3.5.5 ITRS Centre

This report summarizes the activities of the IERS ITRS Centre during the year 2019.

Preparation for ITRF2020

After the release of the ITRF2020 Call for Participation (CfP) which was published at the end of 2018 (see: http://itrf.ign.fr/doc_ITRF/CFP-ITRF2020.pdf), the ITRS Centre continued the dialog with the 4 Technique Centres for the preparation of their inputs to the ITRF2020. The ITRS Centre emphasized the need for the TCs to implement the new recommended models which are annexed to the ITRF2020 CfP. The ITRS Centre has in particular attended most meetings of the analysis working groups of the Technique Centres (IDS, IGS, ILRS and IVS).

Hosting the Unified Analysis Workshop 2019

The ITRS Centre hosted the Unified Analysis Workshop 2019 at Institut de Physique de Globe de Paris, during 2–4 October, 2019. A number of the technique presentations addressed the preparation for the ITRF2020, including the implementation of updated models and analysis strategies.

IERS Technical Note 40

At the initiative of the ITRS Centre, and with the help of the IERS Central Bureau, an IERS Technical Note (# 40) was published in order to, primarily, acknowledge the activities of the ITRS Combination Centres at DGFI and JPL, beside the ITRS Combination Centre at IGN which is part of the ITRS Centre (Altamimi and Dick, 2020). It includes the description of both DTRF2014 and JTRF2014, as well as their inter-comparisons with respect to the official IERS solution, the ITRF2014. The Technical Note was also intended to include evaluations of the three solutions by the IERS Technique Centres (IDS, IGS, ILRS and IVS) who constantly provide input solutions to the ITRF. In addition to DGFI, JPL and ITRS Centre contributions, the Technical Note includes contributions from IDS, ILRS and IVS. A specific article by the ITRS Centre evaluates the two solutions DTRF2014 and JTRF2014 with respect to the ITRF2014 (see IGN ITRS Combination Centre Report, this issue).

Update of Chapter 4 of the IERS Conventions

Chapter 4 of the IERS Conventions has been re-written by the ITRS Centre team which includes the following updates (IERS ITRS Centre, 2019):

- A description of ITRF2014, with its associated equations, to model the nonlinear station motions due to seasonal signals and post-seismic deformation of stations subject to major earthquakes.
- A description of the mathematical model used in the ITRF combination.

- A revision of Table 4.1, listing the transformation parameters relating ITRF2014 to previous ITRFs.
- Improvements in wording and the removal of unnecessary paragraphs.

Resolutions on ITRS/ITRF

The ITRS Centre has prepared the text of an IUGG resolution on the ITRF which was adopted at the occasion of the IUGG General Assembly 2019 in Montreal, Canada, see: http://www.iugg.org/resolutions/2019%20IUGG%20GA%20Resolutions.pdf.

At its 9th Session, the UN-GGIM Committee of Experts supported the agreement of the Subcommittee on geodesy on the adoption of the International Terrestrial Reference System and the International Terrestrial Reference Frame as the standard for scientific, geospatial and operational geodetic applications. The ITRS Centre has significantly contributed to the text of that agreement, see Decision 9/104 of the 9th Session report available here: https:\ggim.un.org/meetings/GGIM-committee/9th-Session/documents/GGIM9-report-e.pdf.

Participation to the activities of the UN-GGIM subcommittee on Geodesy

The ITRS Centre contributes actively to the activities of the UN-GGIM subcommittee on Geodesy and is charing a Working group related to the geodetic infrastructure. The ITRS Centre has in particular attended the subcommittee related meetings in 2019, and contributed to the writing of the implementation plan of the Roadmap on the Global Geodetic Reference Frame for Sustainable Development, and two reference documents: draft Position Paper on Sustaining the Global Geodetic Reference Frame and draft Concept Paper on Establishing a Global Geodetic Centre of Excellence.

Maintenance of the IERS network

The ITRS Centre assigns DOMES numbers to geodetic tracking stations or markers as unambiguous identifications of points in space, independently from the technique of their tracking instruments. The IERS network database, which contains the descriptions of the sites and points, is continuously updated as DOMES numbers are assigned. DOMES number request form can be found on the ITRF web site http://itrf.ign.fr, and should be sent to domes@ign.fr. An updated list of all available DOMES number is available at . The IERS site information is available to the users through the ITRF website interface (see below). Several new stations, mainly GNSS permanent stations where added to the ITRF network and database.

ITRF web site

The ITRF web site, available at http://itrf.ign.fr, provides an interface to consult the IERS network database. Site and point information can be requested on line; it contains approximate coordinates of the sites, the list of their points as well as their descriptions, their DOMES numbers

and the list of ITRF versions in which they have been computed. Subsets of points can be selected and their ITRF coordinates can be requested at any epoch in any ITRF version if their coordinates are provided in the requested ITRF version.

The maps of the ITRF networks can be displayed depending of the measurement techniques and of the ITRF realization. Velocity vectors can be displayed as well as tectonic plates. The dynamical map can help users to familiarize with ITRF products and can be used for educational purpose. It can also be an interesting tool to select IERS sub-network depending on the measurement techniques, co-located hosted instruments or ITRF versions. ITRF94, ITRF96, ITRF97, ITRF2000, ITRF2005, ITRF2008 and ITRF2014 solutions are available for download.

Preparation for a new ITRF web site

The ITRS Centre has started an initial study analysis and preparation for a new design of the ITRF web site. It will be designed to provide more ITRF-related information to the users using more user-friendly interfaces. The new web site which was expected to be operational beginning 2016 experienced some delay, unfortunately, and will hopefully be available by early 2021.

Local ties of ITRF co-location sites

The ITRS Centre collects all new surveys operated by either IGN or the hosting agencies of ITRF co-location sites. The reports of these surveys are posted at the ITRF Website and are available to users at http://itrf.ign.fr/local_surveys.php. The local ties SINEX files used in the ITRF combinations are also available on that web site.

At the occasion of the ITRF2020 analysis, we expect new local tie SINEX files and corresponding reports to be submitted to the ITRS Centre. All past and new local surveys used in the ITRF2014 computation are now available via the ITRF website:
http://itrf.ign.fr/local_surveys.php.

Publications

Altamimi, Z. and W. R. Dick (Eds.), (2020), Description and evaluation of DTRF2014, JTRF2014 and ITRF2014, IERS Technical Note 40, Frankfurt am Main: Verlag des Bundesamts für Kartographie und Geodäsie. 167 p., ISBN 978-3-86482-137-0, online: https://www.iers.org/IERS/TN40.

IERS ITRS Centre, 2019, Chapter 4 of the IERS Conventions (Terrestrial reference systems and frames), available at https://iers-conventions.obspm.fr/chapter4.php

Zuheir Altamimi, Bruno Garayt, Xavier Collilieux, Paul Rebischung, Laurent Métivier