Lunar Autonomous Scalable Emitter and Receiver (LASER)

BIG Idea Challenge 2020

Colorado School of Mines and University of Arizona

LASER POWER BEAMING

Lasers can transmit power wirelessly to photovoltaic receivers in dark locations. We built a prototype system and demonstrated laser power beaming to a receiver thirty meters away (Figure 1).

LIGHTING PERMANENT SHADOW

The Moon's permanently shadowed regions hold water, the oil of space. Exploration here will require power in dark craters. Our proof of concept can scale to power rovers operating in such environments.

THE LASER SYSTEM

The laser transmitter autonomously locates and charges remote receivers ejected from the lander. (Figure 2).

FIGURE 1: Laser power beaming over 30 meters.

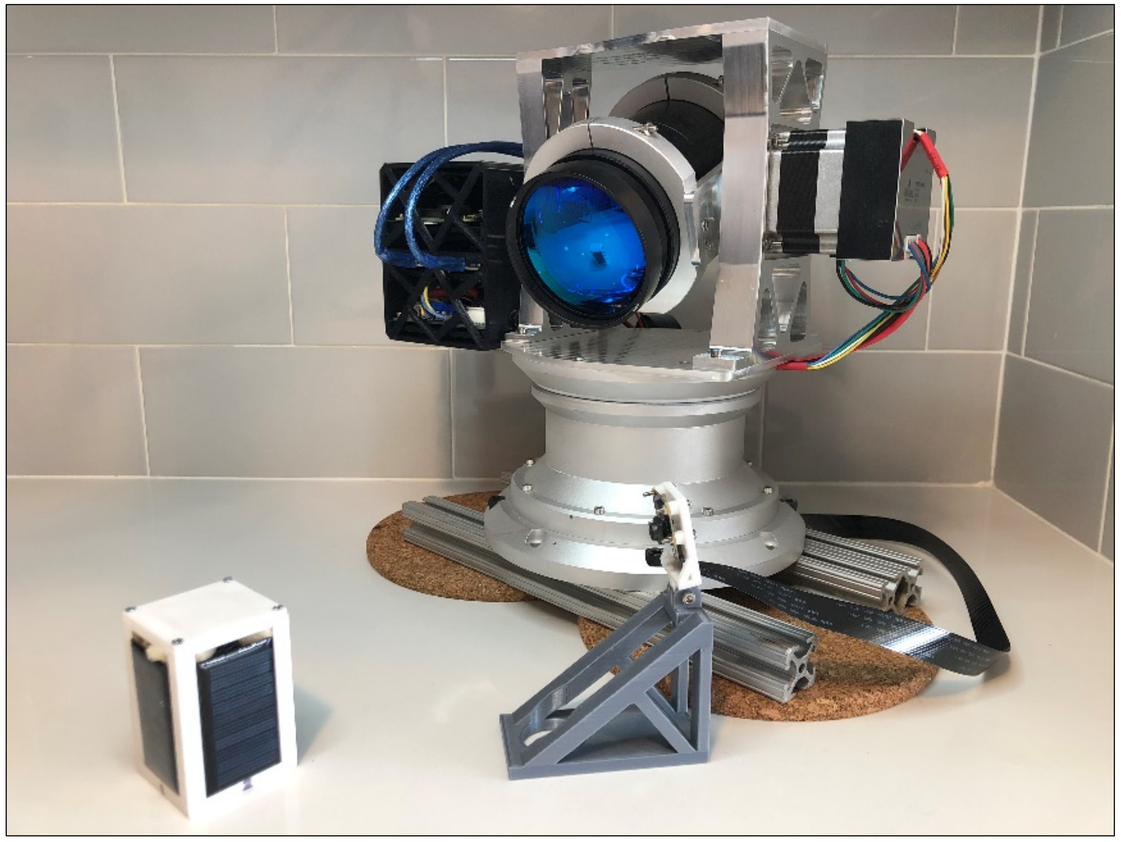

FIGURE 2: The LASER system: transmitter (a) and receiver (b). The transmitter draws 8 watts. The receiver masses 84 grams.

RESULTS

- Demonstrated laser power beaming
- Demonstrated autonomous localization and charging
- Tested receiver in simulated regolith environment
- Demonstrated operation in vacuum

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