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A Systems Framework to Mitigate Small Arms Fire Vulnerability of Directed Energy Weapons Systems

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Abstract: Directed Energy (DE) weapon systems constitute a class of modern weapons that use focused energy to engage a target. These systems most commonly are laser weapons, but they may include microwaves or other forms of energy. The United States Department of Defense seeks to employ DE weapons to combat a variety of threats, from rockets and artillery to aerial drones. Defense contractors are working to identify the best means of incorporating DE systems into combat vehicles, and one of the foremost concerns is their vulnerability to enemy small arms fire. This research sought to develop a systems framework for employing mitigation measures to protect a DE system. The team used Parnell and Driscoll's Systems Decision Process (SDP) to analyze the problem and evaluate potential solutions. Problem definition resulted in a value model that considers potential solutions by such measures as weight of armor added and protection gained. Solution design generated an array of candidate solutions, and an analysis of alternatives demonstrates the potential trade-space. In the end, composite armor provides the most effective value vs. cost alternative.

Keywords: Directed Energy, Value Modeling, Small Arms Fire