2009 Munitions Executive Summit
OSD Perspective

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Land Warfare and Munitions
Discussion Topics

- OSD / AT&L Organization
- AT&L Goals and Initiatives
- DoDI 5000.02 Update
- Budget Trends
- Munitions Interest Areas
  - Insensitive Munitions DOTC and Joint Munitions Program
  - Fuze Technology
  - Cluster Munitions
  - Conventional Munitions Demil
  - Rocket Motors Business Process Review
  - Small Arms Joint Assessment Team
  - TATB
  - Joint Munitions Program
  - DoD Ordnance Technology Consortium (DOTC)
USD (AT&L) Goals

AT&L Organizational Goals

1. High-performing, Agile, and Ethical Workforce
2. Strategic and Tactical Acquisition Excellence
3. Focused Technology to Meet Warfighting Needs
4. Cost-effective Joint Logistics Support for the Warfighter
5. Reliable and Cost-effective Industrial Capabilities Sufficient to Meet Strategic Objectives
6. Improved Governance and Decision Processes
7. Capable, Efficient, and Cost-effective Installations

http://www.acq.osd.mil
Goal 3
Focused Technology to Meet Warfighting Needs

• Promote and shape investments to lower costs and development time for the enterprise.
• Take proactive steps to transition technology programs.
• Conduct Defense Support Team (DST) activities to assist ACAT Programs.
• Enable greater coordination and collaboration on S&T programs.
• Understand effects of DoD policy and program decisions on the industrial base, and the extent to which industry decisions limit or expand DoD options.

• Expand and sustain the industrial base to encourage competition and innovation for essential industrial and technological capabilities.

• Expand Non-Traditional Supplier participation in DoD Acquisition.
Operation of the Defense Acquisition System

DoDI 5000.02 Update

Detailed information available at https://akss.dau.mil/dapc/
The Defense Acquisition Management System 2008

Changes to Phases

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<tr>
<td>Concept Refinement (CR)</td>
<td>Materiel Solution Analysis</td>
<td>More robust AoA (result of changes to JCIDS)</td>
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<tr>
<td>Technology Development (TD)</td>
<td></td>
<td>Competitive prototyping / PDR</td>
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<tr>
<td>Systems Development &amp; Demonstration (SDD)</td>
<td>Engineering &amp; Manufacturing Development (EMD)</td>
<td>More robust system engineering</td>
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Budget Trends
Planning, Programming, Budgeting, and Execution

4 Administration Years with 2-year PPBE Cycle

We are here! “Review and Refinement”

“Formalizing the Agenda”

“Execution of Guidance”

“Ensuring the Legacy”

New Admin

Off-year GDF

Modify Budget Submission (previous administration)

Budget Submission Year 1

Budget Submission Year 2

Budget Submission Year 3

Budget Submission Year 4

Budget Execution Year 1

Budget Execution Year 2

Budget Execution Year 3

Budget Execution Year 4

FY 11-15
Program
Budget Review

FY 12-17
Program
Budget Review

FY 13-17
Program
Budget Review

FY 14-19
Program
Budget Review

Election
Past and Projected Resources for Defense

(Billions of 2009 dollars)

Past and Projected Resources for Defense Investment

(Billions of 2009 dollars)

Smart Munitions vs. Other Munitions

Procurement Trend

General Purpose Bombs

GPS Guided Munitions

Fiscal Year

07 08 09 10 11 12 13

FY06$M CONSTANT

Smart Munitions  Other Munitions
<table>
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<th></th>
<th>2007</th>
<th>2008</th>
<th>2009</th>
<th>2010</th>
<th>2011</th>
<th>2012</th>
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<tr>
<td>Ammo (A)</td>
<td>2,616</td>
<td>2,389</td>
<td>2,276</td>
<td>2,403</td>
<td>2,284</td>
<td>2,432</td>
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<td>1,362</td>
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<td>894</td>
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<td>Missiles (A)</td>
<td>1,617</td>
<td>1,899</td>
<td>2,211</td>
<td>1,429</td>
<td>1,546</td>
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<td>Missiles (AF)</td>
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<td>5,537</td>
<td>5,518</td>
<td>4,674</td>
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<td>Weapons (N)</td>
<td>2,897</td>
<td>3,093</td>
<td>3,575</td>
<td>3,874</td>
<td>3,840</td>
<td>3,870</td>
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<td>($ M)</td>
<td>13,338</td>
<td>14,437</td>
<td>15,615</td>
<td>15,163</td>
<td>14,330</td>
<td>14,341</td>
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Munitions Interest Areas
Insensitive Munitions (IM) Update

• IM Strategic Plans continue to garner the attention of senior military leadership – reduced munition vulnerability translates into reduced platform vulnerability

• Third submission of strategic plans has highlighted the significant improvements being made in some systems while identifying other areas that need additional focus and investment to prevent them from blocking advancement toward an IM compliant stockpile
  – Over 80% Munitions stockpile remains non IM compliant

• Encouraged by strategic investments and trickle down of technology described in some plans; we will work with all PEOs to ensure that their IM investment plans are linked to IM technology transitions and to acquisition “windows of opportunity”

• IM Strategic Plans remain the primary tool for guiding IM technology investments
Joint IM Technology Program Update

• Joint Insensitive Munitions Technology Program
  – Total FY10-15 Funding is $231M
  – Program is focused on developing and demonstrating enabling technologies in 5 munition areas – High Performance Rocket Propulsion, Minimum Smoke Rocket Propulsion, Blast/Fragmentation Warheads, Anti-Armor Warheads, Large Caliber Gun Propulsion
  – First technology transfer should occur in FY09
  – DOTC is the mechanism for engaging industry

![Pie charts showing FY 09.2 Investments and FY 09.3 Investments]
Fuzing Science & Technology Efforts

• POM10 fuze issue addresses fuze technology shortfalls for priority capabilities
• $81.4 million S&T funding FY2010 - FY2015

• VISION – Advance and maintain a healthy U.S. industrial and fuze technology base; establish early and continued government involvement in the development, application, and transition of fuze technology to munitions development.

• 4 Fuze Area Technology Groups formed:
  – Hard Target Survivable Fuzing
  – Tailorable Effects Weapon Fuzing
  – High Reliability Fuzing
  – Enabling Technologies and Common Architecture

• Participants
  – DoD communities: S&T / Requirements / Acquisition
  – Dept. of Energy
  – Industry via DOTC
Cluster Munitions

• New DoD policy issued June 2008; after 2018 all cluster munitions must have UXO rate of 1% or less.
  – Joint Staff leading a study to identify capability impacts, alternatives to replace legacy cluster munitions
• Convention on Cluster Munitions signed by 94 nations in December 2008; bans nearly all cluster munitions; U.S. is not a signatory
  – U.S. is negotiating within the Convention on Conventional Weapons to regulate (not ban) use of cluster munitions
• Impacts of new policy and treaty:
  – Increase in demil liability
  – Potential new R&D and production of replacement munitions
  – Possible changes in how U.S. operates with coalition partners who signed Convention on Cluster Munitions
Design for Demilitarization
Policy Memo Signed by USD(AT&L) August 2008

• Demilitarization stockpile poses safety and environmental hazards, and impacts readiness
• If not considered early in the design, increases weapons’ life cycle costs
• During system design, weapons designers can optimize demil methods and resource reclamation and reuse
  – Facilitate disassembly and access to energetic materials
  – Use energetic materials and components having reclamation or reuse potential
  – Efficiently accommodate existing demilitarization processes
  – Reduce the use of environmentally sensitive materials
  – And enhance safety for demil operators
• PMs will now include in acquisition documents and in design reviews how they intend to address demil in design and test

• Current stockpile: ~460K short tons ammo, 360K short tons missiles
• Army is executive agent for all conventional ammunition demil
  • FYDP Execution ~ $750M
  • FYDP R&D ~ $85M
• Cluster munitions policy will increase demil stockpile
Rocket Motors
Business Process Review (BPR)

• Concept Decision Review of the Joint Air-to-Ground Missile (JAGM), March 2007, directed DUSD(A&T) lead a BPR to streamline the five year development/certification timeline

• With Service Acquisition Executive support, we formed an IPT made-up of stakeholder PEOs to oversee the effort, and assembled Nation-wide SMEs (from all 3 Services) to conduct a nine-month Lean Six Sigma review

• The review resulted in a new joint process for DoD rocket motors development and qualification and 13 recommendations for reducing cycle-time and program risk

• Pending USD(AT&L) charter for a Joint Rocket Motor Advisory Group (JRMAG), to serve as a multi-Service body of technical experts that will inform the requirements generation and material development processes
Small Arms & Ammunition
Joint Assessment Team
& Defense Support Team
TATB

- Triaminotrinitrobenzene (TATB) is one of the least sensitive explosive materials known and is a critical ingredient in the booster explosives PBXN-7, used in bomb and missile fuzes and PBXW-14, used in mortar fuzes.

- The only qualified source, BAE Systems, Royal Ordnance in Bridgewater, UK, ceased production in Dec 2005 and closed in 2006.

- Current efforts to develop and qualify a drop-in replacement have been unsuccessful to date

- Current needs being met from a limited DOE stockpile

- Lack of a qualified TATB source may critically impact our capabilities

- Support from the entire munitions community required to address this critical need
TATB – Way Forward

• Establish senior-level steering committee – DoD & DOE
• DoD-wide IPT in place to identify and oversee TATB efforts – All potential solutions will be considered.
  – Continued support for MANTECH efforts at BAE and ATK, if warranted
  – Re-establish previous manufacturing capability at U.S. facility, if warranted
  – Utilize DoD prize authority to incentivize non-traditional defense contractors to work this issue
  – Utilize Title III authority to encourage industry investments
  – Consideration of stop-gap solutions should TATB availability end
  – Long-term technology investments to identify, scale-up, and qualify a TATB replacement through Joint IM Technology Program investments
  – Request for Information to U.S. Industrial Base for TATB and 1,3,5-TCB manufacturers
Joint DoD/DOE Munitions Program (JMP)

- **Goal:** transition technologies and tools developed by the JMP-DOE National Labs to NWEC members in accordance with federal laws & Lab rules
- To date several technologies have transitioned to industry, none have occurred through DOTC/NWEC
- Approx. 40 projects in 9 Technology Coordinating Groups arranged in 5 focus areas:
  - Modeling & Simulation (TCG I & II)
  - Energetic Materials (TCG II & III)
  - Initiation, Fuzing & Sensors (TCG X & XIII)
  - Warhead Technology (TCG IV & XI)
  - Munitions Lifecycle (TCG IX & XIV)
Current JMP Transition Opportunities

- Composite Case Technology for Munitions
- LLM-105 High-Power/Insensitive Explosive
- CHEETAH – Thermochemical code
- Complex system reliability estimation and prediction software
- On demand sensitization of materials technology
- Schlieren System for Surveillance of Detonators
- Advanced Diagnostic Suite for Detonators
- Inkjet Deposition of Explosives
- Micro-Monolithic Capacitive Discharge Unit (M2CDU)
- Thin-Film Thermal Battery Technology (TFTB)
- CTH – Shock Physics Analysis for Munitions Applications
- 3-Axis Milli-Pen (3AMP) Acceleration Recorder

For Technology Transition Opportunity Quad Charts contact JMP Technical Advisor, Eric Brown (eric.brown@osd.mil)
EXAMPLE JMP Technology Transition Opportunity
Micro-Monolithic Capacitive Discharge Unit (M²CDU)

Overview

Prototype M²CDU
Switch and Flex Cable
Capacitor
Transformer
High Voltage Diode
Circuit Board Base

Transition Intent

Transition the M²CDU technology for wide range of applications. One non-exclusive license has been executed with component supplier Novacap to develop, manufacture, and distribute the M²CDU in accordance with export controls.

Applications

Applications include harsh-environment, miniaturized electronic fuzes for military uses, and for industrial purposes such as the drilling industry.

Technical Description

Miniaturization technologies and assembly methods harden the module against harsh deceleration environments. Technologies include Low-Temperature Co-Fired Ceramics for hardened transformers and high-k dielectrics for multi-layered-ceramic capacitors. Assembly of the unit is non-trivial.

Warfighter Payoff

The M²CDU enables the survivability and performance of smart fuzes for defeat of hard and deeply buried targets. Their small volume also benefits missile/rocket ancillary systems such as rocket motors, gas generators, separation charges, and may enable safer and more reliable fuze architectures.

Milestones

<table>
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<tr>
<th>Milestones</th>
<th>FY06</th>
<th>FY07</th>
<th>FY08</th>
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<tr>
<td>• Built 1st prototype</td>
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<tr>
<td>• Demonstrated in harsh environments</td>
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<tr>
<td>• Redesign for reliable assembly techniques</td>
<td></td>
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<tr>
<td>• Redesign for manufacturability</td>
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PoC: Paul Butler, SNL, pcbutle@sandia.gov; 505-844-7874

Click on link to DOTC to express interest
The Technology Transition Challenge

• DOTC is a technology transfer point for the DOE/DoD Joint Munitions Program
  – Technology can be transferred directly to industry with laboratory oversight
• No technology transitions to industry via DOTC to date
  – “Industry Day” events held in 2003, 2005
  – Technologies from Livermore, Los Alamos, Sandia presented
• Seeking to improve the transition process, but….cannot succeed without commitment from industry
DoD Ordnance Technology Consortium

DoD Laboratories

• OUSD (AT&L) LW&M
• Department of The Army
• Department of the Navy
• Department of the Air Force
• Department of Energy
• Special Operations Command
• Other Agencies and Departments

National Warheads & Energetics Consortium

• Defense Contractors
• Traditional & Non-Traditional
• Academic Institutions
• Not-for-Profits Organizations

Rapid & Agile Acquisitions

Section 845 Other Transaction

DoD and NWEC… Partnering to Leverage Capabilities and Investment
DOTC Mission

• Demonstrate Feasibility and Transition Advanced Explosives, Propellants, Pyrotechnics, Warheads, Fuzing and Demilitarization Prototype Technologies

  • Advocate a critical mass of world-class technologists to meet the Department of Defense needs for conventional energetics (explosives, propellants, pyrotechnics), warheads, fuzes and demilitarization

  • Operate as an “open” center in which industry, academia, and other Government organizations and departments can freely participate

  • Be a focal point to rapidly transfer technology to the war fighter

  • Develop strong working affiliations with private and public energetics, warhead, fuze and DEMIL facilities and technology organizations

  • Leverage governmental and private sector research and development resources to maximize return on investment

    • Promote non-traditional defense contractor involvement

    • Promote innovation
DOTC Success =

• Stronger partnerships between Government and Industry
• Better collaboration among Government labs
• Increasing contributions of non-traditional defense contractors
• *Transitioning technology to system development and to the field*
Questions?