



Fuze Science and Technology Overview

63rd Annual NDIA Fuze Conference
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George Jolly

Ordnance Division, AFRL Munitions Directorate

A World-Wide Enterprise of Researchers





AFRL/RW **The Munitions** **Directorate**

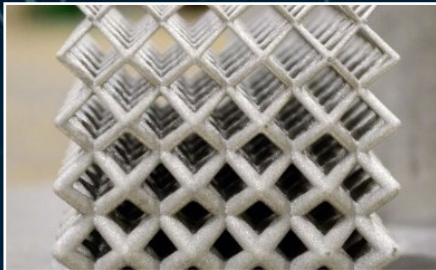
AFRL/RW Mission

Lead the discovery, development, integration, and transition of **affordable** weapons technology, enabling the warfighter to **win across all domains**

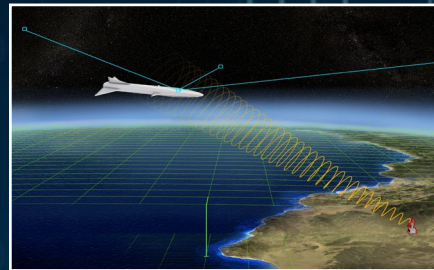
**Better Buying Power 3.0:
Achieving Dominant Capabilities through
Technical Excellence and Innovation**

Our Responsibility to the Warfighter

Develop Superior Weapons Technologies That Are Effective & Affordable



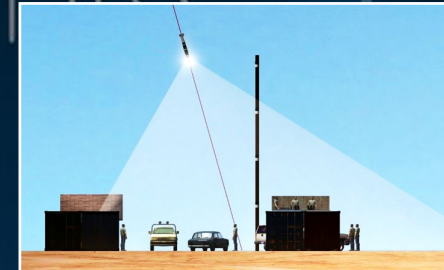
3D Printed Structural Reactive Materials



Alternative Navigation

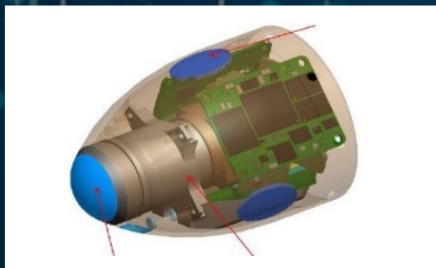


Autonomy / Networked

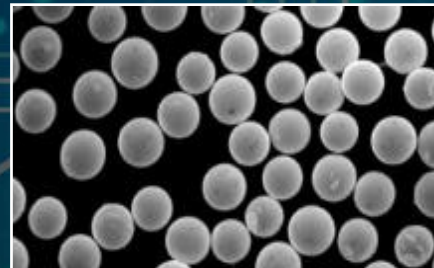


Selectable / Dialable Effects

Modeling & Simulation



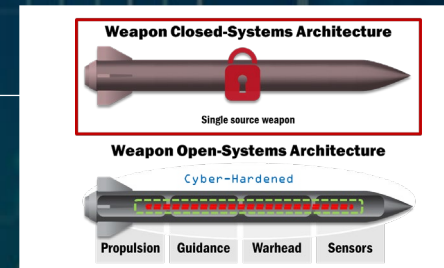
Advanced Seeker Technologies



Advanced Energetics



Stronger, Cost-Effective Metals



System Modularity

Maturing Tech to Give Our Warfighters an Asymmetric Advantage



OSD(AT&L)

Office of Land Warfare & Munitions

- Joint Munitions Program
- Joint Fuze Tech Program
- Joint Insensitive Munitions Tech Program
- Leveraging Dept. of Energy – NNSA
- Common services challenges

International

- The Technical Cooperation Program
- Program Agreements (PA's)
- International Cooperative Research and Development (ICR&D)
- Coalition Warfare Program (CWP)
- AFOSR Int'l Offices of Aerospace R&D

Industry

- Open and Special BAA
- DEFENSEWERX (Doolittle)
- SBIR/STTR/STMP
- NAC – National Armaments Consortium
- IRAD - Industry Research and Development
- CRADA – Cooperative Research And Development Agreement



Other Gov't Entities

- DARPA
- DoD Labs
- Other
- Communities of Interest (COI)
- Joint Capability Tech Demonstration
- Quick Reaction Support
- Emerging Capability & Prototyping
- POM & Seedling Initiatives
- Joint Service MOA's

Academia

- AFOSR
- UARC- University Affiliated Research Center
- Centers Of Excellence
- Mathematics Modeling and Optimization Inst.
- Summer Faculty Fellowship Program
- SMART – Science, Mathematics & Research for Transformation
- AFRL Science and Technology Fellowship
- AFRL Scholars Program
- STEMM Academy

RWM Integrated Ordnance Integrating Concepts Fuzees



RWM Technology Area Priorities

- **Hypersonics**
- **Selectable Effects**
- **Hard Target Defeat**
- **Air-to-Air**
- **Distributed, Collaborative, Cumulative Effects**

Fuze S&T Decomposition - Hypersonics

- **Initiation**
 - Reliable initiation of new formulations
 - High temperature detonator and booster HE
- **Multipoint (Forward Modules)**
 - OSD funded CPS program. SNL collaboration
 - Heavily leverages AFRL Distributed Embedded Fuze Sys (DEFS) Research
 - Focus is a single module that allows for both above and post perforation detonation.
 - Optimized location for survivability, lethality (asymmetric warhead shape), and reliability.
- **Sensors**
 - Proximity Sensor with High Temperature antenna
 - S&A Sensor
- **High Temperature Electronics**

Fuze S&T Decomposition – Selectable Effects

- **Success and lessons learned in Dialable Effect Munition**
- **Initiation**
 - Reliable initiation of new formulations such as graded HE or Hybrid Loads
 - Dual Mode energetics
- **Multipoint (Forward Modules)**
 - DEFS
 - Selectable forward modules that perform different functions
 - Smart layer counting
- **Sensors**
 - Precision Height of Burst
 - Active Imaging
 - S&A Sensor (Replace current wind turbine generator technology)

Fuze S&T Decomposition – Hard Target Defeat

- **Initiation**
 - Reliable initiation of advanced formulations (Cast-cure and Pressed)
 - Initiation to detonation in cellular/lattice structured warhead
 - Effective initiation of combined DE/KE mechanisms
- **Multipoint (Forward Modules)**
 - Heavily leverages AFRL DEFS Research
 - Wireless technology to accommodate internal structures and increase reliability
 - Layer/Void detection
- **Sensors**
 - S&A Sensor (same as Selectable Effects)
 - Terra sensing (non-inertial or tuned warhead)
 - Health Monitor Salvage



Fuze S&T Decomposition – Air-to-Air

- Initiation
 - Multipoint initiation for effects
- Electronic Safe and Arm/Flight Termination and Directional Fire
- Sensors
 - Active Imaging
 - Conformal seeker/fuze antenna

Fuze S&T Decomposition – Distributed, Collaborative, Cumulative Effects

- **Initiation**
 - Miniaturized Firesets
 - Focused Effects
- **RF Communication for Weapon Collaboration and Synchronization**
 - Data Link Radar Suite
 - Guidance Integrated Fuzing

Questions?