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UTILIZATION OF BROADBAND ARRAY SPECTROGRAPH SYSTEM (BASS) THERMAL IR OBSERVATIONS OF GEOSYNCHRONOUS EARTH ORBIT (GEO) OBJECTS IN THE CREATION OF AN OBSERVATION-BASED MODEL OF THEIR THERMAL EMISSION

Abstract

Although there are approximately 400 active satellites at GEO, there are only a handful of satellite bus manufacturers. For a given satellite bus type, there are strong similarities in the surface materials and finishes between members of that bus type family, that produce the detectable thermal infrared signature. We have taken advantage of the similarities of on-orbit GEO satellites to allow estimation of thermal emission from an object of a certain bus type based on observations of other members of that family. In this work, we report on long-wave thermal IR observations of such GEO objects, taken with the Aerospace Corporation's Broadband Array Spectrograph System (BASS), in the IR (3-13 m), from 2006 to the present. We have categorized the observations by bus type, for four different satellite bus types. Fitting the thermal emission from the observations with black-body curves, and utilizing the parameters of the fits, we have assembled thermal emission models, as a function of solar phase angle, for each of the satellite bus types. We describe our methods, the data collected, our analysis approach and results, and our future plans.