



Abstract

Title: Extended Range Non-Lethal Impact Munitions

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Non-lethal Impact Munitions are valuable tools that provide favorable alternatives to the use of lethal force to control aggressive subjects or deter unwanted behavior. They are useful in crowd management situations, as well as in targeting specific aggressive individuals. The munitions allow the user to elicit compliance from the subject without coming into physical contact, which improves the safety of all involved. While all impact munitions have the potential for causing injury, careful control of the design, materials, and performance of the impact projectile minimizes the probability of serious injury.

Current operational scenarios require greater stand-off distances to deliver a non-lethal response while minimizing the risk to the user. Other requirements include delivery of a chemical irritant or marking payload to the target, to provide a multi-sensory stimulus. Achieving these objectives at extended ranges requires a balance between the effectiveness and the safety of the munitions. For maximum effectiveness, the pain inflicted by the projectile impact must be sufficient to elicit compliance or incapacitate, yet the delivered energy must be low enough to prevent serious injury. Equally important is the projectile accuracy, to allow precise shot placement over a wide range of engagement distances to maximize standoff from the target.

This paper describes the design challenges and trade-offs that must attempt to maximize the range, accuracy and impact energy of the projectile, while maintaining non-lethal impact performance over the operational range. Also addressed are the challenges of using available experimental tools to assess the non-lethality of extended range impact munitions.

Key Words: Impact Munitions, Extended Range, Non-lethal