3 Reports of IERS components
3.1 Directing Board

The IERS Directing Board (DB) met twice in the course of the year 2010. Summaries of these meetings are given below.

Meeting No. 50

May 1, 2010, Technical University of Vienna, Vienna, Austria

Introduction and approval of agenda

The agenda was accepted. The Chair, Chopo Ma, welcomed the guests and the members of the IERS Directing Board. Urs Hugentobler is the new IGS representative in the IERS DB. As the status and schedule of the ITRF2008 are discussed more external experts were invited than usual.

Formalities

Besides minor formal changes the Central Bureau received no further comments for the minutes of IERS DB No. 49.

Earth orientation products

Status and function of current and new / changed EO products

Daniel Gambis presented the report of the Earth Orientation Centre:

- Combination: short-term: GPS, long-term: VLBI.
- GPS has a constant offset.
- Two analyses have been done:
    1. Simultaneous study of annual and Chandler variations for GPS, VLBI and SLR. There is a good agreement between GPS and SLR, less with VLBI (higher discrepancies).
    2. Allan variance analysis of long term behaviour of EOP series (GPS flicker noise, VLBI white noise, SLR between flicker noise and white noise)
- An individual analysis of IGN and DGFI solutions can be found in their respective presentation.

IERS pilot project on prediction

Brian J. Luzum presented the pilot project set up to investigate the feasibility of initiating the operational ensemble EOP predictions and the participants' role within the project. The participants can either get involved with prediction series (daily data, prediction period is equal) or with combined prediction series (daily data, 1-day to 90-day predictions). Documentation of algorithms is mandatory in both cases.

The pilot project:

- Collection of all individual and combined predictions for archival, backup, and evaluation.
- Provide near-real-time feedback for all predictions.
- C04 as standard, predictions of different methods will be

compared to this standard.

- Expecting ~10 participants, comparison will be done in every case.
- Participants can bring in their solution or take them out to compare/combine.
- A later participation will be possible at any time.

The goal of the pilot project is to provide recommendations on the feasibility of producing operational ensemble EOP products. The estimated timeline envisages:

- Call for participation: June 2010 (notification of participants: July 2010).
- Providing sample data file and documentation of the participants: August 2010.
- Providing predictions operationally: September 2010 (October 2010 for combined predictions).
- Interim reports to IERS DB: 2010–2012 and a final report and recommendations in fall 2012.

Decision: The DB agreed on the pilot project.

New Action Items:

#50.01 Schedule for updating EOP XX C04 according to ITRF2008

#50.02 Prepare the call for proposals to participate in the EOP prediction pilot project, CB will distribute

Status of the new GGFC components

Tonie van Dam reported about construction of the new GGFC website: the skeleton structure is ready but some inputs are missing. The Special Bureaus for the Atmosphere and for the Oceans still have their old websites, the 6-month accreditation period is to be finished by summer.

She also presented the GGFC Status Report as of 1 April 2010. Short reports of the Special Bureaus for the Oceans and for the Atmosphere were received about their work, products, and the progress of the new web pages. There was no reply from the SB for Hydrology. An overview of the SBs concerning available new products and links to data server/websites was given. D. MacMillan, who continues to run the atml_load at NASA/GSFC, is a potential contributor and was asked for a proposal.

R. Koenig sent in a proposal concerning site displacements due to atmospheric pressure loading computed at GFZ.

New Action Items:

#50.03 Send the GFZ proposal by R. Koenig to SB chairs for review, GGFC chair should give a recommendation to IERS DB

#50.04 Complete the actions described in the GGFC report (improve website, invite other contributors)

Urs Hugentobler presented results of IGS products: final orbits

Reports from the Technique Centres

International GNSS Service (IGS)

and clocks, rapid orbits and clocks, ultra rapid orbits and clocks. There were 9 ACs between 1994 and 2007. Starting in 2011 decisions on new models and new reprocessing will be made. A real time pilot project on real time clocks was set up and will be combined at ESOC.

There is an issue on equipment change because there seem the be observed changes in data attributed to instrumental effects. An infrastructure committee set up by S. Fisher will handle numerous changes in the 400-station network detected big discrepancies due to frequent equipment changes at stations. On-site calibration of the stations, especially for radome covered antennas, could provide useful information.

The combination activities have been moved from NRCan to IGN.

New satellite antenna offsets will be updated in a new SINEX version.

GRGS (Groupe de Recherche de Géodésie Spaciale) will become a new AC, but this is not yet official.

There are only a few ACs for the ultra rapid orbits and ultra rapid clocks. IGS needs more ACs for the case that an AC fails.

International Laser Ranging Service (ILRS)

Erricos Pavlis presented a summary of the ILRS report. The are 8 ACs: ASI, BKG, GA, GFZ, GRGS, JCET, and NSGF. Concerning the ITRF2008P Tests, 4 ACs responded, 2 have provided some input so far:

- JCET report (E. Pavlis): ITRFP combination improves the a priori fits of the two LAGEOS data sets for the entire data period, there is a significant overall improvement to fits over the period 2006 to 2010 (collected data did not contribute to ITRF2005), and an even more significant improvement of data from 2009 which are not contributing to either combination.
- ASI report (V. Luceri): comparison of ILRSA vs. SLRF2005 and ITRF2008P, core sites gave a residual WRMS of ~4mm in the mean.

International VLBI Service for Geodesy and Astrometry (IVS)

Rüdiger Haas gave a short report on the IVS. The VLBI 2010 project is ongoing, some new telescopes have been approved for Spain and requested for Onsala, Sweden. The EO has potential low latency for UT1 but the ultra rapid sessions are not in the EOP products because they are not reduced operationally. He gave an overview of the analysis of a real-time correlated ultra rapid R&D session with respect to a rapid session and a priori and predicted UT series, showing a good agreement to the predicted values. The objective is to obtain the UT1 result within the shortest possible time. A recorded session Onsala – Tsukuba was correlated in 2–3 minutes with a new software correlator at GSI and the UT1 result was available with a latency of 45 min. Making it operational will need coordination.

ITRS/ITRF

Reports and decision on ITRF 2008

Zuheir Altamimi presented the status of ITRF2008, but no final consensus was reached with the DGFI solution. However, differences are not considered to be significant. ITRF2008 is already outdated for all South-American sites because of the Chile earthquake. Summary of TC opinions after first tests:

- 75% of TCs favour the release of the ITRS Centre (IGN) solution for evaluation without additional delay.
- IVS, ILRS and IDS propose extensive evaluation of the two solutions.
- ITRF2008P was released to the TCs for evaluation on March 31, 2010.
- ITRF2008D solution is also available at the ITRS Centre server.

IVS did extensive evaluations, all IVS concerns will be satisfied for the final ITRF2008 solution.

Z. Altamimi proposed to the IERS DB:

- A final ITRF2008 solution will be ready and can be released before the end of May, 2010.
- Set up an extensive campaign of evaluation and comparison of the DGFI and IGN approaches and solutions until October 2010.

Concerning the evaluation/comparison campaign, the following data should at least made available for both solutions:

Combination procedure and starting assumptions, like frame definition handling of each technique, adjusted parameters, usage of local ties, method for relative technique weighting, discontinuity handling and velocity constraints, frame definition of the final combination. Full solutions and files for the 4 techniques. Local ties used and their weighting. Full post-fit residuals of technique solutions (positions, velocities, EOPs) and local ties. Additional test combinations must be provided.

Hermann Drewes presented a summary of the ITRF computation strategy at DGFI and the differences with respect to the combination technique at IGN. The principal difference is the accumulation of NEQs, followed by fixing the datum on the basis of normal equations (DGFI) and a final inversion of the normal equations, versus stacking the weekly inverted NEQs by similarity transformations, fixing the datum crust-fixed (IGN) for a final solution. There is a fundamental question of whether a “crust-fixed” reference frame takes into account the IERS. H. Drewes analysed a difference of 1 ppb for SLR/VLBI (corresponding to 6mm) and a moving geocentre of 1 mm/year.

H. Drewes is interested in discussing the two solutions and not only presenting them. He presented Manuela Seitz as his successor as director of the combination centre at DGFI for the next ITRF.

In addition to the DGFI report given at the IERS DB meeting, M. Seitz prepared a detailed presentation about the aspects of ITRF2008 computation and investigations at DGFI. Details are given concerning scale analysis and scale definition of ITRF2008 and the selection of local ties. In the chapter comparison with IGN solution station coordinates, datum parameters and EOPs are investigated and finally suggestions for improvements are given. Due to a lack of time it was not possible that M. Seitz gave the presentation, which is available on request from the author or the CB.

Recommendations for the next ITRF:

Markus Rothacher: keep all solutions open and accessible for all interested groups and persons.

Chopo Ma: better schedule for the next ITRF, giving more time for evaluation (problem: late response of ACs).

M. Rothacher: understanding the differences between the two solutions before the next ITRF will be computed.

H. Drewes proposed a new ITRF in 2012 in order to collect enough data within a minimum of 2 years after the earthquake in South America in 2010.

Z. Altamimi will author a short booklet as a technical note for the ITRF2005 (no technical note existing so far). For ITRF2008 a technical note is foreseen with a comparison and a note on DGFI solution.

IERS Working Group on on Site Survey and Co-location

As Pierguido Sarti could not participate in this IERS DB meeting, his report was distributed with the minutes, covering the following subjects:

- WG meetings: 1st WG meeting was held on December 16th, 2009 at San Francisco (detailed minutes can be found in the report). Next meeting on May 4, 2010 at EGU in Vienna. Agenda: Site survey standards, tie vector estimation, site survey activities, coordination and research, miscellaneous.
- EGU2010 session: A session covering all aspects relevant to the WG activity, "The Global Geodetic Observing System: Tying and Integrating Geodetic Techniques for Research and Applications", covering the large inter-technique residuals in combinations of the different space-based and ground-based techniques. These discrepancies have to be reduced by modernising the

geodetic infrastructure and homogeneous processing of geodetic data.

IERS Working Group on Combination at the Observation Level

Daniel Gambis presented the report of the IERS WG for Richard Biancale:

A comparison campaign on combination at the observation level was set up to analyse the strategy of SINEX files processing at GRGS. The SINEX to GINS conversion was tested for AIUB SINEX files and the GRGS EOP determination was analysed and proposals given. A benchmark was established August, 10 to 30, 2008, the file exchange format is SINEX. Participating ACs are: AIUB, DGFI, ESOC, GFZ, GRGS. Showing a diagram he explained the strategy of SINEX files processing at GRGS. SINEX to GINS conversion: keep identified elements (parameter names), convert units used for EOP into GINS format, convert ASCII files into binary files. Solution estimation by NEQ inversion: adapt director files with the SINEX signalled elements, extract solutions from Dynamo solution files. Conversion of solution from GINS to SINEX: make SINEX files available via ftp. Summary: Homogenous SINEX format.

Decision: ITRF2008 of IGN will be the official ITRF2008, but in the Technical Note publication both solutions will be presented.

New Action Items:

#50.05 Send information of local survey in O'Higgins to Z. Altamimi

#50.06 Complete ITRF2008 according to proposed schedule

#50.07 Make available the DGFI final result for examination

New version of IERS Conventions

Brian J. Luzum presented for Gérard Petit the new reference edition of the IERS Conventions covering the updates of the different chapters highlighting the achieved points concerning:

- Ch. 3 Conventional dynamical realization of the ICRS
- Ch. 4 Terrestrial reference systems and frame
- Ch. 5 Transformation between ITRF and GCRS (rewritten, FCN model, introduction of librations)
- Ch. 6 Geopotential (ocean pole tide, new conventional geopotential model)
- Ch. 7 Displacement of reference points (conventional ocean tide loading. Ocean pole tide loading, technique-dependent effects, new conventional mean pole)
- Ch. 8 Tidal variations in the Earth's rotation (new model for zonal tides)
- Ch 9 Atmospheric propagation (optical: new model, radio: new conventional mapping functions, new section on ionosphere)
- CH. 10 General relativistic models for space-time

coordinates and equations of motion (new section, implementation of IAU recommendations)

and the still-under-work points concerning:

- Ch. 2 Conventional celestial reference system and frame (new ICRF)
- Ch. 6 Geopotential (ocean tides)
- Ch. 7 Displacement of reference points (diurnal/semidiurnal atmospheric pressure loading effect, non tidal) loading effect, technique-dependent effects
- Ch. 4 [possibly] Terrestrial reference systems and frames (ITRF2008)
- Ch. 8 [possibly] Tidal variations in the Earth's rotation (new model for diurnal and semidiurnal EOP variations)

Other work: Software associated with conventional models, conventions document to be fully cross-referenced, glossary under development, web page on "additional material".

A new mean pole model was defined as the old model was not sufficient. For Ch. 8 the current high frequency ERP model is deficient, especially for GPS. Updated software was implemented and additional material added. The IERS Conventions 2010 are to be available in the near future.

C. Ma proposed to look at the high frequency EOP model and the description in June and to look for specific points with R. Ray in the beginning of July. E. Pavlis mentioned that the Technique Centres are not informed from when the Conventions should be used and implemented. Also for multiple models some evaluation is needed on the level of model differences compared to level of accuracy.

The final version of the conventions for print should be finished in December, the latest, or in October. The Directing Board should endorse major change, goal of Sept. 2010.

New Action Item:

#50.08 Model for diurnal/subdiurnal variations: choose a new model for high frequency earth orientation

Reports on GGOS, GIC and GEO

GGOS

Markus Rothacher presented the GGOS Portal and the GGOS Book and gave a report on GGOS activities since IERS DB meeting #49 including:

New components in GGOS: Established new components (January 2009), GGOS portal (January 2009), GGOS2020 Book (published in summer 2009), GGOS Coordination Office (January 2010)

Frankfurt meeting on GGOS Intergovernmental Committee (GIC):

- Goals: coordination of resources, promotion for GGOS in international entities, link GGOS to higher intergovernmental bodies

- Past meetings: Frankfurt Meeting in November 2–3, 2009 (Frankfurt Declaration), FIG 2010 in Sydney on April 15, 2010
- Next meeting: EGU in Vienna on May 7, 2010
- Problem: long-term support and sustainability of IAG Services
- White paper and inter-agency agreement to be prepared

3 GGOS themes to make progress towards integrated GGOS products:

- Theme 1: Global Unified Height System
- Theme 2: Geohazards
- Theme 3: Sea-Level Change, Variability and Forecasting
- Global GGOS network of core sites (GGCN): Call for participation in preparation
  GEO Committee Representatives from GGOS, GEO task representation from GGOS

Past meetings and workshops:

- Workshop on Infrastructure of IAG Services, November 2–3, 2009 in Frankfurt
- GEO VI Plenary/IGOS Symposium, November 17–18, 2009 in Washington
- AGU Fall Meeting, GGOS Session, December 14–18, 2009 in San Francisco
- GGOS Retreat on Implementation Plan, February 1–4, 2010 in Miami
- FIG 2010, April 12–16, 2010 in Sydney; GGOS session

Next meetings and workshops:

- GGOS session at EGU meeting, May 5, 2010 in Vienna
- 18th GGOS Steering Committee meeting at EGU, May 3, 2010 in Vienna
- IGS Workshop 2010, June 28 – July 2 in Newcastle, UK
- Wegener meeting, September 14–17, 2010 in Istanbul
- Reference Frame Symposium, October 4–8. 2010 in Paris
- GGOS Science Workshop on “Earth Rotation”, October 25–29, 2010 in Shanghai, China
- GEO Ministerial Summit, November 3–5, 2010 in Beijing, China

Next major steps: Follow-up on the three themes and action items, implementation plan for GGOS2020, GGOS Portal and official GGOS web pages, update of GGOS ToR, GEO tasks: GEO VI and

IGOS, call for participation for GGCN, GGOS "strategy" document.

GIC

Bernd Richter presented the GGOS Intergovernmental Committee (GIC):

Strengths: IAG Services are the backbones of GGOS, delivering the products related to high precision reference frames, fundamental science and infrastructure for global geodetic tasks, functional community of international voluntary cooperation and scientifically based strategy plan for the enhancement of the geodetic product. Weaknesses: the products of IAG Services currently "best effort", suboptimal global observing networks, infrastructure custodians are missing long-term stable financial resources, replacement of aging infrastructure (allow new technical challenges) and suffering of the global geodetic network of several debilitating closures.

Meetings:

- Meeting of Governmental, IAG, GOOS and IAG Services on November 2 and 3, 2009 in Frankfurt
- 1st meeting of the GIC Planning Team on February 2–4, 2010 during GGOS Retreat in Miami
- 2nd meeting at FIG Congress on April 12–16, 2010 in Sydney
- 3rd meeting at EGU on May 7, 2010 at Vienna

GIC supporting GGOS: providing a forum for the coordination of resources, promotion of GGOS in international entities, examining options for aligning the activities of GGOS with some higher intergovernmental oversight

Membership of GIC: representatives of organisations contributing resources to the existing activities of the IAG services; other organisations may be invited as observers.

Goals: strengthen GGOS structurally and administratively and the infrastructure they are based on, secure long-term operation.

Tasks: Identifying the resources needed for the basic GGOS operations, maintain liaison with IAG/GGOS, government representation, maintenance of the liaison with GGOS (new GGOS governance structure).

GEO

Bernd Richter made a presentation of the GEOSS (Global Earth Observation System of Systems) Architecture and Data Committee (ADC) Activities, showing the GCI (GEOSS Common Infrastructure) operational view including its nine social benefit areas and the Earth observations contributions. The goal of GCI is to strengthen GGOS (+its infrastructure) and to secure their long-term operation. From 2010 to 2015 the operational scenario is changing from multiple (three Web Portals and three Clearing Houses) to single

GCI components (one Web Portal and one Clearing House). BR presented the GEO Sub-Task AR-09-02c (Global Geodetic Reference Frames) showing the Work Plan, organizational changes (Lead Zuheir Altamimi, point of contact Bernd Richter), objectives and progresses made (GGOS2020, WG on ITRS ISO standards, CfP for Unified Height System) and GEO Sub-Task AR-09-03e (Global Geodetic Observing Systems) by M. Pearlman showing the target (operational ground network of space geodetic sites satisfying Sub-Task DA-09-02c (Global Reference Frame Systems), the Work Plan, schemata with the proposed elements of the Data Strategy (including ADC, UIC, STC and CBC) and the strategy from a functional perspective.

Consequences for IERS out of UAW

Markus Rothacher gave a report on the GGOS Unified Analysis Workshop (UAW) 2009: the goal was to increase the common understanding of all techniques for each individual technique contributing to GGOS and to make concrete progress. The four workshop sessions covered: (1) products by the Services, GGOS Portal and Metadata, (2) modelling deficiencies and modelling based on external data, (3) combination strategies, common parameters and combined products, (4) network simulations and analyses. The major action items concern benchmarking of software packages, SINEX format update, working group on SINEX and data base of daily SINEX files, troposphere combination campaign, sub daily ERPs, IERS WG on parameterisation and modelling standards for IERS201x, unified documentation of AC modelling and parameterisation, reference pressure for atmospheric loading, sub daily ERP tidal model, consistent ERP parameterisation, SLR tracking of GLONASS, survey for products.

One point was also the SINEX update to version 2.10, with the introduction of new blocks (e.g. a FILE/METADATA block) and extended parameterisation (e.g. piece-wise linear representation) amongst others.

Next UAW: in late 2011 at ETH Zürich, Switzerland.

M. Rothacher proposed the foundation of a working group on SINEX format with involvement of TCs, Daniela Thaller as chair as SINEX format expert, including AC Coordinators, involving GGOS and the gravity field service of they are interested. He will ask D. Thaller and Carey Noll.

New Action Item:
#50.09 Write draft charter and membership list for WG on SINEX and contact D. Thaller as prospective chair

Jean Souchay presented a report on ICRS Centre activities.

ICRS/ICRF

Current status/news of the ICRS-dedicated tasks:

- Task 1: Maintenance and extension of the ICRF (contribution to ICRF2).
- Task 2: Investigation of future VLBI realisations of the ICRS (ICRF2 as new fundamental astronomic reference frame, details in IERS Technical Note 35, WG meeting held on February 10, 2010 in Hobart, development of future reference frames).
- Task 3: Investigation of future non VLBI realisations of the ICRS (L.Q.R.F. , Large Quasar Reference Frame).
- Paris Observatory VLBI Group (radio source monitoring).
- Astro-photometric study of the variability of quasars.
- Task 6: Maintenance of link to Hipparcos (UCAC-USNO CCD Astrograph Catalogue – version 3 released.
- Task 10: Maintenance of link to the dynamical system through LLR.
- Corrections to the celestial pole coordinates (VLBI, LLR and combination).
- Recovery of lost lunar reference point Lunokhod 1, VLBI with constant bias, no real drift between VLBI and LLR.

IAU-related issues

Alexander Brzezinski gave a summary:

- Division I “Fundamental astronomy” – discussing possibility of quasi-permanent bodies within IAU and re-examination of Commissions. IAU agreed to co-sponsor the GGOS meeting in Shanghai and the Journées 2010.
- Commission 19 “Rotation of the Earth”: Harald Schuh and Florian Seitz working on commission member list, new web site: <http://www.iau-comm19.org/>
- Commission 4 “Ephemerides”: Message to the IERS DB from George Kaplan, President of the IAU Commission 4, concerning the adoption of JPL’s DE421 ephemeris in Conventions without sufficient study and the comparison of the three major independent ephemeris centres JPL, IAA and IMCCE.

Meetings of interest:

- Journées 2010 Système de référence spatio-temporels on September 20–22, 2010 in Paris (see IERS Message No. 160 and <http://syrte.obspm.fr/journees2010/ >)
- Joint GGOS/IAU Science Workshop on October 25–28, 2010 in Shanghai, China (see IERS Message No. 162 and <http://GGOS-C19.shao.ac.cn/>)

Tom Herring approached as possible IERS AC, but has to accept

Renewal of the IERS Analysis Coordinator

(agreed in principle). A description of the role and tasks of IERS Analysis Coordinator is needed.

Reports on ICSU activities

For lack of time the report on ICSU activities was left out and sent out with the minutes.

The presentation by Bernd Richter reported on the World Data System (WDS) and the Strategic Coordinating Committee on Information and Data (SCCID) of the ICSU (International Council for Science):

WDS: construction structure: ICSU -> Strategic Coordinating Committee -> World Data System Scientific Committee -> Data centres and services. The WDS Common Data Portal Prototype is built on 4 layers: the producers (related projects, data efforts, institutes, monitoring, services) feeding the WDC as long-term data archiving and publishing facilities, dissimilation of WDC catalogue via offline products, WDC and other portals, DOI registry and library catalogues to the community.

WDS Components: World Data Centres, International Data Analysis Services, National Data Centres and Analysis Services, disciplinary data organisations (e.g. IRIS, Intermagnet, Virtual Observatories, etc.), Data publishers.

SCCID: leadership role on behalf of the global scientific community (policies, management and stewardship), expertise and advice to ICSU, coordination among ICSU activities, training and capacity enhancement focused on least developed countries, strategic advice and guidance of the implementation of new ICSU WDA structure, work with relevant ICSU bodies and key partners.

Miscellaneous

ITRF standardization: Zuheir Altamimi gave a report from C. Boucher working on ISO standards and ISO products within GGOS that France is willing to host the secretariat and provide the 100.000 Euro needed to do the ISO standardization. This would be done by AFNOR; the proposal has to be ready in October/November 2010. DB members, countries and organisations should support the proposal. Bernd Richter reminded that support is through the national standardization organisation of each country. Z. Altamimi proposed that IAG national representatives should be asked to work with their standards organizations.

Next IERS Directing Board meeting

The DB discussed whether the next meeting should be held in Europe (e.g. during the IAG Commission I Symposium 2010 in Marne-La-Vallée, France) or in USA.

New Action Item:

#50.13 Set the next DB meeting after consulting T. Herring

Meeting No. 51

October 10, 2010, Observatoire de Paris, Paris, France

Introduction and approval of agenda

The agenda was accepted. Jean Souchay as representative of Observatoire de Paris, and the Chair, Chopo Ma, welcomed the guests and the members of the IERS Directing Board.

Formalities

Besides minor formal changes the Central Bureau received no further comments for the minutes of IERS DB No. 50.

Status of the new GGFC

Tonie van Dam gave an overview on the status of GGFC concerning the reorganization, the combination products, the web site and the how to proceed in the near future.

The reorganization of the GGFC was approved in October 2009. New product centres are:

- TUV gridded Vienna mapping functions 1 and zenith delay,
- GFZ (Maik Thomas) contributes AAM (SBA), OAM (SBO) and HAM (SBH).

Loading has been calculated by:

- NCEP atm pressure contributing to SBA,
- GLDAS hydrology contributing to SBH, and
- ECCO bottom pressure contributing to SBO.

Concerning the combination products: AOD (Atmosphere and Ocean De-aliasing) loading still needs to be generated, the web site is still under construction (mainly the download area), but will be set up by the AGU meeting.

The web site will be reachable under <http://geophy.uni.lu> and will be online in 2 weeks.

The tasks for the near future are mainly the accreditation of SBO, SBA and SBH. Furthermore, missing products have to be identified and a call for new products prepared, especially cryosphere observations or models, solid earth models (post glacial rebound core mantle) and GRACE products.

One question to answer is how external products (i.e. new products of the IERS services) can be validated and accredited to be consistent with the already existing, well defined, standard products.

A meeting is envisaged in 2011, probably at EGU2011.

New Action Items:

#51.01 Get GGFC web site operational.

#51.02 Survey of community, products → how to validate new products?

Earth orientation products

Generating IERS EOP series consistent with ITRF2008

Christian Bizouard presented some results and comparisons carried out with C04_05 series and the new C04_08 series. Remarkable is a pole coordinates shift of 40 mas in the IVS EOP compared to the C04_05 series.

Tom Herring proposed a reprocessing of the EOP with ITRF2008 pointing out, that the IGS solution is too smooth, causing the C04 solution being too smooth too.

Zuheir Altamimi argued that there is no problem to reprocess the solution more precisely using all data available until 2009.5 to be consistent with C04_08. The user will use the EOP and the reference frame together (provide to OPAR).

Christian Bizouard might ask the services to provide the solution between 2009.5 up to now.

Proposal: make C04_08 solution public, and stop C04_05 solution at a given date (e.g. December 1, 2010), notifying the users in November 2010.

Noise and stability of pole coordinate series: the offset between the various time series reflects the precision of pole coordinates. The Allan variance of this offset quantifies their stability at different time scale (the smaller the Allen variance for time lag τ, the larger is the precision of these time series).

Clues for the future combination: stability of time series differences depends on time scale. The present weighting of techniques is not satisfactory (it does not account for technique dependency on time scale).

IERS pilot project on prediction

Chopo Ma made the presentation of the WG (as Brian Luzum was excused) showing the status of the pilot project on EOP combination of prediction.

The pilot project collects all individual predictions and combined predictions for archival, backup and evaluations. The project provides near-real-time feedback for all predictions using the C04 solution as metric. The goal is to provide recommendations on feasibility of producing operational ensemble EOP predictions.

The project started in June 2010 with the call for participation. When the project will be operational (this is scheduled for October 2010) the participants will provide predictions and combined predictions operationally (list of participants see below).

Interim reports to the IERS DB are envisaged for 2010–2012 and a final report for fall 2012.

List of participants:

- Jet Propulsion Laboratory (R. Gross)
- Paris Observatory (D. Gambis)
- Pulkovo Observatory (Z. Malkin) (combined products)
- Shanghai Astronomical Observatory (Xu X.)
- Siberian Scientific Research Institute of Metrology and Siberian State Geodetic Academy (V. Tissen)

- Space Research Centre (W. Kosek, T. Niedzielski) (combined products)
- Ulyanovsk State Technical University (S. Valeev)
- U.S. Naval Observatory (B. Luzum) (combined products)

Auxiliary data will come from the IERS Special Bureau for the Atmosphere (AAM data), from IGS (ultra EOP predictions) and from GFZ (AAM/OAM/HAM data).

Information concerning the pilot project and its contributing participants can be found at <http://maia.usno.navy.mil/eopcppp>, with a mirror site available at <http://www3.cbk.waw.pl/eopcppp>.

New Action Items:

#51.03 Make C04_08 solution public, and stop C04_05 solution a.s.a.p. at a given date. Notify the users, coordinate the transition to the C04_08

#51.04 TCs should provide data consistent with ITRF 2008

#51.05 When is the IGS ready to regenerate polar motion consistent with ITRF2008?

#51.06 IERS Technical Note for C04_08

Reports from the Technique Centres

International DORIS Service (IDS)

Frank Lemoine presented the IDS report 2010 covering the following subjects:

1. Satellite constellation status:
   Current missions are Cryosat-2, Jason-2, Envisat, Spot5, Jason-1 and Spot4, future missions will be Saral/Alti-Ka, Hy2a, Sentinel3a, Jason-3 and Swot. This constellation ensures that there are always 5 or 6 satellites in orbit.
2. Network status:
   A world map showing the DORIS stations can be found in the presentation. Several changes on stations have been done in 2009 and 2010 (beacons, equipment, etc.). For some stations a remote management system has been installed, the stations configuration has been standardized and the beacon model 3.0 deployment is almost completed.
3. DORIS data and data centre status:
   DORIS measurements are available in RINEX format (see <http://www.ids-doris.org/pub/ids/data/RINEX_DORIS.pdf> for further information). Measurements are dated in two ways: in On Board Time and in International Atomic Time scale. The directory structure at data centres can be found in the presentation. New satellite data from Jason-2 and CryoSat-2 in DORIS and RINEX format. Data reissue for Jason-2 and SPOT4 data.

4. Central Bureau report:
   There is a new version of the IDS web site since March 2010 at <http://ids-doris.org>. The Central Bureau's ftp site is available under <ftp.ids-doris.org>.
5. DORIS special issue:
   This will be published in two volumes (volumes 45 and 46) of Advances in Space Research (Elsevier).
6. There us a new IDS citation.
7. Analysis centre activities (post-ITRF2008):
   An IDS Analysis Working Group meeting took place on May 26–27, 2010 at ESOC, Darmstadt, Germany. Guilhem Moreaux (CLS) is new IDS Combination Centre Coordinator.

International GNSS Service (IGS)

Urs Hugentobler presented an overview on the IGS activities. A workshop in Newcastle in June/July 2010 was held with ~235 participants, covering the following topics:

- infrastructure and network
- new GNSS signals
- real time
- reprocessing
- modelling, and
- atmosphere

Concerning the product quality: 2.5 cm consistency for final and rapid orbits, 5 cm for ultras in first 12h prediction. There are too large numbers in the discontinuities.

The Infrastructure Committee made a revision of the site guidelines. The GRGS in Toulouse became a new AC within the IGS, so that there are now 8 ACs providing products for the final combination, the reference frame coordinate transition from NRCan to IGN was performed by Bruno Garayt and there is a new working group on orbit modelling under Marek Ziebart.

The IGS is furthermore involved in RTCM (RINEX), the ICG (geodetic references, time references, alignment to international standards and retro-reflectors on GNSS satellites), and in demonstration campaigns QZSS and CONGO.

A data reprocessing contributing to the ITRF2008 took place from February 2008 until November 2009. All products are available except time scale; currently models are updated according to the updated IERS conventions. Next reprocessing is planned after the new standards have been successfully implemented and tested (~end of next year).

In the field of real time point positioning, there are some 130 stations and several casters, 7 agencies are providing RT solutions (mainly clocks), a conversion to experimental service will be possible in spring 2011.

C. Ma asked about the infrastructure committee. Is it necessary to renew the infrastructure and to calibrate radoms? U. Hugentobler mentioned that this should be a data operation issue.

International Laser Ranging Service (ILRS)

Erricos Pavlis presented the news of the ILRS Analysis Working Group (AWG).

ESA became a new AC of the ILRS, so that there are presently nine ACs contributing products to the ILRS. The operational products (weekly and daily) are delivered routinely and on time (daily: data from the prior week until the day of yesterday). One of the AWG projects was the evaluation of ITRF2008 and ITRF2008D (see "ITRS/ITRF – Summary of the TC services in the use of ITRF2008" in the next section for details). Other projects are the adoption of improved modelling and IERS C&S2010 (starting in early 2011), the re-analysis for the period from 1983 to present, and beginning once all improvements have been checked and validated by all ACs.

The daily product becomes operational in early 2011 and the weekly product becomes "definitive" product with 1–1.5 month latency (to be able to take advantages of global fields for environmental modelling).

The USNO evaluation of the daily product was completed successfully.

Concerning new products, there are some pilot projects in progress covering:

- orbit products (SP3C files)
- weekly 2x2 gravitational harmonic solutions
- CRD data format validation process (new format by January 2011)
- new NP generation procedure, and a
- Special issue of Journal of Geodesy.

Some potential projects are the use of Starlette, BLITS and Ajisai (EOP and TRF) and the near real-time analysis of SLR data for "station health".

A comparison of the daily EOP product – polar motion (ILRS daily vs. USNO finals) – was carried out. The de-aliasing product test shows no obvious differences between the use of a static vs. a daily changing gravity model, differences in mean RMS is 0.5 mm (consistent with prior tests using a de-aliasing product based on ECMWF 6-hr fields only).

AWG meetings: two meetings in 2010 (EGU 2010, Vienna and REFAG 2010, Paris); another meeting possibly at AGU fall meeting. Next meeting: May 14, 2011, Bad Kötzting, Germany.

International VLBI Service for Geodesy and Astrometry (IVS)

Rüdiger Haas presented the IVS report:

Since October 2009 the routine IVS combination is at BKG and works fine. In the analysis, the XY-partials and IAU2006 precession are now used in Solve by GSFC and BKG, the older dψ/dε are only achieved by backward calculation. Some telescope problems in 2010 caused a lot of changes in the IVS schedule in this time: Wettzell is out of operation because of bearing repair since September 1, but should be back operationally in the middle of November this year; Tsukuba was out of operation since July 26 because of repair and is now back since the beginning of October; HartRAO is re-operating since September (was not operating since October 2008), and Fortaleza will be back soon, after being repaired. Concerning the intensive sessions INT-1/2/3: during the time for repair, Westford replaces Wettzell, and Kashima replaces Tsukuba.

The IVS Task Force for Intensives is working on unifying analysis strategy for INT: the ultra-rapid solution is automated with a very low latency; the rapid solution is generated interactively with a low latency, and the final solution is a combined solution. The automated ultra-rapid UT1 observations are interactively analysed with Calc/Solve (USNO) and with C5++ under evaluation of Nick Stamatakos (USNO). Results: differences of max. 75 μsec for UT1 between the two solutions for all sessions. The comparison of the Calc/Solve solution and the C5++ solution for one 24h IVS-session (Onsala – Tsukuba) shows slight differences.

VLBI2010:

- *System development*
  There are several feed-horn, Dewar and data acquisitions developments ongoing at Haystack, Onsala and Göteborg.
- *Network*
  In near future there are some changes in the VLBI network: the Twin Telescope Wettzell (TTW) is under construction; within RAEGE, three or four new telescopes will be built on the Azores, the Canary Islands and in Yebes. Furthermore there are new sites GGAO, Arecibo, and Auscope (three telescopes) and projects in Korea and China. Some submitted project proposals coming from Norway (Twin Telescope Ny-Ålesund – TTN), France (Tahiti), India, Brazil and Saudi Arabia. Projects are in preparation in the USA (10 antennas), Russia (4–10 antennas), Finland and Japan.
- *Simulations*
  VLBI2010 simulations with 'realistic' networks are previewed to be available in 2015, consisting of VLBI2010 antennas and upgraded legacy antennas (network size:

18 telescopes). Scheduling tests are carried out at GSFC and TU Wien, source structure simulations at Observatoire de Bordeaux.

New Action Item:

#51.07 Information about IGS change to ITRF2008

ITRS/ITRF

Report from IAG Commission 1 Symposium – REFAG2010

Zuheir Altamimi gave an overview on the 6 sessions that were held during the Commission 1 Symposium in Marne-La-Vallée (October 4 – 8, 2010):

- *Session 1*: Theory and realization of global terrestrial reference systems
  The main topics were the computation and the quality assessment of both ITRF solutions, the TRF activities of the space techniques (SLR, VLBI, GNSS, DORIS) and their contribution to ITRF2008. Furthermore local ties, site stability and the IERS Conventions were discussed.
- *Session 2*: Strengths, weaknesses, modelling standards and processing strategies of space geodetic techniques
  The topics of this session were: the increasing use of external data (like ECMWF data for mapping functions) that do not cause a problem for reprocessing but for near real-time products (on time availability); DORIS improvements: reached the precision level of SLR and VLBI, GRGS IGS AC achieve a performance comparable to other IGS ACs; combination on the observation level (COL), as well as multi-technique combination, space ties and other related topics.
- *Session 3*: Definition, establishment, maintenance and integration of regional reference Frames
  Most regional sub-commissions are currently in reprocessing mode, except some few institutions (AFREF & APREF, SIRGAS). The recommendation is to minimize the “network effect” by using a global network to realize regional reference frames.
- *Session 4*: Interaction between the celestial and the terrestrial reference frame
- *Session 5*: Definition and establishment of vertical reference systems
  Main conclusion: the vertical datum problem has been studied by many groups using different kind of data, analysis strategies and perspectives. The combination of geometrical and physical parameters makes the vertical datum unification reliable, but the vertical datum problem is still a big challenge for the geodetic community.

- *Session 6*: Usage and applications of reference frames in Geosciences
  This session had shown that reference frames are fundamental to Earth science (sea level change), planetary science (interplanetary spacecraft navigation) and the society (precision agriculture). Co-located measurement techniques on the Moon are previewed to improve the terrestrial reference frame.

Z. Altamimi presented the summary of the REFAG2010 symposium; no decisions have been made so far.

The proceedings of the symposium will be published by Springer as an IAG Symposia volume. Paper submission deadline is January 8, 2011.

C. Boucher pointed out that the task now is to transform the scientific activities into operational services.

Lessons from ITRF2008 and considerations for the future

Zuheir Altamimi presented some technical considerations and some structural considerations.

- Technical considerations
  ITRF2008 accuracy: origin: 1cm over the time-span of SLR observations; scale: 1.2 ppb (8mm) over the common time-span of VLBI and SLR observations.
  Local ties in ITRF: Regarding the uncertainties of the transfer of SLR origin and SLR&VLBI mean scale to GPS frame the presentation shows that the uncertainties of TX, TY, TZ and scale components are 2–3 times larger when using "good" (small sub-set of) ties only, compared to using all available ties, properly weighted (see presentation for details).
  Conclusion: all available weighted ties should be used (the more ties used the more precise is the estimation); technique specific errors are e.g. GPS uncalibrated radomes, VLBI antenna gravitational deformations, SLR range/timing biases and DORIS beacon reference point behaviour.
  Schedule: observe and respect reasonable and agreed schedule for next ITRF solution
- Structural considerations
  ITRS Centre role: enforce role to improve the IERS image; ITRS Centre solution is the official IERS standard solution, but encourage DGFI and other groups to do combination in order to create active competition; IERS label should be unique.

M. Rothacher prefers to see all solutions available and proposed to draw a list of criteria as a basis for tests by the (ACs and) TCs.

T. Herring proposes to publish recommendations by the IERS regarding (among others) the ties, the scale between the techniques and the linear motion.

The proposal came up to name the combination solution of the Combination Centres as a composition of the name of the CC and the reference year (e.g. IGN2008, DGFI2008). The DB voted on this issue and the proposal was accepted without opposition.

M. Rothacher proposed the formation of an ITRF evaluation group within the IERS, composed by several people of the technique centres. The members of this group should be the ACs of IERS, the ACs of the different services and the CB.

C. Ma added that this group won’t exist permanently, rather epoch-wise in parallel with ITRF generations.

The DB accepts this proposal, but details have to follow.

F. Lemoine added that the evaluation group should also be open for everyone who is willing to make contributions.

C. Ma: The IERS DB should accept the membership in the evaluation group by appointment.

Summary of the Technical Services in the use of ITRF2008

- *IGS*
  U. Hugentobler: IGS needs time to switch completely to ITRF2008 as it is not usable immediately.
- *IVS*
  R. Haas: Generally good experiences, but some stations with smaller problems (e.g. Zelenchukskaya)
- *IDS*
  F. Lemoine: IDS sees no difficulties or problems so far, but some DORIS stations are missing
- *ILRS*
  E. Pavlis: ILRS sees no problems using the new ITRF and presented the results of the WG meeting including a detailed analysis of both ITRF solutions:
  LAGEOS 1 & 2 data have been re-analysed from 1983 to present using ITRF2008 (IGN2008) and ITRF2008D (DGFI2008) as apriori. Furthermore comparisons of the site coordinate residuals, Helmert translation parameter Tx, Ty and Tz, as well as the scale have been carried out, without showing significant differences between SLRF2005, ITRF2008 and ITRF2008D. Only the scale comparison is slightly different in ITRF2008 (scale slope ~–0.2mm/yr) and ITRF2008D (scale slope <–0.1mm/yr). Also the 3D site residuals wrms fit quite well between ITRF2008 and ITRF2008D.

IERS Working Group on on Site Survey and Co-location

C. Ma summarised the report from P. Sarti:

A WG meeting took place before the EGU 2010 meeting in Vienna (minutes are under preparation). Ongoing activities:

- Local tie surveying: possibility to write guidelines for surveyors resumed in a reference manual, as the methods are highly site dependent. The objective is a harmonization of the different surveying methods. Furthermore the WG sees the need to inter-compare and test the different software which is used to calculate the local ties coming from field measurements.
- Tie vector residuals are currently being investigated for assessing critical situations at the co-location sites.
- A close cooperation with the Product and Combination Centres is compulsory and part of the ongoing investigation.

The WG needs closer cooperation with the single technique services (particularly IVS, IDS and ILRS) to investigate the role of PCV connecting the electronic and conventional reference points of the different geodetic instruments.

Z. Altamimi proposed to put discrepancies of ties on the web site to facilitate the identification of survey problems.

Decision: The name of the combination product of each Combination Centre will be composed by the name of the CC and the reference year (e.g. IGN2008, DGFI2008). Build an evaluation group.

New Action Items:

#51.08 Information when TCs switch to ITRF2008

#51.09 Write Technical Note on ITRF2008

New IERS Conventions

Gérard Petit presented the new version of the IERS conventions. At present, the new IERS Conventions (2010) are online – <http://tai.bipm.org/iers/conv2010/conv2010.html> – and comments will be accepted until October 18, 2010.

Several chapters have been rewritten, introducing new numerical standards, models (geopotential model, model for zonal tides) or references (ICRF-2, ITRF2008, mean pole), beside other conventions.

Some chapters will be revised afterwards, like Chapter 7.2 (loading effects): for this chapter volunteers and collaboration are needed or Chapter 8 (Tidal Variations in the Earth's Rotation): new model for diurnal and semidiurnal EOP variations.

Furthermore the IERS Conventions also support software associated with conventional models by providing documentation and test cases, including IERS Conventions Software License.

The web page on "additional material" is under construction and expanded as needed: <http://tai.bipm.org/iers/convupdt/convupdt_aux.html>

New Action Items:

#51.10 Implementation and publishing of schedule for new Conventions by Conventions Centre

#51.11 Prioritize the changes

#51.12 Estimate the implementation schedule

Reports on GGOS, GIC and WDS

GGOS

Markus Rothacher presented the GGOS activities since the last DB meeting (#50):

The activities have been:

- The GGOS Web pages
  The web pages are ready, presently reviewed by the GGOS EC and then opened for the GGOS SC
- The 3 GGOS Themes to make progress towards integrated GGOS products
  1. Global Unified Height System (GUHS):
     Capability of ITRF and GUHS (standards, models); tide gauge referenced to ITR collocated with GNSS; time series for tide gauge stations and GIA sites; GGOS core sites (connection to tide gauges wherever possible); co-location of ITRF sites with gravity sites.
  2. Geohazards
     Continued refinement of the accuracy/stability of the ITRF; improved ultra-rapid GNSS orbits and clocks for PPP
  3. Sea-Level Change, Variability and Forecasting
     High-precision ITRF is crucial (geocenter); time series of vertical motion; new format for time series of station coordinates
- Tasks and Action Plans for GGOS2020
  Task 1 – Recommendations in the GGOS2020 Book: step-by-step realization; list of action items from the recommendations
  Task 2 – Work on the three Themes identified in Miami (see above).
  Task 3 – Write down implementation plans for the various GGOS components: core network, data handling, analysis, Earth system model
- GGOS Inter-Agency Committee (GIC)
  The major problem is the long-term support and sustainability of the IAG Services and the global GGOS infrastructure. To support GGOS, the GIC attains its goals by: Forum for the coordination of resources, promotion of GGOS in international entities (UN, etc.), and options to link GGOS to higher intergovernmental bodies.
  The first step is a white paper and an inter-agency

agreement (prepared by GIC Planning Group).
Past meetings of the GIAC: Frankfurt, Germany (Nov, 2009), GGOS Retreat Miami, USA (2010), FIG Sydney, Australia (April, 2010), EGU Vienna, Austria (May, 2010). Next meeting possibly at AGU2010 in San Francisco, USA (December, 2010)

- Meetings, sessions, workshops
  Past meetings:
  GGOS Session at EGU Meeting May, 2010, Vienna and 18th GGOS SC also in Vienna; IGS Workshop in Newcastle, June, 2010; Wegener Meeting in Istanbul, September 2010 and at the Reference Frame Symposium (IAG Comm. 1 Symposium), in Paris, October, 2010.
  Next meetings and workshops:
  GGOS Science Workshop on "Earth Rotation" in Shanghai, China (October 25–29, 2010), GEO Plenary VII Meeting and Ministerial Summit in Beijing, China (November 3–5, 2010), 19th GGOS Steering Committee Meeting in San Francisco (December 11, 2010), AGU Fall Meeting (GGOS session) in San Francisco (December 13–17, 2010), IUGG General Assembly 2011 in Melbourne, Australia (June 28 – July 7, 2011)

The next major steps of GGOS are the follow-up on the three themes and the action items of the GGOS Planning Meeting and SC Meeting, action plans for GGOS2020, GGOS Portal and GGOS web pages, update of the GGOS ToR, contribution to GEO tasks (GEO VII and Ministerial Summit), GGOS "strategy" document, recognition of GGOS by ICSU and other organizations.

GIC and WDS

Bernd Richter added to the remarks given above: a letter to invite the agencies to sign the Frankfurt Declaration, recognize the White Paper and become member of the GIAC was sent out to 15 agencies as a first initiative.

The old World Data Centres and the Federation of Astronomical and Geophysical Services (FAGS) are dissolved and will be reorganised under a new structure (World Data Services, WDS) by ICSU. The new structure has been set up; soon the applications to become a WDS member will be sent out.

New IERS Analysis Coordinator

C. Ma thanked Markus Rothacher for being the AC for the last eight years and proposed Tom Herring as the new AC.

Statement from the new IERS Analysis Coordinator

Tom Herring gave an overview of the tasks of the AC:

As described in the IERS ToR the AC is responsible for the consistency of the IERS reference frame and other products. Furthermore, he is responsible to ensure the appropriate combination of the TC products into the single set of official IERS products. T. Herring proposed to possibly change the ToR in that way that the AC's role covers the monitoring of the TC and PC activities to ensure that the IERS objectives are carried out.

Some specific tasks of the AC are: coordinate and stimulate the generation of the combined and consistent IERS products of different latencies and improve the consistency of the techniques among each other. Therefore, he has to work closely together with ACs of the different techniques. The AC should also be the chair of the working group on parameterization/modelling of ITRF20xx/IERS20xx (to be established); he should serve in the "ITRF datum evaluation" working group, support GGOS in organizing the biennial UAW.

Concerning the ITRS Centre and the ITRS Combination Centres, T. Herring pointed out the current complication that the product centre is one of the two combination centres and that there is a need of more combination centres (possibility to provide ITRF coordinate and velocities but not all EOPs). Desirable is a more open access to intermediate results during their generation.

Other issues concerning the AC's role are: current status and use of the Global Geophysical Fluids Centre (non-tidal loading, VMF), current study groups, roles of IERS and GGOS and their interaction as well as the interaction between the AC and the DB. Z. Altamimi proposed regular discussions between the ACs and the IERS AC to bring in more interaction between them.

Changes in IERS Terms of Reference

Bernd Richter proposed some changes in the IERS Terms of References (ToR):

IERS DB members

Old: "The Directing Board consists of the following members: [...] Representatives of IAU, IAG/IUGG and FAGS."

New: "The Directing Board consists of the following members: [...] Representatives of IAU, IAG/IUGG and GGOS, and Representative of IGFS with observing status."

IERS Analysis Coordinator

Old: "The AC serves for a four-year term, renewable once by the DB. [...]"

New: "The AC is elected by the DB for a term of four years with the possibility of re-election for one additional term. [...] This is accomplished through direct contact with the independent TC Analysis Coordinators *and PC chairs* or equivalent. […]"

Decisions:

The changes of ToR were accepted by the DB.

T. Herring was elected as new AC under the new ToR.

New Action Item:

#51.13 The IAG Executive Committee has to be contacted to inform about the proposed changes in the IERS DB membership (representative of GGOS). GGOS should delegate a representative.

IERS Annual Reports

There are still a non-negligible number of reports missing for the AR 2008, so that the DB decided to publish a bi-annual report 2008/2009 which should be finished by the end of this year.

New Action Item:

#51.14 Send out informational email concerning missing reports for AR 2008/09

Miscellaneous

Election of the new IAG Executive Committee: The IAG services are represented by 3 members.

G. Beutler sent out an email asking for nominations (deadline November 5, 2010). At present H. Schuh, R. Neilan and M. Rothacher are nominated. For the election C. Ma proposed T. Herring as one of the candidates of the three service representatives.

Decision: The IERS DB accepted the proposal to nominate T. Herring as a candidate for the IAG EC.

Next IERS Directing Board meeting

B. Richter proposed to meet before/after EGU2011 in Vienna (April 3 or April 9, 2010).

New Action Item:

#51.15 Coordinate the meeting with the IAG EC

Sabine Bachmann, Wolfgang R. Dick, Bernd Richter