

SPACE POWER SYMPOSIUM (C3)  
Wireless Power Transmission Technologies, Experiments and Demonstrations (2)

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SPACE SOLAR POWER SANDWICH MODULE TESTING AND PERFORMANCE  
CHARACTERIZATION

**Abstract**

The prospect of effectively limitless, continuous electricity from orbiting satellites for use on earth has captured people's interest for many years. The approach entails collection of solar energy in space and its wireless transmission to the earth. This potentially gives the benefit of provision of baseload power while avoiding the losses due to the day/night cycle and atmospheric effects that are associated with terrestrial solar power. Proponents have contended that the implementation of such systems could offer energy security, environmental, and technological advantages to those who would undertake their development. Among recent implementations commonly proposed for SSP, the Modular Symmetrical Concentrator, SPS-ALPHA, and other modular concepts have received considerable attention. Each employs an array of modules for performing conversion of concentrated sunlight into microwaves or laser beams for transmission to earth. The research described herein details efforts in the development and testing of photovoltaic arrays, power electronics, microwave conversion electronics, and antennas for 2.45 GHz microwave-based "sandwich" module prototypes. Prototypes were designed, fabricated, and subjected to the challenging conditions inherent in the space environment, including the solar concentration levels in which an array of modules might be required to operate. Results from the module's characterization are presented and compared with metrics of interest.