

Abstract Submitted  
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**Laser Power Beaming Hazard Analysis for Unmanned Ground and Aerial Vehicles**<sup>1</sup> LOUIS RIZZO, New Jersey Institute of Technology, KATE DUNCAN, U.S. Military Academy, West Point, JAMES ZUNINO, U.S. Army ARDEC, Picatinny Arsenal, JOHN FEDERICI, New Jersey Institute of Technology — Laser power beaming (LPB) is the wireless transmission of electrical power with the use of a laser source and a receiving device in the form of photovoltaic arrays. There is a recent increase in the desire for systems utilizing LPB to power unmanned aerial and ground vehicles limited by short operational time due to battery life. The required lasers for this application present serious dangers to the operators of LPB systems. This can be a limiting factor for LBP, allowing its application to limited areas of laser hazard zones and requiring drone operators wear personal protection equipment. This paper discusses topics in hazard analysis for 125 watt infrared lasers with continuous wavelengths ranging from 800nm to greater than 1400nm under the guidelines of the American Standard for the Safe Use of Lasers. The intention is to find an optimum wavelength range and corresponding enlarged beam diameters that reduce laser hazards and meet the application requirements to power small drones while operational. The analysis concludes that an eye safe minimum expanded beam diameter of 43 cm occurs for a wavelength of 1297nm and a skin safe minimum beam diameter of 28 cm occurs for wavelengths between 1100-1400nm.

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