UNITED NATIONS
Office for Outer Space Affairs

INFORMATION NOTE

United Nations/Indonesia Workshop on the Applications of Global Navigation Satellite Systems

Organized jointly by
The United Nations Office for Outer Space Affairs,
National Research and Innovation Agency and Universitas Indonesia (Indonesia)

Co-organized and co-sponsored by
The International Committee on Global Navigation Satellite Systems

Jakarta, Indonesia

17- 21 November 2025

1. Introduction

Global navigation satellite systems (GNSS) technologies are now ubiquitous in everyday life: they are incorporated in electronic devices and are used by the public, surveyors, and geoscientists on a regular basis. In developing countries in particular, GNSS applications offer cost-effective solutions that make it possible to foster economic and social development without neglecting the need to preserve the environment, thus promoting sustainable development.

Satellite navigation systems in use around the world are the Global Positioning System (GPS) of the United States of America, the Global Navigation Satellite System (GLONASS) of the Russian Federation, the BeiDou Navigation Satellite System (BDS) of China and the European satellite navigation system (GALILEO) of the European Union. Regional systems that provide additional signals from satellites operating over a given geographical area include the Navigation with Indian Constellation (NavIC) system of India and the Quasi-Zenith Satellite System (QZSS) of Japan, which are also compatible with one or more GNSS. These systems are being further developed and improved to ensure the continued provision of reliable and accurate positioning, navigation and timing (PNT) services, thereby enabling new possibilities and applications.

The International Committee on GNSS (ICG) has encouraged tangible international cooperation and facilitated compatibility and interoperability among the different GNSS services with a view to ensuring that satellite-based positioning, navigation and timing services together provide global coverage for the benefit of all. ICG acts as a platform for open discussions and the exchange of information under the umbrella of the United Nations.

The availability of GNSS and other space-based systems is creating an unprecedented opportunity, bringing benefits in the areas of emergency management, marine and land monitoring, or fleet control to name a few. Due to this availability, the development of integrated applications is an area in rapid expansion. To address a wide array of GNSS applications for socioeconomic benefits and to focus on initiating pilot projects and strengthening the networking of GNSS-related institutions in the region, **a Workshop on the Applications of GNSS will be held in Jakarta from 17 to 21 November 2025**. This workshop is being organized by the United Nations Office for Outer Space Affairs in cooperation with National Research and Innovation Agency (BRIN) and Universitas Indonesia (UI). The workshop is co-organized and co-sponsored by the International Committee on GNSS (ICG). The workshop will be hosted by National Research and Innovation Agency (BRIN) and Universitas Indonesia (UI) on behalf of the Government of Indonesia.

2. Objectives and Expected Outcomes

The **main objectives** of the workshop will be to reinforce the exchange of information between countries and scale up the capacities in the region pursuing the application of GNSS technology solutions; share information on national, regional, and global projects and initiatives, which could benefit regions; and enhance cross-fertilization among those projects and initiatives.

The **specific objectives** of the workshop will be to introduce GNSS-based technology and its applications; promote the greater exchange of actual experiences with specific applications; focus on appropriate GNSS applications projects at the national and/or regional levels; and define recommendations and findings to be forwarded as a contribution to the Office for Outer Space Affairs and ICG, particularly, in forging partnerships to strengthen and deliver capacity-building on satellite navigation science and technology.

The **expected outcomes** of the workshop will be recommendations and findings on discussed topics to be adopted by the workshop participants; preliminary agreement of cooperation between countries in the region and action plan addressing identified issues/concerns.

The discussions at the workshop will also be linked to the 2030 Agenda for Sustainable Development and to its targets set out for Sustainable Development Goals (SDG), such as,

- *SDG 3*: *Good health and wellbeing* - GNSS positioning enables individual patients, staff or equipment to be monitored, and response teams directed more efficiently;
- *SDG 7: Affordable and clean energy* - GNSS reflectometry techniques can produce scatterometry models to assist in the optimum positioning of off-shore wind farms;
- *SDG 9: Industry, Innovation and Infrastructure* - GNSS signals can be used for navigation and positioning of in-orbit space operations particularly from low-Earth orbit to cis-Lunar); and
- *SDG 11*: *Sustainable Cities and Communities* - GNSS is widely used for urban planning in order to pinpoint structures and reference points for cadastral and urban planning purposes.

3. Preliminary programme of the workshop

The workshop programme will include plenary sessions and sufficient time for discussions among participants to identify the priority areas where pilot projects should be launched and examine possible partnerships that could be established. A half-day technical tour will be arranged by the local organizing committee during the workshop. As a preliminary suggestion the following sessions will be organized:

Thematic Sessions

Session 1: Current and planned GNSS and satellite-based augmentation systems

- Programme updates on GNSS and satellite-based augmentation systems: GPS, GLONASS, GALILEO, BDS, NavIC and QZSS.

Session 2: GNSS-based applications focusing on, but not limited to

- Advances and performance benefits due to multi-sensor integration of GNSS applications;
- The use of GNSS for aviation, including integration of satellite navigation technology into air traffic management and airport surface navigation and guidance;
- The use of navigation and timing systems for road, rail, and engineering applications, including vehicle guidance, geographic information system (GIS) mapping, and precision farming;
- Navigation systems operation in the marine environment, including waterway navigation, harbour entrance/approach, marine archaeology, fishing, and recreation;
- Commercial applications of GNSS;
- Navigation system operations for early warning system and detection for potential geologic hazard.

Session 3 (*Seminar*): GNSS spectrum protection and interference detection and mitigation

- ICG activities and its role in spectrum protection and interference detection and mitigation.

Session 4: GNSS data processing

- Understanding GNSS data types, GNSS errors, coordinate systems and applications;
- Example case studies of low-cost receiver systems;
- Introduction to data processing tools for high-accuracy.

Session 5: GNSS and Space Weather

- Atmospheric monitoring (troposphere) to improve numerical weather predictions;
- Space weather monitoring (ionosphere) for space situational awareness;
- Impacts of space weather on technological systems in space and on the ground;
- Space weather effects on GNSS performance and accuracy, and monitoring and forecasting of these effects by scintillation receivers, modelling and other means.

Session 6: GNSS reference frames/systems and reference station networks

- Programme updates on regional and national reference frames/systems and perspectives for a regional cooperative mechanism.

Session 7: Capacity building, training, institutional strengthening and education in the field of GNSS

- GNSS education opportunities at different levels/needs;
- GNSS education tools/open-source software related to GNSS;
- Collaboration in GNSS application among the government and non-governmental stakeholders.

Discussion Session

- Issues, concerns and approaches for pilot projects/initiatives, requirements, mechanisms and resources of implementing;
- Possible follow-up projects and initiatives and proposals for future workshops/training courses/technical seminars.

4. Working Methods

Participants of the workshop are requested to deliver a presentation paper and materials covering information on the thematic sessions subject in their respective countries. It is necessary to submit an abstract of presentation with a maximum of 600 words including the following details: *Paper Title, Author (s) Name(s), Affiliation(s), and e-mail address* for the presenting author. **Applicants are requested to *use* the provided *template* to present an *abstract* in the required format. Please note that the abstract template will be provided after submission of the completed online application form.**

5. Sponsorship of the Workshop

The United Nations Office for Outer Space Affairs and Indonesia are responsible for organizing the workshop. The ICG is a co-sponsor of the workshop. **Sponsorship of the workshop is still open to interested entities.**

6. Expected participants

The workshop is being planned for a total of 100 participants including scientists, engineers, university educators, and policy-and-decision makers and senior subject-matter experts from the following groups: international, regional, national and local research and development institutions, United Nations agencies, intergovernmental and non-governmental organizations or industry, academia, think tanks and educational institutions. **Equally qualified female applicants are particularly encouraged.**

7. Language of the Workshop

The working language of the workshop will be English.

8. Financial support

Within the limited financial resources available, a limited number of selected participants will be offered financial support to attend the workshop. This financial support will defray the cost of travel (a round trip air ticket – most economic fare – between the airport of international departure in their home country and Jakarta and/or the room and board expenses for the duration of the workshop. The co-sponsors of the workshop will jointly select participants on a competitive basis. Successful applicants will be notified of the outcome within three weeks after the deadline.

9. Deadline for Submission of Applications and Abstracts

The online application form is available on the website of the Office for Outer Space Affairs at the following address: https://forms.office.com/e/RexK3vtq3G

Please note that once the online application form has been submitted, an automated message containing the templates of the documents required to complete the application procedure will be sent to the email indicated in the application form.

The completed application form together with the presentation abstract and signature page should be submitted on-line, to the Office for Outer Space Affairs, **no later than Sunday, 24 August 2025.** Only complete applications with all the requested information and signatures will be considered by the workshop organizing committee.

10. Life and Health Insurance

Life/major health insurance for each of the selected participants is necessary and **is the responsibility of the candidate or his/her institution or Government.** The co-sponsors will not assume any responsibility for life and major health insurance, nor for expenses related to medical treatment or accidents.

11. Further Information and Contact Details

For information regarding the submission of nominations for attendance and funding, please contact Mr. Patrick Gindler, United Nations Office for Outer Space Affairs, at the following e-mail address: (patrick.gindler@un.org).