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

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# THE FEASIBILITY OF APPLYING SPACE SOLAR POWER FOR FORWARD OPERATING BASES

**Abstract**

Space Solar Power (SSP) is an emerging technology that shows promise for providing electrical power on Earth via means of satellite collection and transmission. SSP technology is currently in an early developmental state, with full integration into civilian/global power systems still several years away. Military applications of emerging technology often prove feasibility and promote overall development. One application is providing satellite transmitted solar power to military Forward Operating Bases (FOBs) located in severe and/or remote locations. In these locations, electrical power can cost as much as 1,000 cents per kWh and gasoline can be as much as 400 dollars per gallon, not including the cost and risk to human life and transport resources [1]. Projected five years into the future, the development of SSP technology could lead to costs less than 100 cents per kWh. [2]. This cost level is not feasible for residential use where consumers pay on average 12 cents per kWh [1], but the potential fiscal savings in military applications are enormous and could save lives in the process. SSP also has an advantage over other power supply techniques such as batteries as it provides an inexhaustible amount of power. As great as these savings are, SSP in remote settings would not come without a challenge. The receiving stations for mobile platforms such as this would need to be small, thus relying on transmission of high power concentrations from the space platform. Additionally, the supporting hardware would also require transport, which requires further mobility resources. This study will analyze how existing infrastructures for SSP can be modified for higher power concentrations, and to what extent mobile receiving stations can be developed and reduced in size. Part of this analysis will include studying which of the two leading transmission concepts, microwave or laser, would be best suited for this application. In addition to researching the technological requirements, a risk and cost analysis will be performed to compare this application to current modes of power supply to FOBs.

[1] Data derived from IEA 2013 Key World Energy Statistics and "More Capable Warfighting Through Reduced Fuel Burden", Report of the Defense Science Board, p.19, May 2001.

[2] Dr. Paul Jaffe, Naval Research Laboratory