



## S&T Campaign: Analysis & Assessment

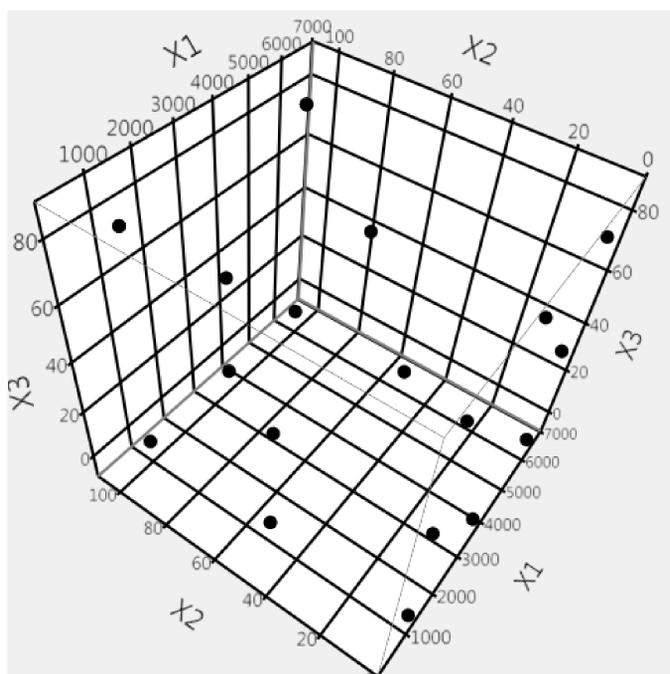
### Design of Experiments for Ballistic Testing, Modeling, and Simulation

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## Research Objectives

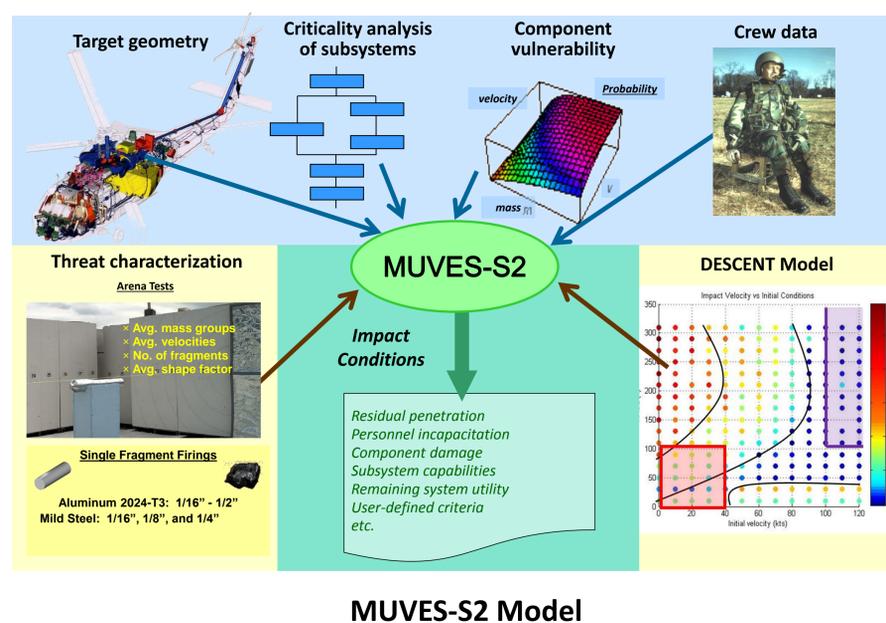
- Construct a process to develop and validate probability of component dysfunction given a hit and probability of kill given a hit.
- Determine the most influential factors/parameters in personnel vulnerability as conducted by the ORCA model.
- Design experiments to assess the effect of uncertainty on MUVES-S2 model output.



Custom Test Design Generated in JMP

## Challenges

- Limited sample sizes in live fire and component level test data.
- Large parameter space includes threat type, mass, velocity, and orientation; unique target configurations with multiple materials and material thicknesses; and shot line hit point, azimuth, and elevation.



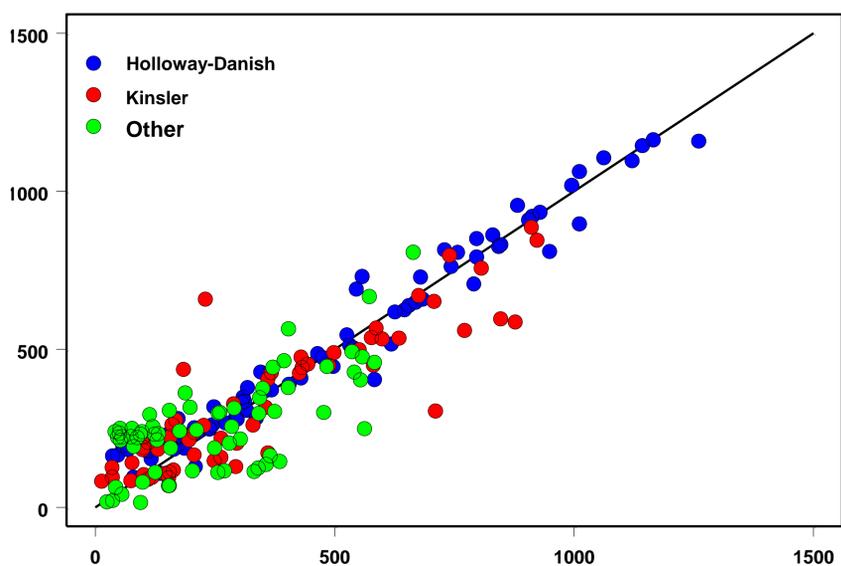
MUVES-S2 Model

## ARL Facilities and Capabilities Available to Support Collaborative Research

- Statisticians and vulnerability analysts
- Statistical software tools JMP, R, SPSS, and Mathematica
- 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



Predicted vs. Observed Residual Velocity