Weapon-Projectile Mechanics During Gun Launch

S&T Campaign: Sciences for Lethality and Protection
Kinetic Lethality
Propulsion and Launch

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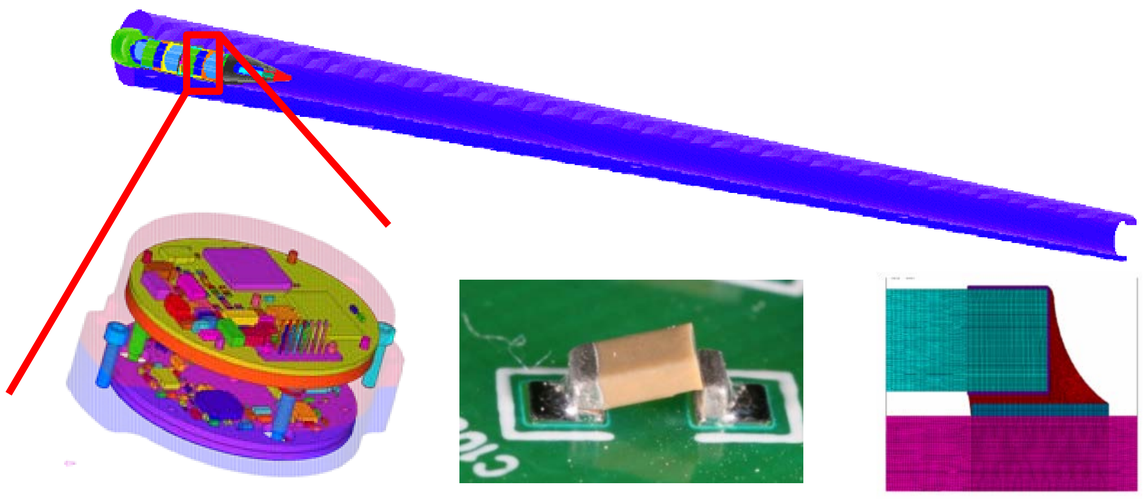
Research Objective

Apply experimental and numerical methods to further the understanding of complex weapon-projectile interactions, their dynamics, and their effect on projectile system during gun launch in order to directly link the interior and exterior ballistics sciences.



Structural Modeling to Predict Structural Integrity of Electronic Components Subjected to High-G Gun Launch

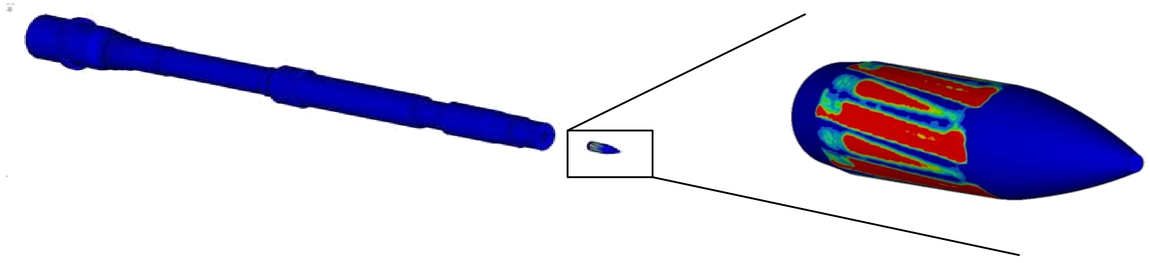
Challenges

- **Multiscale/Multidiscipline Modeling**
- **Tightly Coupled Multiphysics Modeling**
- **Constitutive Models for Extreme Environments**
- **Material Failure Models**

Multiscale and Multidiscipline Approaches to Lethality

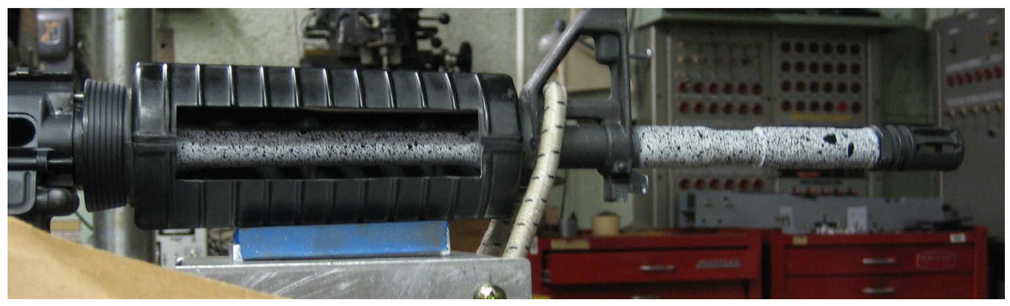
ARL Facilities and Capabilities Available to Support Collaborative Research

- **Computational: ARL DoD Supercomputing Resource Center (DSRC)**



Structural Simulation of High-G Gun Launch of Small Caliber Ammunition

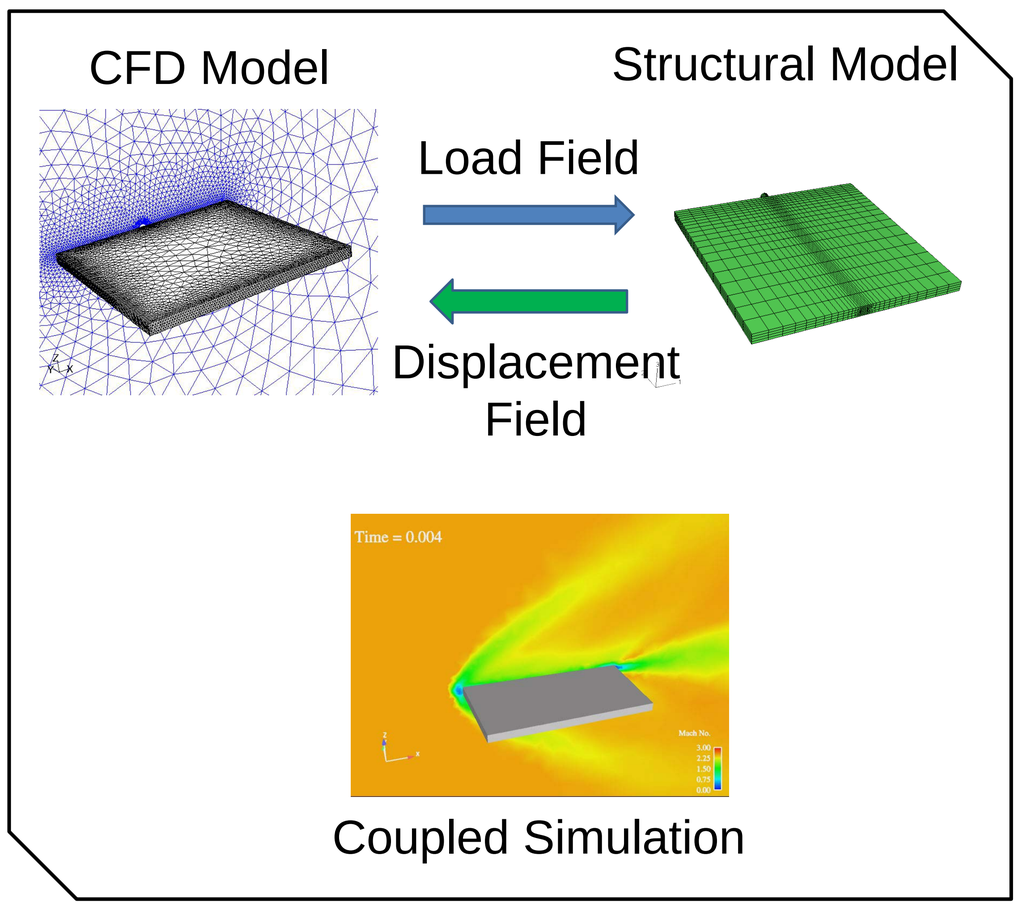
- **Experimental**
  - **Small Caliber Indoor Facility**
  - **High G Simulation via Air Guns**



Experimental Setup for Small Caliber Weapon-Projectile Interaction Measurement using Digital Image Correlation

Complementary Expertise / Facilities / Capabilities Sought in Collaboration

- **Numerical approaches to coupled multiphysics modeling**
- **Novel methods for multiscale modeling**
- **Advanced material models for extreme environments**



Coupled Simulation

Tightly Coupled Multiphysics Modeling