

66th International Astronautical Congress 2015

SPACE POWER SYMPOSIUM (C3)  
Space-Based Solar Power Architectures / Space & Energy Concepts (1)

Author: Prof. Nobuyuki Kaya  
Kobe University, Japan, kaya@kobe-u.ac.jp

CONCEPTUAL DESIGN ON THE SANDWICH SOLAR POWER SATELLITE ?

**Abstract**

We succeeded in the JAXA/ISAS sounding rocket experiment on the “Furoshiki” deployment, the retrodirective antenna and the crawling robots on the deployed mesh in January, 2006. The S-310-36 sounding rocket was launched to verify our newly proposed scheme to construct huge structures under microgravity condition in space. The rocket experiment had three main objectives, the first objective of which was to verify the Furoshiki deployment system, the second was to test the retrodirective antenna system to correct the distortion of the structures in a long range from space to the ground as mentioned above and the last is a microgravity test of the crawling robots on the deployed mesh. We also succeeded in the demonstration on the microwave beam control using the retrodirective antenna system at the SPS Conference in Toronto in 2009. We showed the participants the retrodirective antenna system could control the microwave power beam to follow the pilot signal transmitted from the receiving antenna.

We are planning the next demonstration for the Solar Power Satellite after our successful demonstration in Toronto. We are sure the fundamental beam control system of the microwave has been established by the demonstration, which is one of the most important and critical issues to realize the SPS. Our next plan is an orbiter experiment to carry out the beam control test with a pilot signal from the ground. We are launching small many satellites to extend the Furoshiki deployment, which can work a test bed to investigate the functions of the Sandwich panels and robotic technologies related to the SPS. We launch many Sandwich panels with the antenna element to work as an active phased array antenna after the construction of the large mesh. Each antenna element, which receives the pilot signal transmitted from the large parabola antenna on the ground, transmits a radio wave of the different frequency from the pilot signal by controlling the output phase to the ground. This space experiment is the first trial in the world to construct the real small Solar Power Satellite. While, we have to design the practical models of the SPS including the construction methods and the critical technologies.

We will describe about our recent investigation on our conceptual design of the practical Solar Power Satellite in our presentation.