



Activities of the International Earth Rotation and Reference Systems Service



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SIRGAS Meeting / GGOS Days, Rio de Janeiro, November 12, 2019

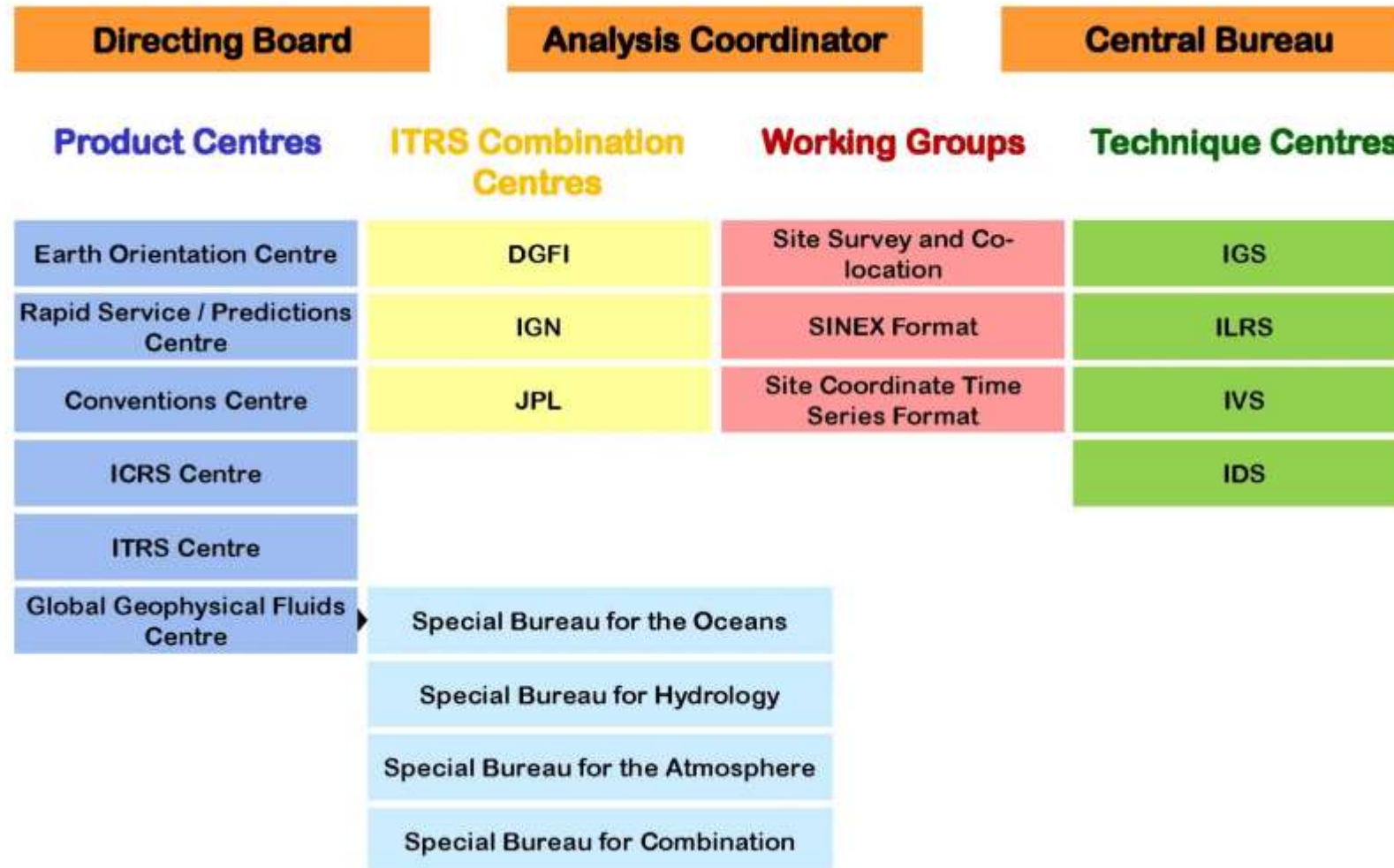


History of the IERS

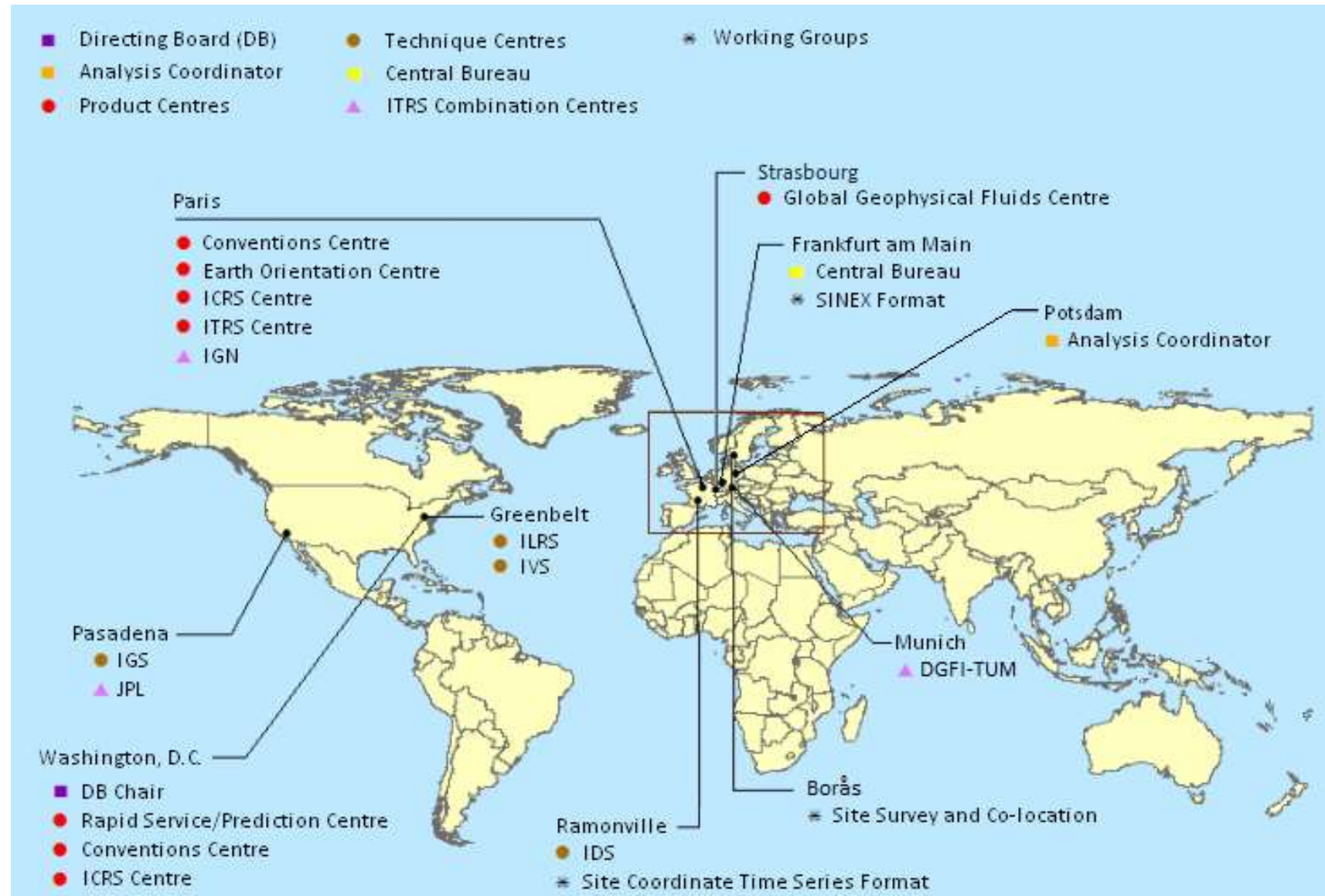
- The “International Earth Rotation Service” (IERS) was created in 1987
- Responsible to the **International Astronomical Union (IAU)** and the **International Union of Geodesy and Geophysics (IUGG)**
- IERS began operations on 1 January 1988 replacing the “International Polar Motion Service” (IPMS) and the Earth Rotation Section of the “Bureau International de l’Heure” (BIH)
- IERS changed its name to “International Earth Rotation and Reference Systems Service” in 2003 to better represent its responsibilities
- Earth orientation relies directly on having accurate, well-defined reference systems
- IERS functions as an **IAG Scientific Service**



Current Structure of the IERS



Current Structure of the IERS



Relation with IAG Technique Services

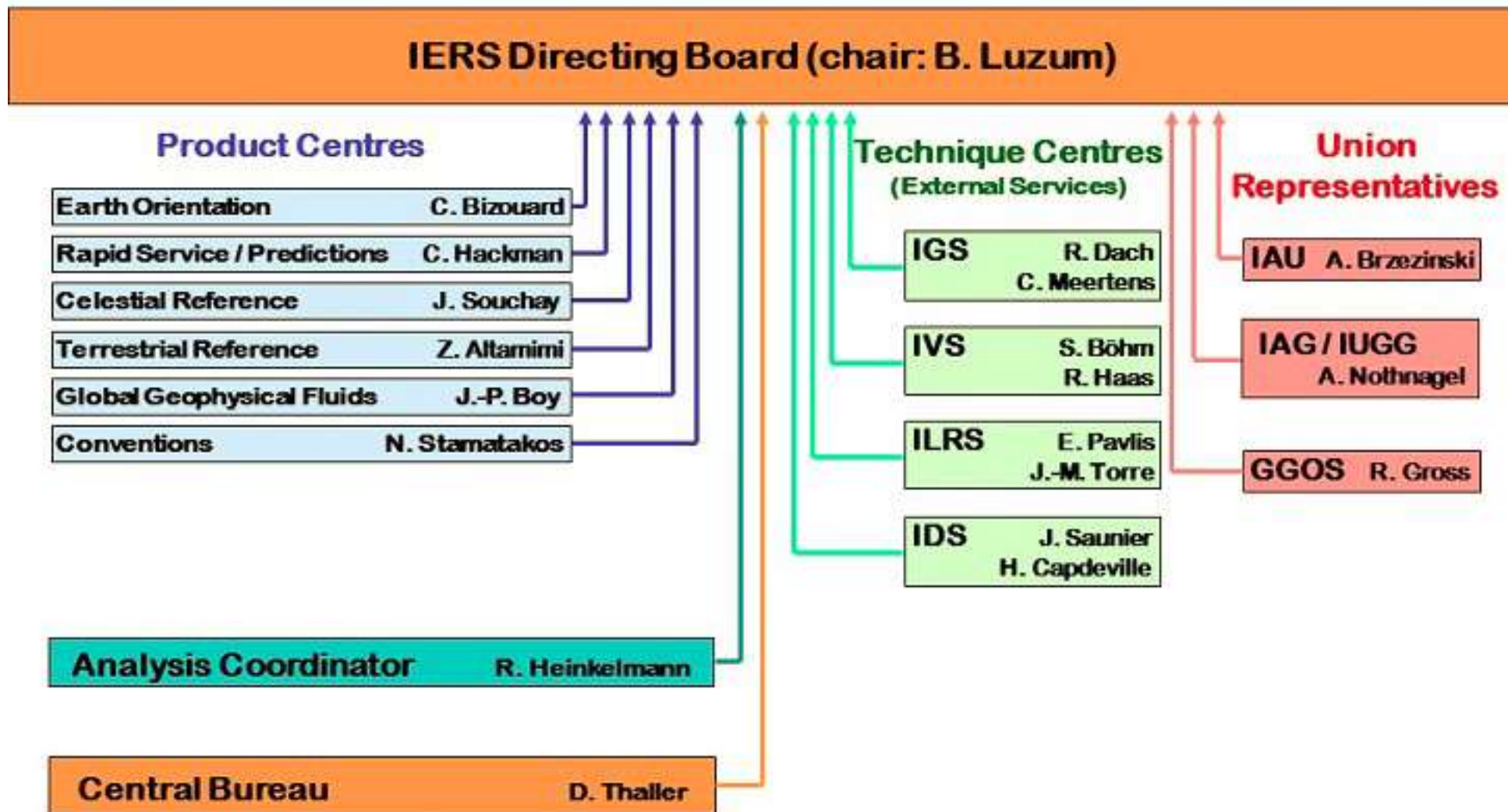
The IAG Services specific for the space-geodetic techniques GNSS, VLBI, SLR/LLR and DORIS are incorporated into the IERS as **Technique**

Centres:



- International GNSS Service
- International VLBI Service for Geodesy and Astrometry
- International Laser Ranging Service
- International DORIS Service

Directing Board of the IERS





Two Product Centres for EOPs

1) **Earth Orientation Centre** (Observatoire de Paris)

- Monitoring of long-term EOPs
- Generate „Final“ IERS EOP series: C04
- Publications of time disseminations
- Leap seconds announcements

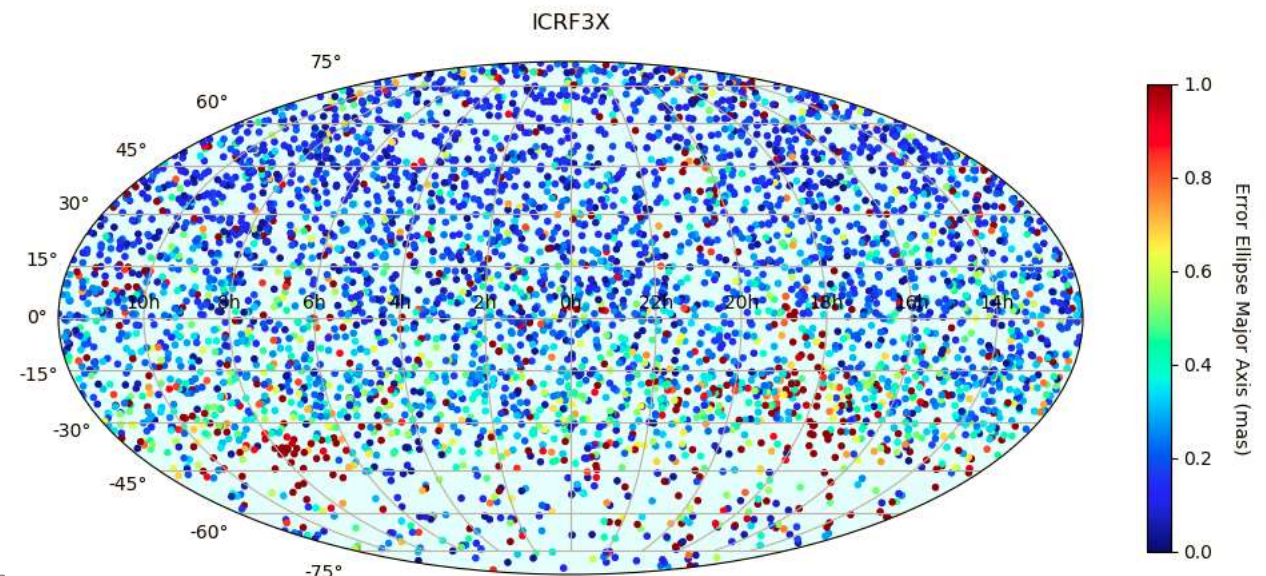
2) **Rapid Service / Prediction Centre** (USNO)

- Generate „Rapid“ IERS EOP series: Bulletin A
- Provide predictions of EOPs

- Since February 2017: all EOP series are aligned to ITRF2014
- All EOP series are multi-technique combined products

Product Centre for ICRS / ICRF

- Operated by Observatoire de Paris and USNO
- Responsible for maintaining the International Celestial Reference System and Frame
- New realization **ICRF-3** was adopted by IAU GA 2018 and became effective on January 1st, 2019
- ICRF-3 was prepared together with IAU Division A Working Group on ICRF3
- ICRF-3 includes X-, K-, KA-band





Product and Combination Centres for ITRS/ITRF

1) **ITRS Product Centre** (IGN France)

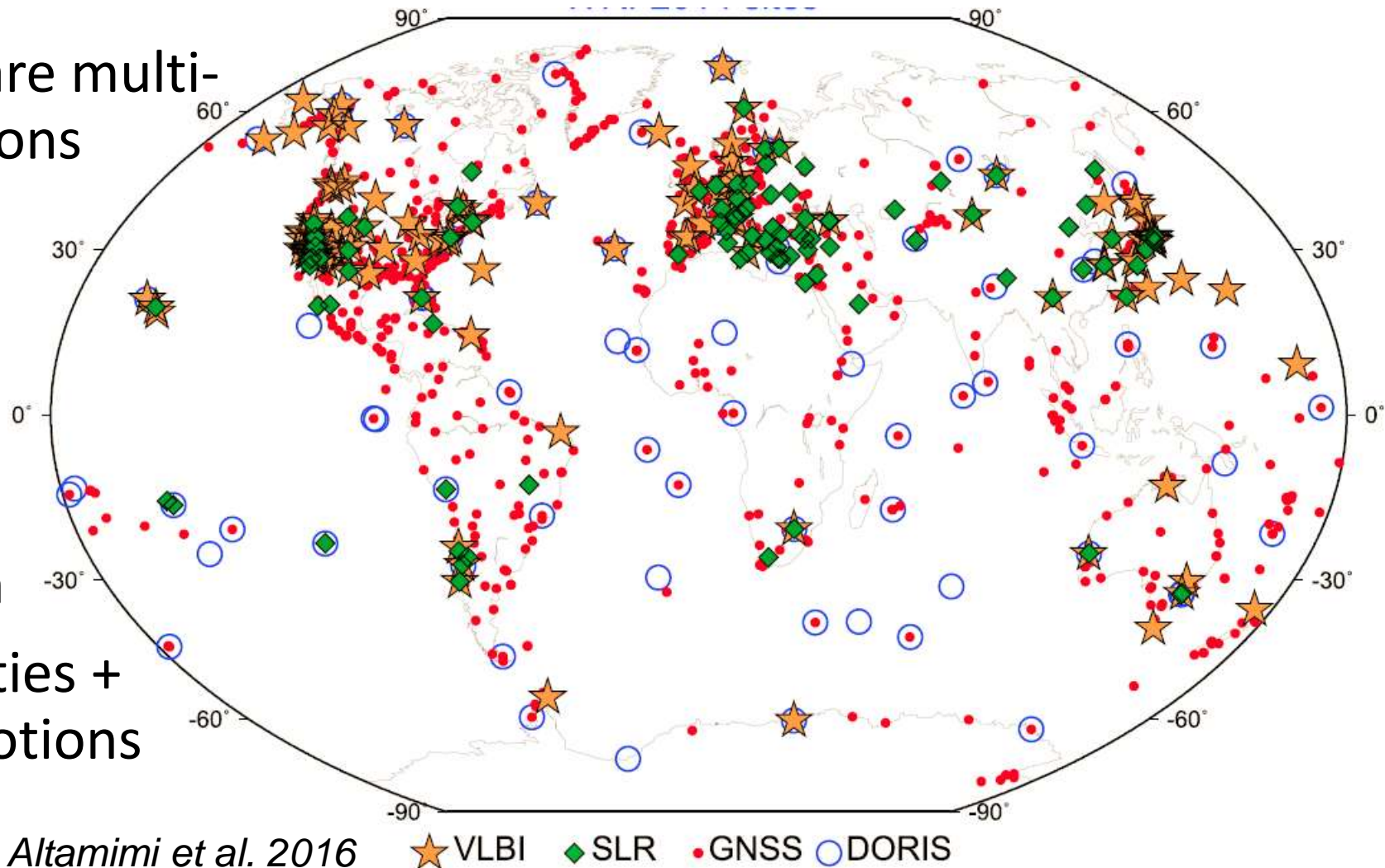
- Publish the long-term terrestrial reference frame
- Latest realization is ITRF2014; it was published in January 2016
- Call for Participation for next realization (i.e. ITRF2020) issued

2) **Three ITRS Combination Centres**

- DGFI-TUM: generated DTRF2014
- IGN France: generated ITRF2014
- JPL: generated JTRF2014

Product and Combination Centres for ITRS/ITRF

- All ITRS realizations are multi-technique combinations
- ITRF2014 contains 1499 stations at 975 sites
- Earth Orientation Parameters are estimated along with
- Coordinates + Velocities + non-linear station motions





Product Centre for Global Geophysical Fluids

- Coordinated by University of Strasbourg
- Three Special Bureaus for:
 - Atmosphere
 - Ocean
 - Hydrology
- One Special Bureau for mass changes in combined systems
- Provide and evaluate products of global geophysical fluids (mass changes, loading deformation)



Product Centre for Conventions

- Operated in cooperation by USNO and Observatoire de Paris
- Responsible for the maintenance of the IERS conventional models, constants and standards
- Current version: **IERS 2010 Conventions** (including partial updates provided on the website)
- Editorial Board is currently organizing a new release of the IERS Conventions: Call for Participation was issued in February 2018



IERS Analysis Coordinator

- Elected for 4 years
- Since December 2018: Robert Heinkelmann (GFZ Potsdam)
- Responsible for the internal and long-term consistency between all IERS products
- Responsible for the appropriate combination of the single-technique contributions into the official IERS multi-technique products
- In preparation: **Joint Working Group on consistent realization of CRF, TRF and EOP**
 - Under IERS, IAG (sub-commission 1.4) and IAU (Commission A2)



IERS Central Bureau

- Operated by BKG
- General management of the IERS
- Executive arm of the IERS Directing Board
- Maintains the IERS website as central access point:
<https://www.iers.org>
- Maintains a Data and Information System for all products of the IERS



[Organization](#) [Data / Products / Tools](#) [Publications](#) [Science background](#) [News / Meetings](#) [Links](#)

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Organization

The IERS was established in 1987 by the International Astronomical Union and the International Union of Geodesy and Geophysics. According to the Terms of Reference, the IERS accomplishes its mission through the following components: Technique Centres, Product Centres, Combination Centres, Analysis Coordinator, Central Bureau, Directing Board.

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Publications

The IERS issues Messages to distribute news, Bulletins to provide Earth orientation data, Technical Notes to publish research results and proceedings of workshops, and Annual Reports to inform the public about its work.

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Links to Earth rotation and IERS - Geodesy and other geosciences - Astronomy - Space research - Mathematics - Physics - Books and papers - Computers and informatics - Link lists and search engines.

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The IERS provides data on Earth orientation, on the International Celestial Reference System/Frame, on the International Terrestrial Reference System/Frame, and on geophysical fluids. It maintains also Conventions containing models, constants and standards.

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Science background

Information about Earth rotation, reference frames, and observation techniques in general - Glossary - References - List of acronyms.

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News and meetings

View news ordered by date or with respect to publications or general topics of the IERS. Calendars of meetings related to the work of IERS and of IERS Workshops are available.

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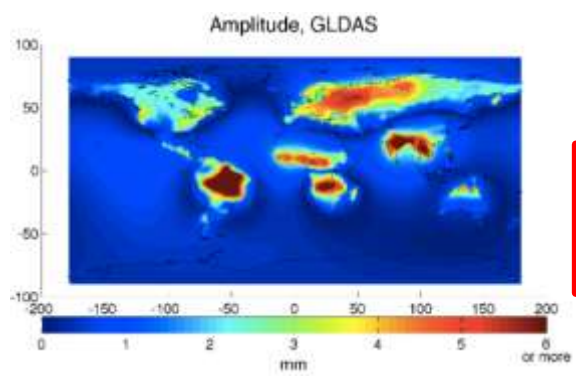
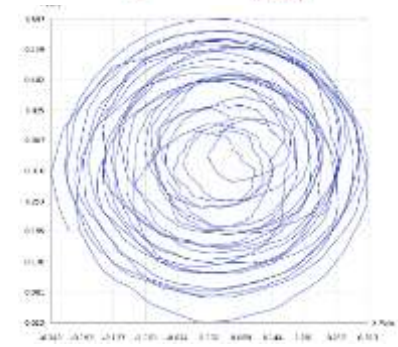
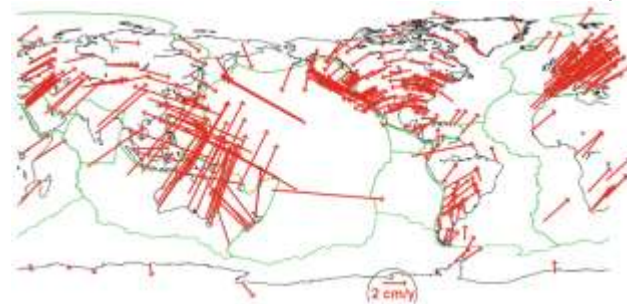


IERS Central Bureau

- Provide tools for visualising and accessing the IERS products

Terrestrial and Celestial Reference Frame

Earth Orientation Parameters



Geophysical fluid models for loading

SIRGAS 201

International Earth Rotation and Reference Systems Service

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Data / Products / Tools

Publications

Science background

News / Meetings

Links

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Acronyms

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IERS Central Bureau

International Earth Rotation and Reference Systems Service (IERS)
Service International de la Rotation Terrestre et des Systèmes de Référence

IERS Technical Note No. 38

Analysis and results of ITRF2014

Z. Altamimi, P. Rebischung, L. Métivier, X. Collilieux

Verlag des Bundesamts für Kartographie und Geodäsie
Frankfurt am Main 2017



Organization

Data / Products / Tools

Publications

Science background

News / Meetings

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IERS Messages

The IERS Messages contain short and rapid information about the IERS and its products for contributors and users. They replace the IERS Gazettes, issued between 1996 and 2000.

[product metadata](#)
[available versions](#)

IERS Bulletins

IERS Bulletins contain rapid and monthly earth orientation data as well as leap second announcements and announcements of DUT1 distributed via e-mail or by downloading.

[more...](#)

IERS Technical Notes

The IERS Technical Notes give technical information related to the IERS activities, e.g. reference frames, excitation of the earth rotation, computational or analysis aspects, models, etc.

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IERS Annual Reports

The annual reports contain description of the activities of all components of the IERS within a specific year and give additional information on IERS structure, contacts and Terms of Reference.

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