Experimentation and Optimization for Improved Performance And Accuracy in the M203 SCORPION Projectile

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ABSTRACT:

The overall objective of the SCORPION project was to vastly improve the capabilities of the current M203 and M203A series grenade launcher. Specifically, the accuracy and control of fires from the weapon systems needed improvement due to large errors in muzzle velocity, causing dispersion at the target. The SCORPION round utilizes a 'puffer' and built-in logic system: the 'puffer' creates a change in pressure around the projectile effectively altering its flight path, and the logic system controls the puffer system as well as tracks the velocity and position of the round. Since the round 'knows' where it is and how fast it is going, it can determine, using built in algorithms, where it needs to be in order to effectively strike a given target.

The main focus of the testing I was involved in was to optimize the algorithms that govern the muzzle velocity error correction protocol. Using the Arrowtech program, PRODAS, I was to conduct projectile simulations and determine the ideal 'puffer' correction for given target distances and muzzle velocity errors. I tested and recalibrated a series of look-up tables that governed how long the 'puffer' would be activated in order to adjust for various errors. The optimization was successful in improving the projectile's accuracy up to a particular threshold in muzzle velocity error.

With the information gathered in this optimization, the SCORPION team will be able to integrate the new information into the actual projectile algorithms and test fire the round. This is only the first step in many towards making a semi-smart projectile capable of being fired from small arms weapon systems. Later applications for the SCORPION will be guiding the round towards a moving target and striking targets obscured by various obstacles.

KEYWORDS: SCORPION, puffer, PRODAS, muzzle velocity error

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