

European Laser Timing – new challenges for the SLR community (9:15 – 9:30)

Ivan Procházka², Jan Kodet^{1,2}, Ulrich Schreiber¹

¹Technical University of Munich, Forschungseinrichtung Satellitengeodäsie Fundamentalstation
Wetzell, 93444 Bad Kötzing, Germany

²Czech Technical University in Prague, Brehova 7, 115 19 Prague, Czech Republic

ulrich.schreiber@canterbury.ac.nz

Optical time transfer provides a novel approach in order to combine methods of metrology and SLR. The T2L2 project has demonstrated this impressively. The European Laser Time Transfer Project (ELT) follows this approach. It differs from T2L2 in that way, that it does not have any signal strength compensation and that it uses the timing devices of the two-way microwave time transfer link of the Atomic Clock Ensemble in Space (ACES). ACES is scheduled to be launched in July 2015 and will present a single photon detection approach.

The laser time transfer link is under construction for the European Space Agency. *The mission is expected to operate on board of International Space Station.* We have developed and tested the photon counting detector optimized for operation in space for this project. The flight module is under manufacturing now. The objective of this laser time transfer is the synchronization of the ground and space based clocks with precision of the order of a few picoseconds and the accuracy of 50 ps. The later requirement is rather challenging. The particular contribution of absolute timing delays of the detector package itself can be measured with acceptable accuracy. However a number of system delays associated with the ground based SLR system can be determined only by newly developed calibration procedure. That is why the participating SLR stations have to be calibrated by means of a reference device. The mission layout, the experimental calibration procedure and setup with stations requirements will be described.