3.7 IERS Working Groups
3.7.1 Working Group on Site Survey and Co-location

The work towards a more general output and methodology of the work related to co-location and local ties continued. The first step towards a common nomenclature between techniques was reached with the resolution submitted to the REFAG proceedings, which is available through the IERS home page.

Due to different national surveying procedures, local constraints etc., a detailed plan, handbook or instruction for how to perform a local survey has previously been disregarded. However, for the benefit of future surveying work the operational entity of IGN is working on local survey guidelines. The thorough work of producing and reviewing these guidelines is ongoing.

Co-location status within the different services

International DORIS Service, IDS

IDS has adapted the generalized nomenclature, which clarified internal relations between different features of the antennas and its surroundings. Co-location is a permanent objective throughout the DORIS network deployment and evolution. A further development under consideration is monitoring of the DORIS monument stabilities. The current status of the 57 stations in the DORIS network is that 45 are co-located with GNSS, 9 with SLR, and 6 with VLBI. In addition to the geometrical relations between the stations on a site, several DORIS/VLBI radio frequency (RF) compatibility tests were performed by BKG and CNES at Wettzell. The different aspects and requirements for co-location are thus becoming clearer. Future co-locations with DORIS in the coming years are expected in San Juan, Katherine, Ny-Ålesund, Changchun (TBC), and Papenoo (Tahiti).

International GNSS Service, IGS

In IGS, the effort to assess individual antenna setup constellations continues. The future antenna phase center model igs14.atx will contain about a dozen of additional robot calibrations that will allow improving the modeling of the phase center position of affected stations. The corresponding antenna/radome combinations have not been calibrated previously; alternatively converted field calibration values have been used. However, the effort applies to many individual stations and only a small number of co-located sites will benefit directly. The model has been compiled, but is not yet in operation.

International Laser Ranging Service, ILRS

The ILRS is maintaining a Site information section under its Network heading on the ILRS home page. In this section, links to ILRS Station Survey reports with available survey data are being kept. 24 links to ILRS applicable survey reports, as well as a historical list of surveys performed from the mid-sixties and onwards are available.

International VLBI Service, IVS

The European Metrology Research Program (EMRP) joint research project “Metrology for long distance surveying” contributed to the IVS development of local ties. During the EUR137 and T2105 experiments (2015-09-07 and 2015-08-25, respectively) VLBI/GNSS/local tie campaigns were undertaken on the Onsala-Metsähovi baseline. The measurements simultaneously monitored the VLBI telescopes, the IGS antennas, schedule-generated terrestrial ties with the HEIMDALL system, and telescope-mounted GNSS ties during the whole experiments. Although the data have not been fully analyzed yet, the measurements as such were successful. Hence, whatever the results turn out to be, the concept of continual and automated local ties has been proven for the VLBI/GNSS combination without restrictions during two normal experiments. In addition to this, terrestrial laser scanning of radio telescopes (Onsala) and refinement of TLS deformation analysis were made. This aids the detection of focal length variations with respect to elevation, and comparisons with local gain optimization parameters.

Recent surveying activities

The Frankfurt team performed local survey campaigns at Onsala space observatory to connect the IVS and IGS reference points in August and September 2015.

Geoscience Australia has continued to undertake monitoring surveys at the Australian sites: Katherine VLBI Observatory (VLBI, GNSS), Mt Stromlo Observatory (VLBI, GNSS, DORIS) and Kiribati (GNSS, DORIS) in 2015.

IGN carried out 36 high precision local tie surveys over the 6 last years (through its involvement in DORIS, REGINA, SONEL).

The US National Geodetic Survey conducted an IERS local site survey of the Mauna Kea, Hawaii ITRF site during 2015. There are two techniques co-located at this site (GNSS and VLBI). A report and SINEX file were provided to the IERS at the conclusion of the survey. NGS is currently developing field procedures and data analysis strategies for using an absolute laser tracking system (Leica AT402) to conduct local tie surveys. If all works out, NGS will use this system to conduct future surveys at a higher level of precision and with increased efficiency.

Publications

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Metrology for long distance surveying, <https://www.ptb.de/emrp/sib60-home.html>

ILRS Station Survey Reports, <https://ilrs.cddis.eosdis.nasa.gov/network/site_information/survey_reports.html>

ITRF co-location survey: online reports, <http://itrf.ign.fr/local_surveys.php>

Sten Bergstrand