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

Author: Dr. Koichi Ijichi
Japan Space Systems, Japan

Mr. Hiroki Yanagawa
Japan Space Systems, Japan
Mr. Hidetoshi Kitabatake
Japan Space Systems, Japan
Mrs. Hitomi Inada
Japan Space Systems, Japan
Mr. Osamu Kashimura
Japan Space Systems, Japan
Prof. Koji Tanaka
Institute of Space and Astronautical Science (ISAS), Japan Aerospace Exploration Agency (JAXA), Japan
Dr. Ryo Ishikawa
The University of Electro-Communications, Japan, Japan
Dr. Kazuhiko Honjo
The University of Electro-Communications, Japan, Japan
Dr. Kosei Ishimura
Waseda University, Japan

INTRODUCTION OF THE UP-TO-DATE CURRENT DEVELOPMENT ACTIVITIES AND THE POWER BEAM CONTROL EXPERIMENT PROJECT FROM THE LEO FOR THE REALIZATION OF THE OPERATIONAL SSPS

Abstract

The project to establish the RF beam control technology to transmit power from the LEO satellite to the ground was started at the end of 2022 as the following, and also based on the development results of current Space Solar Power System (SSPS) project according to the development roadmap under Ministry of Economy, Trade and Industry, Japan.

Japan Space Systems and organized team have been engaged in the SSPS development for more than 30 years and have succeeded in the microwave power transmission test from the ground to the up in the air about 100 m height from in the year of 2019, which taking over the result of the successful horizontal power transmission experiment in the year of 2014.

Subsequently, in 2019, the power transmission system development project was started. The project consisted of the establishment of, so called, Power Generation and Transmission Panel whose size is about 50 cm square and 10 cm thick, and targeted less than 9 kg, to improve the total efficiency from DC input to output RF power to exceed 60 percent, and realize the long distant power transmission more than 1km. The project was progressed as planned and came to almost two third of planned project phase.

Now, the new power beaming experiment project from the LEO satellite to the ground called "On-orbit experiment of HIgh-precision beam control using small SAtellite for MicrowAve power transmission (OHISAMA)" was authorized and started in December 2022 based on the developed results of the current SSPS project on going since 2019.The power transmission satellite consist of power transmission panels and environment measuring equipment, and the ground system consisted of the receiving devices spread

around certain area to measure the beam control capability of the power transmission panels, and also large parabolic antenna to demonstrate the power transmission.

The up-to-date results of the current SSPS power transmission system development project and also the outline of the newly started RF power beaming experiment from the LEO satellite will be introduce and discussed.