3.2 Central Bureau

General activities   The IERS Central Bureau (CB), hosted and funded by Bundesamt für Kartographie und Geodäsie (BKG), organized and documented the IERS Directing Board (DB) Meetings No. 44, April 15, 2007, at Technical University Vienna, Austria, and No. 45, December 11, 2007, in San Francisco, USA. Between the meetings the CB coordinated the work of the DB.

Together with the Global Geodetic Observing System (GGOS), the CB prepared the GGOS Unified Analysis Workshop, held December 5–7, 2007, at the Beach Resort Monterey in Monterey, CA, USA. Ca. 45 specialists took part in this workshop. The programme, the position papers, and the presentations were published at the IERS web site. For a summary see Section 4.

The CB represented the IERS at the following meetings: WDC Meeting, FAGS Meeting, GGOS Retreat 2007, IUGG 24th General Assembly, GGOS Unified Analysis Workshop, and Geotechnologien Statusseminar.

IERS components maintain individually about 20 separate web sites. The central IERS site <www.iers.org>, established by the CB, gives access to all other sites, offers information on the structure of the IERS, its products and publications and provides contact addresses as well as general facts on Earth rotation studies. It contains also electronic versions of IERS publications, a list of meetings related to the work of the IERS, and an extended link list for IERS, Earth rotation in general and related fields. Throughout 2007 the web site was regularly enlarged and updated. Several documents about the history of IERS were compiled; these include an IERS Timeline and lists of all IERS components and officers from 1988 to 2007. Also the minutes of IERS Directing Board meetings from 1993 to 2000, most of which were provided by the former Central Bureau at Paris, were converted to PDF files and made available at the IERS web site.

The IERS Annual Report 2005 appeared in online and in printed form. The CB started also to prepare the IERS Annual Report 2006 for publication. Along with the reports of the IERS components, the Annual Reports contain information on the IERS compiled by the CB.

The CB prepared reports about IERS' activities for the International Union of Geodesy and Geophysics, the International Association of Geodesy (both for the period 2003 – 2007), and for the Federation of Astronomical and Geophysical Data Analysis Services (for the year 2006).

During the year 2007, 18 IERS Messages (Nos. 105 – 122) were edited and distributed. They include news from the IERS and of general type as well as announcements of conferences.

Address and subscription information has regularly been updated in the IERS user database. There were about 2500 users in 2007 with valid addresses who subscribed to IERS publications for e-mail and regular mail distribution.

Several questions from IERS users concerning IERS publications and products as well as Earth rotation and reference frames in general were answered or forwarded to other specialists.

IERS Data and Information System (DIS)

The IERS Data and Information System (IERS DIS) is being developed by the Central Bureau since 2002. The system is being adapted and extended by new components continuously in order to fulfil the requirements for a modern data management and for the access to the data by the users. In this context international and interdisciplinary projects like the Global Geodetic Observing System (GGOS) or the Global Earth Observation System of Systems (GEOSS) are demanding special requirements with respect to the standardization of the data and applications on the data.

In 2007 further developments of the IERS DIS were mainly driven by the following aspects:

- enhancement of the IERS Data Management System collecting all IERS products and data from the Product Centres and extracting the metadata into the metadata database;
- extending the IERS metadata profile to the SINEX format and to a fully compliant ISO 19115 metadata profile,
- development of tools for the management of metadata (e.g. metadata editor and parser),
- development and proof of a concept to port the IERS Content Management System (CMS) – and its publication component – to the so-called Government Site Builder, the CMS used within the division of the German Federal Ministry of the Interior,
- development of concepts for an interactive data analysis tool and for the improvement of the IERS Plot Tool.

All developments are being made in close cooperation with two research projects at BKG, the projects ERIS and GGOS-D:

The aim of ERIS (Earth Rotation Information System) as a part of the research unit FOR 584 "Earth Rotation and Global Dynamic Processes" is the development of a virtual Earth rotation system for geodetic and geoscience applications. The joint project "GGOS-D: Integration of Space Geodetic Techniques as Basis for a Global Geodetic Observing System" is meant to develop the IT infrastructure and the required software for the operational service of a Global Geodetic Observing System.

Both projects are providing an information, communication, and database system as a central interface between the research part-

ners and their applications and fields of interest. E.g. within the research unit FOR 584 the common Web portal called Earth Rotation and Global Dynamic Processes (<http://www.erdrotation.de>) realizes the entry point for all services provided by the project. The portal's homepage gives access to three subsections, one for the public presentation of the research unit, one for the information system ERIS, and one for internal communication.

One of the most important tasks in both projects deals with the data preparation and data networking. To ensure interoperability all data series are transformed into standardized data formats. Based on the XML versions developed for the IERS the XML schemata and the transformation routines are revised to harmonize the data structure and to enhance the machine readability.

While XML schemata describe the technical data structure of data series stored in XML, metadata are needed to describe the content of the series, how the data are produced, the authorship, the availability of the data, parameterization etc.

To ensure interoperability of the metadata with respect to international and interdisciplinary metadata catalogues, the IERS specific metadata profile has been extended to an ISO 19115 "Geographic Information - Metadata" standard compliant profile. Furthermore, routines have been established for automatic generation of metadata as well as a metadata editor to support the creation of metadata. A variety of interactive tools were set up. First some applications have been developed which realize interactive Web interfaces for some helpful geodetic and astronomic tools: transformations between Gregorian calendar and Julian and Besselian date / epoch, calculation of Greenwich Sidereal Time, calculation of the ephemeris of Earth, transformation between the reference systems GCRS and ITRS, and calculation of the time dependent precession and nutation matrices.

Second, if downloading data, often single data points, data of a short time period, or time series of isolated parameters are needed. The *EOP Reader* represents the first step in this direction in the context of ERIS. It allows the user to extract the EOP data of a single day from a data series of his choice by entering the date as Gregorian date or as modified Julian date.

Furthermore, a concept for an interactive tool for time series analysis has been developed. Via a graphical user interface it will allow the user to apply standard methods of time series analysis to data series of the ERIS and the IERS data archives as well as to own data. The following analysis procedures will be incorporated into the initial version of the data analysis tool: extraction of statistical values (mean value, maximum, median, etc), polynomial, sinus and spline approximations, FIR filters (high-pass / low-pass / band-pass, Moving-average, derivation), up / down sampling and shifting of the

time axis, FFT, short-time FFT and power spectrum, correlation and autocorrelation, and time / frequency analysis with wavelets.

Staff

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Dr. Wolfgang R. Dick, *scientist*
Carola Helbig, *secretarian*
Dr. Alfred Kranstedt, *scientist (until May 31, 2008)*
Anja Kreutzmann, *scientist (since May 15, 2008)*
Alexander Lothhammer, *technician (on leave since Nov. 2007)*
Sandra Schneider, *technician*
Dr. Wolfgang Schwegmann, *scientist*

Publications

Dick, W. R.; Richter, B. (eds.) (2007): IERS Annual Report 2005. Verlag des Bundesamts für Kartographie und Geodäsie, Frankfurt am Main, 2007. 175 p.

Rothacher, M.; Drewes, H.; Nothnagel, A.; Richter, B. (2007): Integration of Space Geodetic Techniques as the Basis for a Global Geodetic-Geophysical Observing System (GGOS-D): An Overview. In: L. Stroink (ed.): Observation of the System Earth from Space (Science Report). Status Seminar, 22 – 23 November 2007, Bavarian Academy of Sciences and Humanities, Munich. (Geotechnologien Science Report, No. 11) Koordinierungsbüro Geotechnologien, Potsdam, p. 75–79

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