



# Joint Fuze Technology Program (JFTP) 56<sup>th</sup> Annual NDIA Fuze Conference Baltimore, MD

15 May 2012

## **Joint Fuze Technology Panel**

Lawrence Fan (Navy) - Presenter

Charles Kelly (OUSD AT&L PSA LW&M)

Timothy Tobik (Air Force)

Philip Gorman (Army)



# Outline

- **JFTP Overview**
- **Budget**
- **Technology Focus Areas**
- **Process and schedule**
- **Summary**



# Joint Fuze Technology Program Overview

- JFTP is a 6.2/6.3 national program established (FY10 start) to develop and mature technologies for improving future fuzing performance, survivability, and reliability
- JFTP leverages and coordinates with projects in JMP, JIMTP and Service S&T
- Budget constraints have limited ongoing 6.2 projects and minimized 6.3 starts
- Transitions and Metrics for Success:
  - Demonstrations of JFTP Fuze technologies at DoD TRL 5-6
  - Transitions to service Advanced Prototype efforts or weapon POR (secure PEO/PM transition agreements or endorsements)
  - Strengthen fuze technology transition ties with Industry

**Need government and industry members to collaborate in S&T efforts to address fuzing needs and transition technologies**

# Joint Fuze Technology Program Management Structure



**OUSD(AT&L)/  
PSA/LW&M**

**Technical Advisory  
Committee**

**JOINT FUZE TECH PANEL OVERSIGHT COMMITTEE**

**PROGRAM MANAGERS**

Charles Kelly, Lawrence Fan, Phil Gorman, Tim Tobik

## FUZE AREA TECHNOLOGY GROUPS

<b>FATGI – Hard Target / Survivable Fuzing</b>	<b>FATGII – Tailorable Effects &amp; Initiation</b>	<b>FATGIII – High Reliability Fuzing</b>	<b>FATGIV – Enabling Fuze Technologies</b>
Chair Howard White (AF)	Chair Gene Henderson (Army)	Chair John Hendershot (Navy)	Chair Chris Janow (Army)
Co-Chairs John Kandell (Navy) Bill Konick (Army)	Co-Chairs Daniel Lanterman (Navy) George Jolly (AF)	Co-Chairs Don Clabaugh (AF) Tom Crowley (Army)	Co-Chairs Matt Bridge (AF) Bruce Hornberger (Navy)
SME Participants	SME Participants	SME Participants	SME Participants



# Fuze Area Technology Groups

FATG I – Hard Target / Survivable Fuzing

FATG II – Tailorable Effects

FATG III – High Reliability Fuzing

FATG IV – Enabling Fuze Technologies

**1.1 Improved M&S**

**1.2 Fuze Environment**

1.3 Next Generation Fuzing Hardware

2.1 Initiation & Multi-point

2.2 ESAD Based Multi-point Initiators

2.3 MEMS Based Multi-point Initiators

2.4 Smart Fuzing: Algorithms, timing and control

2.5 Adv Fuze Initiation

**3.1 Fuzing Architecture**

**3.2 Fuzing Components**

**3.3 UXO reduction features**

4.1 Common / Modular Fuze Architecture

4.2 Components Technologies

**4.3 Proximity Sensors**

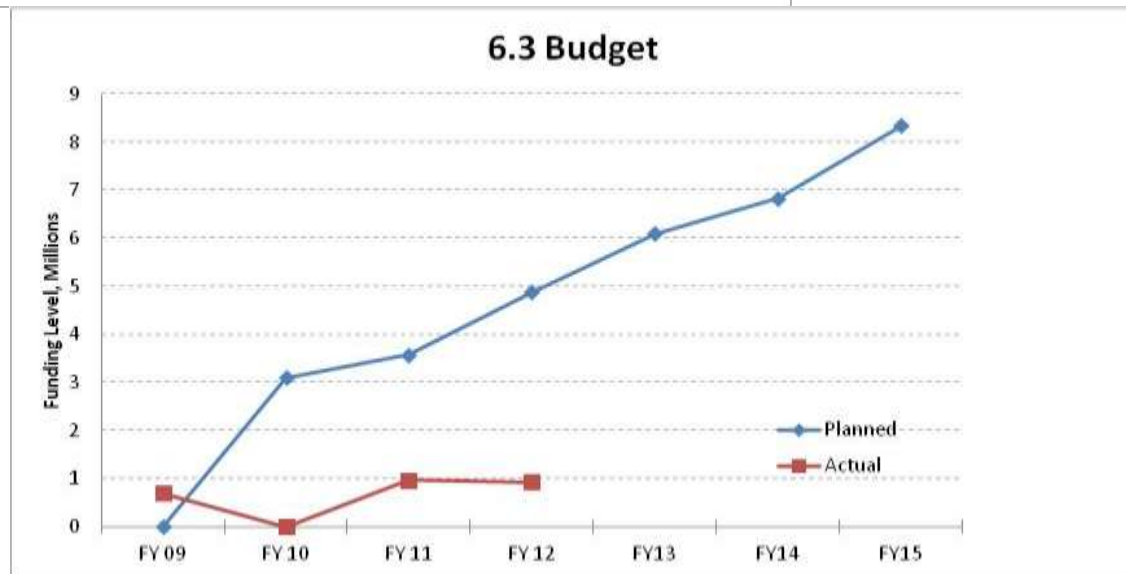
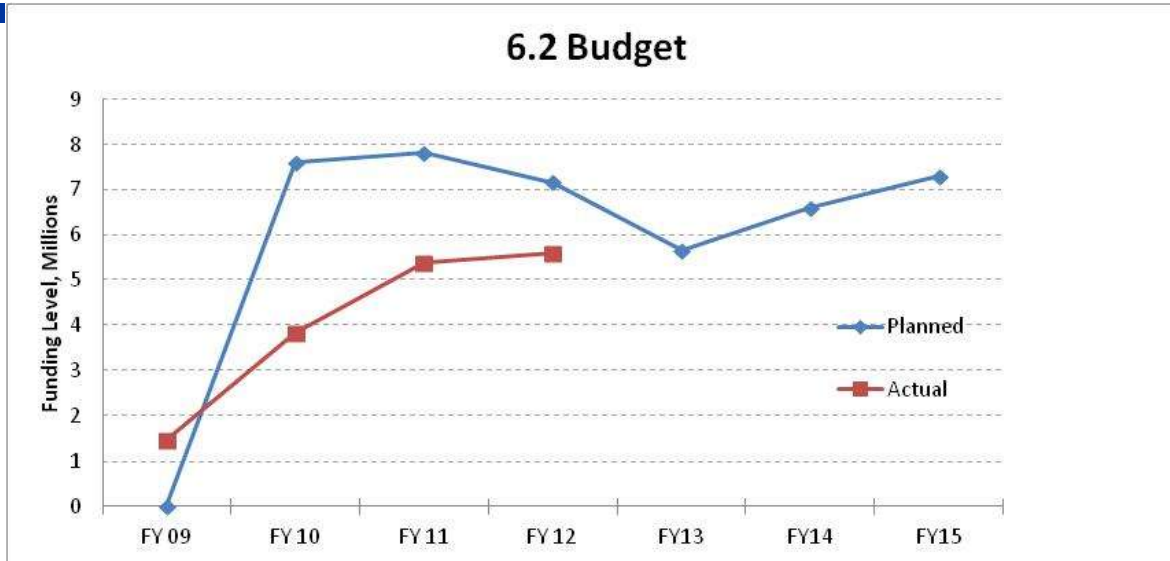
4.4 Weapons Effects & Damage Assessment

**4.5 Fuzing Power Sources**

**Bold: JFTP investment areas FY10-12**



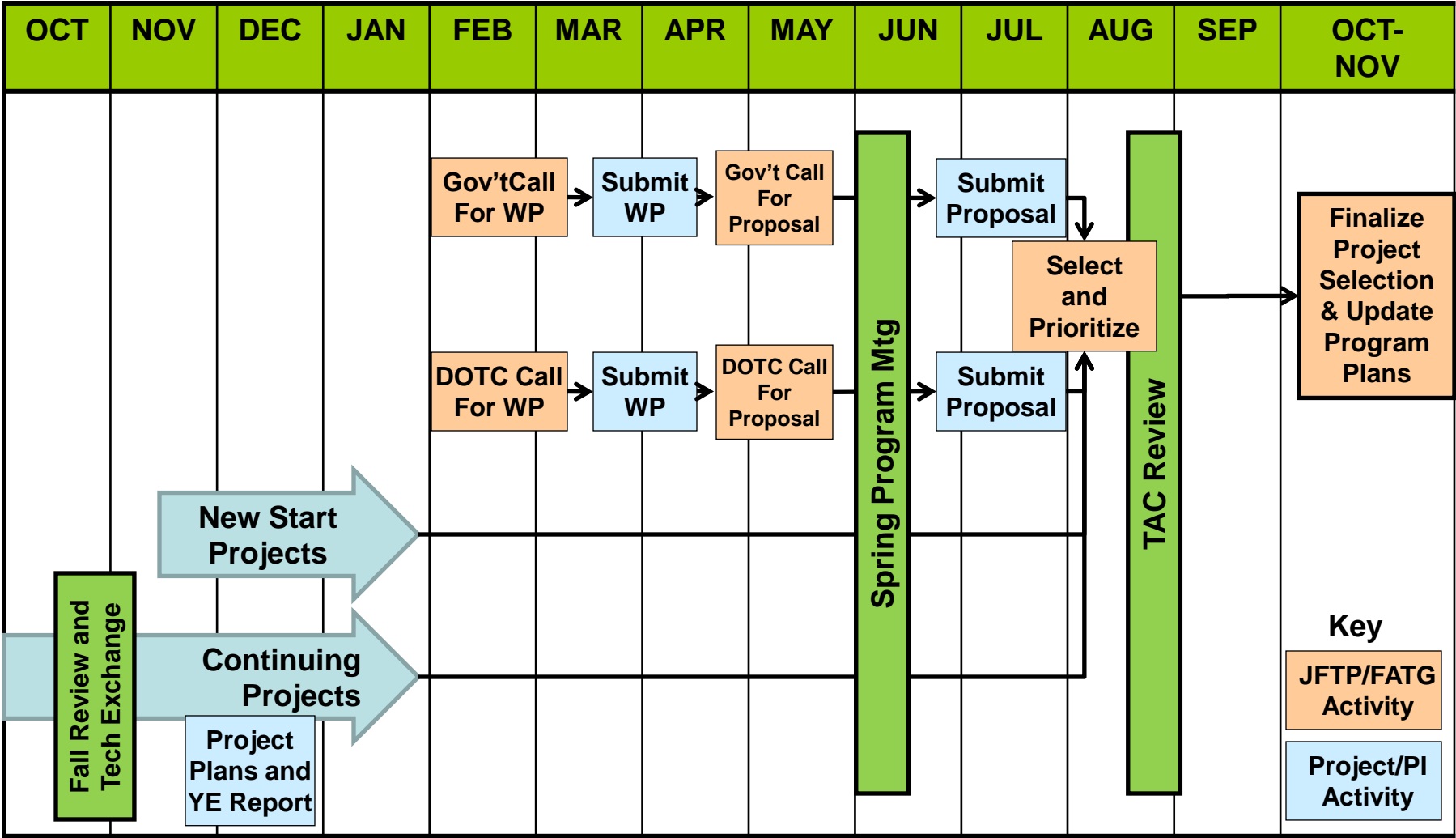
# JFTP Budget Planned vs. Actual



DISTRIBUTION STATEMENT A. Distribution is unlimited



# JFTP Annual Cycle





# FATG I Hard Target Fuzing

**Advance Fuzing Technology to Hold at Risk the Full-Spectrum of Hard Targets**

Goal

Objective (s)

Technical Challenge (s)

Technical Approach (s)

Sample Project (s)

Model and Predict Fuze Performance

Understand the Fuze Environment During Penetration

Develop Next-Generation Hardware

Numerical Tools and Techniques

Test Techniques to Represent the Penetration Environment

Instrumentation and Recording Capabilities

Survivability in Hard Target Applications

Materials and Simulation

Data for Code Validation

Instrumentation and Recorder Systems

Miniaturization and Robust Components

10-038 Hydrocode Simulations of Fuze Electronics

10-086 Fuze Environment Characterization and Test Support for High Speed Penetrators

10-095 Hardened Miniature Fuze Technology (completed)

10-088 Material Interfaces Under Shock

Legend

- 6.2 Current Project
- 6.3 Current Project

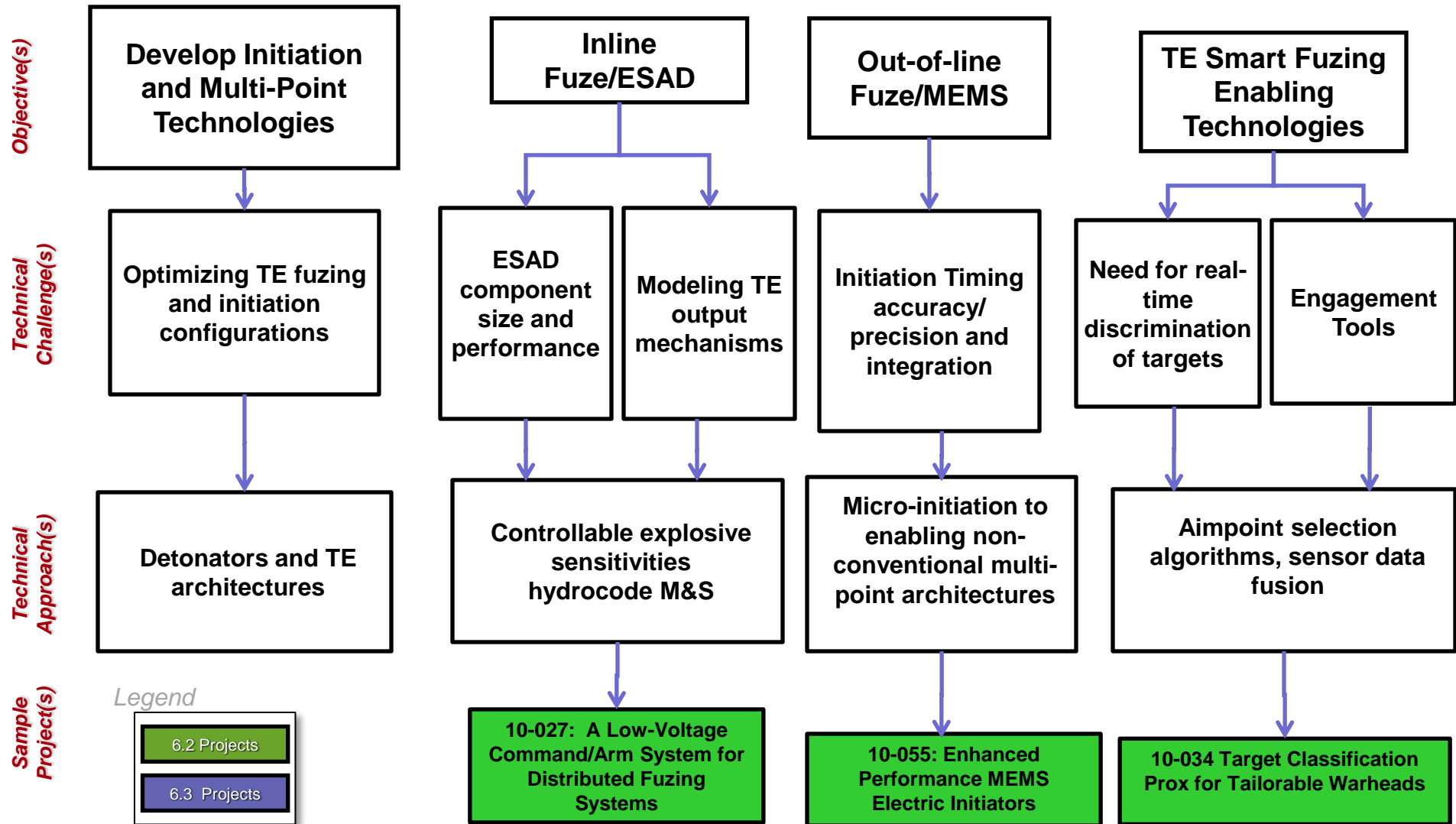




# FATG II Tailorable Effect Fuzing

**TAILORABLE EFFECTS (TE) WEAPON SYSTEMS TECHNOLOGIES THAT ENABLE SELECTABLE YIELD OPTIONS APPLICABLE to MUNITIONS SYSTEMS**

Goal

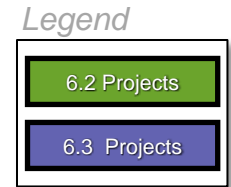




# FATG II Tailorable Effect Fuzing

**ADVANCE FUZE INITIATION TECHNOLOGIES for BROAD WEAPON APPLICATION** *Goal*

Objective(s)  
Technical Challenge(s)  
Technical Approach(s)  
Sample Project(s)



Improve Weapon System Fuze Train Performance  $O_4$

Overcome existing fireset limitations (volume, weight, cost).

Initiation of IM materials (main warhead, booster fills).

Develop improved/advanced fireset components.

Develop improved/advanced booster components.

Develop improved/advanced detonators and initiators.

10-102: Integrated Switch Slapper

11-I-022: Maturation of a Smaller, Cheaper High Performance Monolithic Ceramic Flyback Transformer for High Reliability Firesets( Completed)

11-G-015: PGK Explosive Train Redesign for IMX-101 Compatibility

6.2 Projects
6.3 Projects



Goal

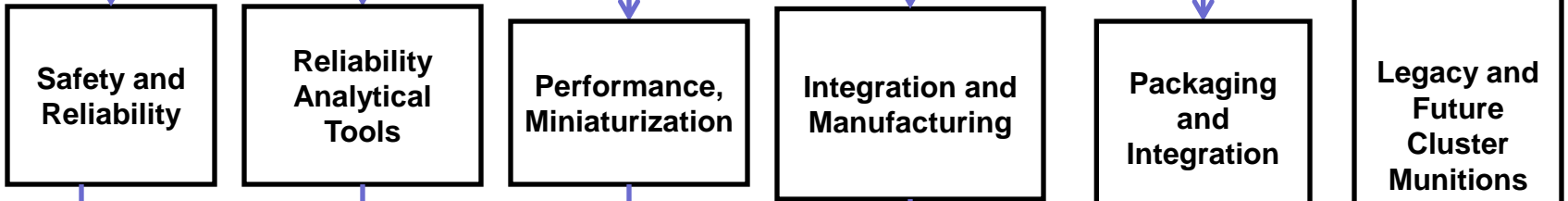
# FATG III High Reliability

## Very High Reliability Fuzing for Cluster and All Weapons

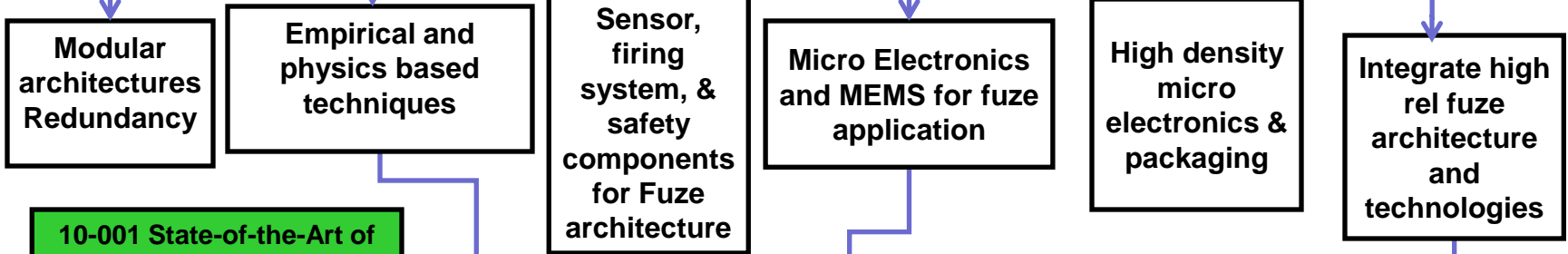
Objective (s)



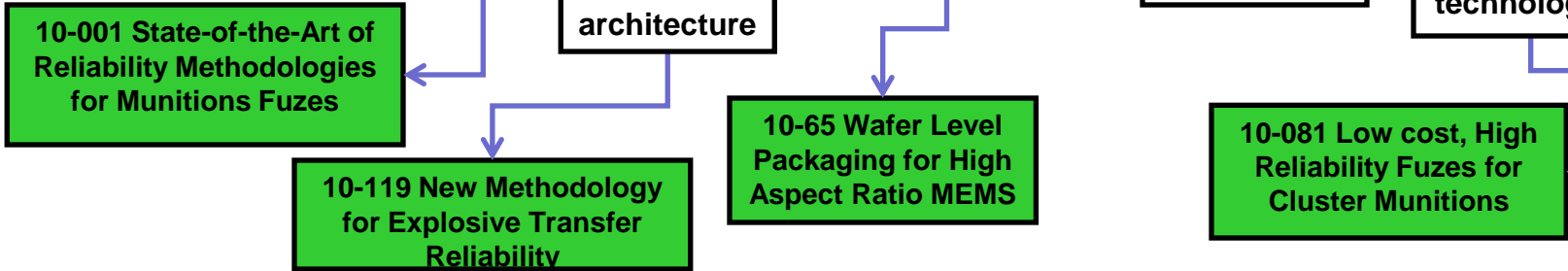
Technical Challenge (s)



Technical Approach (s)



Sample Project (s)





# FATG IV Enabling Fuze Tech

Goal

## FATG IV Fuze Sensors and Power Sources

Objective (s)

Develop Miniaturized, Robust and Affordable Fuzing Sensors

Improved Fuzing Power Source Performance for a diverse range of applications  
Increased Output (Power & Energy Density Improvements for higher power needs)

Technical Challenge (s)

Performance and technology development of proximity sensors, environmental safety sensors and retard / impact sensors

Rise time improvements and Energy density  
Decrease time to set fuze

Legend

6.2 Projects
6.3 Projects

Technical Approach (s)

Investigate RF, IR and optical sensors  
Develop advanced antennae, transceiver, and signal processing algorithms

Apply advancements in power and materials technologies in compact form factors  
Develop Thermal Battery Materials  
Develop Electrolytes

Sample Project (s)

10-042 Next Generation Proximity Sensors

10-010: 6.3 MEMS Retard & Impact Sensor

10-070: Nanofoil-Heated Thin-Film/ Conformal Thermal Battery Construction

10-078: High Energy Density Super Capacitors



# JFTP NWECC Projects



- **Three ongoing projects funding NWECC members**
  - ***10-042 Next Generation Proximity Sensors for Fuzing Applications***
    - FY10-13 6.2 project to develop next-generation proximity fuze technology to replace the current Frequency Modulated Continuous Wave - Directional Doppler Ratio Ranging (FMCW-DDR) proximity sensors
    - NWECC performer - University of Florida
  - ***10-035, Target Classification Prox for Tailorable Warheads***
    - FY10-13 6.2 project to develop a sensor system to identify primary features of different target scenes. Sensor data provides information to make smart decisions on “how” and “when” to initiate tailorable warheads
    - NWECC performer - University of Florida
  - ***11-I-022: Smaller, Cheaper High Performance Monolithic Ceramic Flyback Transformer for High Reliability Firesets***
    - Mature smaller high performance monolithic flyback transformer for inline and multi-point fuze applications.
    - NWECC performer - NASCENTechnology Manufacturing, Inc.



# Industry Collaboration and Transition Opportunities

- Industry Collaborations
  - Hard Target Fuzing
    - 10-095 Hardened Miniature Fuze Technology
  - Firing system components
    - 11-I-022 High Performance Monolithic Ceramic Flyback Transformer
  - Bomb fuzing components (FY13)
    - 10-010 MEMS Retard & Impact Sensor
    - 12-G-036 Bellows Actuator Motor
- M&S Toolsets and Future Fuzing Architectures
  - 10-081 Low cost, High Reliability Fuzes for Cluster Munitions
  - High G Fuze Modeling: Phase I 6.3 Computational Comparisons



# 2012 JFTP Schedule

- FY13 JFTP DOTC Call for Proposals
  - JFTP process will be in sync with Service's Fuze annual plan process
  - Conveyed JFTP requirements will be focused on unfilled gaps
  - FY13 white papers review and selection completed - 10 May 12
  - Proposals due – 12 July 12
- JFTP 2012 Spring Review: 19-21 June 12, Arlington, VA
  - Proposers requested to brief FY13 project
- Technical direction for awards – October 12
- JFTP 2012 Fall Review: Industry-Gov't meeting
  - 23-25 October 12



# Summary

- Projects making progress – several 6.2 and 6.3 projects transitions occurring during FY12
- Budget constraints have limited ongoing 6.2 projects and minimized 6.3 starts
  - Significant effort expended working the program with the budget bogey (Congressional marks, CR, DDR&E marks)
  - Funding allocation focused on completing ongoing 6.2 projects - limits new starts for FY12
- Strengthen technology transition ties with Services and **Industry:**
  - JFTP fund Industry on existing 6.3 projects to increase TRL & MRL
  - Industry provide input to fuze technology needs/gaps via DOTC annual plan





**Questions?**