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LESSONS ON WIRELESS POWER TRANSMISSION FROM A STUDENT SPACE ELEVATOR.

Abstract

Power distribution is a necessary challenge associated with any undertaking in space exploration. Wireless Power Transmission (WPT) is a technology with great potential for exploration and research, as it allows the transmission of power over line-of-sight distances without intermediate infrastructure. Once properly developed, this technology can play a key role in rover missions, satellite-satellite power transfer, and extraterrestrial base development.

As a part of the Elevator:2010 NASA Centennial Challenge, students with the University of Saskatchewan Space Design Team (USST) designed and built a working WPT system for their climber . Using their system, the USST successfully recovered 1 kW of usable electric power at a distance of 800 m from an 8 kW fibre laser source. Through design, operation, and development of their system, the USST learned key lessons on efficiency, safety, and system scalability. By sharing these lessons, we hope to advance the study and application of wireless power transmission, which will in turn benefit space exploration as a whole.