Joint Insensitive Munitions Technology Program Overview

Mr. Anthony Di Stasio
Program Manager
US Army ARDEC
973-724-4547
Anthony.r.distasio.civ@mail.mil
OUSD(AT&L)/TWS/LW&M

Joint Insensitive Munitions Technology Program

Mission - Develop, mature and transition Joint Insensitive Munition science and technologies to improve the response of the DoD munitions portfolio to threats from combat, terrorists, and accidents.

Purpose – to provide a Science and Technology base to support the Secretary of Defense in ensuring that munitions under development or procurement are safe throughout their lifecycle when subjected to unplanned stimuli to the maximum extent practicable.

This is accomplished by working toward the technology gaps identified in PEO Insensitive Munition Strategic Plans, and continuous communication between the JIMTP, the Joint Service Insensitive Munitions Technical Panel (JSIMTP), Service IM boards, and the acquisition community.

Laws and Standards

NATO STANAG 4439 DEFINITION

Insensitive Munitions are: *Munitions which reliably fulfill their performance, readiness and operational requirements on demand and which minimize the probability of inadvertent initiation and severity of subsequent collateral damage to weapon platforms, logistical systems and personnel when subjected to unplanned stimuli.*

USC, Title 10, Chapter 141, Section 2389
December 2001

"§ 2389. Ensuring safety regarding insensitive munitions. The Secretary of Defense shall ensure, to the extent practicable, that insensitive munitions under development or procurement are safe throughout development and fielding when subject to unplanned stimuli."

U.S. DoD IM Requirements

U.S. Law

USC, Title 10, Chapter 141, Section 2389 December 2001: "§ 2389. Ensuring safety regarding insensitive munitions. The Secretary of Defense shall ensure, to the extent practicable, that insensitive munitions under development or procurement are safe throughout development and fielding when subject to unplanned stimuli."

Department of Defense Policy

DoDD 5000.01, May 12, 2003: E1.1.23. Safety. "… All systems containing energetics shall comply with insensitive munitions criteria."

Joint Chiefs Policy

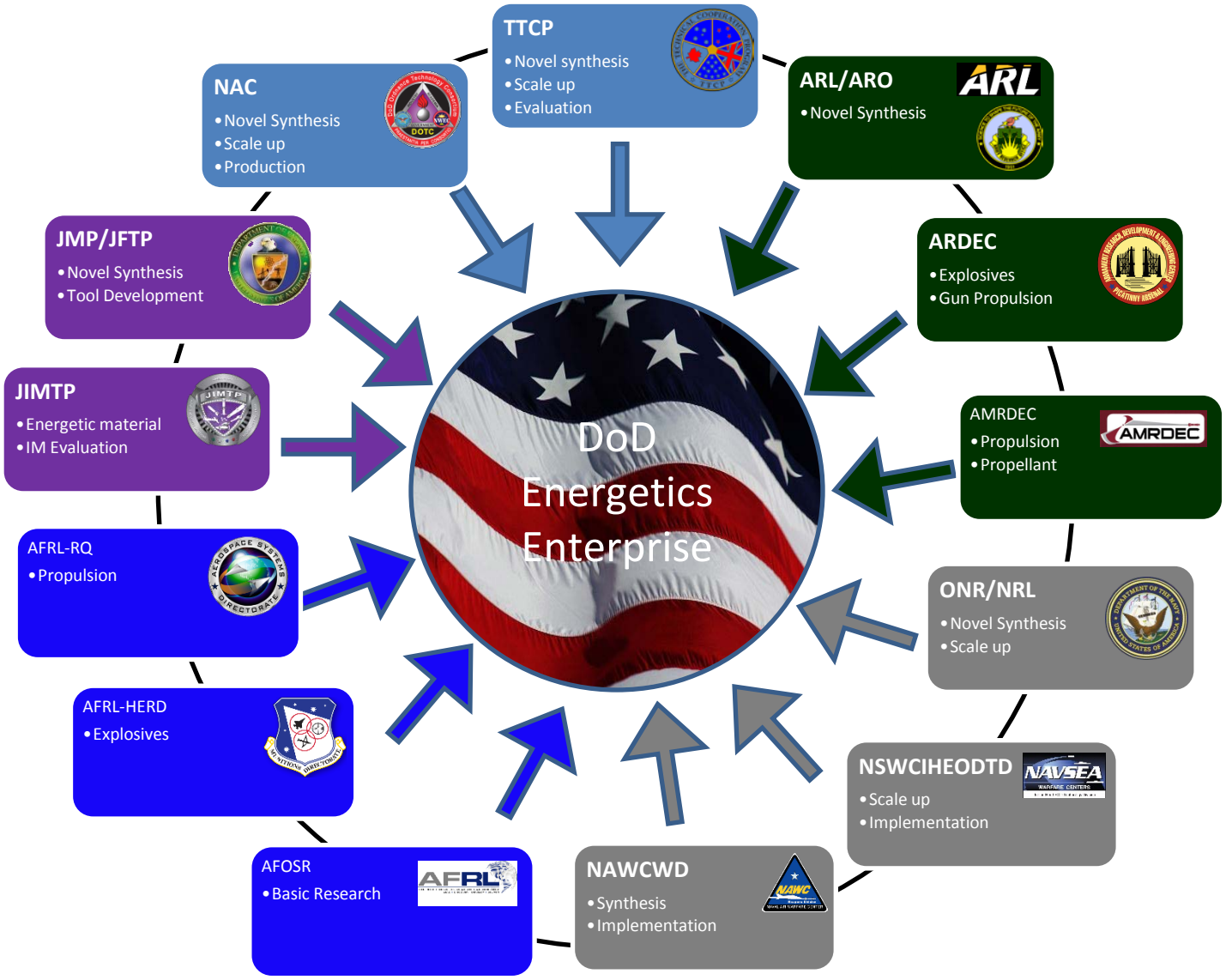
Joint Capabilities Integration and Development System: 23 Jan 15 Appendix J Enclosure D "Standardized IM test protocols used in assessing a weapon's response to unplanned threats are established in references cccccc and dddddd."

cccccc – JROCM 235-06, 6 November 2006, "Insensitive Munitions Standards and Passing Criteria"
dddddd - MIL-STD-2105D, 19 April 2011, "Hazard Assessment Tests for Non-Nuclear Munitions"

JIMTP Approach

- **<u>Objective :</u> Enable improved munitions response for the benefit of the warfighter**
  - Invest mostly in tangible IM technology and integrated technology demos
  - IM not an independent requirement – rather part of an overall desired capability
- **Advocate/support key enablers**
  - Modeling and simulation
  - Alternative munition concepts
  - Key studies to guide investment decisions
- **Continually clarify and improve metrics**
- **Expect and require high-quality archived technical work**
- **Leverage other available technology and funding (and capability)**
  - An avenue for demonstration/maturation of non-JIMTP generated technology
  - Exploit other dual-use technology investments (e.g., armor materials)
  - But, not a substitute for other IM investment

Energetics Enterprise



JIMTP Organization

Acquisition and S&T Senior Leadership Oversight

Land Warfare & Munitions
Jose Gonzalez (Lead)

DoD IM IPT

Kathryn Hunt, LW&M

PEOs Responsible for IMSPs

Senior DoD Lab Managers

DoD/NNSA/DP JMP TAC Co-chair
Robert Hanrahan
and Senior DOE Lab Managers

Navy

Air Force

Army

Jeff Brock (C), Deputy PM

Program Manager
Anthony Di Stasio
ARDEC

JSIMTP
Environmental Liaison
EOD "Technical Liaison"

Financial Management
Inna Nisimov (C)

Working Level Acquisition and S&T Collaboration

MATG – Munition Area Technology Group

MATG I
High Performance Propulsion

MATG II
Minimum Signature Propulsion

MATG III
Blast/Fragment Warheads

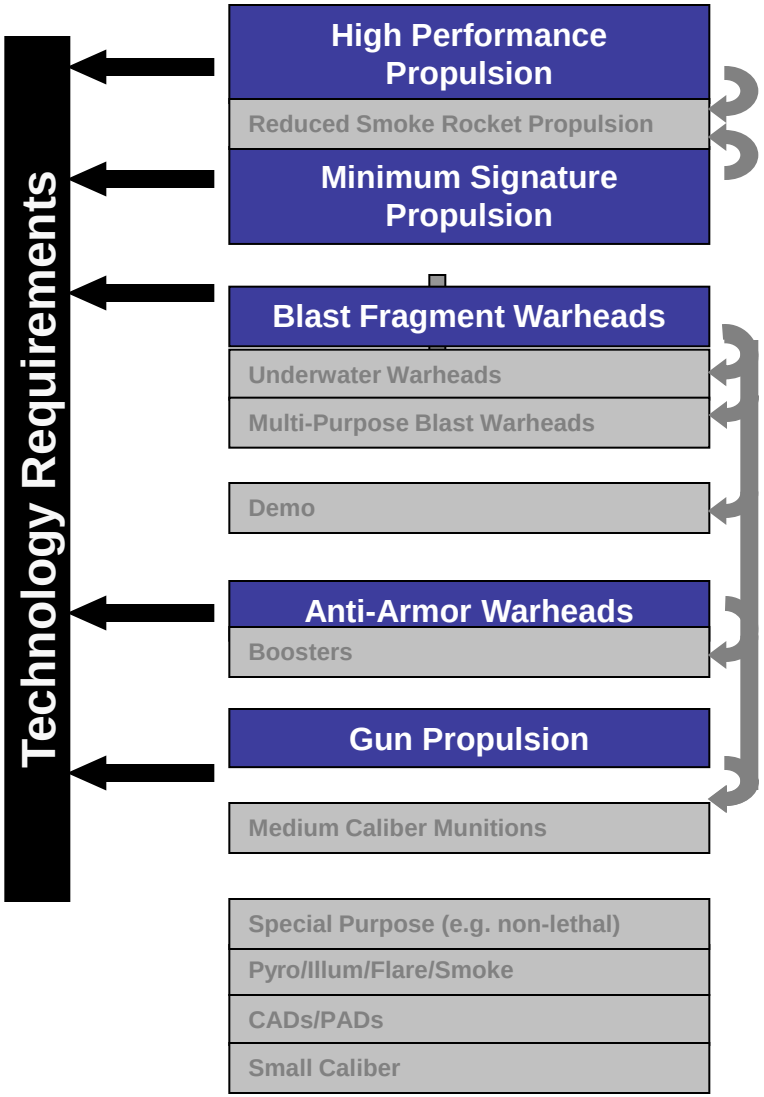
MATG IV
Anti Armor Warheads

MATG V
Gun Propulsion

Performers: DOD labs, DOE Labs, Industry

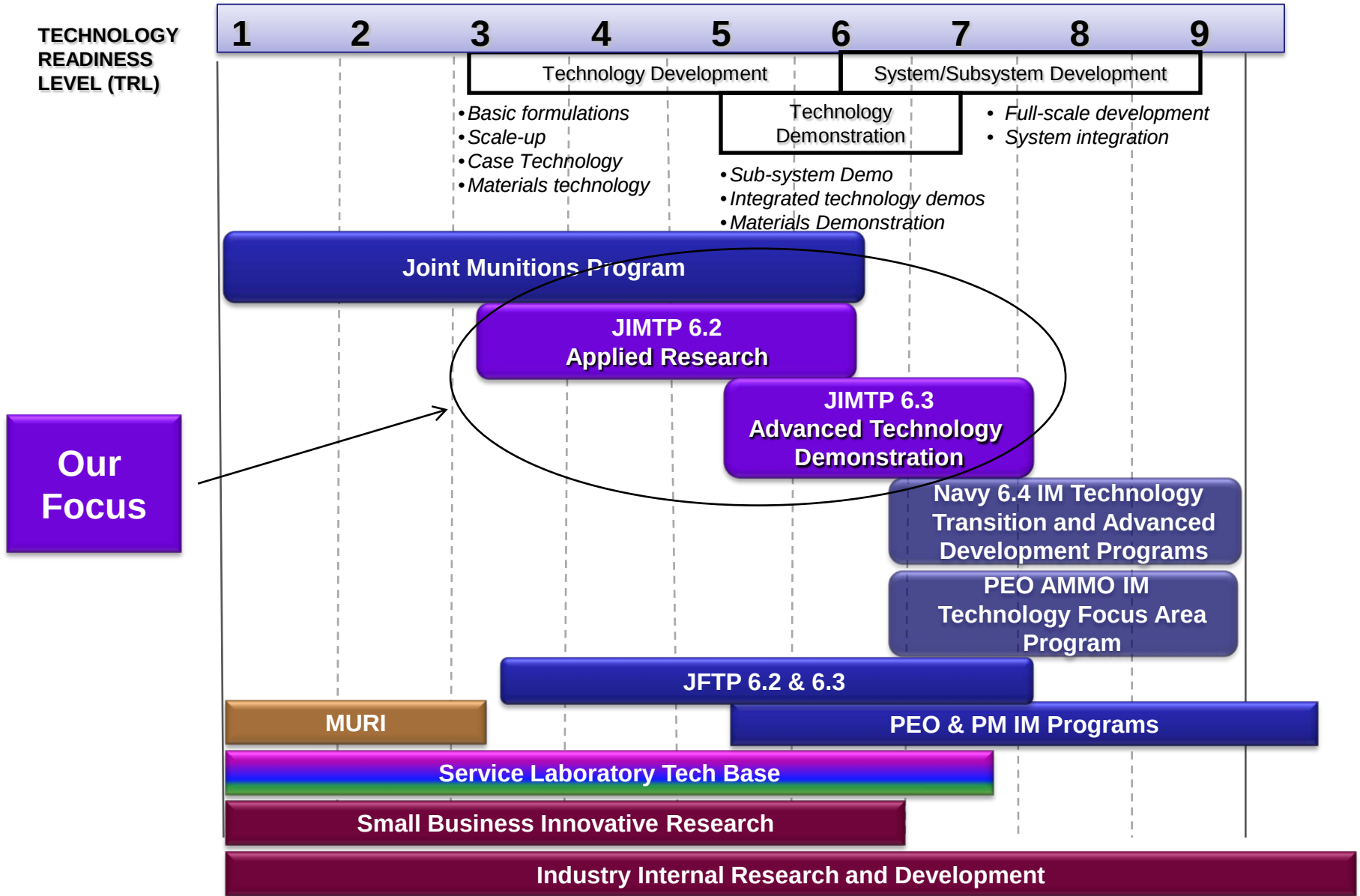
JIMTP S&T Focuses on DoD Munitions Portfolio

Munition Area Technology Groups (MATG)



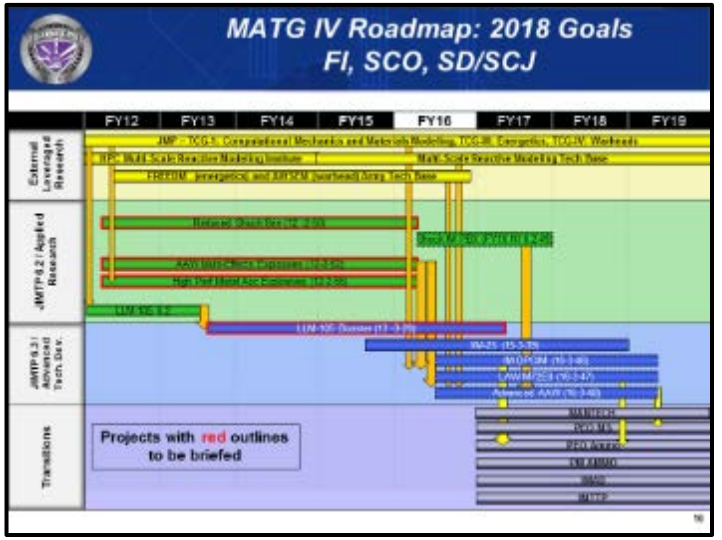
- **DoD Portfolio contains five primary areas where Non-compliant munitions are identified for procurement**

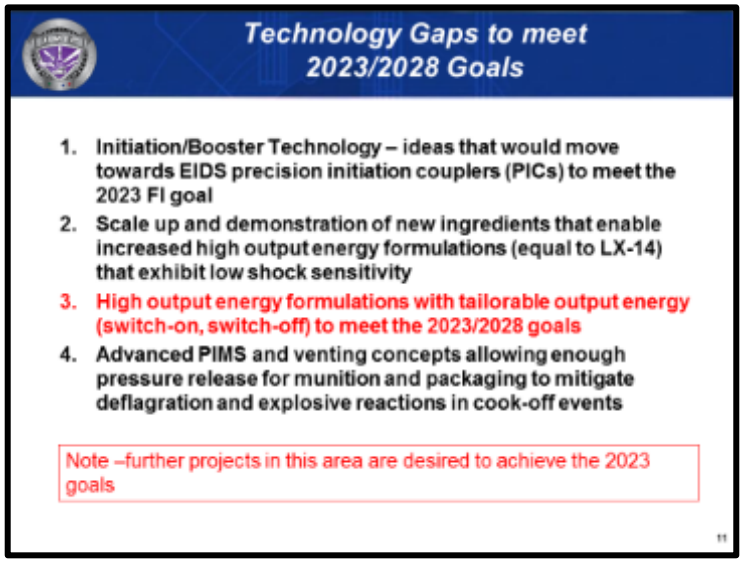
Insensitive Munitions Research



6.2/6.3 Technology Roadmaps

- **Each MATG has a technology roadmap package identifying:**
  - **Feeder technologies**
  - **Current Projects**
  - **Potential transition opportunities**
  - **Technology needs/gaps**

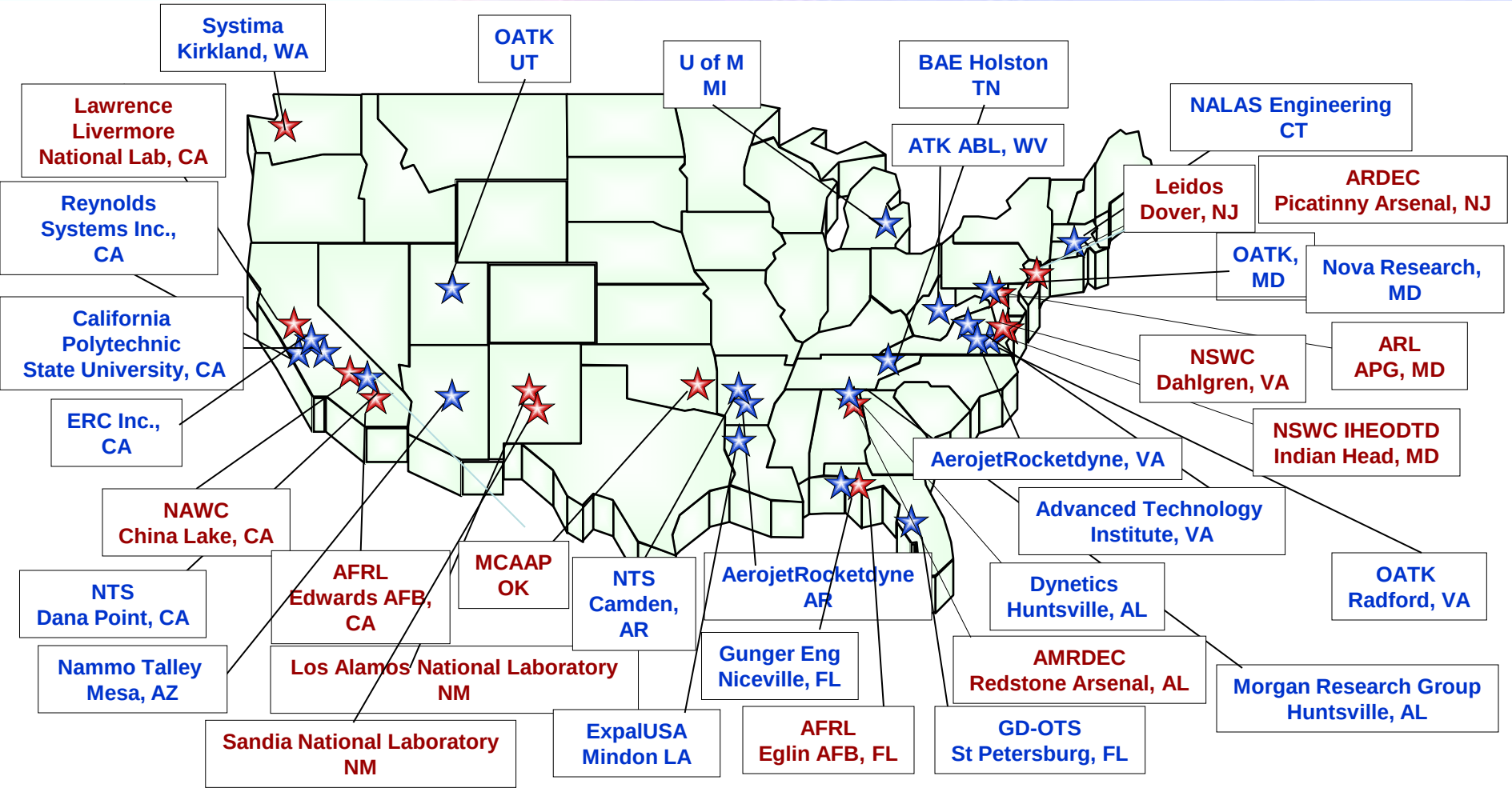




- **Roadmaps updated and Technology Gaps identified in preparation for the Annual Call for Ideas**

•Roadmaps presented to TAC for approval

FY16 Joint Munitions Technology - Performers -



JIMTP is strengthening government-industry partnerships

JIMTP Goals

MATG I

	2018	2023	2028
Slow Cook-off	III (2)	IV w/active mitigation (2)	V w/active mitigation (3)
Fragment Impact *	V (1) / IV (2)	VI (1) / V (2)	VI (1,2,3)
Bullet Impact *	IV (1,2)	V (1,2)	VI (1,2,3)
Fast Cook-off	IV (2)	V w/active venting (2,4)	V w/active venting (3)

MATG II

	Cast Cure (2,4)	Extruded (1)	Extruded (1)/ Cast Cure (3,4)	Extruded (1)/ Cast Cure (5)
	2018	2023	2028	
Fragment Impact	IV	III	V	VI
Slow Cook-off	V	IV	V	VI
Shape Charge Jet			PASS (40 mm)	PASS (81 mm)

MATG III

	2018	2023	2028
Shape Charge Jet		PASS 40mm (1)	PASS 40mm (2), 81mm (1)
Sympathetic Reaction	PASS (1a,1b)	PASS (1c, 2a)	PASS (2b)
Fragment/Bullet Impact	IV (1)	V (1, 2a)	V (2b, 2c)
Slow Cook-off	IV (1a,1b) / III (1c)	V (1a, 1b) / IV (1c)	V (1c, 2)

MATG IV

	2018		2023		2028	
Fragment Impact	IV (1)	III (2)	IV (1,3)	V (2,3)	IV (1,4)	V (2,4)
Slow Cook-off		III (2)	V (1,3)	V (2,3)	V (1,4)	V (2,4)

MATG V

	2018		2023*	2028*
Fragment Impact	IV (1,3)	V (2)	V (1,2,3)	V (1,2,3)
Slow/Fast Cook-off	IV (1,3)	V (2)	V (1,2,3)	V (1,2,3)

Challenges

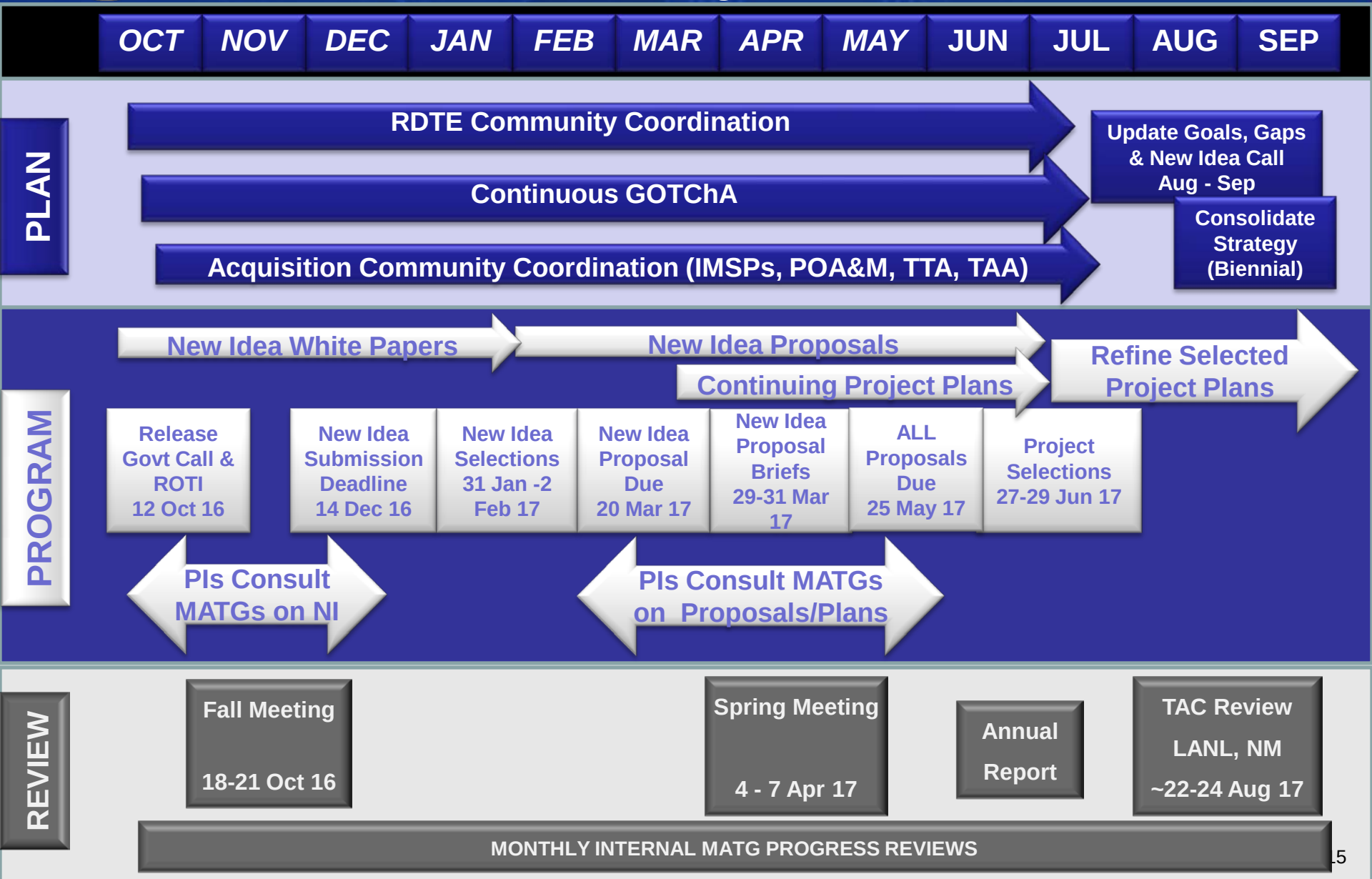
- **Lack of data and characterization for large Dcrit (non-ideal) explosives**
  - **Directed Study to address**
- **Understanding of relationship between short duration shock vs long duration shock (HJ criteria vs wedge test)**
  - **Directed Study to address**
- **Understanding defects in “pristine” materials and the effect on sensitivity**
- **Understanding “damage” (cracks, voids, porosity, thermal) generation and propagation during insult**
- **Understanding the science behind SCO/FCO challenges**
  - **MSIAC workshop (JIMTP participation)**

FY17 Portfolio

- **Applied Research (6.2) Areas**
  - General Purpose Bomb Boosters
  - Propellants for tank ammunition
  - Mixing and coating technologies
  - Novel ingredient formulations
  - Sensors for Slow Cookoff mitigation
  - Rocket motor propellants for SCO/FCO and BI/FI

- **Advanced Technology Development (6.3) Areas**
  - General Purpose Bomb fill formulations and venting
  - Rocket motor propellant demonstrations
  - Medium caliber ammunition FI and SCO
  - Shoulder launched weapon warhead and propellants

JIMTP FY18 Planning and FY17 Execution Cycle

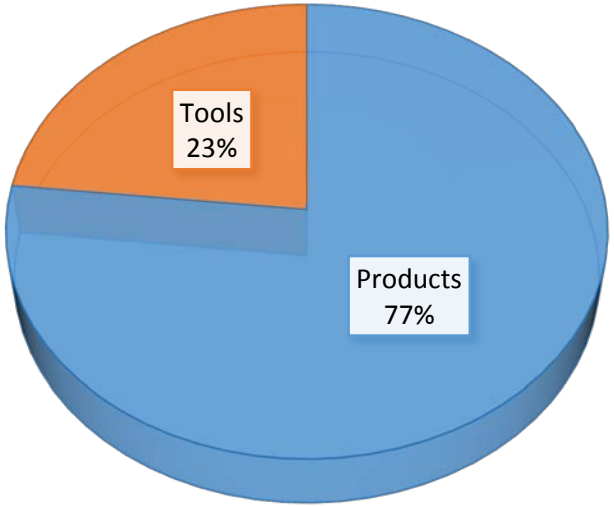


Bottom Line

- **Transitions to Acquisition Community are happening**
- **Revised 2018, 2023 and 2028 goals**
- **New capabilities drive new technologies to be investigated for IM improvement**
  - **Smaller/smart warheads with same or increased lethality**
  - **Extended range for access limited munitions**
  - **Extended range for cannons and mortars**
  - **MOUT/FFE**
- **Fundamental understanding gaps remain broad and complex but narrowing**
- **Joint program with <u>exceptional technologists</u> working tough problems – always looking for new PIs to propose great ideas!**

Summary

Probability of Success \ IM Improvement	Negligible	Marginal	Significant	Extreme
Very Low				
Low				
Medium				
High				
Very High				



- **Transitions have been plentiful and trickle down technology is working!**
- **JIMTP focus has begun to incorporate “tools” and “processing” where required**
- **Large increase in funded efforts involving**
  - **Explosive processing**
  - **Small scale test development**
  - **Modeling and simulation**

Questions