

SPACE DEBRIS SYMPOSIUM (A6)
Space Debris Removal Concepts (7)

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FASTSAT ORBITAL DEBRIS REMOVAL MISSION - AN AFFORDABLE, SCALABLE AND
RESPONSIVE FLIGHT DEMONSTRATION**Abstract**

It is a well accepted fact that space is becoming increasingly congested. Effective methods must be developed to address this significant issue which has both safety and operational implications. Numerous studies have assessed methods that could effectively mitigate orbital debris but so far, there hasn't been any actual demonstration of the efficacy of a particular method. Central to the problem of a true demonstration of orbital debris removal has been the estimated cost—some estimates have been close to a billion dollars. What is needed is a near term, low cost, low risk (i.e. high TRL) demonstration of actual orbital debris removal. Dynetics and NASA's Marshall Space Flight Center are leveraging a successful industry/government partnership to develop a debris removal demonstration for less than \$150M and within 3 years. Our focus is demonstrating that such a vital mission can be accomplished in a cost/schedule contained basis. The foundation for the demonstration is Dynetics flight proven commercial FASTSAT bus, which is currently operating on-orbit. FASTSAT is an excellent candidate for this specific mission because it can provide the necessary nano-satellite deployment, communications capability, proximity sensing and propulsion to support the debris removal mechanisms FASTSAT is an ideal mothership. Additionally, FASTSAT's inherent scalability provides us with the opportunity to address a wider range of future debris removal missions. The affordability of FASTSAT coupled with Dynetics ability to manufacture in Huntsville significantly contributes to meeting stringent cost and schedule objectives. Essentially, there will be no new development required the concept is to integrate proven technologies. There are readily available capture methods such as grappling and/or adhesives that our analysis confirms meet our objectives. It is very likely that the mission will employ more than one capture method to gain as much information as possible about the effectiveness of various methods. Since FASTSAT has already demonstrated the ability to deploy a nanosatellite, one aspect of the demonstration will utilize this important capability in a formation flying capture activity. In addition, FASTSAT will be configured with a "green" propulsion system that is both affordable and operationally effective.