Overview of MUVES 3 and the MUVES 3 V/L Service

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The Vulnerability/Lethality (V/L) analysis community is facing multiple issues. First, it is imperative that our analyses properly evaluate modern military systems, in particular systems that rely on active protection systems or collaborative survivability. Second, computer hardware is advancing rapidly, with multi-core computers now the norm. It is necessary that our V/L simulations use modern hardware effectively. Thirdly, it is crucial that our analytic results be meaningful to the war-fighters and decision-makers by showing how V/L outcomes affect mission effectiveness. To address these issues the U.S. Army Research Laboratory (ARL) Survivability/Lethality Analysis Directorate (SLAD) is developing MUVES 3.

MUVES 3 is an all-new V/L analysis environment that will replace MUVES-S2, ARL’s current V/L model. MUVES 3 has many features to assist analyzing modern systems including the ability to analyze multiple vehicles and dismounted infantry in a scene. It also includes a time-aware damage evaluation system that calculates performance metrics as a function of time and damage. MUVES 3 uses a network-distributed, parallel-processing simulation engine that is able to make use of multiple processors across multiple computers.

To better support decision-makers by putting V/L results in context, MUVES 3 includes the Vulnerability/Lethality Service (VLS). VLS is a feature of MUVES 3 that provides external clients, such as force-on-force simulations, with interactive access to MUVES 3 V/L simulation capabilities. Using VLS, a client can define multiple platforms, position them in a scene, and introduce threats into the scene. VLS will calculate the damage, accumulate damage from multiple attacks, and return capability as a function of time for each platform in the scene. VLS provides on-demand, high-resolution V/L metrics for client-specified engagements, thus eliminating the need for static V/L tables and increasing the fidelity of the client models. VLS has been successfully integrated with SLAD’s System-of-System Survivability Simulation (S4) agent-based, force-on-force model.

This paper presents the capabilities and architecture of MUVES 3 and the MUVES 3 VLS. It will discuss how to integrate MUVES 3 into higher-level models and how to incorporate lower-level models, such as penetration and damage models, into MUVES 3.