

IAF SPACE POWER SYMPOSIUM (C3)
Solar Power Satellite (1)

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HIGH POWER ELECTRIC GENERATION AND WPT DEMONSTRATION IN SPACE FOR SPS

Abstract

Space Power Satellite(SPS) is a huge spacecraft to utilize solar energy in space. Dr. Glaser proposed the SPS concept in 1968 and this year is the 50th anniversary. Because of the huge size, immense mass and high power, there exist many technical challenges and there is no a technology demonstration system developed so far. According to different proposed SPS development roadmaps by IAA, Japan and China, the technology flight demonstrations in different lever, including component lever, subsystem lever and system level, need to be carried on in space. Based on the proposed SPS roadmap of China, 1 MW demonstration system should be developed after 2030. Therefore, some relative key technologies need to be demonstrated in space before that time. Among these technologies, the high power electric generation and the wireless power transmission technologies are most important. This paper shows a proposed high power electric generation and WPT demonstration mission in space around 2025. The mission includes two spacecraft, one is the main spacecraft, another one is the energy receiving spacecraft. The main spacecraft includes high power electric generation and transmission subsystem, microwave energy transmission subsystem, laser energy transmission subsystem and platform. The energy receiving spacecraft includes microwave energy receiving subsystem, laser energy receiving subsystem, science payload and platform. The mission will demonstrate the 50kW thin-film solar array technology, 500V high voltage electric transmission technology, 1kW laser transmission technology, 5kW microwave transmission technology and large scale structure and control technology, etc.