

## SPACE POWER SYMPOSIUM (C3)

## Poster Session (P)

Author: Mr. Zhibin Wang  
China, wzb.hit@163.com

DEMAND ANALYSIS OF SPACE STATION FLEXIBLE SOLAR ARRAY'S APPLICATIONS AND  
FEASIBILITY EVALUATION OF THEIR POWER GENERATION PROGRAM

**Abstract**

With the deepening of China's manned space missions, the project of constructing China's independent-research space station has been gradually put on the agenda. The space station is different from the traditional satellites, which is larger, more powerful, and has a longer life. These new characteristics require more power supply from the solar arrays. These new requirements are followed with a lot of technology difficulties, such as higher volts, higher specific power and higher stowed specific volume. Therefore, people need to make a choice among rigid solar array which has been widely used in most satellites, semi-rigidity solar array which has been successfully applied in the Tiangong-1 module and the flexible solar array which has been gradually adopted by foreign countries. Relatively, flexible solar array is a newly applied technology. The solar panel consists of films, which is easier to bend; because of this feature such type of solar array is named as flexible. The advantages of flexible solar array are obvious. The flexible solar array is designed to be automatically extendible and retractable. It has higher stowed specific volume and higher power output with lighter weight. Meanwhile, the flexible solar cell circuit is highly integrated thus researchers must find more solutions to satisfy the requirements of attaching, welding and other integrated technologies. Although the related technologies of flexible solar array are not well developed, because of its obvious advantages, flexible solar array technology has gradually become a mainstream trend of space station development and application. NASA has successfully applied the flexible solar array technology to space station power generation, which could supply 187.2kW energy with less than 0.5mm (0.02inch) thickness panel. Through comparing the structures of different solar arrays and analyzing the practical applications of International Space Station, the demand analysis of flexible solar array was made and the feasibility of its power generation program to space station was evaluated. Base on the theoretical analysis and technology research in tackle problems, a prototype of flexible solar array was developed as shown in fig.1. These works will make positive contribution to the selection of space station solar arrays in the future.