

SPACE POWER SYMPOSIUM (C3)

Space-based Solar Power Architectures – New Governmental and Commercial Concepts and Ventures (1)

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

Abstract

Japan Aerospace Exploration Agency (JAXA) has been conducting studies on Space Solar Power Systems (SSPS) using microwave and laser beams since FY1998. Large structure assembly is one of the most critical technologies for realizing SSPS. Large structure of kilometer-size must be constructed on orbit for the SSPS practical models. We have been studying how to assemble a structure of 100m size like mirror and panel for antenna and solar array on orbit as a middle target before the study of kilometer-size structure. We conducted trade-off study on the style and assembling method of large structure from FY2008 to the middle of FY2010. As the potential candidates, we selected deployable truss structures using deploying and docking equipments and inflatable truss structures using the assembling platform. Regarding the former method, we are preparing for ground demonstration of assembling technology for deployable truss structures in FY2012. Regarding the latter method, we carried out deploying and rigidizing examination of inflatable tube in order to get the basic data in FY2010. For the light reflecting mirror, we analyzed the rate of gathering solar light and distribution of illumination on the solar array by using the flatness data of mirror that we measured in order to study on size and configuration. We also manufactured thermal structure models of panel structure that is the fundamental structural element in order to study the extremely light-weight structure for SSPS.