

International Union of Geodesy and Geophysics (IUGG)

Report to the 18th meeting of the Consultative Committee for Time and Frequency (CCTF), BIPM Sèvres, June 4-5 2009

The International Union of Geodesy and Geophysics is currently interested by several issues related more or less closely to the missions of the CCTF, either as contributors, or as representatives of scientific user communities in Geosciences. As an illustration, IUGG need to describe the overall opinion of this community with regards to the new definition of UTC.

Most of the interest lies into the geodetic component of IUGG, namely the International Association of Geodesy (IAG), and its associated services, many of them being under the joint umbrella of the International Astronomical Union (IAU) and IUGG.

Several bodies working under the umbrella of IUGG has active involvement in CCTF domains. They will report directly during the meeting, namely :

- The IGS Working group on Clock products, part of the International GNSS Service (IGS)
- The IERS Convention Product Center, part of the International Earth Rotation and Reference Systems Service (IERS)

The BIPM Time section itself is also a labeled service of the IAG.

In addition, this short report focuses on two specific issues on GGOS and on the promotion of ITRS.

GGOS

The Global Geodetic Observing System (GGOS) is a new permanent structure of the IAG, in charge of the overall coordination of geodetic service activities existing among the various IAG bodies, and particularly IAG services such as IGS or IERS . One of its major goals is to offer a unified visibility and access to the various services of interest for any scientific community and numerous societal benefits. GGOS is the IAG contribution to GEO.

For more informations :

<http://www.iag-ggos.org/>

ITRS

The International Terrestrial Reference System (ITRS) is presently the recommended Terrestrial Reference System (TRS) for the whole geoscience community, through a resolution adopted by IUGG during its General Assembly of Perugia in 2007.

The ITRS is also recognized by the International Astronomical Union (IAU).

The fundamental realizations and access of ITRS are provided by several scientific services under the umbrella of IAG:

- IERS is, since its establishment in 1988, in charge of the primary realization of ITRS, by an optimal combined use of space geodetic techniques. Several successive solutions were computed and released to the international community, labelled International Terrestrial Reference Frames: ITRFyy (ITRF88, up to the current ITRF2005).
- Furthermore, each primary space geodetic technique is now organized in the frame of an international scientific service, also under the IAG : IVS for VLBI, ILRS for laser ranging, IDS for DORIS and IGS for GNSS (GPS, GLONASS and soon Galileo). Each of these services not only contributes to the IERS activities by providing input data, but also uses the IERS products to compute and release their own operational products. In particular, they use the ITRF solutions to express their products in the ITRS. This is true in particular for satellite orbits (expressed in the rotating terrestrial system). Such products are widely used by the geodetic and geophysical community, mostly for GPS, as provided by IGS.
- These primary realizations are also densified and disseminated through regional, national and local terrestrial geodetic networks (permanent markers or active stations, such as GPS stations providing differential corrections). A wide coordination is ensured regionally by ad hoc committees, also under the IAG umbrella: EUREF for Europe, SNARF and CORS for North America, SIRGAS for South America...
- Another community also provides realizations and accesses to ITRS, with a rapidly growing importance, namely the Satellite Navigation community (GPS, GLONASS, EGNOS, Galileo, ...) commonly designated by GNSS. An upper lever coordination of this community (providers as well as users) is now existing through the International Committee for GNSS (ICG), linked to UN through the UN Office for Outer Space Affairs (UNOOSA), which provides the secretariat for ICG. See <http://www.unoosa.org/oosa/SAP/gnss/icg.html>

The geodetic community has undertaken several actions in order to get a better recognition of the importance of Terrestrial reference systems and frames for scientific research as well as societal activities. This work has many similarities with time community with regards to time scales. A major objective is to get a formal recognition of ITRS beyond the geoscience community. The following actions are contributing to this task:

- Within GEO, GGOS leads a Task force on Global Geodetic Reference Frames (DA-09-02c)
- A GGOS working group on has been established on an ITRS ISO Standard

- Finally, IGS and BIPM, both members of the International Committee on GNSS, has succeeded to establish within this committee task forces of time and geodetic references respectively.