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Committee on the Peaceful Uses of Outer Space

Tenth 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) was established in 2005 under the umbrella of the United Nations as an informal, voluntary body for the purpose of promoting cooperation, as appropriate, on matters of mutual interest related to civil satellite-based positioning, navigation, timing and value-added services. ICG is a unique platform for multilateral discussions among system providers. Since the establishment of ICG, its work has increased rapidly in line with the expectation that global navigation satellite systems (GNSS) applications will continue to grow in the coming years.

2. The ultimate goal of ICG is to achieve the compatibility and interoperability of GNSS, thereby saving costs through international cooperation and making positioning, navigation and timing available globally for societal benefits, including monitoring all aspects of environment and security. Another significant issue before ICG is the integration of GNSS services into national infrastructure, in particular in developing nations.

3. ICG pursues its work through four working groups, involving both GNSS operators and international organizations representing a cross-section of major users of GNSS. The working groups focus on systems, signals and services; enhancement of GNSS performance, new services and capabilities; information dissemination and capacity-building; and reference frames, timing and applications.

4. The Providers' Forum, established in 2007 within ICG, is a multilateral environment that provides a means of promoting discussion among operators of GNSS and regional augmentation systems on key technical issues and operational

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concepts. The Forum meets in conjunction with the annual meetings of ICG or, when necessary, at the request of the Forum co-chairs.

5. The Office for Outer Space Affairs of the Secretariat, as the executive secretariat of ICG and its Providers' Forum, prepares the annual meetings of ICG in cooperation with the host country of the meeting. In addition, the Office handles the coordination of the planning meetings of ICG and the Forum, which are held in conjunction with the sessions of the Committee on the Peaceful Uses of Outer Space and its subsidiary bodies. The Office also implements a programme on GNSS applications, as mandated by ICG and the Forum (see A/AC.105/1106).

6. Previous meetings of ICG have been hosted by the European Commission and the European GNSS Agency on behalf of the European Union (Prague, 2014) (see A/AC.105/1083); the government of Dubai (Dubai, United Arab Emirates, 2013) (see A/AC.105/1059); China (Beijing, 2012) (see A/AC.105/1035); Japan (Tokyo, 2011) (see A/AC.105/1000); Italy and the European Commission on behalf of the European Union (Turin, Italy, 2010) (see A/AC.105/982); the Russian Federation (Saint Petersburg, 2009) (see A/AC.105/948); the United States of America (Pasadena, 2008) (see A/AC.105/928); and India (Bangalore, 2007) (see A/AC.105/901). The First Meeting of ICG was organized and hosted by the Office for Outer Space Affairs in Vienna in 2006 (see A/AC.105/879).

7. The Tenth Meeting of ICG was held in Boulder, United States, from 2 to 6 November 2015. The fifteenth meeting of the Providers' Forum was held, in conjunction with the meeting of ICG, on 1 and 5 November 2015. The Department of State and the University Corporation for Atmospheric Research organized the meeting on behalf of the Government of the United States.

B. Structure and programme of the meeting

8. The programme of the Tenth Meeting of ICG included three plenary sessions and a series of meetings of the four working groups. An update on satellite-based navigation systems in operation and under development was provided by a representative of each system at the first plenary session, on 2 November 2015. ICG members, associate members and observers, representing key GNSS user communities, gave presentations on matters of interest to ICG and its working groups. The Office for Outer Space Affairs also contributed, with a presentation entitled "Activities carried out in 2015 in the framework of the ICG workplan", in which regional workshops and training courses, as well as the work carried out through the regional centres for space science and technology education, affiliated to the United Nations, were described.

9. In accordance with the ICG workplan, the four working groups met on 3 and 4 November 2015 to review progress made in implementing the recommendations made at previous meetings and ways and means of carrying them forward in 2016 and beyond.

10. A joint session of the working groups was held on 4 November 2015. The joint session, led by the chair of the Tenth Meeting of ICG, convened to consider each working group's workplan and recommendations status, including the actions to be taken on specific cross-cutting issues.

11. After considering the various items on its agenda, ICG adopted a joint statement (see sect. III below).

12. In conjunction with the Tenth Meeting of ICG, the Providers' Forum held its fifteenth meeting on 1 and 5 November 2015 under the co-chairmanship of the United States and the European Commission (see sect. IV below).

C. Attendance

13. Representatives of the following States participated in the Tenth 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 intergovernmental and non-governmental organizations dealing with GNSS services and applications were also represented at the meeting: Arab Institute of Navigation, Asia-Pacific Space Cooperation Organization, Civil Global Positioning System Service Interface Committee, European Space Agency, International Aeronautical Federation, International Association of Geodesy and International Association of Geodesy Reference Frame Sub-Commission for Europe, International Association of Institutes of Navigation, International Bureau of Weights and Measures (BIPM), International Federation of Surveyors and International Global Navigation Satellite System Service (IGS). Representatives of the Office for Outer Space Affairs and the regional centres for space science and technology education, affiliated to the United Nations, located in China, Mexico and Morocco, also attended the meeting.

15. ICG decided to invite, at their request, observers for Australia and Canada and the Space Generation Advisory Council to attend the Tenth 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.

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

D. Expert panel on global navigation satellite systems

17. A panel of experts to address the theme "Global navigation satellite systems: today and preparing for the future" was held on 2 November 2015 as part of the Tenth Meeting of ICG. Topics discussed by the panel, comprising experts representing a variety of GNSS sectors, ranged from GNSS vulnerabilities to the use of GNSS signals for atmospheric remote sensing and from the geodetic challenges of GNSS measurement modelling to the design of operational positioning infrastructure (in the form of continuously operating GNSS receivers) to augment GNSS accuracy. Industry perspectives on the design of new multi-constellation GNSS chipsets, issues relating to GNSS governance and United Nations initiatives in areas such as geodetic references and geospatial information management were also discussed.

E. Expert seminar on global navigation satellite system applications

18. An expert seminar entitled “Observing Earth processes using GNSS” was held on 3 November 2015 to raise awareness of issues and opportunities in user applications and GNSS technology for consideration by ICG and its working groups.

19. Presentations given at the seminar included the following: “Development of BeiDou Navigation Satellite System”, by the representative of China; “GNSS ionospheric sounding for space weather”, by the representative of the United States; “Review of GNSS as sources of opportunity for Earth observation: radio-occultation and reflectometry”, by the representative of Spain; “Using GNSS signals to measure soil moisture, vegetation water content, snow depth, water levels, permafrost and volcanic plumes”, by the representative of the United States; “GNSS for monitoring regional water resources and cryospheric changes”, by the representative of Luxembourg; “Update on the International Terrestrial Reference Frame and handling deformation caused by large earthquakes”, by the representative of France; and “GNSS augmentation to the tsunami early warning system”, by the representative of the United States.

F. Documentation

20. A list of the documents before the Tenth Meeting is contained in annex II. Those documents and further information on the meeting agenda, background materials and presentations are available on the ICG information portal (www.unoosa.org/oosa/en/ourwork/icg/icg.html).

II. Observations, recommendations and decisions

21. After considering the various items before it, at its Tenth Meeting ICG made the observations, recommendations and decisions set out below.

22. ICG noted that the joint working group session had discussed the implementation status of recommendations made at previous meetings related to: (a) the international GNSS monitoring assessment; (b) the template for GNSS space service volume; and (c) the working groups’ workplans and potential revisions thereto.

23. The working groups discussed cross-cutting issues relating to the international GNSS monitoring assessment, highlighting the work performed by the task force. It was noted that utilizing existing resources such as IGS and the providers’ monitoring and assessment systems, which might include signal quality monitoring, could maximize benefits in the early stages of the international GNSS monitoring assessment road map.

24. In the course of the discussion on matters related to GNSS space service volume, the advantages of an interoperable GNSS space service volume for the space user community were highlighted. It was noted that GNSS service providers had already provided their space service volume characterizations to be included into the space service volume booklet.

25. The view was expressed that, in order to develop unified GNSS space service volume analysis, ICG should develop standard definitions of minimum number of satellites and constellation geometry.

26. ICG noted that the Working Group on compatibility and interoperability had completed the review of its workplan, which included additional areas of work consistent with the workplan of the Providers' Forum. It was also noted that the group's name had been changed to "Working Group on Systems, Signals and Services". In addition, the Working Group would include a permanent subgroup on compatibility and a permanent subgroup on interoperability, with ad hoc task forces, as necessary.

27. ICG also noted that the Working Group on enhancement of GNSS service performance had reviewed its existing workplan, taking into consideration the actual work conducted by the group and areas of interest for ICG. It was noted that in order to better reflect the group's objective and scope of work, it had been renamed "Working Group on Enhancement of GNSS Performance, New Services and Capabilities".

28. ICG further noted that the Working Group on Information Dissemination and Capacity-building and the Working Group on Reference Frames, Timing and Applications would prepare the status of past recommendations and define any significant changes in their workplans in the lead-up to the Eleventh Meeting of ICG in 2016.

29. ICG noted that the Working Group on Information Dissemination and Capacity-building would elaborate on various studies on the economic benefits of utilizing GNSS for the purpose of dissemination to current and future GNSS users.

30. ICG noted with appreciation that the executive secretariat had developed and launched a new ICG information portal, which had been designed to better serve its membership and raise awareness of the work of ICG, and that it represented a great improvement in terms of design, navigation and access to information. The ICG information portal is available through the website of the Office for Outer Space Affairs at www.unoosa.org or directly at www.unoosa.org/oosa/en/ourwork/icg/icg.html.

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

32. ICG endorsed the decisions and recommendations of the working groups with regard to the implementation of the actions set forth in their workplans.

33. ICG accepted the invitation of the Russian Federation to host the Eleventh Meeting of ICG in 2016 and noted the offer of Japan to host the Twelfth Meeting in 2017. ICG also noted the expressions of interest by China and India in hosting the annual meetings of ICG in 2018 and 2019, respectively.

34. ICG agreed on a tentative schedule for the preparatory meetings for its Eleventh Meeting, to be held during the fifty-third session of the Scientific and Technical Subcommittee and the fifty-ninth session of the Committee on the Peaceful Uses of Outer Space, both in 2016. It was noted that the Office for Outer Space Affairs, as the executive secretariat of ICG and its Providers' Forum, would assist in preparations for those meetings and the activities of the working groups.

35. At a closing ceremony, participants expressed their appreciation to the United States Department of State and University Corporation for Atmospheric Research for organizing the meeting and to the Office for Outer Space Affairs for its work in support of ICG and its Providers' Forum, including carrying out planned activities.

III. Joint statement

36. ICG adopted by consensus the following joint statement:

1. The Tenth Meeting of the International Committee on Global Navigation Satellite Systems (ICG) was held in Boulder, United States of America, from 2 to 6 November 2015 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. ICG also addressed relevant challenging issues associated with observing Earth processes using GNSS. Representatives from industry, academia and Governments shared their views on GNSS today and vision for the future.

2. The President of the University Corporation for Atmospheric Research, the Aerospace and Defense Industry Champion of the Colorado Office of Economic Development and International Trade, the Major General of the United States Air Force Space Command and the Deputy Assistant Secretary of the United States Department of Homeland Security delivered opening speeches on behalf of the United States. The Director of the Office for Outer Space Affairs of the Secretariat also addressed the Meeting.

3. The Meeting was hosted by the United States and organized by the University Corporation for Atmospheric Research. The Meeting was attended by representatives of 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 non-governmental organizations: Arab Institute of Navigation, Asia-Pacific Space Cooperation Organization, Civil Global Positioning System Service Interface Committee, European Space Agency, International Aeronautical Federation, International Association of Geodesy and International Association of Geodesy Reference Frame Sub-Commission for Europe, International Association of Institutes of Navigation, International Bureau of Weights and Measures (BIPM), International Federation of Surveyors and International Global Navigation Satellite System Service (IGS). Representatives of the Office for Outer Space Affairs also participated. Australia and Canada were invited to attend as observers. The representatives of the regional centres for space science and technology education, affiliated to the United Nations, located in China, Mexico and Morocco, and the Space Generation Advisory Council attended the Meeting.

4. ICG recalled that the General Assembly, in its resolution 69/85, had noted with satisfaction 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 infrastructure, particularly in

developing countries. The Assembly had noted with appreciation that ICG had held its Ninth Meeting in Prague from 10 to 14 November 2014.

5. ICG noted that the working groups had 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. The Working Group on compatibility and interoperability addressed all areas of its current workplan in 2015 through multiple meetings of its subgroup and task forces, two intersessional meetings (Vienna, in June 2015, and Gold Coast, Australia, in July 2015) and during the Tenth Meeting of ICG. The compatibility and performance standard subgroup decided to continue addressing the need for worldwide GNSS spectrum protection through a recommendation to providers and user community member States to promote the implementation of protection measures for GNSS operations in their nations and/or regions as well as other parts of the world. The interference detection and mitigation task force had organized and completed the fourth ICG interference detection and mitigation workshop in Vienna in June 2015. That event and subsequent deliberations within the Working Group had led to a recommendation to the Committee on the Peaceful Uses of Outer Space to establish a multi-year agenda item focused on national efforts to protect the radio navigation satellite services spectrum and pursue GNSS interference detection and mitigation in member States.

7. The international GNSS monitoring and assessment task force conducted several meetings in 2015, and the second international GNSS monitoring and assessment workshop was hosted by China in Xi'an. The task force intended to initiate a joint trial project with IGS that would demonstrate a global GNSS monitoring and assessment capability after the completion of several preliminary items. Finally, the interoperability task force reported several conclusions based on all five workshops held by providers in 2014 and 2015. The task force, under a restructuring and revised workplan completed by the group, would become the interoperability and service standards subgroup, with the international GNSS monitoring and assessment task force continuing under its auspices, as well as the ongoing work on open service performance standards. The existing compatibility and performance standards subgroup, which had been renamed the compatibility and spectrum subgroup, would also have responsibility for the interference detection and mitigation task force. The approved new workplan included a new area of possible work focused on system-of-systems operations, pending the assignment of tasks by the Providers' Forum. The new structure compromised the work of the Working Group, which had been renamed Working Group on Systems, Signals and Services.

8. The Working Group on enhancement of GNSS service performance made important progress in establishing an interoperable GNSS space service volume. All service providers recognized the importance of GNSS for space missions. Characteristics to establish an interoperable GNSS space service volume were given by all six providers. ICG appreciated the efforts made by all service providers to establish these characteristics. Members of the Working Group would continue to develop a booklet on interoperable GNSS

space service volume for presentation at the next Providers' Forum and conduct the necessary simulations as a joint effort.

9. The Working Group reviewed the progress made in analysing the benefits of the NeQuick Galileo ionospheric model for single frequency users based on the assessment made by different service providers. Promising results had been obtained with the model. Space users in low-Earth orbit could also benefit from it.

10. The members of the Working Group acknowledged the benefits of ranging signals broadcast from Galileo satellites in eccentric, non-nominal medium-Earth orbit for position, velocity and time applications and scientific demonstrations. Information was provided regarding progress made on the use of the Global Navigation Satellite System for geodetic applications showing similar performance to other GNSS. It was noted that high-precision applications benefited from satellite-based augmentation system geosynchronous satellite (GEO) ranging if sufficient quality ephemeris data for the GEO satellite was provided. The group confirmed that wide band signals would minimize multipath error and could significantly improve accuracy for users.

11. The application subgroup continued its work and presented an application catalogue. The findings of the group will be summarized in a report for the Eleventh Meeting of ICG in 2016. The Working Group reviewed and updated its workplan. The updated workplan continued to address future integrity solutions, the monitoring of application developer needs and atmospheric correction models. In addition, new areas of work related to space service volume and space weather and remote sensing communities were introduced. China was appointed as the third co-chair of the Working Group to support the follow-up of the updated workplan.

12. Noting the benefits of increased cooperation and support among providers' service centres and the United Nations-affiliated regional centres for space science and technology education, the Working Group on Information Dissemination and Capacity-building proposed the expansion of knowledge-sharing by means of engaging in faculty and student exchange programmes and providing textbooks and teaching materials.

13. In addition, the Working Group recommended that the ICG members consider the value of national and regional positioning, navigation and timing advisory committees and share their findings at future ICG meetings, when available. It also recommended that providers and GNSS user information centres continue to develop and adopt a process for referring enquiries to each other, where appropriate.

14. The Working Group on Reference Frames, Timing and Applications apprised ICG of General Assembly resolution 69/266 on the global geodetic reference frame for sustainable development. The Committee of Experts on Global Geospatial Information Management had endorsed the establishment of a working group on the global geodetic reference frame, whose task was to develop a "road map" for its realization. The co-chairs of the working group were engaged in the global geodetic reference frame working group.

15. The Working Group organized a panel of expert speakers at the Tenth Meeting of ICG. The Working Group also met to discuss progress since the Ninth Meeting of ICG. The Working Group noted that significant progress had been made on the geodetic and timing references for the GNSS currently represented in ICG, with the refinement of (a) the alignments of GNSS associated reference frames to the latest realization of the International Terrestrial Reference Frame (ITRF2008) and (b) timing references in relation to rapid Coordinated Universal Time. The Working Group reported on several developments at BIPM, including updates on its Circular T, Coordinated Universal Time and the revision of the definition of Coordinated Universal Time being discussed at World Radiocommunication Conference 2015. The Working Group informed ICG of progress in the computations of the new ITRF2014. ITRF2014 would be a significant improvement over the current ITRF2008.

16. The Working Group had contributed to the international GNSS monitoring assessment initiative as one of the co-chairs of the international GNSS monitoring assessment task force. Since the Ninth Meeting of ICG, the work of the task force had focused on the definition of the parameters to be monitored. Considerable progress had been made at the Tenth Meeting of ICG, with the recommendation to launch a joint ICG-IGS trial project. The Working Group had undertaken to review its workplan and define new tasks in the lead-up to the Eleventh Meeting of ICG in 2016, paying particular attention to issues related to precise/scientific applications of GNSS.

17. ICG accepted the invitation of the Russian Federation to host the Eleventh Meeting of ICG in Sochi from 6 to 11 November 2016. 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 to be held in 2016. ICG noted expressions of interest by Japan in hosting the Twelfth Meeting of ICG in 2017, by China in hosting the Thirteenth Meeting in 2018 and by India in hosting the Fourteenth Meeting in 2019.

18. All of the presentations made during the Tenth Meeting of ICG were available through the ICG information portal (www.unoosa.org/oosa/en/ourwork/icg/icg.html).

IV. Providers' Forum

37. The fifteenth meeting of the Providers' Forum, co-chaired by the United States and the European Union, was held in conjunction with the Tenth Meeting of ICG, on 1 and 5 November 2015 in Boulder. China, India, Japan, the Russian Federation, the United States and the European Union were represented at the meeting.

38. After considering the items on its agenda, the Providers' Forum adopted the report on its fifteenth meeting, containing the recommendations set out below.

A. Summary of discussions and recommendations

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

1. Japan, as the secretariat of Multi-GNSS Asia, provided an update on the multi-GNSS demonstration project in Asia and Oceania, noting that 89 multi-GNSS monitoring network stations were currently in operation. It also explained that 24 proposals had been endorsed by Multi-GNSS Asia and were in progress. The seventh Multi-GNSS Asia conference would be held in Brunei Darussalam from 7 to 10 December 2015.

2. Information centres and information portal of the International Committee on Global Navigation Satellite Systems

2. The ICG executive secretariat provided an update on recent and future activities.

3. The Russian Federation had hosted a regional workshop in Krasnoyarsk from 18 to 22 May 2015. The workshop had focused on the use of GNSS for various applications that provide sustainable social and economic benefits, in particular for developing countries.

4. The ICG information portal (www.unoosa.org/oosa/en/ourwork/icg/icg.html) was being redesigned by the Office for Outer Space Affairs.

5. Updates from the GNSS providers had been received and the ICG booklet was scheduled to be completed by the end of 2015.

B. Other matters

1. Orbital debris

6. The United States gave a presentation on the national and international disposal requirements and guidelines applicable to the Global Positioning System (GPS). The presentation discussed the United States guidelines on orbital debris, which included the United States Government Orbital Debris Mitigation Standard Practices, Department of Defense Instruction 3100.12, Air Force Instruction 91-217 and the Inter-Agency Space Debris Coordination Committee (IADC) Space Debris Mitigation Guidelines, which defined three disposal options and were applicable to United States government missions.

7. Six restrictions on disposal orbits that were contained in the documents were discussed. It was noted that the United States had conducted a study on the GPS-IIF satellites and determined that the collision probability over 500 years for each of the 12 GPS-IIF satellites was less than 0.001. The United States was also in the process of conducting a study looking at the effects on the future medium-Earth orbit debris environment of two different strategies: delaying eccentricity growth, which was the current GPS practice; and accelerating eccentricity growth, a briefing on the results of which would be provided to IADC.

8. A question was asked about whether other countries or providers were conducting additional related work. It was noted that both the Italian Space Agency and the European Space Agency were doing work in that area and conducting additional studies, and it was suggested that the topic be further discussed at future Providers' Forum meetings.

2. Global navigation satellite system space service volume

9. The United States presented an update to the GNSS space service volume concept. The objective from the United States perspective was to expand the GPS space service volume into a multi-GNSS space service volume; further improvements could be obtained by increasing the availability of satellite signals in the space service volume, in most cases by utilizing the side lobes. There was great interest in ensuring the consistency of definitions so that they were common across all providers, which would help to create a unified analysis.

10. The presentation explained that space service volume specifications were crucial for providing navigation solutions in low-Earth orbit, medium-Earth orbit and highly elliptical orbit. The National Aeronautics and Space Administration (NASA) of the United States had issued a request for information for spaceborne receivers in order to better understand receiver technology currently available. Public input was welcome until the end of December 2015.

3. International GNSS monitoring and assessment project status and updates

11. China presented an update on its international GNSS monitoring and assessment project, explaining that the objectives were to establish a global tracking network and to monitor operational status and key indicators for all GNSS. The project had been operational on a trial basis since July 2014, providing users with raw observation data, basic products and monitoring and assessment information. The schedule included three stages until the end of 2020. There were currently eight completed monitor stations within China, as well as four international stations outside China. Three data centres and eight analysis centres had also been completed, and the operations and control centre was located in Beijing.

4. United States space weather strategy

12. The United States gave a presentation describing aspects of the United States national space weather strategy, which had been released to the public on 29 October 2015. The strategy had been developed to address societal and economic impacts in the event of a severe space weather event. The Space Weather Operations Research and Mitigation task force, consisting of 20 United States government departments and agencies, had responsibility for carrying out the six high-level goals outlined in the strategy. The United States noted that goal 6 called for increased international cooperation on space weather. Following the presentation, the European Union commented that they were looking at space situational awareness, which included both debris mitigation and space weather, and that they might report on the issue at a future Providers' Forum meeting.

5. International Committee on Global Navigation Satellite Systems experts meeting

13. The ICG executive secretariat reported that the ICG experts meeting would be held in Vienna from 14 to 18 December 2015. ICG working group co-chairs and representatives from the working groups were encouraged to participate and give presentations on the status of their working group activities. The meeting would also include a seminar on GNSS spectrum protection and interference detection and mitigation. The United States commented that the history of the seminar extended back to 2005 and that it would be held on a trial basis for the regional workshops. This was an ICG recommendation adopted in 2014, which had originated in the Working Group on compatibility and interoperability.

6. Next meeting of the Providers' Forum

14. The providers agreed that the sixteenth meeting of the Providers' Forum would be held in Vienna on 6 June 2016, in conjunction with the fifty-ninth session of the Committee on the Peaceful Uses of Outer Space. The agenda would be further discussed during a Providers' Forum planning meeting, to be held on 22 February 2016, in conjunction with the fifty-second session of the Scientific and Technical Subcommittee of the Committee. In the meantime, members of the Providers' Forum were encouraged to contact the co-chairs with suggestions for the agenda of the sixteenth meeting of the Providers' Forum.

Annex I

List of States Members of the United Nations, United Nations entities 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
Asia-Pacific Space Cooperation Organization
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 II

Documents before the Tenth Meeting of the International Committee on Global Navigation Satellite Systems

Symbol	*Title or description*
ICG/WGA/2015	Report of the Working Group on Systems, Signals and Services
ICG/WGB/2015	Report of the Working Group on Enhancement of GNSS Performance, New Services and Capabilities
ICG/WGC/2015	Report of the Working Group on Information Dissemination and Capacity-building
ICG/WGD/2015	Report of the Working Group on Reference Frames, Timing and Applications