

IAF SPACE POWER SYMPOSIUM (C3)
Wireless Power Transmission Technologies and Application (2)

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MICROWAVE POWER TRANSMISSION SUBSYSTEMS DESIGN EVOLUTION FROM
DEMONSTRATION TO OPERATION SYSTEMS FOR SSPS

Abstract

In recent years, several countries have announced their ambitious plans to demonstrate space solar power satellite (SSPS) on orbit. And a Space Solar Power Demonstrator prototype has been launched into orbit by Caltech and SpaceX early this year. In China, the SSPS development roadmap is being updated also. Five steps from demonstration to operation for SSPS are conceived. Microwave power transmission (MPT) is one of the key components/subsystems through all these systems, which will be designed and tested in each step. For each demonstration or operation system, the MPT subsystem should be adapted to different but inherited targets from low Earth orbit (LEO) systems to geostationary orbit (GEO) systems. So its design evolution is meaningful and attracted much interest. Demonstration strategy was investigated with respect to these different and inherited factors, which was also bounded by the orbit and platform characteristics. MPT subsystems were discussed for LEO-LEO, LEO-Earth and GEO-Earth demonstration or application. The key technologies to be evaluated through each demonstration were also listed, and some solving approaches were proposed. Some suggestions were proposed for construction of these systems. This paper is expected to contribute to a healthy and ordered developing process of SSPS.