SPACE POWER SYMPOSIUM (C3)
Wireless Power Transmission Technologies, Experiments and Demonstrations (2)

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LASER WIRELESS POWER TRANSMISSION SYSTEM FOR THE SPACECRAFT: DESIGN AND TESTING OF THE PROTOTYPE

Abstract

Wireless power transmission is considered as promising technology for space application in medium and long term. During 4 years the technology has passed through successive stages from basic principles to prototype demonstration Two test of prototype were carried out for the technology readiness level demonstration. 100 and 1000 meters wireless power transmission experiment were performed. 100 W of optical power was transmitted to static and dynamic receivers with subsequent storage in the li-ion battery. The unmanned aerial vehicle and rover with fixed laser power converter were used as moving targets. The key components of the prototype are: 810 mn diode laser, off-axis beam forming system, GaAs high efficiency laser power converter and fine guidance system. Depending on guidance precision the efficiency of power transmission was in range from 5 to 12%. Technology readiness level was proved as TRL 6. The next step of technology demonstration is ISS based experiment. Design of stringent requirements equipment for power transmission from ISS to transport cargo vehicles is being performed. In this paper the laser wireless power experiment and evaluation of prototype characteristic are described.