

International GNSS Service (IGS)

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<http://www.igs.org/>



Overview

Planning for the years 2016-2019, the International GNSS Service (IGS) has a number of activities and tasks to pursue, both externally and internal to the organization. The mission of the IGS is to provide the highest-quality GNSS data and products in support of the terrestrial reference frame, Earth rotation, Earth observation and research, positioning, navigation and timing and other applications that benefit society.

The IGS is comprised of more than 200 organizations in over 100 countries, and has a fundamental tracking network of 500 stations. Recent key efforts are the extension of IGS tracking network observations and analytical capabilities to include new GNSS and signals, as well as development and expansion of IGS real-time GNSS capabilities.

These efforts are particularly appropriate to the IGS Multi-GNSS Experiment (MGEX), which is now a full IGS Pilot Project, as well as the IGS Real-Time Service (IGS RTS). Much work undertaken by the IGS is based on its global tracking network, which requires continuous maintenance and extension, in close cooperation with the contributing agencies and institutions, to ensure long-term usability and sustainability.

A key undertaking through 2016 will be the development of the next IGS Strategic Plan for the period 2017-2020. The IGS Strategic Plans dating back to 2002 are available in the new IGS Knowledge Base (KB): <http://kb.igs.org/>

The IGS develops annual strategic implementation plans that summarize the measurable progress of various organizational components within the service. The 2015 IGS Implementation Plan is also available in the IGS Knowledge Base.

Figure 1 displays the organizational structure of the IGS and includes the list of Pilot Projects and Working Groups.

Key Activities

The IGS global tracking network, and the quality of the GNSS data acquired from it, is the basis for the generation of the aforementioned highest-quality products. High priority tasks for the near future include fostering the network and data contributions, monitoring the quality of station data, and facilitation of its extension to include more stations with multi-GNSS observations capability, in real-time and with generation of products. IGS has planned for the transition to a GNSS tracking network without disruption of the existing long-station coordinate time series required for the maintenance of the reference frame.

The quality of the IGS products is continuously monitored and improved. IGS contributes to the International Earth Rotation and Reference Systems Service (IERS) for the International Terrestrial Reference Frame (ITRF) generation. To accomplish this, IGS Analysis Centers recompute or reprocess all data from inception, applying new models to the available data, with the exclusion of stations that have been disturbed by earth motion, earthquakes, antenna changes, and other factors that would deem the observation data not suitable for the reference frame combination determination. IGS GNSS linkage to many dense regional networks is the key method for accessing the ITRF globally.

IGS fully supports the IAG Global Geodetic Observing System (GGOS) and considers its products as GGOS products. It works with other IAG components towards the realization of GGOS Mission, Vision and Goals, see: <http://www.ggos.org>

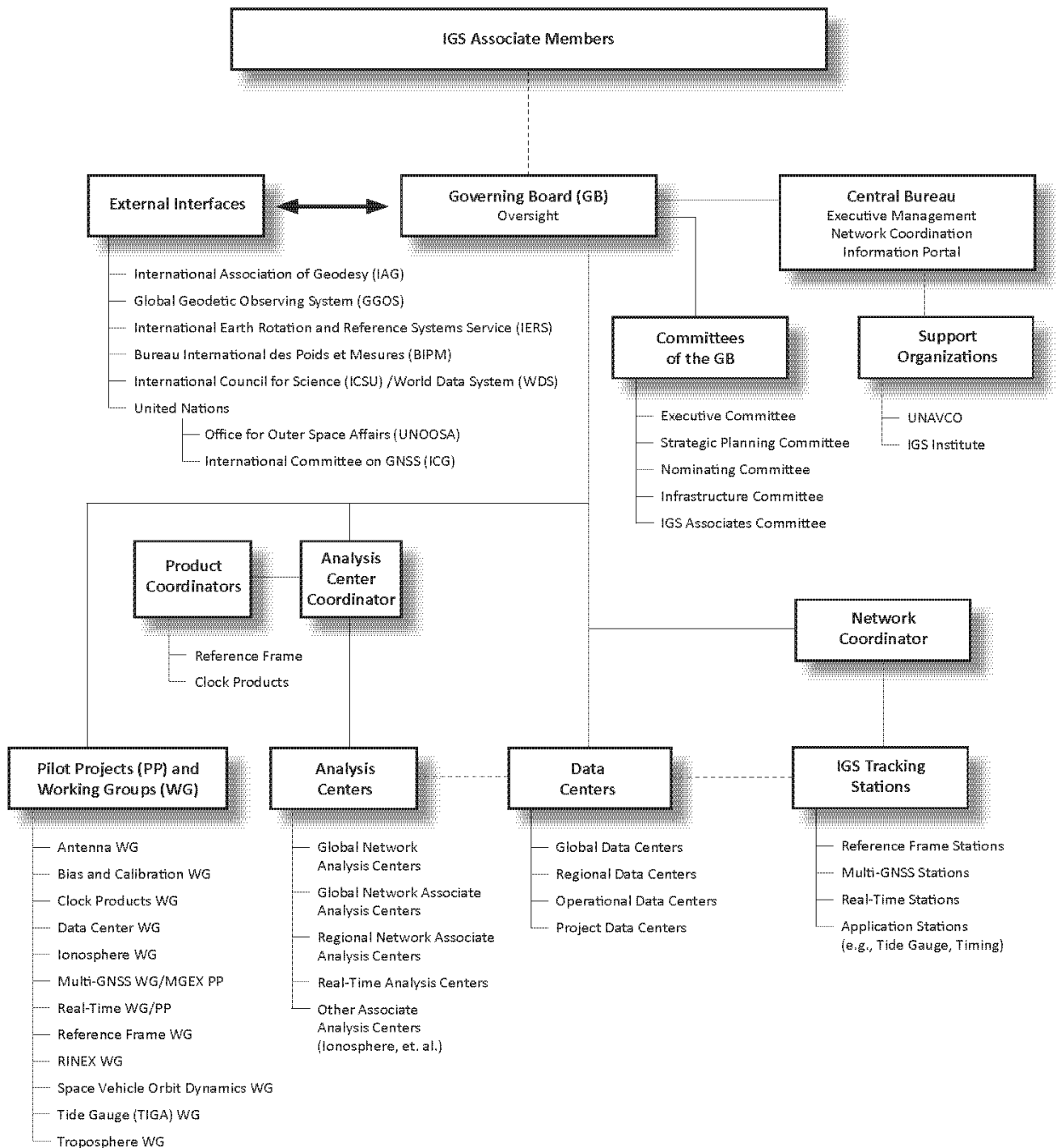


Fig. 1 IGS Organization Chart and Association with International Scientific Organizations, 2016

The Multi-GNSS Pilot Project is expanding the IGS tracking network, currently tracking GPS and GLONASS (Figure 2), to include GNSS observations of the latest constellations: Galileo (European Union), BeiDou (Compass - China), QZSS (Japan), and Indian Regional

Navigation Satellite System (IRNSS), as well as laying the foundation for tracking the modernized signals of GPS and GLONASS. Coordinated analysis of the observations and generation of reliable products continues to be a challenge as the IGS strives to incorporate all GNSS.

IGS operates a real-time network as part of the IGS Real-Time Pilot Project (Figure 3). Currently data are available to project participants, and real-time analysis is coordinated by the European Space Operations Center in Darmstadt (ESA/ESOC), Germany. For more information, visit the project page: <http://igs.org/rtts>

IGS is an active Associate Member of the United Nations Office for Outer Space Affairs (UNOOSA) International Committee on GNSS (ICG). One of the ICG's four Working Groups, the Working Group on Reference Frame, Timing and Applications, is co-chaired by IGS, IAG and the International Federation of Surveyors (FIG). IGS was recently also named co-chair of a new Task Force, formerly an ICG sub-committee on GNSS Monitoring and Assessment. The Task Force is co-chaired by representatives of China and Japan, as well as the IGS. This is recognition that IGS, due to multi-GNSS observations and analysis, may potentially be able to take on a greater service role for system providers by providing independent monitoring of the available GNSS constellations.

A challenge for the IGS in both the IGS MGEX and Real-Time Pilot Project is data format issues. The IGS has formalized its efforts towards standardization of multi-GNSS batch and real-time observation and product formats and protocols through cooperation with the Radio Technical Commission for Maritime Services (RTCM). RTCM Special Committees are chartered to address in-depth radio-communication and radio-navigation areas of concern to the RTCM membership. The output documents and reports prepared by these committees are usually published as RTCM Recommended Standards and include standards for GNSS.

The IGS is a member of the International Council for Science (ICSU) World Data System (WDS). This is an interdisciplinary body of ICSU, an integration of the former Federation of Astronomical and Geophysical Data Analysis Services (FAGS) and World Data Center System. See: <http://www.icsu-wds.org/>

IGS continues to support other IAG elements, with focus on lesser economically developed countries (LEDC). Since 2001, IGS has been actively supporting efforts within Africa to realize the Unification of African Reference Frames – AFREF. This is progressing well, but continued engagement between Africa and elements within IAG is needed.

Internally, the IGS Central Bureau (CB) is still in the process of a complete redesign and implementation of the IGS website. A top goal of the design is to have a state-of-the-art website that has shared administration with other principal people within the IGS. A 'Site Log Manager (SLM)' was jointly developed with the University NAVSTAR Consortium (UNAVCO), and enables station operators to manage and update their own information. The information within the website and the SLM will have automatic validation procedures built in, for efficient management the over 500 stations and networks within the IGS. The website tools and processes can be extended to other scientific services within the IAG and to GGOS. Social networking options for the IGS are implemented, including Twitter, Facebook, Google+, Instagram, LinkedIn, and YouTube, see: <http://igs.org/social>

The IGS 2014 Workshop was held in Pasadena, California, USA, in celebration of the 20th anniversary of the founding of the IGS. The workshop was and was hosted by the Central Bureau, and sponsored by Caltech and the NASA Jet Propulsion Laboratory.

Geoscience Australia and University of New South Wales hosted the IGS 2016 Workshop in Sydney, Australia. The workshop was well attended, by over 180 people from around the world.

See <http://igs.org> for IGS meetings, videos and presentations, and posters. We know that many people cannot attend workshops, and use the website to provide access to IGS workshop resources for all members of the community.

Summary

The IGS remains a vital organization that continues to evolve with challenging opportunities. The IGS is preparing for a future with new additional GNSS signals and new constellations, with the goal of generating highest-quality products for all available GNSS -- for the benefit of science and society. Global resources, both funding, human intellect, information technology and analysis continue to be required in order to ensure the long-term success and sustainability of this service.