

IERS REPORT TO IAG, 1999-2003

1. The new organization of the IERS

The re-organization of the Service began in November 1999, when the Call for Participation was issued. The Letters of Intent that arrived were then reviewed by the IERS Directing Board (DB) at its meeting in December 1999 (San Francisco). It was decided to set up the Proposal Review Committee (PRC) with the task to evaluate all proposals and prepare the corresponding recommendations for the next IERS DB meetings. The list of candidates of PRC was composed, consisting of knowledgeable scientists, independent both of the IERS DB and proposing organizations. The PRC was then established, under the chair of I.I. Mueller, at the beginning of 2000. Its first recommendations were delivered and taken into consideration at the IERS DB meeting in Washington (June 2000), and some of them accepted. Nevertheless, there were still several multiple proposals for the same components whose primary scientists were further contacted by the PRC and, in some cases, asked for new joint proposals. These cases were considered and accepted later, so that the IERS DB at its meeting at Frankfurt a.M. (September 2000) was able to take final decisions. Several minor changes of the Terms of Reference were adopted by the 'old' Directing Board at its last meeting in San Francisco (December 2000), mainly reflecting a slightly changed structure of the ITRS Product Centers. The new structure of the IERS began operation on January 1, 2001.

The main novelties are:

- The previous Sections and Sub-Bureaus of the Central Bureau are now autonomous components within the IERS and are called Product Centers;
- The Central Bureau moved from Paris to Frankfurt am Main in Germany and has now primarily administrative functions;
- New elements of the structure are Combination Research Centers, ITRS Combination Centers and the Analysis Coordinator;
- External services like IGS, ILRS and IVS serve as Technique Centers for the IERS.

According to the IERS Terms of Reference, primary objectives of the IERS are to serve astronomical, geodetic and geophysical communities by providing:

- International Celestial Reference System and Frame (ICRS, ICRF);
- International Terrestrial Reference System and Frame (ITRS, ITRF);
- Earth Orientation Parameters (EOP) that define the transformation between the ICRS and ITRS;
- Relevant geophysical data (i.e., information on the distribution and motion of the atmosphere, terrestrial and oceanic water, mantle, core...);
- Conventions (i.e., standards, constants, models, algorithms, software...).

IERS Terms of Reference define the following components of the new IERS:

- **Technique Centers (TC)** that are generally autonomous independent services, cooperating with the IERS. There is typically only one TC per technique, and it provides its operational products to the IERS. At the moment, these are the following:
 - *International VLBI Service (IVS);*
 - *International GPS Service (IGS);*
 - *International Laser Ranging Service (ILRS);*

- *International DORIS Service* (IDS) that has however not yet been formed; the technique serves as a Pilot Experiment of the CSTG.
- **Product Centers** (PC) that are responsible for the products of the IERS. They are:
 - *Earth Orientation PC*, responsible for monitoring long-term orientation parameters, publications for time dissemination and announcements of leap seconds. It is located at Observatoire de Paris.
 - *Rapid Service/Prediction PC*, responsible for providing Earth orientation parameters on a rapid basis, primarily for real-time users. It is placed at U.S. Naval Observatory, Washington D.C.
 - *Conventions PC* is responsible for the maintenance of the IERS conventional models, constants and standards. Joint proposal of U.S. Naval Observatory (Washington D.C.) and Bureau International des Poids et Mesures (Sèvres) was accepted.
 - *International Celestial Reference System PC*, responsible for the maintenance of ICRS and its realization, ICRF. Joint proposal of Observatoire de Paris and U.S. Naval Observatory was accepted.
 - *International Terrestrial Reference System PC*, responsible for the maintenance of ITRS and its realization, ITRF. It is located at IGN, Marne-la-Vallée.
 - *Global Geophysical Fluids PC*, responsible for providing relevant geophysical data sets and related results. This center now consists of eight Special Bureaus (for Atmosphere, Core, Gravity/Geocenter, Hydrology, Loading, Mantle, Oceans, and Tides), and is hosted at NASA's Goddard Space Flight Center.
- **Combination Centers:**
 - *ITRS Combination Centers*, responsible for providing ITRF products by combining ITRF inputs from the Technique Centers and other sources. Three institutions established ITRS Combination Centers:
 - DGFI, Munich, Germany;
 - Geomatics Canada, Ottawa, Canada;
 - IGN, Marne-la-Vallée, France.
 - *Combination Research Centers*, responsible for the development of combinations from data (or products) coming from different techniques. They are expected to provide their solutions to Analysis Coordinator. There are now eleven of them
 - AICAS & CTU, Prague, Czech R.;
 - FGS & DGFI, Munich, Germany;
 - FGS & FESG, Munich, Germany;
 - FGS & GIUB, Bonn, Germany;
 - GFZ, Potsdam, Germany;
 - FFI, Kjeller, Norway;
 - GRGS, Toulouse, France;
 - IGN, Marne-la-Vallée, France;
 - JPL, Pasadena, USA;
 - IAA, St. Petersburg, Russia;
 - ASI, Matera, Italy.
- **Analysis Coordinator** that is responsible for long-term and internal consistency of the IERS reference frames and other products, for ensuring the appropriate combination of the TC products into a single set of official IERS products and for archiving them. The designated Analysis Coordinator is Markus Rothacher, TU Munich, Germany.

- **Central Bureau** that is the administrative center of the IERS; it is responsible for the general management (according to the directives given by the Directing Board), for coordinating the activities, IERS publications, archiving the products and it also serves as its communication center with the users. It is placed at BKG, Frankfurt a. M., Germany.
- **Directing Board** that exercises general control over the activities of the IERS; its chairperson (elected by the Board from its members) is the official representative of the IERS to external organizations. The DB consists of two representatives of each of the Technique Centers, one for each of the Product Centers, one for all Combination Research Centers together, a representative of the Central Bureau, Analysis Coordinator, and the representatives nominated by the IAU, IAG/IUGG and FAGS.

2. IERS Activities in 2000-2003

The IERS DB in its new composition met at least twice each year:

- Meeting No. 30 in Washington, June 3-4, 2000;
- No. 31 in Frankfurt a.M., September 14-15, 2000;
- No. 32 in San Francisco, December 18, 2000;
- No. 33 in Nice, March 26, 2001;
- No. 34 in Brussels, September 26, 2001;
- No. 35 in Paris, April 20, 2002;
- No. 36 in Munich, November 22, 2002; and
- No. 37 in Paris, April 2, 2003

to decide on important matters of the Service like minor structural changes, overall strategy, creating working groups, launching projects, changing Terms of Reference, etc.

The IERS DB also organized two Workshops and a Retreat:

- *IERS Workshop on the Implementation of the IAU 2000 Resolutions* (Paris, April 18-19, 2002). It included detailed presentations and explanations of the contents of the Resolutions, the background reasons for their adoption, associated concepts and implementations as well as answers to specific questions. About 80 participants from 20 countries took part in the meeting. The Proceedings were printed as IERS Technical Note No. 29 and are available also online through IERS's website. The results of this workshop are also, to some extent, reflected in IERS Conventions 2000, now nearly finished.
- *IERS Workshop on Combination Research and Global Geophysical Fluids* (Munich, November 18-21, 2002). Its main goal was to improve all IERS products in accuracy, consistency, stability, timeliness, user-friendly access, and documentation, and to make first steps towards a rigorous combination of the various products, contributing thus significantly to the realization of an "International Global Geodetic Observation System" (IGGOS). The workshop was divided into two strongly related parts:
 - different aspects of the comparison and combination of the results of all major space geodetic techniques;
 - IERS Global Geophysical Fluid Center (GGFC), the present status of its products and its role in future.

The Proceedings of this Workshop will be published as IERS Technical Note No. 30.

- *IERS Retreat* (Paris, March 31 - April 1, 2003). It was summoned to review the present and propose future IERS products, ensure their better mutual consistency, to specify the IERS

requirements and to develop a vision for the future. Discussion on possible organizational consequences led to the concrete proposals for the DB meeting that immediately followed the Retreat.

Among the most important decisions made by the DB in 2000-2003 belong:

- Creation of the new ITRS Combination Center in Canada;
- Creation of the new GGFC Special Bureau for loading;
- Creation of the new Combination Research Center in Italy;
- Decision to contribute to the prepared IAG Pilot Project IGGOS;
- Launching the IERS Combination Pilot Project, and establishment of Working Group on Combination;
- Changing the name to ***International Earth rotation and Reference systems Service***, without changing its acronym (IERS).

Jan Vondrak, Chairman of the IERS Directing Board,
Bernd Richter, Director of the IERS Central Bureau.