

SPACE DEBRIS SYMPOSIUM (A6)  
Measurements (1)

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## COMPARISON OF THERMAL IR AND VISIBLE SIGNATURES OF GRAVEYARD ORBIT OBJECTS

**Abstract**

There exists a population of defunct satellites in the so-called graveyard orbit, at altitudes several hundred kilometers above the geo-stationary arc. These drifting, non-station-kept objects have a variety of ages and sizes, and exhibit behavior quite different from operational, station-kept objects in the geo-stationary arc. In addition, new objects are now appearing in this volume of space in and around the geo-stationary arc and graveyard orbit. These objects may be pieces of other objects or previously uncatalogued objects. In trying to understand the geo environment, studies of all of these types of objects are important to pursue, and we are taking advantage of every opportunity to do so with as many sensors, wavelengths, spatial, and spectral resolutions as we have at our disposal.

Previous work<sup>\*,\*\*</sup> presented an interesting set of results on one such object, COSPAR 1994-047a (“DirecTV-2”), a communications satellite retired from active service in April 2007 to an orbit 320 km higher than GEO, taken with the Broadband Array Spectrograph System (BASS), in both the IR (3-13  $\mu\text{m}$ ), as well as the visible. We presented interesting light-curves in both wavebands, and compared our collected signatures with the predictions of simple dynamical models of the object. Here, we present new observational results on a variety of other graveyard orbit objects, collected with BASS, in the visible and IR, generated using our standard analysis techniques. We compare the signatures from these recently observed objects with previously observed objects. We describe our methods, the data collected, our analysis approach and results, and our future plans.

\* Skinner, M. A., et al., “Observations in the thermal IR and visible of drifting objects around the western stable point at GEO,” IAC-13-A6.1.5, International Astronomical Congress 64th meeting, 23-27 September 2013, Beijing, China.

\*\* Skinner, M. A., et al., “Further observations and analysis in the thermal IR and visible of graveyard orbit objects,” IAC-14-A6.1.7, International Astronomical Congress 65th meeting, 29 September- 3 October 2014, Toronto, Canada.