Army Science and Technology (S&T) Lethality Portfolio Overview

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Agenda

- Army S&T Mission, Vision and Roles
- Enterprise
- Investment Strategy
- Resourcing
- Portfolio Investments
- Summary
MISSION: Identify, develop and demonstrate technology options that inform and enable effective and affordable capabilities for the Soldier

VISION: Providing Soldiers with the technology to Win

Current Force
- Deployable Force Protection Adaptive Red Team
- Advanced Rotary Wing Aerial Delivery Sling Load Net
- Video from Unmanned Aerial Systems
- High Speed Container Delivery System

Future Force
- Enabling the Future Force
- Cyber tools
- Next Generation Rotorcraft
- Neuroscience
- High Energy Lasers
- Occupant Centric Platform

Enhancing the Current Force
Roles for S&T

- Solve current problems – Operational Needs Statements (ONS)/Joint Urgent ONS (JUONS)
- Improve current system capability – Engineering Change Proposals (ECPs), product improvements
- Drive down technical risk for Programs of Record (PoRs)
- Inform affordable and achievable requirements
- Investigate new technology/approaches for potential Army application
- Determine technology/system vulnerabilities and identify mitigation
- Conduct “technology watch” functions
Who are we and how are we organized?
Army S&T Enterprise

Secretary of the Army
Honorable John M. McHugh

Under Secretary of the Army
Honorable Brad R. Carson

Assistant to the Secretary of the Army for Acquisition, Logistics, and Technology
Honorable Heidi Shyu

Deputy Assistant Secretary of the Army
(Research & Technology)
Ms. Mary J. Miller

* Percent of S&T core program executing, PB16

74%*
Army Materiel Command

8%*
U.S. Army Medical Command

14%*
U.S. Army Corps of Engineers

3%*
U.S. Army Space & Missile Defense Command

2%*
HQDA, G-1 Personnel

Note: Figures may not add due to rounding
Army S&T Enterprise—Research, Development & Engineering Centers & Labs

- U.S. Army Materiel Command
- U.S. Army Medical Command
- U.S. Army Corps of Engineers
- U.S. Army Space and Missile Defense Command
- Headquarters, Department of the Army, G-1

Total Civilian Manpower: ~17,000
  - ~12,000 Scientists & Engineers
  - ~5,000 Technicians, Analysts, and Administrative support
  - ~500 Military S&E
How do we make investment decisions?
How we prepare for an uncertain future…
Addressing the probable, possible, and unthinkable

• To maintain a leading edge in technology, S&T must continue; once given up, too expensive and too time-consuming to regain lost ground

• Threat assessments primarily address the “probable”

• Preventing tactical, operational, and strategic surprise requires S&T to address the “possible” and the “unthinkable”

Army S&T must have a broad investment strategy
Leap-Ahead and Disruptive Technologies enable Revolutionary Capabilities, but are high-risk and have big impacts to DOTMLPF.
Army Enduring Challenges

➢ Greater **force protection (Soldier, vehicle, base)** to ensure survivability across all operations
➢ Ease **overburdened** Soldiers in Small Units
  • Timely **mission command & tactical intelligence** to provide situation awareness and communications in **all** environments
  • Reduce logistic burden of **storing, transporting, distributing** and **retrograde** of materials

➢ Create **operational overmatch** (enhanced lethality and accuracy)
  ▪ Achieve operational **maneuverability** in all environments and at **high operational tempo**
  ▪ Enable ability to **operate in CBRNE environment**
  ▪ Enable **early detection and improved outcomes for Traumatic Brain Injury (TBI) and Post Traumatic Stress Disorder (PTSD)**
  ▪ Improve **operational energy**
  ▪ Improve **individual & team training**

➢ **Reduce lifecycle cost** of future Army capabilities
How are we funded?
Modernization Strategy in a Fiscally Challenged Environment

- Reduce procurement quantities to match force structure reductions
- Gained efficiencies
  - Leveraging multi-year procurement (Black Hawk, Chinook)
  - Incorporate Better Buying Power initiatives (contracting, should-cost, competition)

- Delay some new capability development & invest in next generation of capabilities
- Incremental upgrades to increase capabilities; Modernize aging systems
- Enable near-term readiness for contingencies
- Reduce O&S cost; address Non-Standard Equipment

O&S = Operations & Support
Applications research for specific military problems

Components, subsystems, models, new concepts

Understanding to solve Army-unique problems

Knowledge for an uncertain future

Material Science

Aeromechanics and Computational Methods

Occupant Centric Protection

Demonstrate technical feasibility at system and subsystem level

Path for technology spirals to acquisition—rapid insertion of new technology

Far Term

12-20+ yrs

Mid Term

6-12 yrs

Near Term

0-6 yrs

Note: Figures may not add due to rounding
Technology Maturation/Manufacturing Technology Strategy

**Goal:** Enabler programs to mature key capabilities the Army needs, applied when and where appropriate to “ramp up” technology insertion.

**6.4 Technology Maturation/Prototyping**
- Further mature technologies (goal TRL 7)
- Enable competitive prototyping prior to MS B
- Inform materiel requirements
- Drive down technology and cost risks
- Accelerate capabilities to the Warfighter

**6.7 Manufacturing Technology**
- Provide efficient and affordable manufacturing for next-generation combat systems
- Reduce production risks and manufacturing costs
How do we manage the Lethality Portfolio?
Army Investments by Portfolio

PB16 - $2.4B (FY16)

Army Investments FY16
- BA1: $425M
- BA2: $880M
- BA3: $896M
- BA4: $41M
- BA7: $48M
- BA6: $32M, Procurement $62M

**Soldier/Squad**
Personnel, Training, Human System Integration, Dismounted mission equipment and power & energy

**Basic Research**
Materials Science; Medical/Life Sciences; Quantum/Info Science; Autonomy; Networks

**Innovation Enablers**
High Performance Computing; Environmental Protection; Base Protection; Studies; Technical Maturation Initiatives; Procurement

**Medical**
Combat Casualty Care, Infectious Disease mitigation, clinical/rehabilitative medicine

**Lethality**
Offensive/Defensive kinetic (guns, missiles), Soldier Weapons, Directed Energy (HEL) weapons

**Ground Maneuver**
Combat/tactical ground platforms/survivability; unmanned ground systems; austere entry; power & energy

**Air**
Advanced air vehicles; unmanned aerial systems; manned/unmanned teaming

**C3I**
Secure Comms-on-the-move; cyber/EW; sensors
Lethality Portfolio
6.2 and 6.3 Funding

$254M

Investment Areas
- Energetic Materials
- Warheads
- Propulsion
- Guidance
- Seekers

Investment Areas
- Artillery
- Rockets
- Mortars

Investment Areas
- Squad Weapons
- Ground Vehicle Weapons
- Air Launched Weapons

Investment Areas
- Enablers
- Ammunition
- Precision Effects
- Volume Effects
- Counter Defilade
- Optics & Fire Control

Investment Areas
- High Energy Laser
- High Power Radio Frequency

Investment Areas
- Energetic Materials
- Warheads
- Propulsion
- Guidance
- Seekers

Air Defense
$34M
- Counter UAS/CM
- Counter RAM
- Radars

Fire Support
$47M
- Counter UAS/CM
- Counter RAM
- Radars

Close Combat
$30M
- Counter UAS/CM
- Counter RAM
- Radars

Soldier Weapons
$23M
- Counter UAS/CM
- Counter RAM
- Radars

Directed Energy
$48M
- Counter UAS/CM
- Counter RAM
- Radars

Weapons Enablers
$73M
- Counter UAS/CM
- Counter RAM
- Radars

As of PB16

FY16

Lethality Portfolio

SMDC
17%

AMRDEC-MI
34%

ARL
11%

ARDEC
38%
Lethality S&T Strategy

Goal: To achieve overmatch at extended ranges with precise and affordable weapons

Key Research Areas

- Energetics, Propulsion and Warheads for increased range and decisive effects
- Guidance for improved precision and GPS-denied precision
- Directed Energy Weapons
- Affordable component technologies to address weapon cost drivers
- Seeker technologies to defeat moving targets and air defense threats

Drivers

- CSA Strategic Priorities
- Army Strategic Planning Guidance
- Army Enduring Challenges
- Air & Missile Defense Strategy
- Arms Soldier Weapons Strategy
- Army Capabilities Needs Analysis
- Force 2025 and Beyond
- Army Operational Concept
**Lethality Major Efforts**

### Long Range Fires – Artillery/Rockets

**Goal:** Provide range extension, accuracy in GPS denied environments, and defeat of area and point targets

### Affordable Air Defense – KE & DE

**Goal:** Demonstrate affordable options (kinetic and directed energy) to defeat RAM, UAS and Cruise Missiles

### Medium Caliber Weapons

**Goal:** Demonstrate a more accurate and lethal medium caliber weapon system and ammunition for extended range engagements

### Small Arms Weapons Tech

**Goal:** Demonstrate small arms ammunition, weapons, optics and fire control technologies for precision at extended ranges with reduced weight

### Disruptive Energetics

**Goal:** Provide 3-10x yield in Energetics leading to game changing leaps in weapons effects and range.
Soldier Weapons Investments (PB16)

<table>
<thead>
<tr>
<th>Portfolio Thrust Areas</th>
<th>6.2 and 6.3 Technology R&amp;D Examples</th>
<th>Capability Gaps Addressed</th>
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<tbody>
<tr>
<td>Enablers</td>
<td>Disruptive Energetics; Adaptive solid lubricants; Active stabilization</td>
<td>Required Capability: Future Army maneuver forces require the capability to fire, maneuver, and survive in close combat to close with and capture, kill, or neutralize the enemy.</td>
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<tr>
<td>Ammunition</td>
<td>One-way luminescence; improved tungsten carbide</td>
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<tr>
<td>Precision Effects</td>
<td>From precision-guided to steerable; scalable effects</td>
<td>Gaps:</td>
</tr>
<tr>
<td>Volume Effects</td>
<td>.50 cal advanced remote/robotic armament; lightweight polymer ammo</td>
<td>• The Army lacks sufficient capability to enable riflemen to accurately engage and kill adversaries out to 600m</td>
</tr>
<tr>
<td>Counter-Defilade</td>
<td>Advanced fuzing and extended range for 40mm LV grenade</td>
<td>• Snipers lack the ability to engage targets at 1500m with precision rifle fire</td>
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<tr>
<td>Optics &amp; Fire Control</td>
<td>Direct View Optics; Multi-mode targeting sensor; Pre-shot detection</td>
<td></td>
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Technology investment focus is to increase the squad capability and mitigate threat overmatch
Summary

- Align S&T investments and develop a modernization strategy that creates technology insertion opportunities for Programs of Record

- Invest S&T resources where we must (i.e., Army-specific areas), and leverage where we can -- from industry, other Services/Agencies, Federally Funded Research Development Centers, National Labs, academia, and international partners

- Look to harness investments in technologies that reduce operational and sustainment costs, increase combat readiness, and increase reliability

- Keeping Updated with all small arms stakeholders via different activities: JSTAC TDS; S3R; POM submission; LIRA; AUSA; NDIA

- Business Opportunities—See next page for web site address

**Army S&T has a responsibility to lay the foundation for Army’s technology needs that drive future capabilities**
For Business Opportunities, see the following Organizations:

Armaments Research Development and Engineering Center (ARDEC)
https://www.pica.army.mil/TechTran/policy/

Army Research Laboratory (ARL)
Defense Innovation Marketplace

The Defense Innovation Marketplace is a communications resource to provide industry with improved insight into the Research and Engineering investment priorities of the Department of Defense (DoD). The Marketplace contains DoD R&E strategic documents, solicitations, and News/Events to better inform Independent Research and Development (IR&D) planning. The IR&D Secure Portal houses project summaries that provide DoD with visibility into the IR&D efforts submitted.

NEW BUSINESS OPPORTUNITIES
Have a solution to a DoD Technology need? Find links to:
- RFIs
- RFPs
- Presolicitations

TECHNOLOGY INTERCHANGE MEETINGS
Technology Interchange Meetings (TIMs) allow DoD and industry/academia to come together around specific R&E technology challenges and focus areas.
- Weapons Technology (Closed)
- Human Systems (June 22-26)

STRATEGIC DIRECTION
Where is the Department of Defense headed? Gain insight by linking to key DoD and Services information:
- Strategic Documents

WHAT'S NEW
Solicitations
- Army Multi-Role Technology Demonstrator-Architecture Implementation Process Demo
- Navy Improvements for Prototype Pipe Inspection Robot
- Navy Non-Cognitive testing Sources Sought
- AF Open System Acquisition Initiative Other Transaction
- Air Force Ultra Short Pulse Laser Support Services
- NASA Draft Cooperative Agreement Notice
- Navy IDS Technical and Integration Support Services

Strategic Documents
- Army S&T Overview
- Army Equipment Program 2016
- OTI Technical Assessment, Autonomy

Events
- Army Cyberpace Industry and Innovation Day ** May 28 **
- Airborne Network Technology Review Days
Army Science & Technology

Providing Soldiers with the Technology to Win