

IAF SPACE TRANSPORTATION SOLUTIONS AND INNOVATIONS SYMPOSIUM (D2)
Future Space Transportation Systems Verification and In-Flight Experimentation (6)

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STUDY ON THE EFFECTIVENESS EVALUATION OF THE ATMOSPHERIC HYPER-SPEED
VEHICLES

Abstract

According to the particular properties of the atmospheric hyper-speed vehicles which are quite different from the traditional in-space flight vehicles, evaluation systems of the effectiveness for the atmospheric hyper-speed vehicles are introduced in this paper. A uniform index system that is suitable for atmospheric hyper-speed vehicles is introduced based on the atmospheric hyper-speed vehicles evaluation systems framework. The effectiveness evaluation index system is gradually refined from the four levels of the general index level, sub index level, basic index level and parameter level based on the selection principle of the effectiveness evaluation index. Under the management of verification, verification and accreditation (VVA) of effective simulation model, the Bayes method of multi-source data fusion based on subsection and small sample flight test, supplemented by ground test and large sample virtual flight, is adopted to form the effectiveness evaluation method of the whole aircraft system covering the whole flight envelope. Finally, the uncertainty of evaluation results is quantitative analyzed. The volatility of evaluation conclusion is used to measure the evaluation risk, and the control method of evaluation risk is given. It is an effective reference for the effectiveness evaluation of the atmospheric hyper-speed vehicles, and could be used as a criterion for the optimization of future vehicle design.