

**ILRS Governing Board Meeting  
San Fernando, Spain  
June 9, 2004**

**Attendees:** Giuseppe Bianco, Werner Gurtner (Chair), David Carter, Jan McGarry, Hiroo Kunimori, Bob Schutz, Graham Appleby, Ron Noomen, Wolfgang Seemueller, Peter Shelus, Georg Kirchner, Ulli Schreiber, Hermann Drewes, and Mike Pearlman

**ILRS Recognition**

The GB has been very concerned that SLR is not getting proper recognition in paper and reports that are being issued by the analysis and science community. The CB has sent out a reminder to the whole community and has brought this to the attention of the IGS and the IVS. The CB will also place a note to this effect on the ILRS web site and on the SLR data archives. EDC will put similar notification on its website

**Network**

As a result of the recent NASA budget reductions, the SLR stations in Arequipa and Maui have been closed and cutbacks have been implemented at GSFC, Monument Peak, and McDonald. Efforts are now underway to bring the Arequipa station back into operation.

The Station Qualification procedure has been implemented. ILRS maps now highlight the operational stations. GPS receivers are now at all of the high performing stations. Some are waiting for IGS endorsement.

**Predictions**

There is still some duplication of effort regarding predictions. For some missions, predictions are being issued by more than one center. This in itself is not a problem since some redundancy is health and competitive, but we do not know whether the stations are using the best product. One concern is whether the prediction providers are making the very best use of alternative data (GPS, DORIS) to issue the most accurate predictions. Most of the active missions are either doing their own predictions or have been relegated them to a specific center (GRACE, Champ, ERS-2, Meteor-3M, GFO-1, TOPEX, ICESat, GLONASS, and GPS). HTSI provides predictions on all of the passive satellites plus some of the active ones.

***Action:*** The CB will update the station prediction and prepare a list of recommended predictions sets.

**Ground Survey and Collocations**

The IERS has established Working Group 2 on Site Survey and Collocation. From the ILRS, Mike Pearlman, Giuseppe Bianco, and John Manning are members. The WG has the task of coordinating collocation survey activities at the multi-technique stations. At its first meeting in Nice in April, the WG agreed to (1) develop a survey standards document to provide details, explanations, and examples of full site survey reports, (2) draft a brief explanation for the need of precise terrestrial ties, (3) establish an IERS WG2 web site to collate all existing site survey

reports, and (4) clearly define output products including a detailed explanation of the SINEX requirements.

A precursor to this WG, organized by Chopo Ma, Jim Long, Zuheir Altimimi, and Mike Pearlman organized the recent survey trips to Hartebeesthoek and Shanghai. HTSI is also in the process of analyzing the recent survey data from several other stations.

### **Data Definition**

We have had an inconsistency on our definition of data quantity. Some sources report passes while others report pass segments. This arises because of pass interleaving, especially for the higher satellites. The GB agreed that we should report minutes of data and passes, rather than pass segments. The issue of pass definition at synchronous altitude was left unresolved.

**Action:** The CB will inform the data centers and the analysis centers that data volume should be reported in minutes of data and passes.

### **Data Centers**

The CDDIS and the EDC have come to agreement on a revised structure to archive the SLR data. When implemented, this will end some historic differences in the data files at the two centers. The new data structure has been endorsed by the Analysis WG with the caveat that on-line monthly data files are built up continuously rather than being issued at the end of each month.

The Data Centers have also agreed to a 5-minute turnaround time for data availability.

### **Working Group Reports**

**Analysis WG:** The Analysis WG reported that ASI had been selected as the ILRS Combination Center. DGFI was selected as the Alternate. Both are expected to provide weekly solutions for the IERS reference frame. These selections will be reviewed every two years. The WG also selected five operational centers: NSGF, JCET, ASI, DGFI, and GFZ. Other centers may become operational centers as they qualify.

**Network and Engineering WG:** The Networks and Engineering WG is in the process of starting the development of the new engineering data file. K. Salminsh is working on the initial database in Riga and several stations have agreed to participate in the pilot phase. Other stations are encouraged to join. There is some concern that normal points may not be calculated in equivalent ways at different stations and that some biases may exist.

**Action:** Mark Torrence will organize a test to calculate NP's from full rate data and compare with current NP submissions.

**Missions WG:** Several new missions were reviewed and deferred to the GB. The vulnerability of onboard optical detectors is a big issue. Procedures must be developed to reduce the risk, but the missions must take the responsibility.

**Data Formats and Procedures WG:** The Refraction Study Group is ready to put the new refraction model on the website. The WG should make a recommendation that the analysis groups adopt the new model when appropriate. The Prediction Formats Study Group is at the stage now where some operational tests need to be conducted.

**Action:** The Refraction Study Group will work with Carey Noll to get the new refraction model posted on the ILRS website.

**Signal Processing WG:** The Signal Processing WG has determined high and low signal strength C/M values for many of the spherical satellites for SPADS. They have also solicited high and low signal strength tests at some of the field sites. Results from Yarragadee with the MCP showed very little amplitude dependence on C/M corrections in the 1 - 100 p.e. range. The WG was urged to work with the Analysis WG to find a reasonable way of characterizing system signal strength levels and C/M corrections for the SPAD systems, recognizing that accuracy of a few mm would still be an improvement over the current "one size fits all" philosophy.

### **Mission Items:**

**ETS-VIII:** A Tracking Support Request Form was submitted by JAXA to the ETS-VIII satellite. Since the satellite will be in synchronous orbit over the western Pacific, and therefore, observable by only stations in that region, the project was deferred to the WPLTN. The ILRS will provide the usual data center support and the analysis groups are invited to analyze and use the data for their research.

**Action:** The Central Bureau will inform the Mission to deal with the WPLTN.

**ALOS:** A Tracking Support Request Form was submitted by JAXA for the ALOS satellite, which is scheduled for launch in 2005. This satellite carries a passive sensor that sweeps the ground normal to satellite path. The SLR tracking could damage the detector, and a very careful safety plan must be implemented. The mission will start off a few very carefully monitored stations and expand the coverage as confidence increases. The GB was very concerned with the liability issue and was reluctant to proceed without some sufficient indemnity for detector damage.

**Action:** The ILRS will work with the satellite host organization on the procedure of time restricted laser transmission and on liability issues.

**ICESat:** ICESat is back in operation, with tracking limited to only a few carefully monitored stations.

**Cryosat:** The Cryosat Mission submitted a Tracking Support Request Form in 2002. The Governing Board tentatively approved the mission at a previous meeting with the caveat that the SLR role should be more clearly defined.

**Action:** The CB Bureau will contact the mission and get the clarification.

**GP-B:** GP-B was launched in late May. Both HTSI and CSR will issue predictions. The GP-B retros can be viewed on only the backend of the spacecraft. The Mission will issue weekly viewing tables to tell the stations when to range. The on-board detectors are not vulnerable to the SLR and mission safety is not an issue with GP-B. Tracking will begin in July.

**Action:** The CB will distribute examples of the viewing tables to the stations along with proper description of the GP-B Mission.

**Galileo:** We are still waiting for more information from ESA system engineers on the technical details of the retroreflector arrays.

## **Report Card**

The 2003 4Q Report Card was completed by Van Husson in early 2004. In Van's absence, RITSS is working on the 2004 1Q and performance charts and should have them ready shortly.

## **Annual Reports**

The 2002 Annual Report is ready for mailing. The delay was caused primarily by the art work, assembly, and printing processes. The report for 2003 and 2004 will be combined. The form will be pretty much the same as AR2002, but we will also include one page summaries from the stations and the Analysis and Associate Analysis Centers (as we did in AR 2001). The CB will issue a notice and schedule in early July. (See notes attached).

## **ILRS Bi-annual Elections**

The CB will begin the bi-annual elections for ILRS GB members in early July as usual. The process will begin with the selection of the Networks Representatives and finish in mid-October with the election of the At-Large members. (See notes attached)

The Terms of Reference state that the ILRS Alternate to the IERS will be the Lunar Representative. It has been noted that this limits our flexibility. The GB agreed that the Alternate should be chosen by the GB with the recognition that our IERS representatives should represent both the SLR and the LLR communities.

## **Meetings**

The ILRS had a very successful technical Workshop in Koetzing in October 2003 along with meetings of the GB and the Working Groups. This was deemed a good model for the future. The Analysis WG and the GB also met in Nice in April 2004. It was agreed that we need to hold a GA meeting once per year. The Working Groups and the GB could meet twice a year if necessary. The next meeting will be a Koetzing type meeting in either the spring or fall of 2005 with meetings of the GA, GB, and Working Groups. (Subsequently, an offer was accepted to hold the meetings in Herstmonceux in October 2005.) The meetings in 2006 will be held in conjunction with the Laser Workshop in Canberra in October 2006.

The GB will consider meeting at the AGU in San Francisco in December. Graz has offered to host a small working group meeting in kHz lasers later this year.

## **Terms of Reference**

The GB agreed that several changes should be made to the ILRS Terms of Reference to recognize (1) the new IAG change in structure, (2) the reduction from two GA meetings per year to one meeting, and (3) the new means of selecting the ILRS Alternate for the IERS Board.

Action: The CB will draft the revisions to the TOR and circulate them for comment.