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USE OF AN OPTIMISATION TECHNIQUE FOR THE CORRELATION OF AERODYNAMIC DATA
ON GEOMETRIC PRIMITIVES FOR DEBRIS DEMISE CALCULATIONS**Abstract**

The accuracy of numerically simulated space debris demise scenarios is of key concern to space agencies and hardware manufacturers around the world, particularly in the case of debris ground impact locations. This study describes the use of Kriging, a multivariate engineering optimisation technique, to correlate the aerodynamic coefficients of geometric primitives towards the improvement of the accuracy of debris demise calculations.

The data from a series of engineering level simulations performed using RAC, the Re-Entry Aerodynamic Calculator, are presented. These scenarios simulate the aerodynamics of cylindrical debris analogues between the free molecular and continuum regimes at varying angles of incidence to the flow.

The correlation method and the basis of the aerodynamic simulations are described, and comparisons are made between the final model's predicted values and computationally expensive full factorial simulations.