

SUMMARY
of the Thirtieth Meeting of the Providers' Forum
held in conjunction with the Eighteenth Meeting of the International Committee
on Global Navigation Satellite Systems (ICG)

6 and 10 October 2024

Wellington, New Zealand

The thirtieth Meeting of the Providers' Forum, chaired by the United States, was held in conjunction with the Eighteenth Meeting of the International Committee on Global Navigation Satellite Systems (ICG) in Wellington, New Zealand, on 6 and 10 October 2024, in a hybrid format with both in-person and virtual participations. The meeting agenda is attached as an annex to this report. China, the European Union, India, Japan, the Russian Federation and the United States of America were represented at the meeting.

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

Open service information dissemination

The organizers of the second ICG Low Earth Orbit Positioning, Navigation, and Timing (LEO PNT) workshop presented a summary. There was good engagement by those planning LEO PNT systems, and a table of the expected systems was shown with key characteristics. Systems are either standalone or planned to augment existing Global Navigation Satellite Systems (GNSS). Compatibility with the existing Medium Earth Orbit (MEO) and Geostationary Orbit (GEO) GNSS was emphasised. The participation of commercial LEO PNT systems continues to be encouraged.

The European Space Agency (ESA) presented work conducted on the Proba3, Lunar Pathfinder and GNSS Experiment, called EXPOL projects. These are aimed at supporting activities to provide robust, accurate and precise Lunar and cis-Lunar PNT, through improvements to precise orbit determination (ODTM), and in high eccentric orbits, high dynamic environments, and demonstrating the clear advantage of and need for interoperability.

The United States of America provided an update on their objectives and plans for an open architecture lunar PNT system focusing on specific user needs, a gradual expansion from utilizing GNSS at the moon to dedicated lunar systems and promoting interoperability specifications to enable international compatibility.

Service performance monitoring

China introduced progress of its international GNSS Monitoring and Assessment System (iGMAS). The performance of four global navigation satellite systems was reviewed through daily monitoring per-slot availability and continuity, signal-in-space range error, Coordinated Universal Time (UTC) offset error, standard positioning accuracy, and the BeiDou Navigation Satellite System (BDS-3) Precise Point Positioning through B2b signals of GEO satellites (B2b-PPP) enhanced services over the past year. The on-orbit calibration of BDS-3 Phase Centre Offset (PCO)/ Phase Centre Variation (PCV) of B1C/B2a and B1I/B3I with BDS-3/Global Positioning System (GPS)/Galileo GNSS (Galileo) different combination in iGMAS was introduced and the preliminary estimated PCV pattern and PCO were shared. Details of the tenth iGMAS Symposium held in August 2024 was also shared.

Multi-GNSS demonstration project in the Asia-Oceania region

Japan provided an update on Multi-GNSS Asia (MGA), which promotes multi-GNSS in the Asia/Oceania region. The next annual MGA conference is planned to be held on 4 to 7 March 2025 in Phuket, Thailand. All GNSS providers are invited to present their system updates.

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

The executive secretariat of ICG provided an overview of the established regional centres in each region covered by the regional economic commissions of the United Nations (for Africa, Asia and the Pacific, Latin America and the Caribbean and West Asia). The ICG executive secretariat described the nine-month postgraduate courses offered by the regional centres, which were followed by a year of participation in a pilot project in the participant's home country, after which students presented their thesis at the centre in order to receive a certificate of course completion.

The Providers noted that the Regional Centre for Space Science and Technology – in French language, in Rabat, hosted a training course on GNSS data processing from 6 to 10 May 2024. The training course included a series of lectures on GPS and Galileo services provided by the United States and the European Commission experts respectively, and hands-on-activities, devoted to GNSS high-accuracy data processing methods, were organized by the experts from the Centre for Spatial Information Science of The University of Tokyo, Japan.

The Providers further noted that a course on the BeiDou Navigation Satellite System and future perspectives of GNSS was held at the African Regional Centre for Space Science and Technology Education — in English language (ARCSSTE-E) in Ile-Ife, Nigeria, from 5 to 9 August 2024. The course, organized in cooperation with the experts from the National Time Service Centre of the

China Academy of Sciences, was held simultaneously with a nine-month postgraduate course on GNSS.

Potential areas of coordination between ICG and international organizations

The liaisons from the Interagency Operations Advisory Group (IOAG) to ICG presented an update on its work to provide a forum for identifying common needs across multiple international agencies for coordinating space communications policy, high-level procedures, technical interfaces, and other matters related to interoperability and space communications. ICG and IOAG will host a multilateral cis lunar PNT workshop from 11 to 13 February 2025 in Vienna organized by a leadership team from China, the European Union, Japan, and the United States of America. The workshop shall: serve as a mechanism to better understand the scope and depth of lunar PNT systems being developed; propose recommendations that may be taken up by lunar PNT developers; and facilitate refinement of interoperable, compatible, and available lunar PNT systems of the future. The workshop co-leaders shall also seek the collaboration of other international bodies such as the International Space Exploration Coordination Group (ISECG), the Consultative Committee for Space Data Systems (CCSDS), and the Space Frequency Coordination Group (SFCG) to strengthen the international coordination and standardization of lunar PNT systems.

Other matters:

Requests for membership of the Providers' Forum

The Providers discussed the request from the Republic of Korea (Letter dated 15 January 2024) regarding the membership status of the Provider's Forum. No consensus was reached.

Requests for membership in the International Committee on GNSS

The Providers discussed Pakistan's request for membership in ICG (Notes Verbales dated 4 January 2021, 24 May 2023 and 6 October 2024).

India highlighted that despite the objectionable depiction of international boundaries by Pakistan in the presentation made in support of its application at ICG, it has remained constructively engaged on this matter. In the spirit of cooperation, India sought information from Pakistan in February 2022 to enable the consideration of its application. Pakistan's responses to its technical queries were received by February 2024. India has requested Pakistan for additional information through some follow-up queries in October 2024 with a view to completing its assessment of the application. At this meeting, India was not in a position to support the application, therefore there was no consensus.

Review of the terms of reference of the Providers' Forum

On the basis of proposals submitted by China, India and the United States, the providers reviewed the Terms of Reference of the Providers' Forum. Since it was found that more careful review is required, it was agreed to continue the discussion in an ad hoc working group of the Providers' Forum and the results will be reviewed in future meeting of the Providers' Forum.

Review of the terms of reference of the International Committee on GNSS

On the basis of proposals submitted by Australia, China, India, Japan, the Republic of Korea and the United States, the providers reviewed the Terms of Reference of the ICG. The ad hoc working group of the ICG discussed these proposals and no consensus was reached. Additional review is needed by the ad hoc working group with results being discussed in a future meeting of the Providers' Forum and the ICG.

Providers' Forum agreed that China will chair the meetings of the Providers' Forum to be held in 2025.