**GLOBAL GEODETIC OBSERVING SYSTEM**

**Overview**

**Global Networks Supporting GGOS**

**Standing Committees**

**Standing Committee on Performance simulations & Architectural Tradeoffs (PLATO)/Thierry, B. M.**

- Examining trade-off options for station deployment and closure, technology upgrades, the impact of siting, etc., and project future network capability based on network configuration projected by the IGS for relevant IGS services (EGS, GLL, CSR, DSNG).
- Investigating the impact of enhanced tracking scenarios including spherical satellites, LEO, and GEO satellites and slr satellites tracking on reference frame products; identifying technology pathways by analysing short baselines, data from new observation campaigns, and existing networks.
- Investigating the best practice methodologies for co-location in space and assessing the impact of co-location on space reference frame products based on existing ground stations and by simulation studies for proposed missions.

**Standing Committee on Satellite Missions (CSM)/R. Puli, C.K. Shum**

- Continuation of the review of the IGS satellite mission infrastructure. This CSM meeting discussion has led to a detailed 2020 PPP (positional navigation, geodetic, and surveying) plan.
- Support preparation of future field mission studies by different space agencies.
- Increase exchange with SIRGAS to study the alignment process in the IGS mission evaluation and planning activity.

**Standing Committee on Data and Information System/N. Brown, C. Noll**

- Geocose Australia leading a global initiative to identify and meet user requirements for flexible, accessible, interoperable, and real-time VPOS (virtual position system): data. The initiative is part particular attention to ensuring the new and emerging user base of positioning information (e.g. location-based services and intelligent transport services) have VPOS geodetic data.
- Workshop on IGSO-DORIS interoperability and IGSO-DORIS/PPP activities.
- Continuation development of metadata system including site information, relevant tools and capability (e.g. Geosec).
- Definition of the requirements of the metadata system.
- Metadata implementation plan including definition of metadata, roles, distribution of tasks, and plans for integration of components.

**IERS Working Group on Site Survey and Co-location Tasks/R. Hippsell**

- Improvements made to standardizing report and data submissions of local site surveys to provide consistency across all sites.
- Additional website enhancements for storage of survey data and reports are underway.
- Additional standard operating procedures being authored to account for new routines and laser tracking instrumentation being deployed to local site surveys.
- Local site surveys recently completed at Table Mountain Geophysical Observatory (Colombia, USA), Midway Naval Research Optical Test Facility (Arizona, USA), and the National Radio Astronomy Observatory (Hershey, USA).

**Current Activities and Plans of the Bureau of Networks and Observations**

**MichaelPearlman,DirkBehrend,AllisonCradock,CarryNoll,EnricPavls,JeromeSaurier,**

**AndrewMatthews,RiccardoBarzaghi,DaniellaThaler,BenjaminMaennel,JoeBergstrand,JorgenMuller**

**Global Networks Supporting GGOS**

**IGS Services**

**International Laser Ranging Service (ILRS)/Enric Pavils**

- ILRS tracks over 300 targets including IGS, RSFNS, GSOD, and lunar arrays; several targets require restricted tracking to avoid damaging optically sensitive payloads.
- New stations established in or propose to process in NASA, ESA, BKG, China, Russia, Norway, etc.; spatial gaps still exist in Africa, Central America, Oceania, etc.; some remote stations being outfitted with a second LSR system to relieve the tracking load.
- ASC preparing for the data analysis for ITRF2020; the Sytematic Error Monitoring File Project is completed, making error monitoring operational tool (the mode of operation for the ITRF2000 and the standard for the output products); the next PLF will introduce LARES as a 4th target and weekly estimates of frequency dependent harmonic in new IGS products.
- Implementation of improved Satellite Center of Mass values for geodetic satellites and new systematic modeling based on recent VLBI measurements.
- Increased data from tracking campaign resulting in improved EOC data even since: The 2010 EOC Technical Workshop “laser ranging” to improve accuracy, performance, and adoption: for applications to ITRF2008 and ITRF2014.
- The first Satellite laser ranging school was held in Stuttgart prior to the 2019 ITRF Technical Workshop, attracting about 40 students from around the world.
- Journal of Geodesy Special Issue on Laser Ranging was completed and published (20 articles).

**Global Internet of Sensors Service (GIS)/Allison Cradock**

- IGS Analysis Centers (AC) submitted test solutions to confirm the correct application of “repro3” processing standards for the IGS contributions to ITRF2020.
- Work continues at DORIS (Doppler Orbitography and Radiopositioning Integrated by Observation) and VLBI (Very Long Baseline Interferometry).
- Continuation development of metadata system including site information, relevant tools and capability (e.g. Geosec).
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**International DORIS Service (IDS)/Jerome Saurier**

- The IGS DORIS team assigns coordinates currently contribute to IDS need to be launched in the coming months: Jason-2 (US), CHAMP (DE), and Envisat (FR).
- Start of the deployment of 4th generation DORIS beacon from June 2010: seven stations already equipped.
- Performance improvements implemented in new service to maintain a good level of service of the network: re-installation at St-Johns, Santa-Cruz and La-Reunion (all co-located with IGS stations).
- Feedback for improvements in the ITRF2008 version become available at the end of 2019 to stakeholders (CNES and IGN); network densification is one of the 20 recommendations under discussion.
- The ITRF2008 version introduces the contribution to ITRF2008 is expected in 2020 in order to provide the DORIS combined solution (2000-2000-2010-2010) to the IERS in March 2012.

**IGS Services**

**International Gravity Field Service (IGFS)/Riccardo Barzaghi**

- Implementation of the IGS/SHF- network design, theory and methods for collaboration with gravity missions and SGRS Focus Area on Unified Height System and SGRS BKG.
- Commissioning of a new web service (in co-operation with GRS, BKG, IGN, GA) to establish a new GRS service.
- Work for the establishment of a new GRS service.
- Implementation of improved Satellite Center of Mass values for geodetic satellites and new systematic modeling based on recent VLBI measurements.
- The new generation DORIS beacon from June 2019: seven sites already equipped.
- Work continues at DORIS and VLBI (Very Long Baseline Interferometry) for applications to the International Terrestrial Reference Frame (ITRF).
- ILRS tracks over 100 targets including LEO, HEO, GNSS, GEO, and lunar arrays; several targets require restricted tracking to avoid damaging optically sensitive payloads.
- New stations established in or propose to process in NASA, ESA, BKG, China, Russia, Norway, etc.; spatial gaps still exist in Africa, Central America, Oceania, etc.; some remote stations being outfitted with a second LSR system to relieve the tracking load.
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**Permanen Service for Mean Sea Level (PSMSL)/Elizabeth Braddish**

- Set up a capability to preserve and deliver GWG (Gravity and Water Level) time series to the European Union Horizon 2020 Surves project.
- Helped develop a Data models for Sea Level Archives Workshop.
- Develop a Citizen Science project to digitise handwritten tide gauge ledgers.
- Working towards establishing how to use level data recorded from historical records can be incorporated into the PSMSL database.
- Work is ongoing with IFS Analysis Centre on sea level data processing to assess the connections to the various tasks related to the level data.
- We develop methods to analyse in a non-CHIRP format the new tide gauge data of the level analysis system.

**For Further Information**

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