



## **Ninth Meeting of the International Committee on Global Navigation Satellite Systems (ICG)**

**10 – 14 November 2014  
Prague, Czech Republic**

### **Joint Statement**

The Ninth Meeting of the International Committee on Global Navigation Satellite Systems (ICG) was held in Prague, Czech Republic from 10 to 14 November 2014 to continue reviewing and discussing developments in global navigation satellite systems (GNSS) and to allow ICG members, associate members, and observers to address recent developments in their organizations and associations with regard to GNSS services and applications. The Deputy Minister of Transport of the Czech Republic, the Head of Unit Galileo International Relations of the European Commission and the Executive Director of the European GNSS Agency (GSA) delivered opening speeches on behalf of the European Union. The Director of the Office for Outer Space Affairs of the United Nations Secretariat also addressed the Meeting.

The European Commission and GSA on behalf of the European Union organized the Meeting. The Meeting was attended by representatives of China, India, Italy, Japan, Malaysia, the Russian Federation, the United Arab Emirates, the United States of America and the European Union, as well as the following intergovernmental and non-governmental organizations: Arab Institute of Navigation (AIN), Civil Global Positioning System Service Interface Committee (CGSIC), European Space Agency (ESA), European Space Policy Institute (ESPI), European Position Determination System (EUPOS), Interagency Operations Advisory Group (IOAG), International Aeronautical Federation (FAI), International Association of Geodesy (IAG) and IAG Reference Frame Sub-Commission for Europe (EUREF), International Association of Institutes of Navigation (IAIN), International Bureau of Weights and Measures (BIPM), International Earth Rotation and Reference Systems Service (IERS), International Federation of Surveyors (FIG) and International GNSS Service (IGS). Representatives of the Office for Outer Space Affairs of the United Nations Secretariat and the International Telecommunication Union (ITU) also participated. Canada was invited to attend as an observer. The representative of Space Generation Advisory Council (SGAC) also attended. The representatives of the Asia-Pacific Space Cooperation Organization (APSCO) also attended. APSCO was recognized by ICG as a new observer.

The ICG recalled that the United Nations General Assembly, in its resolution 68/75 of 16 December 2013, had noted with satisfaction the continuous progress made by the ICG

towards achieving compatibility and interoperability among global and regional space-based positioning, navigation and timing systems and in the promotion of the use of GNSS and their integration into national infrastructure, particularly in developing countries, and noted with appreciation that the ICG held its eighth meeting in Dubai, United Arab Emirates, from 10 to 14 November 2013.

The ICG addressed GNSS application market opportunities, and applications in the area of aviation, spatial aerial plants (i.e. cable cars), train control and management systems, and high precision agriculture. Representatives from industry, academia and Governments shared views on challenges and opportunities for GNSS services.

The ICG noted that the working groups focused on the following issues: compatibility and interoperability; enhancement of the performance of GNSS services; information dissemination and capacity building; and reference frames, timing and applications.

Beginning at its inter-sessional meeting held in Geneva, Switzerland, hosted by the ITU, and continuing during the ninth meeting of the ICG, the Working Group on Compatibility and Interoperability (WGA) addressed all four areas of its current work plan. The compatibility and performance standard subgroup reported on the status of on-going work in these areas and updated its recommendation on compatibility between international mobile telecommunications (IMT) and radio determination satellite service (RDSS)/radio navigation satellite services (RNSS) spectrum. In addition to the inter-sessional meeting, the newly formed Interference Detection Task Force organized and completed the third ICG Interference Detection and Mitigation (IDM) Workshop at the ITU. This event and subsequent deliberations led to three recommendations on IDM capabilities and the conduct of United Nations workshops on spectrum protection and IDM to be organized by the Office for Outer Space Affairs on a regional basis.

The International GNSS Monitoring and Assessment (IGMA) Task Force also brought forward two recommendations to the Working Group based on three meetings held in 2014, including a proposal to hold an IGMA workshop in Xi'an, China immediately preceding the 2015 China Satellite Navigation Conference.

Finally, the Interoperability Task Force reported on three workshops held in Russia, China, and Japan, where inputs from industry and users on the subject of multi-GNSS interoperability continued to be collected and analyzed. The Task Force will continue its work in 2015, to include an interoperability workshop in Europe, and leading to potential recommendations for working group and committee consideration at the tenth meeting of the ICG.

The Working Group B on the Enhancement of GNSS Service Performance (WGB) made progress in establishing an interoperable GNSS Space Service Volume (SSV). SSV relevant characteristics were presented by Global Positioning System (GPS), Global Navigation Satellite System (GLONASS), BeiDou Navigation Satellite System (BDS) and Quazi-Zenith Satellite System (QZSS). Galileo aims to release its SSV related characteristics in the Spring of 2015. Members of WGB will develop a booklet on

“Interoperable GNSS SSV”. WGB will continue to work towards an interoperable GNSS SSV. WGB members acknowledged the benefits of signal broadcast from satellites in non-nominal orbit or from satellites not part of the operational constellation for a wide range of users, including SSV users. .

Apart from SSV the group continued to work according to its workplan. Good quality ionospheric error compensation models were identified in order to provide single frequency users with better accuracy. Results obtained from one of these, the Nequick Galileo model, demonstrating good performance, were discussed. Following the recommendation of ICG-8 the discussion continued on the Time To First Fix (TTFF) estimation methodology leading to the identification of additional Figures of Merit.; Interference mitigation techniques at the antenna level and at the Digital Signal Processing level were discussed and the importance of investigating interference mitigation techniques at the user level was confirmed.

The Application Subgroup of WGB held dedicated meetings and continued monitoring application needs. The findings will be summarized in a report. The way forward to ICG-10 for WGB and its Application Subgroup were defined.

Recognizing the present status of GNSS and the prospects for continued development of a wide variety of applications critical to science, commerce and infrastructure, the Working Group C on Information Dissemination and Capacity-Building (WGC) recommended that more workshops and training courses should continue to be held on specific areas of interest to end users. The WGC encouraged knowledge transfer via e-learning systems using existing web-based distance learning programmes, as well as communication and outreach to the wider community through the UN-affiliated regional centres for science and technology acting as information centres for the ICG.

To improve cooperation between existing or developing user information centres of the providers, WGC recommended that all the provider and GNSS user information centres consider development and adoption of a process for referring inquiries to each other where appropriate.

The Working Group D on Reference Frames, Timing and Applications (WGD) apprised the ICG of developments within the United Nations Economic and Social Council (UN ECOSOC) in New York, to establish a Committee of Experts for UN Global Geospatial Information Management (UN-GGIM), and a working group on the Global Geodetic Reference Frame (GGRF). UN-GGIM notes that the services derived from GNSS technology provide a framework for all geospatial activity, as a key enabler of spatial data interoperability, disaster mitigation and sustainable development. The Co-Chairs of WGD are engaged in the GGRF working group, and suggested that the ICG and UN GGIM explore close cooperation.

WGD noted significant continued progress on the geodetic and timing references for the GNSS currently represented in the ICG. Specific progress was noted in (1) the refinement of the alignments of GNSS associated reference frames to the latest realization of the

International Terrestrial Reference (ITRF) System in the form of ITRF2008, and (2) on timing references in relation to rapid Coordinated Universal Time (UTC<sub>r</sub>), BIPM publication and GNSS time offsets.

WGD has contributed and will continue to contribute to the IGMA initiative. The Working Group also made two recommendations: one in relation to the UN-GGIM initiative regarding a United Nations General Assembly resolution on GGRF, and one on the possible provision by GNSS Providers of satellite data that would improve orbit modeling and accuracy.

The ICG adopted a Vision Statement contained in the Annex to this statement.

The ICG accepted the invitation of the United States to host its Tenth Meeting of the ICG in Boulder, Colorado from 2 to 6 November 2015. The Office for Outer Space Affairs, in its capacity as the Executive Secretariat of ICG and its Providers' Forum, will assist in the preparations for the meeting and for interim planning meetings and Working Groups activities to be held in 2015. The ICG noted the expression of interest by the Russian Federation to host the Eleventh Meeting of the ICG in 2016, and by Japan to host the Twelfth Meeting of the ICG in 2017.

All the presentations made during the ICG-9 are available at the ICG information portal ([www.unoosa.org](http://www.unoosa.org)).

## **Annex**

### **Vision Statement of the International Committee on Global Navigation Satellite Systems**

The International Committee on Global Navigation Satellite Systems (ICG) strives to encourage and facilitate compatibility, interoperability and transparency between all the satellite navigation systems, to promote and protect the use of their open service applications and thereby benefit the global community. Our vision is to ensure the best satellite based positioning, navigation and timing for peaceful uses for everybody, anywhere, any time.

