



International Global Navigation Satellite Systems Service
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GNSS Performance Monitoring IGMA-IGS Joint Trial Project

Call for Participation

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Outline of this Call for Participation

1. Rationale and Schedule

- 1.1 Background
- 1.2 Objectives
- 1.3 Schedule
- 1.4 Organizational Aspects

2. Call for Participation

- 2.1 Observing Sites
- 2.2 Data Centers
- 2.3 Monitoring Analysis Center
- 2.4 Monitoring Analysis Center Coordinator

3. Instructions for Submitting a Proposal

1. RATIONALE and SCHEDULE

1.1 Background

The IGS was officially established in 1994 as a Service of the International Association of Geodesy. Originally based on a pure GPS tracking network, the Service developed into a GNSS service with the inclusion of GLONASS in 1998. In 2012 the Multi-GNSS Experiment (MGEX) was launched with the goal to prepare the transition of the IGS to a Multi-GNSS Service. In 2015 MGEX was phased up into a Pilot Project. In 2013 the IGS Real-time Service was launched providing open real-time data and products. Today the IGS operates a global tracking network of more than 495 stations equipped with a variety of different geodetic receivers and antennas, with about 180 stations providing tracking data in real time and more

than 149 stations providing Multi-GNSS tracking data from the new GNSS such as Galileo, BeiDou, QZSS. Pooling resources and expertise contributed by more than 200 organizations and individuals in more than 100 countries, the IGS has generated world standard GNSS products for more than 20 years. The IGS data and products are openly available to all users.

The International Committee on GNSS (ICG) was established under the United Nations in 2005 to discuss how a harmonized multiple GNSS constellation would provide social benefit to the world. Performance monitoring and assessment of system service parameters based on equal algorithms and procedures for all GNSS is one of the important tasks that will benefit the user community. The International GNSS Monitoring and Assessment (IGMA) Task Force was formed to establish a framework to realize a performance monitoring and assessment function for multiple GNSS constellations.

During the 10th meeting of the ICG (November 2015 in Boulder CO, USA), the IGMA Task Force recommended that a Joint Trial Project be established with IGS to monitor the performance of all the GNSSs, The GNSS Performance Monitoring IGMA-IGS Joint Trial Project is devised to authoritatively monitor GNSS performance benchmarks with cooperation between the GNSS providers and the IGS.

1.2 Objectives

The purpose of the GNSS Performance Monitoring IGMA-IGS Joint Trial Project is to implement an authoritative performance monitoring system for all participating GNSSs. In the first phase of the Trial Project, a limited number of parameters will be monitored utilizing existing IGS monitoring infrastructure supplemented by the GNSS providers. During this phase, further requirements will be developed for monitoring the GNSSs over a longer term. Through the Trial Project, user benefits of consolidated monitoring system products and combined use of multi-constellations are to be demonstrated. The Trial Project shall promote trust in GNSS via an ICG endorsed monitoring system.

1.3 IGMA-IGS Joint Trial Project Schedule

The GNSS Performance Monitoring IGMA-IGS Joint Trial Project will be implemented in phases. In the initial phase, a limited set of service parameters such as broadcast ephemeris accuracy shall be monitored. Subsequent phases would expand the monitoring/assessment capabilities based on the Trial Project progress and ICG and IGS review.

- August 2016: Distribute Call for Participation
- End of September 2016: Proposals due (entities may propose and join at any time)
- October/November 2016: Evaluation of proposals
- December 2016: Launch Trial Project
- December 2017: End 1st phase of Trial Project
- December 2017: 2nd Phase of Project begins

1.4 Organizational Aspects

The GNSS Performance Monitoring IGMA-IGS Joint Trial Project is a joint activity of GNSS Providers and the IGS. It is aimed at creating an authoritative international GNSS monitoring and assessment system with results trusted by all parties and worldwide. The Trial Project activities are coordinated through the ICG IGMA Task Force, which is composed of members from the GNSS Providers and IGS (through the ICG WG-D on Geodetic Reference Frames and Timing, which is co-chaired by IGS).

The IGS participation within the Joint Trial Project is being solicited through this Call for Participation. GNSS Provider participation is solicited through a separate Call for Participation issued by IGMA Task Force. Providers are encouraged to contribute GNSS tracking data from select ground tracking stations as well as to participate in analysis of monitoring data.

The GNSS Performance Monitoring Working Group is the organizing group within IGS consisting initially of a subset of Governing Board Members who also participate on the IGMA Task Force. Participation on this Working Group is to be supplemented in the future by IGS participants and other parties who respond to this Call. The GNSS Performance Monitoring Working Group supports the Trial Project implementation in cooperation with the IGMA Task Force and advises the Task Force on related matters. The GNSS Performance Monitoring Working Group, with assistance from the Central Bureau, will evaluate and respond to the proposals received in response to this Call for Participation.

2. CALL for PARTICIPATION

The IGS is seeking participation in the GNSS Performance Monitoring IGMA-IGS Joint Trial Project through the following components:

- Multi-GNSS Observing Sites
- Data Centers
- Monitoring Analysis Centers
- Monitoring Analysis Coordination Centers

2.1 Observing Sites

The IGS Multi-GNSS network will serve as backbone for the performance monitoring activities. This will presumably be supplemented by additional observing site data contributed by GNSS providers under a separate Call for Participation. Participation of additional Multi-GNSS stations and networks are welcome providing that station installations adhere to IGS Site Guidelines <<http://kb.igs.org/hc/en-us/articles/202011433>>, including public availability of tracking data. GNSS receivers should be capable of tracking GPS or GPS+GLONASS signals, and in parallel signals of further systems such as Galileo (IOV/FOC), BeiDou, QZSS and, if possible, IRNSS on at least two frequencies. The capability for real-time transmission of tracking data is desirable though not required for the first phase of the Joint Trial Project.

2.2 Data Centers

Support is requested from organizations and data centers with the capability to expand their archives to include products from participants in this Trial Project. Interested parties should refer to the IGS Data Center Charter (<http://kb.igs.org/hc/en-us/articles/202455478>) for a list of requirements. Existing IGS data centers are encouraged to support the Trial Project.

Product upload to the Data Center should be performed through ftp (anonymous or by user account/password). However, it will be the responsibility of the Trial Project Data Center(s) to coordinate the product upload with the IGS Associate Analysis Centers (AAC). The products should be available online within hours after reception from the AAC and for at least 3 months after the Trial Project. Offline availability upon request should be maintained for at least 2 years.

Data Centers are expected to provide open access to IGS data and products provided through this Trial Project.

2.3 Monitoring Analysis Centers (MAC)

The initial phase of the Trial Project is focussed on collecting and making publicly available observations and limited number of monitoring parameters calculated by post processing analysis. In the initial phase the desired GNSS constellations set to be monitored are

- BDS
- GALILEO
- GLONASS
- GPS
- QZSS

The list of monitored parameters for the initial phase is limited to the well-defined set of publicly accessible signals broadcast by the respective GNSSs. Parameters for monitoring in the initial phase are

- Broadcast Ephemeris Accuracy (Orbits and Clocks)
- SIS User Range Error
- SIS UTC Offset Error
- PDOP

IGS operational products shall serve as reference for monitoring of the parameters.

Analysis results of the IGS Monitoring Analysis Centers may be combined and submitted to ICG IGMA Task Force at later stages of the Trial Project and made available to the IGS and user community. The definition and methodology to calculate the initial monitoring parameters are defined in Terms of Reference for the IGMA/IGS Joint Trial Project. Standards for formats of products, latencies etc. are to be defined and agreed to in the initial phase of the project by the IGMA Task Force in close coordination with the IGS GNSS Performance Monitoring Working Group.

2.4 Monitoring Analysis Center Coordinator (MACC)

Analysis results of whole IGS Monitoring Analysis Centers may be combined and submitted to ICG IGMA Task Force at later stages of the Trial Project and made available to the IGS. One Monitoring Analysis Center Coordinator may be selected among applicants of MAC.

3. INSTRUCTIONS for SUBMITTING a PROPOSAL

Parties wishing to participate within this Trial Project should complete the online proposal form located at: <https://connect.igs.org/cfp?formID=IGMA>

Any questions about this form can be directed to the IGS Central Bureau at support@igs.org.

It is highly desirable that participating organizations consider continuing their activities after the end of the initial phase of the Trial Project.