

SPACE POWER SYMPOSIUM (C3)
Wireless Power Transmission Technologies, Experiments and Demonstrations (2)

Author: Prof. Nobuyuki Kaya
Kobe University, Japan

DEVELOPMENT OF SANDWICH PANELS FOR POWER GENERATION AND TRANSMISSION OF
PRACTICAL SPS

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. In our study, especially the high power amplifier is improved. There are some requirements for realization of the practical high power amplifier. The first qualification is that the high power amplifier is made as small as possible because one of the biggest issues for the SPS is to reduce weight and thickness of the sandwich panels as lightly and thinly as possible, which can reduce the transportation cost. Therefore, if the high power amplifier is miniaturized, it can reduce the weight of the sandwich panels. In addition, the smaller the high power amplifier is, the more flexible the design becomes. The new divider; “Directional coupler divider” is focused to be developed in our study on the power transmission unit in the sandwich panel. The new 8 ports power divider is simulated, designed and examined on the characterization. The result shows that “Directional coupler divider” can improve different items; the size of the panels, distribution performance and the loss between input and output. In addition, the unit of the sandwich panel is designed in this study to have a regular form and expandability.