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Uncertainty Quantification in Vulnerability Modeling

S&T Campaign: Assessment & Analysis
Statistical Methods in Ballistic Modeling and Simulation

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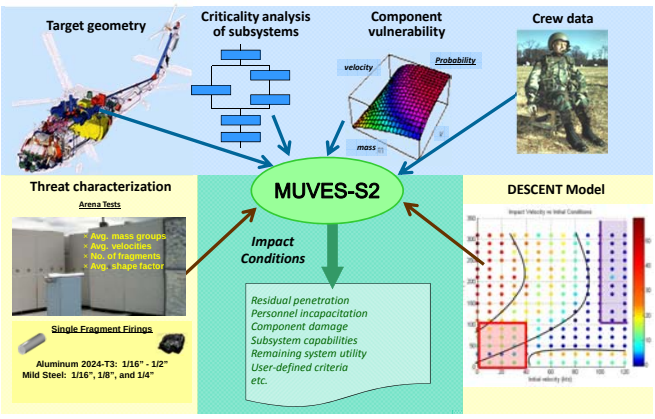
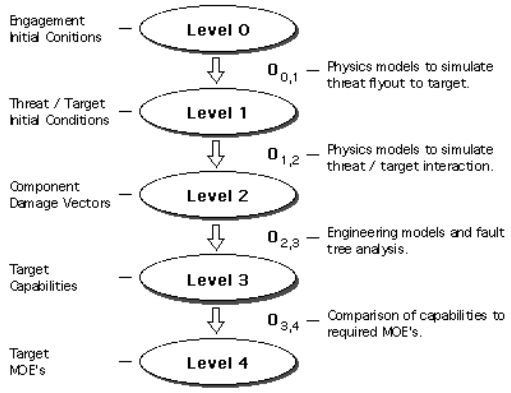
Research Objective

- Identify sources of uncertainty in the MUVES-S2 ballistic survivability/lethality/vulnerability model.
- Design experiments to assess the effect of uncertainty on model output.
- Recommend resource allocation to minimize the impact of uncertainty on model accuracy.



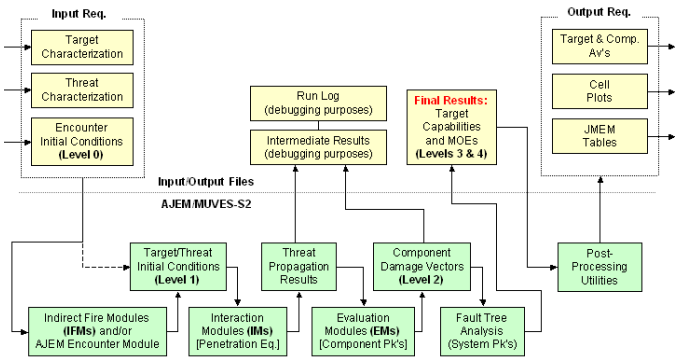
MUVES-S2 Model



SLV Taxonomy

Challenges

- Inputs include numerous scalars and functions.
- Output may be multidimensional.
- Continuous variation in inputs can produce discontinuous response variation.
- Uncertainty quantification must be generalized to wide classes of threats and targets.



MUVES-S2 Flowchart

ARL Facilities and Capabilities Available to Support Collaborative Research

- Vulnerability analysts and statisticians
- Previous sensitivity studies
- Models continuously updated with experimental data
- Distributed-processing environment

Complementary Expertise/ Facilities/ Capabilities Sought in Collaboration

- Large-scale simulation
- BRL-CAD modeling
- Expertise in mathematical and statistical methods

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