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AN UPDATE ON DEBRISAT'S DEBRIS CATEGORIZATION SYSTEM

Abstract

DebriSat is an ongoing experiment to provide new, relevant characterization data generated by a hypervelocity impact test that will be used to update existing orbital debris break-up models. Currently, the project is in the post-impact phase in which thousands of debris fragments generated by the impact test are collected, extracted, measured, and recorded. Each of the debris fragments produced from the hypervelocity impact test has a large number of associated characterization data points. The amount of data associated with each debris fragment multiplied by the tens of thousands of individual debris fragments generated by the impact test results in an immense data management challenge. In response to this challenge, the Debris Categorization System (DCS) was developed and implemented to allow efficient and effective management, tracking, and analysis of DebriSat's large data set.

Since its initial deployment, the DCS has evolved and adapted to meet the projects growing needs. As new data fields, data types, system-wide features, and other changes have been requested and implemented, the DCS has broadened in breadth and scope. Over the past few months, post-impact characterization activities (panel processing, to fragment collection and analysis) have been refined and finalized. During this time, the DCS has also been refined and has changed to enable, for example, external updates to the database such as direct entry modification and insertion queries executed by the MATLAB-based imaging and space-carving scripts. This paper discusses the modifications and improvements that have been made to the DCS as well as describe some of the processes and procedures that were utilized to ensure a smooth transition from previous revisions of the system to the most current version. Furthermore, this paper discusses how the DCS development cycle was aligned to the development cycles of the various imaging and x-ray systems to provide a level of synergy and intuitiveness to the end product.