



# U.S. ARMY COMBAT CAPABILITIES DEVELOPMENT COMMAND – ARMAMENTS CENTER

ARMY Fuze S&T Overview at the 63<sup>rd</sup> NDIA Fuze Conference

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## AGENDA



**Organization**

**Facilities**

**Fuze S&T Overview**

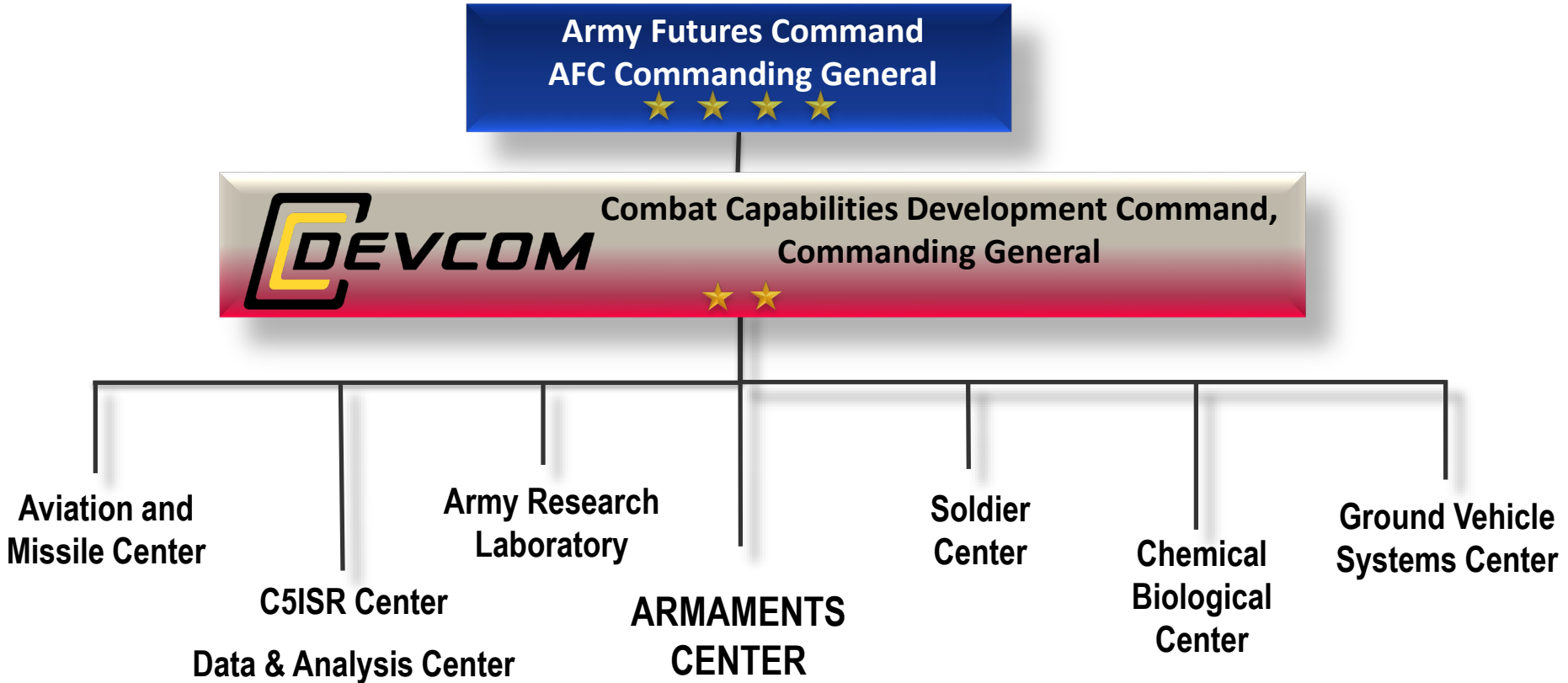
- **Current Investment Areas**
- Ongoing Projects**
- Thrust Areas**

**Collaboration Opportunities**

**63<sup>rd</sup> Annual Fuze Conference Presentations**

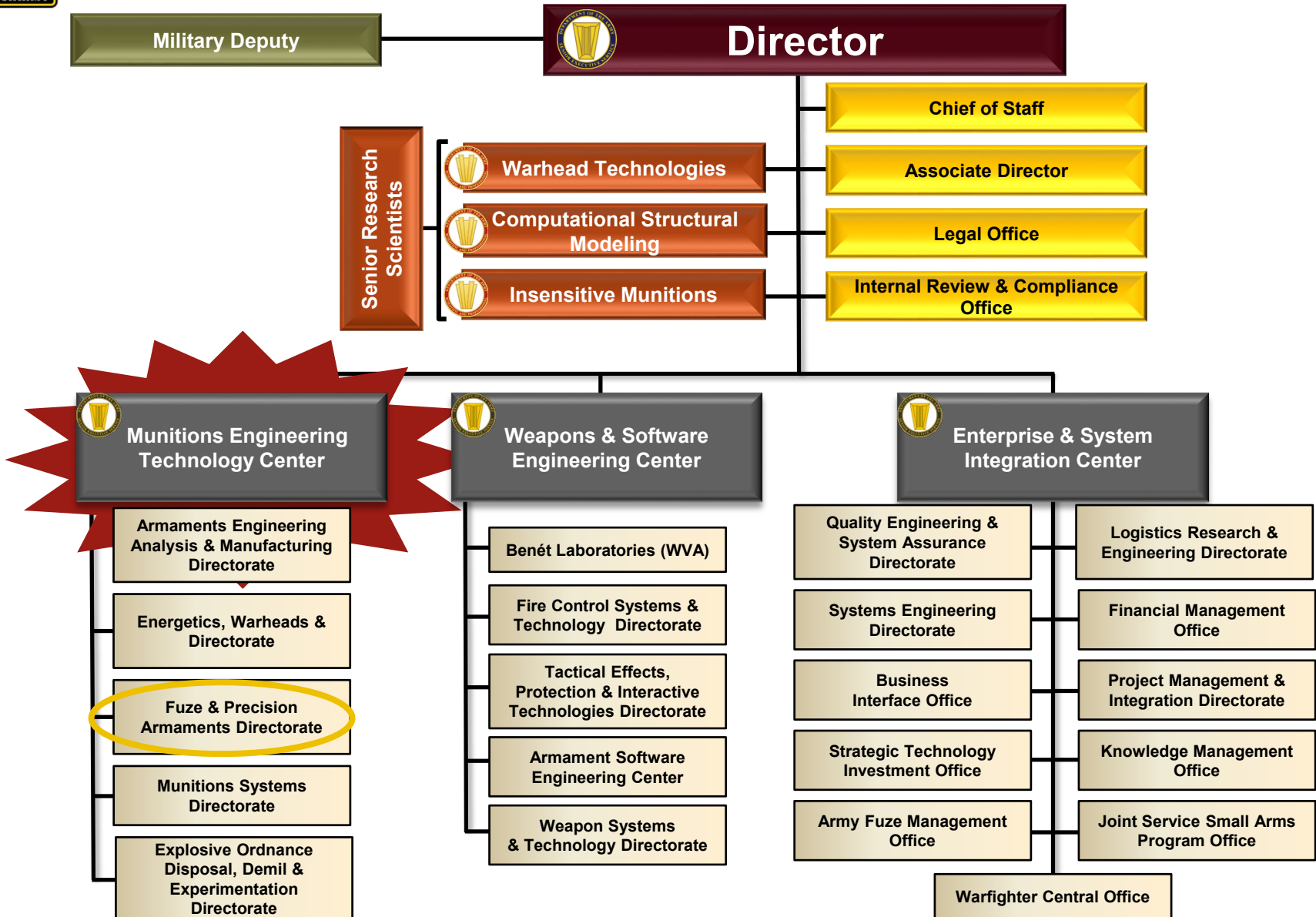


# ARMY FUTURES COMMAND ORGANIZATION



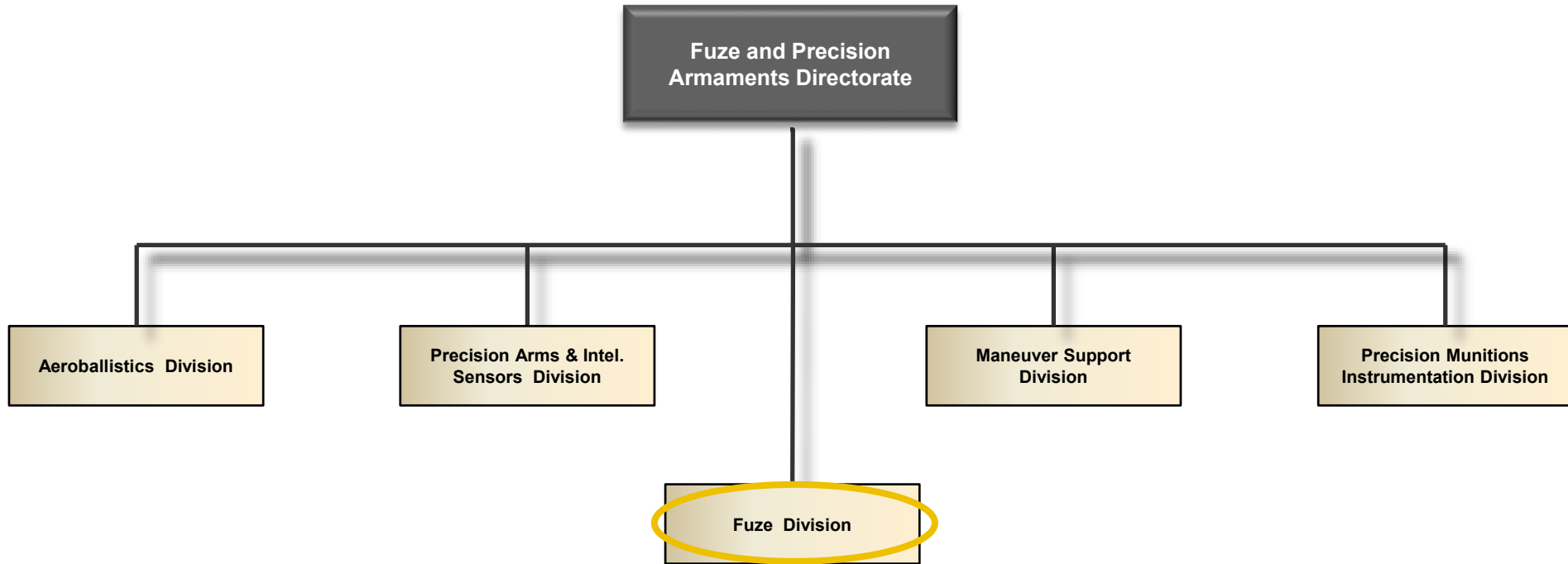


# ARMAMENTS CENTER ORGANIZATION



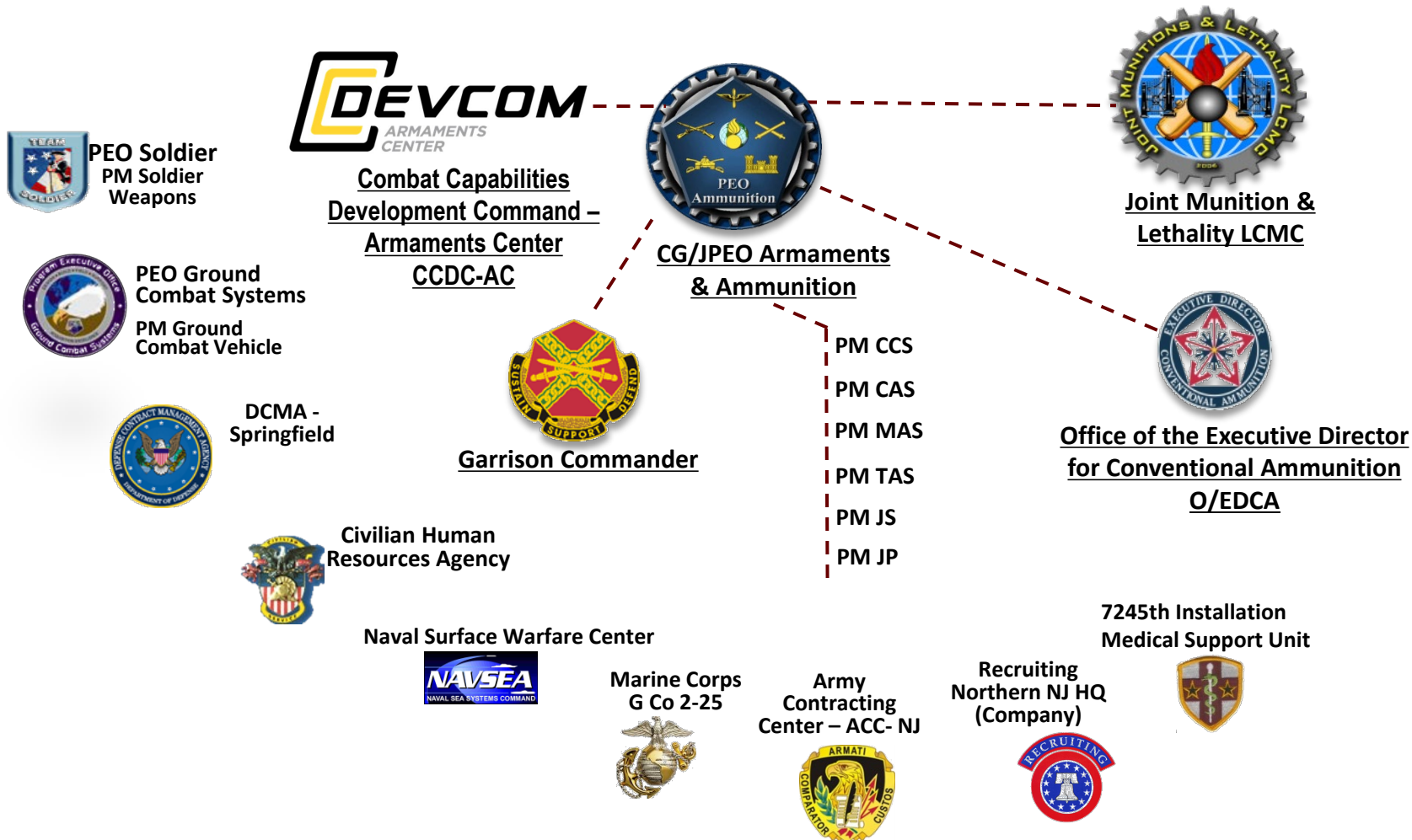


# FUZE AND PRECISION ARMAMENTS DIRECTORATE





# PICATINNY'S OTHER TENANTS



**DoD Joint Specialty Site for Guns and Ammunition**



# ARMAMENTS CENTER CAPABILITIES



RESEARCH



DEVELOPMENT



PRODUCTION



FIELD SUPPORT



DEMILITARIZATION

## *Advanced Weapons:*

- Line-of-sight (LOS), beyond line-of-sight (BLOS) and non line-of-sight (NLOS) fire
- Scalable effects; non-lethal; directed energy; autonomous weapons.

## *Ammunition:*

- Small, medium, large caliber
- Propellants; explosives; pyrotechnics; warheads; insensitive munitions
- Fuzes
- Logistics; packaging; environmental technologies and explosive ordnance disposal

## *Fire Control:*

- Battlefield digitization; embedded system software; aero ballistics and telemetry

***“Center of Lethality” for Armament Systems and Munitions for Joint Services***



# ARMAMENTS CENTER FUZE DIVISION COMMODITY AREAS



**Fuze Setters**



**Mortar Fuzes**



**Medium Caliber Fuzes**



**Rockets & Missiles**



**Artillery Fuzes**



**Hand Grenades**



**Power Sources**



**Tank Ammo**



**Safe and Arm Devices**





# ARMAMENTS CENTER FACILITIES



Armament Software Engineering Center



Ballistic Gun Range Complex



Energetics Synthesis, Formulation and Scale-up Complex



High Performance Propellants Complex



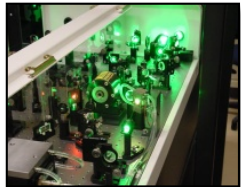
Davidson Warhead Facility



Automated Test Sets Facility



Directed Energy Facility



Fuze Development Center



Electromagnetic Effects Complex



Soft Catch Gun Facility



**Our Organic Facilities Enable Integrated Armament System Solutions**

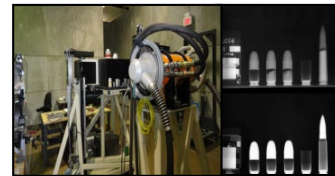
Demilitarization Facility



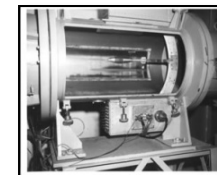
Drop Tower Facility



Non-Destructive Evaluation Facility



Wind Tunnel Facility



Precision Armaments Complex



DoD Joint Packaging, Handling, Storage, and Transportation Complex





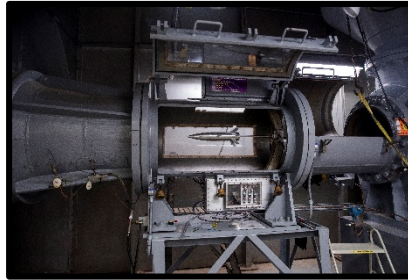
# FUZE AND PRECISION ARMAMENTS FACILITIES



Precision Armaments Lab



Encapsulation Lab



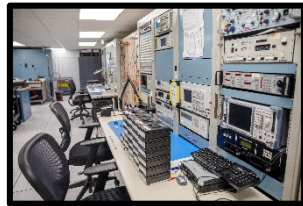
Wind Tunnel Facility



Environmental Lab



Hardware In the Loop Lab

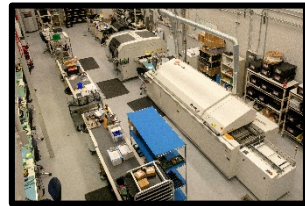


Telemetry Ground Station & Electronics Lab

*Our Organic Facilities Enable Integrated Armament System Solutions*



Electronics, Electro-Mechanical & Prototype Facility



Fuze Development Center



Integration Lab



RF Anechoic Chamber



Electromagnetic Sensor Test Facility



Electromagnetic Environmental Effects Lab



Soft Catch Gun Facility



Battery Test Lab



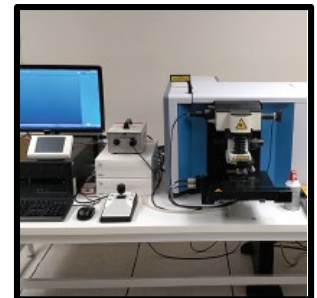
Sensor Calibration Lab



Fuze Division Lab



Soldering Inspection Facility



Raman Spectroscopy Lab



# FUZE S&T INVESTMENT AREAS



## Advanced Fuze Setting

- PIAFS, ePIAFS, iPIK
- Medium caliber setters



PIAFS



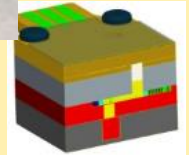
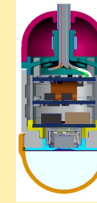
EPIAFS



iPIK

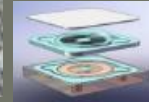
## Advanced Warhead Initiation Schemes

- Many point ESAD, networked initiation
- Micro-Scale Firetrain (MSF)
- Embedded Fuzing



## Launch and Target Sensing

- Next-Gen Prox, tracking prox, dynamic triggering, optical prox, active imaging
- G-Switch, Target Media Sensing



Fuze Decision Logic

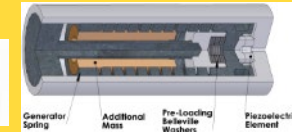
## Novel Power & Energy

- Thermals, liquid reserve, harvesters

Thermals



Liquid Reserves



Generator/Spring Additional Mass Pre-loading Belleville Washers Piezoelectric Element

## Advanced Safe and Arming

- MEMS S&A, Low Cost ESAD



Rotor S&A



# CURRENT FUZE PROJECTS



## Emerging & Maturing Technologies

### 6.2 OSD Joint Fuze Technology Program (JFTP)

MEMS Stab Detonator  
 EPIC-ABAQUS Subroutines  
 Alt. Prox Fuze Technologies for CUAS  
 Low Cost Tracking Proximity Sensor  
 Fracture & Damage Mechanisms of LIGA MEMS  
 TPV Power Generation for HVP

### 6.3 OSD Joint Fuze Technology Program

Target Scene Generator  
 Determination Optimal Potting Hi-G Electronics & Fuzes  
 High Reliability Micro-Scale Firetrain  
 High-Voltage Power Generation for ESAD  
 COTS Accelerometer As Impact Sensor  
 Glass Ampoule Analysis Capability Transition

### CCDC-AC S&T Projects & Demonstrations

Fuze & Power Tech Enablers: Tracking Proximity Sensors,  
 Advanced Initiation, Wireless Setting, Novel Power  
 Cluster Munitions Replacement Technology  
 XM1155 Development  
 XM1182, XM1204, and XM1206 Hardware Development  
 XM1068 Development  
 MOFA2/iMOFM Development

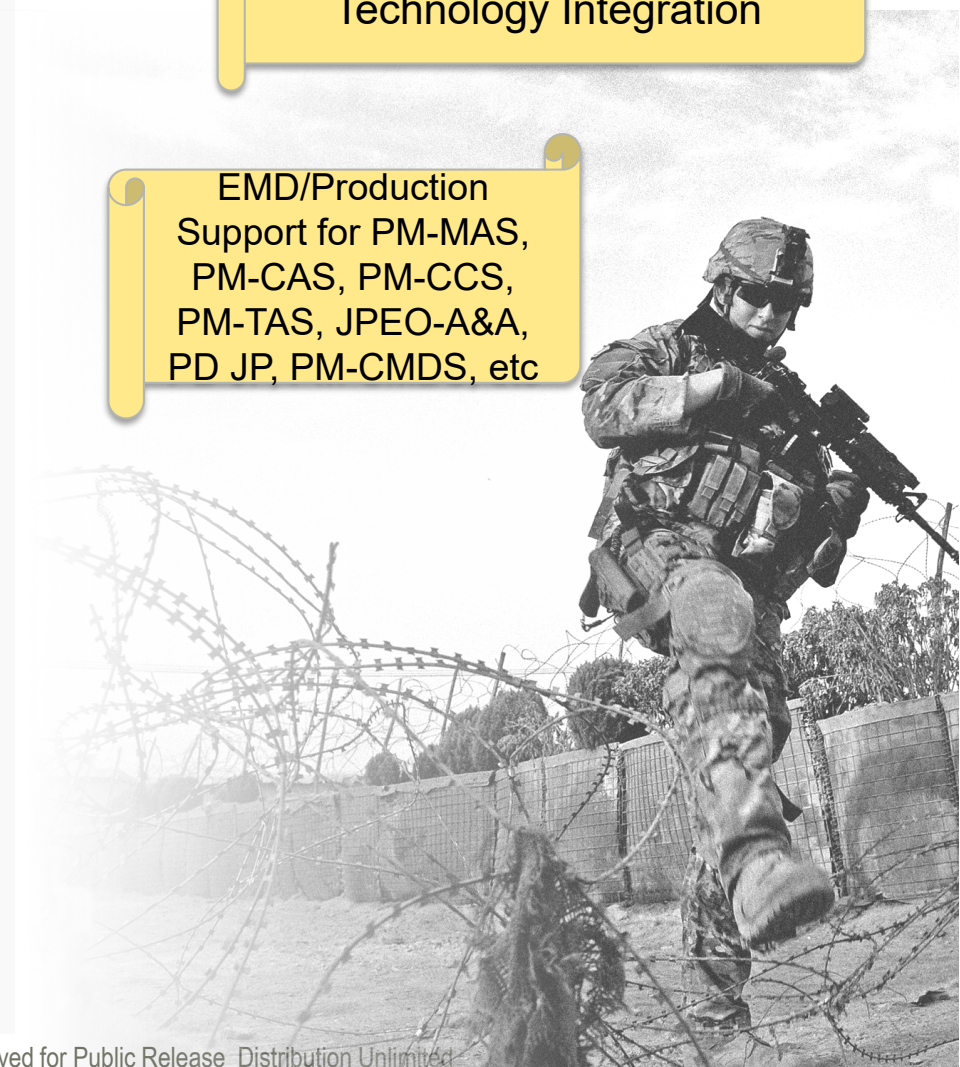
### 6.7 Fuze Technology Integration Efforts (FTI)

M734A1 MEMs Switch Producibility  
 Replace Obsolete Prox Electronics Components (MMIC  
 replacement)  
 M550 Spinlock Replacement  
 ESAD Enhancements for Indirect Fire  
 Hand Grenade Fuze Improvements  
 Improved Delay Assembly for M739A1

Gold, 17-G-  
 Green, 18-G-  
 Blue, 19-G-  
 Red, 20-G-

On-going 6.7 RDTE Fuze  
 Technology Integration

EMD/Production  
 Support for PM-MAS,  
 PM-CAS, PM-CCS,  
 PM-TAS, JPEO-A&A,  
 PD JP, PM-CMDS, etc





## FUZE S&T CURRENT THRUST AREAS



- Novel Power for Long Range Applications
- MEMs Sensing and MEMs S&A
- Advanced Initiation Schemes – Many Point ESAD
- Fuze Proximity - Low Cost Tracking Proximity Sensors, Dynamic Triggering, Optical Proximity and Active Imaging
- Secure Wireless Data Transmission for In-Flight Fuze Setting
- Networked Fuzing Architectures
- Moving toward Embedded Fuzing – Fuze on a Chip (ESAD, Prox, Setting)



## COLLABORATION OPPORTUNITIES



- **Industry to CCDC-AC engagements**
  - Formal IR&D Reviews with CCDC-AC
  - Informal IR&D Reviews with Fuze Division
  - Cooperative Research and Development Agreements (CRADAs)
  - DoD Fuze IPT Opportunities
- **DOTC**
  - Industry-suggested topics
  - Annual plan feedback
  - Enhanced-whitepaper feedback
  - General Membership Meeting one-on-ones
- **Joint Fuze Technology Program**
- **DOD Fuze IPT**



# ARMAMENTS CENTER BRIEFINGS AT 63<sup>RD</sup> NDIA FUZE CONFERENCE



Presenter/Author	Titles	Time
Kevin O'Connor	DEVELOPMENT IN METAL MEMS LATCHING SETBACK SENSING MECHANISM	Tues 1:55PM
Maxim Keyler	NEXT-GENERATION LARGE CALIBER SETTER	Wed 1:40PM



Thanks for your time and Attention