



INTERNATIONAL EARTH ROTATION SERVICE (IERS)  
SERVICE INTERNATIONAL DE LA ROTATION TERRESTRE  
WWW: <http://hpiers.obspm.fr>

**MINUTES OF THE IERS DIRECTING BOARD MEETING No 29**  
**Monday 13 December 1999**  
**AGU San Francisco**

**10 February 2000**

**prepared by D. Gambis, Central Bureau**

Attendance: C. Reigber (Chairman), J. Vondrak, D. Gambis, B. Chao, C. Ma, P. Shelus,  
B. Melbourne, B. Schutz, P. Willis, D.D. McCarthy, C. Boucher, J. Ray  
Invitee: J. Souchay (ICRS representative)  
Excused: F. Arias

C. Reigber informed the Board that H.G. Wenzel, formal FAGS representative to the IERS recently passed away.

**WELCOME**

Jan Vondrak was nominated as the new IAU representative to the IERS Directing Board starting from July 1999 in replacement of B. Kolaczek. J. Souchay is representing F. Arias, unable to attend this meeting.

**NEW IERS**

D. McCarthy informed the Board that he had a correspondence with the general secretary of the IAU who confirmed that no formal approval from the Union is required for the IERS new Terms of Reference.

**RESPONSES BY LETTERS OF INTENT**

The Call for Participation in the new IERS was disseminated on November 16th via Gazette 46 and also more officially through hard copies directly sent to 34 different institutions of various countries.

The IERS Directing Board reviewed the Letters of Intent which were received before December 10th. In total 16 different institutions indicated their intention to prepare an individual or joint proposal for participation as one or a number of components.

In addition, letters have been received from individuals who express in particular, their support of IERS activities.

Noticing that some institutions involved in activities linked to reference systems and geodynamics might have "missed" the Call for Participation, a gazette (#49) recalling this opportunity was sent on December 21, 1999. All institutions which have not yet submitted a Letter of Intent can still, and are encouraged, to submit proposals.

In January 2000, the institutions having sent their intentions to participate are listed below in alphabetical order, the '\*' represents a joint proposal of different institutions.

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**Product Centers on Earth Orientation**

- Institute of Astronomy\* (Moscow)
- JPL
- Paris Observatory
- Russian Mission Control Center (RMCC)
- Shanghai Astr. Observatory
- Sobolev Astr. Inst. (St. Petersburg)

**Product Centers on Rapid Service, Prediction**

- Institute of Applied Astronomy (St. Petersburg)
- JPL
- RMCC
- Sobolev Astr. Inst. (St. Petersburg)
- USNO

**Product Centers on Conventions**

- BIPM
- Institute of Applied Astronomy (St. Petersburg)
- USNO

**Product Centers on ICRS**

- Institute of Applied Astronomy (St. Petersburg)
- Paris Observatory
- Shanghai Astr. Observatory
- USNO

**Product Centers on ITRS**

- Bundesamt fuer Kartographie & Geodaesie (BKG)\*
- Institute of Applied Astronomy (St. Petersburg)
- Forschungsgruppe Satellitengeodaesie (FGS) and DGFI\*
- FGS - Univ. Bonn\*
- Institute of Astronomy\* (Moscow)
- IGN
- RMCC
- Shanghai Astr. Observatory

**Combination Research Center(s)**

- Astr. Inst. Prague\*
- FGS and DGFI\*
- FGS - TU Munich\*
- GFZ Potsdam\*
- GRGS\*
- IGN\*
- Institute of Astronomy\* (Moscow)
- Institute of Applied Astronomy (St. Petersburg)
- JPL
- Norwegian Defence Research Establishment (FFI)
- USNO

**Analysis Coordinator**

- FGS - TU Munich\*
- USNO

**Central Bureau**

- BKG\*
- Paris Observatory

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The Board, expressed its satisfaction about the number of answers of the first round and noticed confusion by some institutions on the distinction between 'joint' and 'in cooperation' proposals. This has to be clarified in the final proposals. A joint proposal should be signed by the various institutions involved.

## **SELECTION OF PROPOSAL REVIEW BOARD MEMBERS**

A number of specialists selected by the Board will be asked to serve on the review panel. This committee called "Review Board" (RB), as soon as it is formed, will act as an independent body and review the proposals in order to make recommendations to the IERS DB.

The planning of the review process will be made by this RB directed by its chairperson designated by the DB. A first meeting DB+RB is planned during IAU colloquium 180 in Washington (end of March 2000). A second RB meeting could be held during the EGS2000 in Nice, France (end of April).

A representative of the RB (its chairperson?) will make recommendations to the DB at the end of May 2000 in Washington during the Spring AGU meeting.

## **SCHEDULE**

It was decided that the final decision on the composition of the New IERS will be made at the next board meeting in Washington D.C. in early June 2000.

## **STATUS OF CURRENT WORK**

### ***IERS TECHNICAL NOTE 28***

At the EGS meeting held in Den Haag in May 1999, it was decided to collect the papers presented at the Session G18 on "High Frequency Oscillations of Earth Rotation" in order to publish them in the IERS Technical Note Series.

This Technical Note will be edited by Drs. B.Kolaczek, H.Schuh and D.Gambis.

The main topics of papers are as follows:

- Daily, subdaily and short-period oscillations of Earth rotation determined from VLBI and GPS observations,
- Short-period oscillations of atmospheric and oceanic angular momentum excitation functions,
- Nutation series with microarcsecond accuracy and subdiurnal periods,
- Wavelet and Fourier Transform Band Pass Filter methods applied to the analysis of high-frequency oscillations of Earth rotation.

So far, 6 papers have been collected.

### ***ITRF2000 (see <http://lareg.ensg.ign.fr/ITRF/ITRF2000/>)***

The Call for Participation in the ITRF2000 was sent on 14 October, 1999. The primary goal of ITRF2000 is to be a REFERENCE solution for use by a wide application community. It will include primary core stations (usually used in the annual ITRF solutions) as well as a significant extension provided by continental and regional solutions for densification and other useful geodetic markers. The time schedule is the following:

- Deadline for data submission: 1 March 2000
- Validation phase: April 1 - June 30, 2000
- Final solution: July 2000
- As of January 2000, the following groups proposed to contribute:

ALASKA, BOROWIEC, CGS, CODE, CSR, EUVN, FSG, GFZ  
GIUB, GRGS/GFZ (GRIM), IBGE, JPL, NIMA, REGAL, SHAO.

Other groups able to provide regional networks will be contacted. In particular those able to send coordinates of new points located at tide gauges.

## **STATUS OF THE CONVENTIONS 2000**

Contributions for each chapter are reviewed and put together by the editorial Board. So far, most of the drafts of the various chapters are completed. One objective of the next IAU 180 colloquium which will be held in Washington at the end of March 2000 is to have a full discussion of the various topics with the aim of

making the results consistent and come to a set of recommendations and resolutions at the IAU General Assembly in Manchester, August 2000. Two topics will be particularly discussed:

- The new definitions of the celestial reference system and
- The new Precession/Nutation model which will be adopted at the IAU general Assembly.

A discussion began within the Board on the necessary distinction between conventional standards needed as references and geophysical models. For consistency purpose, it is assumed that the Conventions should be used in the community as a standard although best models could exist.

This led to a more general discussion about the use of the Conventions and the way analysis centers are using them or not in their analyses.

A difficulty arose in particular about the way the permanent tides are to be processed.

Should they be considered in the tide model or in the station coordinates?

In the latter case the coordinates given for the ITRF would have a long-term average motion which would not be observable. A secondary result of applying this effect in the coordinates would be to change all the products derived including the satellite orbits, EOP, etc. All the values used in the ITRF have arbitrary reference. From a geophysical point of view, at present, ITRF has to be corrected. The consideration of the permanent tides in the TRF was discussed at the ITRF WG meeting held during the Fall AGU meeting.

## **IERS WORKING GROUP ON THE ITRF DATUM**

In 1995 the IERS Directing Board formed a Working Group on the ITRF datum to develop specifications for the precise datum definition to be used for future realizations of the ITRF. During the past IAG quadrennium, the WG sponsored an "Analysis Campaign to Investigate Motions of the Geocenter," the results of which were reported in IERS Technical Note 25 (April 1999). In addition, the WG prepared a "Final Report" (15 July 1999) containing recommendations for the ITRF datum specification (see Gazette 50). A copy of the full report may be obtained at the IERS web sites:

<ftp://hpiers.obspm.fr/iers/itrf/ITRF-WG.Report>

## **ORGANIZATION OF IERS ACTIVITIES**

### ***Global Geophysical Fluids, status and progress***

Ben Chao presented the activity of the GGFC:

The main portal site (<http://bowie.gsfc.nasa.gov/ggfc/>) is ready to be released to the public after update from the GGF meeting held on December 14th. Chao is still soliciting images for the image gallery. The Special Bureaus on the Core, Atmosphere, tides, hydrology are already linked to the portal site. Oceans, Mantle and geocenter/gravity SB are in preparation.

Now the archived data products already available are the ones concerning Atmosphere (AAM), Core (theoretical data), Tides, Oceans (circulation, hydrological models) and Mantle (seismic data).

For the mirror sites, France (Strasbourg, P. Gegout) is already on-line. Japan (Mizusawa, Y. Tamura) and USA for SB Core (on bowie) are close to ready.

The IERS Technical Note is partially completed. An invited paper which will be submitted to EOS (Chao et al., 7 authors) is close to being finished. The Board expresses its wishes that the TN be published as soon as possible since GGFC is an IERS component.

A collective GGFC group paper was presented at EGS1999, in Spring AGU1999 and at IUGG1999. A paper will be presented at EGS2000 and Ocean Science meeting 2000 for the SB Ocean. There was a dedicated Union special session at the Fall AGU1999.

A discussion occurred about the role of the SB gravity/geocenter.

The geocenter motion activities address different aspects linked to geophysics (cause of excitation, atmosphere, ocean...), gravitation (gravity fields) and geometrics (reference frame monitoring). The gravity aspects are part of GGFC's Special Bureau for Gravity/Geocenter (Mike Watkins).

According to the "IERS Geocenter motion Campaign" in 1997 and the TN25, it appeared that in the non-tidal band there is no agreement between the results derived from the various techniques on one hand and the

geophysical fluids phenomena on the other hand. Consequently no model can be yet recommended for general use (see the final Report of the IERS Working Group on the ITRF Datum <ftp://hpiers.obspm.fr/iers/itrf/ITRF-WG>).

As a result of the geocenter analysis campaign, the ITRF WG recommended that the general geocenter monitoring should be continued by the SB gravity/geocenter of GGFC in relation to the ITRF section. It is so far not clear how the SBgravity/geocenter is working and how the information is available to the users. If, for example, somebody wants an observed geodetic time series for geocenter motions for comparison to geophysical time series, where should the user go to get it? - ask each of the SB to get their part and add them up or ask the SB gravity/Geocenter? According to B. Chao the SBgravity/geocenter is not yet ready to do that since the issues of this topic are not sufficiently mature.

## **IERs EXTERNAL COOPERATIONS**

### ***Status and progress of the ILRS (<http://ilrs.gsfc.nasa.gov>)***

B. Schutz presented the ILRS status and progress:

There was an ILRS meeting in September 1999 in France. The main aspect was that the Analysis Centers are more active. Stress was put on operational aspects, procedures and a search for generation of combined products.

The First Annual report is being prepared. The first draft will be ready at the end of February, 2000.

E. Pavlis requested that the IERS write a formal letter to the ILRS stressing that LAGEOS and LAGEOS 2 SLR tracking are of vital importance in the maintenance of the ITRF and therefore urging ILRS to instruct the network to track them until told otherwise (i.e. forever) in a "permanent" campaign mode. The Board considers that this request should be officially made to the IERS Chairman by the ILRS Chairman, J. Degnan. B. Schutz agreed to clarify with the ILRS chairman.

#### *Main future meetings*

- ILRS Analysis Working Group Meeting (January 17-19, 2000, Frankfurt, Germany)
- Fourth ILRS Meeting at the 2000 EGS (European Geophysical Society) Meeting (April 25-29, 2000, Nice, France)
- 12th International Workshop on Laser Ranging (October 16-20, 2000, Matera, Italy)

### ***Status and progress of the IVS (<http://ivsc.gsfc.nasa.gov>)***

C. Ma presented the IVS status and activities.

Activities getting started: data centers have been set up. More analysis centers are needed for delivering products to data bases. The 2nd IVS Directing Board met in Birmingham in July 1999.

A. Nothnagel was elected as Analysis Coordinator and began his activities in the following October.

The first IVS annual report was issued and is still available on request to Nancy Vandenberg.

There is a proposal from the IVS to track the GPS satellites by VLBI with the goal of mapping the transmitter beam-characteristics. It would have to be done by SLR also. It seems that other tools are available for that. This should be discussed at the IGS Board meeting. The Chairman of the IGS should send a letter to the other Services for this special effort.

The first IVS General Meeting will take place in Kotzting, Germany on February 21-24, 2000. In the future the IVS general meeting will be held every 2 years. This meeting will concern operational matters: data acquisition, hardware, etc.

There will be an attempt to have tutorials in order that different sections of IVS can explain to other sections of the IVS what they do. An analysis workshop will be held on the last day (24 February) with a number of topics which will come up. The meeting also provides a forum for interaction with other members of the VLBI and Earth science communities.

In his presentation, C. Ma informed the DB that GSFC is producing regular EOPs on a weekly basis generated on Fridays. These data have not yet been submitted to IERS. C. Ma should inform the IERS about this.

### **Status and progress of the IGS (<http://igscb.jpl.nasa.gov/>)**

W. Melbourne presented the IGS status and progress.

At the end of 1999 the terms of three members of the IGS Governing Board(GB) expired (Bock, Kouba, Melbourne) and election was held for these three positions. Markus Rothacher, John Dow, and Jim Zumberge were elected. In addition I. Mueller resigned his position as IAG Representative on the Board. Tom Herring was appointed as his successor as of 1 January 2000. LEO activities will increase, the IGS is on the way to send a call for participation for LEO missions.

The IGEX-98 Workshop held on 13-14 September in Nashville, Tennessee was a great success. Approximately 80 people attended. Papers are being collected for publication in the proceedings.

A summary of IGEX-98 and some of the results presented at the workshop are in a paper entitled "The International GLONASS Experiment (IGEX-98): Organization, Preliminary Results and Future Plans", which can be found together with other information in the IGEX web site (<http://www.ion.org/workgroup.html>).

As the main result of the workshop, the International GLONASS "Pilot Service" will be proposed as an IGS Pilot Project, initially for the time period 1999-2003. It will be organized similarly to the other technique-based existing services.

A Call for Participation in this Pilot Service will be distributed in the future.

### **Progress of the DORIS activities (<http://doris@www-projet.cst.cnes.fr:8060/>)**

P. Willis presented the DORIS status and progress.

The Technique Center for DORIS is currently being organized as a Pilot Experiment of Commission VIII (CSTG)

Final proposals were sent in December 1999.

Central Bureau : one joint proposal, CNES/CLS/IGN  
Data Center : GSFC  
Analysis Centers : 7 proposals  
    3 from France  
    2 from Russia  
    1 expected from Texas,  
    1 from Australia: AUSLIG

People asking to get a DORIS beacon.

P. Willis mentioned the CNES proposal to provide DORIS receivers to be put on a satellite.

A DORIS 2000 meeting is scheduled for May 2nd and 3, 2000 in Toulouse, France.

The main topics of this meeting are on data flow, data format and analysis.

### **Selection of IERS representative to the IGS**

Following the proposition of C. Reigber, C. Boucher, present representative was unanimously elected and re-confirmed as the IERS representative to the IGS.

### **ITRF time series pilot project (<http://lareg.ensg.ign.fr/~sillard/ITRSTS/>)**

GPS data are available through IGS products. IGN(DORIS) data were specifically submitted for this experiment. For this latter computation, ITRF local ties were used as additional observations.

Data submission :  
    GPS : all IGS A.C.  
    DORIS : IGN  
    SLR : AUSLIG

The IGN combination center developed new software to combine simultaneously EOP's and terrestrial frames. The software is operational at the end of 1999.

Some preliminary combinations were made:

6 weeks of EMR (GPS) data  
1 week of EMR(GPS) and CODE(GPS) data  
1 week of EMR(GPS) and IGN(DORIS) data

## **FUTURE IERS DB MEETINGS**

May 30-June 3: AGU Spring Meeting (Tuesday-Saturday) Washington DC