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

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THE DEVELOPMENT RESULTS OF THE CURRENT SSPS PROJECT AND THE PROGRESS STATUS OF THE FOLLOW-ON OHISAMA PROJECT FOR THE REALIZATION OF THE OPERATIONAL SSPS

Abstract

Japan Space Systems and organized team consisted of JAXA ISAS, Universities and Industries under Ministry of Economy, Trade and Industry engaged in the Space Solar Power Systems (SSPS) development activities since early 1990th. In the year of 2006, the targeted system model of SSPS called USEF model and the road map toward the realization of the operational SSPS by the 2050 has been established and the actual phased development activities to realize SSPS has been started.

The current phase of the SSPS development started in the year 2019 consisted of following activities based on the precursor phases of development activities through several tenth of distance horizontal, and then vertical, microwave power transmission demonstration with full success.

1.The development of the Power Generation and the Transmission Panel (PGTP), 2.Improvement of the total efficiency of the power transmission by the improvement of the efficiency of power amplifiers. 3.The long distant power transmission demonstration experiment from the aircraft onboard phased

antenna to the ground arranged antenna and receiver.

These development phase activities are concluded in this year 2024.

And now, in parallel with the SSPS development mentioned above, the development project to demonstrate microwave power transmission from the LEO as named "On-orbit experiment of HIgh-precision beam control using small SAtellite for MicrowAve power transmission (OHISAMA)" was authorized and started in the year 2022, and now in the middle of actual manufacturing phase of the spacecraft and the power transmission panels to be launched in the year of 2025. The environment measurement sensors (Langmuir Probe, Plasma Wave Analyzer, Impedance Probe) and Release Probe are also installed for the measurement of the ionosphere environment.

In this project, the highly precise beam configurated and controlled phased array antenna is integrated on the small satellite and will be launched to the LEO, and radiate the 5.8GHz controlled microwave beam to the ground according to the pilot signal from the ground, and measure and evaluate the power density and distribution by the distributed ground measurement systems, and demonstrate and establish the highly precise beam configuration and direction technologies, and also for the demonstration of the power transmission from the space.

The results of the SSPS development activities and also the progress of the development status of the OHISAMA project will be introduced and discussed.