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Automatic determination of the SLR reference point at Côte d'Azur multi-technique geodetic Observatory

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Abstract. The "Observatoire de la Côte d'Azur" (OCA) hosts several space geodesy techniques in Nice area (Caussols, France). The relative positions (local tie vectors) between the measuring reference points of these instruments are essential for the International Terrestrial Reference Frame (ITRF) construction and should be known at one millimeter accuracy.

The satellite laser ranging (SLR) station known as GRSM-7845 in the International Laser Ranging Service (ILRS) performs daily distance measurements. It is one of the four telescopes in the world capable of laser ranging on the Moon (Lunar Laser Ranging). Its reference point is the intersection of the telescope axes, which is supposed to be static. Currently, the coordinates are determined once a year during a multi-technique local survey. However, this is a time-consuming operation during which the telescope cannot perform its satellite measurements. It also requires specific metrology accessories and trained surveyors.

To improve this protocol, measuring devices and a data-processing chain were set up to automatically determine the reference point of the SLR station.

In order to use an indirect approach (circular fitting), circular and motorized prisms were fixed on the station to be always visible during the telescope rotation. A software package was developed to control the telescope, the dome and the total station motions for fully automatic measurements.

In addition to providing an easy determination of the cross-axis for local ties, this system will allow to study the potential motion of the telescope's axes intersection throughout the year.