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Radar Corner Reflector installation at the OCA geodetic Observatory (France)

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Geodetic observatories play a fundamental role in the determination of the International Terrestrial Reference System releases. They host several geodetic permanent instruments whose coordinates can be determined at the centimeter level or better. They comprise Global Navigation Satellite System (GNSS) permanent antenna/receivers, Satellite Laser Ranging (SLR) stations, Very Long Baseline Interferometry (VLBI) telescope and Doppler Orbitography Integrated by Satellite (DORIS) beacons. The Calern site of the Observatoire de la Côte d'Azur (OCA) is an example of such a multi-technique site located in the South of France. It hosts a DORIS beacon, a SLR/LLR station and two GNSS permanent stations.

In the process of determining coordinates of geodetic instruments in a unified reference frame, the relative positions of the instruments at co-location sites are integrated in the ITRF combination. Thanks to the additional measurements obtained from local surveys, it is possible to determine global biases between coordinates determined by individual space geodetic techniques, and express them in the same reference system. An additional fundamental assumption of the combination process is that stations located on the same site do not move with respect to each other. Spaceborne Synthetic Aperture Radar Interferometry (INSAR technique), is an interesting tool to evaluate that hypothesis as it allows measuring ground displacements in the line of sight of the satellite, and has been used only occasionally in the past for this purpose,. Notably, the Persistent Scatterer (PS) Interferometry enables determining time series of ground displacements on particular scatterers exhibiting phase stability in a stack (or series ?) of SAR images. To ensure the existence (or presence ?) of such PS, artificial corner reflectors can be installed.

We present the procedure that we adapted from Parker et al. (2007) to install and validate the installation of a corner reflector at OCA observatory, close to the currently operating GNSS, SLR and DORIS stations, specifically designed for Sentinel-1 satellite. An initial local tie survey was carried out to assess the stability of the reflector through time.