

"First Experiments in Bistatic Laser Ranging to Space Debris in Riga"

K.Salmins¹, J. Del Pino¹, J. Kaulins¹, P.Lejba², T. Suchodolski², P. Wang³, M. Steindorfer³, F. Koidl³

1) University of Latvia, Institute of Astronomy

2) Space Research Centre of the Polish Academy of Sciences

3) Space Research Institute, Austrian Academy of Sciences Graz, Austria

Abstract

The Riga Satellite Laser Ranging (SLR) system has recently undergone significant upgrades to support bistatic laser ranging capabilities. The detector unit was enhanced with the addition of a secondary receiver channel, incorporating a low-noise hybrid photo diode detector that operates in free-running mode. To accommodate bistatic observations, the optical channel switching mechanism between different Coudé focus ports was also improved by adding the precise static mirror positioning mode for the switching mirrors . This upgraded system can potentially be used for active space debris tracking, provided a high-intensity laser is available on site. Bistatic experiments were conducted jointly with the Borowiec and Graz SLR stations, laser wavelength 532nm, with data recorded in full-record mode. This configuration enabled the successful detection of debris-scattered photons, even in cases where the exact laser firing times were not known in advance. In such scenarios, the detected signals were identified during post-processing after obtaining the actual laser firing times from the transmitting station. We present the results from two successful sessions: one with the Borowiec SLR on 16 May 2024, and another with the Graz SLR on June 5, 2024.