

SYMPOSIUM ON SPACE DEBRIS (A6)
Hypervelocity Impacts and Protection (3)

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SIZE CHARACTERIZATION USING A TWO-DIMENSIONAL APPROXIMATION FOR DEBRISAT
FRAGMENTS**Abstract**

DebrisSat was a representative LEO satellite subjected to a ground-based hypervelocity impact test. To date, over 120,000 fragments have been collected from the DebrisSat test. The debris fragments are being characterized to update satellite breakup models. A significant amount of the collected fragments are slivers and thin plates that analyses have shown can be approximated as two-dimensional (2D) objects while retaining acceptable dimensional characteristics (characteristic length, cross-sectional area). By neglecting thickness, the 2D characterization approach improves processing speed. A 2D imaging system, which utilizes a single camera for automated size characterization, has been developed and tested on both emulated debris fragments and calibrated objects with known dimensions. Testing has indicated results accurate to within 3% of the actual dimension. The results are repeatable to within 2% of the nominal dimension. End-to-end size characterization times of less than four minutes per fragment have been achieved. This paper describes the analyses and verification tests performed to validate the 2D approximations.