Global Geodetic Observing System

Overview

Standing Committees

IAG Services

International Laser Ranging Service (ILS)

- ILS trials on 39 stations including IGS, Javad, Sagnac, and Erken surveys, several targets required by the European GNSS system (EGNOS), and one target in Spain;

- New stations established or in process by Russian Federation, FEMSA, BAG, SAGS, China, Finland, Norway, Greece, and one station in Africa, Central America, Eastern Asia, etc.;

- New stations being outfitted with a second SLR system to relieve the tracking load;

- IGS has implemented the MTRF-US/TEC2014 in its operational products; the Systematic Error Monitoring Procedure is evolving into an operational tool; the next PP will seek to introduce LARES as a fifth station in the grid;

- Quality Control Board (QCB) monthly telecons held at the director level spanning data quality issues;

- Output of the ILRS and its products have been taken to large targets at the IGS Governing Board.

The 2017 IGS Technical Workshop was held in Riga, Latvia in October 2017; next International Workshop on Laser Ranging will be held in Canberra, Australia, November 20–29, 2018.

Call for papers for Journal of Geodetic Special Issue on Laser Ranging is still open and a final extension of the submission deadline was recently granted (May 31, 2018).

International DORIS Service (IDS)

- DBS exams updated continually currently contribute to IDS; 8 to 10 future missions are expected to be added by 2020 with Sentinel 3B to be launched April 2018;

- Specifications for coordinated DBS and VGS have been established based on IR compatibility tests performed at Greenwich, MD USA; Wettzell, Germany; Papendrecht, and French Polynesia;

- Host stations in Mongolia, Guiana, and Iran have been established in 2018; Argentina to be installed in the May–April 2018 time frame;

- DORIS station in Koehn, Anamox moved to the IDS "WTH" station;

- Prototype 4th generation OGS/IDS transceiver in testing phase for mid-2018 deployment; Twelve stations out of 55 now equipped with new ground antenna (stair type D) with the 20th site center location defined in 20 mm;

- CPOD (CPOD) extensions of the TRF for Precise Orbit Determination now released twice a year and being used in the DORIS position and velocity simulation solution;

- An IDS survey is currently underway to prepare for the IDS Sentinel schedule for June 2018 in order to define the addition of the service for the next decade.

IDS workshop will be held in Ponta Delgada, Azores (Portugal) September 26–28, 2018 as part of the 25 Years of Progress in Radio Astronomy Symposium (DPTS).

Internal GNSS Service (IGS)

- The IGS adopted a new reference frame (IGS04) on January 29, 2017. An updated set of satellite and ground antenna absolute type mean calibrations were also implemented. The antenna updates include robust calibrations for additional ground antenna types, increasing the percentage of IGS ground stations with absolute calibrations to over 80%.

- The IGS network adopted the IGS P004 format, handling the ability for 9-character IPR and firmly defining the definition of IGS reference time scales. The IGS White Paper on Satellite and Information Operations for Determining Reference Frame Parameters and P004's IPR Analysis and P004 Implementation paper are official sanctioned IGS papers.

- The IGS analysis centers are currently focused on understanding and improving the modeling of systematic errors in IGS observations. For orbit modeling, they seek to further understand and resolve the impact of solar radiation pressure models introduced from the APF analysis centers for GPS satellites, and to improve the gravitational modeling through the use of long time series underway for the IGS ground stations.

- The IGS is also encouraging research into station specific effects that can distort the antenna-calibrated values which can introduce biases into the position estimates.

- Wuhan University is now the IGS global data center; the DORIS network expanded with additional full-weighted adaptation of Wuhan rapid products.

- The next IGS Workshop is scheduled for October 22–November 2, 2018 in Wuhan, China.

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Global Networks Supporting GGOS

Global Geodetic Observing System

International GNSS Service (IGS)

- The IGS supported the 1st realization of the International Casteren Reference Frame (ICRF) and will include catalogs at S/X, E/R, and J/S frequencies.

- IGS Working Group on Geodetic Astrometry studied issues related to incorporating the effect of solar system rotation around the galactic center. ICRF recommends that this effect—which can be as large as 5.5 arcsec—be included in ICRF catalogs.

- The ICRF-D22/17 (November 26–December 12, 2017) experiment included two independent Hipparcos and Tycho II catalogs of 8.5 million distributed stations. In addition, all-station VGS broadband network took 14 days.

- During 2017 VGS observing made important strides towards becoming operational. In addition to VGS-C22/D22 (November 26–December 12, 2017), we collected 34 24-hour VGS observations concerning 56 stations: GDS2012, Westford, Yarragadee, Mangilao, Hartebeesthoek, Onsala, and Wettzell.

- The Chinese Tech Telescopes were inaugurated on May 18, 2017 as part of the European VGS Group for Global Location of Reference Points (GLORP) workshop.

- Observations are underway at Bel-Air Observatory (South Africa), Almasiyah (Malaysia), and Shanghai (China). The Australian A ccpole observatory at Hobart, Katherine, and Yarragadee will be upgraded to 24-hour broadband systems.

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Studying the celestial frame and its evolution is a complex challenge requiring international cooperation across multiple disciplines. The Global Geodetic Observing System (GGOS) is a broad effort to develop a harmonized set of measurements spanning a wide range of technologies and disciplines, covering all aspects of the Earth system. GGOS is supported by the Bureau of Networks and Observations at NASA, as part of the International Geosphere-Biosphere Programme (IGBP) and the International Council of Science (ICSU), and in collaboration with multiple international organizations, including the International Union of Geodesy and Geophysics (IUGG). GGOS is a collection of national and international networks, systems, ground stations, and space missions designed to observe the Earth system and its interactions with the solar system. The GGOS framework includes a suite of related standing committees that work together to define and implement the observing system. The standing committees focus on specific aspects of the GGOS, such as data and information systems, modeling of the Earth system, GNSS and DORIS networks, and global location and monitoring. GGOS is an international effort, with representation from more than 70 countries and organizations. GGOS is supported by a variety of funding sources, including government agencies, universities, and private companies. GGOS is a long-term project, with ongoing development and improvement. GGOS has made significant contributions to understanding the Earth system and its evolution, including contributions to climate change studies, geodesy, and geophysics. GGOS is an important part of the global scientific community, and continues to evolve and grow in scope and impact.