United Nations A/AC.105/1059

General Assembly

Distr.: General
29 November 2013

Original: English

Committee on the Peaceful Uses of Outer Space

Eighth Meeting of the International Committee on Global Navigation Satellite Systems

Note by the Secretariat

I. Introduction

A. Background

1. The use of the signals received from existing global navigation satellite systems (GNSS), the best known of which are the Global Positioning System (GPS) of the United States of America and the Global Navigation Satellite System (GLONASS) of the Russian Federation, has become a cross-cutting tool to support growth in precise positioning applications. With the European Satellite Navigation System (Galileo) and China's Compass/BeiDou satellite navigation system currently being developed and deployed, the number of satellites available at any given time will increase greatly, thereby enhancing the quality of services and increasing the number of potential users and applications.

2. The International Committee on GNSS (ICG), established in 2005 under the umbrella of the United Nations, is a forum where governments and interested non-governmental entities from around the world discuss all matters regarding GNSS. The goal of ICG is to promote the greater use of GNSS capabilities to support sustainable development and to promote new partnerships among Committee members and institutions, particularly taking into account the interests of developing nations.

3. The Office for Outer Space Affairs, in its capacity as the executive secretariat of ICG and its Providers' Forum, and through its programme on GNSS applications, continues organizing workshops and training courses focusing on capacity-building in the use of GNSS-related technologies in various fields of science and industry, including on the subject of space weather effects in the ionosphere and their impact on positioning (see A/AC.105/1060). In 2013, the *Global Navigation Satellite Systems Education Curriculum* (ST/SPACE/59) was introduced at the regional

V.13-88281 (E) 111213 121213

centres for space science and technology education, affiliated to the United Nations, which also serve as information centres for ICG. As such, the centres aim to contribute to the creation of a knowledgeable workforce, necessary for the advancement of GNSS and its applications in the regions.

4. Pursuant to General Assembly resolution 67/113 of 18 December 2012 and as part of the United Nations Programme on Space Applications, the United Nations/Croatia Workshop on the Applications of Global Navigation Satellite Systems was organized by the Office for Outer Space Affairs and the Faculty of Maritime Studies of the University of Rijeka on behalf of the Government of Croatia, and was held in Baška, Croatia, from 21 to 25 April 2013 (see A/AC.105/1055). The workshop was co-sponsored by the United States through ICG.

5. 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 (see A/AC.105/879). The Second Meeting was held in Bangalore, India, from 4 to 7 September 2007 (see A/AC.105/901). The Third Meeting was held in Pasadena, California, United States, from 8 to 12 December 2008 (see A/AC.105/928). The Fourth Meeting was held in Saint Petersburg, Russian Federation, from 14 to 18 September 2009 (see A/AC.105/948). The Fifth Meeting was held in Turin, Italy, from 18 to 22 October 2010 (see A/AC.105/982). The Sixth Meeting was held in Tokyo from 5 to 9 September 2011 (see A/AC.105/1000). The Seventh Meeting was held in Beijing from 4 to 9 November 2012 (see A/AC.105/1035).

6. The Eighth Meeting of ICG was held in Dubai, United Arab Emirates, from 9 to 14 November 2013, hosted by the government of Dubai.

B. Structure and programme of the Meeting

7. The programme of the Eighth Meeting of ICG included four plenary sessions and working group meetings. At the first plenary session, on 10 November 2013, a variety of updates were provided on system development by the world's GNSS operators and augmentation and regional system providers. ICG members, associate members and observers, representing key GNSS user communities, outlined recent developments in their organizations and associations with regard to GNSS services, applications and capacity-building activities.

8. At the second plenary session (led by the co-chairs of the ICG Providers' Forum), held on 11 November 2013, issues for discussions in ICG and/or its working groups were identified; the meeting focused on getting GNSS user input to gain insight into users' needs and requirements.

9. In accordance with the workplan of ICG, four working groups met on 12 and 13 November 2013, focusing on the following issues: compatibility and interoperability (led by the Russian Federation and the United States); enhancement of the performance of GNSS services (led by India and the European Space Agency (ESA)); information dissemination and capacity-building (led by the United Arab Emirates 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).

10. At its third and fourth plenary sessions, held on 13 and 14 November 2013, ICG considered the implementation of the recommendations of the working groups and plans to address the current and future work of each working group.

11. After considering the various items on its agenda, ICG made recommendations and decisions and adopted a joint statement (see section III below).

12. In conjunction with the Eighth Meeting of ICG, the Providers' Forum held its eleventh meeting on 9, 11 and 13 November 2013 under the co-chairmanship of China and the United States (see section IV below).

C. Attendance

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

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

15. 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 (CGSIC), ESA, Interagency Operations Advisory Group (IOAG), International Aeronautical Federation (IAF), International Association of Geodesy (IAG), IAG Reference Frame Sub-Commission for Europe (EUREF), International Association of Institutes of Navigation (IAIN), International Bureau of Weights and Measures (BIPM), International Federation of Surveyors (FIG) and International Global Navigation Satellite System Service (IGS).

16. ICG decided to invite, at their request, the observers for Canada, the Asia-Pacific Space Cooperation Organization (APSCO), the Arab Institute of Navigation (AIN) and the European Space Policy Institute (ESPI) to attend the Eighth 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 their status.

17. ICG also decided to invite, at their request, the observers for the African Regional Centre for Space Science and Technology Education — in English language and the Space Generation Advisory Council (SGAC) to participate in an expert capacity in the work of the ICG working group on information dissemination and capacity-building 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 their status.

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. Expert seminar global navigation satellite system applications

19. An expert seminar on GNSS scientific and technology applications was held on 10 November 2013 as part of the Eighth Meeting of ICG. The seminar introduced issues and opportunities in user applications and GNSS technology for consideration by ICG and/or its working groups. The presentations given at the seminar included the following: “Experience of utilizing GLONASS technologies in various fields of the Russian economy”, by the representative of the Russian Federation; “Galileo in-orbit-validation position results”, by the representative of ESA; “Position, navigation and timing assurance standards for GNSS receivers used in critical applications”, by the representative of the United States; “Galileo and EGNOS applications”, by the representative of the European Commission; and “BeiDou application demonstration and experience campaign progress and BeiDou/GNSS applications” and “BeiDou application for precision agriculture”, by the representatives of China. An exhibition was also held near the site of the Meeting from 10 to 13 November 2013.

E. Documentation

20. A list of the documents before the Eighth Meeting is contained in annex III. Those documents and further information on the Meeting’s agenda, background materials and presentations are available from the ICG information portal (www.unoosa.org/oosa/en/SAP/gnss/icg.html).

II. Observations, recommendations and decisions

21. At the Eighth Meeting, the chair outlined the work of ICG at its current Meeting and reviewed related events held in conjunction with it.

22. Also at the Eighth Meeting, ICG took note of the results of the eleventh 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. In preparation for its Tenth Meeting, to be held in 2015, ICG recommended that a list of accomplishments within ICG be prepared, which would include the excerpts document and inputs from the working groups and ICG members, associate members and observers.

24. ICG agreed that a joint meeting with the providers and ICG members, associate members and observers should be introduced as a regular item on the agenda of the ICG annual meetings in order to report on the status of the recommendations and to exchange views on the providers’ response to input from the user communities. ICG noted that that item could serve as a way to gain insight into users’ needs and requirements, and to get information on how services are performing. It was also noted that the ICG outreach activities would increase the visibility of ICG.

25. ICG agreed that, taking into account the roles and functions of GNSS service providers and intergovernmental bodies, such as the International Civil Aviation Organization (ICAO) and the International Maritime Organization (IMO), an effort should be made to encourage their participation in the ICG meetings.

26. ICG took note with appreciation of the paper summarizing discussions concerning the future of ICG, which had been submitted by the co-chairs of the Providers' Forum. Its purpose was to provide a number of possible options and modalities that could strengthen the effectiveness of ICG in the future. It was agreed that that summary would serve as a basis for assessing the progress made by ICG.

27. ICG also highlighted the importance of the availability of financial and other resources for the successful implementation of the programme of work of the ICG executive secretariat.

28. 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.

29. ICG endorsed the decisions and recommendations of the working groups with regard to the implementation of the actions set forth in its workplan.

30. The chair of the Meeting informed participants that requests for observer status with ICG had been received from AIN and ESPI.

31. ICG heard statements by the representatives of AIN and ESPI on their organizations' plans for implementing GNSS applications and granted the organizations the status of observer.

32. The executive secretariat was requested to amend the terms of reference of ICG to reflect the addition of new observers.

33. ICG accepted the invitation of the European Union to host the Ninth Meeting, to be held in 2014, and noted the offer of the United States to host the Tenth Meeting, in 2015.

34. ICG agreed on a tentative schedule for the preparatory meetings for its Ninth Meeting, to be held during the fifty-first session of the Scientific and Technical Subcommittee and the fifty-seventh session of the Committee on the Peaceful Uses of Outer Space, in 2014. 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.

35. ICG expressed its appreciation to the Office for Outer Space Affairs for its work in support of ICG and its Providers' Forum, including carrying out the activities planned for 2013 and maintaining the ICG information portal.

III. Joint statement

36. ICG adopted by consensus the following joint statement:

> 1. The Eighth Meeting of the International Committee on Global Navigation Satellite Systems (ICG) was held in Dubai, United Arab Emirates, from 10 to 14 November 2013 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 Chairman of the United Arab Emirates Telecommunications Regulatory Authority and the Chairman of the Emirates Institution for Advanced Science and Technology (EIAST) delivered opening speeches on behalf of the host Government. A representative of the Office for Outer Space Affairs of the United Nations Secretariat also addressed the Meeting.

2. ICG addressed GNSS science and innovative technology applications and future commercial applications. Representatives from industry, academia and governments shared views on GNSS compatibility and interoperability.

3. EIAST hosted the Meeting on behalf of the government of Dubai. Attendees included China, India, Italy, Japan, Malaysia, the Russian Federation, the United Arab Emirates, the United States, and the European Union, as well as the following intergovernmental and nongovernmental organizations: CGSIC, ESA, IAF, FIG, IAIN, IAG, EUREF, BIPM, International Earth Rotation and Reference Systems Service (IERS), IGS and IOAG. Representatives of the Office for Outer Space Affairs and ITU also participated. A representative of Canada was invited to attend as observer. The representatives of APSCO, the African Regional Centre for Space Science and Technology Education — in English language and SGAC also participated. The representatives of AIN and ESPI also attended and were recognized by ICG as new observers.

4. ICG recalled that the United Nations General Assembly, in its resolution 67/113 of 18 December 2012, had noted with appreciation 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 GNSS and their integration into national infrastructures, particularly in developing countries, and also noted with appreciation that ICG had held its Seventh Meeting in Beijing from 5 to 9 November 2012.

5. ICG considered the future scope of its work and organizational structure, and ways and means to enhance user input and the visibility of ICG, and other proposals to increase the effective implementation of its recommendations. In this regard, ICG adopted a mission statement, contained in annex I, and concluded that ICG, as a platform for open discussions and information exchange was a great success, and adopted the Summary of discussions concerning the future of ICG.

6. 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.

7. Working Group A, on compatibility and interoperability, addressed all four areas of its current workplan during its intersessional meeting held in Vienna from 11 to 13 June 2013 and during the Eighth Meeting of ICG. The compatibility and international GNSS monitoring and assessment subgroups of Working Group A provided reports at the intersessional meeting that formed

the basis for recommendations on spectrum protection, open service performance and the monitoring of open services. Recommendations were also presented to ICG related to interoperability and interference detection and mitigation. In addition to the intersessional meeting, Working Group A organized and completed the second ICG interference detection and mitigation workshop and the first interoperability workshop, held in Honolulu, United States, from 19 to 22 April 2013, and reported the conclusions to the working group. The next interference detection and mitigation workshop will take place on 20 May 2014, immediately preceding the China Satellite Navigation Conference, to be held in Nanjing, China, from 21 to 23 May 2014. Two regional interoperability workshops involving users and manufacturers from China and the Russian Federation, as well as members of the interoperability task force, will be held, one in Moscow in conjunction with the Moscow Satellite Navigation Forum, on 23 and 24 April 2014, and the other in Nanjing in conjunction with the China Satellite Navigation Conference. A meeting of the International GNSS Monitoring and Assessment subgroup is planned for 22 to 26 June 2014 in Pasadena, United States in conjunction with the twentieth anniversary International Global Navigation Satellite System Service workshop, and the 2014 intersessional meeting is tentatively scheduled for 16 to 18 July at ITU, in Geneva.

8. Working Group B, on the enhancement of GNSS service performance, made significant progress in establishing an interoperable GNSS space service volume during the Eighth Meeting of ICG through significant advance work, presentations at the Meeting and additional robust contributions from the administrations of China and the Russian Federation. The Working Group further discussed the benefits of an interoperable GNSS space service volume. All Working Group B participants believed that a fully interoperable GNSS space service volume would result in significant benefits for future space users, as it would allow performance that no single system could provide on its own. The Working Group will continue to work within ICG towards an interoperable GNSS space service volume.

9. Working Group C, on information dissemination and capacity-building, focused on the available capacity-building opportunities and the status of operations of the United Nations-affiliated regional centres for space science and technology education and centres of excellence, such as the Russian Education Centre led by the Federal Space Agency of the Russian Federation, the Beihang University of China and the Geospatial and Space Technology Consortium for Innovative Social Services of Japan. In that context, Working Group C noted that providing additional new GNSS education opportunities at different levels would be the best way to cover the different needs in the GNSS field in order to maximize the benefits of the use of GNSS to support sustainable development, particularly in developing nations. The Working Group recommended that new technical knowledge generated by ICG should be effectively communicated to the public, the GNSS-related scientific research community and industry at large, through the ICG information portal and through the use of existing electronic infrastructure and brochures. The Working Group noted that EIAST would also provide capacity-building and contribute to information dissemination on the use of GNSS and its applications.

10. Working Group D, on reference frames, timing and applications, noted significant continued progress on the geodetic and timing references for the GNSS currently represented in ICG. Specific progress was noted in (a) the refinement of the alignments of GNSS-associated reference frames to the latest realization of the International Terrestrial Reference System (ITRF2008), and (b) on timing references in relation to rapid Coordinated Universal Time (UTCr), the BIPM publication and GNSS time offsets. Working Group D had contributed and would continue to contribute significantly to the ICG international GNSS monitoring and assessment initiative. The Working Group also made five recommendations: one in relation to the assessment of the level of reference frame alignments to the International Terrestrial Reference Frame and four on timing issues related to: the work of the proposed redefinition of UTC; the official provision of UTCr by BIPM; the BIPM publication; and the monitoring of offsets between GNSS times.

11. ICG accepted the invitation of the European Union to host its Ninth Meeting in Prague from 10 to 14 November 2014. The Office for Outer Space Affairs, in its capacity as 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 to be held in 2014. ICG noted the expression of interest by the United States to host the Tenth Meeting of ICG, in 2015.

IV. Providers' Forum

37. The eleventh meeting of the Providers' Forum, co-chaired by China and the United States, was held in conjunction with the Eighth Meeting of ICG, on 9, 11 and 13 November 2013, in Dubai, United Arab Emirates. China, India, Japan, the Russian Federation, the United States and the European Union were represented at the meeting. The United Arab Emirates, as host of the Eighth Meeting of ICG, was also represented.

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

A. Summary of discussions and recommendations

1. Opening remarks

1. A proposal was made to update the ICG booklet for the Tenth Meeting of ICG, in 2015. System providers had been requested to provide updated information to the ICG executive secretariat. It was noted that ICG Working Group A had developed a recommendation addressing this matter in more detail.

2. Open service information dissemination

2. The United States presented an update to the GNSS space service volume concept. The United States continued to encourage the development of an

interoperable space service volume to enable improved capabilities. The presentation highlighted some of the advantages of creating an interoperable global space service volume, including improvements to space weather predictions and lunar navigation. A template had already been distributed through Working Group B for assistance in that effort.

3. The European Union provided an update on the Galileo in-orbit validation, which is the validation before system deployment. It reported two successful in-orbit validation satellite launches and highlighted that they were well on their way to achieving full operational capability. The in-orbit validation campaign had been initiated in May 2013 and completed in November 2013, with very good performance results.

3. Service performance monitoring

4. The United States made a presentation on GNSS civil performance monitoring, explaining that such monitoring provided benefits to both providers and users and supported the ICG principle of transparency. The Civil Monitoring Performance Specification addressed current civil GPS signals by specifying metrics that address performance measures based on the GPS performance standard.

4. Spectrum protection: interference detection and mitigation

5. The United States was currently working on a GPS adjacent-band capability assessment to draft new GPS spectrum interference standards. The purpose was to determine GPS spectrum-protection criteria to inform future proposals for non-space commercial uses of the adjacent bands. The United States wanted to be proactive in protecting GPS from interference. The United States also reported on efforts taking place in the ITU Joint Task Group 4-5-6-7 in preparation for the World Radiocommunication Conference. The Task Group was evaluating additional spectrum allocations for mobile broadband services, and the United States was working to protect GNSS spectrum bands from outside interference as a result of any changes to spectrum allocations. It was noted that the next Joint Task Group meeting would be held in Geneva from 20 to 28 February 2014, and the United States encouraged other entities to participate actively in activities leading to the final recommendations to the World Radiocommunication Conference, where the spectrum allocation changes would be finalized.

B. Other matters

1. Report on a multi-global navigation satellite systems demonstration project in the Asia-Oceania region

6. The secretariat of Multi-GNSS Asia provided an update on the activities taking place. The three main activities were (a) the establishment of a multi-GNSS monitoring network, (b) working groups to conduct experiments and (c) the Asia-Oceania Regional Workshop on GNSS. The next workshop was scheduled for 1 to 3 December 2013 in Hanoi.

2. Information centres and information portal

7. The executive secretariat of the International Committee on Global Navigation Satellite Systems reported that the United Nations-affiliated regional centres on space science and technology education would implement the postgraduate course on GNSS from November 2013 to December 2014, using the *Global Navigation Satellite Systems Education Curriculum* (ST/SPACE/59). The improvement of the ICG information portal would continue to be discussed in Working Group C, on information dissemination and capacity-building.

3. Future role and work of the International Committee on Global Navigation Satellite Systems and its Providers' Forum

8. The discussion was based upon previous Providers' Forum meetings. The co-chairs reviewed two related papers: the summary of discussions concerning the future of ICG and the paper on the meeting with the associate members and observers that took place at the Seventh Meeting of ICG. The summary of discussions will be presented to ICG for adoption.

9. The co-chairs made a presentation on the way forward to increase user contributions to ICG. Several questions were identified regarding users and their relationship to ICG. The Providers' Forum agreed that the establishment of a users' forum would be premature, but noted that further discussion on ways to bring user input into ICG should continue.

4. Selection of the co-chairs of the Providers' Forum

10. At the tenth meeting of the Providers' Forum, it was agreed that the topic of the selection of co-chairs for future Providers' Forum meetings would be discussed.

11. The Russian Federation made a presentation proposing ideas to consider for the selection of future co-chairs. It also suggested updating the Providers' Forum terms of reference.

12. China made a presentation on the selection of co-chairs. The proposal would allow each provider to co-chair on a two-year rotational basis, and established a schedule for the next several years. The providers agreed to the schedule through 2017 and in the coming months would confirm the remaining schedule through 2019. The terms of reference of the Providers' Forum would be modified accordingly and circulated by e-mail for final approval.

5. Working group recommendations

13. The providers reviewed the recommendations of Working Groups A, B, C and D and agreed that they would be forwarded to ICG for consideration and final approval at the ICG plenary session.

6. Membership of the International Committee on Global Navigation Satellite Systems

14. The providers noted that AIN and ESPI had requested observer status with ICG and agreed that the requests would be forwarded to ICG for consideration and final approval at the plenary session.

7. Next meeting of the Providers' Forum

15. A Providers' Forum planning meeting will be held in Vienna on 17 February 2014, in conjunction with the fifty-first session of the Scientific and Technical Subcommittee of the Committee on the Peaceful Uses of Outer Space. A symposium on GNSS commercial applications will also be held in the Subcommittee on 17 February 2014.

Annex I

Mission statement of the International Committee on Global Navigation Satellite Systems

The International Committee on Global Navigation Satellite Systems (ICG), established in 2005 under the umbrella of the United Nations, promotes voluntary cooperation on matters of mutual interest related to civil satellite-based positioning, navigation, timing and value-added services. ICG contributes to the sustainable development of the world. Among the core missions of ICG are to encourage coordination among providers of global navigation satellite systems (GNSS), regional systems and augmentations in order to ensure greater compatibility, interoperability and transparency, and to promote the introduction and utilization of those services and their future enhancements, including in developing countries, through assistance, if necessary, with the integration into their infrastructures. ICG also serves to assist GNSS users with their development plans and applications by encouraging coordination and serving as a focal point for international information exchange.

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
Arab Institute of Navigation
Civil Global Positioning System Service Interface Committee
Committee on Space Research
European Space Agency
European Space Policy Institute
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

Annex III

Documents of the Eighth Meeting of the International Committee on Global Navigation Satellite Systems

Symbol	*Title or description*
ICG/WGA/2013	Report of the Working Group on Compatibility and Interoperability
ICG/WGB/2013	Report of the Working Group on Enhancement of the Performance of Global Navigation Satellite System Services
ICG/WGC/2013	Report of the Working Group on Information Dissemination and Capacity-building
ICG/WGD/2013	Report of the Working Group on Reference Frames, Timing and Applications
ICG/TOR/2013 (amended)	Terms of reference of the International Committee on Global Navigation Satellite Systems
ICG/PF/TOR/2013 (amended)	Terms of reference of the Providers' Forum
ICG/INFO/2013	Summary of discussions concerning the future of the International Committee on Global Navigation Satellite Systems