Paper ID: 10874
oral
student

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

Author: Mr. Sven Kevin Flegel
Technische Universität Braunschweig, Germany, sven.flegel@fhr.fraunhofer.de

Mr. Johannes Gelhaus
Technische Universität Braunschweig, Germany, j.gelhaus@tu-bs.de
Mr. Marek Möckel
Technische Universität Braunschweig, Germany, m.moeckel@tu-bs.de
Mr. Vitali Braun
Technische Universität Braunschweig, Germany, v.braun@tu-bs.de
Dr. Carsten Wiedemann
Technical University of Braunschweig, Germany, c.wiedemann@tu-braunschweig.de
Dr. Holger Krag
European Space Agency (ESA), Germany, holger.krag@esa.int
Dr. Heiner Klinkrad
European Space Agency (ESA), Germany, Heiner.klinkrad@esa.int
Prof. Peter Voersmann
Technische Universität Braunschweig, Germany, *(email is not specified)*

MASTER-2009 SMALL PARTICLE FLUX

Abstract

The validity of the small particle environment of MASTER-2009 was determined by using impact data from the Long Duration Exposure Facility (LDEF), the Hubble Space Telescope (HST) Solar Panels and the European Retrievable Carrier (EuReCa). Returned surfaces were analyzed with respect to impact features. Craters were investigated to determine the nature of the particles that created them. For some surfaces on LDEF and the HST solar panels, information on the chemical species of some of the impactors could be retrieved. The current paper presents the validation results for the MASTER-2009 model with a renewed look at uncertainties associated with the impacts. Furthermore, the MASTER-2009 model for the first time incorporates future populations reaching down to diameters of one micrometer. Previously the lower diameter limit had been one millimeter for the future population. This feature is exploited to show how the flux onto missions similar to ones used for the MASTER-2009 population validation could change in the future. These results again are looked at with a view on possible uncertainties. One of the issues which will be addressed is the effect of different solar flux values on the orbital lifetime of small particles and the resulting changes in the flux onto space craft. The paper is concluded by a short view on the possible implications of the findings with respect to degradation of space craft surfaces.