SPACE DEBRIS SYMPOSIUM (A6)
Poster Session (P)

Author: Mr. Grant Bonin
Space Flight Laboratory (SFL), Canada

THE CANX-7 DRAG SAIL DEMONSTRATION MISSION: ENABLING SPACE ENVIRONMENTAL STEWARDSHIP FOR NANO- AND MICROSATELLITES

Abstract

With the proliferation of single- and multi-small spacecraft missions, the need for environmental stewardship in space has never been more critical. As the 25-year deorbiting recommendations of the Inter-Agency Space Debris Coordination Committee (IADC) are adopted globally, there will be increased pressure on operators of small satellites to be able to deorbit their spacecraft in a cost-effective, expeditious way. Meeting the challenge of deorbiting satellites at end-of-life is particularly complicated by the fact that the satellites cannot be relied upon to operate properly under such circumstances. Thus, the need for a simple, passive, independent, and effective deorbiting technology—that does not itself increase risks to other low-Earth orbit spacecraft—is a problem of mortal significance for the small satellite community.

This paper discusses the Canadian Advanced Nanospace eXperiment (CanX-7) technology demonstration mission, which will demonstrate a passive drag sail-based deorbiting device in low-Earth orbit (LEO). The paper is divided into three parts. First, a general overview of deorbiting options for small spacecraft is presented, and so-called "killer trades" associated with each deorbiting approach is discussed. Next, a model is presented that enables system designers to quickly choose the right deorbiting technology for a given spacecraft and orbit. The third part of this paper describes the CanX-7 deorbiting demonstrator itself. Expected to launch in 2014, CanX-7 will deploy a simple, modular, redundant, and adaptable drag sail technology for removing spacecraft from LEO at end-of-life. This technology, once demonstrated on orbit, can then be adapted to other LEO spacecraft to enable simple maintenance and EOL disposal in a passive and cost-effective way.