European Laser Timing (ELT): Testing some challenging parts of the processing chain

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In all three parts of the processing chain there are really challenging tasks which needed testing before launch. On the measurement side, the eye-safety issue is solved, but the disturbances of the additional retroreflectors on-board the ISS has to be tested. For this purpose, we conducted a measurement campaign from the 25th of July until the 2nd of August. We will present the outcome of this campaign and discuss the influences these additional reflectors have for the SLR tracking stations and the data analysis. The timing unit of the microwave link (MWL) is responsible for the time tagging of the one-way measurements of ELT. Unfortunately, the flight model degraded in comparison to the engineering one. We show where nonlinearities occur on short timescale and what performance can be expected for longer timescales. Temperature dependencies are an important issue, too, so we discuss the outcome of the related experiments. Last but not least, there is a challenge on the product side. ELT, as an optical measurement technique, has the objective to calibrate the MWL time transfer. To make the most out of the calibration, we will compute one parameter for the MWL uplink and one for the downlink. For these the two very different techniques, which work in different frequency regimes, have to be combined rigorously. We show the challenges in this task as well as the procedure how we will finally perform the calibration.