



# General Assembly

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## Committee on the Peaceful Uses of Outer Space

### Seventh Meeting of the International Committee on Global Navigation Satellite Systems

#### Note by the Secretariat

#### I. Introduction

##### A. Background

1. The International Committee on Global Navigation Satellite Systems (ICG) is composed of operators of the world's four global navigation satellite systems (GNSS) and regional and augmentation systems (see ST/SPACE/50). ICG was established in 2005 under the umbrella of the United Nations, and has conducted annual meetings since its establishment to review and discuss developments in GNSS. In 2007, a Providers' Forum was established to discuss issues of compatibility and interoperability among systems. Participation in ICG is open to all countries and entities that are either GNSS providers or users of GNSS services and are interested and willing to actively engage in ICG activities.

2. To support the work of ICG, the Office for Outer Space Affairs of the Secretariat was designated as the executive secretariat of ICG. In that capacity, the Office, through its programme on GNSS applications, is organizing workshops, training courses and meetings focusing on capacity-building in the use of GNSS-related technologies in various rapidly growing fields of science and engineering, as well as facilitating the deployment of instruments for the International Space Weather Initiative (ISWI). Annually, all these activities bring together a large number of experts, including those from developing countries, to discuss and act on issues of great relevance to ICG. The Office for Outer Space Affairs has also led the development by ICG of the GNSS education curriculum (see ST/SPACE/59) for inclusion in the training programmes at the United Nations-affiliated regional centres for space science and technology education, which also serve as the information centres for ICG (see ST/SPACE/55).



3. Pursuant to General Assembly resolution 66/71 and as part of the United Nations Programme on Space Applications, the Office for Outer Space Affairs held the United Nations/Latvia Workshop on Applications of Global Navigation Satellite Systems in Riga from 14 to 18 May 2012 (A/AC.105/1022) and the United Nations/Ecuador Workshop on the International Space Weather Initiative in Quito from 8 to 12 October 2012 (A/AC.105/1030). These workshops were co-sponsored by the United States of America through ICG.
4. The Office for Outer Space Affairs organized and hosted the First Meeting of the International Committee on Global Navigation Satellite Systems in Vienna on 1 and 2 November 2006 (A/AC.105/879). The Second Meeting was held in Bangalore, India, from 4 to 7 September 2007 (A/AC.105/901). The Third Meeting was held in Pasadena, California, United States, from 8 to 12 December 2008 (A/AC.105/928). The Fourth Meeting was held in Saint Petersburg, Russian Federation, from 14 to 18 September 2009 (A/AC.105/948). The Fifth Meeting was held in Turin, Italy, from 18 to 22 October 2010 (A/AC.105/982). The Sixth Meeting was held in Tokyo from 5 to 9 September 2011 (A/AC.105/1000).
5. The Seventh Meeting of ICG was held in Beijing from 4 to 9 November 2012 and was hosted by the Government of China.

## **B. Structure and programme of the Meeting**

6. The programme of the Seventh Meeting of ICG included three plenary sessions and working group meetings. At the first plenary session, held on 5 November 2012, GNSS service providers and augmentation system providers made presentations on the status of their systems and future plans. The presentations made by associate members and observers outlined recent developments with regard to GNSS services, applications and educational and capacity-building activities at the global, regional and national levels.
7. In accordance with the workplan of ICG, four working group meetings, held on 7 and 8 November 2012, focused on the following issues: compatibility and interoperability (led by the Russian Federation and the United States); enhancement of performance of GNSS services (led by the European Space Agency); information dissemination and capacity-building (led by China and the Office for Outer Space Affairs); and reference frames, timing and applications (led by the International Federation of Surveyors, the International Association of Geodesy and the International Global Navigation Satellite System Service).
8. At its plenary sessions held on 8 and 9 November 2012, ICG considered the implementation of the recommendations of the working groups and plans to address the current and future work of each working group.
9. After considering the various items on its agenda, ICG made recommendations and decisions and adopted the joint statement summarized in section III below.
10. In conjunction with the Seventh Meeting of ICG, the Providers' Forum held its Ninth Meeting on 4, 6 and 8 November 2012 under the chairmanship of China and the United States (see section IV below) and adopted the statement of the Providers' Forum concerning ICG (see annex I).

11. The meetings of members, associate members and observers of ICG were held in parallel with the Providers' Forum Meeting, on 6 and 8 November 2012, during the Seventh Meeting of ICG.

### **C. Attendance**

12. Representatives of the following States participated in the Seventh Meeting of ICG: China, Italy, Japan, Malaysia, Russian Federation, United Arab Emirates and United States. The European Union was also represented.

13. The representatives of Pakistan, the Republic of Korea and Thailand as well as the Asia-Pacific Space Cooperation Organization and the Preparatory Commission for the Comprehensive Nuclear-Test-Ban Treaty Organization, were invited to participate in an expert capacity in the work of the Seventh Meeting of ICG and to address it as appropriate on the understanding that it would be without prejudice to further requests of that nature and that doing so would not involve any decision of ICG concerning status.

14. ICG decided to invite, at their request, the observers for Australia, Canada and Saudi Arabia to attend the Seventh Meeting and to address it, as appropriate, on the understanding that it would be without prejudice to further requests of that nature and that doing so would not involve any decision of ICG concerning status.

15. The following United Nations entities were represented at the Meeting: Office for Outer Space Affairs and International Telecommunication Union.

16. The following intergovernmental and non-governmental organizations dealing with GNSS services and applications were represented at the Meeting: Civil Global Positioning System Service Interface Committee, European Space Agency, Interagency Operations Advisory Group, International Aeronautical Federation, International Association of Geodesy (IAG) and IAG Reference Frame Sub-Commission for Europe (EUREF), International Association of Institutes of Navigation, International Bureau of Weights and Measures, International Earth Rotation and Reference Systems Service, International Federation of Surveyors and International Global Navigation Satellite System Service (IGS).

17. Observers for the African Centre for Space Science and Technology Education — in French language and the Space Generation Advisory Council were invited, at their request, to participate in an expert capacity in the work of ICG and to address it as appropriate.

18. A list of States Members of the United Nations, United Nations entities and governmental, intergovernmental and non-governmental organizations participating in ICG is contained in annex II.

### **D. Global navigation satellite systems applications experts seminar**

19. GNSS experts held a seminar on GNSS applications on 5 and 6 November 2012 as part of the Seventh Meeting of ICG. The seminar consisted of three sessions, on professional applications, mass-market applications and scientific applications. The primary purpose of the seminar was to raise awareness of issues

and opportunities with respect to user applications and GNSS technology, for consideration by ICG and its working groups. During the seminar, 18 presentations were given by representatives of GNSS service providers, States Members of the United Nations and intergovernmental and non-governmental organizations dealing with GNSS applications. An exhibition was also held near the site of the Meeting from 5 to 9 November 2012.

### **E. Documentation**

20. A list of the documents of the Seventh Meeting is contained in annex III. Those documents and further information on the Meeting's programme, background materials and presentations are available from the ICG information portal ([www.unoosa.org/oosa/en/SAP/gnss/icg.html](http://www.unoosa.org/oosa/en/SAP/gnss/icg.html)).

## **II. Recommendations and views**

21. The chairman of the Seventh Meeting outlined the work that ICG had before it at the Seventh Meeting and reviewed related events held in conjunction with that Meeting.

22. ICG took note of the results of the Ninth Meeting of the Providers' Forum. It was noted that the Providers' Forum continued to work cooperatively to enable better service. It was also noted that the Providers' Forum considered activities that promote GNSS awareness and education, as well as proposals to enhance service performance and the monitoring and assessment of performance.

23. ICG noted with appreciation the achievements of providers and users of positioning, navigation and timing services in promoting GNSS, as reflected in the publication "10 years of achievement of the United Nations on Global Navigation Satellite Systems" (ST/SPACE/55).

24. ICG took note with appreciation of the reports of its four working groups, which contained the results of their deliberations in accordance with their respective workplans.

25. ICG endorsed the decisions and recommendations of the working groups with regard to the implementation of the actions contained in its workplan.

26. ICG noted that members, associate members and observers of ICG had held a meeting during the Seventh Meeting and noted in that context, that continued discussions were needed regarding the effective functioning of ICG and its current format in order to maximize the benefit for all GNSS users.

27. Some delegations were of the view that developing countries should benefit from GNSS applications, in particular to support their social and economic development, and that it was necessary to develop cooperation for the exchange of knowledge and the transfer of GNSS applications.

28. ICG agreed that a new item would be added to the agenda of the Eighth Meeting of ICG, for members, associate members and observers to report in plenary session on the results of their meeting.

29. ICG agreed on a tentative schedule for the preparatory meetings for its Eighth Meeting, to be held during the fiftieth session of the Scientific and Technical Subcommittee and the fifty-sixth session of the Committee on the Peaceful Uses of Outer Space, in 2013. It was noted that the Office for Outer Space Affairs, as the executive secretariat of ICG and its Providers' Forum, would assist in the preparation of those meetings and the activities of the working groups.

30. ICG expressed its appreciation to the Office for Outer Space Affairs for its work undertaken in support of ICG and its Providers' Forum, including carrying out the activities planned for 2012 and maintaining the ICG information portal.

### III. Joint statement

31. ICG adopted by consensus the following joint statement:

1. The Seventh Meeting of the International Committee on Global Navigation Satellite Systems (ICG) was held in Beijing from 4 to 9 November 2012, 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 opening ceremony was moderated by Chairman of the China Satellite Navigation Committee. The State Counsellor delivered an opening speech on behalf of the Government of China. The Director of the Office for Outer Space Affairs also addressed the meeting. The Ministers of the Ministry of Foreign Affairs, the Ministry of Science and Technology, the China National Space Administration and other departments also attended the opening ceremony.

2. ICG addressed professional, mass-market and scientific GNSS applications. Representatives of industry, academia and Governments shared their views on GNSS services.

3. The Meeting was hosted by the Government of China. The Meeting was attended by representatives of China, 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: Civil Global Positioning System Service Interface Committee, European Space Agency, Interagency Operations Advisory Group, International Aeronautical Federation, International Association of Geodesy (IAG) and IAG Reference Frame Sub-Commission for Europe, International Association of Institutes of Navigation, International Bureau of Weights and Measures, International Earth Rotation and Reference Systems Service International Federation of Surveyors and International Global Navigation Satellite System Service. Representatives of the Office for Outer Space Affairs and the International Telecommunication Union also participated. Australia and Canada were invited to attend as observers. The representatives of Pakistan, the Republic of Korea, Saudi Arabia and Thailand, as well as the Asia-Pacific Space Cooperation Organization, the African Centre for Space Science and Technology Education — in French Language, the Preparatory Commission for the Comprehensive Nuclear-Test-Ban Treaty Organization and the Space Generation Advisory Council also participated.

4. ICG recalled that the General Assembly, in its resolution 66/71, welcomed the continuous progress made by 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 global navigation satellite systems and their integration into national infrastructure, particularly in developing countries, and noted with satisfaction that the International Committee had held its Sixth Meeting in Tokyo from 5 to 9 September 2011.
5. 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.
6. ICG further noted that Working Group A on compatibility and interoperability had addressed all four areas of its current workplan at an intersessional meeting held on 23-27 July 2012, in conjunction with the International Global Navigation Satellite System Service workshop held in Olsztyn, Poland, in 2012, and additional presentations and discussions had been conducted during the Seventh Meeting of ICG. The compatibility and international GNSS monitoring and assessment subgroups of Working Group A also provided, at the intersessional meeting, reports that formed the basis for recommendations on spectrum protection and open service performance monitoring. Working Group A organized and completed the first ICG interference detection and mitigation workshop, held in Vienna on 7 and 8 June 2012, and reported on the conclusions at the Seventh Meeting of ICG, including a recommendation to conduct additional workshops. The next workshop will take place in 2013, immediately preceding the Institute of Navigation event entitled "Pacific Positioning, Navigation and Timing (PNT)", to be held in Hawaii, United States, on 22-25 April 2013, at which an interoperability workshop involving users and manufacturers will also be held.
7. Working Group B on enhancement of the performance of GNSS services followed up on its workplan and its recommendations made at the Sixth Meeting of ICG. The Working Group discussed the benefits of an interoperable GNSS space service volume. All Working Group participants believed that a fully interoperable GNSS space service volume would result in significant benefits for future space users as it would allow for a performance that no single system could provide on its own. The Working Group would continue to work towards an interoperable GNSS space service volume. Concepts for ensuring the integrity of signal coverage in maritime areas by exploiting the arising multiplicity of new satellite navigation signals were discussed, and the significance of multipath-resistant navigation signals for good ranging performance was confirmed. The value of multi-GNSS application demonstrations was noted.
8. Working Group C on information dissemination and capacity-building addressed education and training programmes related to GNSS for purposes of building capacity in developing countries through the regional centres for space science and technology education, affiliated to the United Nations, and centres of excellence, such as the international centre for GNSS science, technology and education at the Beihang University of China. It was noted that

those centres, acting as information centres for ICG, might grow into a network of centres and provide a major springboard for the transfer and enhancement of skills and knowledge in GNSS research and applications. A new item on information dissemination, including materials for publication on the web, was introduced in the Working Group's workplan.

9. Working Group D on reference frames, timing and applications noted significant continued progress on the geodetic and timing references for GNSS providers currently represented in ICG. Specific progress was noted in the alignment of the China Geodetic Coordinate System 2012 (CGS-2012) for BeiDou, the Japan satellite navigation Geodetic System 2010 (JGS-2010) for the Quasi-Zenith Satellite System (QZSS), the Parametry Zemli 1990 (PZ-90) geodetic datum for the Global Navigation Satellite System (GLONASS) of the Russian Federation and the World Geodetic System 1984 (WGS-84) for global positioning systems to the latest realization of the International Terrestrial Reference System in the form of ITRF-2008. The Working Group also made recommendations in relation to developments in the recognition of the International Terrestrial Reference System and Coordinated Universal Time (UTC). A notable development was the progress on a pilot service by the International Bureau of Weights and Measures and associated timing laboratories to produce "Rapid UTC".

10. The Ninth Meeting of the Providers' Forum was held in conjunction with the Seventh Meeting of ICG. The Providers agreed upon a statement highlighting key achievements of ICG and the Providers' Forum.

11. ICG accepted the invitation of the United Arab Emirates to host its Eighth Meeting in Dubai from 10 to 14 November 2013. 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 Group activities. ICG noted the expression of interest by the European Union to host the Ninth Meeting of ICG in 2014.

#### **IV. Providers' Forum**

32. The Ninth Meeting of the Providers' Forum, co-chaired by China and the United States, was held in conjunction with the Seventh Meeting of ICG in Beijing on 4, 6 and 8 November 2012. China, Japan, the Russian Federation, the United States and the European Union were represented at the meeting.

33. After consideration of the items on its agenda, the Providers' Forum adopted the report on the meeting containing the recommendations and decisions set out below:

##### **A. Summary of discussions and recommendations**

###### **1. Open service information dissemination**

1. The representatives of the European Union and the United States of America made a presentation on their joint efforts in the area of using multiple

GNSS constellations for advanced receiver autonomous integrity monitoring (ARAIM). The presenters requested from the Providers service commitments to expand the use of multiple constellations (as discussed in Working Group A). Additional information on this topic will be provided at future ICG meetings.

2. A review of the space service volume concept was presented. The United States requested that the Providers' Forum members complete the templates developed to document the space service volume characteristics of the Provider systems. The United States further requested that the definition of space service volume be added to the ICG glossary of terms.

**2. Service performance monitoring**

3. The representative of China provided information on the status and progress of the International GNSS Monitoring Assessment System (iGMAS). It was noted that iGMAS would support various multi-GNSS monitoring activities such as cooperating with the International Global Navigation Satellite System Service Multi-GNSS Experiment (M-GEX) by sharing stations, data and geodetic receivers. China requested that more countries and organizations participate in future iGMAS activities. The co-chairs of Working Group A indicated that the topic would be addressed further within the Working Group.

**3. Spectrum protection: interference detection and mitigation**

4. The representative of the United States informed participants that the Interference Detection and Mitigation workshop had been held in Vienna on 7 and 8 June 2012 and that the workshop would be discussed within Working Group A.

**B. Other matters**

**1. Report on a multi-GNSS demonstration project in the Asia/Oceania region**

5. The representative of Japan presented the status of the demonstration campaign and the upcoming workshop to be held in Kuala Lumpur on 8-10 December 2012. It was reported that there were currently 17 participating organizations and 8 joint experiments. It was requested that the Providers participate in the upcoming workshop.

**2. ICG information centres**

6. The executive secretariat provided an update on the ICG information centres. It was reported that a GLONASS model and educational video had been provided to the Office for Outer Space Affairs. A request was made for the Providers to work closely with the information centres.



**3. ICG information portal**

7. The presentation “ICG Information Service System website”, made by the representative of China, highlighted the Beihang University website, which contains a repository of information on and reports of ICG meetings.

8. The presentation “ICG website”, made by the representative of the United States, provided a proposal on possible redesign of the ICG website. That included expanding the ICG website utility to provide collaborative functions to support ICG activities as its work and membership increased. The presentation had been made previously, during the Seventh Meeting of the Providers’ Forum.

9. The Providers discussed the two presentations and the topic of the ICG website. It was asked whether the ICG website should be on a Provider-hosted site versus a United Nations-hosted site. China stated that their website served as an enhanced external information service website. The information centre websites and their relationship to ICG were discussed. It was agreed that the establishment of separate websites for the information centres would be beneficial. Two members expressed the view that it would be ideal for the ICG website to be hosted by the United Nations, but as discussed in previous meetings, that approach had limitations. The executive secretariat offered to explore the matter further. The Providers’ Forum co-chairs proposed that discussions on that topic take place in ICG Working Group C.

**4. Glossary of terms related to the work of ICG and its Providers’ Forum**

10. The executive secretariat provided an update on the ICG glossary of terms and the educational curriculum, which would be published as a United Nations publication.

**5. Statement of the Providers’ Forum**

11. The Providers agreed upon a statement highlighting key achievements of ICG and the Providers’ Forum, to be annexed to the ICG report (see annex I).

**6. ICG Working Group recommendations**

12. The Providers reviewed the recommendations of Working Groups A, B, C and D and agreed that they be forwarded to ICG for consideration and final approval in plenary session.

**7. Next meeting of the Providers’ Forum**

13. The Providers agreed that the next meeting of the Providers’ Forum would be held in Vienna in June 2013, in conjunction with the fifty-sixth session of the Committee on the Peaceful Uses of Outer Space. The meeting would be co-chaired by China and the United States. It was agreed that an agenda item be added to the agenda of the Providers’ Forum regarding the method of selection of co-chairs. The representative of the United States pointed out that a change to the terms of reference of the Providers’ Forum might be necessary.

**8. Future role and work of ICG and its Providers' Forum**

14. The co-chairs introduced the documents prepared for this topic. The co-chairs agreed to revise the paper reflecting the discussions held and distribute it to the Providers for discussion at the Providers' Forum planning meeting in February 2013. It was agreed that an item be added to the agenda for consideration in plenary session at the Eighth Meeting of ICG, for the members, associate members, and observers to report on the results of their meeting.

**9. Other matters**

15. The matter of arrangements for the Ninth Meeting of ICG, to be held in 2014, was discussed, and the European Union expressed an interest in hosting that meeting.

## Annex I

### **Statement of the Providers' Forum concerning the International Committee on Global Navigation Satellite Systems**

On 6 November 2012, at its Ninth Meeting, in Beijing, the Provider's Forum adopted the following statement:

The International Committee on Global Navigation Satellite Systems (ICG) was established in 2005 and has steadily developed into an important platform for the system providers, the user communities, observers and interested United Nations Member States to exchange views and information concerning the field of satellite navigation. ICG has taken a leading role internationally to promote collaboration in the utilization of global navigation satellite systems (GNSS) services for a range of commercial, scientific and technological applications. Specific areas of interest to ICG and its working groups include compatibility and interoperability, service performance and service performance enhancement, timing and geodetic reference frames, education and training, and global applications.

The Providers' Forum was established in 2007, at the Second Meeting of ICG. Since then, each of the global and regional system providers has hosted a meeting of ICG, achieving an important milestone in demonstrating the commitment of the Providers to the goals and objectives of ICG. This commitment serves as a foundation to enhance collaboration and to increase global awareness of GNSS.

During its series of meetings, in particular, at its Ninth Meeting, held in conjunction with the Seventh Meeting of ICG in Beijing on 4-9 November 2012, the Providers' Forum considers user recommendations, works cooperatively to enable better service, supports the protection of the radio navigation satellite services (RNSS) spectrum, considers activities that promote GNSS awareness and education, and considers proposals to enhance service performance and performance monitoring and assessment.

The Providers' Forum promotes compatibility and interoperability among current and future global and regional space-based systems by exchanging detailed information about planned or operating systems and the policies and procedures that govern their service provision. More importantly, the Providers' Forum is a mechanism to continue discussions on important issues addressed by ICG that require focused inputs from system providers.

In its Ninth Meeting, the Providers' Forum considered the future role of ICG and agreed to keep that item on its agenda.

## Annex II

### **List of States Members of the United Nations and governmental, intergovernmental and non-governmental organizations participating in the International Committee on Global Navigation Satellite Systems**

China  
India  
Italy  
Japan  
Malaysia  
Nigeria  
Russian Federation  
United Arab Emirates  
United States of America  
European Union  
Civil Global Positioning System Service Interface Committee  
Committee on Space Research  
European Space Agency  
Interagency Operations Advisory Group  
International Aeronautical Federation  
International Association of Geodesy  
International Association of Geodesy Reference Frame Sub-Commission for Europe  
International Association of Institutes of Navigation  
International Bureau of Weights and Measures  
International Cartographic Association  
International Earth Rotation and Reference Systems Service  
International Federation of Surveyors  
International Global Navigation Satellite System Service  
International Society for Photogrammetry and Remote Sensing  
International Steering Committee of the European Position Determination System  
International Telecommunication Union  
International Union of Radio Science  
Office for Outer Space Affairs of the Secretariat

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**Annex III****Documents of the Seventh Meeting of the International  
Committee on Global Navigation Satellite Systems**

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<i>Symbol</i>	<i>Title or description</i>
ICG/WGA/2012	Report of the Working Group on Compatibility and Interoperability
ICG/WGB/2012	Report of the Working Group on Enhancement of the Performance of Global Navigation Satellite System Services
ICG/WGC/2012	Report of the Working Group on Information Dissemination and Capacity-building
ICG/WGD/2012	Report of the Working Group on Reference Frames, Timing and Applications

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