

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

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WIRELESS POWER TRANSMISSION: PROOF OF CONCEPT

**Abstract**

Practical wireless power transmission was proposed by Nicola Tesla in the Nineteenth Century and demonstrated by William Brown in the Twentieth Century. Several important demonstrations of wireless power transmission have taken place that prove the principle of wireless power transmission including: Brown's long duration (24 hour) tethered microwave powered helicopter flight and his laboratory demonstration of 54% end-to-end transmission efficiency; the NASA/Raytheon long range (one mile) high power transmission experiment that recovered more than 34 kW of power from the rectenna; Japanese sounding rocket experiments investigating microwave-ionosphere interactions and demonstrating transmission through the atmosphere from the rocket to earth; and more recently, the demonstration of laser wireless power transmission in powering a robotic climber over a distance of one kilometer.

Conceptual designs have been developed to utilize wireless power transmission (especially microwave wireless power transmission) on earth and in space, ranging from Peter Glaser's solar power satellite concept to import electric energy from space to providing power for satellites to rocket propulsion. However, little has been done to validate these concepts. This paper discusses what has been done and the steps still needed to validate different wireless power transmission concepts