

**Kunar Province, Afghanistan**

# **Harvesting Technology for Warfighters**



**Dr Chuck Perkins**

**Acting DUSD (Advanced Systems & Concepts)**

**Joint Precision Airdrop System ACTD**

“There is nothing more difficult to carry out, nor more doubtful of success, nor more dangerous to handle, than to initiate a new order of things ...Whenever his enemies have the abilities to attack the innovator, they do so with the passion of partisans, while others defend him sluggishly, so that the innovator and his party alike are vulnerable” --

Nicco Machiavelli, *The Prince*

# UAVs since 1994

Before 1994, DoD cancelled nine UAV programs. By 1 Oct 2008, DoD had fielded over 6,000 unmanned aerial systems, the following aided by AS&C initiatives:



High Altitude Endurance UAV ACTD produced *Global Hawk* 9



Medium Altitude Endurance UAV ACTD produced *Predator* (109) and *Reaper* (26) 135



Tactical UAV ACTD led to *Shadow* 288



Scan Eagle 13



Expendable UAV ACTD produced *TigerShark* 12



Micro Air Vehicle ACTD 54



Small UAV ACTD produced *Raven* 4,995



## **Our Job**

### **Harvesting Technology for Warfighters**

## **Our Goals**

**Find mature technology for warfighting needs**

**Get to warfighters within the budget cycle**

**Overcome obstacles and gaps**

**Minimize risks in acquisition**

**Ensure sustainable technologies**



**Deep bleeding control enabled by  
Office of Technology Transition**

# We Don't Do it Alone

## Our Partners



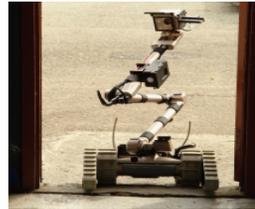
# Tools Brought to Bear -- Sustainable Technologies

Residuals



Thermobarics ACTD – 20 warheads provided to combatant commander

Program of Record



CUGR ACTD -- CBRN unmanned ground vehicle transitioned to Joint NBC Reconnaissance System Increment 2 Program

GSA Schedule



JMIDS ACTD and Technology Transfer – Joint Modular Intermodal Container in GSA catalog

Concepts



CAESAR ACTD – Standard NATO Agreement on mobile targeting

Spin offs



Counter Sniper ACTD – Bullet Ears forerunner of Boomerang gunfire detection system

## Their Value-Added



### New Capabilities

US maritime domain awareness enabled by MASTER JCTD



### Coalition Capabilities

Coastal surveillance network for African nations enabled by RMAC JCTD



### Improved Capabilities

Distant warfighters get faster access to large amounts of map data, with Large Data JCTD



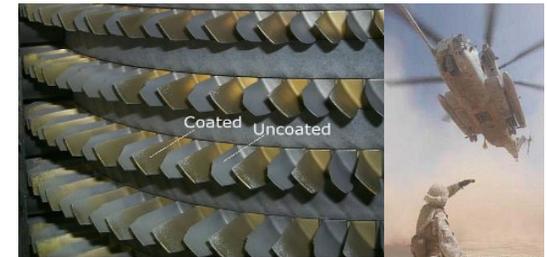
### Faster Warfighting

Communications planned in 20 minutes, vice 24 hours, with software enabled by DAC



### Improved Systems

UH-60 helicopter range/payload increased with lighter materials enabled by ManTech and DAC



### Extended System Use

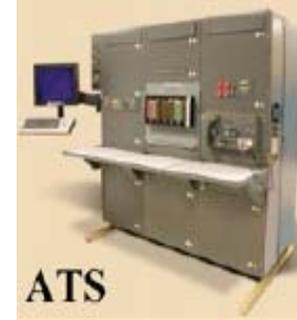
helicopter use extended in desert with TiN coated turbine blades, enabled by FCT and TTI

# Their Value Added



## Reduced Maintenance

Air generator eliminated removal of nitrogen cooling bottles in Sidewinder missiles, saving \$50M in life cycle costs, with FCT



## Smaller Logistics Footprint

Number of electronic testers reduced and faster diagnostics achieved, with ARGCS ACTD



## Affordable Systems

Cost of uncooled focal plane arrays in vision systems was cut from \$16,000 each, to under \$2,000 with ManTech



## Assured Future Systems

Radiation-hardened processors produced for advanced spacecraft with help from DPA Title III

# Game Changers and Life Savers

**“We’ve revolutionized the way we resupply the Warfighter” --  
Maj Gen Scott Gray, Commander, Air Mobility Warfare Center  
(Joint Precision Air Drop System ACTD)**



**“The Marines own Fallujah with biometrics” – US Central  
Command Assistant Chief of Staff for Intelligence,  
(Human Intelligence and Counterintelligence Support  
Tools ACTD)**

**“We have already made a 100-year warfighting leap ahead with  
MQ-1 Predator, MQ-9 Reaper, and Global Hawk”  
– General Barry McCaffery USA (ret)**



**Zephyr JCTD**

**“What's great is that you can send the Raven out ahead of a  
convoy and check for activity ...It can really save lives“ -- Army  
Staff Sergeant Company D, 5th Squadron, 73rd Cavalry Regiment  
(Small UAV ACTD )**



# Use Beyond Defense

**Non-DoD organizations using energy-efficient LED lights, enabled by DPA III**

**New York and Ohio power grids using YBCO tape enabled by DPA III**

**NASA conducting earth research with Global Hawk from ACTD**

**NASA's Mars Orbiter using Hardened Microprocessors aided by DPA III**

**Center for Disease Control using ACTD diagnostic system in Africa**

**Miami-Dade County Police Department testing Micro Air Vehicle from ACTD**

**Health Care industry benefiting from:**

- **Hearing Pill enabled by OTT CRADA and TTI**
- **SAM Sling for pelvic fractures enabled by MilTech**
- **Medical devices using tough, rigid rod polymers enabled by DPA III**
- **Rescue Wraps enabled by MilTech**



**Invention is not enough --**

# **Getting technology used requires processes**

**“Successful innovation often demands an innovative business model”**

**-- John Seely Brown , Director Emeritus, Xerox Palo Alto Research Center**

- Estimate: 3-5 percent of government inventions reach commercial success**
- Time between invention and use is at least 10 years**
- Many inventions often have perilous paths to use**
- The inventor is often not the one who gets a technology used**

**AS&C provides processes for innovation**

**-- they get product solutions used in defense**

# The Core of Our Processes – Knowing User Needs



**We spend our time**

- **Listening to warfighters**
- **Listening to technology providers**
- **Overseeing initiatives**
- **Ensuring sustainable solutions**

# AS&C bridges S&T and Warfighting

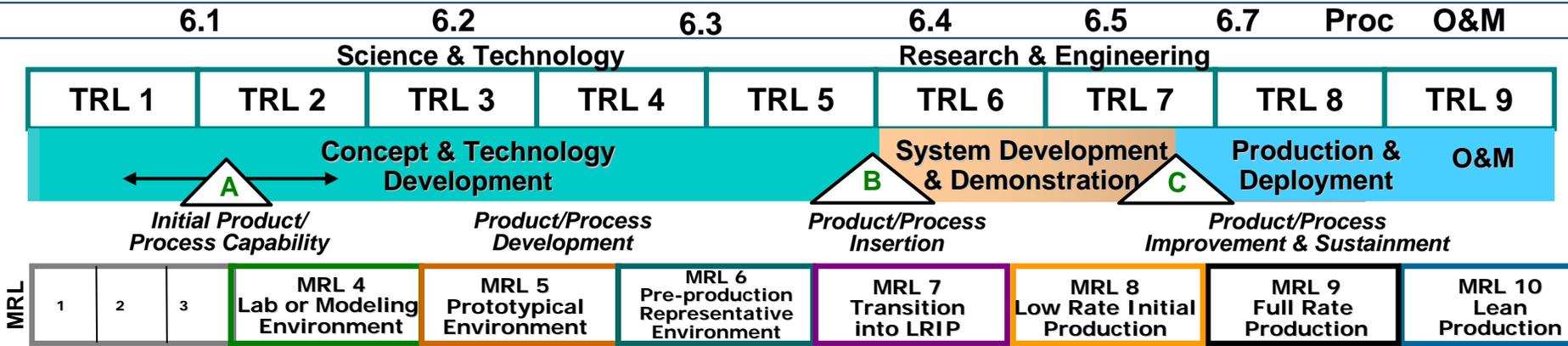
## S&T Sources

- DoD Labs
- Other Government Labs
- Universities
- Industry
- Other Nations

A photograph showing a military truck on a floating causeway system. The causeway is made of metal beams and is supported by a line of white spherical buoys in the water. The truck is a large, dark-colored vehicle with a cylindrical tank on its back. The background shows a body of water, trees, and a cloudy sky.

Lightweight Modular Causeway System  
from Joint Enable Theater Access – Seaports of Debarkation ACTD

# AS&C Processes Rapidly Insert Technology into Acquisition Process



**COCOM /Joint/Coalition focused**

**Joint Capability Technology Demonstrations**

**Demo 1-3 yrs**

**AC/JCTDs Transition Enabler – “joint peculiar” capabilities**

**JCTD Transition & DAE Pilot Program**

**Tests-to-Procure domestic technologies**

**Defense Acquisition Challenge**

**Tests-to-Procure foreign technologies**

**Foreign Comparative Testing**

**Pushes technology out of labs**

**Tech Transition Initiative**

**Transfers DoD technology**

**Technology Transfer**

**to private sector**

**Helps produce US technologies critical to national security**

**Defense Production Act (Title III)**

**Improves manufacturing**

**Defense Manufacturing Technology**



# Joint Capability Technology Demonstrations

Rapidly addresses joint, coalition, and interagency capability gaps

**Validates JCTD need via JCS process and military utility assessment**

**Partners with service/agency and warfighters to address gaps**

**Provides rapid prototypes and concepts for capability gaps**

**Demonstrates solutions in 1-3 years**

**Provides business case analysis for solution's cost and support**

**Transitions solution to enduring capability via service/agency partnership**



**Stand Off Precision Guided Munition  
JCTD meets need for stand-off strikes**



**CORSOM ACTD provides overview  
of coalition forces deployment**



**CHAMPION JCTD meets HUMINT  
Teams need for communications**



# The JCTD Record

**“The JCTD program has been an important tool in developing technology solutions, to validate COCOM warfighting shortfalls, and then transitioning these solutions to enduring, sustainable capabilities” -- General Bantz J. Craddock US Army, Commander, US European Command, March 5, 2008**

**185 ACTD/JCTDs have been selected for initiation**

**80 percent of 127 completed transitioned products to warfighters**

**Over 45 ACTD/JCTDs deployed to OEF, OIF and other operations**

**35 percent involve coalition/partner nations**

## **Awards and recognitions:**

- Link 16 -- Windows World Wide Open Product Award, presented by Bill Gates
- Airbase/Port Biological Detection ACTD – David Packard Excellence in Acquisition Award, 1998
- High Altitude Endurance ACTD -- Robert J. Collier Trophy, National Aeronautic Association, 2000
- CAESAR ACTD -- AFMC International Armaments Cooperation Team Award, 2002
- Thermobaric ACTD -- Special Achievement Award from International Test & Evaluation Association, 2004
- MANPACK ACTD – Tibbetts Award, for innovation involving Federal SBIR program, 2006
- Hunter Standoff Killer team ACTD – Shepard Group’s Integrator of the Year Award 2007
- Stand Off Precision Guided Munition JCTD -- David Packard Excellence in Acquisition Award, 2008
- Focused Lethality Munition JCTD – William J. Perry Award
- Stand Off Precision Guided Munition JCTD – William J. Perry Award, 2009
- JETA– SPOD JCTD -- Defense Logistics award for "Technology Implementation of the Year," 2008



Comparative Testing Office – 80 percent transitioned over last eight years

# Defense Acquisition Challenge Program

Searches for and “tests-to-procure” US technologies meeting warfighting needs

Allows anyone to propose improved system performance, production or affordability.

Annually solicits and selects proposals

Funds testing of proposed technology

Successfully tested items have procurement path

Items tested in about two years, some finishing faster

Avoided \$9 in R&D and other costs for every \$1 spent on testing

Last 3 years, over 25% of tested proposals came from “first time” DoD companies



Medical personnel train with patient simulator, enabled by DAC



Marines use 3-in-1 unit to power, cool and heat field facilities, enabled by DAC



Special operators use fly-away SatCom, enabled by DAC



# Comparative Testing Office – 80 percent transitioned over last eight years

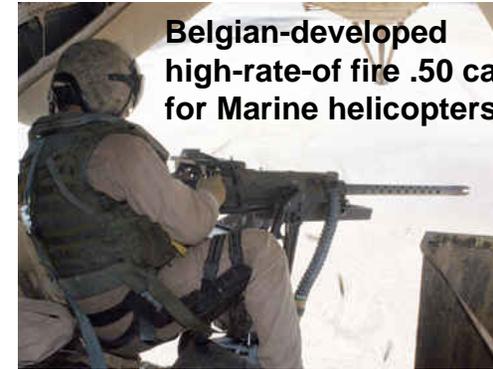
## Foreign Comparative Testing Program

Searches for and “tests-to-procure” foreign technologies meeting warfighting needs



Swedish-developed anti-armor weapon for Rangers

Annually solicits and selects proposals  
Funds testing of proposed technology  
Successful items have procurement path  
Items tested in two years, some sooner  
On average, cut fielding by 5-7 years



Belgian-developed high-rate-of fire .50 cal for Marine helicopters

Avoided \$7 in R&D and other costs for every \$1 spent on testing

Since 1980, DoD has avoided estimated \$7.6 billion in RDT&E costs

29 nations have participated in program

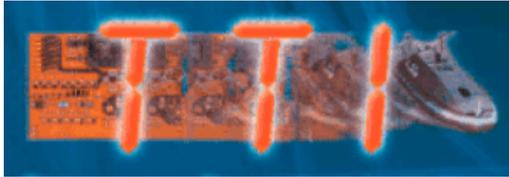
Resulted in US jobs in 33 states



South African-developed Buffalo



French-developed Mobl-mat for fast set-up helipads



-- Transitioned 75 percent of technologies aided

# Technology Transition Initiative

Helps new technologies bridge “Valley of Death”

Identifies promising technologies meeting DoD goals and requirements

Helps fund technologies’ transition from labs

Demonstrates technologies in relevant environment

Accelerates new technologies to operational capabilities by 24 months



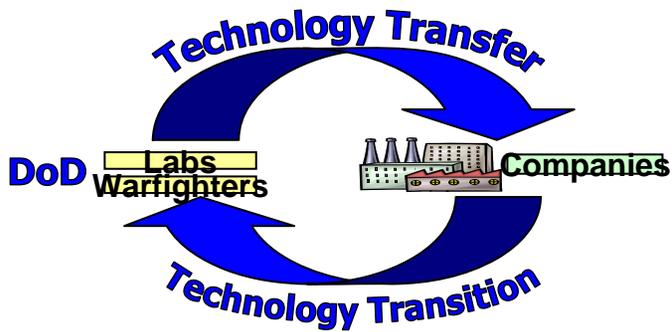
**Navy-developed Hearing Pill, fighting hear loss, undergoing clinical trials with help from TTI**



**Unmanned Sea Surface Vehicle delivered two years ahead schedule with help from TTI**



**Safer, insensitive 155 munitions being accelerated to warfighters with TTI help**



# Technology Transfer

Moves DoD technology to industry for production for warfighters

Links DoD labs and industry via intermediaries

- *DoD TechMatch* – Makes known DoD technologies available for transfer
- *FirstLink* – Links companies to first-responder technologies
- *TechLink* – Helps labs and industry with technology transfer agreements



DoD TechMatch identified an AFRL technology, helped create a capability and delivered 2,300 Bombots for EOD in Iraq

Enables direct exchanges between DoD labs and industry

- Collaboration -- Cooperative Research and Development Agreements
- Intellectual property use – Patent Licensing Agreements



Alternative fuel for USAF aircraft developed with CRADA

Aids small innovative companies' production via MilTech

MilTech helped company expand its application of camouflage military wraps





# Defense Production Act, Title III

Ensures production of technologies essential to national security

**DoD's one tool for addressing production shortfalls**

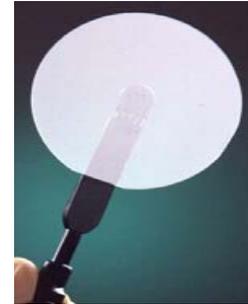
**Provides incentives to create/expand production**

- Purchases or commitments to purchase
- Installs equipment in government or private facilities

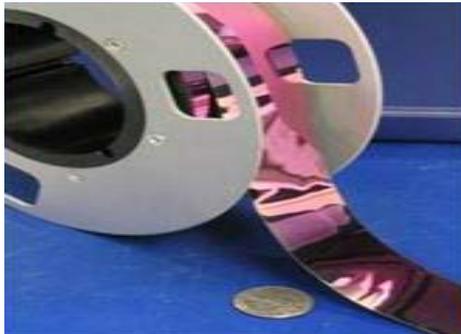
**Bridges gap between R&D and acquisition**

**Addresses shortfalls across programs**

**Strengthens competitiveness of US industrial base**



DPA III aided production of Silicon Carbide Substrates for next generation radar, also used in energy efficient LED lighting in Pentagon and other government buildings



DPA III aided production of YBCO Tape for more efficient electrical transmission in defense systems, also used in cities' power grids



# Defense Manufacturing Technology Program

**Enables fast, affordable and efficient manufacturing**

**Improves fabrication of metals, composites and electronics**

**Enables advanced and affordable manufacturing, maintenance and repair processes**

**Pursues manufacturing processes optimizing development**



**60 ManTech projects are expected to provide \$30 million savings in construction of each Virginia-class submarine.**



**ManTech cut weight and parts in the M777 howitzer and avoided \$40 million in manufacturing costs**

Constant innovation is the new defense demand



