

**ILRS Governing Board Meeting,
26 October 2014,
Annapolis MD**

(Prepared by Cinzia Luceri, Carey Noll and Mike Pearlman)

GB Members:

G. Appleby, NERC/SGF
G. Bianco, ASI
G. Kirchner, Austrian Academy of Science
C. Luceri, e-GEOS ASI/CGS
D. McCormick, NASA GSFC
J. McGarry, NASA GSFC
H. Mueller, DGFI
J. Mueller, IFE, Uni. Hannover
C. Noll, NASA GSFC
T. Otsubo, Hitotsubashi Univ.
E. Pavlis, GEST/UMBC
U. Schreiber, TU Munich, Wettzel
B. Schutz, U. Texas
M. Wilkinson, NERC SGF

Invited Guests:

J. Degnan, Sigma Space
H. Donovan, NASA/HTSI
T. Efim, VNIIFTRI
J. Griffiths, NRL
E. Hoffman, NASA/HTSI
J. Horvath, NASA/HTSI
S. Merkwitz, NASA GSFC
L. Thomas, NRL
S. Wetzel, NASA HTSI

Pippo Bianco gave an overview of the network status to date in terms of satellites, stations, and data. The data yield is running ahead of 2013. The Russians and NASA both have undertaken initiatives to help fill out the network; in addition several new stations are underway. Major issues still include uncorrected system biases, incomplete adherence to reporting procedures, more comprehensive calibration and validation at the stations, and insufficient site ties. New application such as debris tracking and one-way and transponder ranging to lunar and interplanetary targets offer new challenges. We can expect that the filling out of the network with new technology systems will take a long time. We should also be making more use of interactive communications on networks status to share experience and diagnostics

Carey Noll gave rundown on the plans for the laser workshop; the clinics scheduled for Friday afternoon are being organized to address some of the operational issues (mentioned above) at the stations.

Mike Pearlman gave the Central Bureau Report. New initiatives in Russia, NASA SGP, ISRO, Ny Alesund, Metsahovi, etc. will help fill the gaps in the network, but a large geographic gap “opportunities” still exist. There will be an anachronistic mix of new and legacy technologies for many years, but many groups are moving to the newer technologies. Twelve stations participated in the recent GNSS campaign; a second campaign will be organized to try to expand orbital coverage and daylight tracking on a smaller constellation of GLONASS satellites. Four to six stations participated in the one-week campaigns on IRNSS-1A and -1B, IRNSS-1C has been launched and tracking will commence shortly. The network is now supporting 68 missions, and Sentinel, Jason-3, and SpinSat will be launched over the next few months. Other Central Bureau items included approval and implementation of the new normal point population recipe, new log files procedures for tracking station configuration changes, and strengthening ILRS policies regarding station updates and feedback.

Erricos Pavlis reported on analysis activities. The ILRS contribution for ITRF 2013 has been submitted; due to the delinquency by some of the other Services and the tardiness of the current process, consideration is being given to extending the series until the end of 2014. The final determination awaits an IERS/ITRS Center decision, but the ILRS is set up to quickly process the additional data.

Future activities include a Pilot Project for low-degree harmonic estimation, use of LARES data in the operational products, Pilot Project for observational-level modeling of loading corrections for stations and corresponding gravitational corrections in orbit (operational product), finalization of the orbital product for the currently used targets, and benchmarking of new AC's. The new Russian station in Brasilia has been validated. The Russian station in Irkutsk and the SOS station in Wettzell, are in quarantine. Missing information from some of the stations has caused processing issues; hopefully the new procedures will help reduce this problem. The IERS annual report 2013 should be ready by early November; work continues in collecting the last few abstracts for the ILRS special issue JoG. The next AWG meeting is planned within the EGU 2015 week.

Erricos Pavlis and Cinzia Luceri participated in the IERS Working Group splinter meeting on Site Survey and Colocation held in conjunction with the IAG Commission 1 Symposium: REFAG2014 (13-17 October 2014) in Luxembourg. It is an open meeting, but each service has a single point of contact (representative and an alternate). Other teams will be invited from Russia, China, and Japan. Sten Bergstrand, the WG chair, reviewed the goals and objectives in the current WG charter. The discussion pointed out that two main topics need to be addressed: the necessity of revising and completing the Best Practices manual drafted by Pierguido Sarti and John Dawson, and the formal recommendation for frequent surveys at the sites. The chair is creating a SharePoint website for the WG. The next WG meeting will be organized during the EGU 2015.

Toshi Otsubo operates the Data Q/C activity at the Hitotsubashi University. There were 16 incidents reported back to the stations via RapidServiceMail in the last year; response and recovery is improving. Obsolete contact information in the ILRS website was a problem in some cases. A long-term analysis process has been instituted using correlation among parameters as a diagnostic procedure. It looks like it will be a very powerful tool.

Carey Noll and Horst Mueller gave an update on the Data Centers. The data centers are addressing some problems merging the quarantine data in the database. The hardware at CDDIS is being "refreshed" to improve reliability; the new system will be ready at the beginning of next year. Some changes will be made with data suppliers in the transition period. DGFI will move its administrative responsibility to the Technical University at the beginning of next January, probably with a name change.

Toshi Otsubo is the new Chair of the Missions WG; the MSR for SpinSat, 2 Galileo, and IRNSS-1B were approved; other missions are in process.

Horst Mueller gave a report for the Data Format WG. Configuration files have often been obsolete; since the new Change History Log has been implemented, 16 stations have provided the updated change history log. A procedure is being drafted up for a two-path redundant data distribution from the stations to the Operations Centers. CPF and CRD format issues and the reformatting of old CSTG will be discussed during the next meeting. The EUROSTAT station monitoring software and mount model fitting program have been added to the ILRS web site software page, a normal point program and tracking restrictions software should be added in a few months; a source of delay for NASA SW are the legal issues involved in turning code into open source. A Study Group will meet this week to discuss how much more can reasonably be added to the library.

Matt Wilkinson gave the report for the Network & Engineering WG. Due to limited time, an agenda of items for discussion at the next meeting was developed, including: how do stations react when they are notified of an existing bias and what is the WG role; the beam divergence measurement

procedure; site change log; expanded tracking of GNSS and the impact on the other missions, and in-sky safety.

Ulli Schreiber reported for the Transponder WG. LRO has demonstrated one-way ranging; several missions have now demonstrated Time Transfer. The WG charter needs to be updated to reflect the expanded scope of activities. ESA is not supporting the upcoming ELT time transfer activity, but they would appreciate if the ILRS will support it from a few key stations (maybe some could write a letter to us?). Techniques for eye-safe ranging with power restrictions need further examination.

Georg Kirchner proposed that we establish a WG on Space Debris having as tasks: interface between ILRS and other organization, coordination of debris activities, calibration issues, hw/sw support and exchange, promotion of Space Debris Laser Ranging within ILRS. The WG could be an opportunity to strengthen the position of the SLR station (e.g., national funding scenarios) and it may be more lucrative than applying for money for such projects like tracking LAGEOS. It is not the intent of the space debris activity to produce a catalog of non-cooperative objects, but rather to demonstrate the ILRS network capability and its potential to respond to selected situations. A risk exists that this activity could detract attention from the primary ILRS goal, but it is the general opinion that there is space for this kind of activity while still fulfilling the current ILRS requirements. The necessary ranging accuracy is 0.5 m and 100 m for orbital accuracy. ESA is interested in having this kind of contact point within ILRS. In the future, also the EU could be interested and have a project on this topic. A large part of the audience was in favor of establishing the WG or better a study group on Space Debris. The study group will be established, and Kirchner will prepare a charter.

Linda Thomas reported that the first GPS III launch is currently scheduled for 2016; the first retroreflector on the GPS III constellation is now scheduled for 2019.

Mike Pearlman reported that a plan is being developed for the reorganized GGOS Bureau on Network and Observations with its expanded activities. The Bureau activities will be discussed in a small GGOS meeting on Tuesday. A Bureau Meeting will be held on December 17th, during AGU.

The 20th IWLR will be held in Potsdam in 2016; a Technical workshop is being planned for Matera in 2015, the topic to be decided.

The next ILRS GB meeting will be held at EGU 2015 in Vienna, the date and time to be fixed.