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MAKING SMALL SATELLITES VISIBLE: NANOSAT TRACKING AND IDENTIFICATION
TECHNIQUES AND TECHNOLOGIES

Abstract

Nanosats (and CubeSats, ‘Smallsats’, etc.) are of order 10 cm in size, and are at or near the limits of what can be tracked and characterized, using existing space surveillance assets and techniques. Additionally, CubeSats are often launched in large numbers (scores), and can be problematic to distinguish from afar. These factors make them difficult to track and to identify.

In this paper, we have identified a number of technologies that future nanosat missions could employ that would enhance the trackability and/or identification of their satellites when on-orbit. Some of these technologies require active illumination of the satellite with electromagnetic energy, either in the radio frequency or optical frequency regions, and some are passive in nature. We have also enumerated a number of techniques that observers might employ to facilitate tracking and/or identification of small space objects that do not carry any special tracking or identification technology.

From a space traffic management perspective, space objects that can “self report” their orbital information and identity can help to relieve some of the surveillance burden from space tracking assets. Giving designers of future mission various options to choose from when constructing their satellites increases the likelihood that such self-reporting may occur.