SPACE POWER SYMPOSIUM (C3)
Space-Based Solar Power Architectures – New Governmental and Commercial Concepts and Ventures (1)

Author: Prof. Susumu Sasaki
Japan Aerospace Exploration Agency (JAXA), ISAS, Japan

Dr. Tanaka Koji
ISAS/JAXA, Japan
Mr. JAXA Advanced Mission Research Group
Japan

TECHNOLOGY DEVELOPMENT STATUS FOR SPACE SOLAR POWER SYSTEMS

Abstract

Construction of the SSPS requires 4 major technologies; power generation, wireless power transmission, large space structure, and space transportation, each in an extremely large scale. All technologies except wireless power transmission have been already put into practical use in a certain scale. Wireless power transmission has been verified at the 10 kW level in laboratory and field experiments. This situation is completely different from the nuclear fusion, another revolutionary energy system, for which the principle technology "break-even" has not been verified yet. The major problem associated with the SSPS is to apply the technologies to the larger system at GW level in power, km level in size, and several ten thousands of tons in weight. Also it is requested to make its power price be competitive with that of existing power generation systems on the ground. This paper presents the current efforts and near-term achievements expected for each subject, based on the Japanese SSPS research activities. For the wireless power transmission, the high-precision beam control for microwave power transmission will be verified within 3 years in the JAXA/USEF microwave power transmission demonstration. The same subject for laser power transmission will be also verified in the same time frame. The construction method for the large space structure will be verified using a scale model automatic panel builder in two years. The investigation on the reusable launch vehicle and orbit transfer vehicle for SSPS construction is still in a very low level, but the development of technology scenario for the new transportation systems has just been started in the space transportation community.