

SPACE DEBRIS SYMPOSIUM (A6)
Modelling and Risk Analysis (2)

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CHARACTERIZATION OF DEBRIS FROM THE DEBRISAT HYPERVELOCITY TEST

Abstract

DebrisSat is an effort by NASA and the DoD to update the standard break-up model for objects in orbit. DebrisSat was a 50 kg satellite subjected to a hypervelocity test in Spring 2014. For the hypervelocity test, DebrisSat was hung inside a chamber lined with polyurethane foam panels. The foam panels were used to create a “soft-catch” arena for catching the resulting debris and stopping the debris from reaching the metal walls of the chamber. After the impact, the foam panels and debris not caught by the panels were collected and shipped to the University of Florida where the project has now advanced to the debris characterization stage. The characterization work has been divided into debris collection and cataloging and debris measurement. Debris collection and cataloging involves the retrieval of debris from the foam panels and cataloging the debris in a database. The debris collection is a three step process. Debris sitting loosely on the foam panels is removed first. Then exploratory X-ray is used to find debris embedded in the foam panels and hidden from sight. Finally the debris discovered during the X-ray are extracted from the foam panels. As debris is collected, the debris is cataloged in the database along with information to locate the area from which the debris was retrieved. The debris measurement portion of the characterization work aims to gather physical characteristics, such as size and mass, about the debris. This information is added to the catalog entry for the debris. To make measurement of the size of the debris possible, a visual system was developed to digitize the debris and generate a three-dimensional model from which to acquire the dimensions of the debris. This paper describes the debris characterization process and results to date.