

10TH ICCRTS

THE TENTH INTERNATIONAL COMMAND AND CONTROL RESEARCH AND TECHNOLOGY SYMPOSIUM

— THE —
FUTURE
— OF —

COMMAND...
CONTROL...

10TH ICGCRTS

THE TENTH INTERNATIONAL COMMAND AND CONTROL RESEARCH AND TECHNOLOGY SYMPOSIUM

EFFECTS BASED OPERATIONS TRACK

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

SYSTEMS ACQUISITION PROCESS CYCLE

NATIONAL / DEFENSE
INFORMATION
INFRASTRUCTURE

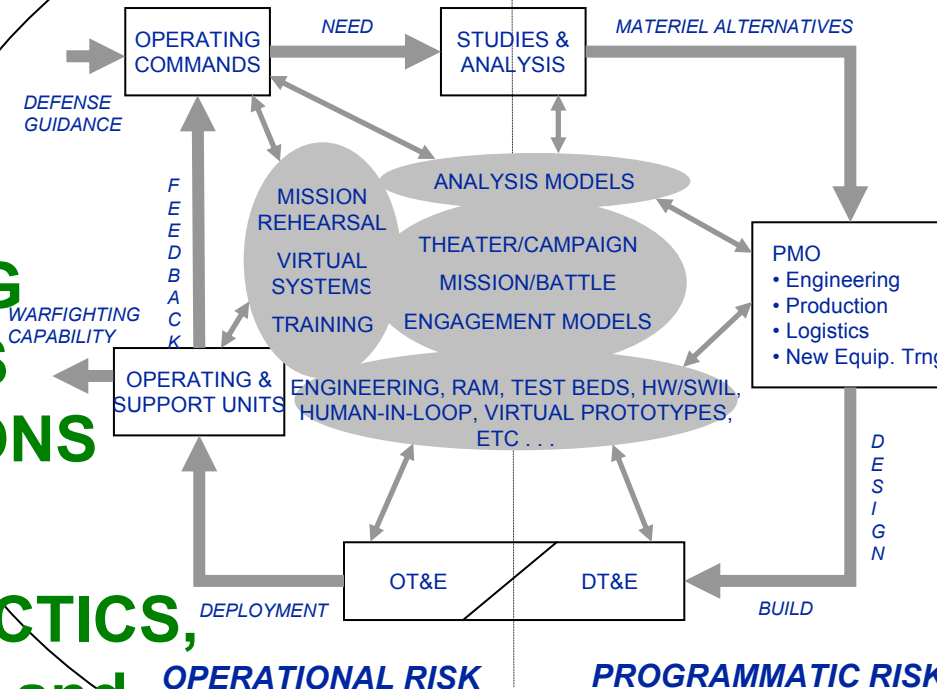
LOGISTICS

MISSION
WARFIGHTING
CAPABILITIES
CONTRIBUTIONS

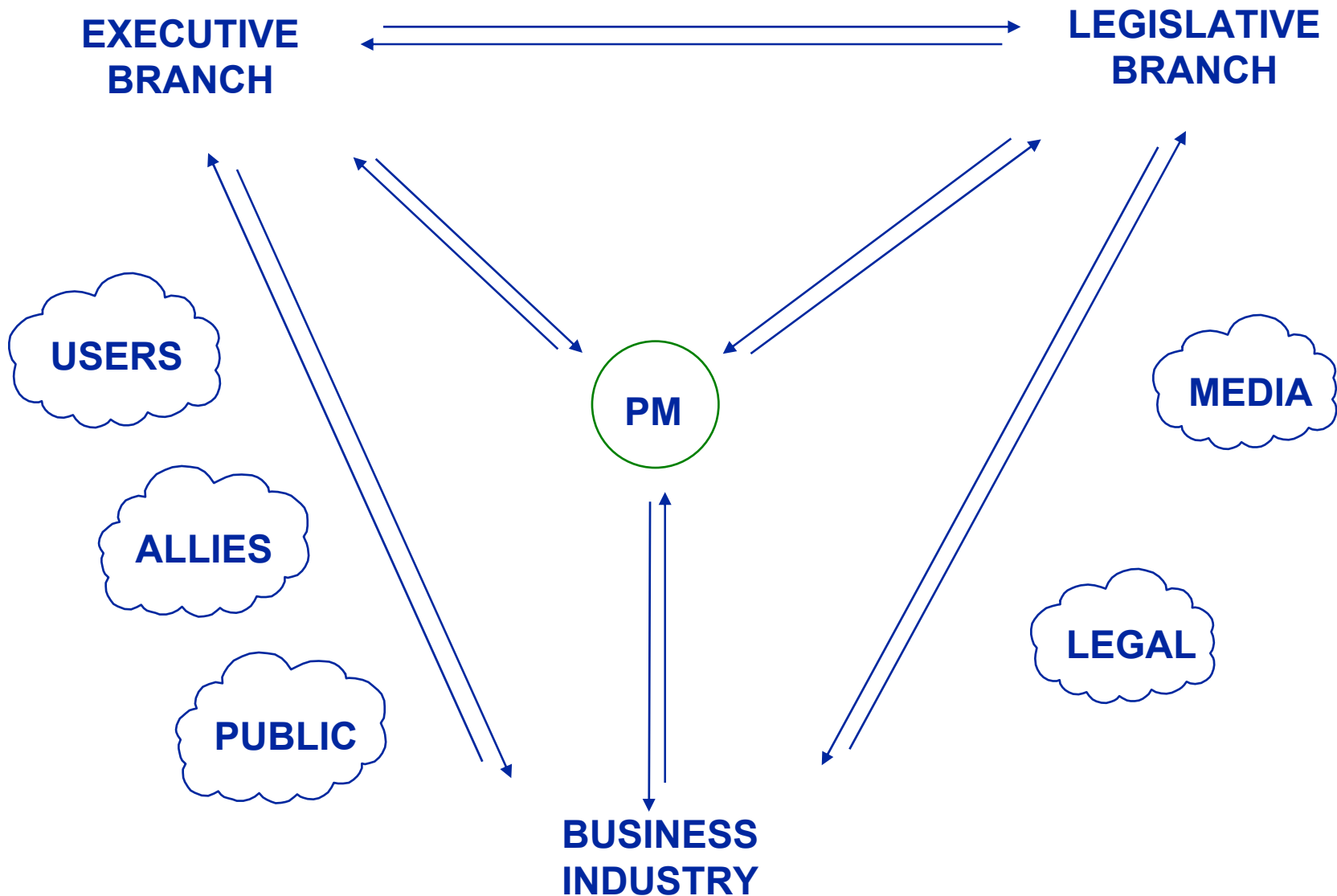
DISTRIBUTED
INTERACTIVE
SIMULATION

TRAINING, TACTICS,
TECHNIQUES, and
PROCEDURES/
CONCEPTS OF OPERATIONS

EVOLVING TO OPERATIONAL ENGINEERING



THE TORTURED / IRON TRIANGLE



THE OSD ENVIRONMENT

- DOD WILL RELY ON THE PRIVATE SECTOR TO PROVIDE MUCH OF THE LEADERSHIP IN DEVELOPING NEW TECHNOLOGIES. THUS, THE DEPARTMENT HAS EMBARKED ON . . . THIS “QUIET REVOLUTION” [WHICH] WILL TAKE ADVANTAGE OF SCIENCE AND TECHNOLOGY AND CONTINUE TO PROVIDE U.S. FORCES WITH TECHNOLOGY SUPERIORITY. (QDR, p. 41, 30 September 2001) (Emphasis added.)
- 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)

EVOLVING OSD POLICY

QDR: Sep 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

USD(AT&L) Goals

- ➡ 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

DDR&E Priorities

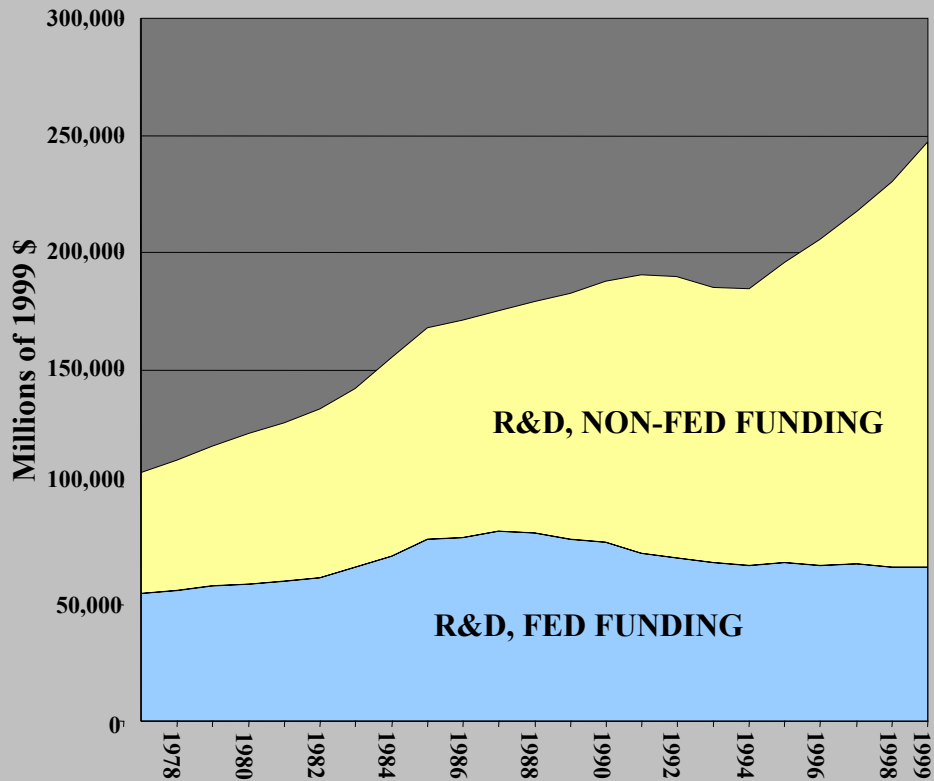
- ➡ Enable future DoD capabilities through an integrated technology program
- ➡ Accelerate technology transition to the warfighter
- ➡ Enhance near term technical support
- Revitalize the DoD laboratories
- Develop, attract and retain a quality national security technical workforce



Issues Requiring Attention to Improve the Technology Transition Process

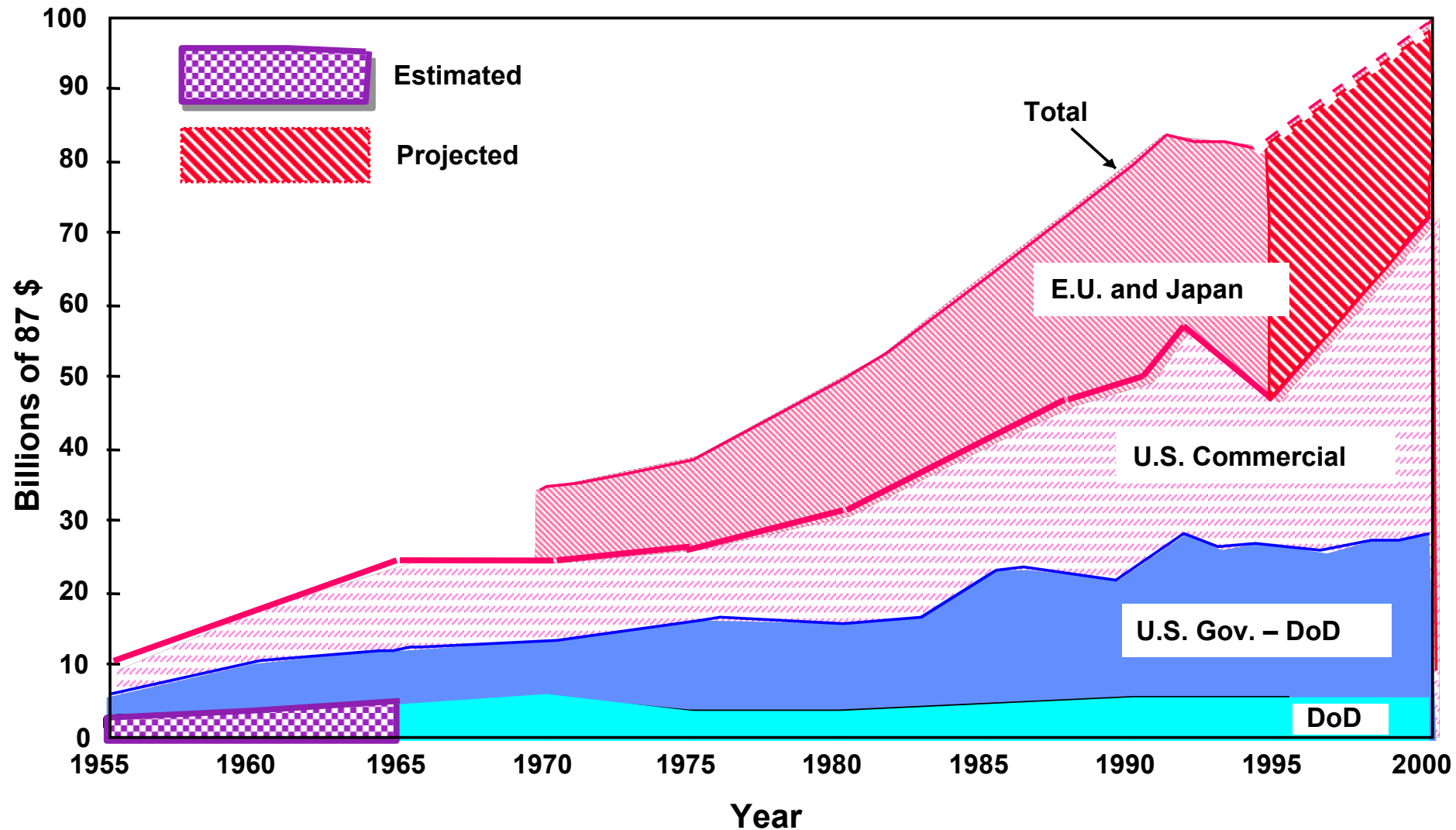
TECHNOLOGY TREND

National R&D Funding



- **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

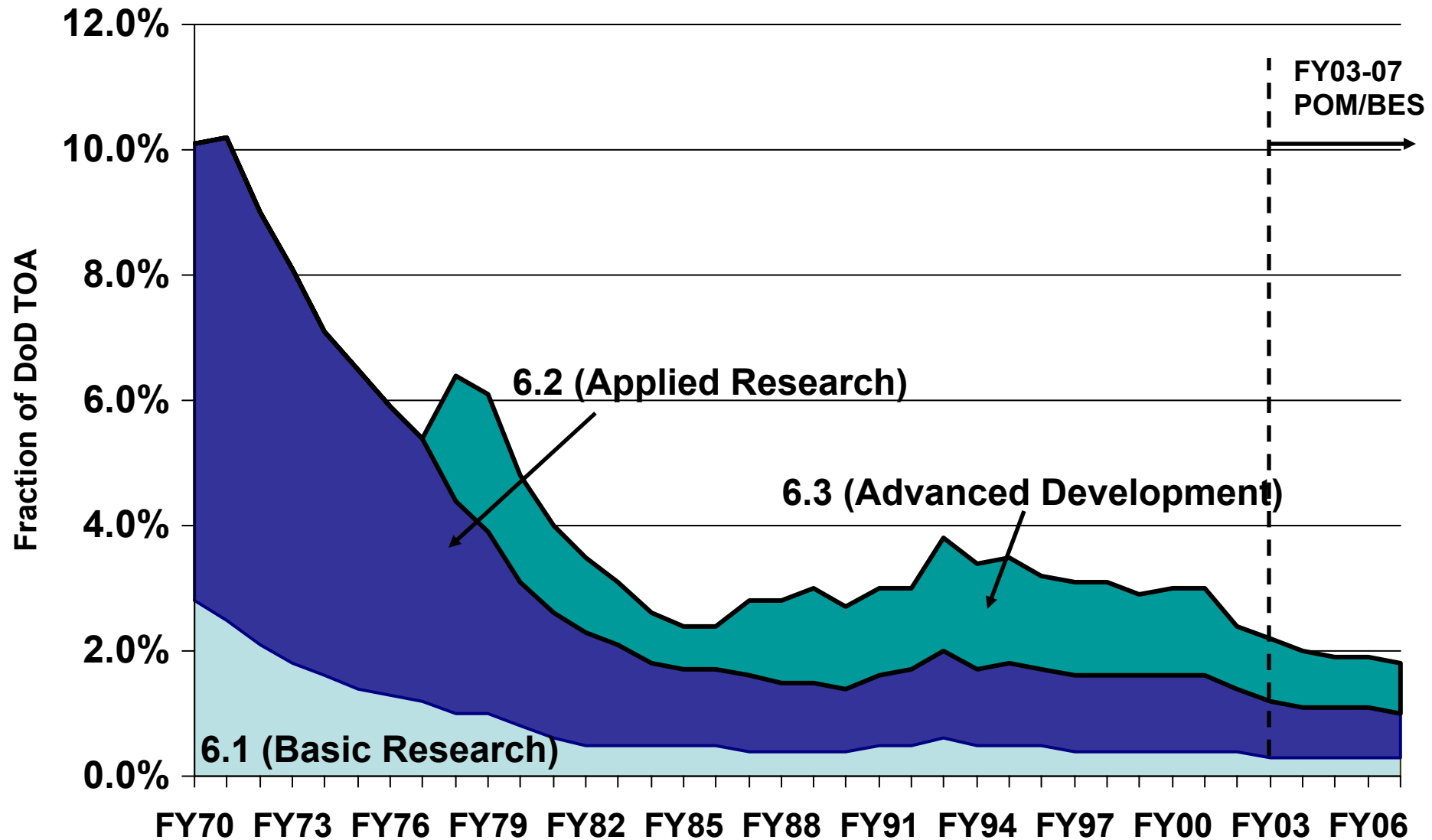
U.S. AND WORLDWIDE RESEARCH BASE SINCE WWII



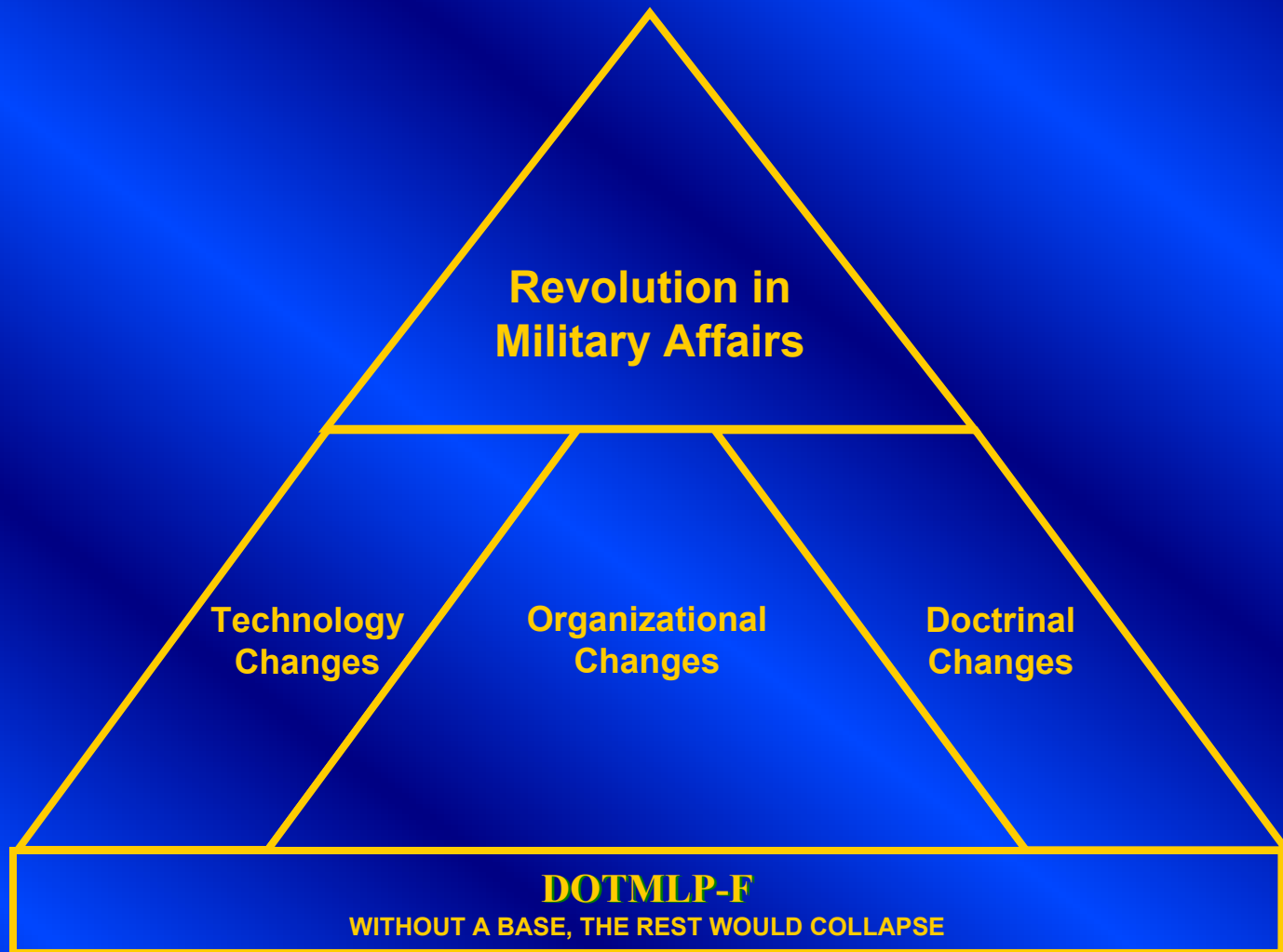
Source: Report of the Defense Science Board Task Force on the Technology Capabilities of Non-DoD Providers; June 2000; Data provided by the Organization for Economic Cooperation and Development & National Science Foundation

Extract from Dr. Segal, NDIA 'DoD Technology Exposition' 5-7 Feb 2000, "DoD S&T Strategy and Plans" Presentation Slides.

DOD SCIENCE & TECHNOLOGY FUNDING HISTORY RELATIVE TO DOD TOA



WHAT MAKES RMA?



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 Need for Transformation



“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.”

Former DEPSECDEF Paul Wolfowitz, 30 Oct 2002

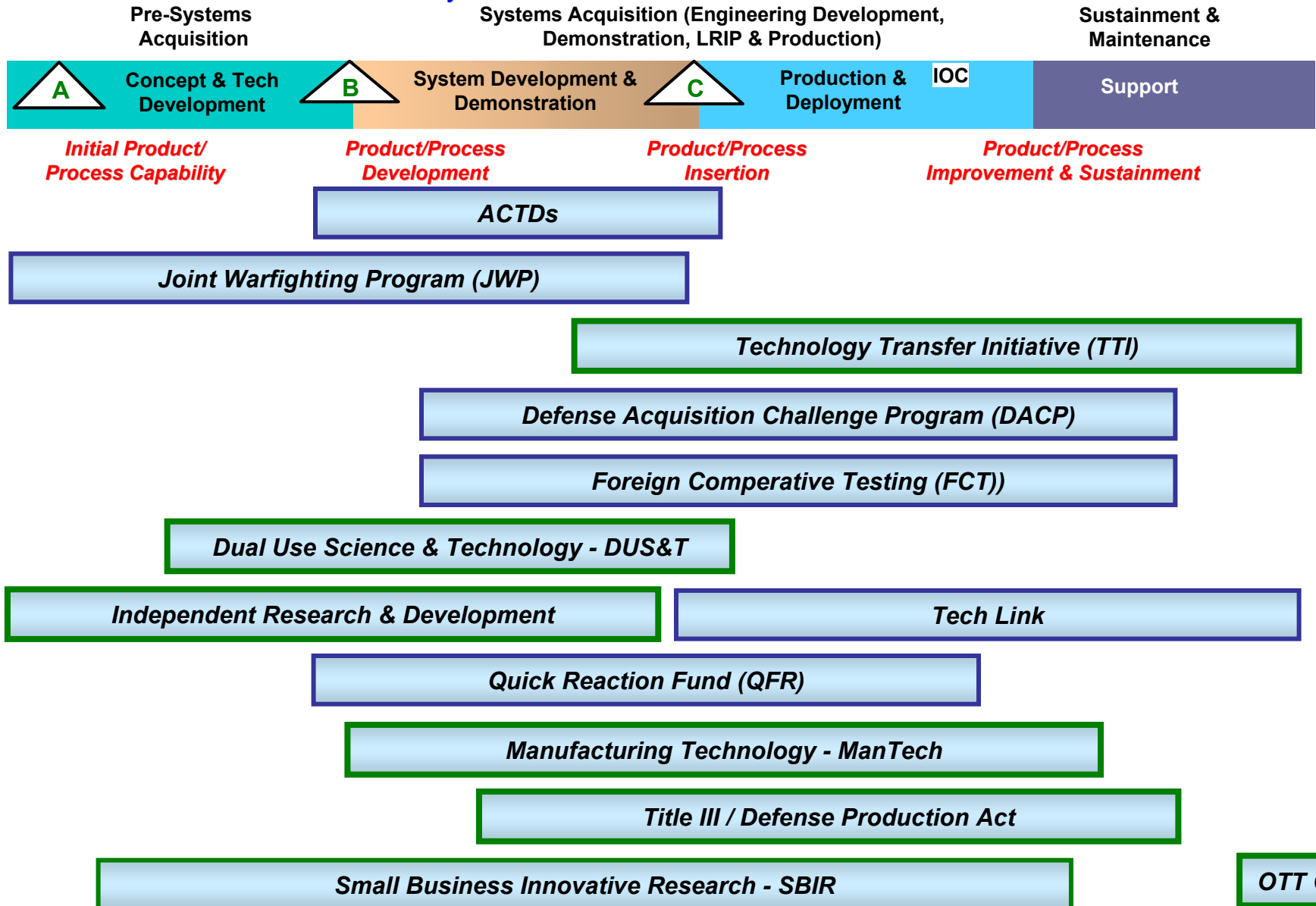
Revised Policy Objectives

- **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

<http://www.dod.mil/ddre/>
<http://www.osd.acq.osd.mil/asc/>

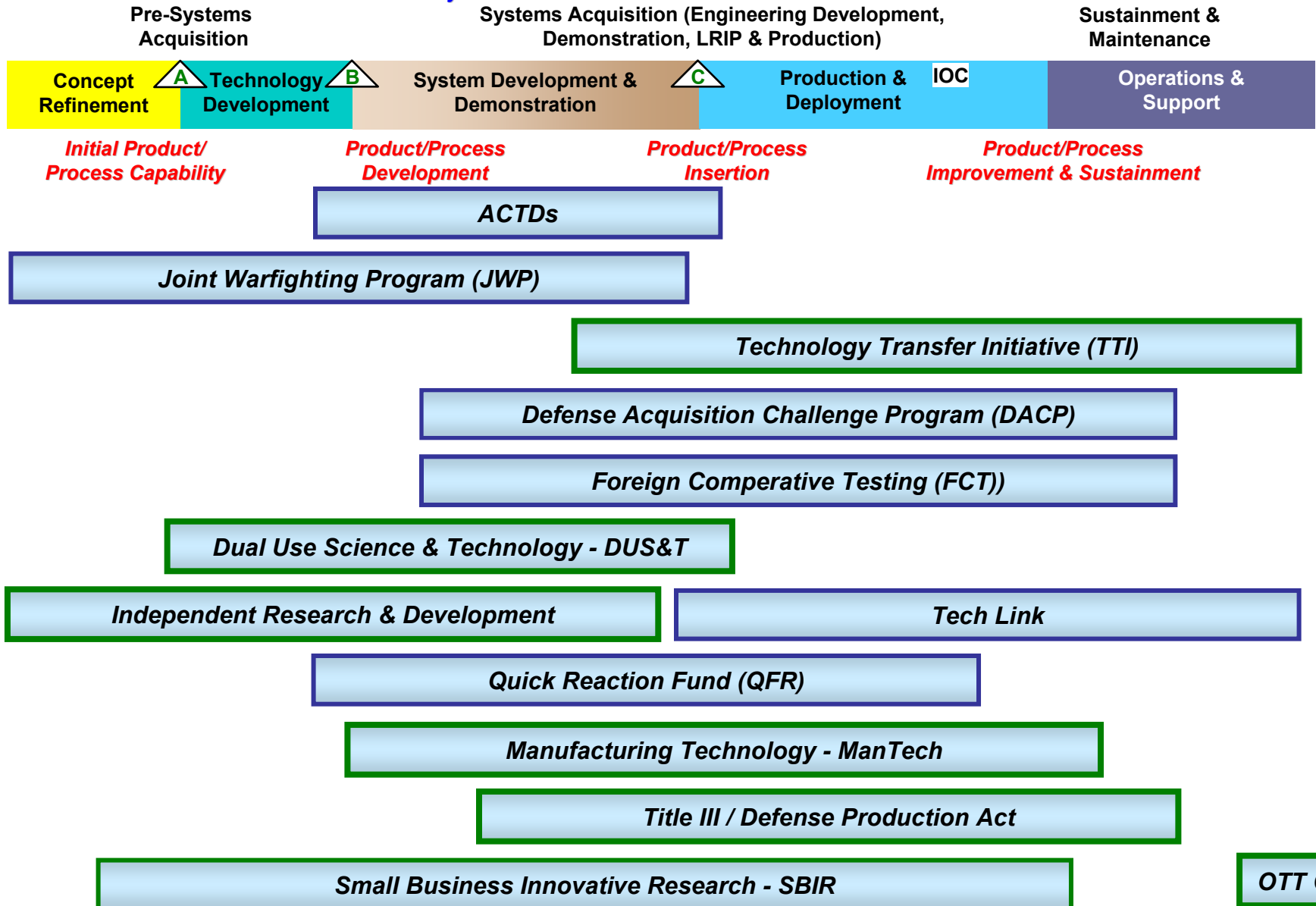
Transition Across the Product / Process Life Cycle



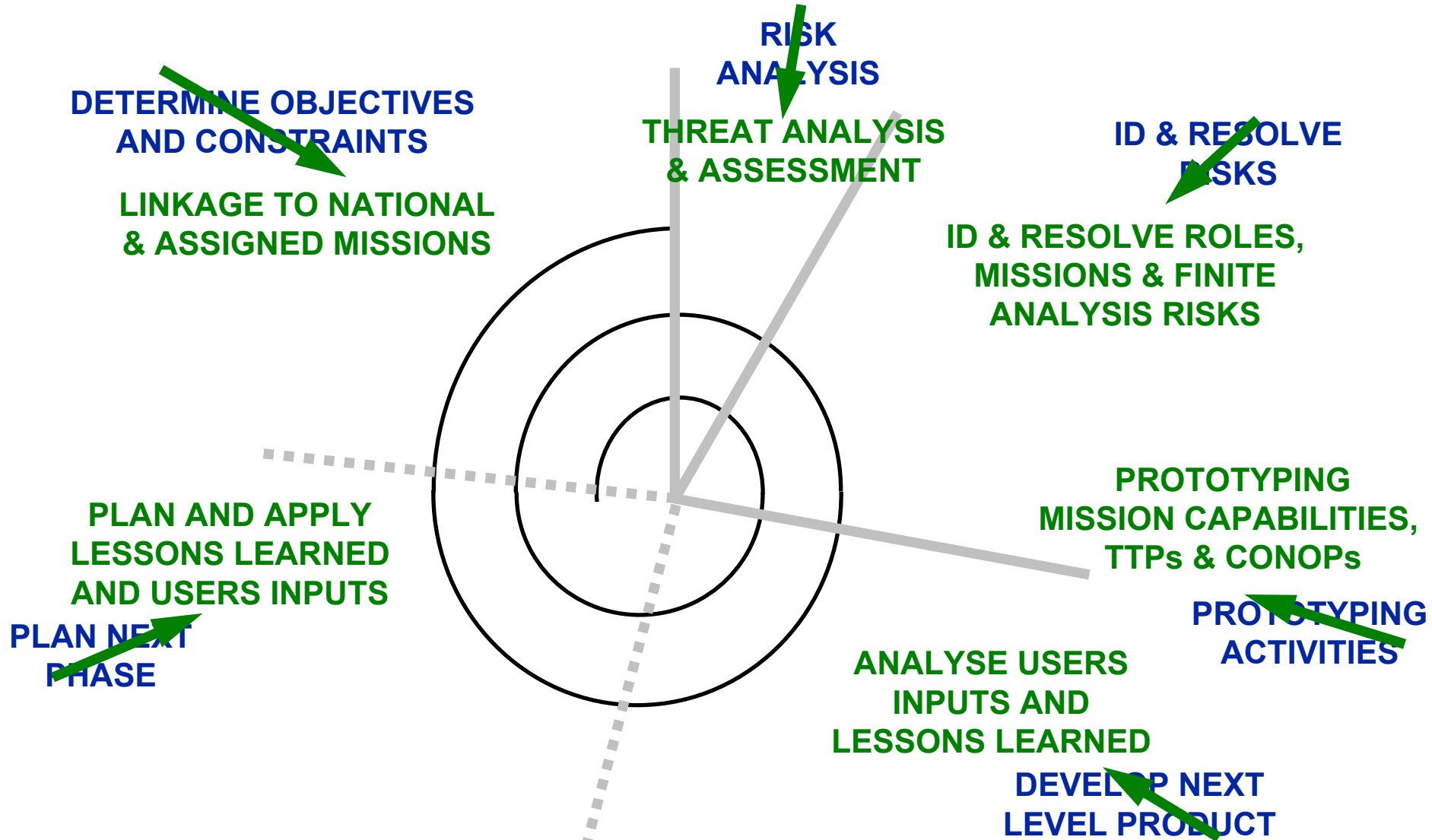
DDR&E / DUSD (AS&C) Transition Programs

<http://www.dod.mil/ddre/>
<http://www.osd.acq.osd.mil/asc/>

Transition Across the Product / Process Life Cycle



SPIRAL METHOD OF OPERATIONAL ENGINEERING



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

TECHNOLOGY TRANSFER

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 INIATIVE (COSSI)

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

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

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



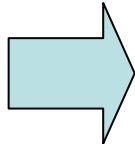
To Date: Over 300 Projects Initiated and Close to \$1B Invested and More than 400 companies, universities, and nonprofit organizations participating

INDEPENDENT RESEARCH & DEVELOPMENT (IR&D)

DoD/Industry Interaction

DoD

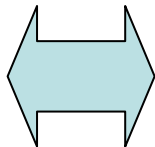
Provide information on DoD's R&D activities & plans, mission needs, & operational requirements



Industry

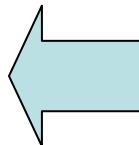
Plan, fund, and conduct IR&D

Review IR&D activities and provide feedback to contractors



Provide technical information about IR&D

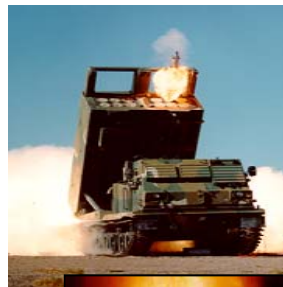
Review IR&D database to identify IR&D of interest



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**

MANUFACTURING TECHNOLOGY (ManTech)

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**



**Plate Forming:
Boron Carbide**



**Interceptor Body
Armor Jacket**

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

BULLET, SAPI, & SURVIVAL



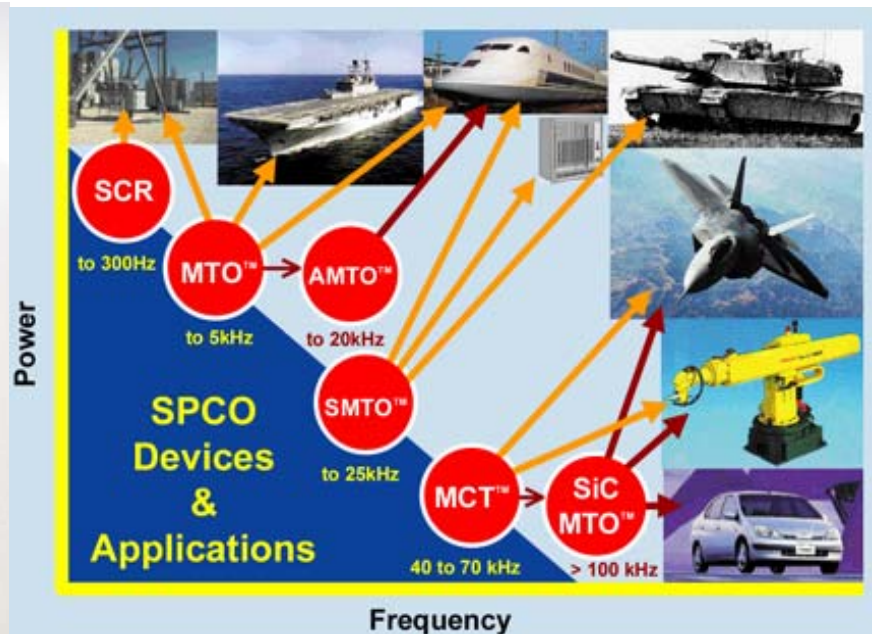
TITLE III / DEFENSE PRODUCTION ACT

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



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



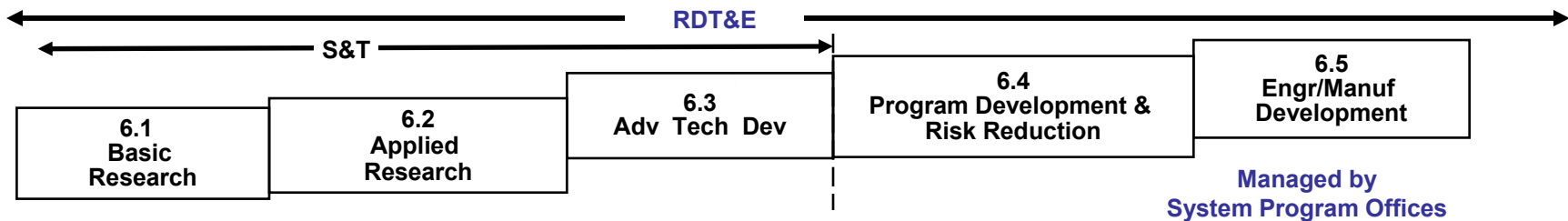
Congressional Interest: 3000 Contracts / Year with Small High Tech Firms

AFFORDABILITY & TRANSITION

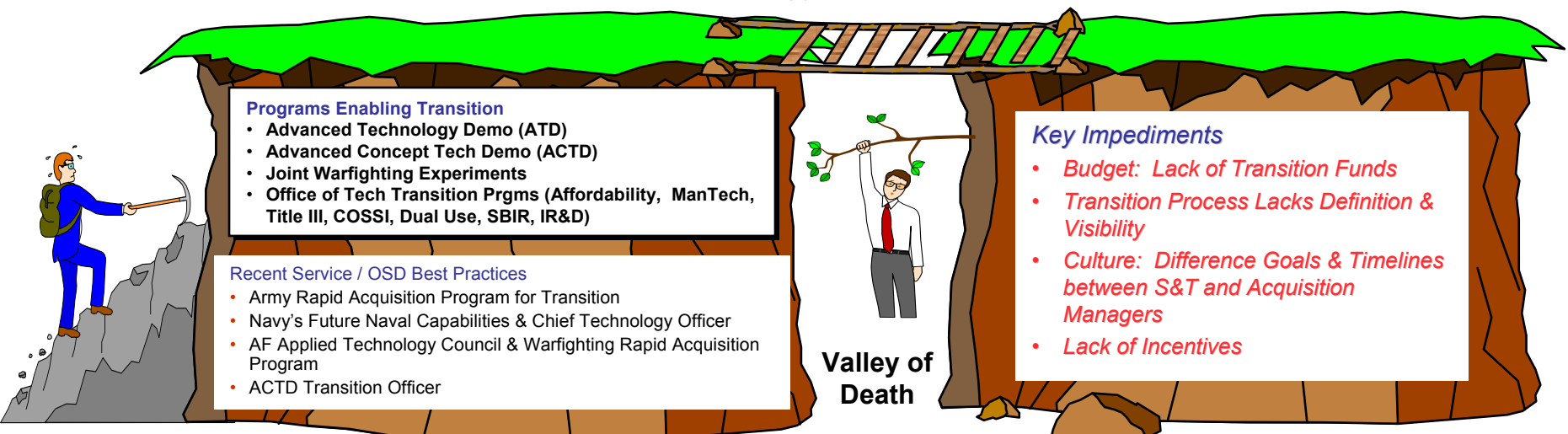
- THE CHALLENGE -

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



Technology Transition “Seam”



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.**

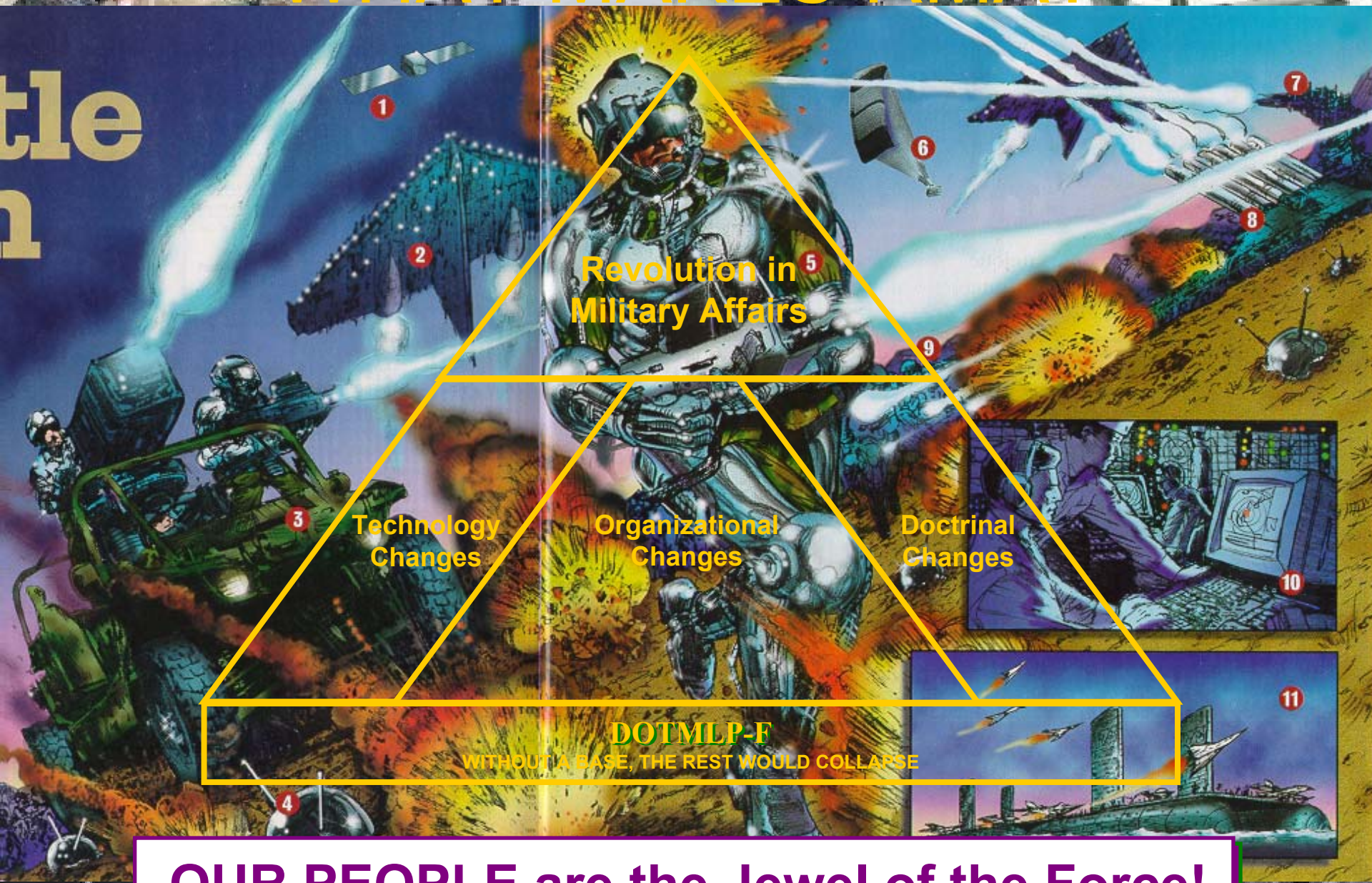
Bottom Line: Warfighter Confidence & Affordable, Faster Transition



*Right Materiel, Right Place,
Right Time, at the Right Cost - All The Time*

WHAT MAKES RMA?

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OUR PEOPLE are the Jewel of the Force!
Former SECNAV Danzig