

SPACE DEBRIS SYMPOSIUM (A6)
Measurements (1)

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ANALYSIS OF OBSERVED AND SIMULATED LIGHT CURVES OF SPACE DEBRIS

Abstract

Since 2004 the Astronomical Institute of the University of Bern (AIUB) regularly observes so called light curves of fast moving earth orbiting objects with the 1 meter telescope ZIMLAT, which is located close to Bern, Switzerland. A light curves represents the brightness variations of an object over time. Those variations result from the superposition of shape, attitude motion and material of an object under a specific viewing and illumination geometry. Whereas actively stabilized objects show relatively flat light curves due to stable attitude, light curves of so called space debris can show large variations even within very short time intervals. The time resolution of the light curves acquired with ZIMLAT is of the order of a few seconds, but even this high resolution does not prevent aliasing effects in some of the light curves. A tool to generate synthetic light curves was developed. The simulator allows defining and independently changing object, illumination and observation geometry parameters. This paper analyses observed and simulated light curves with the aim to asses the feasibility to determine object shape or attitude parameters in the absence of either information and under the premise that the observation parameters (epoch, orbit/distance and geometry) are known.