

***Deputy Under Secretary
of Defense***

**Advanced Systems &
Concepts**

~

**US Pacific Command
S & T
Conference**

~

***The Advanced Systems
and Concepts Portfolio
of Opportunities***

~

OSD/AT&L/DDR&E/AS&C

UNCLASSIFIED



Chuck Perkins

PADUSD(AS&C)

16 July 2008

UNCLASSIFIED



OSD/AT&L/DDR&E/AS&C Mission

OSD/Advanced Systems & Concepts



- **Find, Integrate, Demonstrate, and Transition** operational concepts and technologies for **Joint & Coalition Warfare Needs** to include **coalition shared capacity building** opportunities
- Leverage RDT&E Defense-wide resources through partnerships with Services and Agencies to meet the **Most Critical Needs** of the joint warfighter as defined by **Combatant Commanders (COCOMs)**
- **Induct Innovative Technologies** inside the traditional Planning, Programming, Budgeting, and Execution (PPBE) process that result in an enduring **Capabilities-based Portfolio** to defeat asymmetric threats

Thrusts: Agile, Adaptive, Affordable, Relevant, Urgent, Enduring, Transition

How Advanced Systems & Concepts Functions



OSD/Advanced Systems & Concepts

- **Joint Needs-Driven**
 - Monthly meetings with COCOMs - Progress on Deliverables
 - Frequent meetings with Intel Community
 - Participation in JCIDS and in JS/StratCom/DDR&E-sponsored studies
- **Technological Awareness**
 - Formal searches, pursuits and harvests of specified critical technologies
 - Briefings from industry (Domestic and International)
 - Intimate with technology development and assessment organizations
 - Services, Agencies, Intel Community, DHS, DOE, etc.
- **Program Oversight**
 - Organize, vet, select, and defend programs and projects
 - Validated Service and CoCom Priorities; IPLs and Most Pressing Needs
 - Wholly or partially funding projects – a core function
 - Closely monitor program and project execution
- **Transitioning Capabilities and Transferring Technologies**
 - Identify transfer and transition partners, pathways, PORs and POMs
 - Oversee transition process and progress; stimulate as necessary
 - Fund select game-changing technology enablers and transformation



Advanced Systems & Concepts Portfolio

OSD/Advanced Systems & Concepts

6.1 6.2 6.3 6.4 6.5 6.7 Proc O&M

Science & Technology

Research & Engineering

TRL 1 TRL 2 TRL 3 TRL 4 TRL 5 TRL 6 TRL 7 TRL 8 TRL 9

Concept & Technology Development

System Development & Demonstration

Production & Deployment

O&M

Initial Product/Process Capability

Product/Process Development

Product/Process Insertion

Product/Process Improvement & Sustainment

MRL

1	2	3	MRL 4 Lab or Modeling Environment	MRL 5 Prototypical Environment	MRL 6 Pre-production Representative Environment	MRL 7 Transition into LRIP	MRL 8 Low Rate Initial Production	MRL 9 Full Rate Production	MRL 10 Lean Production
---	---	---	--------------------------------------	-----------------------------------	--	-------------------------------	--------------------------------------	-------------------------------	---------------------------

COCOM /Joint/Coalition focused

Joint Capability Technology Demonstrations

Demo 1-3 yrs

AC/JCTDs Transition Enabler – “joint peculiar” capabilities

JCTD Transition & DAE Pilot Program

Industry “On” Ramp – Test to Procure Tech Refresh

Defense Acquisition Challenge

Service, SOCOM Nominated - Test to Procure

Foreign Comparative Testing

DOD S&T Push

Tech Transition Initiative

DoD Technology Transfer

Formerly TechLink

to Private Sector

Domestic Technologies Critical to National Security

Defense Production Act (Title III)

ManTech Joint Investments

Defense Manufacturing Technology – Next-Gen Multi-Service Enablers



Joint Capability Technology Demonstrations (JCTDs)



OSD/Advanced Systems & Concepts

JCTD Program Mission (Primary Customer: US Combatant Commands)

- Provide capability solutions through rapid prototyping to solve joint, coalition, and inter-agency urgent shortfalls and gaps with technologies and innovational concepts
- Transition enduring capabilities through strong Service & Agency partnerships

Objectives

- To rapidly demonstrate innovational concepts & technologies to address Combatant Commanders, and Most Pressing Military Needs
- Delivering a sustainable capability to the warfighter

Metrics

- JCTD validation via Joint Staff process & independent Military Utility Assessment (MUA)
- Transition to Enduring Capabilities (provide Business Case Analysis)
 - Residual Capability for the Warfighters

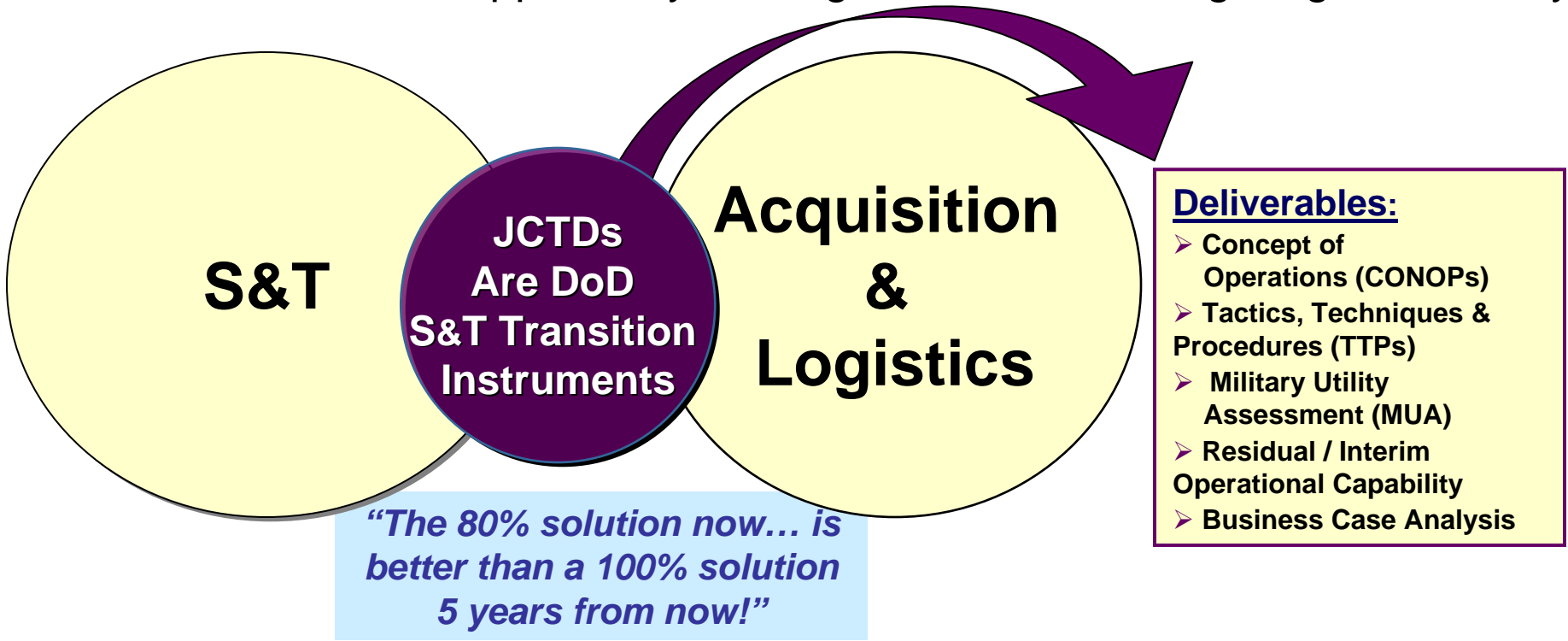




JCTDs Bridge S&T and Acquisition

OSD/Advanced Systems & Concepts

- Fill gaps between S&T and Acquisition for Combatant Commands
- Demonstrate Joint & Coalition Operational Capabilities
- Provides Transition Opportunity serving DoD's S&T/Warfighting Community

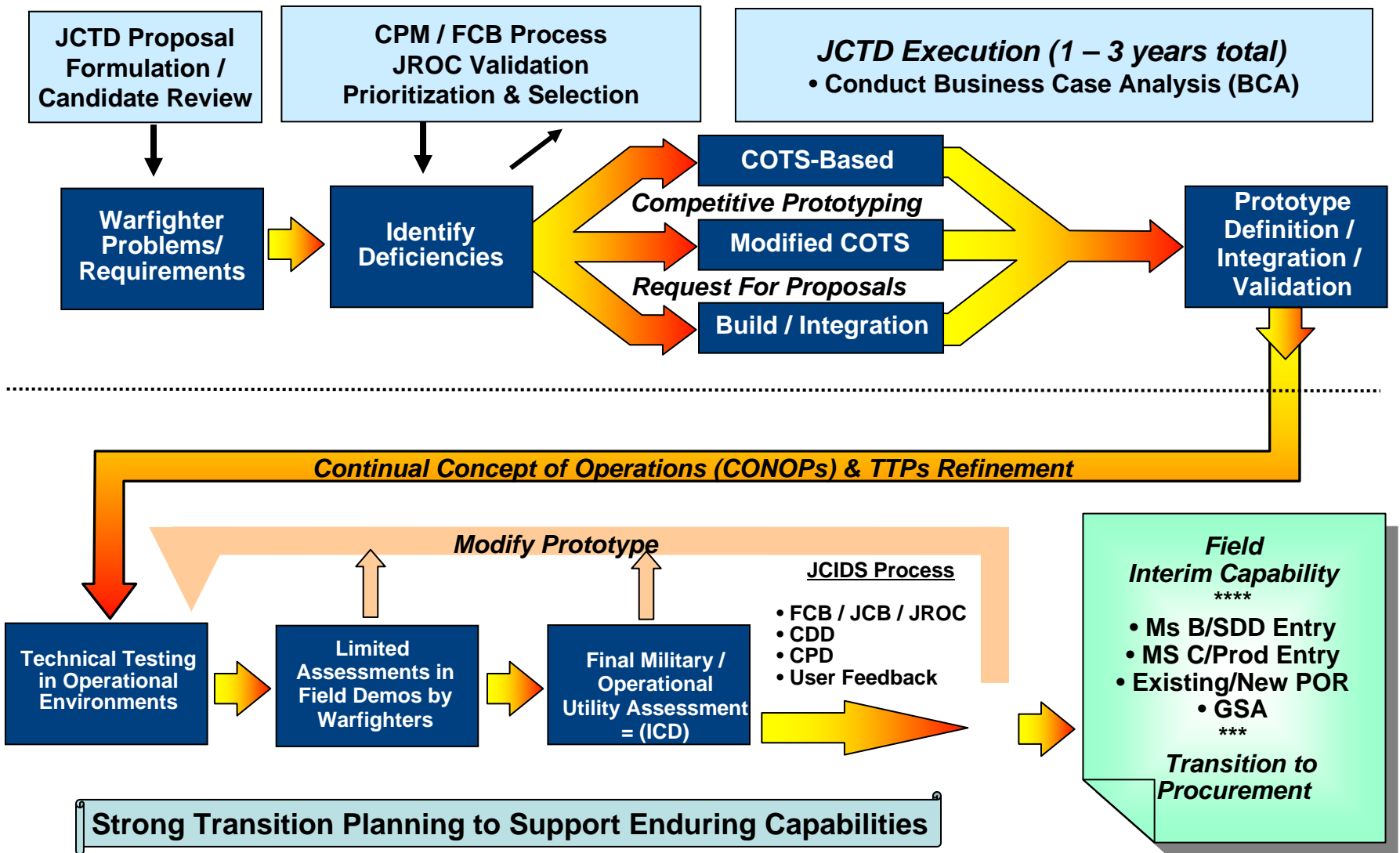


***JCTDs are not science projects but are agile solutions programs...
JCTDs transition capabilities to Warfighters***



JCTDs ... Model for Rapid Prototyping

OSD/Advanced Systems & Concepts

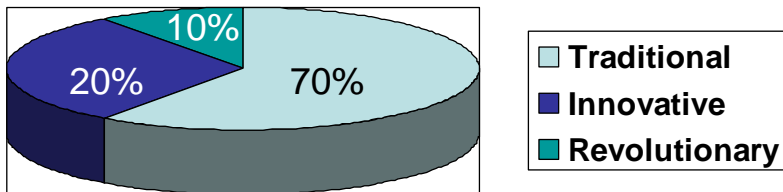




JCTD Metrics

OSD/Advanced Systems & Concepts

JCTD Model	Tech Readiness Level	Transition Commitment Level	Comments
<p><u>Traditional</u> <i>e.g. Comprehensive Maritime Awareness (CMA)</i></p>	<p>5-6 Improve the Joint Force</p>	<p>Level A</p>	<p>JROC Approval, Service/Agency and Transition Commitment 1-3 Years</p>
<p><u>Innovative</u> <i>e.g. Weapon Data Link Network</i></p>	<p>5-6 Leap Ahead Capability</p>	<p>Level B</p>	<p>JROC Approval, Transition Commitment 1-2 Years</p>
<p><u>Revolutionary</u> <i>e.g. Global Observer UAS</i></p>	<p>4-6 Game Changer</p>	<p>Level C</p>	<p>Warfighting Need Identified; Early Transition Planning 1-3 years</p>





The Range of Coalition JCTD Participation

OSD/Advanced Systems & Concepts

35% of JCTDs are Coalition / Partner Nations

Level I
Observe *“LOW”*

- Send limited number of observers to demonstrations

Level II
Development *“Med”*

- *Above plus:*
- Participant in Concept of Operations
- Contribute to Tactics, Techniques & Procedures
- Periodic review/comment on draft documents

Level III
Technical and / or Operational Participation *“High”*

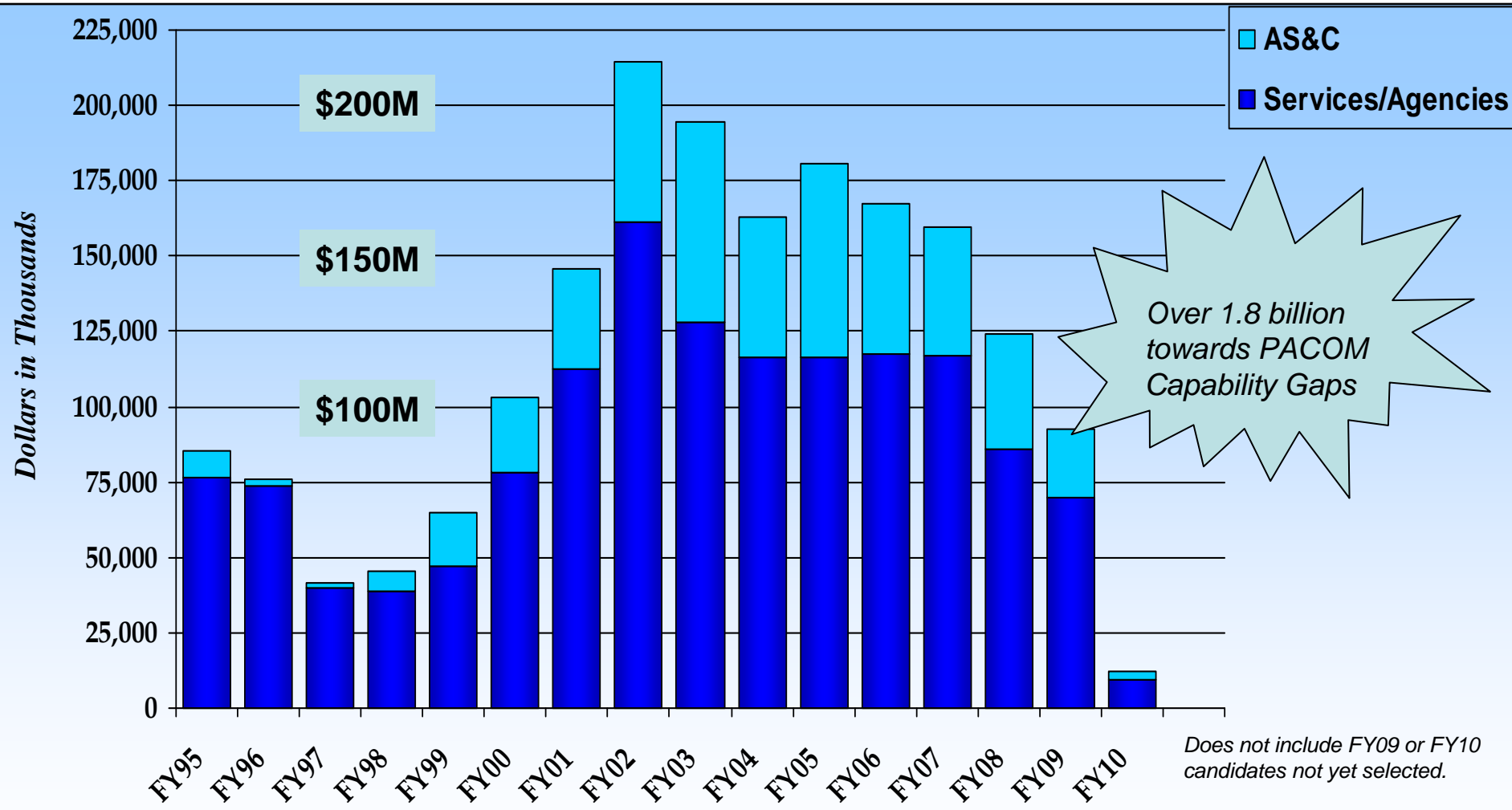
- *Above plus:*
- Participation in demonstrations and assessment events
- Participate in M&S effort

Best when Industry Partners across borders



PACOM ACTD/JCTD PROGRAM HISTORICAL PROJECT FUNDING

OSD/Advanced Systems & Concepts



Over 1.8 billion towards PACOM Capability Gaps

Does not include FY09 or FY10 candidates not yet selected.

Total AS&C ACTD/JCTD funding to PACOM projects since inception: \$466 million which has leveraged over \$1.4 billion in partner funding

Defense Acquisition Challenge (DAC)...

...DoD's On-Ramp to Industry



OSD/Advanced Systems & Concepts

• Scope:

- Allows anyone to propose innovations that could quickly improve -
 - ✓ Affordability, manufacturability, performance, or capabilities at a system, subsystem or component level
- Competitive: Annual BAA in Federal Business opportunities and unsolicited proposals
- Proposals “challenge” existing technology
 - ✓ Evaluated for merit & feasibility
 - ✓ If testing successful, innovations inserted into a program of record
 - ✓ Provides industry entry into DoD acquisition

• Metrics & Measures

- Over 1200 proposals submitted
- 68 projects awarded & ongoing
- 70 companies from 26 states
- 70% are small / medium enterprise technology providers
- ROI (14 completed projects) is > 9:1

Spray Cool Technology: Electronics Sprayed with Non-Corrosive Coolant in a Hermetically Sealed Housing



Before SprayCool: 482 Pounds & 17 Cubic feet

Employed in Counter Targeting System - Part of OVERWATCH ACTD

4 units deployed to Iraq



After SprayCool: 100 Pounds & 2.6 Cubic feet



Mini Combat Trauma Patient Simulation System: Training medics at Camp Pendleton

Casualty simulator improves skills of medical personnel in mass casualty & triage - over 3500 medics trained & deployed to Iraq; attrition rate of trainees reduced from over 20% to 6%

Enhanced Performance Location Report System Tactical Data Network: Replaces manual network planning with automated system

Reduces complexity and need for manpower redundancy, deployed to 900 users (MEF II) in Iraq, enabling rapid and accurate information flow and data priority on the joint/coalition battlefield



Foreign Comparative Testing (FCT)...

...the search for world-class technologies



OSD/Advanced Systems & Concepts

• Scope:

- Seeks international technologies for US warfighting needs
- Leverages mature technologies for economic/speedy buys
- Provides US Forces with new capabilities
- Technologies assessed for use, bought from foreign source or manufactured under license in US



UK system can refuel two aircraft at once, avoiding \$40 million in R&D

• Program Measures & Metrics (1980-2007)

- OSD investment of \$1.1B has avoided \$7B in costs
- 567 projects started, 488 completed, 266 met test req's
- 184 projects resulted in procurements worth about \$8B
- Accelerated fielding averaging 5–7 years
- Participation from 27 allied and coalition partners
- Vendor partnerships in 33 U.S. states
- Past 5 years: Transition rate from test-to-procure > 80%



South-African developed Buffalo mine clearing vehicle probing & clearing mines & IEDs in Iraq



Russian erosion-resistant coating triples life of compressor blades in MH-53 helicopter, avoiding \$1.6 million annually



Korean fiber optic mesh detects breaks and enhances perimeter security



Italian venture, the Joint Service Combat Shotgun, used in Iraq as a "door-buster"



Swedish bunker buster system fired from confined spaces, used in Afghanistan and Iraq



The Technology Transition Initiative (TTI)

OSD/Advanced Systems & Concepts

➤ Objectives

- Accelerate transition of new technologies from DoD S&T programs into acquisition for production and deployment to US Armed Forces
- Demonstrate new technologies in relevant environments

➤ Partners and Processes

- Technology Transition Council
- Technology Transition Working Group

Countermeasures Protection System



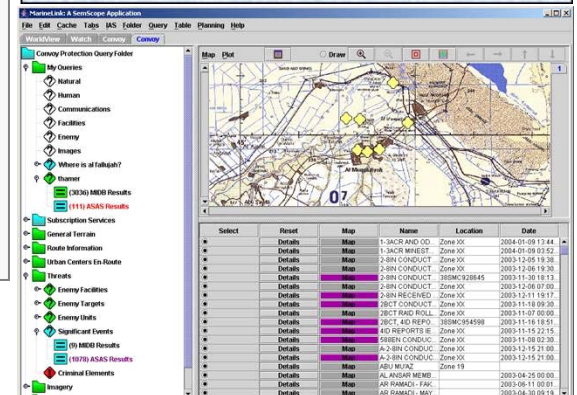
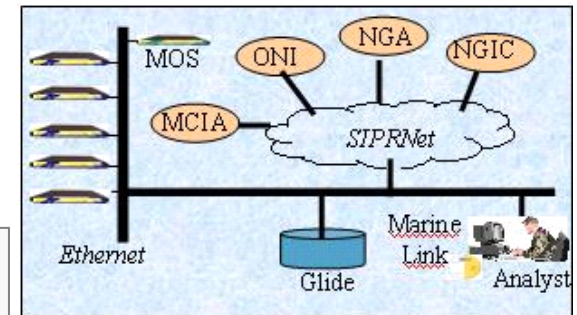
- Improves force protection against radio-controlled IEDs
- Deployed in GWOT

Water Purification Pen



- Eliminates risk of exposure to diseases and bio-chemical pollutants
- Deployed in IRAQ with each of the Services
- Sent as part of Tsunami relief effort in S.E. Asia

Semantic Web Network



- Incorporated into Marine Link
- Deployed w/1st and 2d MEF in Iraq
- Saves Analyst 4-5 hours per manual query



Technology Transfer Programs

OSD/Advanced Systems & Concepts

➤ Objectives

- Ensure full use of the Nation's investment in R&D (15 USC 3710)
- Rapidly enhance warfighter capabilities via technology exploitation

➤ Benefits

- Clear path from DoD S&T to application of technology
- Commercial source for DoD items using DoD-developed technologies
- Speed to deployment and cost-saving advantages

➤ Partners

- US Industry (as opposed to contractual relationship)
- Funds to support joint R&D efforts (funds from CRADAs)
- Royalties on licensed inventions to reward inventors and perform R&D





References and Discussion

OSD/Advanced Systems & Concepts



Advanced Systems & Concepts (AS&C)	www.acq.osd.mil/asc	703-695-5036
Joint Capability Tech Demo (JCTD)	www.acq.osd.mil/actd	703-697-5558
Comparative Test Office (FCTs)	www.acq.osd.mil/cto	703-602-3740
Office of Technology Transition	www.acq.osd.mil/ott/tti	703-607-5316



Theater Effects Based Operations (TEBO)



FY 2004



IPB



Threat



Problem: 21st Century campaigns depend on creating desired effects to alter undesired behavior.

Solution:

- Concepts, tools and procedures for Joint Effects Based Operations.
- Effects based analysis, planning, visualization, collaborative environments, decision making, execution, assessment

Participants

- Lead Service: Army
- Sponsor: PACOM
- User: CFC/USFK
- Op Mgr: JFCOM
- Transition Manager: DISA

Schedule:

- Demos FY04-09
- Residual: FY05 and beyond

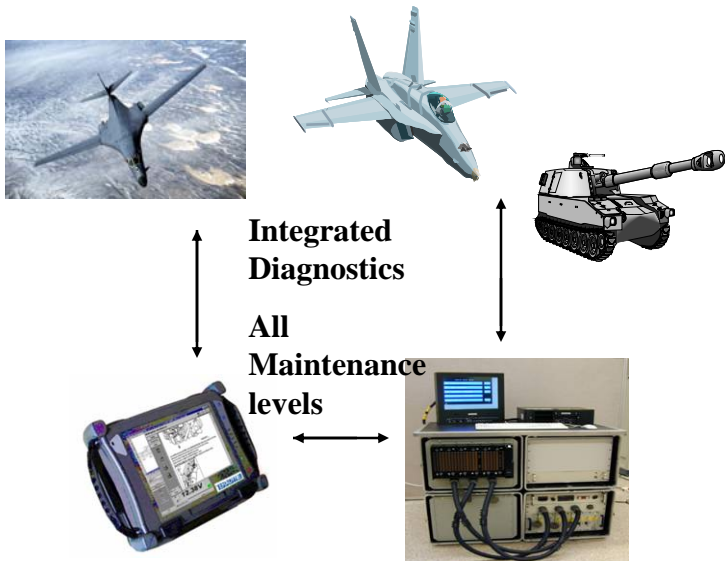
Status: Transitioning into Net Enabled Command & Control by US JFCOM and DISA



Agile Rapid Global Combat Support (ARGCS)



FY 2004



Problem This Solves: No Combat Support System (CSS) Interoperability; Delay In Supporting New Weapon Systems; No Functional Test Capability; No Integrated Diagnostics; Escalating Support and Logistics Costs.

Solution: Smaller Common / Interoperable CSS using SW defined instrumentation and integrated diagnostics. Enabling Migration of Tests from Factory to Field; Obsolescence Immunity; reduction in Proliferation of Peculiar Test Systems; reduction in Total Ownership Costs

Participants:

- Operational Manager – PACOM
- Technical Manager – NAVAIR
- Transition Manager- USMCTMDE

Schedule:

Complete Design	July 04-Jan 05
Integration & Design Testing	Feb 05-Jan 06
Demonstration Systems Delivery	Feb 06-April 06
System Testing	March 06-Aug 06
JMUA	Sept 06-March 07
JMUA User Input Modification	May 07-Oct 07
EUE	Nov 07-Oct 08

Status

- ID & MP in for final approval.
- Source selection for Prime Contractor expected complete June 30
- Coalition Partner Funding solidification/transfer in process.



Coalition Theater Logistics (CTL)



FY 2001

- **Plan, execute, monitor strategic deployment / redeployment**



- **Plan, execute, monitor movement of supply/ sustainment items**



- **Provide infrastructure visibility**

Participants:

OM: PACOM J-411

XM/PM: DISA

Sponsors: PACOM, Australian Defence Force

Schedule:

- Complete Software Development 1Q FY05
- Commence Transition to CENTRIXS Network FY05
- Complete Transition FY06
- IOC FY05

Problem This Solves:

The inability to share accurate logistics information with coalition partners for the full spectrum of military operations.

Solution:

- CTL ACTD will improve effectiveness and the efficiency of coalition logistics and all phases of coalition operations through an improvement in information quality.
- It will coordinate multi-national logistics information and decision support tools for accurate force requirements definition, effective deployment planning, responsive sustainment and rapid logistics re-planning.

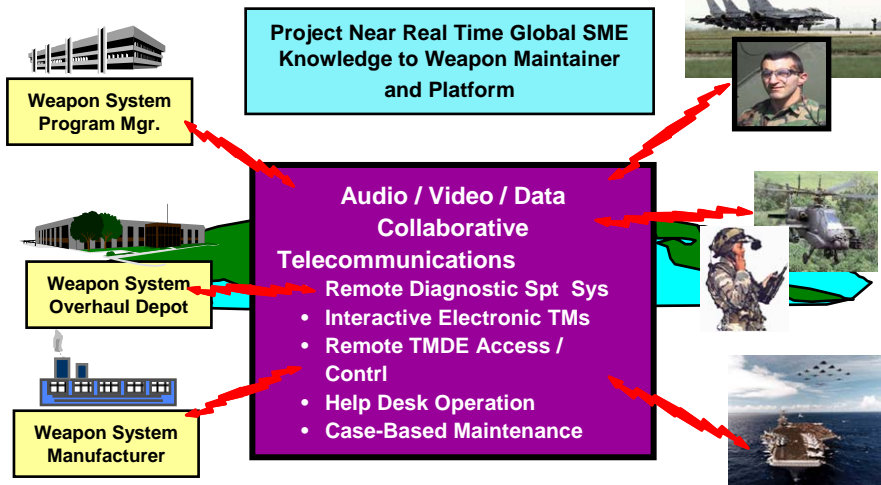
Status:

- Successfully demonstrated logistics decision support tools in three venues (JWID '02, Cobra Gold '03, and MultiNational Experiment 3)
- Final Military Utility Assessment (MUA) Report August 2004
- Transitioned numerous products including CENTRIXs for CENTCOM

Joint Distance and Support (JDSR)



FY 2002



Problem This Solves:

- Shortage of experienced maint. personnel, especially for low density / hi-demand items
- Lack of near real-time maintenance on demand, info for repair and training
- Limited battlefield access to experts & collection of corporate knowledge

Solution: A Joint, common and interoperable tele-maintenance / training environment providing end to end low bandwidth reachback connectivity, customer relationship mgt, interoperable mobile computing devices, and case base reasoning tool

Participants: User Sponsor / OM: JFCOM;
Supporting Services/Agencies: All Services; TM: NAVSEA; XM: NAVSEA; **Coalition:**

Schedule:

	FY02	FY03	FY04	FY05	FY06
System Development	[Bar]				
Cert & Accreditation		[Bar]			
Technical Testing		[Bar]			
Technical Demos		▲	▲	▲	
CONOPS / TTPs	[Bar]				
Assessment Plan		[Bar]			
Op Demos / JMUA		■	■	■	
Extended User Eval				[Bar]	
Transition Planning	[Bar]				
Transition to Acq				[Bar]	

Status:

- Operational Demonstrations #1 and #2 successfully completed May 04 on ATCALs, CH-47 and H-60 helicopters, DDG, LAV, and F-16 weapon platforms.
- JDSR ACTD capability transitioned to demonstration maintenance units for ATCALs, CH-47 and H-60 helicopters, DDG, LAV, and F-16 weapon platforms as used in demonstrations
- JDSR ACTD capability operationally deployed to OIF with Army Fire Finder radar system



Theater Support Vessel (TSV)



TSV Technical Approach



Problem This Solves: Need for a joint expeditionary capability to deliver combat ready units configured for immediate employment in JOA.

- High Speed Rapid Littoral Maneuver and Force Closure
- Rapid Unassisted Ingress and Egress Enables Austere Port Operations
- Reduction of Reception and Staging Times in Theater of Operations
- Mitigate Anti-Access and Area Denial Efforts

Solution:

- High Speed Vessel Capable of:
 - Worldwide Movement of Combat Ready Units
 - Ship-to-Ship and Ship-to-Shore Operations
 - Supporting Operations in the Littorals

Participants:

OM: CENTCOM, CASCOT (Deputy)
 TM/XM: PEO CS&CSS, PM Force Projection,
 PM Army Watercraft Systems
 Independent Assessor: AEC
 Sponsor(s): US Army

Schedule:

Independent Assessments/LUAs – 2QFY04 - 3QFY05
 MUA – 4QFY05
 MS B – 2QFY05
 MS C – 3QFY08

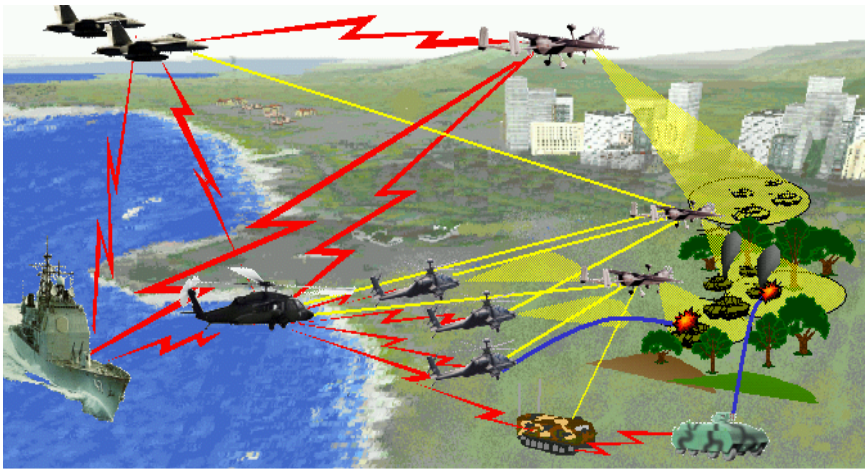
Status:

- OEF/OIF/Joint Military Exercises Support
- Cargo Handling System Modifications
- Ride Control (Retractable T-Foil)
- C4ISR Upgrades – Joint/Service C2, FLIRs
- Battle Command Center/EMPRs
- Full Spectrum Civil Maritime/Mil Comms – Voice/Data
- Movement Tracking System/Blue Force Tracker
- Scalable Self Protection System (Planned)

Hunter Standoff Killer Team (HSKT)



FY 2001



Problem This Solves:

- No airborne sensor to shooter link, manned / unmanned platforms teaming, re-plan on-the-move capability to reduce execution timelines
- Unacceptable stand-off range for manned shooter platforms

Solution: Joint Maneuver Commander Strike teaming of UAVs with AH-64Ds Longbow Apaches, A2C2S Blackhawk and F/A 18s Hornet, integrated with cognitive decision aiding, and precision targeting sensor package

Participants: User Sponsor / OM: USFK, PACOM; **Supporting Services/Agencies:** Navy, Army; **TM:** AMCOM; **XM:** PEO Aviation, Army

Schedule:

	FY01	FY02	FY03	FY04	FY05	FY06
Manned-Unmanned Teaming, CDA integration		█				
Link 16, TC DL, Sensor integration		█				
HSKT Tech Verification				█		
System Testing					█	
CONOPS / TTPs	█	█	█	█	█	█
Assessment Plan			█	█		
Utility Assessments					█	
Extended User Eval					█	█
Transition Planning	█	█	█	█	█	
Transition to Acq				█	█	█

MS B (AH-64 Lot 10) ◆

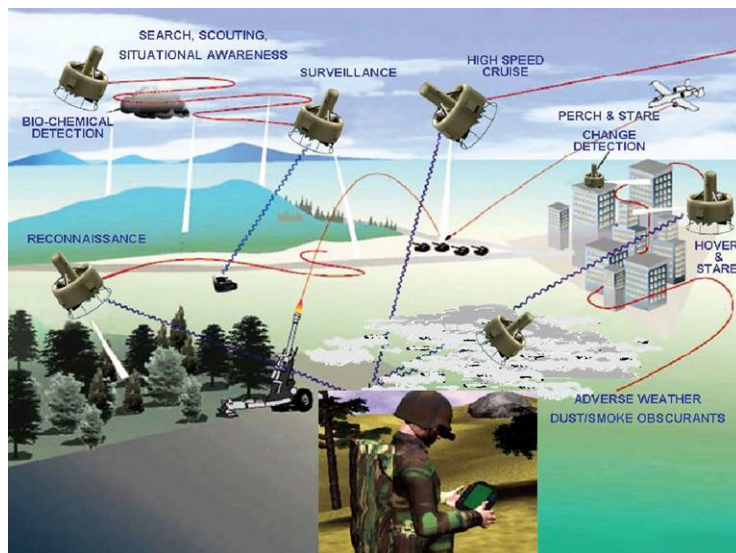
Status:

- Operational Demonstrations and Joint Military Utility Assessment planned for FY05
- HSKT ACTD Hunter UAV 3 Sensor MSOP package being considered for transition to Hunter UAV system, Dec 04 in support OIF



FY 2002

Micro Air Vehicle (MAV)



Problem This Solves: The need for close-in, real-time surveillance capability for small units conducting; urban, security, force protection, chemical, biological, and special operations.

Solution: Demonstrate affordable, expendable, easy-to-use, lightweight, man-portable, micro air vehicle with hover and stare capability.

Participants

- DARPA (executing agency)
- PACOM (lead CINC)
- Army (lead Service), USARPAC

Schedule

- Demo: FY02-FY04
- Transition Residuals: FY05-FY06

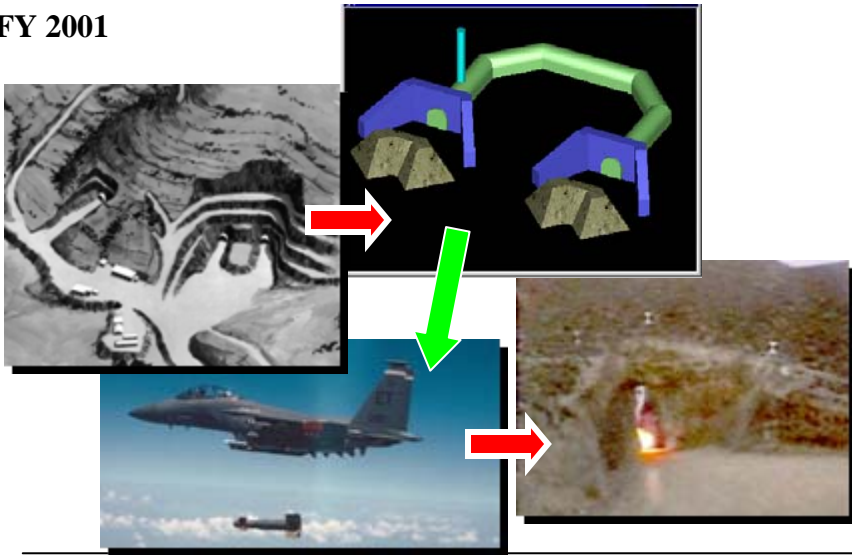
Status: Vehicle, heavy fuel engine and ground station in development. Critical design review Summer 2004.



Thermobaric Weapon



FY 2001



Problem This Solves: Conventional explosives lack the ability to neutralize extended tunnel targets where high value targets exist... Typical targets requires numerous conventional explosive weapons to be effective

Solution: Leverage emerging explosive, guidance, and warhead concepts to design, weaponize, demonstrate, and deliver... An enhanced weapon that will significantly improve the warfighter's capability to defeat military activities protected in tunnels.

Participants:

- PACOM – user sponsor (USFK)
- USFK - operational manager
- DTRA - lead agency / technical manager
- DUSD(AS&C) - OSD sponsor
- USAF – service sponsor

Schedule:

- FY02 - FY04: Payload development, Guidance software optimization, Warhead design, Weapon qualification
- 2QFY05 - Operational Demos

Status:

- AF waiting for performance data prior to transition recommendation
- 20 Thermobaric Weapons – on track
- Delivery Tactics / Planning Tools – on track

Joint Explosive Ordnance Disposal (JEOD)



USD/Advanced Systems & Concepts

FY 2002



Problem This Solves: Make subscribers aware of EOD operational information:

- Increase situational awareness
- Define relevance to eliminate information overload
- Provide a reach-back capability to SME
- Provide an experience capture capability for LL

Solution: Build a GIG compliant transport mechanism (JEODnet) to enable net-centric EOD capabilities with a supporting enterprise KM Decision Support System (DSS)

Participants:

- Sponsor - PACOM
- Program Board - CENTCOM, ONR, DoD EOD
- TM - NAVEODTECHDIV
- XM - PMS-EOD
- Assessment Team - Det 1 AFOTEC

Schedule:

- Build 2 Limited MUA Aug 2004
- Preliminary Op Capability Sep 2004
- Final MUA May 2005
- IOC June 2005
- Residual Support 2006 - 07

Status: On budget and schedule for completion of demonstration. Identified requirement for Tactical Mission Critical System designation.

Global Observer

- Hydrogen Powered UAV -



OSD/Advanced Systems & Concepts

- **Global Observer UAV**
 - Liquid hydrogen fuel enables 7-day endurance
 - Provides the persistent presence required for an “unblinking eye”
 - Enables forensic intelligence operations and other critical missions for all COCOMS and Services
- **Advantages**
 - Long endurance minimizes ops tempo/cost
 - Fewer flights
 - Fewer aircraft
 - Reduced logistic tail



Global Observer UAS
Prototype (in flight)



- **Global Persistence in the Stratosphere up to 65,000 ft**
- **Worldwide station keeping (3+ Sigma Winds)**
- **Up to 500 lb payload with 7+ days endurance**
- **Liquid hydrogen (LH2) powered**
- **Key technologies successfully developed and demonstrated**



Zephyr

- Solar Powered UAV -

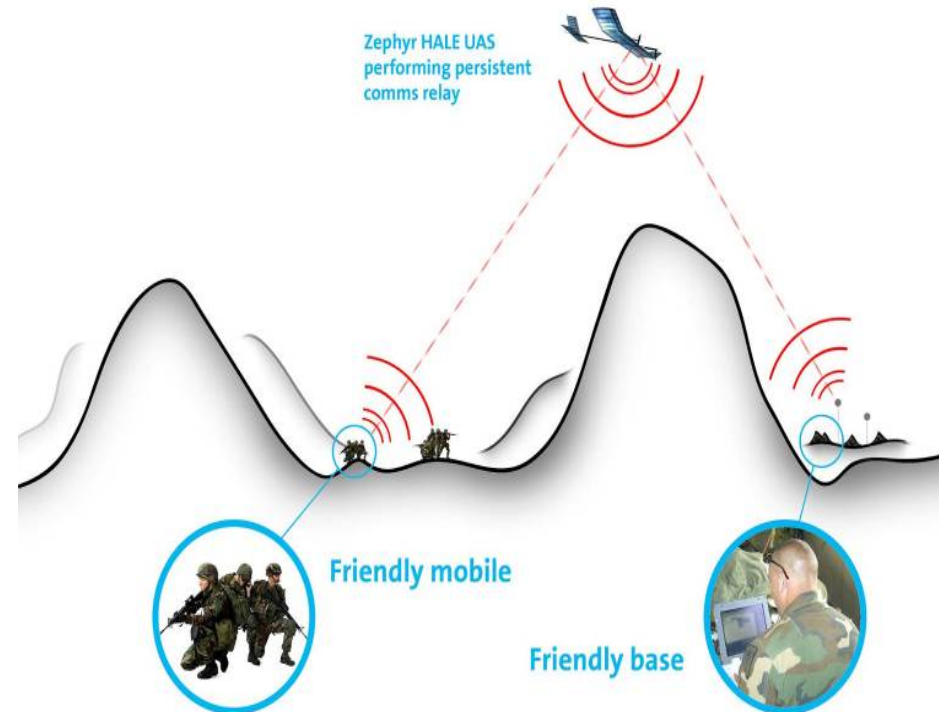
OSD/Advanced Systems & Concepts

Objectives

- Low cost solar-electric HALE UAV
- Extended duration flight of 2 weeks
- High altitude missions >60,000ft
- Sensor capability: EO + comms

Technologies

- Low signature / low mass <66lbs / low projected production cost
- Passive surveillance payload: high resolution, EO, IR, and UHF voice/data relay plus other options as required
- 50ft wingspan with option to scale to 80ft for greater payloads
- Low cost of operational support and minimal personnel need
- Ground launch by hand and recover from unprepared sites / ship
- Technology transfer in the US through partnership with UK



Focused Lethality Munition (FLM)

- Small Diameter Bomb – Eglin AFB



OSD/Advanced Systems & Concepts

- **Problem Statement:** Collateral Damage from Current Weapons Result in Target Restrictions Limiting COCOMs Ability to Prosecute Targets Requiring Minimized Collateral Damage
- **Objective:** Develop Composite Cased Warhead w/ Specialized Fill to Reduce Fragmentation Effects While Increasing Blast Effects → Focused Lethality Munition (FLM)

Prosecute Previously Off-Limits Targets

Solution

- Integrate Dense Inert Metal Explosive (DIME) w/ Composite Warhead Case into the Small Diameter Bomb (SDB) I Airframe

