Global Geodetic Observing System

Overview

Role of the Bureau: To advocate and encourage implementation of the Core and Co-location Network to satisfy GGOS requirements, to monitor the status of the network and project its future condition, and to support and advocate for infrastructure critical for the development of data products essential to GGOS.

Objectives:
- Increase the operational deployment of a globally distributed network of 12, new technology core sites with VLBI, IGS, GGOS and DORIS to achieve reference that will permit mm accuracy at 0.1 mm/year stability over decades. The new sites and upgrade will cover over many years, and some sites for economic and political reasons will not be in the ideal locations. Co-location sites (non-core sites) will continue to play a vital role in our data products. The utility of our information could be impacted by a negligible number of non-core sites (i.e., the number of sites would be at fewer than 1)
- Strengthen communications with the space missions, the simulation activities to project network capability, and some of the data gathering functions.
- Site deployment and upgrade coverage over many years, and some sites for economic and political reasons will not be in the ideal locations. Co-location sites (non-core site) will continue to play a vital role in our data products. The utility of our information could be impacted by a negligible number of non-core sites (i.e., the number of sites would be at fewer than 1)

Organizational Elements:
- Imaging Committee: Performance Simulations and Architectural Trade-off/PLATO, Data and Information Systems, Missions, IGS WG on Site Survey and Co-location Sites, Networks (ITS, TOI, DDR, IGS, SIR, etc.), etc.

GGOS-Organization: Elements within Bureau are intended to work as an integrated team whose main focus is to ensure that the networks required to collect the data that will support the GGOS products are in place and produce these data.

Standing Committees

Standing Committee on Performance Simulations & Architectural Trade-offs (PLATO/D. Thaller, B. Männel)
- Examining trade-off options for station deployment and closure, technology upgrades, impact of site ties, etc. and project impacts of overall network configuration in network design and implementation;
- Conducting simulations to assess impact on reference-frame products of network configuration (e.g., new and additional core sites, station performance, technique and technology, etc.); location conditions, etc. as well as other scenarios (e.g., grid property, antenna, etc.);
- Conducting simulation studies to assess impact on reference frame products of co-location sites, etc. on site survey, site tie, availability, etc. (e.g., grid property, antenna, etc.);
- Developing improved analysis methods for reference frame products including all existing data and available co-location sites (e.g., consistent processing of IGS and ground-based observations);
- Conducting ongoing analysis campaigns with exchanged simulated scenarios.

Standing Committee on Data and Information System (H. Tizz, C. Noll)
- List of satellite contributions to fulfill the GGOS 2020 goals (1 mm / 0.5 mm/r) has been prepared and will be regularly updated;
- Inventory of the GGOS satellite infrastructure has been prepared and will be regularly updated;
- Both lists are published at the OAM section of the GGOS website;
- ESA Earth Reference 20 (EuRef) CCM has contributed to propose a Mobile (future satellite mission) – not selected;
- Exchange with PLATO has been initiated by identifying joint interests and possible collaborations.

Standing Committee on Data and Information System (H. Tizz, C. Noll)
- Adjusting and implementing a data access to GGOS-relevant data products;
- Working on the implementation of a metadata system to provide access to GGOS relevant data products;
- Developing a full metadata system including site information and relevant technologies and tasks (e.g., the Australian GL system);
- Definition of the requirements;
- Resolution issues and adaptability of the Australian GL scheme and recommend schemes;
- Metadara implementation plan including definition of tasks, roles, and distribution of tasks, and plans for integration of competencies.

ERS Working Group on Site Survey and Co-location Tasks/S. Bergstrand
- Geometric: VLBI telescope deformation measurements have been shown to isolate apparent point source movements that Nettlets have been able to isolate using spatial processing at an order of millimeters;
- High priority to have such observations before they are decommissioned to provide the best possible time series for future International Terrestrial Reference Frame (ITRF);
- Starting end-2018, the GALerie Project (GAL) has begun its major European Commission funding in the European Metroplis Programme for Innovation and Research (EMPIR) to improve trasnible long-distance measurements, and look the horizon.

Current Activities and Plans of the Bureau of Networks and Observations

Global Networks Supporting GGOS

International Laser Ranging Service (ILRS):
- ILRS tracks over 300 targets including IGS, IERS, GGOS, GZ, and laser arrays; several targets require restricted tracking to avoid damaging optical sensitive packages;
- New stations established or in process include India, Brazil, Argentina, Indonesia, Chile, China, Finland, Norway, etc.
- Spatial target sites also exist in Africa, Central America, Oceania, Asia, etc. some remote stations being equipped with a second ILS system to realize the tracking load;
- ASC has implemented the new TRF2014 in ILRS-operational products and is now preparing for the analysis to contribute to the development of TRF2020; the Automatic Station Monitoring IFP is evolving into an operational tool and the mode of re-analysis for the TRF2020. The next TRF will seek to introduce a new IFP as a pilot target and deliver weekly estimates of new degree gravitational harmonics for a new ILRS product;
- Quality Control Board (QCB) meeting is being held to address laser ranging long-term stability issues;
- Two-GGOS tracking campaigns held in 2018 to examine tracking strategies for improving coverage of the GGOS satellite constellations;
- Tracking campaigns now in progress to examine the effect of increased observations in improving determination of EOPs and degree-dipole gravitational harmonics;
- New ILRS Board meeting for 2019: Task: Optical evident as their;
- 21st International Workshop on Laser Ranging held in Canberra Australia in November 2018; the 2019 ILRS Technical Seminar “Laser ranging: to improve accuracies, perform, and adapt for new applications” will be held in Stuttgart Germany in October 2019;
- Journal of Geodetic Special Issue on Laser Ranging currently in process; ten papers published online and several in review.

International DORIS Service (IDS):
- Seven DORIS-equipped satellites currently contribute to IGS; future satellites: HY-1C, HY-1D, and Jiuquan-A 2019 be added;
- New stations in Mangiog, Guam Island and San Juan, Argentina into service in April and September 2018 respectively (ongoing negotiation with China for a new station in Changjiang (DORS and SIR co-location);
- Satellite relocation to Myouren, South Korea in October 2018 to co-locate DORS with the other ERS technique within the new geodetic observatory inaugurated June 2018;
- Predictive models of the 4th generation DORS beam stan scanning for mid-deployment; 3 stations now equipped with new ground antenna (Terrain type C) with the 24th phase-center location defined to ± 1 mm;
- New setting for the preprocessing of the IDS IAC stream in order to improve the combined series contribution to the ITRF;
- An analysis of the ITRF2014 vector discrepancies at the DORIS sites is currently being conducted; following the June 2019 IAC report, an IGS strategic plan for the next decade is under preparation;
- IGS Analysis Working Group met in Munich in April 2019 in order to prepare the IGS contribution to TRF2020.

Permanent Service for Mean Sea Level (PSMSS)
- Reached its 20th anniversary in 2018, and celebrated our long history of providing mean sea level records for the world’s oceans and sea level rise measurements;
- Created Medial zone for automatic first level quality control of sea level data;
- Provided training courses for tide gague-operation, port authorities and other interested parties in the Caribbean;
- Expanded information on website linking tide gagues to GGOS receivers and national vertical datums;
- Will assign a digital object identifier (DOI) for the PSMSL database;
- Will assess whether PSMSL follows PAR data principles (Findable, Accessible, Reusable, and interoperable) and avenues where we deviate.

For Further Information:
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