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

Author: Mr. Waldemar Bauer
Deutsches Zentrum für Luft- und Raumfahrt e.V. (DLR), Germany, waldemar.bauer@dlr.de

Dr. Oliver Romberg
Deutsches Zentrum für Luft- und Raumfahrt e.V. (DLR), Germany, Oliver.Romberg@dlr.de
Dr. Carsten Wiedemann
Technical University of Braunschweig, Germany, c.wiedemann@tu-braunschweig.de
Mr. Robin Putzar
Fraunhofer EMI, Germany, robin.putzar@emi.fraunhofer.de
Dr. Frank Schäfer
Fraunhofer EMI, Germany, frank.schaefer@emi.fraunhofer.de
Dr. Gerhard Drolshagen
European Space Agency (ESA), The Netherlands, gerhard.drolshagen@esa.int
Prof. Peter Voersmann
Technische Universität Braunschweig, Germany, (email is not specified)

HVI-TEST SETUP OF IN-SITU SPACE DEBRIS DETECTOR

Abstract

Collisions of spacecraft in orbit with Space Debris (SD) or Micro-Meteoroids (MM) lead to payload degradation, anomalies or failures in spacecraft operating or even to loss of a whole mission. Existing flux models and impact risk assessment tools, like MASTER or ORDEM, and ESABASE2 or BUMPER II are used to analyze the mission risk concerning this hazard potential. The validation of the flux models so far is partly based on SD and MM impact data from in-situ impact detectors, e.g. DEBIE, GORID, capture cells, and on the analyses of retrieved hardware from space, e.g. LDEF, HST or EURECA. However the knowledge on the small objects populations (millimeter down to micron sized) in space is rather limited and need to be enhanced for reliable models. As a contribution to software validation (e.g. MASTER, ORDEM) in terms of data acquisition, a new type of impact detector is currently under development at DLR. The Solar Generator based Space Debris Impact Detector (SOLID) makes use of spacecraft solar panels and therefore offers a large sensor area and high flexibility regarding the orbit. This paper presents the impact detector design as well as the High-Velocity-Impact test (HVI-test) setup, forseen for tests at the Fraunhofer Institute for High-Speed-Dynamics, Ernst-Mach-Institut, EMI.