

SPACE POWER SYMPOSIUM (C3)
Space Power Technologies and Techniques (2)

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OVERVIEW OF STUDIES ON LARGE STRUCTURE FOR SPACE SOLAR POWER SYSTEMS (SSPS)

Abstract

Japan Aerospace Exploration Agency (JAXA) has studied Space Solar Power Systems (SSPS) using laser and microwave beams for years since 1998. In this system, the space solar energy is converted into other optical energies in the geostationary orbit, and optical energies are transmitted to the earth without depending day and night. Therefore, this system is expected as a means to solve energy and environmental problems in the future.

Critical technologies for realizing SSPS are gathering of solar light, thermal control, phased array antenna, amplifier and generator of laser, convertor from sun light to laser and assembling of large structure. Assembling of large structure on orbit is not matured technology. It is the problem how to establish this technology.

In SSPS large structure of km size must be assembled on orbit. Now we study how to assemble structure of 100m size on orbit. Various styles of large structure for SSPS were suggested until now. We try to study the feasibility of large structure of 100m size like large mirror and panel for antenna and generator in case of each structure style. We try to select the best style of large structure for SSPS.

We analyze the relation between flatness of mirror and rate of gathering solar light in order to study feasible requirement of large mirror on orbit. We measured the flatness of commercial mirror and analyze distribution of illumination in the case that the mirror is exposed to the sun.

This paper shows status of our studies.