



UNITED NATIONS
Office for Outer Space Affairs

INFORMATION NOTE

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

Organized jointly by
**The United Nations Office for Outer Space Affairs and the Russian Federal Space Agency
(ROSCOSMOS)**

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

Hosted by
The Reshetnev Information Satellite Systems (ISS) Joint Stock Company

Krasnoyarsk, Russian Federation

18-22 May 2015

1. Introduction

A five-day workshop on global navigation satellite systems (GNSS) technology and its applications to be held in Krasnoyarsk, Russian Federation, from 18 to 22 May 2015 is being organized by the United Nations Office for Outer Space Affairs in cooperation with the Russian Federal Space Agency (Roscosmos) and the Reshetnev Information Satellite Systems Joint Stock Company as part of the activities of the United Nations Programme on Space Applications. The Workshop will be hosted by the Reshetnev Information Satellite Systems Joint Stock Company. The Workshop will be co-sponsored by the Government of the United States of America and the European Union through the International Committee on Global Navigation Satellite Systems (ICG).

The Workshop will address the use of GNSS for various applications that can provide sustainable social and economic benefits, in particular for developing countries. Current and planned projects that use GNSS technology, including the GLOBALnaya NAVigatsionnaya Sputnikovaya Sistema (GLONASS) of the Russian Federation, for both practical applications and scientific explorations will be presented. Cooperative efforts and international partnerships for capacity-building, training and research, including the activities of the GLONASS learning centre will also be presented.

2. Background

The Global Positioning System (GPS) of the United States of America and the Global Navigation Satellite System (GLONASS) of the Russian Federation are currently fully operational global navigation satellite systems (GNSS). Next generation GNSS, that are currently being developed, include the modernized GPS and continued revitalization of GLONASS, as well as the European Satellite Navigation System (GALILEO), China's BeiDou Navigation Satellite System (BDS), the Indian Regional Navigation

Satellite System (IRNSS) and Japan's Quasi-Zenith Satellite System (QZSS). Each of these navigation satellite systems will bring extra satellites and signals to deliver better accuracy, reliability and availability. As new systems emerged, signal compatibility and interoperability among GNSS, as well as transparency in the provision of open civil services, would be key factors in ensuring that civil users received maximum benefit from GNSS applications.

Satellite navigation and positioning data were now used in a wide range of areas, which included mapping and surveying, monitoring of the environment, precision agriculture and natural resources management, disaster warning and emergency response, aviation, maritime and land transportation and research areas such as climate change and ionospheric studies. GNSS applications offered a cost-effective way of pursuing sustainable economic growth while protecting the environment.

The Office for Outer Space Affairs in its capacity as the Executive Secretariat of the International Committee on Global Navigation Satellite Systems (ICG) and its Providers' Forum is promoting the use of GNSS throughout its programme on GNSS applications. ICG was established in 2005 under the umbrella of the United Nations. ICG promotes international cooperation on issues of mutual interest related to civil satellite-based positioning, navigation, timing, and value-added services. Additional information is available at: www.unoosa.org

In the last few years different institutions had begun to deploy several instruments of different kind (for example, GNSS receivers, ionosondes, magnetometers) in many low latitude countries in Africa, South America and Southeast Asia, over which the ionosphere had remained less known because of the scarce distribution of ionospheric sensors. As a consequence the new sets of data now available were expected to make possible improvements in ionospheric modelling efforts, particularly considering data assimilation techniques. Additionally, some specific phenomena that take place in this region could be envisaged. Since the ionosphere the major error source in GNSS receivers, an improved knowledge of the low latitude ionosphere would mitigate the ionospheric effects on GNSS positioning applications (e.g. precision agriculture, environmental monitoring, civil aviation) in the same geographic region. Additional information is available at: <http://www.iswi-secretariat.org/>

Efforts to build capacity in space science and technology are considered a major focus of the Office for Outer Space Affairs and are of specific interest to ICG with particular reference to GNSS and its applications. Such efforts aim to provide support to the regional centres for space science and technology education affiliated to the United Nations, which would also act as information centres for ICG. Additional information is available at: <http://www.unoosa.org/oosa/en/SAP/centres/index.html>

Development projects, applications, services or products requiring georeferencing, require a uniform coordinate reference system. Most countries have some form of national reference frame or system. These reference frames/systems are usually based on local origin or datum point, which restrict their use to a particular country. This makes cross-border mapping, development and planning projects difficult. This therefore calls for the establishment of a common and uniform continental reference coordinates frames/systems. Additional information is available at: <http://www.unoosa.org/oosa/en/SAP/gnss/icg/regrefsys.html>

3. Objectives and Expected Outcomes

The objectives of the Workshop will be to (i) strengthen regional information and data exchange networks on the use of GNSS technology, including various training programmes and capacity-building needs in GNSS and its applications; (ii) develop a regional plan of action that would contribute to the wider use of multi-constellation GNSS and its applications, including the possibility of one or more national or regional pilot projects, or both, in which interested institutions could incorporate the use of GNSS/GLONASS technology; (iii) define recommendations and findings to be forwarded as a contribution to the ICG.

The expected outcomes of the Workshop are: (a) recommendations and findings on discussed topics; (b) preliminary agreement of cooperation between countries in the region and the GNSS continuously operating reference station (CORS) networks; (c) action plan addressing identified issues/concerns.

4. 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 organised:

Thematic Sessions

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

- Programme updates on GNSS and satellite-based augmentation systems: GLObal NAVigation Satellite System (GLONASS) and System of Differential Correction and Monitoring (SDCM), Global Positioning System (GPS) and Wide-Area Augmentation System (WAAS), European Satellite Navigation System (GALILEO) and the European Geostationary Navigation Overlay Service (EGNOS), BeiDou Navigation Satellite System (BDS), Indian Regional Navigation System (IRNSS) and GPS Aided Geo-Augmented Navigation (GAGAN), Quasi-Zenith Satellite System (QZSS).

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

- Advances and performance benefits due to multi-sensor integration of GNSS applications in surveying and geodesy;
- 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 marine environment, including waterway navigation, harbour entrance/approach, marine archaeology, fishing, and recreation;
- Challenges for positioning and navigation in the Arctic;
- Commercial applications of GNSS.

Session 3: GNSS and space/atmospheric weather monitoring

- Atmospheric monitoring (troposphere) to improve numerical weather predictions
- Space weather monitoring (ionosphere) for space situation awareness

Session 4: GNSS reference frames/systems and reference station networks

- Programme updates on regional and national reference frames/systems and perspectives for a regional cooperative mechanism
- International GNSS Service (IGS) and other initiatives, Continuously Operating Reference Stations (CORS) network and multi-GNSS environment

Session 5: Capacity building, training and education in the field of GNSS

- GNSS education opportunities at different levels/needs
- The strengthening of a specialized master's programmes for long-term professional education and support to PhD training and networking in GNSS
- GNSS education tools/open source software related to GNSS

Discussion Sessions

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

Technical Tour

5. Working Methods

Participants of the Workshop are requested to deliver a presentation paper and materials covering information on the use of GNSS technology, case studies/projects in GNSS applications in their respective countries. Each speaker is allocated 20 minutes for the presentation. It is also 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.

Presentations made at the workshop will be published on the website of the Office for Outer Space Affairs (www.unoosa.org) approximately two weeks after the Workshop.

6. Sponsorship of the Workshop

The Office for Outer Space Affairs of the United Nations and ROSCOSMOS together with the Reshetnev ISS Joint Stock Company are responsible for organizing the Workshop. The United State of America and the European Union through the ICG are co-sponsors of the Workshop. **Sponsorship of the Workshop is still open to the ICG membership and other interested entities.**

7. Expected participants

The Workshop is being planned for a total of 75 participants including scientists, engineers, university educators, and policy-and-decision makers and senior experts from the following groups: international, regional, national and local institutions, United Nations agencies, intergovernmental and non-governmental organizations, research and development institutions, and also from industry.

8. Participation requirements

Participants should be in senior managerial or decision-making responsibility at governmental agencies, national and regional institutions, intergovernmental and non-governmental organizations or industry. **Equally qualified female applicants are particularly encouraged.**

9. Language of the Workshop

The working language of the Workshop will be English. Simultaneous translation in Russian is planned to be provided.

10. 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 airticket – most economic fare – between the airport of international departure in their home country and Krasnoyarsk, Russia) 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 by the end of March 2015.

11. Deadline for Submission of Applications and Abstracts

The completed application form together with the presentation abstract should be submitted on-line, to the Office for Outer Space Affairs, **no later than Friday, 27 February 2015**. Only complete applications with all the requested information and signatures will be considered by the Workshop Organizing Committee. Please note that on-line application form is available on the web site of the Office for Outer Space Affairs at the following address:

<https://register.unoosa.org/civicrm/event/register?reset=1&id=31>

All candidates are strongly encouraged to apply for the workshop online, as it helps to streamline the processing of applications as well as helps applicants to save their time.

Alternatively, the fully completed application form and all other required documents may be scanned and submitted in electronic format (.doc or .pdf) by email to the United Nations Office for Outer Space Affairs (GNSS@unoosa.org) with copy to Mr. Ahmed OSMAN, Office for Outer Space Affairs, United Nations Office at Vienna, at (ahmed.osman@unoosa.org). Please indicate the name of the Workshop (United Nations/Russian Federation Workshop on the Applications of GNSS) and your name on the subject line of your email message.

In exceptional cases if there is no access to electronic mail, the completed application may also be sent by postal mail or forwarded through the Office of the Resident Representative of the United Nations Development Programme (UNDP) in the applicant's country to the United Nations Office for Outer Space Affairs, Vienna International Centre, P.O. Box 500, 1400 Vienna, Austria.

12. 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.

13. Further Information and Contact Details

For information regarding the submission of nominations for attendance and funding, please contact **Mr. Ahmed OSMAN**, United Nations Office for Outer Space Affairs, at the following e-mail

address: ahmed.osman@unoosa.org

For information regarding the programme, presentations/abstracts and speakers of the Workshop, please contact **Mr. Ahmed OSMAN**, United Nations Office for Outer Space Affairs, at: ahmed.osman@unoosa.org or **Ms. Sharafat GADIMOVA**, United Nations Office for Outer Space Affairs, at: sharafat.gadimova@unoosa.org

The focal point for Russia will be **Mr. Vassili ZVONAR**, the Reshetnev ISS Joint Stock Company, Krasnoyarsk, Russian Federation, who can be contacted at the following e-mail address: zvonar@iss-reshetnev.ru