



INTERNATIONAL GNSS SERVICE TERMS OF REFERENCE

Formally adopted March 2005

PREAMBLE

A proof of concept for the International Global Positioning System (GPS) Service for Geodynamics (IGS) was conducted with a three-month campaign during June through September 1992, and continued until December 1993 as a Pilot-Service until the establishment of the IGS as a service of the International Association of Geodesy (IAG). The IGS formally began on 1 January 1994. IGS is a member of the Federation of Astronomical and Geophysical Data Analysis Services (FAGS) and it operates in close cooperation with the International Earth Rotation and Reference Systems Service (IERS). Due to the expansion of IGS objectives, the name of the service was changed to International GPS Service (IGS) on 1 January 1999. Following further expansion of IGS, integrating data from the Russian GLONASS system and planning for the deployment of the European Galileo system, the name was changed to 'International Global Navigation Satellite System (GNSS) Service' on 14 March 2005. The organization retains the acronym 'IGS'.

MISSION

The International GNSS Service is committed to providing the highest quality data and products as the standard for Global Navigation Satellite Systems (GNSS) in support of Earth science research, multidisciplinary applications, and education. These activities endeavor to advance scientific understanding of the Earth system components and their interactions, as well as to facilitate other applications benefiting society. The Service also develops the necessary standards and specifications and encourages international adherence to its conventions.

GOALS AND OBJECTIVES

The IGS strives to:

- Provide the highest quality, reliable GNSS data and products, openly and readily available to all.
- Promote universal acceptance of IGS products, standards and conventions.
- Continuously innovate by attracting leading-edge expertise and pursuing challenging projects and ideas.
- Seek and pursue new growth opportunities while responding to changing user needs.
- Sustain and nurture the IGS culture of collegiality, openness, inclusiveness, and cooperation.

- Maintain a voluntary organization with effective leadership, governance, and management.

The IGS collects, archives and distributes GNSS observational data sets of sufficient accuracy to satisfy the objectives of a wide range of applications and experimentation. These data sets are used by the IGS to generate the following data products:

- High accuracy GPS satellite ephemerides and related information
- Earth rotation parameters
- Coordinates and velocities of the IGS tracking stations
- GPS satellite and tracking station clock information, timescale products
- Ionospheric information
- Tropospheric information

The accuracies of these products are sufficient to support scientific objectives including:

- Realization of global accessibility to, and the improvement of, the International Terrestrial Reference Frame (ITRF)
- Monitoring deformation of the solid Earth
- Monitoring earth rotation
- Monitoring variations in the hydrosphere (sea level, ice sheets, etc.)
- Scientific satellite orbit determination
- Ionosphere monitoring
- Climatological research, eventually weather prediction models
- Time and frequency transfer

The IGS accomplishes its mission through the following components:

- Networks of tracking stations
- Data Centers (DCs)
- Analysis and Associate Analysis Centers (AACs)
- Analysis Center Coordinator (ACC)
- Working Groups, Pilot Projects, Pilot Services (WG, PP, PS)
- Coordinators for special products or components: e.g. Reference Frame, Network, Timing
- Central Bureau (CB)
- Governing Board (GB)

NETWORKS OF TRACKING STATIONS

IGS Stations provide continuous tracking using high-accuracy receivers and have data transmission facilities allowing for rapid (minimally daily) data transmission to the data centers (see below). The stations must meet physical and operational requirements as defined in the '*IGS Site Guidelines*' document available from the Central Bureau.

The ensemble of the IGS stations is the IGS network.

DATA CENTERS

IGS data centers fall into three categories: Operational, Regional, and Global Data Centers. Each has varied duties which must be carried out continually and with a minimum of delay or downtime, although the multiplicity of DCs provides a measure of redundancy. The description and responsibilities of each type of DC are detailed in the separate policy document *'IGS Data Centers Charter'* and include duties such as collecting data from GPS tracking stations and ancillary equipment, data validation, permanent archival, providing online availability, and transmittal to and equalization with other DCs. The set of DCs provides for open access to IGS data and products by IGS participants and all external users. DCs are approved by the IGS GB following demonstration of qualifications and commitment.

ANALYSIS CENTERS

The analysis centers fall into two categories: Analysis Centers (ACs) and Associate Analysis Centers (AACs). The Analysis Centers receive and process tracking data from one or more data centers for the purpose of producing IGS products. The Analysis Centers are committed to submit products for combination into IGS products, without interruption, using designated standards and conventions, and within a specified time delay to meet IGS requirements.

The Analysis Centers generally provide the core products of ephemerides, Earth rotation parameters, station coordinates, and clock information, as well as other recommended products, such as rapid, predicted or real-time orbit and Earth rotation solutions.

Associate Analysis Centers produce specialized products recognized by the Governing Board, e.g., ionospheric information, tropospheric parameters, or station coordinates and velocities for a global or regional sub-network.

The *'Charter for Analysis Centers and Associate Analysis Centers'* is a policy statement of the Governing Board and is available from the Central Bureau.

ANALYSIS CENTER COORDINATOR

The Analysis Center Coordinator (ACC, also referred to as the Analysis Coordinator) assists the Analysis Centers. The Analysis Center Coordinator monitors the activities of the Analysis Centers to ensure that the IGS objectives are carried out.

Specific expectations include quality control, performance evaluation, and continued development of appropriate analysis standards. The Analysis Coordinator is also responsible for the appropriate combination of the Analysis Centers' products into a single set of orbit and clock products, which are official IGS products delivered to the Global Data Centers.

The Analysis Center Coordinator is a voting member of the IGS Governing Board (see below) and interacts regularly with the Central Bureau and the IERS. The Analysis Coordinator (or designee as approved by the Governing Board) is one of the two IGS representatives to the IERS Directing Board.

Generally the responsibilities for the Analysis Coordinator shall rotate among the Analysis Centers with appointments and terms specified by the Governing Board.

WORKING GROUPS, PILOT PROJECTS, AND PRODUCT COORDINATORS

A Working Group works on a particular topic related to the IGS mission according to goals and schedule specified in the Working Group's charter. A Pilot Project aims at the development of particular new IGS product(s) or service(s) relying on the IGS infrastructure. A Product Coordinator is responsible for a specialized product related to the IGS missions and components, as specified in its charter. Each Product Coordinator is supported by a Working Group, whose members take responsibility for providing routine contributions to a combined product, and/or make expertise available to the Working Group.

The Governing Board establishes and terminates Working Groups and Pilot Projects, and appoints the Working Group Chairs and Product Coordinators. A minimum initial commitment for any Product Coordinator is four years. The '*IGS Policy to Establish Working Groups, Projects, and Product Coordinators*' is a policy statement of the Governing Board and is available from the Central Bureau.

Chairs of Working Groups and Pilot Projects are non-voting members of the IGS Governing Board (see below). The Coordinators of the fundamental products shall be voting members of the Board (Analysis Coordinator, Reference Frame Coordinator, Timing Coordinator). Coordinators of derived products are non-voting members.

In the case of products requiring significant joint expertise, the GB may approve GB membership of a representative of a partner organization, in order to ensure appropriate representation and communication. Such a representative is designated by the partner organization and is a non-voting member of the GB. It will normally be expected that the GB will in turn be invited to appoint an IGS representative to the Directing Board, or equivalent body, of the partner organization.

CENTRAL BUREAU

The Central Bureau (CB) is the executive arm of the IGS Governing Board, responsible for the general management, coordination and day-to-day operations of the IGS consistent with the directives, policies and priorities set by the Governing Board.

In this role the CB, within available resources, coordinates IGS activities, facilitates communications, coordinates general aspects of the IGS network operations, promotes compliance to IGS standards, monitors network operations and quality assurance of data, maintains documentation, organizes meetings and workshops, and coordinates and publishes reports.

The CB actively coordinates with the IGS Pilot Projects and Services, Working Groups, Product Coordinators, and committees and ensures the compatibility of IGS and IERS by interfacing with the IERS. The CB acts as the outreach office and promotes use of IGS data and products, maintaining and expanding the visibility of the IGS. To accomplish these tasks the CB works closely with the Analysis Center Coordinator and the Product Coordinators.

The CB operates the information system for the IGS and produces the IGS Annual Reports and Directory. The CB coordinates the publication of other documents required for the satisfactory planning and day-to-day operation of the Service, including standards and specifications regarding the performance, functionality and configuration requirements of all elements of the Service.

Although the Chair of the Governing Board is the official representative of the IGS to external organizations, the CB, consonant with the directives established by the Governing Board, is responsible for the day-to-day liaison with such organizations.

Through the existing reciprocity agreement between IGS and IERS, the CB serves as the GPS Technique Center for IERS; as such, its designated representative (subject to Governing Board approval) is a member of the IERS Directing Board (together with the Analysis Coordinator). This representative is a member of the IGS Governing Board. In turn, the IERS Directing Board designates a representative to the IGS Governing Board. This arrangement is to assure full cooperation between the two services.

The long term functioning of IGS is assured through redundancy of most of its components, though this does not apply to the CB. For this reason the performance of the Central Bureau is to be formally reviewed by the GB at least every five years. On these occasions the Central Bureau will either reconfirm its commitment to the IGS for the next period of five years or announce that it will terminate operations after a transition phase of at least one year. The GB will formally approve the Central Bureau's proposal, or, alternatively issue a Call for Proposal for a new IGS Central Bureau to take over responsibilities after the transition phase.

In summary, the Central Bureau performs primarily a long-term coordination role to ensure that IGS participants contribute to the Service in a consistent and continuous manner and adhere to IGS standards.

GOVERNING BOARD

The principal roles of the Governing Board (GB) are to set policy and to exercise broad oversight of all IGS functions and components. It also controls general activities of the Service, including restructuring, that would be appropriate to maintain efficiency and reliability, while taking full advantage of the advances in technology and theory.

The Governing Board (GB) consists of up to eighteen voting members and a number of non-voting members. They are distributed as follows:

- Elected by IGS Associates (see below):

Analysis Centers' representatives	3
Data Centers' representative	1
Networks' representatives	2
- Elected by the Governing Board upon recommendations from the Central Bureau, for the next term:

Representatives of Analysis, Data Centers or Networks	2
Members at large (up to)	3
- Appointed members:

Director of the Central Bureau	1
Analysis Coordinator	1
Reference Frame Coordinator	1
Timing Coordinator	1
Representative of the IERS	1
IAG representative	1
President of IAG or designee from the IAG Executive Committee	1

- Total voting members (up to) 18

Working Group and Pilot Project chairpersons, the Network Coordinator, and Product Coordinators, as well as the FAGS representative, are GB members with voice but without vote. A representative of the BIPM, appointed by the BIPM/CCTF with agreement of the IGS GB, is a non-voting member of the Board. In turn, the IGS appoints a representative point of contact to the BIPM/CCTF. The IERS appoints a representative to the IGS GB. In turn, the IGS GB appoints two IGS representatives to the IERS Directing Board: the IGS Analysis Center Coordinator (or designee) and the IGS/CB representative.

The elected persons (up to eleven) must be members of different organizations. The appointed members are considered ex-officio and are not subject to such restrictions. All elected persons have staggered four-year terms, which are renewable once. The GB membership should be properly balanced with regard to supporting organizations as well as geographically.

For the first six positions, which represent components of the IGS that are elected by the IGS Associates, the nominating committee conducts the elections. The nominating committee consists of three members, the chair of which is appointed by the Chair of the GB and who is a member of the GB not currently up for re-election. For elections, the nominating committee presents to the Associate Members a list of at least two candidates for each position to be filled. The election will be determined by the number of votes received from the Associate Members. In the case of a tie, the election is by the members of the Governing Board.

For the four positions elected by the Governing Board, four weeks prior to the election by the Governing Board, the Central Bureau presents its proposed candidate(s) to the Governing Board. Based on recommendations of the GB members, or on the outcome of the elections by the IGS Associates, the CB may present a revised list at the GB meeting where the election of the new Board members takes place.

In case of a resignation from the Board, after consulting with the appropriate IGS components, the CB will nominate replacement candidates for election by the GB. The replacement will serve until the end of the term of the resigned Board member.

The Chairperson is one of the members of the GB elected by the Board for a term of four years with the possibility of re-election for one additional term. The Chairperson does not vote, except in case of a tie. He/she is the official representative of IGS to external organizations. The immediate past Chairperson, if no longer a voting member of the Board, will be invited to continue as a non-voting member of the Board for a period of one year after completion of the term(s) as Chair.

The IAG and FAGS representatives are appointed respectively by the IAG Bureau and by FAGS for a maximum of two four-year terms.

Members of the GB are eligible to be considered for IAG Fellowship with the appropriate rights and privileges after an initial two-year period.

Most GB decisions are to be made by consensus or by a simple majority vote of the members present, provided that there is a quorum consisting of a simple majority of voting members of the GB. In case of lack of a quorum the voting may be by mail. Voting by e-mail, fax, or mail on any issue is permitted by these Terms of Reference, and the number of mail or e-mail responses must be sufficient to constitute a quorum. Changes in Terms of Reference can be made by a 2/3 majority of all voting members of the GB. At any time the GB can ask for the resignation of the Chair, or any member of the Board, if a majority vote of all voting members of the Board so requests.

The Board shall meet at least annually and at such other times as shall be considered appropriate by the Chairperson or at the request of five members. The Central Bureau provides the secretariat of the GB.

For the GB to effectively assess the value of IGS services to the user communities, and to ensure that the service remains up to date and responsive to changing user needs, the GB will organize reviews of the IGS components at appropriate intervals. The Governing Board will decide, on an annual basis, those groups (Analysis Centers, Data Centers, Network Stations, and the Central Bureau) that are to be reviewed and from time to time may select other activities for review as it deems appropriate.

EXECUTIVE COMMITTEE

The Executive Committee (EC) of the IGS Governing Board is established as a committee that has specific responsibilities allowing it to act on behalf of the GB for the following purposes: 1) to codify and organize issues that are brought to the Board for action, 2) to act for the Board when a quorum of the Board is not present, 3) to act for the Board when a full Board meeting is not possible or necessary. The EC is responsible for exercising the powers of GB in the management of the business and affairs only to the extent set forth in these Terms of Reference. Any actions are communicated to the GB as soon as possible and reported and validated at the next Board meeting. The Executive Committee shall consist of five voting members of the GB:

- Chair of the GB
- Immediate Past Chair (non-voting)
- Director of the CB and
- Three additional voting members of the GB proposed by the Chair of the GB and approved annually by the GB.

Except for the power to amend these Terms of Reference, the Executive Committee shall have all of the powers and authority of the Board in the intervals between meetings of the GB, and subject to the direction and control of the GB. Three votes of EC members are needed for any decision. EC meetings are open to any GB member.

IGS ASSOCIATE MEMBERS

Associate Members are persons representing organizations that participate in any of the IGS components. The membership is balanced with respect to IGS components, organizational representation and geography, and is meant to represent institutions which contribute significantly to the IGS on a continuous basis. Each organization that meets the above criteria shall have a minimum of one and not more than ten Associate Members. The Central Bureau maintains the list of Associate Members, which is revised annually and is subject to the approval of the Governing Board.

Associate Members elect the six members of the GB representing Analysis Centers, Data Centers and Networks (except for those nominated by the CB). The list of Associate Members eligible to vote in elections must be approved by the GB at least three months prior to the election process. Current and former GB members are considered Associate Members.

IGS CORRESPONDENTS

Correspondents are persons on a mailing list maintained by the Central Bureau, who do not actively participate in the IGS but express interest in receiving IGS publications, wish to participate in workshops or scientific meetings organized by the IGS, or generally are interested in IGS activities. Ex officio IGS Correspondents are the following persons:

- IAG Secretary General
- President of IAG Commission 1: Reference Frames
- President of IAG Commission 4: Positioning and Applications
- Chairs and Directors of affiliated IAG Services
 - International VLBI Service (IVS),
 - International Laser Ranging Service (ILRS),
 - International Earth Rotation and Reference Systems Service (IERS),
 - International Doris Service (IDS), etc.,
- Chair of the Global Geodetic Observing System (GGOS), an IAG Project
- IUGG Secretary General
- Former Governing Board Members