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SPACE POWER SYMPOSIUM (C3)
Space-Based Solar Power Architectures / Space & Energy Concepts (1)

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PROPOSAL ON A SPS WPT DEMONSTRATION EXPERIMENT SATELLITE

Abstract

WPT experiment in space can demonstrate the feasibility of SPS and is considered of the necessary experiment during the RD of SPS. A project proposal on wireless power transmission technical validation test in space is presented in this paper. The project will demonstrate the microwave power transmission technology, laser power transmission technology, and beam direction control technology. The DFH-5 satellite platform being developed in CAST is selected as the experiment satellite platform. Some adaptability modifications of the platform are necessary to meet the experiment requirements. The satellite will run on a sun-synchronous orbit with altitude of about 720km. Although it's impossible to transmit power continuously for a long time, but transmission test can be repeated many times. The power can be transmit to different receiving station on ground. By primary analysis, energy transmission time is about 30-200s in an orbit by the mechanical and electrical adjustment of satellite and emitting device. Electric power load provided by satellite is about 30kW, which means the transmitted microwave or laser energy will be tens of kW. For the laser power transmission receiver, high efficiency laser cell array is needed to be developed and constructed. The terrestrial solar power station facilities also can be used. For the microwave power transmission receiver, a big rectenna with diameter of 100 meters is needed to be developed. The FAST project being developed in China has a 500m antenna which may also be used for microwave receiving test.