

IAG Resolutions at the XXVII IUGG General Assembly 2019

Resolution 1: The International Terrestrial Reference Frame (ITRF)

The International Association of Geodesy,

Considering,

- The significant efforts of the International Association of Geodesy (IAG) in developing and maintaining fundamental geodetic products for scientific and societal benefits, in particular the International Terrestrial Reference Frame (ITRF);
- The importance of interoperability of various geospatial data-sets and geo-referencing applications;

Acknowledging,

The adoption by the IUGG Resolution 2 in Perugia 2007 of the International Terrestrial Reference System (ITRS), as the preferred Geocentric Terrestrial Reference System (GTRS) for scientific and technical applications;

Noting,

- That the ITRF is the numerical realization of the ITRS, developed, maintained and made available to the users by the International Earth Rotation and Reference Systems Service (IERS), an IAG service;
- That the ITRF is widely used as the standard in various geo-referencing applications;

Resolves,

To recommend to the user community that the ITRF be the standard terrestrial reference frame for positioning, satellite navigation and Earth science applications, as well as for the definition and alignment of national and regional reference frames.

Resolution 2: Third Realization of the International Celestial Reference Frame

The International Association of Geodesy,

Considering,

- That the International Union of Geodesy and Geophysics adopted at the 25th General Assembly in Melbourne 2011 Resolution 2 on the second realization of the International Celestial Reference Frame;
- That the International Astronomical Union (IAU) adopted Resolution B2 at its XXXth General Assembly (2018) (https://www.iau.org/static/resolutions/IAU2018_Resol_B2_English.pdf) that resolves to consider the “Third Realization of the International Celestial Reference Frame (ICRF3)” as the fundamental realization of the International Celestial Reference System (ICRS) (see note 1);
- That the celestial reference system and the nutation-precession model have a large influence on geodetic and geodynamic observations, analyses and interpretations;
- That the ICRF3 was constructed by the International Astronomical Union (IAU) involving working group members of the International Earth Rotation and Reference Systems Service (IERS) and the International VLBI Service for Geodesy and Astrometry (IVS) communities;

Recommends,

- That the ICRF3 should be used as a standard for all future applications in geodesy and astrometry;
- That the organizations responsible for geodetic VLBI observing programs take appropriate measures to continue existing and develop improved VLBI observing and analysis programs to both maintain and improve ICRF3;

- That highest consistency between the ICRF, the International Terrestrial Reference Frame (ITRF), and the Earth Orientation Parameters (EOP) should be a primary goal in all future realizations.

Note 1: The Third Realization of the International Celestial Reference Frame by Very Long Baseline Interferometry, Presented on behalf of the IAU Working Group, Patrick Charlot, Chris Jacobs, David Gordon et al. Astronomy & Astrophysics (in preparation).

Resolution 3: Establishment of the International Height Reference Frame (IHRF)

The International Association of Geodesy,

Considering,

- The IAG Resolution for the Definition and Realization of an International Height Reference System (IHRF) released at the 26th IUGG General Assembly in July 2015;

Acknowledging,

The achievements of

- GGOS Focus Area “Unified Height System” and its JWG 0.1.2 “Strategy for the Realization of the International Height Reference System (IHRF)”;
- IAG JWG 2.2.2 “The 1 cm geoid experiment”;
- IAG SC 2.2 “Methodology for geoid and physical height systems”;
- ICCT JSG 0.15 “Regional geoid/quasi-geoid modelling – Theoretical framework for the sub-centimetre accuracy”;

in realizing this resolution;

Noting,

The need of an operational infrastructure to ensure the determination, maintenance and availability of an International Height Reference Frame (IHRF) in the long-term basis;

Urges,

All countries to engage with the IAG and concerned components, in particular the International Gravity Field Service (IGFS), in order to promote and support the implementation of the IHRF by

- Installing IHRF reference stations at national level,
- Conducting the necessary gravimetric surveys to guarantee the precise determination of potential values,
- Making data available open access,

- Contributing to the development of analysis strategies to improve the estimation of reference coordinates and modelling of the Earth’s gravity field,
- Describing, archiving and providing geodetic products associated to the IHRF.

Resolution 4: Establishment of the Infrastructure for the International Gravity Reference Frame

The International Association of Geodesy,

Considering,

The IAG Resolution No. 2 for the establishment of a global absolute gravity reference system released at the 26th IUGG General Assembly in July 2015;

Acknowledging,

The achievements of

- JWG 2.1.1 “Establishment of a global absolute gravity reference system”;
- Sub-Commission 2.1 “Gravimetry and Gravity Networks”;
- International Gravity Field Service (IGFS)

in realizing this resolution;

Noting,

That the realization of the International Gravity Reference System (IGRS), the International Gravity Reference Frame (IGRF), is based on measurements with absolute gravimeters (AG) monitored at reference stations and during international comparisons, which needs the support of national and international institutions;

Urges,

International and national institutions, agencies and governmental bodies in charge of geodetic infrastructure to

- Establish a set of absolute gravity reference stations on the national level,
- Perform regular absolute gravity observations at these stations,
- Participate in comparisons of absolute gravimeters to ensure their compatibility,
- Make the results available open access.

Resolution 5: Improvement of the Earth's Rotation Theories and Models

The International Association of Geodesy,

Recognizing,

- That the continuous improvement of the terrestrial and celestial reference systems and frames pursuing the accuracy and stability goals set by GGOS is necessary for determining and investigating the global change of the Earth;
- That the consistent definition and determination of the rotation between the two reference frames is tightly linked to geodynamics and necessary for the accurate realization of terrestrial frames and the determination of global geodetic variables;
- That the current Earth rotation theories are unable to model and predict the Earth orientation parameters (EOP) with an accuracy close to the GGOS requirements, in spite of the improved accuracy and precision of the individual and combined solutions derived from single or multiple techniques;
- That the precession nutation theories IAU2000 and IAU2006 suffer from internal inconsistencies and systematics whose correction is available, but also from inconsistencies due to incorporating outdated models instead of the state-of-art models used in EOP determination;
- That the theoretical models of the different EOPs and their observations are not always referred to the current IAG standards, in particular regarding terrestrial reference frames;

Noting,

- The results of the IAG Commission 3 Joint Working Group on Theory of Earth and validation, joint with the International Astronomical Union (IAU) Commission A2, summarized in its 2015-2019 report (see note 1);
- The need of taking advantage of the advances accomplished or yet in progress on different aspects of the theoretical and empirical modelling and prediction of the Earth's rotation to get closer to the GGOS goals;

Resolves,

- To encourage a prompt improvement of the Earth rotation theory regarding its accuracy, consistency, and ability to model and predict the essential EOP,
- That the definition of all the EOP, and related theories, equations, and ancillary models governing their time evolution, must be consistent with the reference frames and the resolutions, conventional models, products, and standards adopted by the IAG and its components,
- That the new models should be closer to the dynamically time-varying, actual Earth, and adaptable as much as possible to future updating of the reference frames and standards.

Note 1: Report of Commission 3 Joint Working Group 3.1 Theory of Earth rotation and validation (Joint with the IAU). In: IAG Reports Vol. 41 (Travaux de l'AIG 2015-2019, IAG Web page)