

Report on the International Committee on Global Navigation Satellite Systems (ICG)

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The International Committee for GNSS has been established in 2006 on a voluntary basis as an informal body to promote cooperation, as appropriate, on matters of mutual interest related civilian satellite-based positioning, navigation, timing and value-added services, as well as the compatibility and interoperability of GNSS.

The ICG has been created under the initiative of the United Nations Office for Outer Space Affairs (OOSA), and has been recognized by the United Nations General Assembly in its resolution 61/111 of 14/12/2006.

ICG participation is open to States Members of the United Nations, international organizations or international entities that are responsible for GNSS and their augmentations operating under governmental authority or involved in implementing or promoting GNSS services and applications. There are three categories of participants in the ICG: Members, Associate Members and Observers.

Members of ICG are

Current and future core system providers:

- China (Compass/BeiDou Navigation Satellite System (CNSS))
- European Community (European Satellite Navigation System (Galileo))
- Russian Federation (Global Navigation Satellite System (GLONASS))
- United States of America (Global Positioning System (GPS))

States Members of the United Nations with an active programme in implementing and promoting a wide range of GNSS services and applications:

- Italy
- Malaysia
- United Arab Emirates

Current and future space-based regional or augmentation system providers:

- European Space Agency (European Geostationary Navigation Overlay Service (EGNOS))
- India (GPS and Geostationary (GEO) Augmented Navigation System (GAGAN) and and Regional Navigation Satellite System (INRSS))
- Japan (Multi-functional Transport satellite (MTSAT) Satellite-based Augmentation System (MSAS) and Quasi-Zenith Satellite System (QZSS))
- Nigeria (Nigerian Communication Satellite Space Based Augmentation System (NigComsat-1-SBAS))
- Russian Federation (Wide-area System of Differential Corrections and Monitoring (SDCM))
- United States (Wide-area Augmentation System (WAAS))

Associate Members of ICG are

International and regional organizations and associations dealing with GNSS services and applications:

- Office for Outer Space Affairs of the UN Secretariat
- Civil GPS Service Interface Committee (CGSIC)
- International Association of Geodesy (IAG)
- International Association of Geodesy Reference Frame Sub-Commission for Europe (EUREF)
- International Cartographic Association (ICA)
- International GNSS Service (IGS)
- International Society of Photogrammetry and Remote Sensing (ISPRS)
- Fédération internationale des géomètres (FIG)
- European Position Determination System (EUPOS)

Observers are :

- Committee on Space Research (COSPAR)
- Bureau international des poids et mesures (BIPM)
- International Association of Institutes of Navigation (IAIN)
- Union radio-scientifique internationale (URSI)
- International Telecommunication Union (ITU)

The ICG conducts annual meetings hosted by different members and sub-group meetings as necessary. Three meetings of the ICG took place since its creation: Vienna (Austria), 1-2 November 2006; Bangalore (India), 5-7 September 2007 and Pasadena (USA), 8-12 December 2008.

The ICG is structured in working groups: WG A on interoperability and compatibility; WG B on enhancement of performance of GNSS services; WG C on information dissemination; WG D in interaction with national and regional authorities and relevant international organizations; and the WG on satellite-based augmentations system (SBAS) certification.

E.F. Arias and W. Lewandowski are members of WG D. At the 3rd meeting of the ICG in Pasadena, two task forces were created within WG D: Task Force D1 on Geodetic References and Task Force D2 on Time References (see ICG recommendations in annex). Task for D2 is chaired by E.F. Arias, from the BIPM.

Annex

ICG/REC/DEC2008

1) Recommendation for Committee DecisionPrepared by **Working Group D**Date of Submission **11 December 2008**Issue Title: **Task Force on Geodetic References (Task Force D1)****Background/Brief Description of the Issue:**

There is an emerging demand to recognize the International Terrestrial Reference System (ITRS) as the unique preferred system for geo-referencing in science and applications. Activities of the geodetic community for promoting ITRS and improving its quality and availability have led to successive improved realizations of the ITRS in the form of the International Terrestrial Reference Frame (ITRF). The ITRF is produced by the services of International Association of Geodesy (IAG).

All of the currently developed or proposed global components of GNSS (GPS, GLONASS, Galileo and Compass) have stated an intention to realize Geodetic References for each system that are closely aligned to the ITRS. These Geodetic References are:

- World Geocentric System 84 (WGS84) used for GPS;
- PZ-90.02 used for GLONASS;
- Galileo Terrestrial Reference Frame (GTRF) used for Galileo, and;
- China Geodetic System (CGS`2000) used for Compass.

Discussion/Analyses:

There is a need to ensure that the Geodetic References realized for each of the GNSS sub-systems are well understood by all providers and all users. As well as the initial definition and realization of each Geodetic Reference, there is also a need for a clear understanding of any improvements that a particular GNSS provider may implement from time to time. An example of such an improvement would be a particular System Provider updating ground station coordinates due to plate tectonics. Such improvements are propagated to end users through the broadcast ephemeris and will appear in a particular region as an apparent update to the Geodetic Reference in that region.

With the growing number of global and regional navigation satellite systems and with increasing demand by users for improved accuracy, these Geodetic Reference issues will need to be carefully managed.

The ICG is a unique mechanism to ensure such management by bringing together the experts on Geodetic References in the System Providers, in the geodetic scientific community and in the user community.

Recommendation of Committee Action:

It is therefore recommended that the ICG establish a **Task Force on Geodetic References** (Task Force D1). The proposed goals for the Task Force would be:

- a. To bring together all interested ICG participants (experts from the system and service providers, key user communities, etc);
- b. To review the present situation (existing documents, resolutions or practices);
- c. To discuss and agree upon a consistent terminology for geodetic references and related understanding;
- d. To prepare recommended practices for the realization of each GNSS Geodetic Reference and its alignment to ITRF;
- e. To outline and encourage implementation plans in each relevant user community;

- f. To propose mechanisms for informing users of the current realization of a particular Geodetic Reference and any changes that may occur from time to time.

The proposed membership would include experts on Geodetic Reference issues from the System Providers, experts from the geodetic scientific community and from the user community drawn from the membership of the ICG.

ICG/REC/DEC2008

2) Recommendation for Committee Decision

Prepared by ICG Working Group D

Date of Submission 12/11/2008

Issue Title: Task Force D2 on Time References

Background/Brief Description of the Issue:

Global navigation satellite systems (GNSS) performance is closely tied to precise time synchronization. GNSS today provide the primary means of disseminating precise time. Precise time supports many aspects of the world's critical infrastructure, such as telecommunications, power and banking.

Discussion/Analyses:

With the proliferation of GNSS, coordination of navigation and UTC timing services is critical. Consequently, a common timing reference is essential.

This Task Force would address and make recommendations for timing standards. This would include coordination of navigation time scales and standards for precise time and time dissemination services, as well as promotion of the use of standard terminology and common quality metrics.

The Service Providers would appoint their experts on timing issues as members of the Task Force. Membership would also include experts from national and international institutions nominated by the ICG WGD and from appropriate user groups.

Recommendation of Committee Action:

It is therefore recommended that the ICG establish a **Task Force on Time References** (Task Force D2). The proposed goals for the Task Force would be:

- a. To bring together all interested ICG participants (experts from the system and service providers, key user communities, etc);
- b. To review the present situation (existing documents, resolutions or practices);
- c. To discuss and agree upon a consistent terminology for timing references and related understanding;
- d. To prepare recommended practices for the realization of each GNSS Time Reference and its alignment to UTC;
- e. To outline and encourage implementation plans in each relevant user community;
- f. To propose mechanisms for informing users of the current realization of a particular Time Reference and any changes that may occur.

Membership of this Task Force would include timing experts nominated by the GNSS Service Providers and experts in national and international organizations nominated by the WGD of the ICG.