

SLR and GNSS co-location and delay control for the application of laser time transfer

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Recent progress in the optical time transfer using SLR stations is increasing the demands for the stability and accuracy of the local ties measurement of the stations. The main aim of projects like the European Laser Timing (ELT) is the time synchronization with a precision of better than 40 ps rms and an absolute error well below 100 ps. Synchronization in time requires a good control over all system delays involved in the measurement process. We have put a lot of effort in improving the Wettzell Laser Ranging System (WLRS) to cover these requirements. Furthermore we have developed a two-way measurement technique allowing the collocation of the GNSS receivers at Geodetic Observatory Wettzell with respect to time. We are continuously working on improving the additional external target calibration techniques with the goal of including the external target measurements daily and automatically. Our next activity is focused in development of the new GNSS station, which is connected to the same clock as WLRS. The GNSS antenna contains corner cube retro-reflectors allowing the two SLR stations WLRS and Satellite Observing System (SOS) on site to jointly use this external target and to increase the consistency between them. Last but not least, we have added a new reference target to the local ties network, which will be used for ELT calibration. The paper discusses the obtained results and proposes how to properly deal with the system calibration in applications of the optical time transfer.