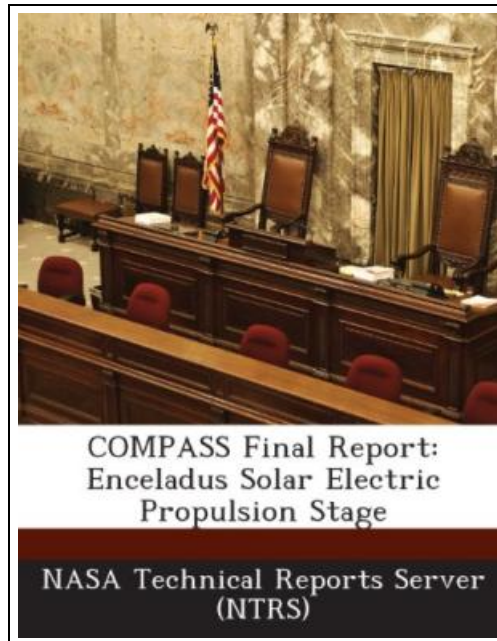


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COMPASS FINAL REPORT: ENCELADUS SOLAR ELECTRIC PROPULSION STAGE



Bibliogov, United States, 2013. Paperback. Book Condition: New. 246 x 189 mm. Language: English . Brand New Book ***** Print on Demand *****.The results of the NASA Glenn Research Center (GRC) Collaborative Modeling and Parametric Assessment of Space Systems (COMPASS) internal Solar Electric Propulsion (SEP) stage design are documented in this report (Figure 1.1). The SEP Stage was designed to deliver a science probe to Saturn (the probe design was performed separately by the NASA Goddard Space Flight Center s (GSFC) Integrated Mission Design Center (IMDC)). The SEP Stage delivers the 2444 kg probe on a Saturn trajectory with a hyperbolic arrival velocity of 5.4 km/s. The design carried 30 percent mass, 10 percent power, and 6 percent propellant margins. The SEP Stage relies on the probe for substantial guidance, navigation and control (GNC), command and data handling (CDH), and Communications functions. The stage is configured to carry the probe and to minimize the packaging interference between the probe and the stage. The propulsion system consisted of a 1+1 (one active, one spare) configuration of gimbale 7 kW NASA Evolutionary Xenon Thruster (NEXT) ion propulsion thrusters with a throughput of 309 kg Xe propellant. Two 9350 W GaAs triple junction (at 1 Astronomical Unit (AU), includes 10 percent margin) ultra-flex solar arrays provided power to the stage, with Li-ion batteries for launch and contingency operations power. The base structure was an Al-Li hexagonal skin-stringer frame built to withstand launch loads. A passive thermal control system consisted of heat pipes to north and south radiator panels, multilayer insulation (MLI) and heaters for the Xe tank. All systems except tanks and solar arrays were designed to be single fault tolerant.



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