

Advances, updates and new techniques at Graz station

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Over several decades Graz station has been committed to maintaining our SLR system in order to provide high-quality data for ILRS and other scientific & engineering applications, and to experiencing the latest state of art technologies.

In this presentation, we will introduce five aspects regarding recent system updates, developments:

- (1) A flat glass window stands in front of our receiving Cassegrain telescope to sealed protect both primary and secondary mirrors. Degrading of its anti-reflection coating had an attenuation effect on incoming photons. A new piece glass was installed to replace the old one, and subsequent comparison showed a good improvement.
- (2) An alignment kit based on a pellicle beam splitter was deployed to substitute the traditional method of counting star noise. This kit helps to align optical tracks, collimation, and detectors in detection package regardless of weather conditions.
- (3) PCO cameras, which have been widely being used to visualize laser beam during daylight, are no longer produced anymore. A new system consisting a 25 cm telescope, a filter and an ASI camera was piggy-back attached on our mount, which give a simultaneously feedback of the laser pointing.
- (4) Our observing cabin was moved from next to our mount to an office, which firstly improves observers' working environment, and secondly gives us more possibilities to deploy more equipment for system monitoring.
- (5) Once ultra-high (e.g. MHz) repetition rate ranging is considered, burst mode laser firing becomes mandatorily desirable due to collisions between real returns and atmospheric backscatters. A bi-static ranging experiment using two separating (approx. 10 m) telescopes has proven that the burst mode can be omitted so that a real MHz can be fired with full power, consistent with calculations related to both field of views.