U.S. ARMY ARMAMENT RESEARCH, DEVELOPMENT, & ENGINEERING CENTER (ARDEC)

Malcolm Baldrige National Quality Award 2007 Award Recipient

ARMAMENT RESEARCH, DEVELOPMENT AND ENGINEERING CENTER
PICATINNY ARSENAL, NJ

TECHNOLOGY DRIVEN. WARFIGHTER FOCUSED.

Dr. Barton Halpern

Joint Service Small Arms Program (JSSAP) Technology Research & Development Strategy

23 May 2011

Bottom Line up Front

Our #1 initiative is the successful transition of technology for small arms related technology to PM Programs of Record

- **Achieve this through a balanced portfolio strategy**
- **Focused on Capability Gaps as identified in the Joint Small Arms Capability Assessment and Army Small Arms Capability Based Analysis**
- **Focused on identified requirements from through the Joint Service Small Arms Master Plan**
- **Focused on leveraging :**
  - **Technology**
  - **Academia**
  - **Industry**
  - **Weapon concepts feasible for further research and development**

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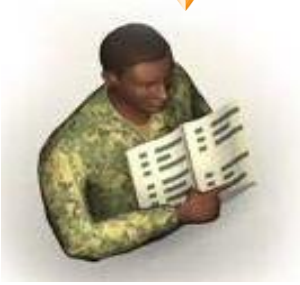
JSSAP Small Arms Systems R&D Strategy

Futures Conferences

Small Arms Capability Based Assessments

Documented Requirements

TRADOC Gaps Warfighter Outcomes



Technology Information Exchanges

NSAC
INDUSTRY
ACADEME
GOVERNMENT

National Small Arms Center – Industry Push

JSSAST Technology Shortfalls

NATO
OTAN

International Small Arms Activities

Joint Service Small Arms Master Plan

- Intensive management of the DoD small arms tech base
- Harmonization of requirements

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Technology Investments Of 2025

2025 Investments	
Threat Engagement	●
Target Acquisition	●
Breaching	●
Weapon Detection	●
Operational and Maintenance	●

- R&D Focus on Technology to support Documented and Emerging Requirements
- Weapon and ammunition must provide a revolutionary increase in capability, while also being as lightweight as possible
- Protect The Soldier
- Unburden the Soldier
- Empower the Soldier

2012-2015 Planned Technology Investments

Advanced Small Unit Small Arms Technology Concepts R.ARD.2012.03

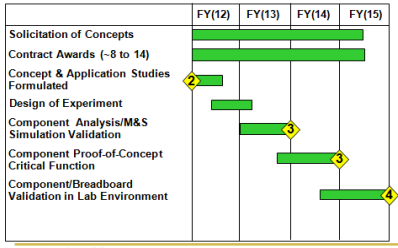



Purpose:
Identify and advance technologies leading to the ability to improve Small Unit Level effectiveness. Utilize new small arms technological concepts to improve range overmatch capability against like-sized threat elements.

Results:
- *TRL 2 Concept development*
- *TRL 3 Demonstrations of components and technologies*
- *TRL 4 Concept tests*
- *Critical new concept designs*

Payoff:
- *Dramatic increase in range overmatch over current small arms systems*
- *Maximized Operational Utility and Survivability*
- *Assured Lethality*

Schedule & Cost



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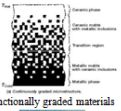
Small Arms Material & Process Technology R.ARD.2012.04


Metal/ceramic composite

Functionally graded materials



Nanocoated Gun Barrel

Superhydrophobic coating

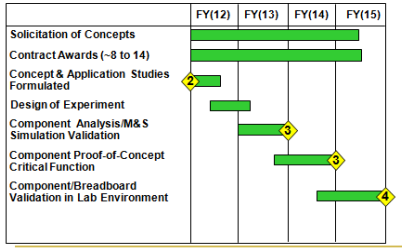
Lubricious coatings

Purpose:
Assess and develop state-of-the-art material and process component technology to enhance the operability and maintainability of small arms weapons for current and future warfighters.

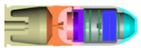
Product:
- Target and harvest state-of-the-art material and processes applicable to weapons, ammunition, optics, suppressors and barrels that increase the useable life, decrease weight, reduce signature and improve reliability of small arms weapons.

Payoff:
- *Increased weapon lifetime*
- *Reduced maintenance or lubrication*
- *Increased reliability*
- *Decreased weapon signature*
- *Reduced weight*
- *Transition to PM Soldier Weapons or other technology programs*

Schedule & Cost



Demonstration Small Arms Grenade Munitions Integration and Evaluation D.ARD.2012.02

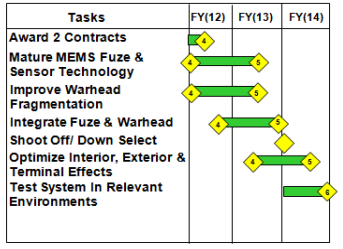




Purpose:
Demonstrate integration of component technologies and improve effectiveness of 40mm Low Velocity Grenade.

Product:
1. *Integrated small fragmenting payloads through directionality and materials for increased effectiveness leveraging breadboard technologies developed under Advanced Lethal Armaments ATO-R*
2. *40mm Low Velocity Grenade (TRL 6) with the following improvements over M433:*
   - *Better engage targets in defilade*
   - *Increased probability of incapacitation*
   - *Enhanced fuze initiation*
3. *Drawings and Specifications*

Payoff:
Multiple critical technology demonstrations enabling increased Probability of Incapacitation for the Soldier, Squad and Platoon against non armored combatants in defilade.

Schedule & Cost



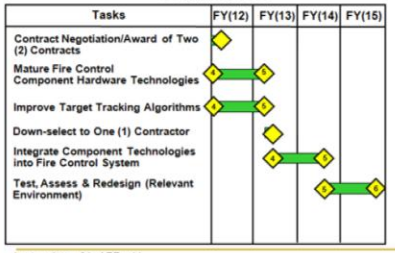
Small Arms Weapons & Fire Control Integration D.ARD.2012.03


Purpose:
To demonstrate the integration of advanced fire control component technology which improves capability to determine range, track moving targets, and increase probability of hit. System will be evaluated on relevant current and developmental small arms weapons.

Product:
- *Integrated Fire Control system leveraging breadboard technologies developed under Advanced Fire Control ATO-R*
- *Dynamic target tracking & range finding components*
- *Adaptive polymer zoom lens subsystem*

Payoff:
- *Critical fire control technology demonstrations addressing small arms capability gaps for acquiring targets, determining range to target, and engaging threats in open and defilade.*

Schedule & Cost



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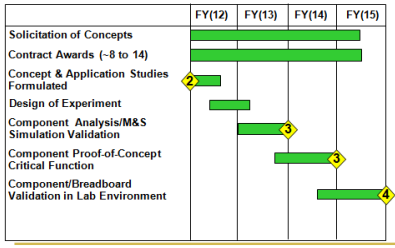
2015-2018 Planned Technology Investments

Advanced Small Unit (Platoon and Company) Weapon Technology Concepts Research




Schedule & Cost



Purpose:
Identify and advance technologies leading to the ability to improve Small Unit Level effectiveness. Utilize new small arms technological concepts to improve range overmatch capability against like-sized threat elements.

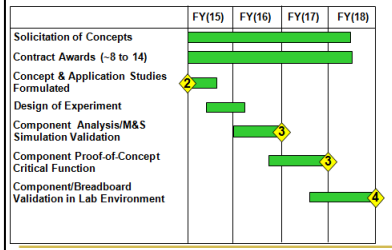
Results:
- *TRL 2 Concept development*
- *TRL 3 Demonstrations of components and technologies*
- *TRL 4 Concept tests*
- *Critical new concept designs*

Payoff:
- *Dramatic increase in range overmatch over current small arms systems*
- *Maximized Operational Utility and Survivability*
- *Assured Lethality*

Advanced Energy Small Arms Concept Exploration Research




Schedule & Cost



Purpose:
Identify power and energy sources to integrate ancillary devices onto small arms while reducing Size, Weight and Power.

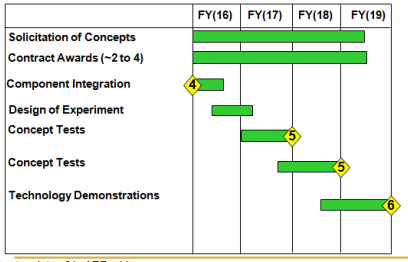
Results:
- *TRL 2 Concept development*
- *TRL 3 Demonstrations of components and technologies*
- *TRL 4 Concept tests*
- *Critical new concept designs*

Payoff:
- *Dramatic increase power management over current small arms systems*
- *Improved lasers and other systems employing directed energy applications*
- *Assured Lethality*

Advanced Small Unit Small Arms Technology Concepts Demonstration




Schedule & Cost



Purpose:
Identify and advance technologies leading to the ability to improve Small Unit Level effectiveness. Utilize new small arms technological concepts to improve range overmatch capability against like-sized threat elements.

Results:
- *TRL 4 concept tests*
- *TRL 6 prototypes and assessments*
- *Technology demonstration and quantification of benefits*

Payoff:
- *Dramatic increase in range overmatch over current small arms systems*
- *Maximized Operational Utility and Survivability*
- *Assured Lethality*

Small Arms Material & Process Technology Demonstration


Metal/ceramic composite

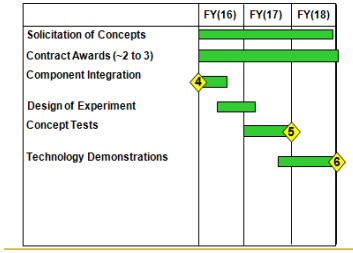

Functionally graded materials


Nanocoated Gun Barrel


Superhydrophobic coating


Lubricious coatings

Schedule & Cost

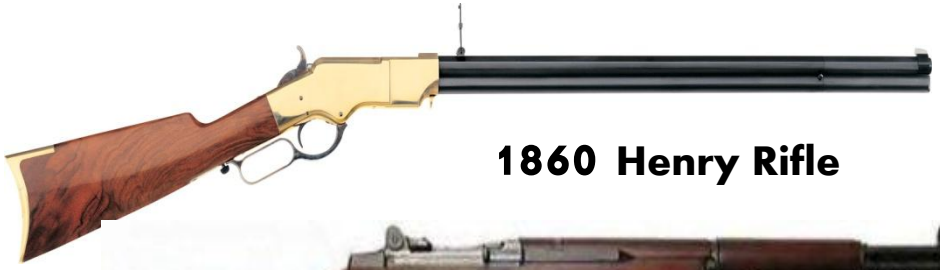


Purpose:
Assess and develop state-of-the-art material and process component technology to enhance the operability and maintainability of small arms weapons for current and future warfighters.

Product:
- *TRL 4 concept tests*
- *TRL 6 prototypes and assessments in existing weapons systems*
- *Technology demonstration and quantification of benefits*

Payoff:
- *Increased weapon lifetime*
- *Reduced maintenance or lubrication*
- *Increased reliability*
- *Decreased weapon signature*
- *Reduced weight*
- *Transition to PM Soldier Weapons or other technology programs*

FY14 Smaller, Lighter, and Cheaper (SLC) Small Arms Technology



1860 Henry Rifle

1906 M1 Garand Rifle

1960 AK-47 Rifle

1997 M4 Rifle

201X LSAT Rifle

New Funding may be available in FY14 to mature and demonstrate technology that focuses on developing increasingly smaller, lighter, and cheaper small arms technology components

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JSSAP Elevator Speech

JSSAP is delivering an integrated Small Arms R&D Capability Package by attacking the documented capability gaps of Threat Engagement, Target Acquisition, Breaching, Weapon Detection and Operational and Maintenance Issues for Small Arms.