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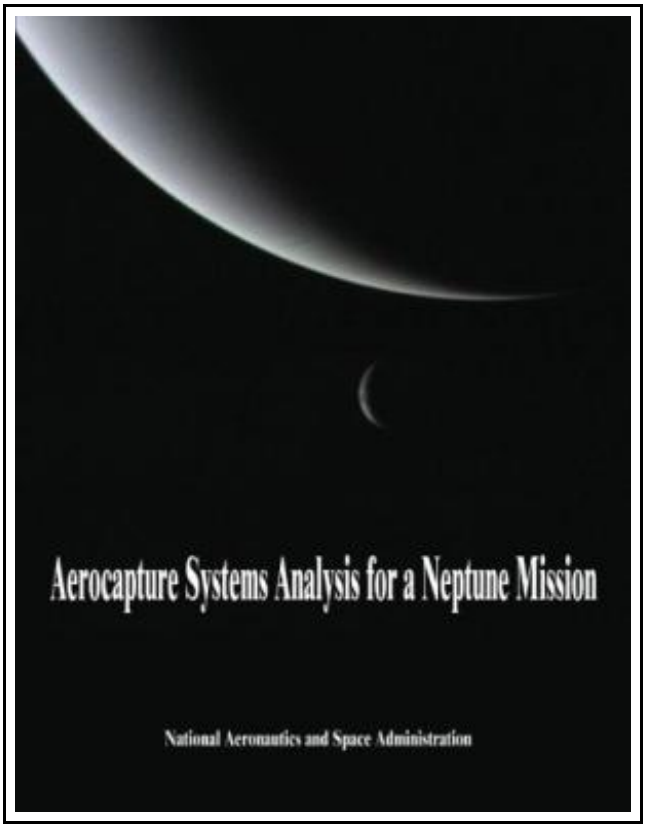

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AEROCAPTURE SYSTEMS ANALYSIS FOR A NEPTUNE MISSION

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Createspace, United States, 2014. Paperback. Book Condition: New. 279 x 216 mm. Language: English . Brand New Book ***** Print on Demand *****.A Neptune Aerocapture Systems Analysis is completed to determine the feasibility, benefit and risk of an aeroshell aerocapture system for Neptune and to identify technology gaps and technology performance goals. The high fidelity systems analysis is completed by a five center NASA team and includes the following disciplines and analyses: science; mission design; aeroshell configuration screening and definition; interplanetary navigation analyses; atmosphere modeling; computational fluid dynamics for aerodynamic performance and database definition; initial stability analyses; guidance development; atmospheric flight simulation; computational fluid dynamics and radiation analyses for aeroheating environment definition; thermal protection system design, concepts and sizing; mass properties; structures; spacecraft design and packaging; and mass sensitivities. Results show that aerocapture can deliver 1.4 times more mass to Neptune orbit than an all-propulsive system for the same launch vehicle. In addition aerocapture results in a 3-4 year reduction in trip time compared to all-propulsive systems. Aerocapture is feasible and performance is adequate for the Neptune aerocapture mission. Monte Carlo simulation results show 100 successful capture for all cases including conservative assumptions on atmosphere and navigation. Enabling technologies for this mission include TPS manufacturing; and aerothermodynamic methods and validation for determining coupled 3-D convection, radiation and ablation aeroheating rates and loads, and the effects on surface recession.

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