

IAG SC 1.4

Interaction of Celestial and Terrestrial Reference Frames

Z. Malkin / Pulkovo Obs.

M. Seitz / TUM

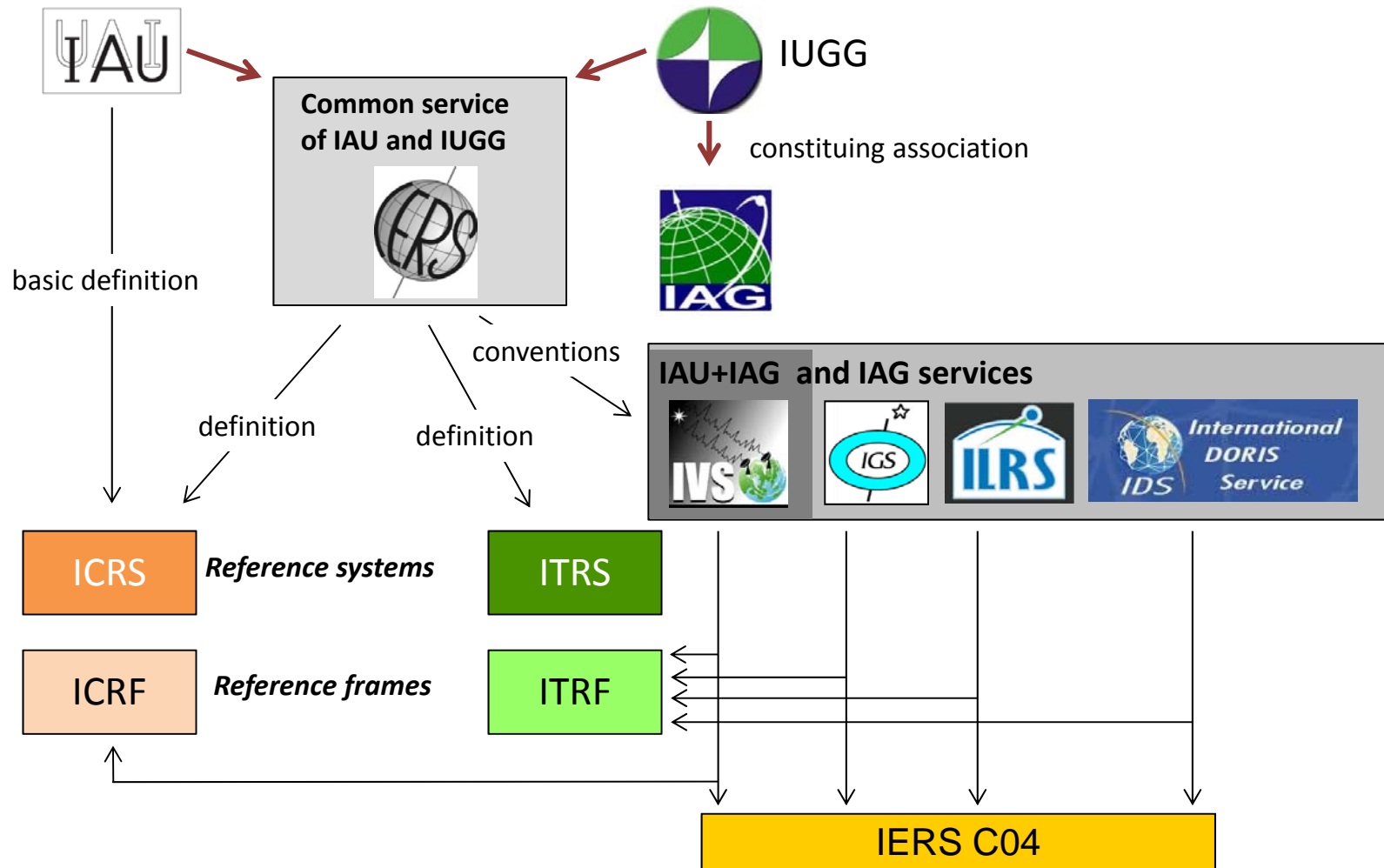
D. MacMillan / NASA/GSFC

S. Lambert / Paris Obs.

Motivation

- Linked between TRF, EOP, and CRF
 - TRF \leftrightarrow Polar motion, UT1
 - CRF \leftrightarrow Nutation, LOD
- Inconsistent realizations
 - TRF obtained from 4 techniques
 - CRF obtained from one single VLBI solution
 - IERS EOP C 04 obtained separately
- Impact on Science...

Infrastructure of Reference System realization



Based on Angermann et al. 2014, GGOS Bureau for Standards and Conventions: Inventory

Today ITRS and ICRS are realized independently by different Combination/Product Centres and based on different observation data.

IAG Working Groups

- 1.4.1: Consistent realization of ITRF, ICRF, and EOP
- 1.4.2: Impact of geophysical and astronomical modeling on reference frames and their consistency
- 1.4.3: Improving VLBI-based CRF for geodesy

*(Other non-)*IAG Working Groups

- 1.4.1: Consistent realization of ITRF, ICRF, and EOP
- 1.4.2: Impact of geophysical and astronomical modeling on reference frames and their consistency
- 1.4.3: Improving VLBI-based CRF for geodesy
- IAU WG 3rd realization of the ICRF (2015—2018, P. Charlot)
- IAU WG ICRS (2015—2018, F. Mignard)
- IVS WG on Galactic Aberration (2015—2018, D. MacMillan)
- ... strong overlap of objectives and memberships

Consistent realization of ITRF, ICRF, and EOP
WG of IAG Subcommittee 1.4
Interaction of Celestial and Terrestrial Reference Frames

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Objectives

- Investigation of the impact of different **analysis options** and **combination strategies** on the consistency between TRF, CRF, and EOP derived from joint analysis of the space geodesy observations.
- Investigation of the **consistency between the current ICRF and ITRF versions and IERS EOP C04 series**.
- Investigation of the **consistency between VLBI-only (IVS) CRF, TRF, and EOP series with the ITRF, ICRF, and C04 EOP series**.
- Study of effects of **geodetic datum realization on VLBI-derived CRF**.
- Study of optimal use of the **space-located techniques** in improvement of the **consistency between TRF, CRF, and EOP**.

Organization

Members

Manuela Seitz	Germany DGFI-TUM (Chair)
Susanne Glaser	Germany GFZ
Richard Gross	USA NASA/JPL
Robert Heinkelmann	Germany GFZ
Chris Jacobs	USA NASA/JPL
Sebastien Lambert	France Paris Obs.
Karine Le Bail	USA NASA/GSFC
Zinovy Malkin	Russia Pulkovo Obs.
David Mayer	Austria TUW
Dan McMillan	USA NASA/GSFC
Hana Krasna	Austria TUW

Schedule

Start of the WG activities: now
WG Meeting at AGU 2016

Website <http://iag.geo.tuwien.ac.at/c1/sc140/sc14wg1>

WG 1.4.2: Impact of geophysical and astronomical modeling on reference frames and their consistency

Areas of Investigation Suggested by Group Members (so far)

- Analysis and Solution Parametrization
 - More advanced gradient parametrization
 - Estimation of systematic temporal variation of source positions
 - Galactic aberration model
- External Models (Comparisons of models and effect on reference frames)
 - Loading models
 - Troposphere delay models (mapping functions or raytraced delays) based on numerical weather models
 - Effects arising from shifting from ITRF2008 to ITRF2014
- Internal Inconsistency
 - Declination zonal systematic CRF difference between 2009 and current solutions
 - Addition of Australian network data?
 - Troposphere estimation effect?
 - Other VLBI network dependent effects?

WG 1.4.2: Impact of geophysical and astronomical modeling on reference frames and their consistency

Working Group Members

- Dan MacMillan (Chair) (NASA GSFC)
- Robert Heinkelmann (GFZ)
- Tobias Nilsson (GFZ)
- Hana Krásná (TU Vienna)
- David Mayer (TU Vienna)
- Sebastien Lambert (Paris Observatory)
- Manuela Seitz (TU Munich)
- Zinovy Malkin (Pulkovo Observatory)

Additional members are likely to be added...

WG 1.4.3: Improving VLBI-based CRF for geodesy

The WG will address the way of improving the VLBI CRF and how these improvements can impact other geodetic products. The following items will be looked:

- ICRS/ICRF definition in view of the latest developments in astrometry and space geodesy,
- Systematic errors in the current individual CRF realizations,
- Effects of changing the wavelengths due to, e.g., core-shift,
- Modeling and analysis options,
- Interaction with futures Gaia-like CRF.

WG 1.4.3: Improving VLBI-based CRF for geodesy

Members

- F. Mignard (ICRS WG Chair, one of PI of Gaia),
- J. Roland (specialist of quasar dynamics inferred from VLBI),
- ... others to be added soon.