SPACE PROPULSION SYMPOSIUM (C4)
Nuclear Propulsion and Power (7.-C3.5)

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RECENT ACTIVITIES AT THE CSNR FOR DEVELOPING NUCLEAR THERMAL ROCKETS

Abstract

If the human race ever really decides to push into the solar system and explore the celestial neighborhood, we will have to develop a propulsion system and power sources that are well beyond the performance of current technology. The vast distances, intense radiation fields, and hazardous environments necessitate reducing mission times as much as possible. Nuclear power has been considered for space applications since the 1960s. Between 1955 and 1972 the US built and tested over twenty nuclear reactors/ rocket-engines in the Rover/NERVA programs. However, changes in environmental laws may make the redevelopment of the nuclear rocket more difficult. Recent advances in fuel fabrication and testing options indicate that a nuclear rocket with a fuel form significantly different from NERVA may be needed to ensure public support. The Center for Space Nuclear Research is pursuing development of tungsten based fuels for use in a NTR, for a surface power reactor, and to encapsulate radioisotope power sources. The potential mission benefits of a nuclear rocket, historical achievements of the previous programs, and recent investigations into alternatives in design and materials for future systems will be discussed.