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PARTICLE FLUX ANALYSIS WITH THE UPDATED MASTER MODEL

Abstract

The Institute of Space Systems of the TU Braunschweig is currently developing the latest version of the European reference model for the description of the space debris environment. This model, called MASTER, provides high-resolution particle flux on oriented satellite surfaces. The last version of this model refers to a reference epoch of May 1, 2009. The updated version of this tool is based on a completely revised particle population. Several new debris generation events were considered. In addition, the historical events were revised and partly reassessed. This usually leads to slight changes in the population. However, a more significant difference from the previous model can be observed in orbits at around 800 km altitude. According to the latest findings, there is a significantly higher number of debris. MASTER is based on a validated debris population. The process for generating the population is very complex. It is a combination of statistical and deterministic methods. The debris release events are described using statistical methods. The orbital distribution is calculated semi-analytically. The distribution of the space debris varies significantly on different orbits. As a result, there are also very different collision geometries with satellite missions. It will be shown here for selected mission examples, to which particle flux satellites are exposed today. The results are shown in terms of impact flux, velocity and direction considering the composition of the particles. The flux is represented for different size classes of particles. The results refer to a current reference epoch.