US ARMY RDECOM

U.S. Army Research, Development and Engineering Command

J·S·S·A·P JOINT SERVICE SMALL ARMS PROGRAM

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ARMAMENT RESEARCH, DEVELOPMENT AND ENGINEERING CENTER PICATINNY ARSENAL, NJ

TECHNOLOGY DRIVEN. WARFIGHTER FOCUSED.

Advanced Lethal Armament Technology for Small Arms

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Agenda

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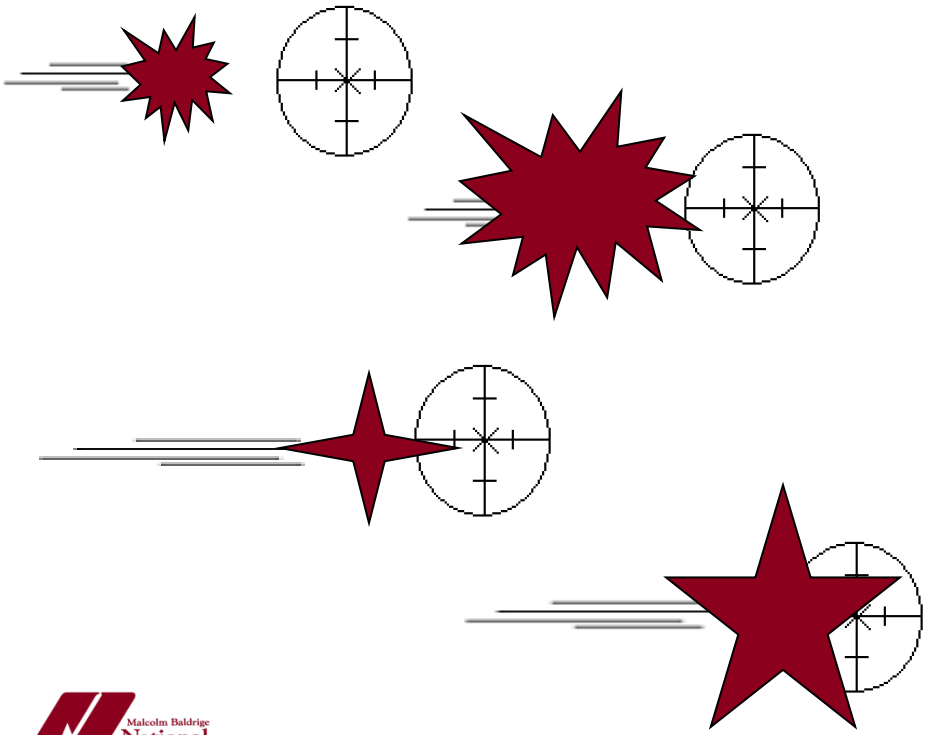
Introduction

The next generation of weapons is always tasked to do more with the same or smaller foot print.



Areas of Interest:

1. Larger Effects
2. Controlled Distribution of Effects
3. Better Accuracy of Effects
4. Less Weight

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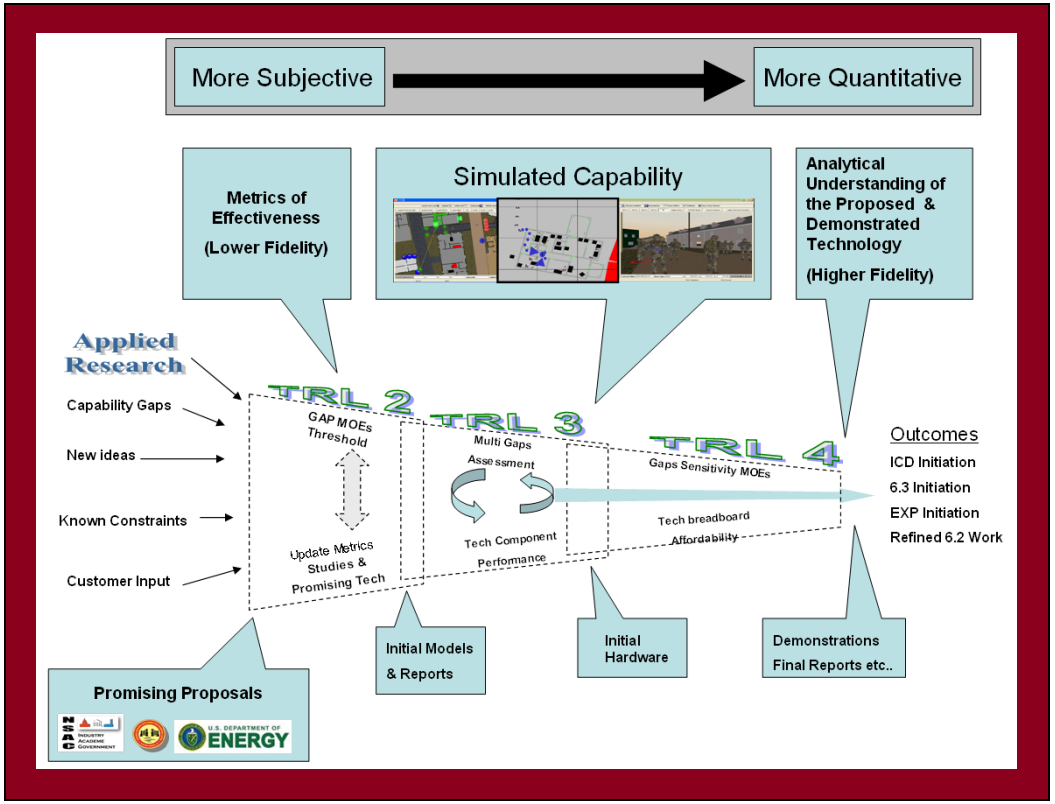
The Advanced Lethal Armament Technology ATO

What is the ALA ATO?

The Advanced Lethal Armament Army Technology Objective (ATO) is a 3-year JSSAP effort which was started in 2008 and was designed to find, mature, and demonstrate state-of-the-art component technology that when integrated, tested, and fielded has the potential to bring new and improved effect capabilities to the unit and to the War-Fighter.



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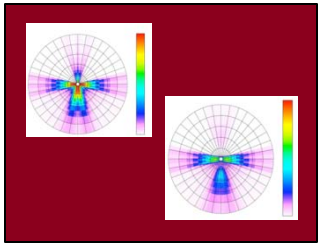
What is the Objective?

To improve our ability to incapacitate targets especially those hidden behind objects and under cover.

What are some of the Challenges?

Incapacitation potential is limited by delivery accuracy, payload efficiency, payload size, and payload type.



What are we looking for?

Immature component technologies in the TRL 2-4 range (applied research through prototype) that will directly or indirectly increase our ability to put effects on target.

Can you be more specific?

Right now, we are primarily interested in air burst technology components.

1. *Technologies that make us more lethal.*
2. *Technologies that make our warhead bursts more controllable and/or more efficient*
3. *Technologies that deliver more effects to the target.*

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What is the expected Outcome?

TRL 4 (Brass Board) component technologies that have been assessed and demonstrated to decision makers enabling further development

Where are the Opportunities?

Advanced Fuzes, Fragment Distribution Techniques, Warhead Efficiency

Metrics and Goals

#	Intent	Current Metric	Goal	Technology Maturity Level
1	Increase the warhead lethality and/or the size of the area affected	P(Incapacitation) / Area	We want to increase the ratio of P(incapacitation) to area affected by 25% or more over current systems.	Start: TRL 2 (M & S Work, Papers, Applied Research)
				Finish: TRL 4 (Brass Board Prototype Demonstration)
2	Increase our ability to focus/ control fragment delivery	Models & Tests	Optimize the effect on the target(s)	Start: TRL 2 (M & S Work, Papers, Applied Research)
				Finish: TRL 4 (Brass Board Prototype Demonstration)
3	Want to launch bigger payloads without making the guns heavier	Launch Recoil per unit Weight	We want to increase the ratio of effects to weight by 25% or more.	Start: TRL 2 (M & S Work, Papers, Applied Research)
				Finish: TRL 4 (Brass Board Prototype Demonstration)
4	Want to reduce the recoil of current and future systems	Launch Impulse (lb-sec)	Reduce launch impulse by 30% or more	Start: TRL 2 (M & S Work, Papers, Applied Research)
				Finish: TRL 4 (Brass Board Prototype Demonstration)

Where are we Looking?

Answer: At Industry, Academia, and Government. Our search for new technologies is ongoing. This is a tough R&D area and we want good ideas from every venue.

Current Actions and Desires

What	Who	Which Metrics			
		1	2	3	4
Guided Projectile Technology Efforts	Academia, Government, Industry	X		X	X
Advanced Warhead Technology Efforts	Government & Industry	X			
Recoil Mitigation Technology Efforts	Government & Industry			X	X
Controlled Fragment Technology Efforts	Industry	X	X		
Advanced Warhead Electronics / Fuzing Efforts	Industry	X	X		
Advanced Material Efforts	Government	X		X	
Enabler Efforts	Government	X		X	

1	Increase the warhead lethality and/or the size of the area affected
2	Increase our ability to focus/ control fragment delivery
3	Want to launch bigger payloads without making the guns heavier
4	Want to reduce the recoil of current and future systems

Objective

Mature course correction technologies to reduce delivery error.

Why?: To place more effects on target more often

Targeted Weapon Platforms

Evolving and existing 25mm - 40mm Grenade Launch Systems such as the M203

Update

1. Multiple Efforts
2. Trade Studies Under-away
3. Preliminary Reports are Encouraging
4. Initial Hardware Tests being Planned.

Objective

Mature Warhead Technologies to more effectively utilize and enhance explosive payloads especially against difficult targets in challenging settings

Why? Larger more controlled effects are needed to defeat the enemy in many situations where cover is ample.

Scenarios to Consider

1. Targets behind walls, trees, and other barriers
2. Difficult to Range Targets
3. Targets in Body Armor

Updates

1. Multiple Efforts
2. Government Models have been promising
3. Initial Hardware Tests are being scheduled.
4. Commercial efforts are being initiated.

Objectives

Mature recoil mitigation technologies to enhance marksmanship and to allow for the fielding of systems with larger and/or more complex payloads

Why? Soldiers need to be able to rapidly deliver precision effects.

More Recoil Mitigation Opens more options:

1. Larger Calibers
2. Faster Muzzle Velocities
3. Faster Rate of Fire

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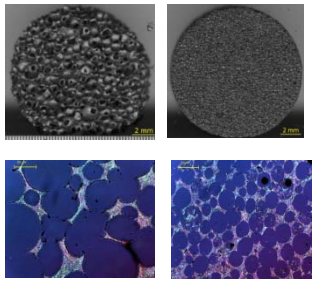
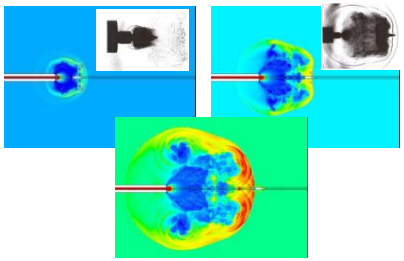
Update

1. Initial Concepts have been submitted.
2. Government Testing is being planned.
3. Commercial efforts are being initiated.
4. Government design work is ongoing.

Technology Enabler Updates



Advanced Materials



Advanced Models

Why?

We also are including those efforts and processes which:

1. Will enable other advance warhead technology to be implemented
2. Reduce the overall R&D risk
3. Allow us to focus in on the technical objectives and challenges

Examples:

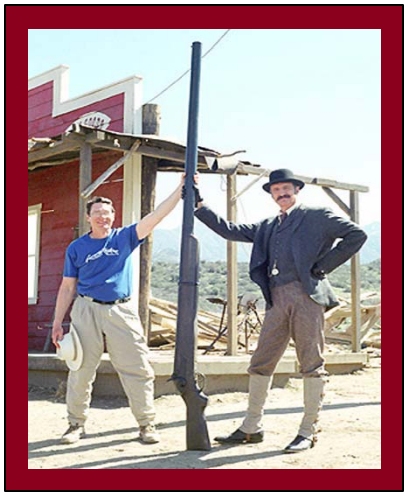
1. Miniaturization of Warhead Electronics
2. Modeling and Simulation
3. Advanced Materials

Updates

1. Multiple Efforts
2. Developing a smaller set back generator to power warheads
3. Maturing a carbon foam to eliminate heat in barrels faster.
4. Developing models to model gas flow in select weapon platforms
5. Developing models to examine the impact of technology efforts to the War-Fighter

We Know the Work is Challenging

1. Small Arms Research and Development has been ongoing for centuries.
2. Ballistics couples just about every physical science there is.
3. Costs MUST be kept down.
4. Everything must be ruggedized, versatile, and ready at a moments notice.
5. Weight is an issue, as is the rest of the human condition.



"No sense getting their hopes up. They couldn't afford it if it worked."

Summary

1. This is a 3-year 6.2 R&D effort looking at component technology that will enhance our ability to deliver precision effects to designated targets.
2. We are seeking to mature advanced component technology from TRL 2-4.
3. We are primarily interested in airburst component technology.
4. We are still in need of good ideas. Watch for upcoming announcements

Highlighted Technology Areas of Specific Interest

1. Directional Fragmentation Technology
2. Control of Projectile Orientation at Target
3. Combined Lethal and Non-Lethal Warhead

Help Us to Help Them