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Author: Mr. Omaly Pierre
CNES, France

Mrs. Maria Luz Hernandez
G.M.V. Space and Defence, S.A., France
Dr. Annaloro Julien
France

SENSIBILITY ANALYSIS WITH DEBRISK: THE CNES' DEBRIS ASSESSMENT SOFTWARE

Abstract

The French Space Agency (CNES) has been developing a fast and efficient tool called DEBRISK, based on an object-oriented approach [1, 2]. This code calculates the space objects trajectory and their ablation during reentry. It supplies a list of the surviving objects and their characteristics upon ground arrival. This tool is used to confirm that the vehicle complies with regulations of the act of French parliament, adopted in 2008,wich imposes satellite constructors to evaluate the end-of-life operations in order to assure the risk mitigation of their satellites during reentry. The difficulty of this kind of tool is to find the good balance in the quantity of uncertainty we have to put in the model. The constraint oscillates between the margin requested by the fact that we deal with human casualty risk and the too big margin that imposes technical constraint that could impact badly the payload mission. In this study we use an instrumented version of our tool DEBRISK into which we are able to induce perturbation in each physical model, to quantify and order the different weight of each physical parameter. By doing this, we increase the confidence in the result and ones do a step thru the relevance of such simplified tool.

1. P. Omaly, M. Spel, DEBRISK, a tool for re-entry risk analysis. Proceedings of the 5th IAASS Conference A Safer Space for Safer World. Noordwijk, Netherlands: European Space Agency, 2012.

2. P. Omaly et al. DEBRISK, CNES tool for re-entry survivability prediction: validation and Sensitivity analysis. Proceedings of the 6th IAASS Conference Safety are Not an Option 21-23 May 2013.