Tracking of GNSS satellites – usage in the GNSS community

Rolf Dach[1], Oliver Montenbruck[2], Marek Ziebart[3], Krzysztof Sosnica[4], Lars Prange[1], Thomas Schildknecht[1]
[1]Astronomical Institute, University of Bern, Bern, Switzerland, [2]DLR, German Space Operations Center, Oberpfaffenhofen, Germany, [3]University College London, London, UK, [4]Wroclaw University of Environmental and Life Sciences, Wroclaw , Poland

The GNSS community is recognizing the increasing number of GNSS satellites carrying retroreflectors. The presentation shall be seen as a contribution to the discussion on strategies for including the bigger number of targets by the SLR observation stations.
We will show selected examples where SLR measurements have been used for validating microwave-based orbit products in order to improve the understanding for GNSS orbit modelling. The SLR measurements have significantly helped to establish a reasonable modelling of Solar radiation pressure for the satellites in the new constellations (Galileo, BeiDou). In general a monitoring of GNSS satellites by SLR measurements is important to detect also unknown effects in the orbits that need attention. One example was for instance the detection of a certain change of the behavior of GLONASS satellites after three to four years of their lifetime thanks to the long history of SLR tracking data to these satellites. Other applications, e.g., to support the GNSS satellite orbit determination by adding SLR measurements (e.g., for satellites in GEOs or IGSOs) is even not fully deployed so far. From each of the examples the specific requirements on the optimal observation scenario is derived.