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IAF SPACE POWER SYMPOSIUM (C3)
Space Power System for Ambitious Missions (4)

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ASSEMBLY OF SPACE BASED SOLAR POWER SATELLITE AND MAINTENANCE USING SPACE ROBOTICS

Abstract

With increasing global warming and natural calamities occurring unseasonal, it is evident that conventional, especially non-renewable resources have been excessively exploited. A hunt for alternative and renewable sources of energy is a must before they get exhausted. In order to tackle the alarming issue, a promising source of energy generation is Space Solar Power with the use of 38 percent efficient Gallium Arsenide panels. This paper highlights the assembly and infrastructure setup of Space Solar Power to generate energy and beam transmit it to the earth station. Modular Solar Panels shall be deployed in Horus or B-roll origami pattern with four sets of the solar array. These arrays will be coupled with a backend system that collects, modulates DC power to the Microwave power source utilizing Klystron, and finally received at the ground station by rectantenna array. Furthermore, a mega-structure like the Space Solar Power cannot be self-assembled; undoubtedly, it depends on spacewalk or space robotics-based assembly. The continuation of this concept also highlights the use of potential space robotics wherein robotic outstation consisting of maintenance bots instilled with RCS thrusters will help to assemble and deploy full infrastructure with repair and replacement capability, and Human Robotic Interface via Manual control using Teleoperation.

Keywords: Space solar power, Horus patter, B-roll pattern, Klystron, Rectantenna, RCS thrusters, Teleoperation