High 3-D wrms coordinate residuals for DGFI and only after February 2010 for GRGS, for all the sites. The GRGS problem disappears while looking at the core sites.**
- BKG solution shows a bad performance in the EOP values since March 2010; BKG is working on a new submission, using Bernese. First evaluation tests show a good EOP performance for the new submission, **but it would be preferable that while both submissions are done over the probation period of about one month, the older submission is also corrected, so that the two can be properly compared.**

The time series from May 2009 will be carefully checked by the ACs and, if necessary, weekly solution time series delivered again to the CCs. **One recommendation to all ACs is to use all of the available data.**

### **JoG**

A draft TOC was presented to the ILRS/GB and it was agreed to send it to the JoG Editor for approval before the announcement of the special issue and the issuing of a call for papers.

### **Next meeting**

In conjunction with the REFAG Symposium at IGN, Marne-La-Vallée, but **at the Paris Observatory, October 1<sup>st</sup>, 2010.**

## **ACTION ITEMS:**

- 1) Note to Zuheir to treat SOLUTION EPOCH block as it is interpreted by the specific technique, i.e. to reflect the true contribution of each station (ECP)
- 2) Notify Horst that new or returning stations should be accepted after they have successfully tracked ~20 (accepted) passes of the two LAGEOS (ECP).
- 3) Testing of atmospheric loading and gravitational variations to be done using the data over years 2008-2009. ECMWF files to be delivered for use in the test (ECP) and GRACE dealiasing products for the same period of time from GFZ (RK).
- 4) Atmospheric modelling to be included in SATAN asap and AWG notified (GA)
- 5) Bernese needs to have the estimation of low degree harmonics included (DT)
- 6) ILRS-A CC will report on bias estimation history of the various ACs (CS/CL)
- 7) A plan for the intensive tracking of GNSS s/c to be submitted from IGS (DT)
- 8) San Fernando to provide the final correction model and documentation for their barometer issue (JG/ECP)
- 9) AWG to respond to CB/GB and NEWG about the redefinition of the NP formulation (ECP/CL).
- 10) Follow up the IGS discussion of ORBEX and report back to AWG (ECP).
- 11) Generation of time-sensitive CoM tables by station are required, based on the current tables and the spreadsheet of the distilled sitelogs for the entire network (GA).
- 12) The proposed TOC for the JoG Special Issue to be sent for approval to the JoG Editor (ECP)
- 13) Arrange the next meeting to occur at the Paris Obs. in conjunction with REFAG (FD/ECP)

CL – Cinzia Luceri

CS – Cecilia Sciarretta

DT – Daniela Thaller

ECP – E. C. Pavlis

FD – Florent Deleflie

GA – Graham Appleby

JG – Jorge Garate

RK – Rolf König

## List of attendees, AWG @ Wien, Spring 2010 (May 8)

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