

## Session 8: Developments in SLR Techniques & Technologies

Session chairs: Georg Kirchner, Manuel Catalán, Daniel Hampf

This session has seen a total of 22 contributions (12 talks + 10 posters). There seems to be a great interest in new technologies to improve the data products, but also to make laser ranging more affordable and easier to access. For many stations new technology and new applications are a way to produce interesting publications and secure funding.

One area addressed is a better understanding of systematics, e.g. by the use of two-colour SLR or the use of 100 kHz picosecond laser ranging to examine spacecraft responses in detail. In terms of equipment, new / refurbished event timers and superconducting nanowire detectors have been discussed. The latter are especially interesting for laser ranging at IR wavelengths, since they offer high detection efficiency up to  $\sim 2 \mu\text{m}$  wavelength, short deadtime and low noise. Downsides are the small size, large footprint and high costs.

To make SLR more accessible, simplifications of the technology have been proposed, especially by making the use of a coudé path obsolete. Alternatives include the integration of the laser on the mount, or the coupling by optical fibre. The use of very high repetition rates (100 kHz or more) can facilitate this process by increasing the range of suitable laser sources.

Laser ranging using CW lasers has been proposed by two groups who are working on the first demonstration with orbital targets. Besides easier handling, these systems offer to produce very accurate range rates.

The Wettzell SLR station has presented their safety concept with special focus on the aircraft detection.

On top of these developments, a few new applications have been discussed. However, since these are not usually covered by ILRS, the presentations only show the tip of the iceberg. Airborne / space-borne laser ranging systems looking to the ground can be used to map surface features. Laser communication and quantum cryptography key distribution via satellite are topics currently pursued with much interest by companies and agencies alike. Finally, space debris monitoring via laser ranging is a topic of great interest, which is discussed in more detail in the special space debris session later in the workshop.

All these new applications make use of the existing laser ranging machinery and the expertise gained in SLR operations, and offer interesting new research options for stations and analysts. The session has also seen a few overviews of current developments at different stations, most notably the new NASA SGSLR system and the Russian Tochka station. Further stations (Graz, Wuhan and Borowiec) have been presented on posters.