

ILRS Governing Board Meeting
Chancellor Hotel
San Francisco, CA USA
Monday, December 14, 2009
19:00-21:00

Attendees:

Governing Board members:

M. Pearlman	J. Mueller
Z. Altamimi	C. Noll
G. Appleby	E. Pavlis
P. Bianco	F. Pierron
C. Luceri	B. Schutz
J. McGarry	

Invited guests:

J. LaBrecque	M. Torrence
P. Shelus	

Opening Remarks:

M. Pearlman began the meeting by acknowledging Werner Gurtner's passing and his many contributions to the ILRS and space geodesy in general. He then introduced the newly elected chair, Graham Appleby, who will complete Gurtner's term as chair of the ILRS Governing Board through 2010. After a few opening remarks from Appleby, the agenda was reviewed; no changes were suggested.

Central Bureau Report:

Pearlman gave an ILRS status report (see attachment). As shown in the network performance charts, data production during the past year was once again dominated by the same subset of ten stations. NASA has upgraded all MOBLAS systems (with the exception of Tahiti) and MLRS to 10Hz capability on low satellites. The increase in tracking at Greenbelt is also due to LRO-LR funding of a second operations shift.

Z. Altamimi reported that he met the new manager from KACST, Dr. Eng. Nasr A. AL-Sahhaf, for SALRO; he and several others will meet with him while at the AGU to discuss station performance, DORIS co-location, and future surveys.

R. Ricklefs continued to survey the network concerning the implementation of restricted tracking procedures. The use of the go/no-go configuration has become a fundamental part of network operations since more satellites today have optical vulnerabilities; the use of the flag allows the mission operations centers to signal stations to cease tracking for specified periods of time.

The CB continued to push implementation of the CRD format throughout the ILRS infrastructure. The format allows for greater range and higher accuracy through additional significant figures. Five stations in the network are now producing validated data in CRD format on an operational basis. The due date for full implementation in the ILRS is the end of January 2010, which at this point is not possible. Ricklefs continues to monitor station implementation; Russian stations have not responded to any queries. Pearlman acknowledged that Ricklefs has been a valuable asset to the CB in the monitoring and implementation of both restricted tracking methodologies and the

CRD format.

Action: The CB will assess the CRD format issue and make an appropriate change in the implementation deadline.

Action Completed: The CDDIS, EDC and the MWG have agreed that all full rate data including KHz data can be sent to the data centers as soon as the data centers are ready; space is not a problem.

J. McGarry gave an update on LRO-LR support. The LOLA flight software has detected signals from the ground stations for over 120 hours of tracking. Currently, seven stations are performing one-way range measurements to LRO; Monument Peak and Yarragadee will soon start tracking as well. These data have not yet been used in POD. The current orbit precision for LRO is from 500 meters to one km; LR should improve this value by at least 2 -3 orders of magnitude. P. Bianco stated that MLRO has a proposal ready to submit to LRO-LR, but the go/no-go flag must be implemented in their software first to enable automated tracking.

Working Group Reports:

AWG:

E. Pavlis gave an update from the AWG (see handout). Operational products continue routine delivery to ILRS data centers. The reanalysis activity for the ITRF2008 was completed and covered data from 1993 through the present from seven ACs and 1983 to present for six ACs; both combination centers submitted results to the ITRF solution. Products from several institutions (BKG/AIUB, ESOC, MCC, and NCL) are under evaluation to be accepted as ILRS analysis centers; BKG recently implemented a new software package for the generation of ILRS products and therefore must undertake the standard benchmarking process again. Representatives from the AWG have supported the validation process of CRD data; many key stations have yet to submit data for testing and evaluation.

Plans are to hold the next AWG meeting the Friday after the EGU in May 2010. Pavlis also reported that the head of combination center at DGFI will retire in 2010, giving us some concern about its continuity as a backup combination center.

Action: The AWG will contact DGFI to ascertain its intentions as a backup combination center.

Action Completed: The AWG has determined that one analysis center is sufficient for CRD format validation.

NEWG:

G. Appleby presented the NEWG report for G. Kirchner and U. Schreiber (see handout). He reported that NRL predictions for the ANDE satellites need to be improved. The problems associated with tracking ANDE and GOCE, very low satellites, have pointed out the need for stations to use the EUROLAS real-time tracking status/bias information exchange, particularly on the very low satellites. Wettzell is near completion of the implementation of its new SOS (Satellite Observing System) that will replace the current WLRS tracking station.

Action: The CB will remind the stations of the importance of participating in the EUROLAS real-time tracking status/bias information exchange.

MWG:

G. Appleby reviewed this year's successful satellite launches (BLITS and ANDE) as well as recently approved missions (RadioAstron, CryoSat-2, QZS-1) (see handout). Appleby received a strong message at Metsovo that the Russians would like the ILRS to track all GLONASS satellites for their clock calibration studies and navigation. Herstmonceux will begin tracking of all operational GLONASS satellites very soon; data will be pushed through normal channels. The ILRS will review this activity to see if other stations could/should join the effort. This activity becomes even more important as the GLONASS satellites are the only GNSS complex with many active retroreflector array satellites and more being planned for launch in the near future.

Appleby also gave an update on Stanford counter tests. Although the devices were inexpensive, the analysts are now seeing biases in the data that may not be recoverable beyond the cm level. The long-term solution is replacement of these counters.

Previous Action: The MWG and the AWG will develop procedures to test data from new or upgraded stations prior to their acceptance into the operational archives

LLR:

J. Mueller presented an update on LLR activities within the ILRS (see handout). He reported that the ILRS needs to encourage the few LLR stations to track all available reflectors to make use of the available geometry. To date, most ranging data comes from the Apollo 15 unit which is the largest and therefore, easiest to track. In four years of operation, the APOLLO station has obtained 4% of all tracking data of the total forty-year time span of lunar ranging. The newly refurbished station in Grasse has recently obtained lunar returns and hopefully ranging will reach an operational level soon. Wettzell will use its older system for lunar tracking following transfer of operations to SOS. MLRO plans to start lunar operations as well. APOLLO is able to schedule 10-14 observing sessions per month, therefore only a few days are available for tracking. An LLR workshop will be held in Bern Switzerland in February 2010.

P. Shelus reported that MLRS will stop all LLR efforts in February 2010 due to the loss of NSF funding. NSF did not fund the latest MLRS proposal, arguing that since the Grasse and APOLLO stations were operational, a third lunar capability at MLRS was not needed. CSR will submit proposals to both NASA ROSES and NSF in the spring 2010 to see if funding can be obtained. Appleby suggested that a letter of support could come from the ILRS if it would be helpful.

J. McGarry reported that Doug Curry/UMD, who has worked on lunar reflectors in the past, is part of a large team that won a proposal from the NASA Lunar Science Institute to design and test a large single cube that could be placed on the limbs of the Moon by the Lunar Landers. JPL is also working on a new series of lunar reflectors.

Task Force Reports:

Task Force 1 (Communications):

M. Torrence presented the pages on the ILRS Web site that have been set up for this task force: http://ilrs.gsfc.nasa.gov/working_groups/taskforce_1/ (see handout). The page points to weekly reports on data quality generated by various AACs. The task force is working to improve the two-way communication between the stations and the analysis centers.

Task Force 2 (Center of Mass Corrections):

G. Appleby reported that the group has developed tables of station corrections for LAGEOS and Etalon (see handout); the values vary ~5mm for LAGEOS and 20mm on Etalon based on the detector regime at the stations. These tables are currently under evaluation for use by the ACs; they will be published following this testing effort and would be used in the next iteration of the reference frame submission. These tables are probably the best solutions that can be achieved with the current satellite data and models available. Regarding the arrays for other satellites, a table summarizing Starlette /Stella values is underway.

Normal Point Formulation:

Pearlman reported that a new proposal is under development for populating normal points to optimize tracking under high data rate conditions and the large constellations of satellites that the ILRS will face in the future (see handout). For laser systems that have full-rate data precisions of ~1 cm, 100 data points would be adequate can get the tracking precision to the 1mm level and tracking on that normal point could stop short of the full normal point window (e.g., two minutes for LAGEOS) and move on to another satellite. This would allow stations to track more satellites and perform more pass interleaving. Normal point separation intervals would still have to be respected. This recommendation will now be evaluated by the AWG, to make sure that any policy we implement does not adversely affect POD quality of any of the satellites. At the moment we have not fully defined tracking scenarios for the GNSS constellations. We also need to examine whether the ILRS full-rate data on the GNSS satellites are going to be used as an engineering tool for operational POD or should the focus remain on scientific results.

Action: The CB and the AWG will formulate a plan to test the new proposal for populating normal points.

Status of ITRF2008:

Z. Altamimi gave a summary of the ITRF2008 activity, highlighting the contribution by the ILRS and SLR (see handout). The ITRF origin will be defined by SLR; the scale will be defined by a mean of SLR and VLBI. The conclusions are that the ITRF2008 is a totally independent combination from ITRF2005, that the origins are almost the same, and that the scale agreement between SLR and VLBI are getting closer, but there is still a 1 ppb issue which may be due to some current limitations in the measurements.

Retroreflector Issues:

M. Pearlman and G. Appleby reported that some stations in the network (Yarragadee, Zimmerwald, Graz, and Concepcion) are able to obtain daylight passes on the GNSS satellites, particularly GLONASS-115 (retroreflector cross section meets or exceeds the ILRS standard) and COMPASS. The larger cross-sections certainly help. As pointed out above, since the GLONASS satellites are the only well-populated GNSS constellation with retroreflectors, GLONASS will play a fundamental role in our GNSS activities over the next several years. However, the ILRS will need a clear statement on the tracking requirements on this constellation. There are still some issues about the effects of polarization with the uncoated cubes that need to be resolved.

Action: Pearlman will work with Dave Arnold and Mark Davis to quantify the polarization issues with the uncoated cubes.

J. LaBrecque stated that we should be working toward satisfying GGOS requirements, not necessarily mission requirements. He also recommended that the ILRS stand firm with missions; if they do not follow ILRS retroreflector standards then the satellite should move to the bottom of the priority list. Pavlis pointed out that more simulations in this area are needed. Altamimi reminded the group that LAGEOS is most important for the ITRF and should not be compromised by increased GNSS tracking. Pearlman believes the network can increase its tracking capabilities by setting priorities properly, performing pass interleaving in an optimal fashion, and changing the normal point configuration requirements. We need a comprehensive network that is functioning optimally.

GGOS Activities:

M. Pearlman reviewed the current status of GGOS, including the structural changes (see handout). The comprehensive GGOS2020 book, edited by Plag and Pearlman, was published by Springer and is available for purchase.

The next meeting of the ILRS Governing Board is tentatively planned for May in conjunction with the EGU.

The meeting was closed at 10:00 p.m.