

SPACE POWER SYMPOSIUM (C3)
Space Power Experiments Applications and Benefits (4)

Author: Prof. Susumu Sasaki
Japan Aerospace Exploration Agency (JAXA), ISAS, Japan, sasaki.s@apost.plala.or.jp

Dr. Tanaka Koji
ISAS/JAXA, Japan, ktanaka@isas.jaxa.jp
Mr. JAXA Advanced Mission Research Group
Japan, sasaki@isas.jaxa.jp

SSPS TECHNOLOGIES DEMONSTRATION IN SPACE

Abstract

The basic plan for space policy in Japan, stating the government commitment to SSPS (Space Solar Power Systems) research, has opened up a new prospect for SSPS demonstration experiments in space. There are a lot of SSPS technologies to be verified in orbit; wireless power transmission, construction and attitude control of large structure, high power/high voltage power generation and management, and high tolerance spacecraft technologies to space environment. SSPS community is requested to establish a logical demonstration strategy in accordance with the SSPS road map towards the final goal, a GW class commercial model in the 2030's. In the initial stage of space demonstration, the most fundamental technology that decisively affects the system-level concept needs to be verified. The first issue is regarding to the wireless power transmission medium, microwave or laser. For the microwave transmission, beam-pointing technology to the pilot signal station on ground and interaction with the ionospheric plasma are to be verified. For the laser transmission, the beam-pointing technology and transmission through the atmosphere are to be verified. The data for the over-all transmission efficiency and electromagnetic/optical contamination outside the beam, together with the results of laboratory experiments, will give an answer to the question on the transmission medium. Once the transmission medium is selected, the configuration of the target system can be designed and the associated technologies to be verified in space will be identified. In this phase, the highest priority will be given to the subject how to construct the large structure in orbit, which will be investigated in conjunction with the expected space transportation system. The technologies to assemble the SSPS main structure will be verified in space using a scale model. Once the feasible construction scenario is established, other essential technologies for the attitude control and power management will be verified in space as required. Based on the space-verified technologies, we will be able to start the development of the pilot plant of MW class, the initial practical model towards the commercial SSPS.