

IAF SPACE POWER SYMPOSIUM (C3)
Solar Power Satellite (1)

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THE CONSTRUCTION METHOD OF A 30-M-CLASS LARGE PLANAR ANTENNA FOR SPACE
SOLAR POWER SYSTEMS

Abstract

In almost all Space Solar Power Systems (SSPS) concepts proposed in the world, constructing large space structures of several hundred meters or more is necessary. On the other hand, a largest space structure realized by traditional hand made construction methods is the International Space Station (ISS) whose size is about 100m x 70m. The ISS was constructed by extravehicular activities and robot arm operations of astronauts. However, the problem is that this construction method is dangerous, expensive and time-consuming. Therefore, an automatic construction method for large space structures is required to solve the problems. In order to realize the construction of several hundred meters or more large space structures for the SSPS, we need to carry out a long series of demonstrations on orbit while gradually expanding the scale of structures. If we can carry out the demonstration as a space utilization mission such as communication/broadcasting and earth observation, we can improve the possibility of realization regarding the demonstration because its cost performance can be improved. Therefore, we study a radar to observe precipitation from the geostationary orbit as the immediate target of research and development on the construction of large space structures. In this study, we aim to construct a 30-m-class large planar antenna by launching one rocket. In order to propose the construction method with expandability to the SSPS about the 30-m-class large planar antenna, we carried out a ground experiment and verified the feasibility of a critical behavior in the construction method that we devised.