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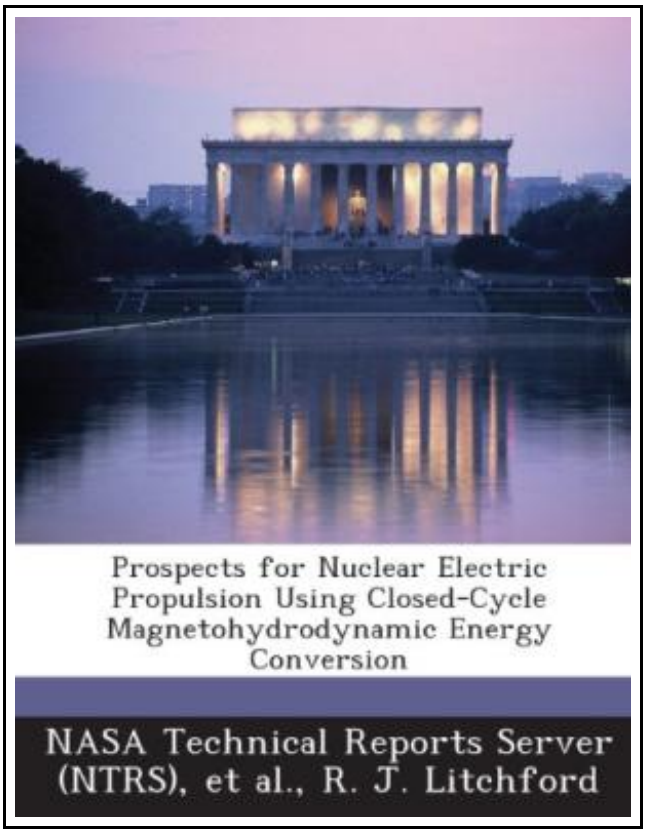

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PROSPECTS FOR NUCLEAR ELECTRIC PROPULSION USING CLOSED-CYCLE MAGNETOHYDRODYNAMIC ENERGY CONVERSION

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BiblioGov. Paperback. Book Condition: New. This item is printed on demand. Paperback. 54 pages. Dimensions: 9.7in. x 7.4in. x 0.1in.Nuclear electric propulsion (NEP) has long been recognized as a major enabling technology for scientific and human exploration of the solar system, and it may conceivably form the basis of a cost-effective space transportation system suitable for space commerce. The chief technical obstacles to realizing this vision are the development of efficient, high-power (megawatt-class) electric thrusters and the development of low specific mass (less than 1 kgkWe) power plants. Furthermore, comprehensive system analyses of multimegawatt class NEP systems are needed in order to critically assess mission capability and cost attributes. This Technical Publication addresses some of these concerns through a systematic examination of multimegawatt space power installations in which a gas-cooled nuclear reactor is used to drive a magnetohydrodynamic (MHD) generator in a closed-loop Brayton cycle. The primary motivation for considering MHD energy conversion is the ability to transfer energy out of a gas that is simply too hot for contact with any solid material. This has several intrinsic advantages including the ability to achieve high thermal efficiency and power density and the ability to reject heat at elevated temperatures. These attributes lead to a reduction in system specific mass below that obtainable with turbine-based systems, which have definite solid temperature limits for reliable operation. Here, the results of a thermodynamic cycle analysis are placed in context with a preliminary system analysis in order to converge on a design space that optimizes performance while remaining clearly within established bounds of engineering feasibility. MHD technology issues are discussed including the conceptual design of a nonequilibrium disk generator and opportunities for exploiting neutron-induced ionization mechanisms as a means of increasing electrical conductivity and enhancing performance and reliability. This item ships from La Vergne,TN....

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