

System design and concept of small-size, low-cost, multi-purpose Omni-SLR System

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We have initiated a small project for a future SLR system. Our goals are to hugely reduce the cost per SLR station and to enable the future expansion of SLR tracking network, including a possibility of operations in Antarctica. A significant increase of SLR stations will not only enhance the precision of global geodetic products (e.g. Otsubo, et al., 2016) but also change the role of SLR. In addition, a number of key technologies in SLR development can be applied to optical communications and other purposes.

As already demonstrated by DLR Stuttgart's Mini-SLR (Hampf, et al., 2019), size reduction and use of COTS products are getting a realistic option for SLR. Our system is now called "OmniSLR" and has the following features:

- **Compactness:** Easy to move. Transportable by a small car. Assembled in a few hours.
- **Low cost:** Collection of COTS products. Total 50 thousand dollars/euros.
- **Distributed system:** Small tasks dispatched to Raspberry Pis. Independent and autonomous subsystems.
- **Multi-purpose:** Aircraft tracking capabilities for future mobile communications. Applicable to space communication, debris tracking etc.
- **Green:** Low energy consumption ~ 100W. Operable with a portable battery.
- **Open:** Most of the system setup, software source codes etc to be opened to the community.
- **Challenge:** Trial-and-error approach. Development without fearing failure.

Technically, the Omni-SLR configuration features a nanosecond-pulse laser, a non-Coude bistatic telescope, a range-gate-less timing, a web-browser UI etc. More details of the OmniSLR system are presented in the three posters (optical subsystem, tracking subsystem and timing/software subsystem) submitted to this workshop.

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