



---

**NDIA**  
**MDA SBIR Industry Day**  
*26 June 07*

**Modeling & Simulation**

**Mr. Greg Cord**

**MDA Advanced Technology, Sensors Dir. (DVS)**



# Agenda

---



- Research Area Objectives
- List of Topics
- Topic Overview
- Questions



# Research Area Scope and Objectives



## *Modeling & Simulation Research Area*

- **Objective:** Develop or improve MDA's ability to predict the State or Change in State of Objects & Phenomena within the Missile Defense Battlespace
- **Scope:** Focuses on the Development of Phenomenological & Physics-Based Representations & Software Simulations of Objects, their Behaviors and Phenomena that are judged to be relevant to Missile Defense Engagement. Includes ability to Generate Signatures, determine intercept lethality and follow on consequences and also the Effects of the Battlespace Environment.
- **Relevance:** Software to generate trustworthy Metric & Radiometric predictions of engagements within the Missile Defense Battlespace. The output of such M&S is used for such purposes as Test Planning, Algorithm Development, Sensor Evaluation, Analysis, Consequence Mitigation and support to Hardware-in-the-Loop, Human-in-the-Loop and highly-aggregated System-Level Simulations



# List of Topics Being Published

---



- **Aerodynamic Drag and Lift Characteristics for Irregularly-Shaped Intercept Fragments**
- **Hypervelocity Intercept Modeling with High-Fidelity, First-Principal, Physics-Based Tools**
- **Improvements to the BMDS Hit-to-Kill Lethality Predictive Toolset**
- **Develop Consistent First-Principal Earthshine and Skyshine UV, VIS, and IR computer models**
- **High Fidelity Missile Hardbody Plume Interactions Modeling**
- **Maneuvering Target Phenomenology**



# Phenomenology Topics



- Phenomenology Topics
  - MDA07-017: Develop Consistent First-Principles Earthshine and Skyshine Ultraviolet, Visible, and Infrared Computer Models
    - Develop earthshine/skyshine models in the UV/visible/IR bands that are consistent and compatible with existing comprehensive radiation transport codes such as the Air Force SAMM2 model.
    - Topic POC: Jim Brown
  - MDA07-018: High Fidelity Missile Hardbody Plume Interaction Modeling
    - Examine innovative techniques to accurately predict both the missile hardbody and plume flowfields simultaneously using a common flowfield solver from launch to impact.
    - Topic POC: Tom Smith/Carol Barclay
  - MDA07-021: Maneuvering Target Phenomenology
    - Develop accurate time-dependent capability to predict signatures from propulsion-generated maneuvers.
    - Topic POC: Tom Smith
- BMDS Relevance
  - Risk Reduction for current and future algorithm and sensor development
  - Improved modeling of boost vehicle performance characteristics
  - Improved plume/hardbody interaction and aerothermal heating characteristics
  - Improved modeling of reflective, absorptive, and emissive processes that contribute to the irradiance field of a sensor



# Lethality Topics



- Lethality Topics
  - MDA07-016: Aerodynamic Drag and Lift Characteristics for Irregularly-Shaped Fragments
    - Develop techniques to measure and/or predict aerodynamic drag and lift characteristics
    - Topic POC: Garry Freeman
  - MDA07-019: Hypervelocity Intercept Modeling with High-Fidelity, First Principal, Physics-Based Tools
    - Determine damage and debris from hypervelocity intercepts
    - Tools will be used to generate data sets
    - Supports the development and validation of fast-running algorithms
    - Topic POC: Garry Freeman
  - MDA 07-20: Improvements to the BMDS Hit-to-Kill Lethality Predictive Toolset
    - Fragment loading modeling
    - High explosive modeling including non-shock to detonation transitions
    - Topic POC: Dimitrios Lianos



# Questions



- Questions after today need to be submitted through the SBIR/STTR Interactive Topic Information System (SITIS)  
<http://www.dodsbir.net/sitis/>
- For reasons of competitive fairness, direct communication between proposers and topic authors is not allowed starting September 13, when DoD begins accepting proposals for this solicitation.
- However, proposers may still submit written questions about solicitation topics in which the questioner and respondent remain anonymous and all questions and answers are posted electronically for general viewing until the solicitation closes.
- All proposers are advised to monitor SITIS (07.3 Q&A) during the solicitation period for questions and answers, and other significant information, relevant to the SBIR 07.3 topic under which they are proposing.