

15th IAA SYMPOSIUM ON SPACE DEBRIS (A6)
Measurements (1)

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WISE IR OBSERVATIONS OF TITAN ROCKET BODIES AND DEBRIS AT GEO

Abstract

NASA's Wide-Field Infrared Survey Explorer (WISE) observed the entire sky from low Earth orbit in four IR bands (3.4, 4.6, 12, and 22 microns) in 2010, and detected a significant number of Earth-orbiting spacecraft. All four bands were observed simultaneously. The two reddest bands are dominated by thermal emission from the spacecraft, while the bluest band is dominated by reflected sunlight. For objects at 1 AU, the 4.6 micron band can have significant components of both thermal emission and reflected sunlight depending on the temperature of the object. In the WISE images are multiple detections of 9 Titan 3C Transtage rocket bodies at geosynchronous orbit (GEO), including the parent objects of both known Titan 3C breakups at GEO: SSN03432 (observed by WISE after breakup) and SSN03692 (observed prior to its breakup in 2014). In addition, 4 pieces of debris from the SSN03432 (1968-081) breakup are in the WISE images. Calibrated IR colors and magnitudes have been determined for these Titan rocket bodies and debris. The results are compared with ground-based data of the same objects in the visual part of the spectrum (400 - 900 nm), and WISE 4-band observations of active geostationary satellites (Lee, et al. 2016).