



General Assembly

Distr.: General
16 November 2023

Original: English

Committee on the Peaceful Uses of Outer Space

Seventeenth meeting of the International Committee on Global Navigation Satellite Systems

Note by the Secretariat

I. Introduction

A. Background

1. Global navigation satellite systems (GNSS) have grown into a global tool whose multi-use services are integral to global security, economic growth, transportation safety, search and rescue activities and scientific research. As such, GNSS capabilities are an essential element of the worldwide economic and social infrastructure.
2. With the participation of States Members of the United Nations, intergovernmental bodies and non-governmental organizations, the International Committee on Global Navigation Satellite Systems (ICG) has become an important platform for communication and cooperation in the field of GNSS. As new systems emerge, signal compatibility and interoperability among the various GNSS and transparency in the provision of open civil services will be key factors in ensuring that civil users around the world receive the maximum benefit from GNSS and their applications. One main challenge is to provide assistance and information for those countries seeking to integrate GNSS into their basic infrastructure.
3. ICG carries out its work through four working groups, comprising GNSS operators, States members of ICG and international organizations representing a cross section of major users of GNSS. The working groups are currently addressing the following topics: systems, signals and services (Working Group S); enhancement of GNSS performance, new services and capabilities (Working Group B); information dissemination and capacity-building (Working Group C); and reference frames, timing and applications (Working Group D).
4. ICG held its seventeenth meeting in Madrid, from 16 to 20 October 2023, in a hybrid format. The Providers' Forum held its twenty-eighth meeting, on 15 and 19 October 2023, in conjunction with the ICG meeting. The European Commission organized and hosted the meeting in collaboration with the Spanish Presidency of the European Union. 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.



B. Structure and programme of the meeting

5. The programme of the seventeenth meeting of ICG consisted of three plenary sessions and a series of meetings of the four working groups. The first plenary session, held on 16 October 2023, provided an opportunity for providers of GNSS, regional systems and augmentation systems to make presentations on their programme and policy updates and exchange ideas in the field of GNSS. ICG members, associate members and observers also shared their views and perspectives on matters of interest to ICG and its working groups.

6. The ICG working groups met in four parallel sessions from 17 to 19 October 2023 to review progress made in implementing the recommendations made at previous meetings and ways and means of continuing to make progress in 2024 and beyond.

7. In addition, the working groups held joint sessions on 17 and 18 October 2023 to address the following topics: (a) lunar positioning, navigation and timing; (b) disaster risk reduction; (c) precise point positioning interoperability; and (d) open service information-sharing and service performance monitoring. The conclusions and recommendations of the working groups were presented and discussed at the ICG second plenary session, on 19 October 2023.

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

9. In conjunction with the seventeenth meeting of ICG, the Providers' Forum held its twenty-eighth meeting on 15 and 19 October 2023, chaired by the European Commission (see sect. IV below).

C. Attendance

10. Representatives of the following States participated in the seventeenth meeting of ICG: Australia, China, India, Italy, Japan, Malaysia, New Zealand, Nigeria, Republic of Korea, Russian Federation, United Arab Emirates and United States of America. The European Union was also represented.

11. The following United Nations entities and intergovernmental and non-governmental organizations dealing with GNSS services and applications were also represented at the meeting: Asia-Pacific Space Cooperation Organization, Civil Global Positioning System Service Interface Committee, Committee on Space Research, European Space Agency, International Association of Geodesy, International Association of Institutes of Navigation, International Bureau of Weights and Measures, International Earth Rotation and Reference Systems Service, International Federation of Surveyors, International Global Navigation Satellite System Service, International Maritime Organization, International Telecommunication Union and Radio Technical Commission for Maritime Services. Representatives of the Office for Outer Space Affairs also participated.

12. ICG invited the observers for Algeria, Pakistan, Türkiye, the Centre for Space Science and Technology Education in Asia and the Pacific and the Regional Centre for Space Science and Technology Education in Asia and the Pacific (China), at their request, to attend the seventeenth 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.

D. Documentation

13. A list of the documents before ICG at its seventeenth meeting is contained in annex II. Those documents and further information on the agenda of the seventeenth

meeting, background materials and presentations are available on the ICG information portal on the website of the Office for Outer Space Affairs (www.unoosa.org).

II. Observations, recommendations and decisions

14. After considering the various items before it at its seventeenth meeting, ICG made the observations, recommendations and decisions set out below.

15. ICG took note with appreciation of the reports of its working groups and its Providers' Forum, which contained the results of their deliberations conducted in accordance with their respective workplans.

16. ICG discussed the recommendations of the working groups with regard to the implementation of the actions set forth in their workplans. The following six recommendations were endorsed: (a) the conduct of a survey into GNSS time offsets for receiver manufacturers; (b) the approval of the revised terms of reference for the joint international GNSS monitoring and assessment trial project; (c) the further inclusion of emerging low Earth orbit positioning, navigation and timing providers in ICG discussions; (d) the joint organization by ICG and the Interagency Operations Advisory Group of a multilateral workshop on cis-lunar positioning, navigation and timing; (e) the use of the broadcast predictions of Universal Time Coordinated (UTC) to determine the offsets between GNSS times for non-space-based users; and (f) the development of GNSS-based techniques for applications related to disaster risk reduction and the monitoring of natural hazards.

17. ICG took note of the schedule of the intersessional meetings and workshops of the working groups for 2024, which would be held in conjunction with space-related international conferences and symposiums, as well as the sessions of the Committee on the Peaceful Uses of Outer Space and its subsidiary bodies.

18. ICG took note of the requests for a change of description to "current and future space-based regional and augmentation system providers" as per the terms of reference of ICG that had been received from the Republic of Korea (letter dated 7 February 2023), Australia (letter dated 10 August 2023) and New Zealand (letter dated 11 August 2023), and agreed to discuss those requests further.

19. ICG noted that requests for membership of ICG had been received from Pakistan (notes verbales dated 4 January 2021 and 24 May 2023, respectively), Türkiye (letter dated 13 February 2023) and Algeria (letter dated 31 May 2023), and recommended that Algeria and Türkiye become new members of ICG. It also agreed to discuss the request for membership made by Pakistan further.

20. ICG noted the work of the United Nations-affiliated regional centres for space science and technology education, which also acted as information centres for ICG. It also noted that the Office for Outer Space Affairs, as the executive secretariat of ICG, would continue to collaborate with the regional centres to further develop the GNSS curriculum and provide support in the dissemination of information on the nine-month postgraduate courses on GNSS and their applications to be provided by the centres in 2024.

21. ICG accepted the invitation extended by Australia and New Zealand to jointly host the eighteenth meeting of ICG in 2024, and noted the offer made by the Republic of Korea to host the nineteenth meeting of ICG in 2025. ICG invited its members to express their interest in hosting the annual meetings of ICG in 2026 and 2027.

22. ICG agreed on a tentative schedule for the preparatory meetings for its eighteenth meeting, to be held during the sixty-first session of the Scientific and Technical Subcommittee and the sixty-seventh session of the Committee on the Peaceful Uses of Outer Space, in 2024. 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.

23. At the closing ceremony, participants expressed their appreciation to the European Commission for organizing and hosting the meeting and to the Office for Outer Space Affairs for its work in support of ICG and its Providers' Forum, including the conduct of planned activities.

III. Joint statement

24. ICG adopted by consensus the following joint statement:

1. The seventeenth meeting of the International Committee on Global Navigation Satellite Systems (ICG) was held in Madrid from 16 to 20 October 2023 to continue reviewing and discussing developments in the field of global navigation satellite systems (GNSS) and to allow ICG members, associate members and observers to address recent developments in their countries, organizations and associations regarding GNSS services and applications.

2. Timo Pesonen, Director General for Defence Industry and Space of the European Commission, and Carmen Librero Pintado, Special Commissioner for Transport, Mobility and the Urban Agenda of Spain, delivered opening statements on behalf of the European Union. Sharafat Gadimova, on behalf of the executive secretariat of ICG and the Office for Outer Space Affairs, also addressed the meeting.

3. The meeting took note of a keynote presentation delivered by Brad Parkinson of the Center for Position, Navigation and Time at Stanford University (United States of America), on the history of the Global Positioning System, on the occasion of the fiftieth anniversary of the System gaining initial approval in 1973.

4. The meeting was held with in-person and online attendance by representatives of Australia, China, India, Italy, Japan, Malaysia, New Zealand, Nigeria, the Republic of Korea, the Russian Federation, the United Arab Emirates, the United States and the European Union. The following United Nations entities and intergovernmental and non-governmental organizations dealing with GNSS services and applications were also represented at the meeting: Asia-Pacific Space Cooperation Organization, Civil Global Positioning System Service Interface Committee, Committee on Space Research, European Space Agency, International Association of Geodesy, International Association of Institutes of Navigation, International Bureau of Weights and Measures, International Earth Rotation and Reference Systems Service, International Federation of Surveyors, International Global Navigation Satellite System Service, International Maritime Organization, International Telecommunication Union and Radio Technical Commission for Maritime Services. Representatives of the Office for Outer Space Affairs also participated.

5. Representatives of Algeria, Pakistan, Türkiye, the Centre for Space Science and Technology Education in Asia and the Pacific and the Regional Centre for Space Science and Technology Education in Asia and the Pacific (China) were invited to attend as observers.

6. Algeria and Türkiye were recognized as new members of ICG.

7. No consensus was reached with regard to the membership application of Pakistan, which had been submitted at the fifteenth meeting of ICG. ICG agreed to work towards a swift conclusion on the matter. Furthermore, a member of ICG expressed its concern over the matter and requested ICG to bring it to the attention of the Committee on the Peaceful Uses of Outer Space.

8. ICG took note of the requests made by Australia, New Zealand and the Republic of Korea to change their description to "current and future space-based regional and augmentation system providers" as per the terms of reference of

ICG and agreed to discuss it further. ICG also took note of a proposal by China to amend the terms of reference of ICG and agreed to discuss it further.

9. ICG noted that the working groups had focused on the following issues: systems, signals and services; enhancement of GNSS performance, new services and capabilities; information dissemination and capacity-building; and reference frames, timing and applications.

10. The Working Group on Systems, Signals and Services (Working Group S), through its subgroups and task forces, had continued the work outlined in its workplan during the intersessional period between the sixteenth and seventeenth meetings of ICG. Under the leadership of the subgroup on compatibility and spectrum protection, the Working Group had continued its campaign to promote adequate protection of the GNSS spectrum by reviewing relevant GNSS and radionavigation satellite service-related International Telecommunication Union activities. In December 2022, the subgroup had conducted a workshop on interference detection and mitigation, focused on the use of Automatic Dependent Surveillance – Broadcast (ADS-B) and the Automatic Identification System (AIS) for interference detection, and the further investigation of national processes for notification of interference testing. The subgroup had agreed to conduct an eleventh workshop on interference detection and mitigation, focused on the reporting process in the aviation and maritime sectors. A potential future recommendation related to notification for GNSS testing was discussed, but no consensus was reached.

11. The subgroup on interoperability and service standards continued to make progress on the work in its workplan, including overseeing the work of its task forces. The performance standards group organized and led a workshop on future low Earth orbit positioning, navigation and timing systems, including those provided by commercial industry. The performance standards group also continued to hold monthly virtual meetings in conjunction with the international GNSS monitoring and assessment task force and continued its work on a “hints and tips” document. The aforementioned task force held a workshop focused on reviewing the terms of reference for the joint ICG-International Global Navigation Satellite System Service trial project, which resulted in a recommendation for ICG to adopt those revisions. The international GNSS monitoring and assessment task force also continued to make progress on calculation methodologies and data formats for the trial project and planned to hold another workshop in 2024. The task force and the performance standards groups planned to continue to hold combined virtual meetings on a monthly basis. Timing experts from the subgroup on interoperability and service standards held a meeting to discuss next steps, and agreed on a recommendation for members of the Working Group to reach out to industry for views on timing interoperability and to conduct a workshop in order to share the results. Lastly, the precise point positioning interoperability task force held a workshop in 2023 and continued compiling information on planned systems through the collection of information from service providers on the characteristics of their services. The task force planned to hold another workshop in 2024 to continue discussing future plans and identify ways to further enhance interoperability.

12. Under the Working Group’s workplan, which was focused on system of system operations, the Working Group received several presentations related to Open Service Navigation Message Authentication. Providers continued to provide feedback on the 2020 report of the Inter-Agency Space Debris Coordination Committee that followed a recommendation made at the thirteenth meeting of ICG to study the issue of debris mitigation practices relevant to the medium Earth orbit and inclined geosynchronous orbit orbital regimes used by GNSS. The Working Group was planning to work with China to develop a response to the Inter-Agency Space Debris Coordination Committee based on the collection of information on orbital parameters from the providers. On the topic of system of system operations, the Working Group

received presentations from system providers, who were investigating methods for the authentication of open civil signals. Lastly, the Working Group agreed to a recommendation supporting the further inclusion of low Earth orbit positioning, navigation and timing providers, who might also be from industry, in ICG discussions on that topic. The Working Group planned to hold another low Earth orbit positioning, navigation and timing workshop in 2024.

13. The Working Group on Enhancement of GNSS Performance, New Services and Capabilities (Working Group B) had made progress in its activities.

14. The Working Group B space users subgroup organized a joint session between all the ICG working groups on lunar positioning, navigation and timing in order to provide them with a consolidated introduction to and overview of lunar positioning, navigation and timing activities. Presentations were made on the following topics: (a) a condensed overview of the current status of systems being proposed, including by China, the European Space Agency, the Japan Aerospace Exploration Agency and the National Aeronautics and Space Administration of the United States; (b) an overview of lunar spectrum considerations and the Space Frequency Coordination Group; (c) an introduction to and overview of the status of the LunaNet Interoperability Specification and the coordination of lunar reference frames and time systems; and (d) the introduction of a recommendation for ICG to jointly organize with the Interagency Operations Advisory Group a multilateral workshop on cis-lunar positioning, navigation and timing. A presentation was also delivered by the European Commission and the European Space Agency announcing the upcoming public availability of transmit antenna gain patterns for the full constellation of European Satellite Navigation System (Galileo) satellites. In addition, the Indian Space Research Organization highlighted its concept of lunar pseudolites.

15. The Working Group noted, on the basis of discussions in the joint session between all the ICG working groups and Working Group B, that several space agencies were planning to provide in situ lunar services, including communication, positioning, navigation and timing and search and rescue services, within the current decade. The Working Group also noted that the LunaNet Interoperability Specification working group was working to define a framework of mutually agreed standards aimed at creating an interoperable network of compliant services, including positioning, navigation and timing services, around the Moon. On the basis of the experience acquired and lessons learned by ICG participants in achieving interoperability between GNSS services, and with the goal of promoting the use of lunar positioning, navigation and timing services, the Working Group encouraged developers of lunar positioning, navigation and timing systems to collaborate towards interoperability through open, inclusive multilateral mechanisms, including the LunaNet Interoperability Specification.

16. The Working Group noted that the current version of the LunaNet Interoperability Specification was publicly available, and encouraged all parties to review it and provide comments by 30 November 2023. Under work package 4 of the Working Group B space users subgroup, a review would also be coordinated within ICG.

17. Since the fifteenth meeting of ICG, the Working Group B application subgroup had been working on an initiative entitled “GNSS applications: for present and future”. The subgroup’s current activities focused on studying cases of operational GNSS applications that were on the market or were under final development before market release.

18. The subgroup’s activities were intended to provide assistance and guidance to GNSS users on the basis of lessons learned. The initiative would lead to a research report entitled “GNSS applications for sustainable development: case studies”.

19. The Working Group noted that the subgroup had made significant progress in implementing the initiative and had been supported by a team of more than 20 active experts. The subgroup actively participated in the United Nations workshops on GNSS applications and related international conferences.
20. Work on the first issue of the research report had been initiated, and the issue was expected to be released by early 2024.
21. The Working Group discussed the progress made on the Medium Earth Orbit Search and Rescue system, Lunar Search and Rescue (LunaSAR) and the Emergency Warning Service of Galileo. The Working Group recognized the early development of LunaSAR capabilities and the importance of interoperability among lunar communication and navigation providers intending to offer those services.
22. A suggestion was made to include in the agenda of the intersessional meetings organized by the Working Group the research subject of the integration of communication and navigation signals, with a view to improving the resiliency of positioning, navigation and timing systems. The Working Group agreed to initiate discussions on the subject at its intersessional meeting and invited interested experts in Working Groups S and D to join the discussion.
23. The Working Group recognized the potential impact that the rising solar activities of the twenty-fifth solar cycle could have on GNSS services and satellites. Further discussions among experts should be conducted through workshops to understand the possible impact of space weather events and the need for alert systems. This would be subject to further discussion at the Working Group's intersessional meeting in 2024.
24. The Working Group on Information Dissemination and Capacity-building (Working Group C) addressed all areas of its workplan. Representatives of China, India, Italy, Japan, Malaysia, Nigeria, Pakistan, the Republic of Korea, the Russian Federation, the United Arab Emirates, the United States, the Asia-Pacific Space Cooperation Organization and the European Space Agency participated in the work of the Working Group. Presentations were made on GNSS education programmes and projects carried out by the respective organizations. The Working Group received an update on the activities undertaken or supported by the Office for Outer Space Affairs during 2023 and the main results achieved.
25. The Working Group noted the work of the United Nations-affiliated regional centres for space science and technology education based in China and India. The Working Group would continue to collaborate with the regional centres to further develop the GNSS curriculum and provide support in carrying out seminars and training courses on GNSS and their applications.
26. The Working Group's project team on space weather monitoring using low-cost GNSS receiver systems, which was established in 2021 and consisted of experts representing the Abdus Salam International Centre for Theoretical Physics (Italy), Boston College (United States), the University of Tokyo (Japan) and the Laboratory of Plasma Physics (France), continued to explore the possibility of using low-cost receiver systems for space weather monitoring and the implementation of a prototype system. The Working Group noted that the preliminary results of a comparison between high-end and low-cost GNSS receivers showed a good correlation with regard to vertical total electron content, the rate of change of total electron content index and code phase scintillation.
27. The Working Group would invite other interested institutions, including the United Nations-affiliated regional centres, to contribute to the project by collecting additional data or providing software in order to perform further data analysis to compute space weather-related parameters.

28. The Working Group on Reference Frames, Timing and Applications (Working Group D) noted progress on geodetic and timing references by the GNSS and radionavigation satellite service providers. The Working Group thanked the GNSS providers for their continued efforts to align their reference frames with the International Terrestrial Reference System.

29. The Working Group thanked the Russian Federation for installing 45 new GNSS stations in the country's national basic astronomical and geodetic network and for following the International Global Navigation Satellite System Service guidelines and standards.

30. The Working Group acknowledged and expressed appreciation for the release of satellite metadata by the Galileo, BeiDou Navigation Satellite System, Quasi-Zenith Satellite System and Global Positioning System constellations.

31. The Working Group noted that some templates on geodetic and timing references currently provided on the ICG website should be updated by the GNSS and radionavigation satellite service providers to contain the most up-to-date information.

32. The International Bureau of Weights and Measures reported that a new naming convention had been decided on for the broadcast predictions of Universal Time Coordinated broadcast by GNSS, or bUTC_GNSS. The Bureau had defined a new, more robust approach to determining UTC-bUTC_GNSS and was ready to publish the new UTC-bUTC_GNSS values in Section 4 of Circular T for the Global Positioning System, Galileo, the Global Navigation Satellite System of the Russian Federation and the BeiDou Navigation Satellite System. The Bureau would give a deadline, but also some time for all laboratories to adapt.

33. The International Bureau of Weights and Measures also reported that under resolution 4 of the General Conference on Weights and Measures of 2022, an increased maximum value for the difference (UT1-UTC) in or before 2035 had been decided on. UT1-UTC differences broadcast by some GNSS would therefore go beyond 1 second, which might not have been foreseen. The possibility of a negative leap second in the next 10 years called for the UT1-UTC tolerance increase to be implemented more quickly. A task group named "Towards continuous UTC" had been created under the Consultative Committee for Time and Frequency in order to prepare a draft resolution to decide on the new tolerance.

34. The International Bureau of Weights and Measures highlighted the work carried out by a dedicated working group under the Consultative Committee for Time and Frequency on the traceability to Universal Time Coordinated through GNSS measurements. Different kinds of users had been identified and for each of them, the traceability chain to Universal Time Coordinated and the requested calibration had been defined. Some recommendations had been formulated for the users, GNSS receiver manufacturers and GNSS providers. The latter were invited to engage in collaboration with national metrology institutes regarding GNSS time realization and monitoring, and to describe the realization of GNSS times and the information contained in the navigation messages following metrological practice and vocabulary.

35. The Consultative Committee for Time and Frequency working group on GNSS time transfer gave a presentation on the organization of GNSS calibrations within the Universal Time Coordinated community. Since 2020, all calibrations included Galileo (E1 and E5a), while calibrations that included the BeiDou Navigation Satellite System (B1C and B2a) started in 2022.

36. The European Space Agency gave a presentation on its activities relating to the absolute calibration of GNSS receiver chains. The Agency was using its GNSS station with absolute calibration to monitor the different UTC-bUTC_GNSS. The

Agency called for further cooperation among the various GNSS providers in order to improve understanding of the observed inter-system biases.

37. The Working Group noted the installation of a Navigation with Indian Constellation (NavIC) timing receiver at the National Metrology Institute (PTB) of Germany, allowing the monitoring of NavIC time with reference to Universal Time Coordinated (PTB) and Universal Time Coordinated. The Working Group also noted the willingness of NavIC to include NavIC time in Section 4 of Circular T of the International Bureau of Weights and Measures. The Bureau recommended that NavIC representatives establish contact with the Consultative Committee for Time and Frequency for that purpose.

38. The Working Group noted the good performance of the Indian Rubidium Atomic Frequency Standard on board the navigation satellite NVS-01 and the impact of a continuous Universal Time Coordinated for NavIC. The current broadcast of UT1-UTC could go up to approximately 1 minute; overall, NavIC had spare bits to represent UT1-UTC up to one hour.

39. Working Group D also noted the request of Working Group B to collaborate on lunar positioning, navigation and timing for space and reference systems and for interoperability. Working Group D was willing to contribute to that effort.

40. The National Time Service Centre of China presented a comparison between the following computation techniques for the Global Positioning System-Galileo time offset: (a) the single-station approach and (b) taking bUTC_GNSS as a pivot. Working Group D confirmed that there was currently a difference between the actual and broadcast time offset (UTC-GNSS time) for the Global Navigation Satellite System of the Russian Federation and the BeiDou Navigation Satellite System, and that the single-station Global Positioning System-Galileo time offset method was indeed the preferred method when satellite visibility permitted.

41. Working Group D drafted a recommendation on the use of bUTC_GNSS for timing interoperability and discussed it with Working Groups B and S. The final recommendation from Working Groups B, D and S was adopted by ICG.

42. In the context of the Working Group D task force on the applications of GNSS for disaster risk reduction, the International Global Navigation Satellite System Service drafted a recommendation, which was adopted by ICG.

IV. Providers' Forum

25. The twenty-eighth meeting of the Providers' Forum, chaired by the European Union, was held in conjunction with the seventeenth meeting of ICG, in Madrid on 15 and 19 October, in a hybrid format with both in-person and virtual participation. The meeting agenda is attached as an annex to the present report. China, India, Japan, the Russian Federation, the United States and the European Union were represented at the meeting.

26. After considering the items on its agenda, the Providers' Forum adopted the report on its twenty-eighth meeting, containing the discussions and recommendations set out below.

A. Summary of discussions and recommendations

1. Open service information dissemination

27. The European Union gave an update on the Galileo programme, emphasizing the services already provided and the new services under preparation. Participants were also invited to participate in the upcoming User Consultation Platform.

2. Service performance monitoring

28. China gave an overview of progress made on its international GNSS monitoring and assessment system. The performance of four global navigation satellite systems was reviewed through daily monitoring of per-slot availability and continuity, signal-in-space range errors, Universal Time Coordinated offset errors, standard positioning accuracy, and ionosphere activity influences on positioning accuracy. The outcome was also shared of the latest work on continuous monitoring of the BeiDou Navigation Satellite System and Galileo precise point positioning services, analysis of advanced receiver autonomous integrity monitoring integrity support message parameters and global availability of multi-GNSS.

3. Multi-GNSS demonstration project in the Asia-Oceania region

29. Japan provided an update on Multi-GNSS Asia, which promoted multi-GNSS in the Asia-Oceania region. The next annual Multi-GNSS Asia conference was planned to be held from 30 January to 2 February 2024 in Chiang Rai, Thailand. The Multi-GNSS Asia co-chair (Thailand) invited participants in the Providers' Forum and the ICG meeting via video message to contribute to the conference.

4. Information centres of the International Committee on Global Navigation Satellite Systems: regional centres for space science and technology education, affiliated to the United Nations

30. A representative of the executive secretariat of ICG noted that the nine-month postgraduate courses on GNSS would be held at the regional centres for space science and technology education, affiliated to the United Nations, in the academic year 2023/2024. The Regional Centre for Space Science and Technology – in French Language, in Rabat, hosted the intersessional meeting and related workshops of the ICG Working Group on Systems, Signals and Services from 28 to 31 August 2023. Participants in the Providers' Forum were invited to contribute to the work of the regional centres by providing educational materials and expertise.

5. Potential areas of coordination between ICG and international organizations

31. The liaisons from the Interagency Operations Advisory Group to ICG presented an update on all activities under its five work packages, on the database of space missions that use GNSS and, in particular, activities in the area of lunar positioning, navigation and timing, on the fifth interoperability plenary meeting of the Interagency Operations Advisory Group, held in June 2023, and on the Group's twenty-sixth annual meeting, held in September 2023. Highlights from the activities under the five work packages included progress made on the LunaNet framework of standards for lunar communications and positioning, navigation and timing interoperability and a recommendation for a joint workshop led by the Interagency Operations Advisory Group and ICG to provide an international forum for the coordination of GNSS and lunar communications and navigation providers. At the Group's twenty-sixth annual meeting, the release of draft documents relating to the LunaNet Interoperability Specification was announced, with comments sought by 30 November 2023.

B. Other matters**1. Requests for membership of the International Committee on Global Navigation Satellite Systems**

32. The providers discussed the requests from the following States Members of the United Nations for membership of ICG: Pakistan (notes verbales dated 4 January 2021 and 24 May 2023, respectively), Türkiye (letter dated 13 February 2023) and Algeria (letter dated 31 May 2023).

33. The providers agreed to recommend to the plenary session of ICG that the request made by Algeria for membership of ICG be accepted.

34. India highlighted once again the incompleteness of the information provided by Pakistan in response to its request for additional information, as well as the gross incorrectness of the international boundaries depicted in the presentation given in support of the application, and indicated that it was not in a position to support the application, pending the provision of additional information and the relevant rectification. Furthermore, India asked for more time to consider the request made by Türkiye for membership of ICG.

35. The providers received a proposal from China to amend the terms of reference of ICG, which was being discussed by the ICG terms of reference ad hoc working group, and agreed to discuss it further within the Providers' Forum.

36. The providers also discussed the requests made by the Republic of Korea (letter dated 7 February 2023), Australia (letter dated 10 August 2023) and New Zealand (letter dated 11 August 2023) to change their description to "current and future space-based regional and augmentation system providers" as per the terms of reference of ICG. As no consensus was reached, the matter would be discussed further by the Providers' Forum.

2. Review of the terms of reference of the Providers' Forum

37. On the basis of a proposal submitted by China, the providers reviewed the terms of reference of the Providers' Forum and agreed to reinstitute the rotation mechanism for the selection of the Chair of the Providers' Forum. On 19 October, the Providers' Forum adopted by consensus the revised terms of reference with a new paragraph 7, which reads as follows:

In the case a provider hosts an ICG annual meeting, it will chair the Providers' Forum meetings for the year of that ICG annual meeting. Otherwise, the chair of the Providers' Forum will rotate among its members subject to a decision on the basis of consensus. The Office for Outer Space Affairs of the United Nations Secretariat, consistent with its role as the executive secretariat of ICG, will also fulfil these responsibilities for the Providers' Forum, in support of the chair.

38. The Providers' Forum agreed that the United States would chair the meeting of the Providers' Forum to be held in 2024 and that China would chair the meeting to be held in 2025.

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

Algeria
Australia
China
India
Italy
Japan
Malaysia
New Zealand
Nigeria
Republic of Korea
Russian Federation
Türkiye
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

Radio Technical Commission for Maritime Services

Annex II

**Documents before the seventeenth meeting of the
International Committee on Global Navigation Satellite
Systems**

<i>Symbol</i>	<i>Title or description</i>
ICG/REC/2023	Recommendation of the Working Group on Systems, Signals and Services
ICG/REC/2023	Recommendations of the Working Group on Enhancement of GNSS Performance, New Services and Capabilities
ICG/REC/2023	Recommendation of the Working Group on Reference Frames, Timing and Applications
ICG/TOR/2023	Terms of reference of the International Committee on Global Navigation Satellite Systems (as amended)
ICG/PF/TOR/2023	Terms of reference of the Providers' Forum (as amended)