MANAGEMENT AND INTRODUCTION OF TECHNOLOGY - AN OSD OFFICE OF TECHNOLOGY TRANSITION PERSPECTIVE FOR EFFECTS BASED SUPPORT IN THE NEW SECURITY ENVIRONMENT

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OUTLINE

• EVOLUTION TO OPERATIONAL ENGINEERING

• PROGRAM MANAGER, OSD, AND RESOURCES
  • WHERE IS TECHNOLOGY IN RMA
  • OTT & PROGRAMS - NAVAL EXAMPLES

• SUMMARY & RECOMMENDATIONS
  • THE ‘SO WHAT’ FACTOR
TAKE AWAYS

• WORK ENVIRONMENT REMAINS CHALLENGING, YET TOOLS ARE AVAILABLE

• WITHOUT ‘BIG PICTURE’ CONTEXT, ANY PATH MIGHT BE ‘TOO LONG A PATH’ FOR DELIVERY

• DEVELOPMENT AND SUSTAINING TOOLS ARE AVAILABLE

• OTT (DUSD(AS&C)) ‘FAMILY OF TOOLS’ ADDRESSES MULTIPLE STAGES OF LIFE CYCLE TOTAL OWNERSHIP COSTS

• EXAMPLES – NAVAL AND COMMERCIAL

• HOW THE TOOLS ARE USED HAS FUTURE IMPACT
THE TORTURED / IRON TRIANGLE

EXECUTIVE BRANCH

LEGISLATIVE BRANCH

PM

PUBLIC

ALLIES

USERS

BUSINESS INDUSTRY

MEDIA

LEGAL

THE OSD ENVIRONMENT


- AT&L OBJECTIVES
  - ACQUISITION AND LOGISTICS SUPPORT PROCESS
  - DOD AT&L WORKFORCE
  - DEFENSE INDUSTRIAL BASE
  - WEAPON SYSTEMS AND INFRASTRUCTURE RATIONAL
  - HIGH LEVERAGE TECHNOLOGIES FOR FUTURE WARFIGHTING

- DEFENSE (S&T) - . . . TO ENSURE THE WARFIGHTERS TODAY AND TOMORROW HAVE SUPERIOR AND AFFORDABLE TECHNOLOGY TO SUPPORT THEIR MISSIONS, AND PROVIDE REVOLUTIONARY WAR-WINNING CAPABILITIES. (Aldridge & Etters Congressional testimony 26 June 2001)
Move From “Threat-Based” to “Capabilities-Based” Planning

Key Military-Technical Trends of Adversaries

Exploit R&D to Maintain Decisive lead in Technologies

Develop & Exploit Technologies

Reduce Cycle Time

Achieve credibility & effectiveness in the acquisition & logistics support process

Revitalize the quality and morale of the AT&L workforce

Improve the health of the defense industrial base

Rationalize the weapon systems and infrastructure with the defense strategy

Initiate high leverage technologies to create warfighting capabilities, systems, & future strategies

Enabled future DoD capabilities through an integrated technology program

Accelerate technology transition to the warfighter

Enhance near term technical support

Revitalize the DoD laboratories

Develop, attract and retain a quality national security technical workforce

Issues Requiring Attention to Improve the Technology Transition Process
DoD facing:

- A changing threat
- An explosion of technological advances around the globe
- An ever increasing growth in commercial R&D compared to defense spending

These changes demand new ways for the DoD to develop and acquire technology

- Greater exploitation of commercial technology investment
- Ability to more rapidly transition technology investments
U.S. AND WORLDWIDE RESEARCH BASE SINCE WWII

Source: Report of the Defense Science Board Task Force on the Technology Capabilities of Non-DoD Providers; June 2000; Data provided by the Organization for Economic Cooperation and Development & National Science Foundation

DOD SCIENCE & TECHNOLOGY FUNDING HISTORY RELATIVE TO DOD TOA

WHAT MAKES RMA?

Revolution in Military Affairs

Technology Changes
Organizational Changes
Doctrinal Changes

DOTMLP-F
WITHOUT A BASE, THE REST WOULD COLLAPSE
OTT PROGRAM CHARACTERISTICS

• Statutorily Based (Title 10)
  – Annual Reports to Congress - Activities of the Office of Technology Transition and associated Programs

• DoD 5000-Series Emphasis on Evolutionary Defense Acquisition & Technology Maturation

• Participation on Multiple IPTs or IPT-Like Groups
  • OSD, DoD-wide, Industry, Other Gov’t Agencies

• Sponsor Conferences, Workshops, & Symposia

Enable Technology Transition & Transfer Between DOD and Industry
“The United States will ... transform America’s national security institutions to meet the challenges and opportunities of the twenty-first century.”

President George W. Bush, September 2002

“The Department currently is pursuing transformational business and planning practices such as adaptive planning, a more entrepreneurial, future-oriented capabilities-based resource allocation process, accelerated acquisition cycles built on spiral development, out-put based management, and a reformed analytic support agenda.”

Secretary of Defense Donald Rumsfeld, Transformation Planning Guidance, April 2003
DoD Leadership’s Intent For DoD 5000 Revision

“….create an acquisition policy environment that fosters efficiency, flexibility, creativity, and innovation.”

DEPSECDEF Paul Wolfowitz, 30 Oct 2002

Revised Policy Objectives

- Encourage innovation and flexibility
- Permit greater judgment in the employment of acquisition principles
- Focus on outcomes vice process
- Empower PM’s to use the system vice being hampered by over-regulation
DDR&E / DUSD (AS&C) Transition Programs

Transition Across the Product / Process Life Cycle

Pre-Systems Acquisition

Systems Acquisition (Engineering Development, Demonstration, LRIP & Production)

Sustainment & Maintenance

A Concept & Tech Development

B System Development & Demonstration

C Production & Deployment

Initial Product/Process Capability

Product/Process Development

Product/Process Insertion

Product/Process Improvement & Sustainment

IOC

Support

ACTDs

Joint Warfighting Program (JWP)

Technology Transfer Initiative (TTI)

Defense Acquisition Challenge Program (DACP)

Foreign Comparative Testing (FCT)

Dual Use Science & Technology - DUS&T

Independent Research & Development

Tech Link

Quick Reaction Fund (QFR)

Manufacturing Technology - ManTech

Title III / Defense Production Act

Small Business Innovative Research - SBIR

http://www.dod.mil/ddre/

http://wwwosd.acq.osd.mil/asc/
DDR&E / DUSD (AS&C) Transition Programs

Transition Across the Product / Process Life Cycle

Pre-Systems Acquisition

Concept Refinement

Skills Acquisition

Systems Acquisition (Engineering Development, Demonstration, LRIP & Production)

Transition Across the Product / Process Life Cycle

Technology Development

System Development & Demonstration

Production & Deployment

Sustainment & Maintenance

Initial Product/ Process Capability

Product/ Process Development

Product/ Process Insertion

Product/ Process Improvement & Sustainment

A

B

C

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Small Business Innovative Research - SBIR

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DETERMINE OBJECTIVES AND CONSTRAINTS

LINKAGE TO NATIONAL & ASSIGNED MISSIONS

PLAN NEXT PHASE

PROTOTYPING ACTIVITIES

PROTOTYPING MISSION CAPABILITIES, TTPs & CONOPs

ANALYSE USERS INPUTS AND LESSONS LEARNED

DEVELOP NEXT LEVEL PRODUCT

USER INVOLVEMENT & JOINT DISTRIBUTED ENGINEERING PLANT CAN REDUCE THE FIELDING CYCLE TIME TO FIELD OPERATIONAL WARFIGHTING CAPABILITY

SPIRAL METHOD OF OPERATIONAL ENGINEERING

RISK ANALYSIS

THREAT ANALYSIS & ASSESSMENT

ID & RESOLVE RISKS

ID & RESOLVE ROLES, MISSIONS & FINITE ANALYSIS RISKS
**Objective:** To ensure full use of the result of the Nation’s Federal investment in R&D - Office of Technology Transition established to encourage, coordinate DoD technology transfer.

**Program Attributes**
- Mechanisms: CRADA, PLA, EPA, and partnering
- Normal contracting rules do not apply
- Joint development for military and commercial applications

**Example: Watertight Hatch Gasket**
- Newly developed, improved, and patented Si rubber gasket with new cross-section.
- Suitable for use in watertight, airtight, and even firezone application closures.
- Adopted by entire Navy Fleet AND USCG
- Impacts: 90% labor savings on install; cost savings ~$18/linear foot; >1,000,000 ft installed; development cost (with testing) ~$18,000.
- Increased service life and ship / vessel survivability.

Making Mutual Transfer of Technology and Joint Development Normal Business
COMMERICAL OPERATIONS & SUPPORT SAVINGS INITIATIVE (COSSI)

**Purpose:**
- Provide funding for the nonrecurring engineering, testing, & qualification needed to insert a commercial technology into a legacy system
- Increase readiness and reduce operations and support costs of legacy systems

**Background:**
- Established by FY98 Authorization Act
- Uses Other Transaction Authority
- Endorsed by DSB Study on “Preserving a Healthy & Competitive Defense Industry”
- O&S savings in excess of $5 billion

**Example: Helicopter Integrated Mechanical Diagnostic - Health & Usage Monitoring System**

- **Issue:** Current Diagnostics are Done Manually - Labor Intensive, Inexact, Leading to Unnecessary Removals
- **Solution:** Adapt Commercial System that Automatically Collects & Analyzes In-Flight Data

Leveraging Commercial Technologies to Reduce Operations and Support Costs
DUAL USE SCIENCE & TECHNOLOGY (DUS&T)

Objective - Partner with Industry to Jointly Fund the Development of Dual Use Technologies Needed to Maintain DoD’s Technological Superiority on the Battlefield & by Industry to Remain Competitive in the Marketplace

Key Tenets:
• Cost sharing between the Military Services & Industry (Traditional and Non-Traditional)
• Use of “Other Transactions” in lieu of standard contracting to attract commercial firms
• Formation of partnerships with industry to develop dual use technologies

Example: Thermal Spray Nanostructured Coatings For Wear, Corrosion, and Erosion Resistant Applications

To Date: Over 300 Projects Initiated and Close to $1B Invested and More than 400 companies, universities, and nonprofit organizes participating
INDEPENDENT RESEARCH & DEVELOPMENT (IR&D)

DoD/Industry Interaction

DoD

- Provide information on DoD's R&D activities & plans, mission needs, & operational requirements
- Review IR&D activities and provide feedback to contractors
- Review IR&D database to identify IR&D of interest

Industry

- Plan, fund, and conduct IR&D
- Provide technical information about IR&D
- Provide IR&D project descriptions

Example: Inertial Measurement Unit

- Project Cost: ~$10 Million
- Performance demonstrated in > 20 Systems
- Increased sales > 10-fold; Unit price reduced > 2/3s
- HG1700 annual Sales: ~$100 Million & rising

Potential Joint Development Efforts Through Joint Identification of Mutual Interest Areas
**Objective:** Improve Affordability of DoD Systems by Investing in New & Improved Manufacturing Processes Across The Weapon System Life Cycle

**Program Attributes**
- Improve Cycle Time & Process Capabilities
- Demonstrate Key Information Technologies
- Adopt Commercial Practices for Military Applications

**Example - Enhanced Manufacturing Processes for Body Armor Materials**

- **Plate Forming:**
  - Siliconized Silicon Carbide
  - Boron Carbide

- **Benefits:**
  - Stops Rifle & Machine Gun Fire
  - 55% Lighter, 60% Lower Cost Compared to Armor Plates
  - Cost Avoidance: $193M

- **Implementation:**
  - Over 50K Plates Delivered & Fielded; 140K Plates on Contract
  - Supports “Operation Enduring Freedom”

**Reduced Total Ownership Costs Through Strategic Manufacturing Investments**
TITLE III / DEFENSE PRODUCTION ACT

Purpose: Create, expand, modernize, and maintain domestic production capacity for essential items and industrial resources needed for national defense

Incentives to Industry:
- DoD shares cost of capital investments
- Process improvements
- Material qualification
- Purchase commitments

Example – Power Semiconductor Switching Devices

Title III – A Driving Force Behind Turnaround in Critical Industry Segments
SMALL BUSINESS INNOVATION RESEARCH (SBIR)

• Stimulates Technological Innovation
• Increases Small Business Participation in Federally Funded R&D
• Encourages Commercialization of Technology

**FY01 Funding**
- Federal Agencies: $1.1B
- DoD: >$500M
- DUSD(S&T): $26M
  - Cognitive Readiness
  - Advanced Distributed Learning
  - Smart Sensor Web
  - Biomedical Programs

**Program Phases**
- **Phase I**: Six months/$100,000 (feasibility study)
- **Phase II**: Two years/$750,000 (prototype development)
- **Phase III**: Commercialize for military & private sector markets

**Example: Acoustic Mouthpiece Using Terfenol-D**
- Low Voltage Transducer Embedded Inside a SCUBA Diver’s Mouthpiece
- Allows Diver to Hear Through Dental Sound Conduction
- Capability Will Be Available for Special Forces Divers Without Full Face Masks

Congressional Interest: 3000 Contracts / Year with Small High Tech Firms
Acquisition Community - “Perceptions” of the S&T Community

• S&T’s job is complete at the tech development stage
• Implementation of the technology is the customer’s (problem) responsibility
• Development cycle for S&T is too long
• Focus only on the technology and not on the business rationale for implementation

Key Impediments

• Budget: Lack of Transition Funds
• Transition Process Lacks Definition & Visibility
• Culture: Difference Goals & Timelines between S&T and Acquisition Managers
• Lack of Incentives

Recent Service / OSD Best Practices

• Army Rapid Acquisition Program for Transition
• Navy’s Future Naval Capabilities & Chief Technology Officer
• AF Applied Technology Council & Warfighting Rapid Acquisition Program
• ACTD Transition Officer

Source: April 2000 PEO SYSCOM Workshop
RECOMMENDATIONS

• Establish a Skunkworks Champion and use some Skunkworks within the organization work force.

• Have a Director of Revolution for shifting organization personnel.

• Make submissions of proposals for technology transition programs a performance factor.

• Have Warfighters and Combatant Commanders evaluate Program Managers and Program Manager Organization.
Bottom Line: Warfighter Confidence & Affordable, Faster Transition

Right Materiel, Right Place, Right Time, at the Right Cost - All The Time
OUR PEOPLE are the Jewel of the Force!

Former SECNAV Danzig