

SPACE POWER SYMPOSIUM (C3)
Advanced Space Power Technologies and Concepts (3)Author: Mr. Roger X. Lenard
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A TWO-STAGE COMBINED CYCLE SPACE POWER SYSTEM FOR ASTEROID EXPLORATION

Abstract

Planetary Power, Inc, is developing a novel two-stage, closed cycle Ericsson power system for transportable terrestrial concentrated solar power, called SUNsparq, which appears to be ideally suited to space power applications. This unit presently operates on air; however, it can be modified to incorporate a mixed gas such as helium-xenon which would make it more compact and efficient. A bottoming cycle which is being studied for this and other PPI power systems, would make the SUNsparq system yet more efficient. SUNsparq employs very high-speed miniaturized turbines and alternator systems as well as multiple heat exchangers to improve system efficiency. Planetary Power is in the process of developing a road-mobile system to serve the needs of remote power areas where energy is expensive or non-existent. The present model can operate on sunlight, hydrocarbon fuels or a combination of the two to enable continuous, reliable dispatchable power. PPI has conceptualized methods to make the system compact, lightweight and deployable for specialized terrestrial applications that could be applicable to a deployable solar power system for asteroid mining. The author will describe the existing SUNsparq system and what a space-based power system would be and how it would operate to provide power for mining asteroids.