RECENT RESULTS OF POSITIONAL ASTROMETRIC OBSERVATIONS AT THE GGI

Diana Haritonova[1], Ansis Zarins[1]

[1]University of Latvia, Institute of Geodesy and Geoinformatics, Jelgavas str. 3, Riga, Latvia
e-mail: diana.haritonova@lu.lv

We propose the method of CCD frame stacking, which is implemented in equatorial coordinates, thus having several advantages in searching space objects using passive optical systems. This method enables increasing the efficiency of capturing faint space objects also in imperfect observation conditions and at different locations.

The proposed method allows to prolong the "effective exposure time" of near-Earth objects (NEOs), and it can be realized using CCD frames obtained at different epochs and via several optical systems simultaneously. The method enables increasing the brightness of GEO (geostationary orbit) and LEO (low Earth orbit) debris or visualizing their motion relative to stars.

As space debris and NEO observation communities use similar technology (telescopes, radar systems, instrumentation) and processes to measure space objects (observation techniques, data processing approaches), the need for synergy is growing.

The Institute of Geodesy and Geoinformatics (GGI) of the University of Latvia is focused on positional astrometric observations of different space objects by the optical tracking system (OTS) using a control and data processing software, which is developed at the institute. The OTS includes twin receiving optical tube assemblies, which are symmetrically mounted on an Alt-Alt mount. Two CCD matrices are used for observation purposes, the more advanced one is 16.8 Mpix CCD matrix, ensuring a field of view of $0.5° \times 0.5°$. The software package is capable of automatic near-real-time processing of CCD frames, star identification and astrometric position determination of space objects.

In this study, recent observation results obtained by the OTS are summarized and compared, showing the efficiency of the proposed method of frame stacking.