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2011 CHEMICAL, BIOLOGICAL, RADIOLOGICAL, AND NUCLEAR SURVIVABILITY CONFERENCE

"CBRN Survivability for Weapons Systems"

Baltimore, MD

17 – 18 May 2011

Agenda (Brochure)
Agenda

TUESDAY, MAY 17, 2011

KEYNOTE SPEAKER
- BG Jess Scarbrough, JPEO-CBD

CBRN SURVIVABILITY OVERVIEW
- Ms. Helen Mearns, Joint CBRN Defense Program Analysis and Integration Office (PAIO)

LABORATORY INFRASTRUCTURE SUPPORT TO CBRN SURVIVABILITY
- Mr. Joseph Wienand

CHAIRMAN OF THE JOINT CHIEFS OF STAFF INSTRUCTION (CJCSI) 3175.01 OVERVIEW
- Mr. Mark Edwards, JRO-CBRND

FUTURE CB ENSEMBLE / GROUND SOLDIER SYSTEM TECHNOLOGY (FCBE-GSS) DEMONSTRATION PROGRAM
- Andra Kirsteins, FCBE-GSS Demonstration Technology Manager

CHEMICAL AND BIOLOGICAL MATERIAL EFFECTS (CBME) DATABASE
- Mr. Chris Hill, U.S. Army Research Laboratory Survivability/Lethality Analysis Directorate (ARL/SLAD)

WEDSDAY, MAY 18, 2011

KEYNOTE SPEAKER

- Dr. John Kuspa, Office of the Deputy to the Assistant Secretary of Defense for Nuclear Matters (DATSD/NM)

NUCLEAR SURVIVABILITY

- Mr. John Franco, DTRA

CBRN TEST INFRASTRUCTURE – TEST RESEARCH MANAGEMENT CENTER

- Dr. Suzanne Strohl, Deputy Director, Strategic Planning, Office of the Secretary of Defense, Test Resource Management Center

OVERVIEW OF JPEO-CBD JOINT PROGRAM MANAGERS (JPMS)

- Representatives from JPM-CA, JPM-IS, JPM-CBMS, JPM-G,

CBRN SURVIVABILITY INFORMATION AND ANALYSIS

- Mr. Jerry Glasow, Chief, Information and Analysis Division, within the Chemical and Biological Directorate of the Joint Science and Technology Office for CB Defense

CURRENT EFFORTS TO IMPROVE CHEMICAL CHALLENGE ESTIMATES

- Dr. Jeffrey H. Grotte, Deputy Division Director of the Strategy, Forces, and Resources Division at the Institute for Defense Analyses

BREAKOUT SESSIONS

- CBRN Survivability Oversight Group (CSOG) Action Officers from the Navy, Air Force, and Marine Corps

2011 CBRN Survivability Conference

May 17-18, 2011

Hilton Hotel

Baltimore, Maryland

2011 CBRN Survivability Conference

May 17, 2011 - Morning

- **8:30** Welcome Remarks – *BG Dean Ertwine, USA (Ret) & Mr. Rich Newton*
- **8:50** Keynote Speaker
  BG Jess Scarbrough, USA
- **9:30** CBRN Survivability Overview
  Ms. Helen Mearns
- **10:00** Break
- **10:30** Laboratory Infrastructure Support to CBRN Survivability
  Mr. Joseph Wienand
- **11:15** Maximizing the DoD's Return on Investment on Investment For CBRN Survivability - *Mr. William Hartzell*
- **11:35** MDAP CBRN Survivability Trail Boss Overviews
  Mr. Jorge Hernandez
- **12:20** Chairman JCS Instruction (CJCSI) 3175.01 Overview
  Mr. Mark Edwards
- **12:50** Lunch

May 17, 2011 – Afternoon

- **2:00** Joint Strike Fighter (JSF) CBRN Survivability
  Mr. William Dooley
- **2:45** Shipboard CBRN Survivability
  Mr. Brian Liska
- **3:15** Break
- **3:45** Integrating CBRN Protection into Combat Duty Uniforms
  Mr. Darren Wheeler
- **4:15** Future CB Ensemble/Ground Soldier System Technology (FCBE-GSS) Demonstration Program
  Ms. Andra Kirsteins
- **4:45** Chemical & Biological Material Effects (CBME) Database
  Mr. Chris Hill
- **5:15** Closing Remarks – *Ms. Helen Mearns*
- **5:15** Networking Reception

2011 CBRN Survivability Conference

May 18, 2010 - Morning

- **8:00** Opening Remarks
  Mr. Rich Newton
- **8:15** Keynote Speaker
  Dr. John Kuspa
- **8:45** Nuclear Survivability
  Mr. John Franco
- **9:30** Break
- **10:00** CBRN Test Infrastructure – Test Research Management Center – *Dr. Suzanne Strohl*
- **10:45** Overview of JPEO-CBD Joint Program Managers (JPMs)
  JPM-P, JPM-CA, JPM-BD, JPM-IS, JPM-CBMS, JPM-G
- **11:45** Lunch

May 18, 2011 – Afternoon

- **12:45** CBRN Survivability Information and Analysis
  Mr. Jerry Glasow
- **1:15** Current Efforts to Improve Chemical Challenge Estimates
  Dr.Jeffrey H. Grotte
- **1:45** CBRN Modeling & Simulation (M&S) Efforts
  Ms. Kate Segovia
- **2:00** Break
- **2:30** CBRN Survivability Oversight Group (CSOG)
  Army, Navy, Air Force and Marine Corps
- **3:30** Closing Remarks – Conference Adjourned
  Mr. Rich Newton

SUMMARY

- Please complete the surveys which will be emailed to you tomorrow
- Attendees will be sent a link to the 18 unrestricted proceedings in one to two weeks
  - Please contact Mr. Jorge Hernandez (jorge.hernandez2@navy.mil) for remaining 7 briefs

**Please join us next year at the
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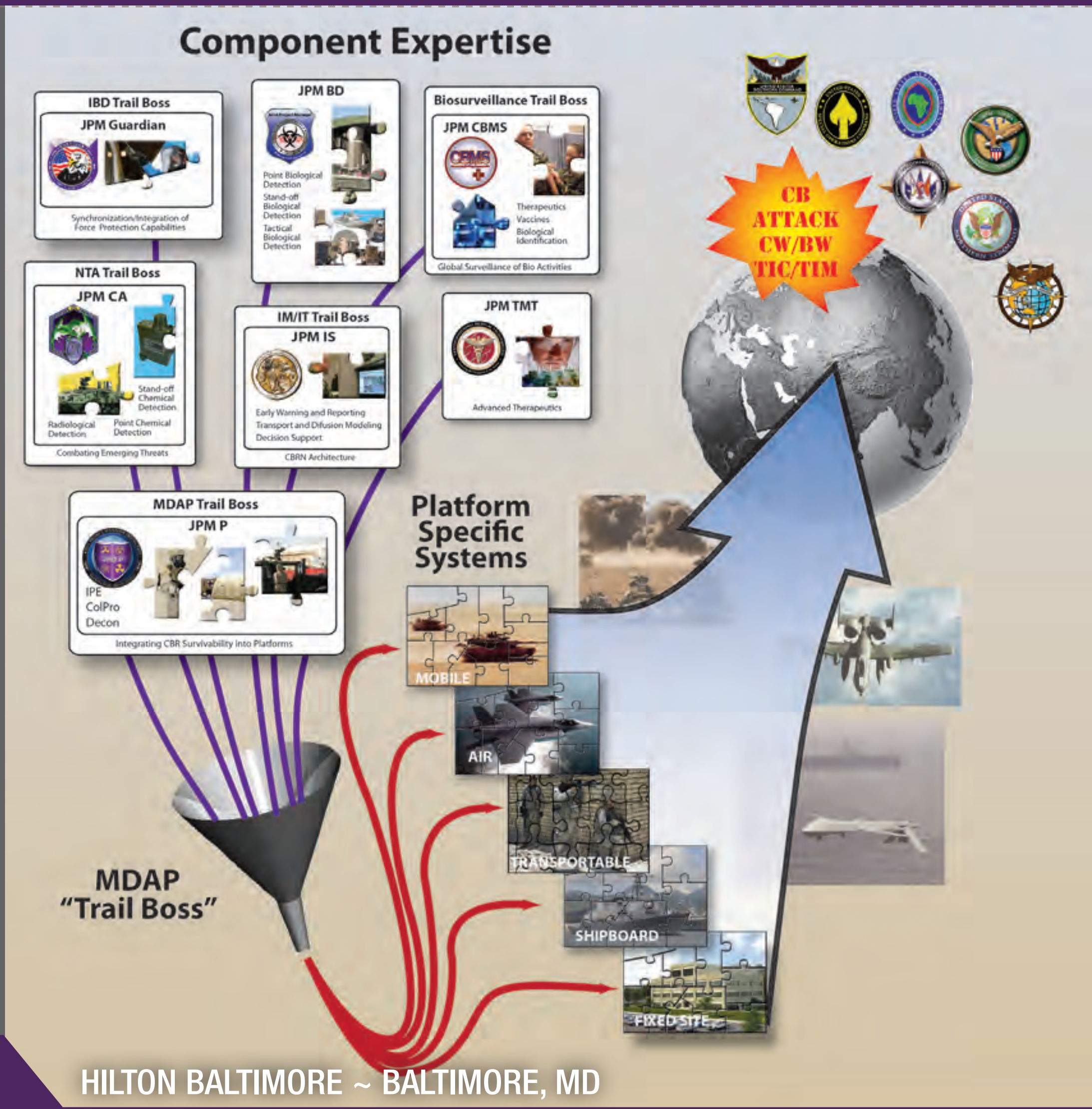
2011 CHEMICAL, BIOLOGICAL, RADIOLOGICAL, AND NUCLEAR SURVIVABILITY CONFERENCE

JOINT PROJECT MANAGER PROTECTION
JPM P
SERVO UNUS, SERVO TOTUS

"CBRN Survivability for Weapons Systems"

Conference Agenda and Speaker Biographies



MAY 17-18, 2011

HILTON BALTIMORE ~ BALTIMORE, MD

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EVENT #1350

TUESDAY MAY 17, 2011

7:00 AM - 8:30 AM — **REGISTRATION AND CONTINENTAL BREAKFAST**
Holiday Ballroom Foyer

8:30 AM - 8:50 AM — **WELCOME REMARKS**
Holiday Ballroom 6

BG Dean Ertwine, USA (Ret.)
Chair, NDIA Chem Bio Defense Division
Vice President, Army Sector
Battelle Eastern Science and Technology Center

Mr. Rich Newton
Protection Integrated Process Assistance Team (IPAT) Lead

8:50 AM - 9:30 AM — **KEYNOTE SPEAKER**
Holiday Ballroom 6

BG Jess Scarbrough
JPEO-CBD

9:30 AM - 10:00 AM — **CBRN SURVIVABILITY OVERVIEW**
Holiday Ballroom 6

Ms. Helen Mearns
Joint CBRN Defense Program Analysis and Integration Office (PAIO)

10:00 AM - 10:30 AM — **MORNING BREAK**
Holiday Ballroom Foyer

10:30 AM - 11:15 AM — **LABORATORY INFRASTRUCTURE SUPPORT TO CBRN SURVIVABILITY**
Holiday Ballroom 6

Mr. Joseph Wienand (SES)
Edgewood Chemical Biological Center Technical Director

11:15 AM - 11:35 AM — **MAXIMIZING THE DOD'S RETURN ON INVESTMENT FOR CBRN SURVIVABILITY**
Holiday Ballroom 6

Mr. Will Hartzell
JPM-P and MDAP Trail Boss

- How the weapon system programs can leverage the expertise and product portfolio within the JPEO-CBD
- Typical CBRN survivability requirements for weapon system platforms
- Importance of considering CBRN survivability requirements early in the acquisition lifecycle
- MDAP Trail Boss effort background
- Overview of the JPM-P organization, including the Individual Protection, Collective Protection, and Decontamination product areas

CONTINUED

11:35 AM - 12:20 PM — **MDAP CBR SURVIVABILITY TRAIL BOSS OVERVIEWS**
Holiday Ballroom 6

Mr. Jorge Hernandez
JPM-P MDAP Support Director

- CBRN defense support provided to weapon system platforms/facilities

12:20 PM - 12:50 PM — **CHAIRMAN OF THE JOINT CHIEFS OF STAFF INSTRUCTION (CJCSI) 3175.01 OVERVIEW**
Holiday Ballroom 6

Mr. Mark Edwards
JRO-CBRND

12:50 PM - 2:00 PM — **LUNCH**
Holiday Ballroom 4&5

2:00 PM - 2:45 PM — **JOINT STRIKE FIGHTER (JSF) CBR SURVIVABILITY**
Holiday Ballroom 6

Mr. William Dooley
JSF Mission Effectiveness IPT Lead

2:45 PM - 3:15 PM — **SHIPBOARD CBRN SURVIVABILITY**
Holiday Ballroom 6

Mr. Brian Liska
MDAP Trail Boss Platform Manager for Shipboard CBRN Survivability

3:15 PM - 3:45 PM — **AFTERNOON BREAK**
Holiday Ballroom Foyer

3:45 PM - 4:15 PM — **INTEGRATING CBRN PROTECTION INTO COMBAT DUTY UNIFORMS**
Holiday Ballroom 6

Mr. Darren Wheeler
Senior CBRN Analyst for JPM-P Future Acquisition Team

4:15 PM - 4:45 PM — **FUTURE CB ENSEMBLE / GROUND SOLDIER SYSTEM TECHNOLOGY (FCBE-GSS) DEMONSTRATION PROGRAM**
Holiday Ballroom 6

Ms. Andra Kirsteins
FCBE-GSS Demonstration Technology Manager

CONTINUED

4:45 PM - 5:15 PM — **CHEMICAL AND BIOLOGICAL MATERIAL EFFECTS (CBME) DATABASE**
Holiday Ballroom 6

Mr. Chris Hill
U.S. Army Research Laboratory Survivability/Lethality Analysis Directorate (ARL/SLAD)

- Online tool that contains comprehensive information on the effects of CB agents, simulants, and decontaminants on materials used in defense systems

5:15 PM — **CLOSING REMARKS**
Holiday Ballroom 6

Ms. Helen Mearns
Joint CBRN Defense Program Analysis and Integration Office (PAIO)

5:15 PM - 6:30 PM — **NETWORKING RECEPTION**
Holiday Ballroom 4&5

WEDNESDAY MAY 18, 2011

7:00 AM - 8:00 AM — **REGISTRATION AND CONTINENTAL BREAKFAST**
Holiday Ballroom Foyer

8:00 AM - 8:15 AM — **OPENING REMARKS**
Holiday Ballroom 6

Mr. Rich Newton
Protection Integrated Process Assistance Team (IPAT) Lead

8:15 AM - 8:45 AM — **KEYNOTE SPEAKER**
Holiday Ballroom 6

Dr. John Kuspa
Office of the Deputy to the Assistant Secretary of Defense for Nuclear Matters (DATSD/NM)

- Nuclear Survivability
- DoD Policy

8:45 AM - 9:30 AM — **NUCLEAR SURVIVABILITY**
Holiday Ballroom 6

Mr. John Franco
DTRA

9:30 AM - 9:45 AM — **MORNING BREAK**
Holiday Ballroom Foyer

CONTINUED

9:45 AM - 10:30 AM — **CBRN TEST INFRASTRUCTURE – TEST RESEARCH MANAGEMENT CENTER**
Holiday Ballroom 6

Dr. Suzanne Strohl
Deputy Director, Strategic Planning, Office of the Secretary of Defense, Test Resource Management Center

- Nuclear Weapons Effects Test Capabilities
- Myth Busting

10:30 AM - 11:45 AM — **OVERVIEW OF JPEO-CBD JOINT PROGRAM MANAGERS (JPMS)**
Holiday Ballroom 6

- Representatives from JPM-P, JPM-CA, JPM-BD, JPM-IS, JPM-CBMS, JPM-G, JPM-RN
- Expertise and product portfolio within each JPM

11:45 AM - 12:45 PM — **LUNCH**
Holiday Ballroom 4&5

12:45 PM - 1:15 PM — **CBRN SURVIVABILITY INFORMATION AND ANALYSIS**
Holiday Ballroom 6

Mr. Jerry Glasow
Chief, Information and Analysis Division, within the Chemical and Biological Directorate of the Joint Science and Technology Office for CB Defense

- Enabling program managers with appropriate information and analysis products, data, methods, and tools will allow them to consider CBRN survivability within the greater DoD context

1:15 PM -1:45 PM — **CURRENT EFFORTS TO IMPROVE CHEMICAL CHALLENGE ESTIMATES**
Holiday Ballroom 6

Dr. Jeffrey H. Grotte
Deputy Division Director of the Strategy, Forces, and Resources Division at the Institute for Defense Analyses

1:45 PM - 2:00 PM — **CBRN MODELING AND SIMULATION (M&S) EFFORTS**
Holiday Ballroom 6

Ms. Kate Segovia
JPEO-CBD M&S IPT Lead

2:00 PM - 2:15 PM — **BREAKOUT SESSION GUIDANCE**
Holiday Ballroom 6

Ms. Helen Mearns
Joint CBRN Defense Program Analysis and Integration Office (PAIO)

CONTINUED

2:15 PM - 2:30 PM — **AFTERNOON BREAK**
Holiday Ballroom Foyer

2:30 PM - 3:30 PM — **BREAKOUT SESSIONS**
Holiday Ballroom 1,2,4,5,6

CBRN Survivability Oversight Group (CSOG) Action Officers from the Army, Navy, Air Force, and Marine Corps

- Discuss Service-specific plans, processes, and policies regarding CBRN survivability, from capabilities document generation through development and testing

Service Specific Requirements and Policies

Air Force	-	Holiday Ballroom 2
Army	-	Holiday Ballroom 5
Marine Corps	-	Holiday Ballroom 1
Navy	-	Holiday Ballroom 4

3:30 PM - 4:30 PM — **POST BREAKOUT WRAP UP**
Holiday Ballroom 6

CSOG Action Officers

4:30 PM — **CLOSING REMARKS**
Holiday Ballroom

Mr. Rich Newton
Protection Integrated Process Assistance Team (IPAT) Lead

CONFERENCE ADJOURNS

SPEAKER BIOGRAPHIES

BG Jess Scarbrough

Brigadier General Scarbrough is the new Joint Program Executive Officer for Chemical and Biological Defense. His responsibilities include the research, development and acquisition of all chemical and biological defense equipment and medical countermeasures for the United States Armed Services.

He was commissioned a Second Lieutenant in Air Defense Artillery (AD) after graduating from the University of Arizona with a Bachelor of Arts Degree in Political Science. Upon graduation, he was assigned to the United States Army – Europe (USAREUR) and Seventh Army as a Unit Commander responsible for Nuclear Surety on a NATO Nike Hercules AD Missile Site.

In 1985, BG Scarbrough was reassigned to III Corps and Fort Hood, Texas where he served in multiple operational assignments as a Battalion S4 and Battery Commander in a Division AD Chaparral/Vulcan Battalion. In 1988, he was reassigned to the 31st Air Defense Artillery Brigade, III Corps and served as the Chief of the Air Defense Element.

In 1989 BG Scarbrough entered into his functional area; research, development and acquisition and has served in numerous acquisition management and staff positions to include; Project Manager for the Army's Tactical Exploitation of National Capabilities Program and Director, Army Space Program Office; Program Executive Office (PEO) for Intelligence, Electronic Warfare and Sensors (IEW&S); and Product Manager for the Army's Information Warfare Program, PM Signals Warfare, PEO IEW&S.

BG Scarbrough's other assignments include Program Director, Special Operations and Conventional Special Programs, Office of the Under Secretary of Defense for Acquisition and Technology; Director, International Cooperative Programs Activity, United States Army Research, Development and Engineering Command; Chief of Staff to the Army Acquisition Executive, and Assistant Deputy, Acquisition and Systems Management, Office of the Assistant Secretary of the Army for Acquisition, Logistics and Technology.

BG Scarbrough has earned two Masters Degrees in Business Administration from the University of Oklahoma and in Strategic Studies from the United States Army War College. Other professional schooling includes the AD Officer Basic and Advanced Courses, the Army's Command and General Staff College, the Air Force Air Command and Staff College, the Department of Defense Systems Management College, and the National Defense University's CAPSTONE General and Flag Officer Course.

His decorations and awards include the Legion of Merit with one oak leaf cluster, the Defense Meritorious Service Medal, the Army Meritorious Service Medal with six oak leaf clusters, the Army Commendation Medal with one oak leaf cluster and the Army's Achievement Medal with one oak leaf cluster. He is also authorized to wear the Office of the Secretary of Defense Identification Badge, the Army Staff Identification Badge, the Army Air Assault Badge, and the German Air Force Air Defense Badge in Bronze.

Dr. John Kuspa

Physical Scientist (2006-Present) Office of the Deputy Assistant Secretary of Defense (DASD) for Nuclear Matters; supporting the Assistant Secretary of Defense (ASD) (Nuclear, Chemical & Biological Defense Programs); in the Office of the Undersecretary of Defense (USD/ATL); in Arlington, Virginia (Pentagon). Provides professional and technical analysis and policy development, implementation, and oversight support for the survivability of DoD systems to nuclear weapons effects, including High-Altitude Electromagnetic Pulse (HEMP).

Senior National Security Analyst, Science Applications International Corporation, Inc. (SAIC), McLean , Virginia Supported in the Pentagon (2004-2006) the Office of the DASD(NM), providing Staff and technical support for the interagency Committee of Principals (CoP) chartered by Presidential Directive (NSPD-28) to oversee Nuclear Command and Control (NC2).

Other experience at SAIC Project leader (2002-2004) for the nuclear weapon outreach training program for the Defense Threat Reduction Agency (DTRA). Responsible for developing courses, conducting training, and providing Subject Matter Experts (SMEs) on nuclear weapons (their design, effects, and materials production), radiological dispersion devices (RDDs) (their availability, delivery, and effects), proliferation and counter-proliferation challenges, and Homeland Security challenges, such as detecting and intercepting nuclear weapons (and Improvised nuclear devices) and RDDs, within DoD and among several federal and local government agencies.

Senior Project Manager and Engineer, K&M Engineering and Consulting Corporation, Washington, D.C. Lead team of independent consultants conducting two Congressionally-mandated external reviews of programs related to the DOE nuclear weapons complex: the Accelerator Production of Tritium (APT) Program (1998), and the Plutonium Stabilization and Handling System Project at Hanford, Washington.

Project manager for consulting services to the Government of Jordan (Ministry of Energy & Mineral Resources) for the Samra Power Station, the first privately owned electric power generation station in Jordan.

Commissioned Officer in the US Army Corps of Engineers Executive Assistant in the Pentagon to the Deputy Assistant Secretary of the Army for Environment, Safety, and Health, dealing with military installation infrastructure and environmental issues at Army bases.

Chief, Nuclear Division, at the On-Site Inspection Agency (OSIA), responsible for implementation of the inspection provisions of the Threshold Test Ban Treaty (TTBT), including hosting Soviet/Russian experts at DOE's Nevada Test Site and training US teams for deployment to USSR/Russia. Led DOD-DOE negotiation team with Russians for U.S. nuclear test Greenwater.

Chief, Nuclear Stockpile Branch and then the NATO Nuclear Branch, J-5, Joint Staff, supported the Nuclear Weapons Council (NWC) and its Standing and Safety Committee (NWCSSC), developed and coordinated the Nuclear Weapons Deployment Plan with the Combatant Commands and OSD, provided Joint Staff support to OASD (Policy) on NATO nuclear policy matters (NPG & HLG) and NATO exercises, and led internal JCS study of U.S. Army nuclear weapons requirements.

US Army War College Fellow to Department of Energy, supporting the Office of Space and Defense Nuclear Power Systems (NE-50), working on national programs to develop space power reactors and radioisotope thermoelectric generators.

Assistant Professor of Mechanics, US Military Academy, West Point, NY, teaching Thermodynamics and responsible for developing and teaching a new Advanced Thermodynamics Course for Cadets in Math, Science, or Engineering major programs.

Mr. William Hartzell

Mr. William Hartzell was born February 24, 1955 in Demopolis, Alabama and enlisted in the Marine Corps in February of 1973. He spent 21 years in the Marine Corps with assignments in the Carolinas, Oklahoma, California, Hawaii, Georgia and Okinawa. During this time, he participated in numerous training and operational deployments worldwide including expeditionary service in Somalia and the Arabian Gulf with the 24th Marine Expeditionary Unit (Special Operations Capable). Mr. Hartzell retired from the Marine Corps in February of 1994 as a Chief Warrant Officer (W-4), Nuclear, Biological and Chemical Officer.

After retirement, Mr. Hartzell attended North Carolina State University earning a Master of Science degree and an advanced graduate teaching certificate (6th year certificate). He joined Marine Corps Systems Command in 1996 and managed the individual protection programs, the biological detection programs and portions of the individual combat clothing and equipment programs until January of 2000. During this assignment, he was accepted into the Department of the Navy's Acquisition Professional Community, completed the Program Management Course at the Defense Acquisition University and attained his Level III Certification in Program Management.

From January of 2000 until September of 2003, Mr. Hartzell was a program manager for Battelle Memorial Institute where he supported the Marine Corps' Chemical Biological Incident Response Force, the Marine Corps' Warfighting Laboratory, Naval Air Systems Command and Marine Corps Systems Command.

In September of 2003, Mr. Hartzell returned to government service initially as the Operations Officer and Acquisition Support Coordinator for the Joint Project Manager, Individual Protection, JPEO-CBD. He was subsequently assigned as the Deputy Project Manager for Individual Protection and served in that capacity until his selection as the Joint Project Manager for Decontamination in July of 2006. On April 13, 2007, Mr. Hartzell was chartered as the Joint Project Manager for Individual Protection. On January 3, 2011, Mr. Hartzell became the Joint Project Manager for Protection, consolidating the Joint Project Management offices for Individual Protection, Decontamination and Collective Protection into a single organization.

Mr. Hartzell resides in Stafford, Virginia with his wife Jeanne and two sons, Steven and Kyle.

Mr. Jorge Hernandez

Mr. Jorge Hernandez is the Director for the Major Defense Acquisition Program (MDAP) CBRN Survivability Support and Integration Directorate, within the JPEO-CBD's Joint Program Manager for Protection (JPM-P) Office. The Directorate assists DoD acquisition programs, designated as CBRN mission-critical, by providing affordable solutions that meet their CBRN survivability and force protection requirements. Mr. Hernandez is an employee of the Naval Surface Warfare Center Dahlgren Division (NSWCDD) in Dahlgren, VA.

Prior to supporting the JPEO-CBD, Mr. Hernandez was the Program Manager for the OSD-sponsored Hydra Hunter Program which developed and deployed several critical systems that enable US Forces to deny and degrade the warfighting capabilities of terrorists and insurgents in Iraq and Afghanistan. During his nine years of federal service, he has also been the Lead Systems Engineer and the Warhead Project Lead for the Affordable Weapon System (AWS) Program and has been the Lead Warhead Engineer for various weapon system efforts.

Mr. Hernandez is a 2000 graduate of Northwestern University where he earned a BS in

Mechanical Engineering and is a 2002 graduate of the Georgia Institute of Technology where he erased an MS in Mechanical Engineering. He is a member of the DoD Acquisition Corps certified at Level 3 and Level 2 in the SPRDE and PM career fields, respectively.

Mr. Hernandez is a member of the Navy's Advisory Council to Hispanic Employment (ACHE), which is chaired by the DASN (Civilian Human Resources). The Council is responsible for helping the Navy address Hispanic employee recruitment and retention issues and for providing the Naval leadership with effective solutions and guidance.

Mr. Hernandez resides in Fredericksburg, VA with his wife Leyla and son Aiden.

Mr. William Dooley

Mr. William Dooley is a member of the Naval Air Systems Command (NAVAIR) 4.1.8 Survivability and Threat Lethality Division and is currently serving as the Mission Effectiveness IPT Lead for the JSF Program.

Mr. Dooley is a 1978 graduate of the US Naval Academy where he received a BS in Mathematics and is a 1994 graduate of the Naval Postgraduate School where he received a MS in Aeronautical Engineering. He has served as the NAVAIR 4.1.8 Susceptibility Branch Officer and as the Chief Engineer of an Advanced Development Program Office developing Low Observable technologies for integration into Fleet platforms. He received the Exceptional Civilian Service Medal as the JSF Signature IPT Lead from 2004 -2006. Mr. Dooley currently serves as the Navy Executive Committee representative for the National RCS Measurement Facilities Certification Program. Mr. Dooley accumulated over 2000 hours in the A-6E Intruder as a Naval Flight Officer. His operational tours included deployments aboard the USS Coral Sea where he flew armed sorties in the Gulf of Sidra in 1986 and aboard the USS Dwight D. Eisenhower for two deployments supporting Operation Desert Shield. Mr. Dooley may be contacted at william.dooley@navy.mil.

Mr. Jerry Glasow

Mr. Jerry Glasow is currently the Chief of the Information and Analysis Division of the CB Technologies Directorate at the Defense Threat Reduction Agency.

Mr. Glasow has over 28 years of expertise spanning and combining chemical, biological, radiological, and nuclear (CBRN) operations, operations research (OR), test and evaluation, and modeling and simulation. Before retiring from military service, Mr. Glasow served as the Director of the Defense Modeling and Simulation Office (renamed the Modeling and Simulation Coordination Office) and Military Assistant to the Deputy Under-Secretary of the Army for OR. His goal with the Defense Threat Reduction Agency is to improve research and development to provide CBRN information and analysis capabilities by combining it with CBRN operations research to support requirement and programmatic decision-making.

MDAP Trail Boss Team Points of Contact (POCs)

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Notes

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THANK YOU FOR ATTENDING THE 2011 CBRN SURVIVABILITY CONFERENCE

"CBRN Survivability for Weapons Systems"

SAVE THE DATE!

2012 JOINT CBRN CONFERENCE & EXHIBITION
MARCH 12-14, 2012
HILTON BALTIMORE • BALTIMORE, MD
MORE INFORMATION COMING SOON!


Welcome

USAF CBRN Survivability

Mr. John Maxey
AF/A5XP
18 May 2011

Overview

- Why CBRN Survivability?
- Air Force CBRN Survivability Program
- Future Focus of CBRN Survivability

Why CBRN Survivability?

The mission of the United States Air Force is to *fly, fight* and *win*...in air, space and cyberspace

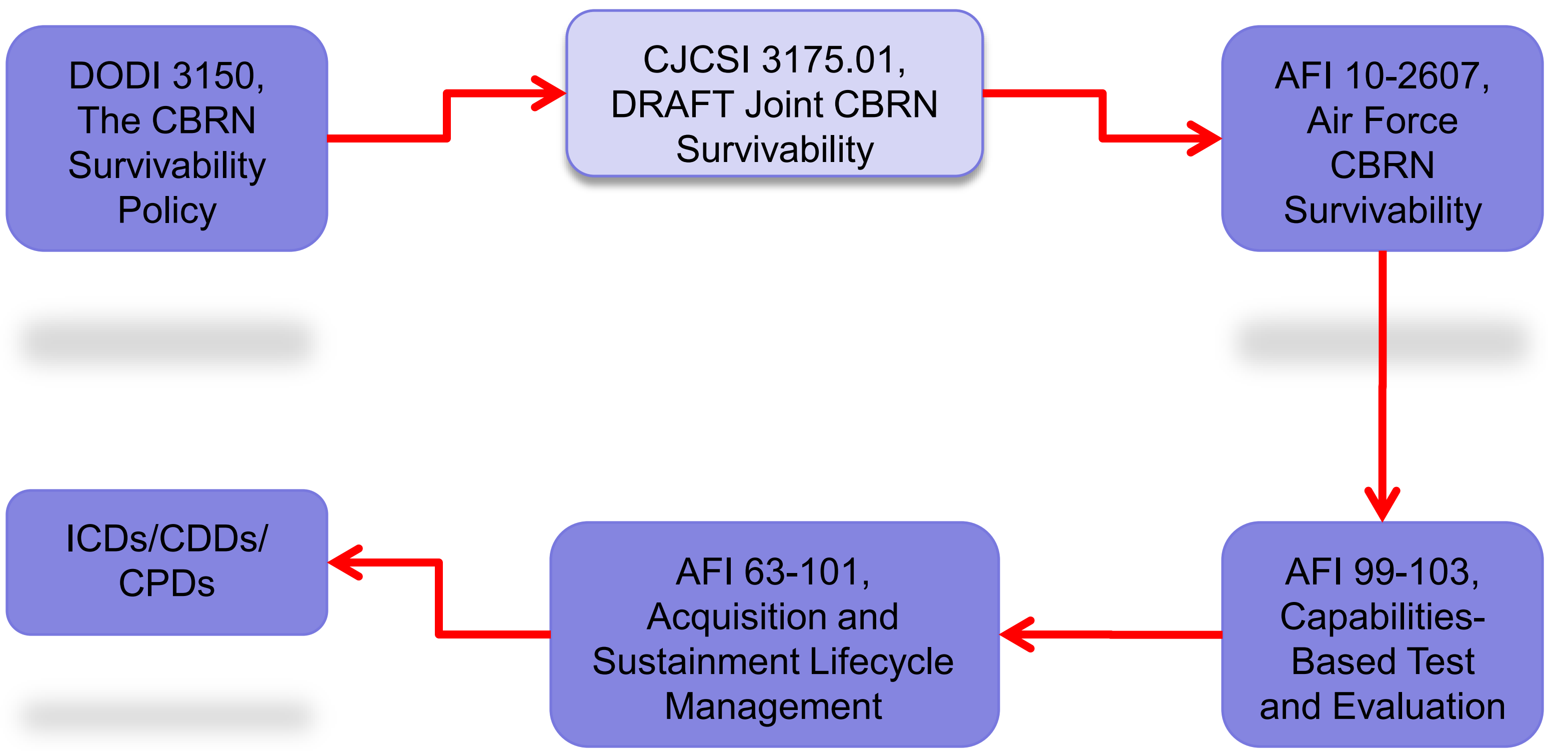
Operational Impacts

- Chemical Warfare Agents
  - Percutaneous and Inhalation Hazard
  - Denies/Disrupts Use of Equipment and Facilities
  - Damage to Equipment
- Biological Warfare Agents
  - Percutaneous and Inhalation Hazard
  - Denies/Disrupts Use of Equipment and Facilities
  - Difficulty to detect/characterize
- Radiological Hazards
  - Potential percutaneous and inhalation hazard
  - Limited medical treatment options
  - Lengthy hazard duration

Operational Impacts (cont.)

- Nuclear hazards
  - Electromagnetic Pulse (EMP) Effects
  - Shock/Blast
  - Thermal
  - Overpressure
  - Downwind Hazards

AF CBRN Survivability



U.S. AIR FORCE

Document Review Process

Round 1

Originator
↓
Joint/AF Gatekeeper
↓
AF/A5R (Requirements)
↓
AF/A5RP (Integration)
↓
AF/A5XP- 3150.09 Compliance Check
↓
AF/A5RP
↓
AF/A5R
↓
Joint/AF Gatekeeper
↓
Originator

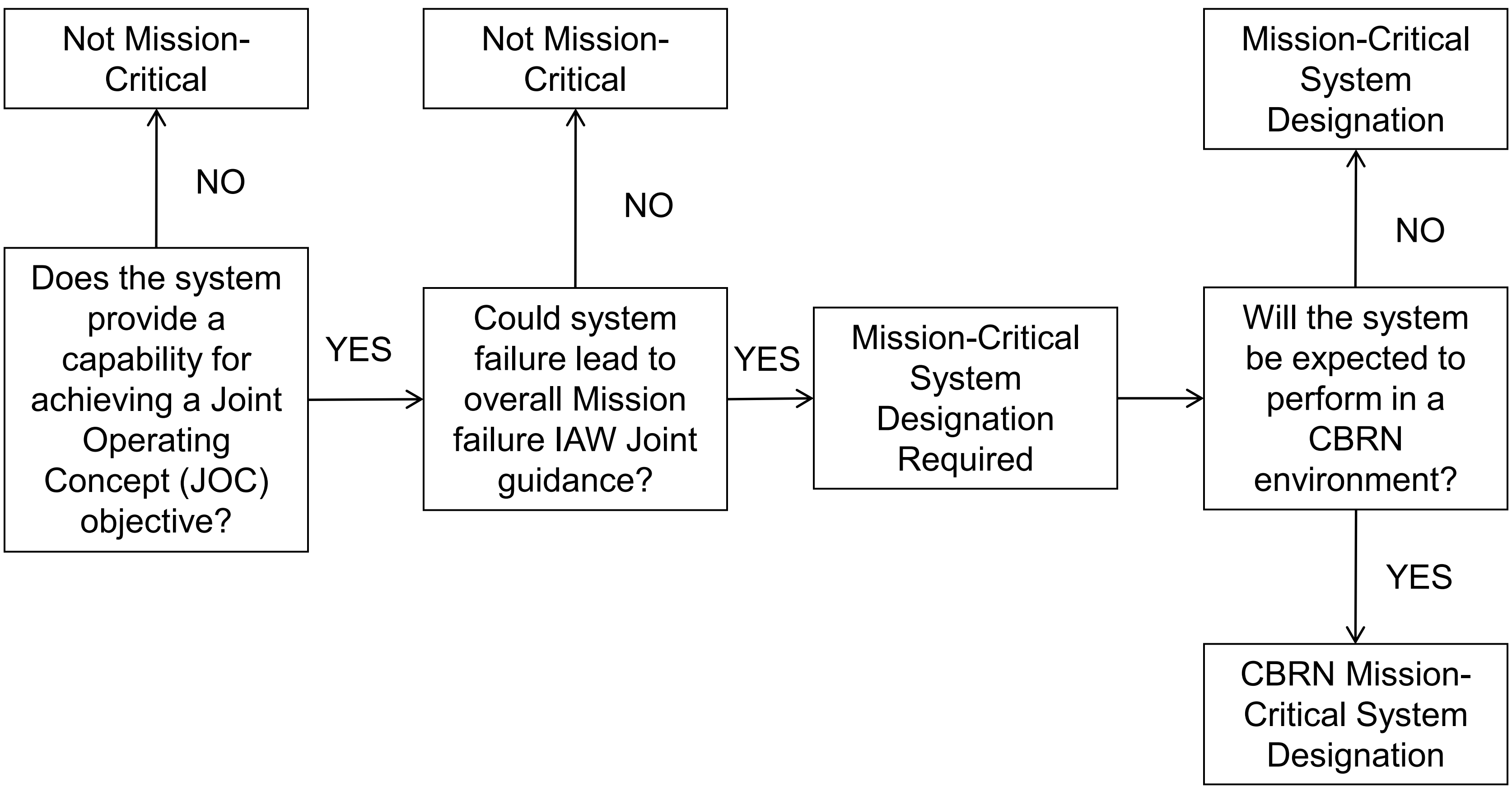
→

Round 2

Originator
↓
Joint/AF Gatekeeper
↓
AF/A5R
↓
AF/A5RP
↓
AF/A5XP- 3150.09 Compliance Check
↓
OPR ★★
(Critical Comments Only)
↓
AF/A5RP
↓
AF/A5R
↓
Joint/AF Gatekeeper
↓
Originator

U.S. AIR FORCE

Mission-Critical Designation



USAF Perspective

- Better comprehension/understanding of USAF operational parameters
  - Minimize denial and disruption of critical mission operations through system hardening
  - Parameter/operational constraints
  - Fight where we sleep

Future Focus of CBRN Survivability

- Industry needs the ability to test system materials and components against the effects of CBRN agents

- CBRN survivability needs to be incorporated into estimating life-cycle costs for maintaining existing systems or developing new ones

U.S. AIR FORCE

Questions?

Joint CBRN Survivability CJCSI 3175.01 (DRAFT) Overview 17 May 2011

Mr. Mark Edwards

Joint Staff/J8/JRO CBRND

Outline (U)

- DRAFT CJCSI 3175.01 Joint Survivability Background
- DRAFT CJCSI 3175.01 Joint Survivability Update
- Joint Staff Responsibilities, Guidance and Coordination

DRAFT CJCSI 3175.01 Background (U)

- Directs compliance with the DoD Security Classification Guide for CBRN Survivability
- Paraphrases the DRAFT "Carter Memo" for JRO, JPEO, Military, Agency and COCOM Interaction during JCIDS Documentation
- Includes implementation previously covered in the JCS memo of 14 May 2008
- J8/JRO is the Office of Primary Responsibility (OPR)

Draft CJCSI 3175.01 Update (U)

- **IPT#1 conducted-November 2010 for DRAFT CJCSI 3175.01**
  - **Military Departments, DUSAT&E, JPEO, USSTRATCOM, DTRA, PAIO, ODATSD(NM)**
  - **Preliminary discussion, comments and updates**
- **IPT#2 conducted-February 2011**
  - **All comments adjudicated**
- **IPT#3 will be scheduled Spring 2011**
  - **Final AO Review**
- **JSAP Final Draft expected after IPT#3**

Joint Staff Responsibilities, Guidance and Coordination (U)

- Review
  - CBRN Mission Critical Systems' capabilities documents and survivability reports: J-8
  - NC2 Mission Critical Systems' capabilities documents and survivability reports: J-6 (CJCSI 5119.01, 6810.01)
- Provide
  - Guidance to service and COCOMS on legacy system survivability: J-6/J-8
  - Coordination and oversight of CBRN survivability initiatives to JROC and COCOMs: J-6/J-8
- Status
  - Ongoing: working with OASD(NM) and PAIO reviewing survivability reports and potential modifications to them

Joint Staff Guidance and Coordination (U)

- **Ensure:**
  - **JROC validation of JROC Interest programs: J-8**
    - **Process in place, not exercised yet**
  - **Multi-Service CBRN mission-critical systems have integrated CBRN survivability requirements: J-8**
    - **Process in place, not exercise yet**
  - **Mission-critical NC2 facilities/equipment are nuclear hardened/survivable: (CJCSIs 3222.01 and 6811.0)**
  - **Joint doctrine and training support the CBRN Survivability Policy: J-6/7/8**
    - **POC's identified, process not updated yet**

Questions?

Nuclear Survivability Overview

Presented to Chemical, Biological, Radiological and Nuclear Survivability Conference

18 May 2011

John Franco
Nuclear Survivability Division

Survivability addressed in 2010 Nuclear Posture Review (NPR) and Quadrennial Defense Review (QDR)

- NPR addresses a survivable U.S. response force
  - Continue Minuteman III Life Extension Program to keep the fleet in service to 2030
  - Retain dual-capable bombers with over $1B over next 5 years to support survivability and improve mission effectiveness of the B-2
  - Make new investments in NC2 system to maximize Presidential decision time in a nuclear crisis

- QDR initiative include
  - Strengthen key supporting capabilities for strategic communications
  - Improve survivability of space systems and infrastructure

OSD has elevated nuclear survivability with a permanent Defense Science Board (DSB)

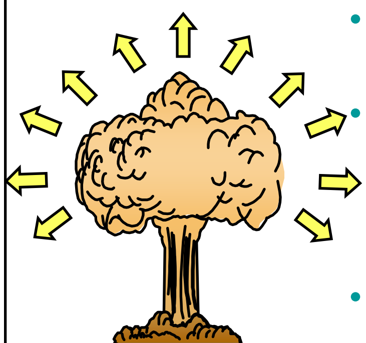
- Permanent DSB task force to assess all aspects of the survivability of DoD systems and assets to EMP and other nuclear weapons effects
  - Build on the work of the EMP Commission and related DSB efforts
    - "The Nuclear Weapons Effects National Enterprise," May 10
    - "Nuclear Weapon Effects Test, Evaluation, & Simulation," Apr 05

- Task Force to assess the implementation of DoDI 3150.09, CBRN Survivability Policy, and the effectiveness of the management oversight group established by the DoDI
  - Conduct an independent review and assessment of DoD's EMP survivability program and review other matters associated with nuclear survivability

Radiation Output of Nuclear Weapons

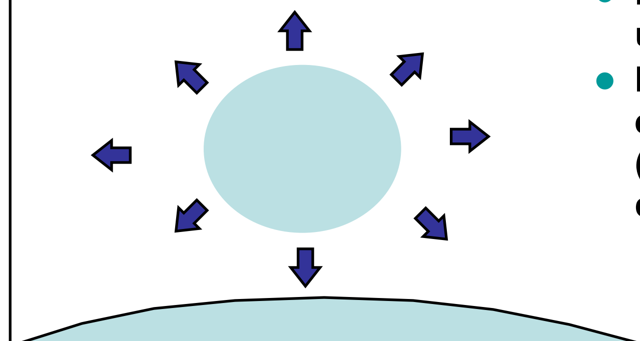
The environments of the nuclear weapon are driven by the highly energetic products of underlying nuclear reactions

Near Surface

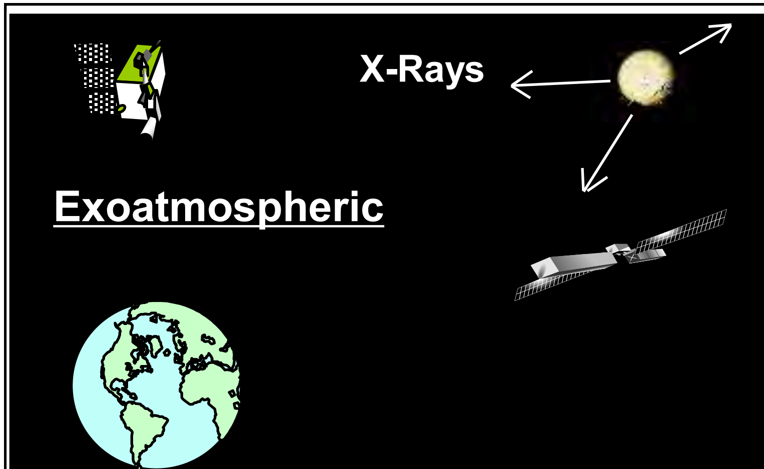


- X-rays are absorbed near the burst.
- Radiation is generally less important than blast and shock.
- Fallout can irradiate personnel.

Endoatmospheric



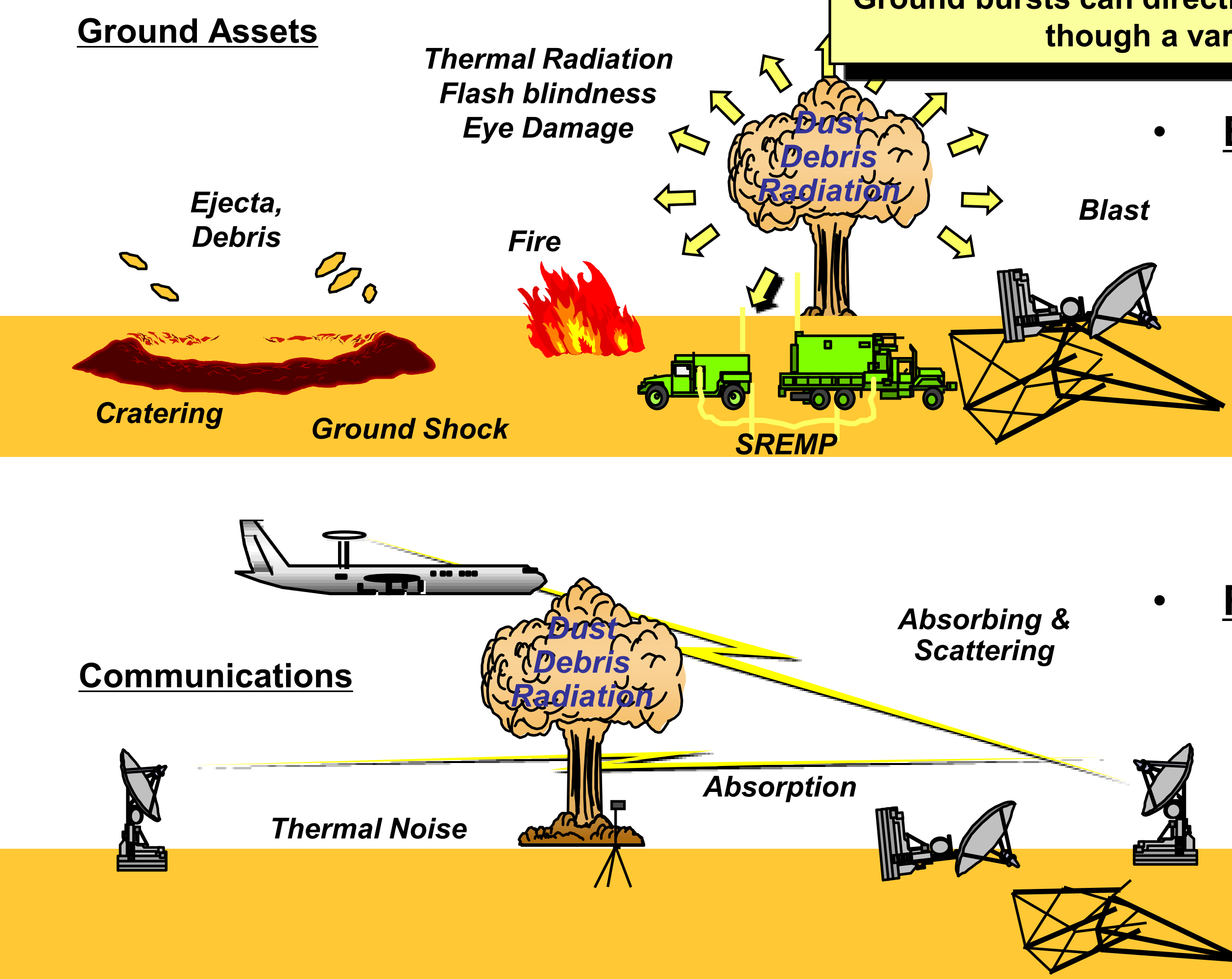
- Radiation (X, γ) ionizes upper atmosphere.
- Ionized layer produces electromagnetic pulse (EMP) that propagates down to ground.



- Radiation (x, γ, n) travel through vacuum to reach space assets
  - Dies off as $1/R^2$
  - Radiation can kill electronics directly (TREE) or create current pulses in wires (SGEMP) that kill electronics.
- Bomb debris are contained in earth's magnetic field.
  - This interacts with low orbit assets (total dose) to cause long term kill in days, weeks or months.

Direct Damage to Ground Nodes: Surface Burst

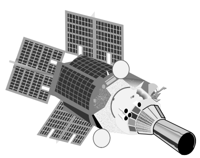
Ground bursts can directly damage or impair system ground nodes though a variety of coupling mechanisms



- **Effects:**
  - Blast & Shock
  - Cratering
  - Thermal
  - Dust
  - Absorption & Scattering
  - Fallout
  - Initial Nuclear Radiation
  - Source Region EMP
- **Results**
  - Destruction of C3I
  - Denial of Use of Assets
  - Loss of LOS Communications
  - Loss of Ability to Communicate

Direct Damage to Space Nodes: Exoatmospheric Bursts

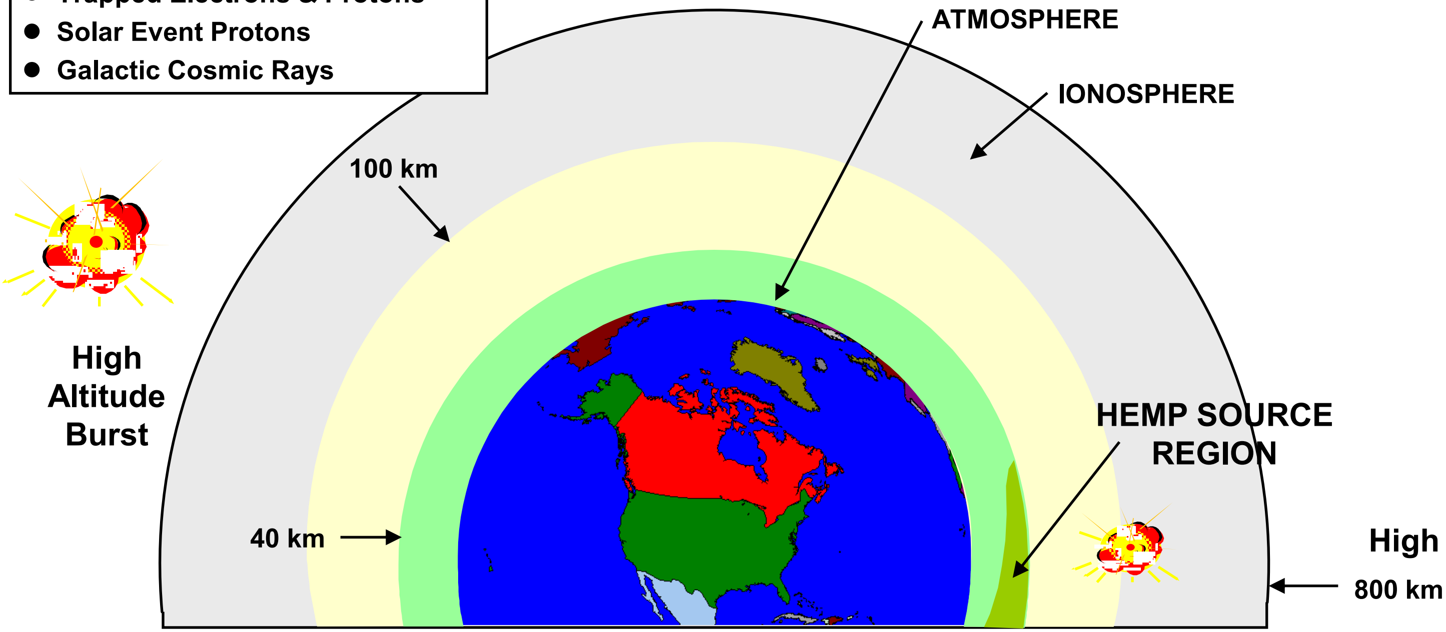
Exoatmospheric bursts can directly impair space nodes through a variety of radiation damage mechanisms



NATURAL SPACE ENVIRONMENTS
- Trapped Electrons & Protons
- Solar Event Protons
- Galactic Cosmic Rays

Exoatmospheric Burst
- Neutrons
- γ-rays
- X-rays
- Radioactive Debris

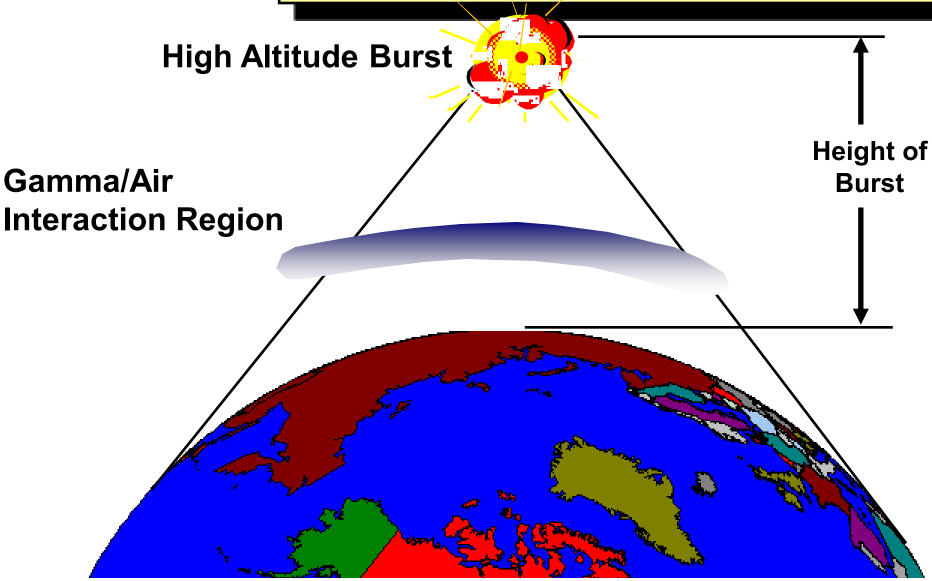
ATMOSPHERIC EFFECTS
- Disturbed Propagation Paths
- Nuclear Backgrounds



- **Effects:**
  - TREE Dose Rate
  - TREE Total Dose
  - TMS
  - SGEMP
  - Debris Gammas
  - Debris Electrons
- **Results**
  - False Targets
  - Electronics Upset
  - Electronics Burnout
  - Loss of Track
  - Link Distortion
  - Physical Damage
  - Loss of Space Node

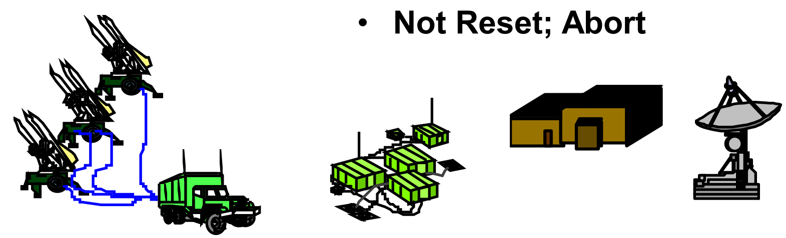
Damage to Ground Nodes: EMP from High Altitude Bursts

High Altitude Bursts can also impair Ground and/or Space nodes through the long range effects of EMP



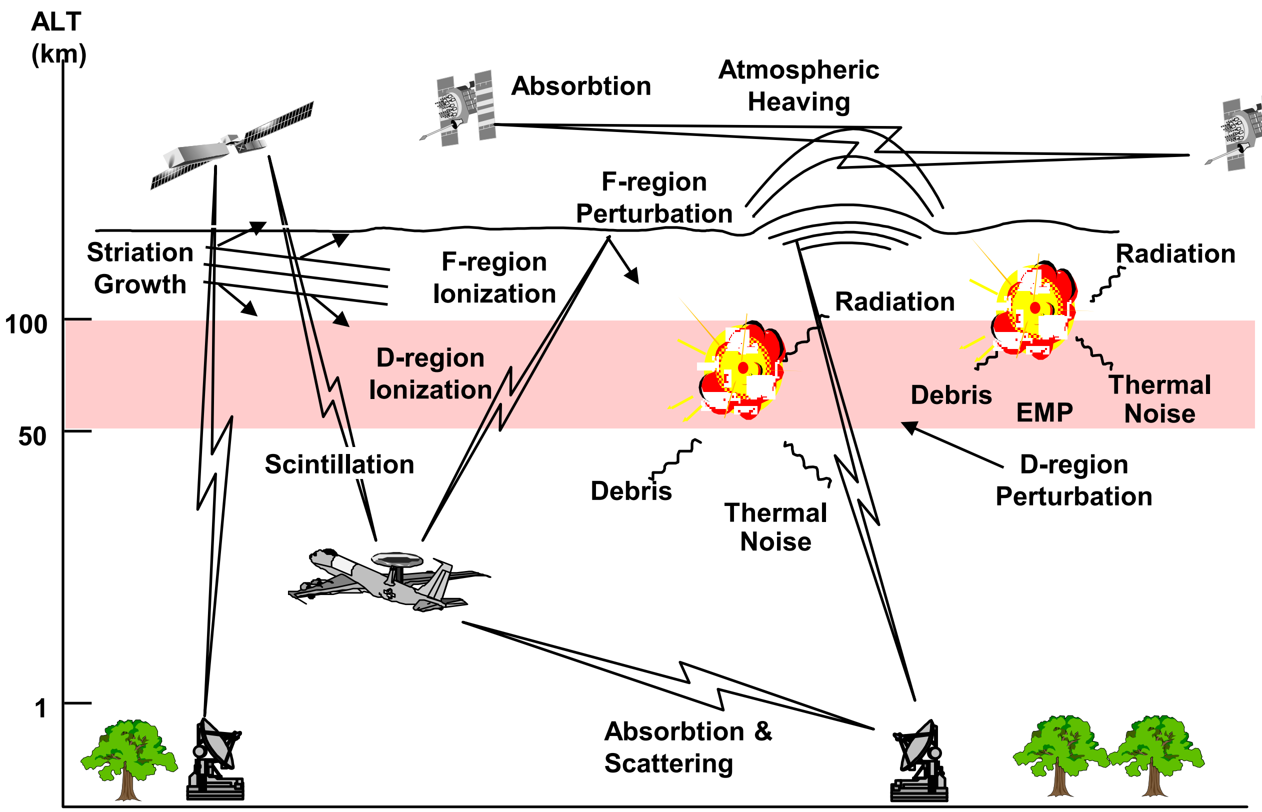
HEMP Component	System Size		
	10s of meters (A/C Missiles)	~200 meters (Bldgs/Long Lines)	10s of km (Long Lines)
Early-Time	✓	✓	✓
Intermediate-Time		✓	✓
Late time MHD-EMP			✓

- <u>Permanent Damage</u>
  - Device or Component Failure
  - Not Correctable
  - Loss of Function
  - Key Issue: Mission Impact
    - Abort
    - Degradation
    - None
- <u>Upset</u>
  - Inadvertent Change of System State
  - Overt or Latent
  - Temporary Condition
  - Key Issue: Mission Impact
    - Reset; No Impact
    - Reset; Degradation
    - Not Reset; Degradation
    - Not Reset; Abort



Indirect Operability Impact: Link Degradation

Nuclear bursts can also indirectly interfere with operations by disturbing sensor/communication links



- Effects
  - Optical Background
  - Radioactive Debris
  - Blackout
  - Scintillation
- Results
  - Target Masking
  - False Targets
  - Link Failure
  - Increased Errors

System Architecture/Operational Approaches

System architecture/operational approaches can be extremely effective at mitigating the effects of nuclear weapons

Mitigation Approach	*System Architecture*
• Proliferation/Distribution of Assets	• TRIAD
• Threat Avoidance	• Mobile Facilities/Command Posts • Satellites in GEO Orbit
• Robust Links	• Network Insensitive to Node Loss Signal Processing (Software/ Hardware)
• Redundancy	• Multiple Redundant Satellites • Multiple Radar Systems

Hardening of Surface Assets to Direct Effects

Near surface assets can be hardened to improve their survivability to near-surface bursts

Thermal Pulse

- Use Reflective Coatings
- Provide Insulating Material
- Use Ablator or Sacrificial Shield
- Build Underground

Air Blast

- Provide Aerodynamic Shape
- Increase Physical Strength or Mass
- Build Underground
- Use Significant Tie Downs

Ground Shock/Cratering

- Increase Physical Strength
- Design Elastic Response
- Reduce Resonant Modes
- Improve Ductility /Flexibility
- Provide Shock Isolators
- Build Very Deep Underground

Hardening of Space Assets to Direct Effects

Space assets can be hardened to improve survivability and operability against the radiation effects of exoatmospheric bursts

SGEMP

- Radiation Shielding
- Circuit Design
- EM Shielding Topology

Thermo-mechanical

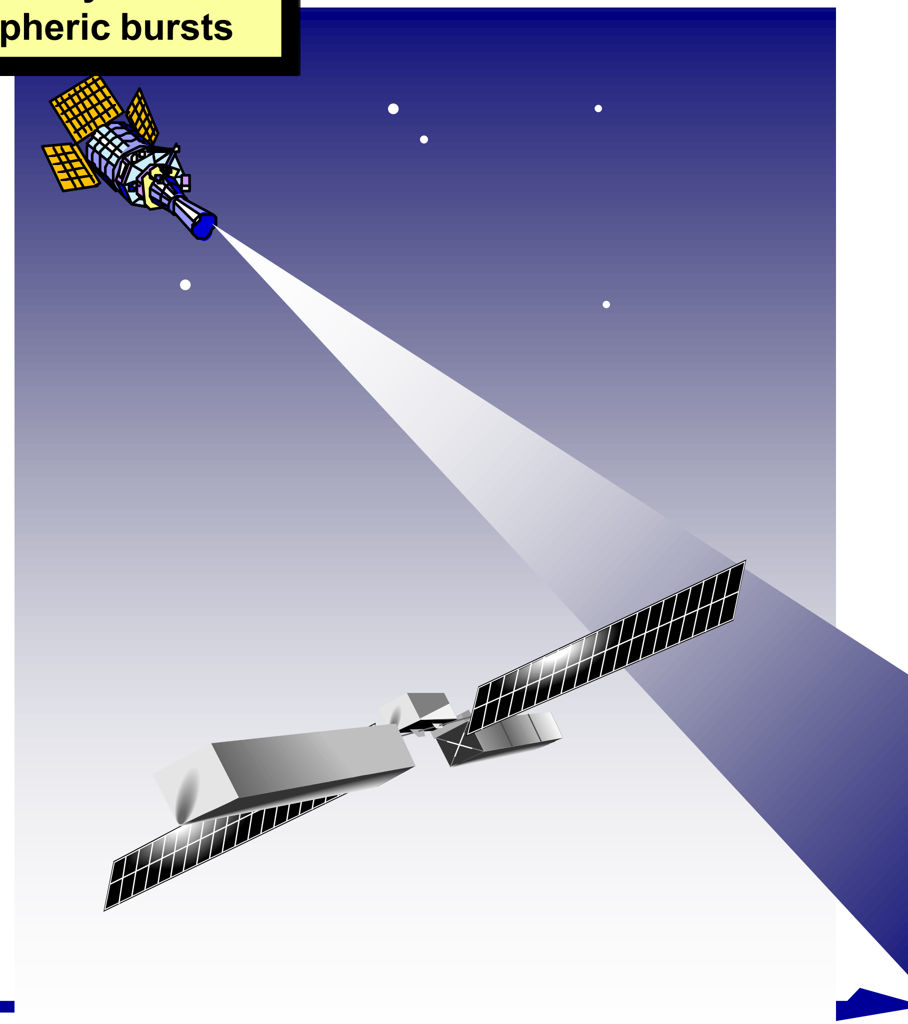
- Shielding
- Material Selection

Dose Rate (TREE)

- Radiation Shielding
- Parts Selection
- Circuit Design
- Circumvention/Reset

Total Dose

- Radiation Shielding
- Hardened Parts



Hardening of Assets to EMP

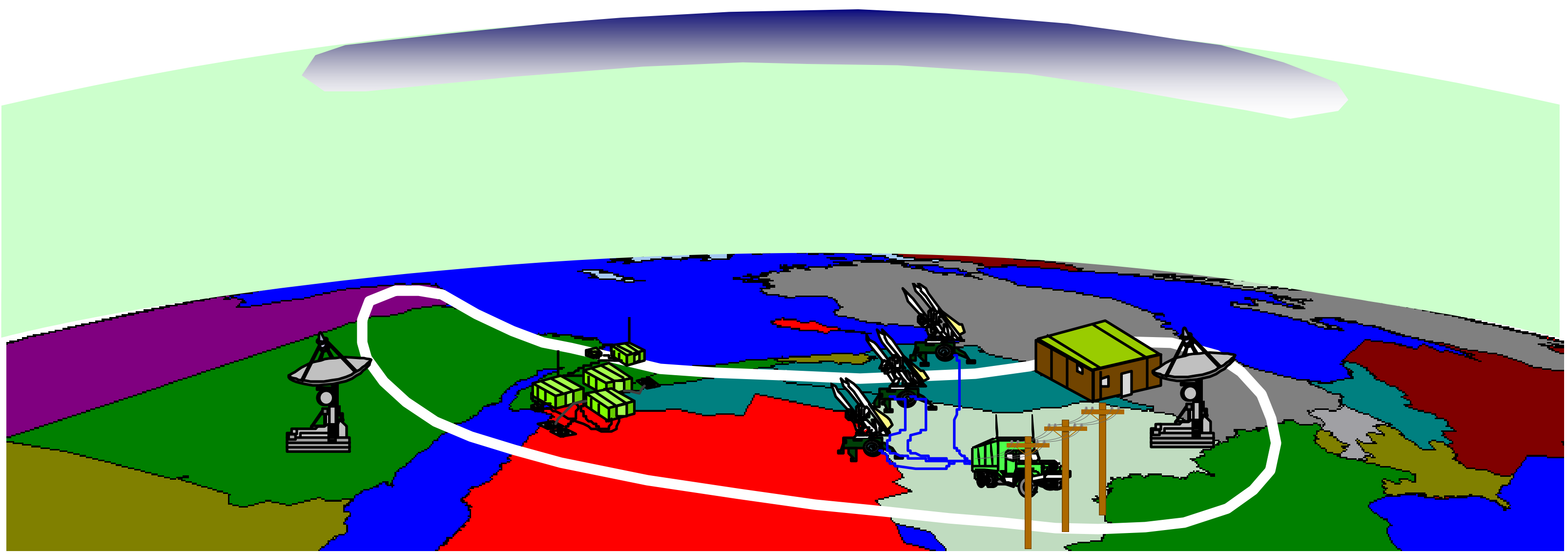
Near surface assets can also be hardened against the effects of EMP from a high-altitude burst

Shielding

- Faraday Cage
- Point of Entry (POE) Control
- EM Gaskets
- Connector Shells
- Rule of Thumb:
  20 dB per Shield ($I_{out}=10^{-2}\,I_{in}$)

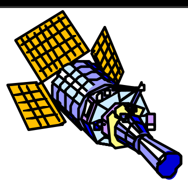
Interface Design

- Terminal Protection Devices
- Filters
- Current Limiting
- Transformer Isolation



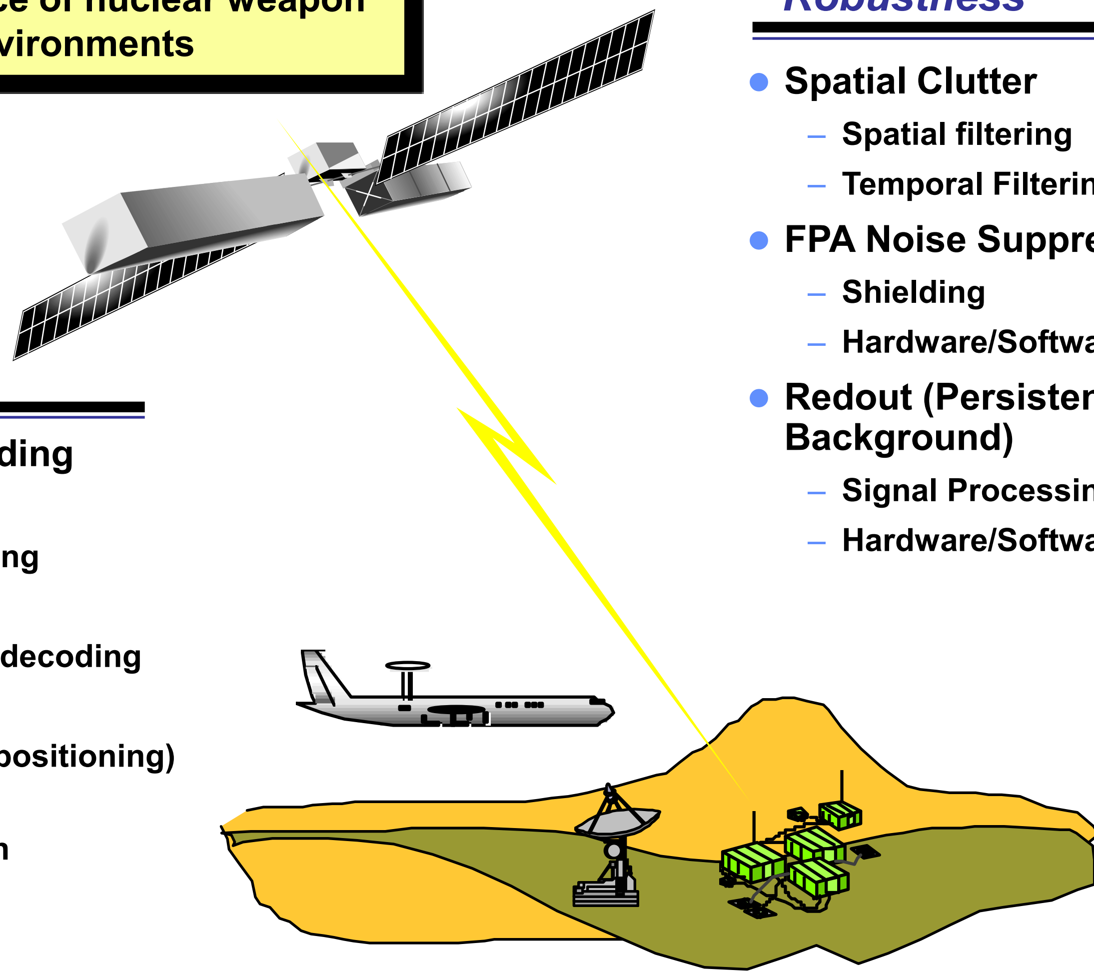
Robust Links

Special design techniques can improve link performance in the presence of nuclear weapon induced noise environments



Communication Link Robustness

- Scintillation/Amplitude Fading
  - Modulation selection
  - Low rate encoding/ decoding
  - Message repetition
  - Error correction encoding/decoding
  - Long interleaving
  - Spatial diversity (antenna positioning)
- Blackout
  - Carrier frequency selection
  - Adaptive equalization



Sensor Link Robustness

- Spatial Clutter
  - Spatial filtering
  - Temporal Filtering
- FPA Noise Suppression (e^-, γ)
  - Shielding
  - Hardware/Software
- Redout (Persistent Optical Background)
  - Signal Processing
  - Hardware/Software

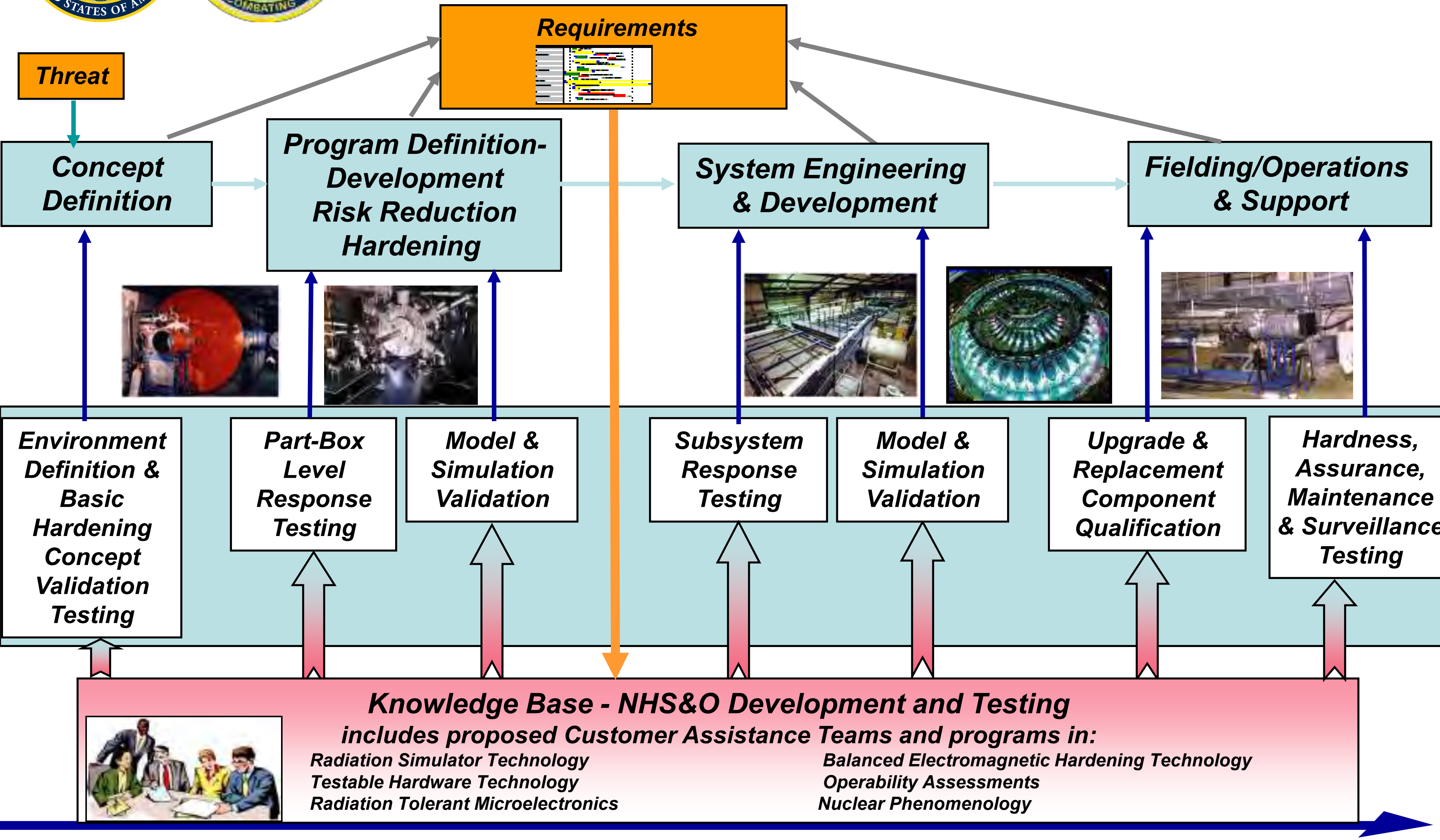
Core Competencies for Survivability

- Weapon outputs to determine requirements
- Rigor in design phase (standards, protocols)
- Technical strategy for each NWE environment
  - Phenomenology-based understanding of nuclear effects
  - Advanced experimentation capability for nuclear weapon environments and effects modeling validation
  - Nuclear survivability hardening technologies
- Sustained expertise in research, development, test, and evaluation

Relative Survivability Criteria by System

System Type	X-rays	Neutrons	Total Dose	Gamma Rate	EMP	Air Blast	Thermal
Strategic Systems							
Missiles	M	M	M	M	Mil Std	L	M
RV/RB	H	H	H	H	Mil Std	L-M	H
Satellites	L-M	L-M	L-M	L-M	-	-	L-M
C3I	-	M	M	M	Mil Std	M	M
Submarines	-	-	-	-	Mil Std	-	-
Tactical Systems							
Missiles	L	M	M	M	Mil Std	M	M
Airborne	-	M	M	M	Mil Std	L-M	L-M
Fixed Installations	-	L-M	L-M	L-M	Mil Std	M	M
Ships	-	L-M	L-M	L-M	Mil Std	M	M
Vehicles	-	L-M	L-M	L-M	Mil Std	M	M
Exposure Levels	cal/cm^2	n/cm^2	rads(Si)	rads(Si)/s	Mil Std	psi	cal/cm^2
H - High	>0.1	$>10^{13}$	$>10^4$	$>10^9$	2169B	>10	>80
M - Medium	0.01-0.1	10^{11}-10^{13}	$2X10^3$-10^4	10^7-10^9	2169B	2 - 10	10 - 80
L –Low	<0.01	$<10^{11}$	$<2X10^3$	$<10^7$	2169B	<2	<10

Simulators Play Critical Roles at Each Life-Cycle Stage



Nuclear Weapons Effects Simulators

Test	Type of Simulator	Size of Test
X-ray Effects (Hot)	Low Voltage Flash X-ray Machines	Components and small assemblies
X-ray Effects (Cold)	Plasma Radiators	Components
Gamma Ray Effects	Flash X-Ray Machines Linear Accelerator Fast Burst Reactor	Components, circuits & equipment
Total Dose Gamma Effects	Cobalt 60 Fast Burst Reactor	Components, circuits and equipment
Neutron Effects	Fast Burst Reactor	Components, circuits & equipment
Blast Effects (Overpressure)	Small Shock Tubes Large Shock Tubes HE Tests	Components, circuits & equipment Small systems & large equipment Vehicles, radars, shelters, etc
EMP	Pulsed Current Injection Free Field	Equipment, large components Systems
Thermal Effects	Thermal Radiation Source Flash Lamps & Solar	Equipment, large components Components & materials
Shock Effects (Dynamic Pressure)	Large Blast Thermal Simulator (LBTS) Explosives	Equipment, large components Systems

Nuclear Weapons Effects Simulators

Nuclear HEMP Military Standards

- MIL-STD-2169B HEMP Environment
- MIL-STD-188-125-1 Fixed C4I Facilities
- MIL-STD-188-125-2 Transportable C4I Facilities
- MIL-HDBK-423 HEMP Protection C4I Facilities
- MIL-STD-464 System E^3 Requirements
- MIL-STD-461F Equipment EMI Emissions/Susceptibility
- MIL-STD-3023 Aircraft HEMP Protection (draft)
- MIL-STD-XXXX Maritime HEMP Protection (FY09 start)

Summary

- Characteristics of nuclear weapons detonations are well understood
- Mission Impact of Nuclear Weapon Detonation is real and we know how to mitigate the threat
    - Engineering aspects well understood
    - Testing options are available
- Hardening is affordable if addressed up front
- Radiation hardening is a part of balanced survivability

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create
collaborate
communicate

Joint Science & Technology Office for Chemical and Biological Defense

Information & Analysis

CBRN Survivability Conference
May 2011

DEFENSE THREAT REDUCTION AGENCY   JOINT SCIENCE AND TECHNOLOGY OFFICE   CHEMICAL AND BIOLOGICAL DEFENSE

Jerry Glasow
Chief, Information and Analysis Division

Topics

- ***JSTO Overview***
- JSTO and CBRN Survivability

Joint Science & Technology Office – Chemical and Biological Defense

Director: Dr. Alan Rudolph

Deputy Director: COL David Holliday

Operational Support Division

Chief Medical Officer

Chief Medical Science Officer

Advanced Development Advisor

Basic & Supporting Science Division

Information & Analysis Division
Mr. Jerry Glasow

Translational Medical S&T Division

Diagnostics and Disease Surveillance S&T Division

Physical S&T Division

The Focus Imperative: Translating Enablers and Thrusts into “JSTO Inside” Products

Enablers

- Novel Threat Research
- Applied Math Tools
- Multifunctional Materials
- Flexible Design & Manufacturing
- Systems Biology

Strategic Thrusts

“JSTO Inside” Products

- Host/Pathogen-Based Point of Need Diagnostics
- Broad Spectrum Therapeutics
- Advanced Decon/Coupled Sensing
- New Sensors and Surveillance Tools
- Flexible Manufacturing (Reagents/Therapeutics)

- Disease Surveillance, Threat Detection and Point of Need Diagnostics
- Threat Activity Sensing and Reporting
- Adaptive Medical Countermeasures and Technologies
- Rapid Response and Restoration Science and Technology

An Unpredictable Future

- ***Prepare*** for surprise from fast moving field(s) and widening dynamic threats
- ***Proactively seek adaptable and flexible technology*** in seeking the best ideas and practices and associated business activities
- ***Focus*** on key critical areas of need and the delivery of capability and products
- ***Openly innovate*** with National and Defense labs, academia, industry
- Recognize that ***speed matters***; we will save lives

Topics

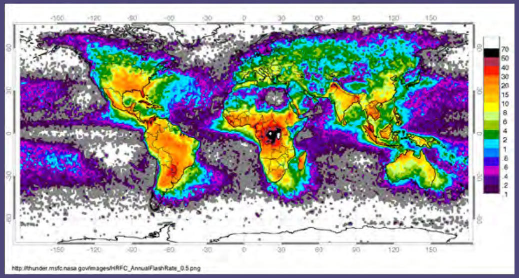
- JSTO Overview
- ***JSTO and CBRN Survivability***

JSTO and CBRN Survivability

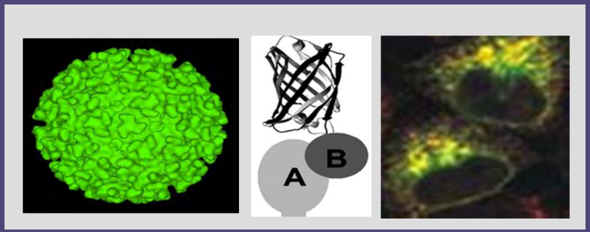
- *Medical Programs*
  - *~ CBRN Survivability via the Human Immune System*
- *Basic Science, Physical, & Information-Analysis Programs*
  - *~ CBRN Survivability via…*
    - ✓ *Basic research*
    - ✓ *Physical sciences*
    - ✓ *Information and Analysis Capabilities*

Medical Programs
CBRN Survivability via the Human Immune System

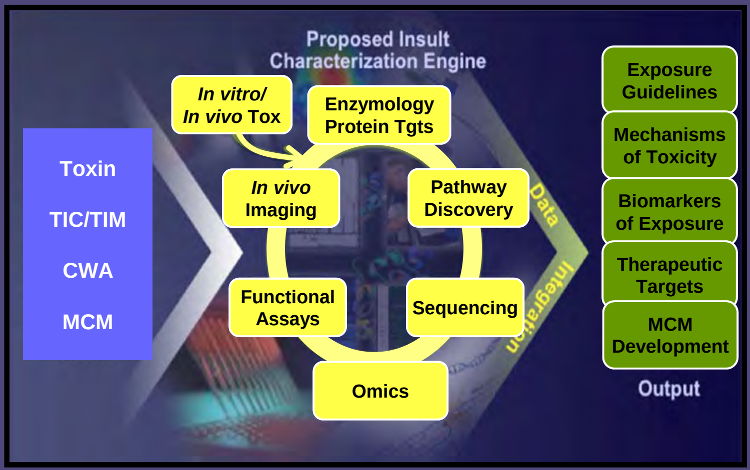
- Developing new in-silico tools using computational approaches to identify unknowns



- Evolution and emergence of pathogens



- Common host responses for medical countermeasure development

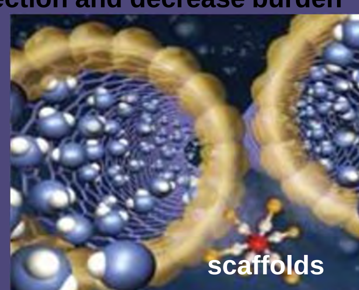


- Systems toxicology

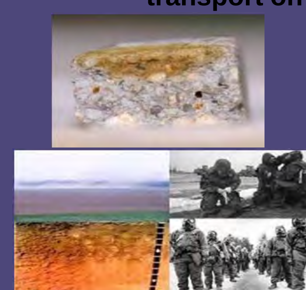
Basic Research and CBRN Survivability

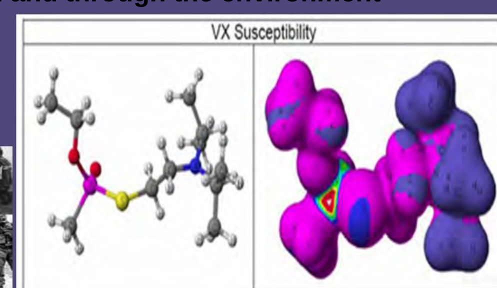
- Basic Research provides a robust fundamental knowledge base for countering current and future CB threats
  - Promotes discovery for translational efforts
  - Proactively engages with scientific community
  - Dedicated to innovation and critical thinking
- Examples:
  - Designed new textile materials by special non-woven techniques and incorporating super low contact angle surfaces (water & oil resistant; liquid aerosol barrier; resists saturation via roll off)
  - Capture and kill biological decontaminants (antimicrobial; light-activated; detection and disruption)

Novel materials to increase protection and decrease burden



Physicochemical properties & agent transport on and through the environment

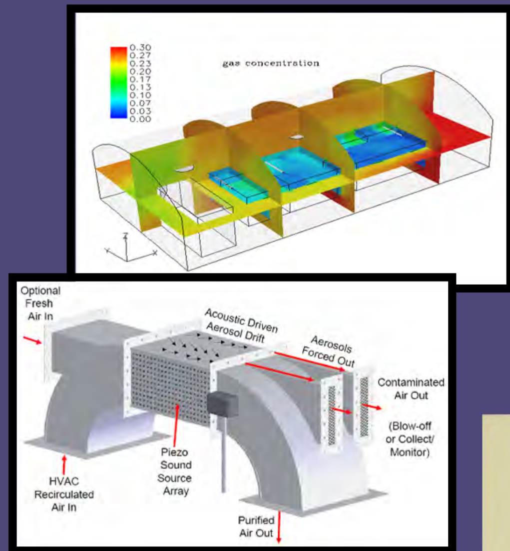




Physical Sciences and CBRN Survivability

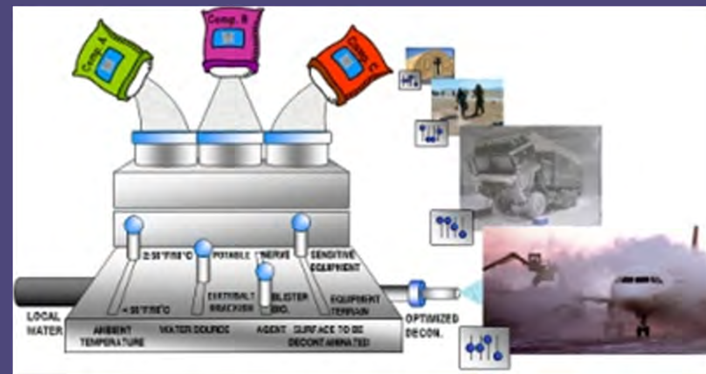
IP (Integrated Garment) Program

BioProtection of Facilities

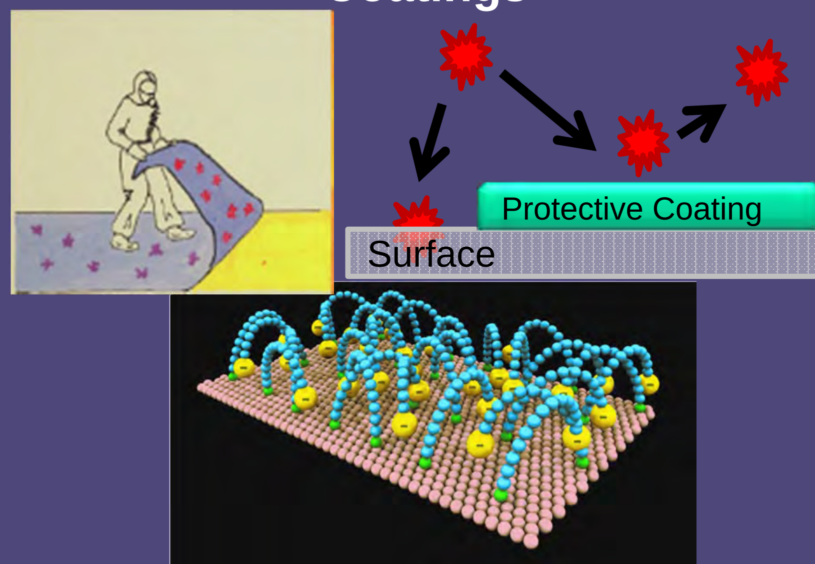


Surfactant System

Dial-a-Decon



Coatings



Information-Analysis & CBRN Survivability

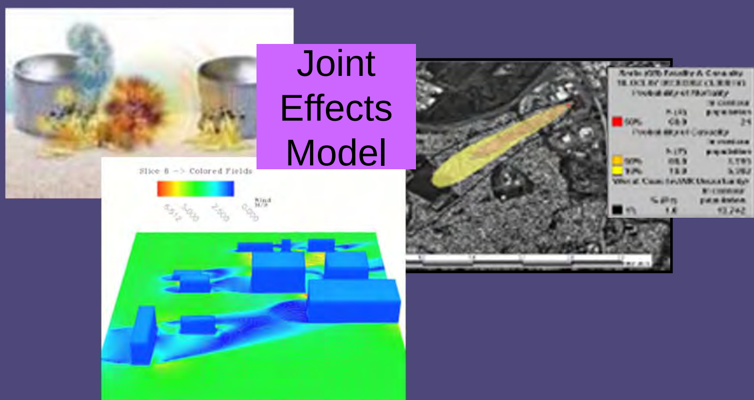
- The JSTO Information & Analysis Division provides information and analysis capabilities that enable operational & programmatic decision-making:
  - ***People:***
    - ✓ Make ***data*** discoverable, accessible, & usable.
    - ✓ Develop ***methods*** that turn data into actionable information.
    - ✓ Develop and use ***tools:***
      - Super-user implementations for S&T, R&D, & support
      - General-user implementations for operational use
  - ***Services:***
    - ✓ Operational Effects Analysis Support Program
      - Developing future analysis capabilities
      - Answering current questions

Information and Analysis and CBRN Survivability

Critical Questions	JSTO CBI Research Area
• Survivability against what?	Hazard Prediction
• Who needs to be warned?	Warning and Reporting
• Who & what are affected & how?	Individual & Systems Performance
• How is the mission affected • How can we adjust? • How do we recover?	Operations and Planning

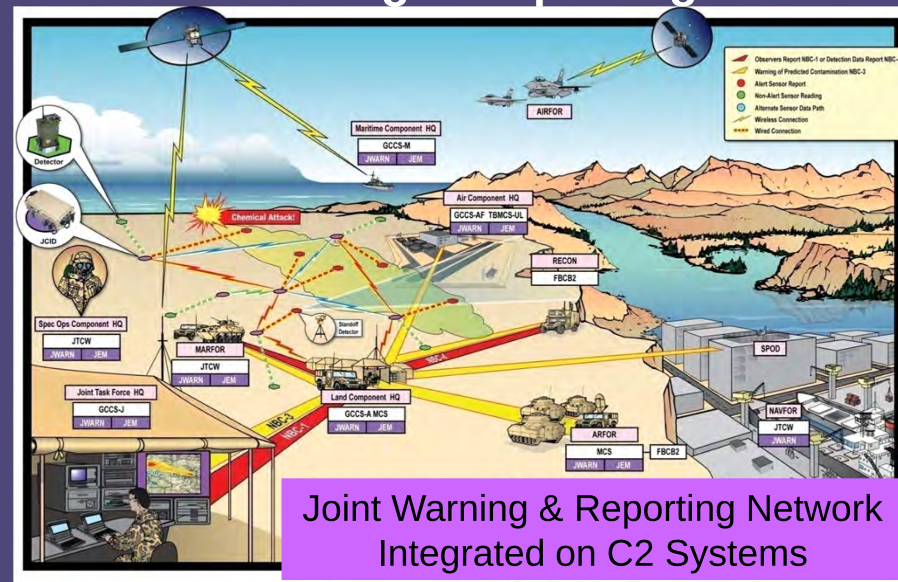
Information and Analysis Division

Hazard Prediction



Joint Effects Model

Warning & Reporting



Joint Warning & Reporting Network Integrated on C2 Systems

Systems Performance

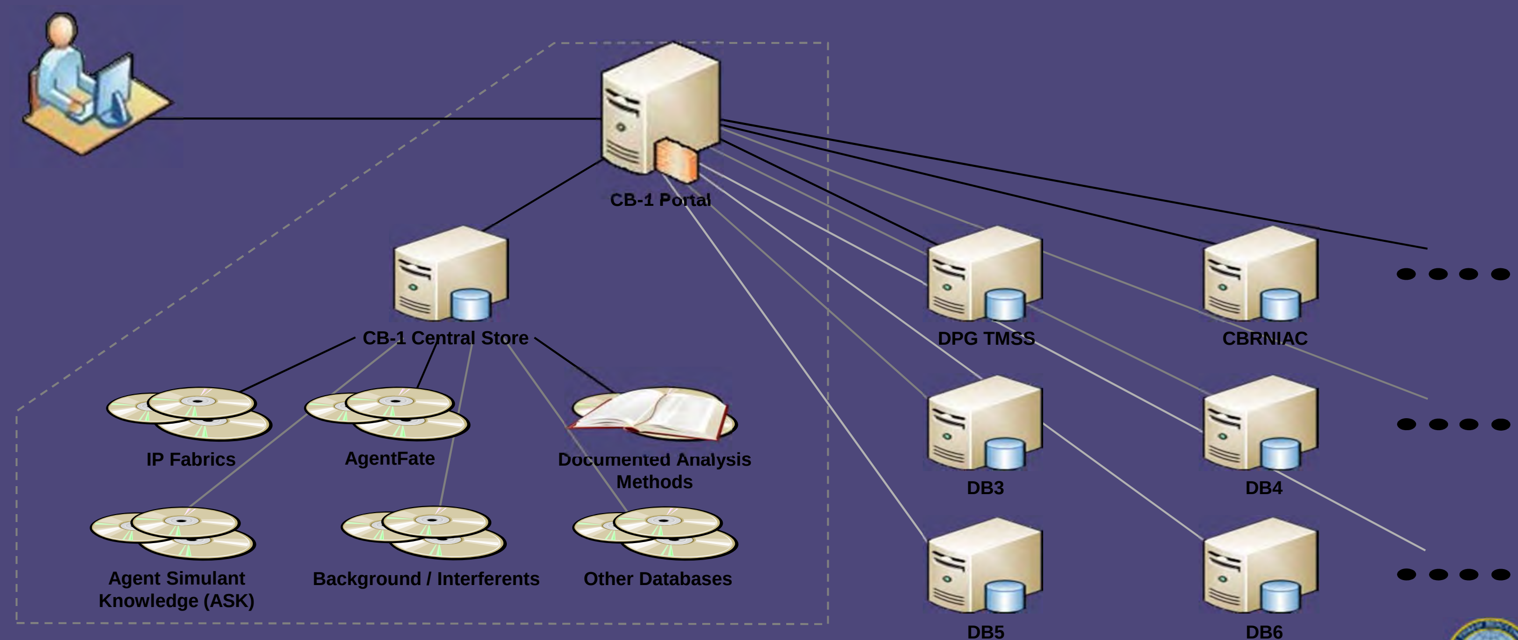
Systems Performance Models

Operations & Planning

Joint Operational Effects

Program Highlight –
CB Warfare Agent Effects Manual - "CB-1"

- ***CB Warfare Agent Effects Manual, "CB-1"***
  - Provides information on data and methods used in CB defense analysis and M&S development
    - ✓ Manual containing tutorial-level descriptions of analytical methods and processes
    - ✓ Web portal facilitating access to data



Program Highlight – CBRN Operational Effects and Analytical Support Program (ASP)

Portfolio Objective: To apply, and where absent, develop and acquire, data, methods and tools needed to inform particular needs of the CBDP acquisition process.

The ASP:

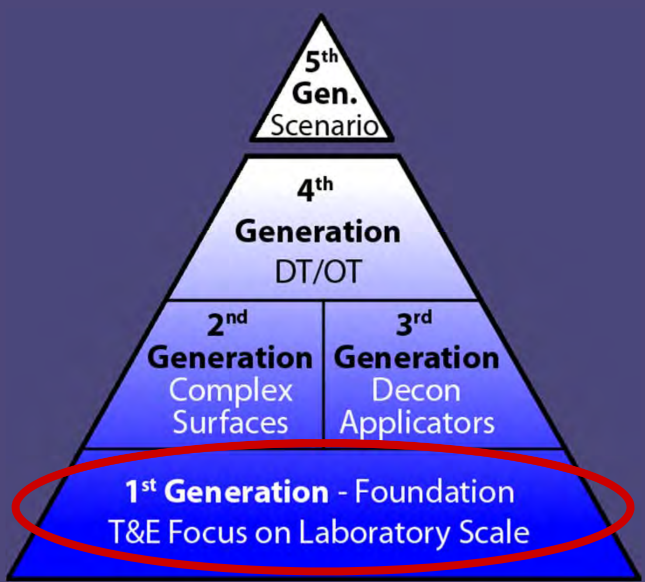
- Informs CBRN issues and decisions with rapid responses to urgent questions
- Conducts thorough technical review to efforts performed elsewhere
- Provides knowledgeable participants to action groups, process teams, exercises, proposal evaluations

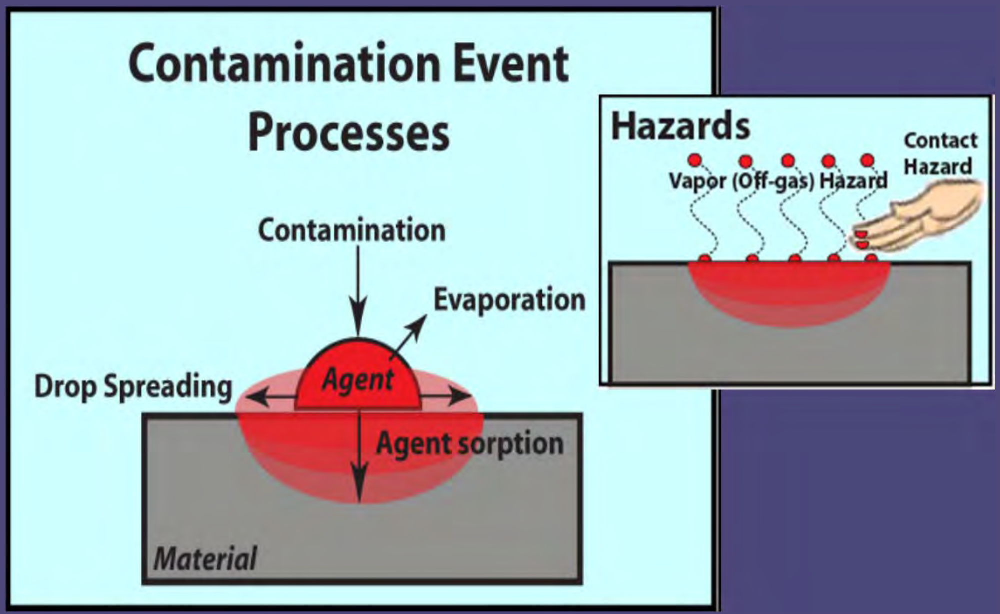
All CBDP elements can utilize the outputs of this effort

JRO	To Support Military CBRN Requirements Development
JSTO	To Guide Choice of CBRN S&T Investigations
JPEO	To Assess Utility and Support CBRN Equipment Milestone Decisions
T&E	To Guide Tests of Equipment/Material and Nonmaterial CBRN Military Capabilities

Program Highlight – Decontamination Systems Performance Model

- ***Decontamination Systems Performance Model***
  - Predictive decontamination model that provides an accurate assessment of decontaminant performance and post-decon hazards for a variety of operationally relevant surfaces over a range of environmental conditions and realistic scenarios.
  - Provides information on survivability of any equipment on the battlefield



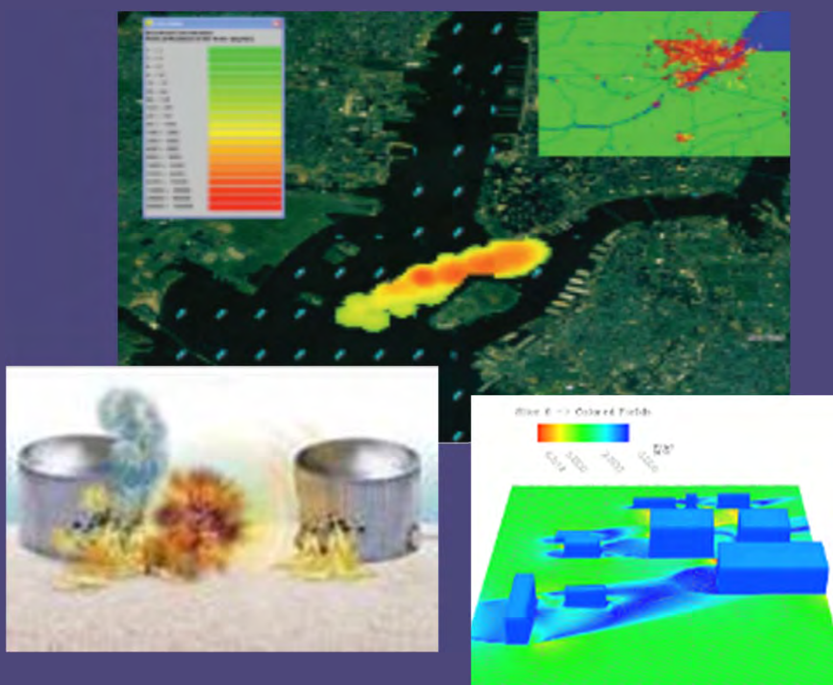


Questions?

Backup

Hazard Prediction

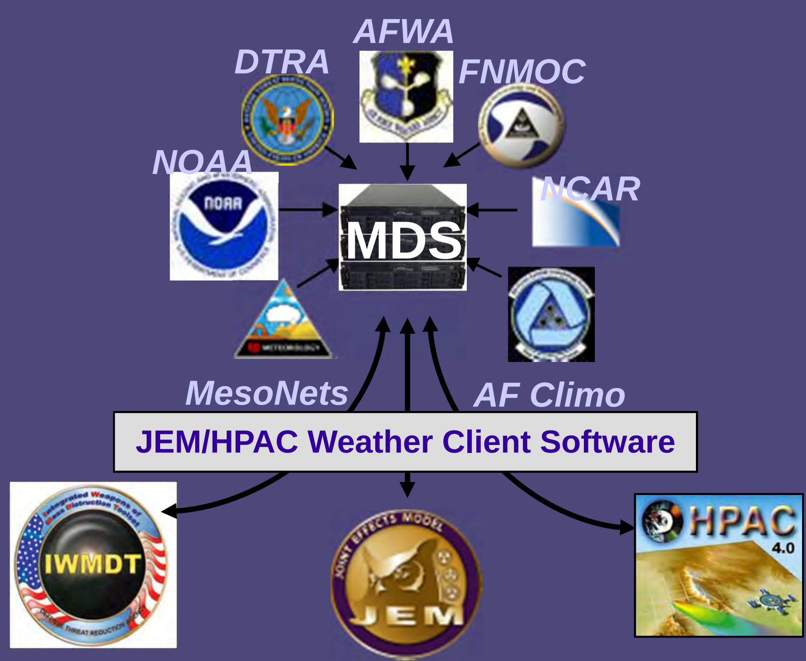
Portfolio Objective: Enable the prediction of hazard area size and severity in near real-time for single and multiple incidents, up to the incidents for an entire theater campaign.



- Urban transport & dispersion
- Source term model
- Waterborne transport
- Joint Effects Model S&T Prototype
- Atmospheric chemistry
- 64-bit & multi-core computing
- CB small scale testing

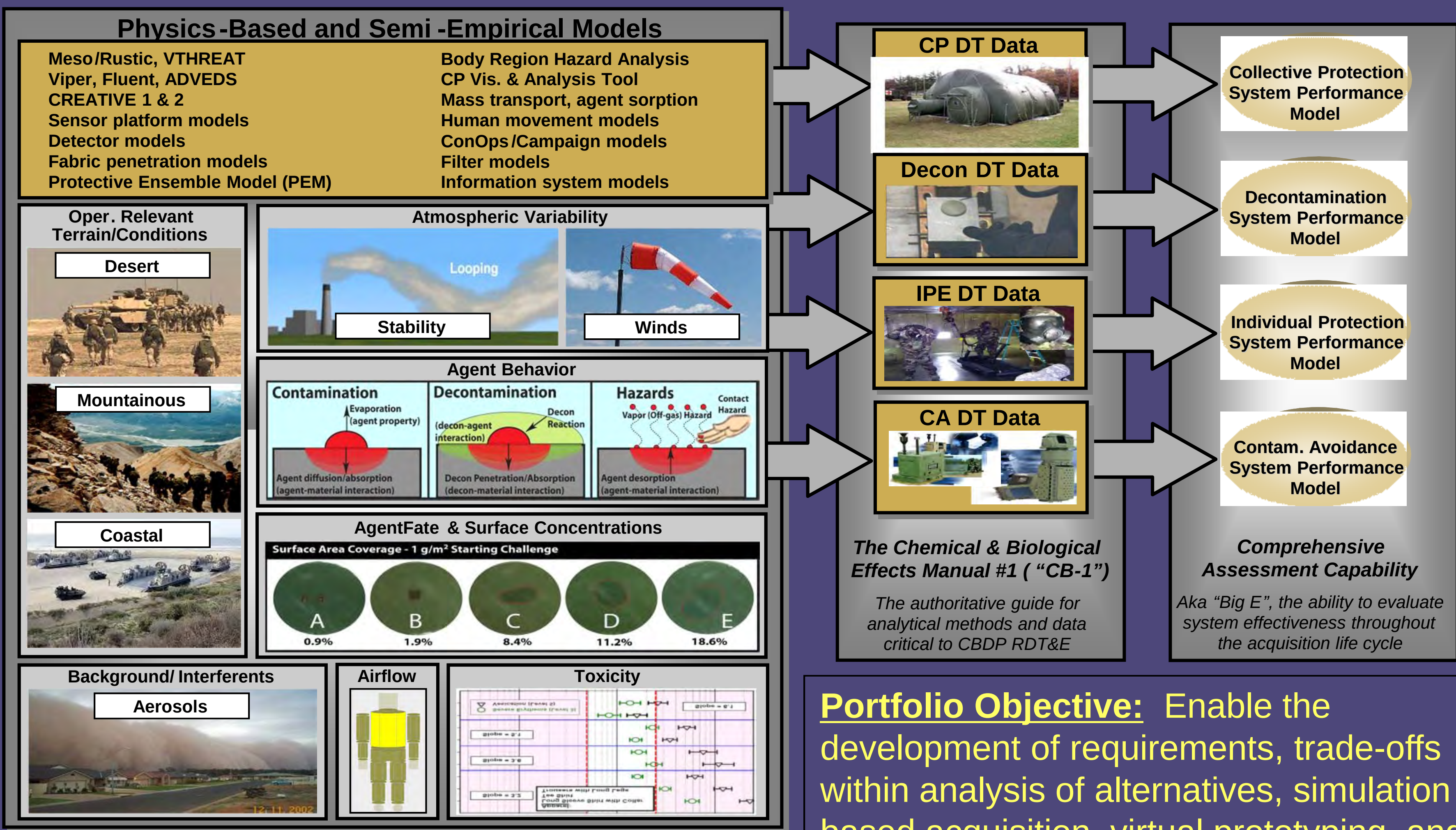
Warning and Reporting

Portfolio Objective: Enable timely and accurate warnings and recommended actions by connecting detection capabilities to information-analysis capabilities that reside on and use the overall command and control architecture.



- Interior modeling
- High-resolution climatology
- False alarm reduction
- Data assimilation and fusion
- Validation and analysis of hazard models
- Interactive coupling of CBRN and environmental models
- High-fidelity synthetic environments

Systems Performance

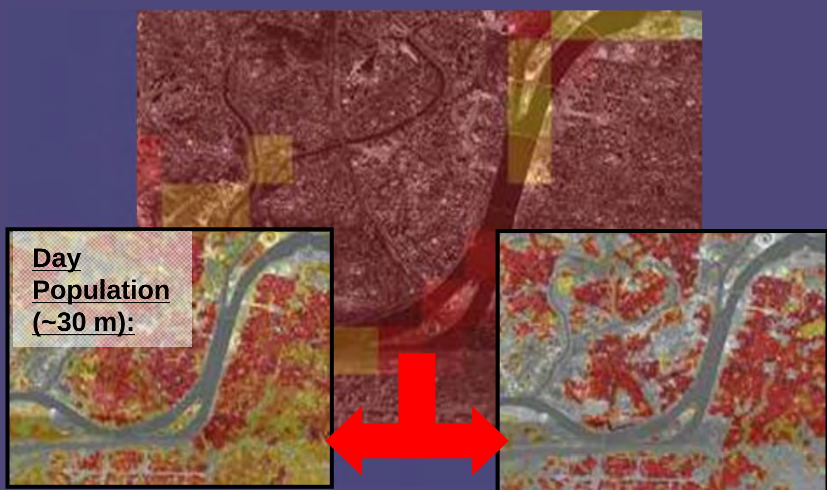


Portfolio Objective: Enable the development of requirements, trade-offs within analysis of alternatives, simulation based acquisition, virtual prototyping, and system evaluations.

Operations and Planning

Portfolio Objective: Enable real-time and preplanned development of operational plans by enhancing warning and reporting capabilities with novel decision support tools.

- Decision support tools
- Consequence management
- Operations modeling



Information and Analysis Division's Recent Accomplishments

- 10 S&T Transitions to Programs of Record and Joint Program Managers for FY10
- Initiation of JEM S&T Prototype strategy to converge JEM & HPAC
- Initiation of the Analysis Support Program (ASP)
- First of its kind semi-empirical first principles decontamination model to predict decontamination efficacy and hazards.
- Detector to C2 system connection software to replace the hardware solution rejected by all four services. Will enable completion of a 20 year-old vision for networking all CBRN sensor systems.
- Significant success in the development of the Optimized Sensor Placement Tool. Preliminary results of the tool show a 30% increase in probability of detection using 3 sensors.

Current Efforts to Improve Chemical Challenge Estimates

Presentation to the 2011 Chemical, Biological, Radiological, Nuclear Survivability Conference

Jeffrey H. Grotte

Institute for Defense Analyses

May, 2011

IDA | The Problem

- An understanding of —howmuch” chemical challenge US forces might face on the battlefield is a vital input to all aspects of the acquisition process, from applied S&T to the final fielding decision
- There is concern that some values currently in use are
  - Based on an outdated worldview or outdated technical data
  - Not analytically transparent
  - Not standardized or used consistently through different phases of the developmental life or for equipment that will operate in the same environment
  - Single values do not permit adjusting for higher or lower acceptable risk

Program of “Challenge” Studies

- To address these concerns, the Joint Requirements Office-CBRND has commissioned a series of studies to chemical (and biological) challenge, as measured by deposition (mg/m2), concentration (mg/m3) and by dosage (mg-min/m3)
  - Chemical Challenge (December, 2006)
  - Non-Traditional Agent Challenge (August, 08)
  - Operational Challenge Study (October, 08)
  - CB Planning Scenarios (ongoing)
- The Joint Science and Technology Office also requested an estimate of challenge in terms of liquid and solid aerosols (# particles/m3 by size bin).

IDA | Challenge Studies Increase in Detail

- Chemical Challenge Study: Notionalized target, realistic artillery, missile, bomb attacks with GB, HL, VX, AC, CG, TVX. Challenge distributions based on individual multi-munition attacks.
- Chemical Challenges for Contamination Survivability Analyses: Requested by T&E Executive for the CBDP to characterize challenge levels on vehicles & equipment
- Non-traditional agent study. Subset of above using non-traditional agents.
- Operational Challenge Study: Similar to Chemical Challenge Study but challenge distributions based on multiple attacks based on CAA TAA-15 analyses
- CB Planning Scenario Study: not a challenge study per se, but enable distributions at the entity level in five operational vignettes (32 attacks—10 bio, 22 chemical).

Challenge study overview

- Characterize the immediate chemical challenge resulting from attacks with traditional CWA delivered by artillery, missiles and aerial bombs to generic targets of predefined size.
- IDA participated in and coordinated with ITF-46.
- Source terms provided by NGIC, some missile inputs from SAIC.
- Quantitative results are derived with VLSTRACK model and post-processing to obtain droplets and HE shell fragment ranges.
- Challenge quantities are deposition, droplets and concentration per unit target area.
- No TICs. No IEDs. Not considering pickup and transfer.
- Droplet impact velocity not evaluated for this study.

Methodology

Setup and modeling

- Attacks are applied time-on-target to targets of predefined size with imperfect delivery accuracy.
  - Artillery applied to forward units ranging in magnitude from single launcher to multiple battalion fires, with traditional firing doctrine.
  - Up to 5 successful missile strikes to rear-area targets.
  - Bombs applied in sorties of up to 16 weapons on rear-area targets.
- Source terms are required to describe the approximate initial state of the cloud or liquid release per agent-munition combination.
- Release and transport modeled with VLSTRACK, using a fixed meteorological prescription (with excursions)
  - Neutral stability, 5 m/s wind
  - Sensitivity to stability category and wind speed for GB cannon
- Artillery fragmentation effects indicated by measuring only contamination presented beyond a serious injury radius
  - Criterion is 50% chance of hit producing serious injury or death.
  - Fragment data for FSU 152mm cannon round, FSU 122mm rocket.

IDA | Methodology

Measures and metrics

- Challenge metric is the *fraction of target area* presenting deposition, droplets (by size or number), concentration and exposure at or above a given level.
  - We report target coverage to nearest percent, or indicate small, finite challenge at less than 1% coverage or ≤ 1%.'
  - Cross-tabulate surface contamination with droplet size distribution contributing to each deposition level.
  - Exposures accumulated for lesser of one hour or on-target lifetime of hazard, including secondary evaporation.
- Attacks compared by their capacity to challenge the target; i.e. weapon system accuracy, agent fill weight, dissemination efficiency, and number of munitions fired.
  - Same attack has different result depending on target size.
  - Can compare across multiple weapon systems per agent.
- Challenge results are average or expected outcome, not worst case.

Study cases

		GB	VX	HL	AC	CG
FORWARD	Cannon	V,L,M,S	V,L,F,S	V,L,F,S	V	V
	Sm Rocket	V,L	V,L,F	V,L,F	V	
	Lg Rocket	V,L	V,L	V,L	V	
REAR	TBM	V,L	V,L			
	Bombs	V,L		V,L		

Combinations without notation are excluded from the study.

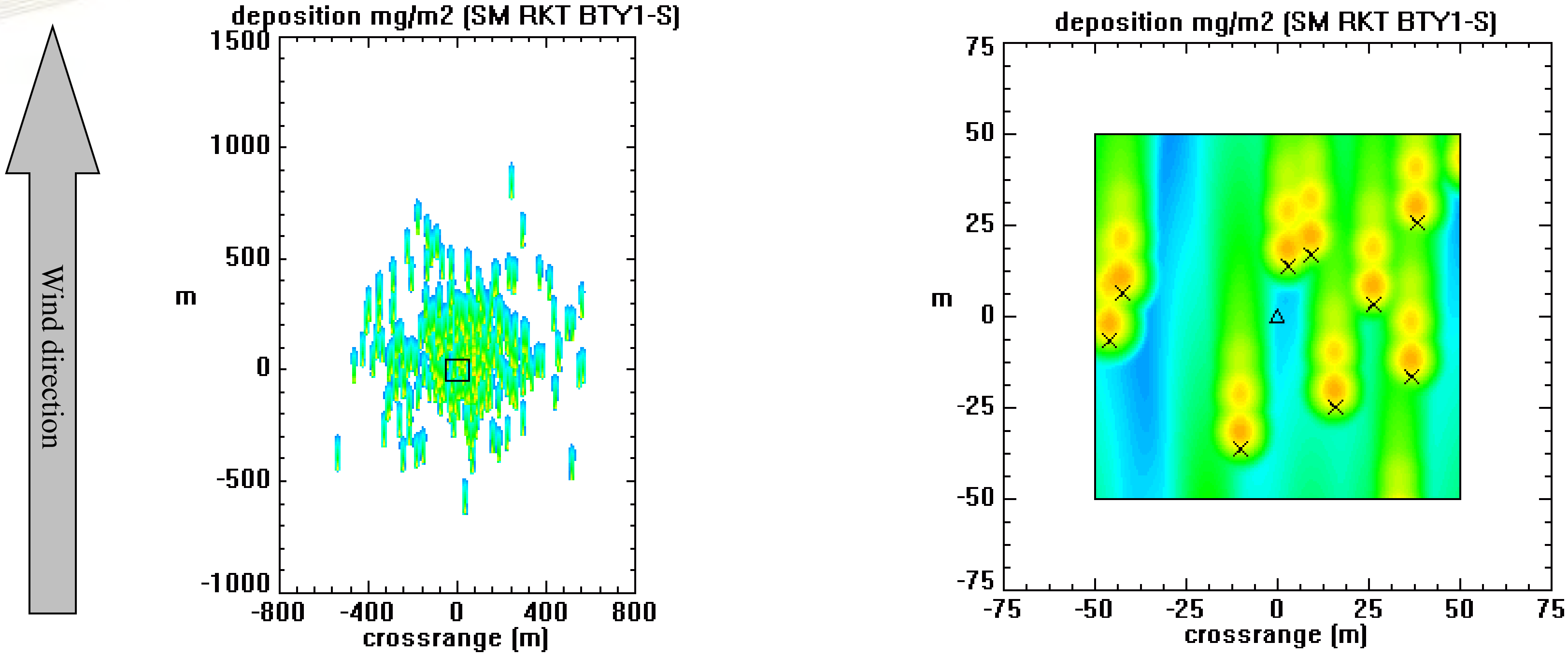
V: vapor measures (Ct, C_{max})
L: liquid deposition (including droplets)
F: fragmentation adjusted deposition
M: meteorological excursions
S: standard deviation of mean challenge from munition delivery

Small (S)	Forward	100 x 100 m^2
Medium (M)	Forward	250 x 250 m^2
Large (L)	Forward, rear*	1000 x 1000 m^2
X-Large (XL)	Rear	4000 x 4000 m^2

*Bomb sorties only to Large target, not TBM

Burst height sensitivity evaluated for artillery with persistent agent fills.

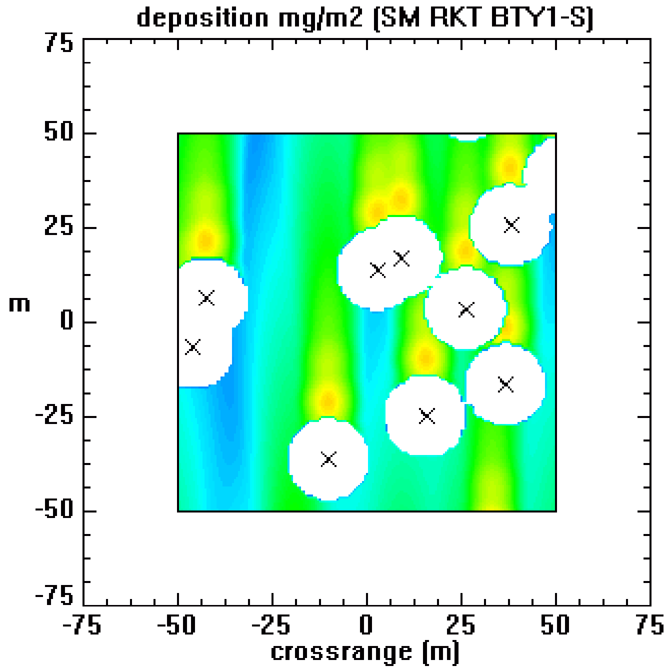
Artillery deposition example

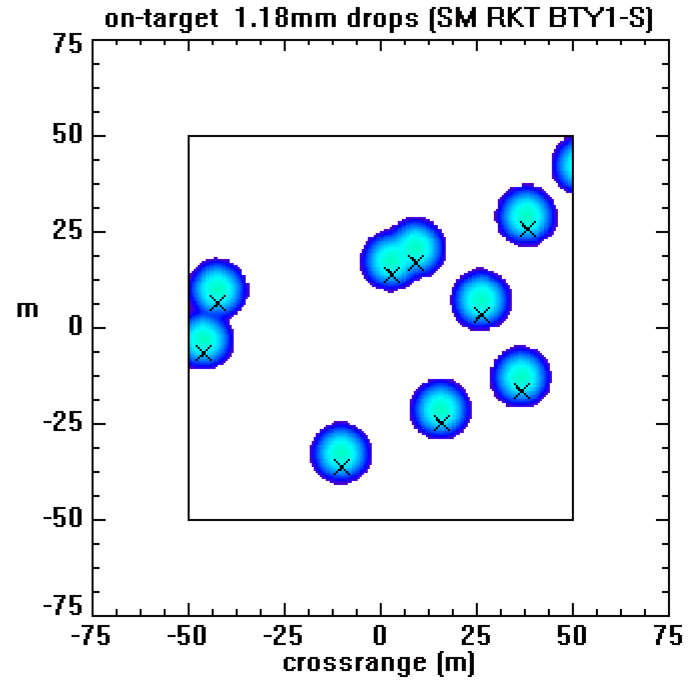


Attack with single battery of small rockets (240) on one hectare target
Only 9 of 240 successfully strike the target

Artillery deposition example

Drops and fragments

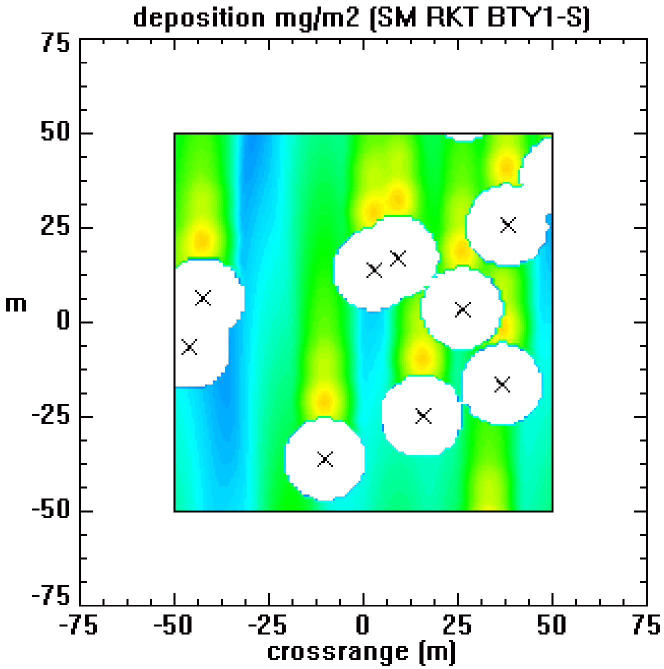




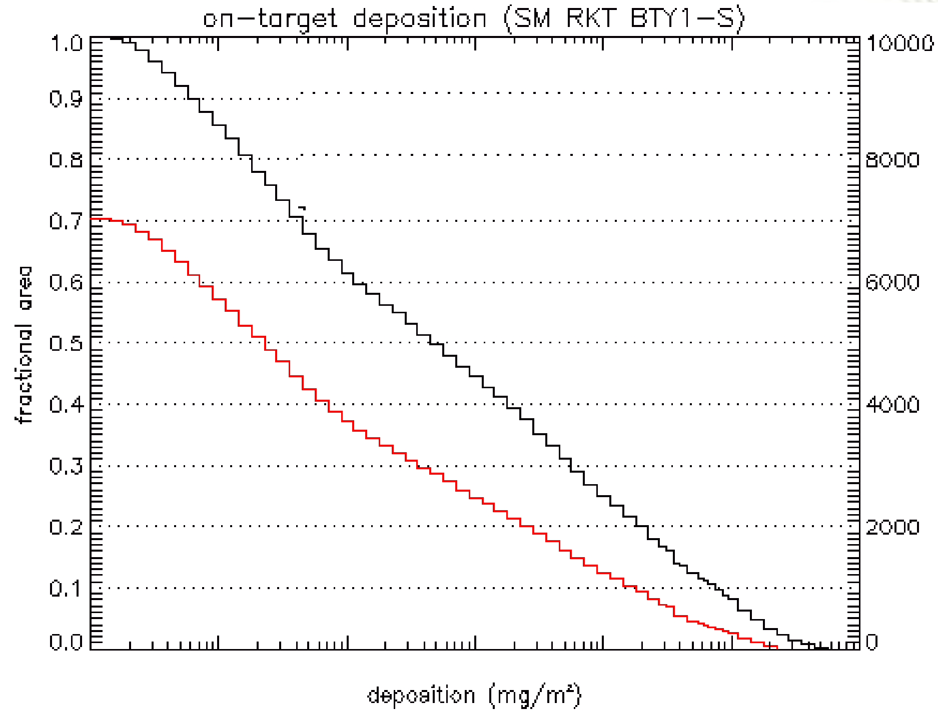
[L] Fragmentation resulting in 50% chance of hit with serious injury to standing unarmored personnel (other postures and protection defined in study)

[R] Distribution of drops with size comparable to TOP 8-2-501 diameter. Note their overlap with fragmentation zones

Artillery deposition example

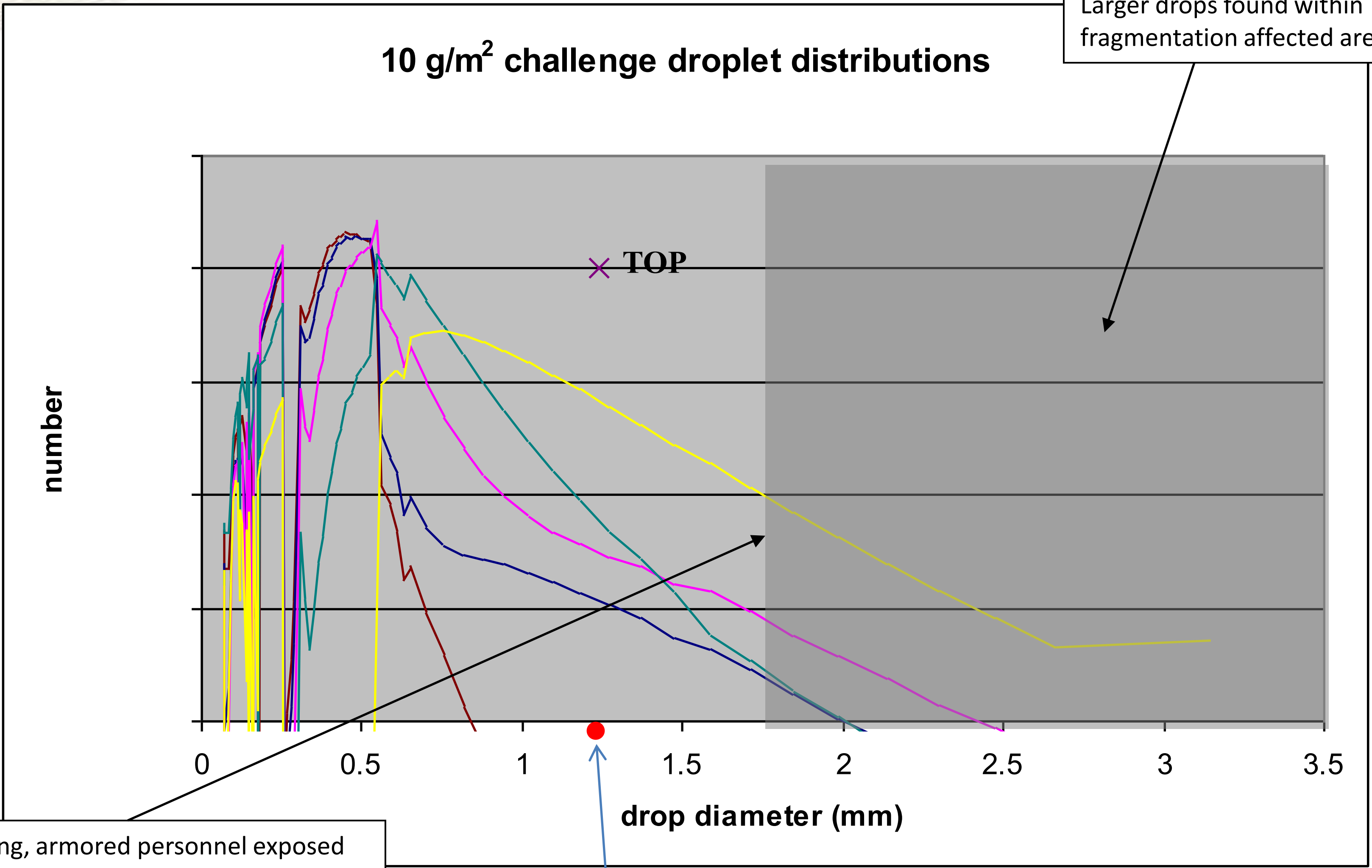


Adjustment for fragmentation



Result is sensitive to protection and posture.
Better ballistic protection → smaller fragmentation circles.

Not all 10 g/m² challenges are the same



Larger drops found within fragmentation affected areas.

Standing, armored personnel exposed to drops less than 1.7 mm outside fragmentation range.

Droplet size used in many swatch tests

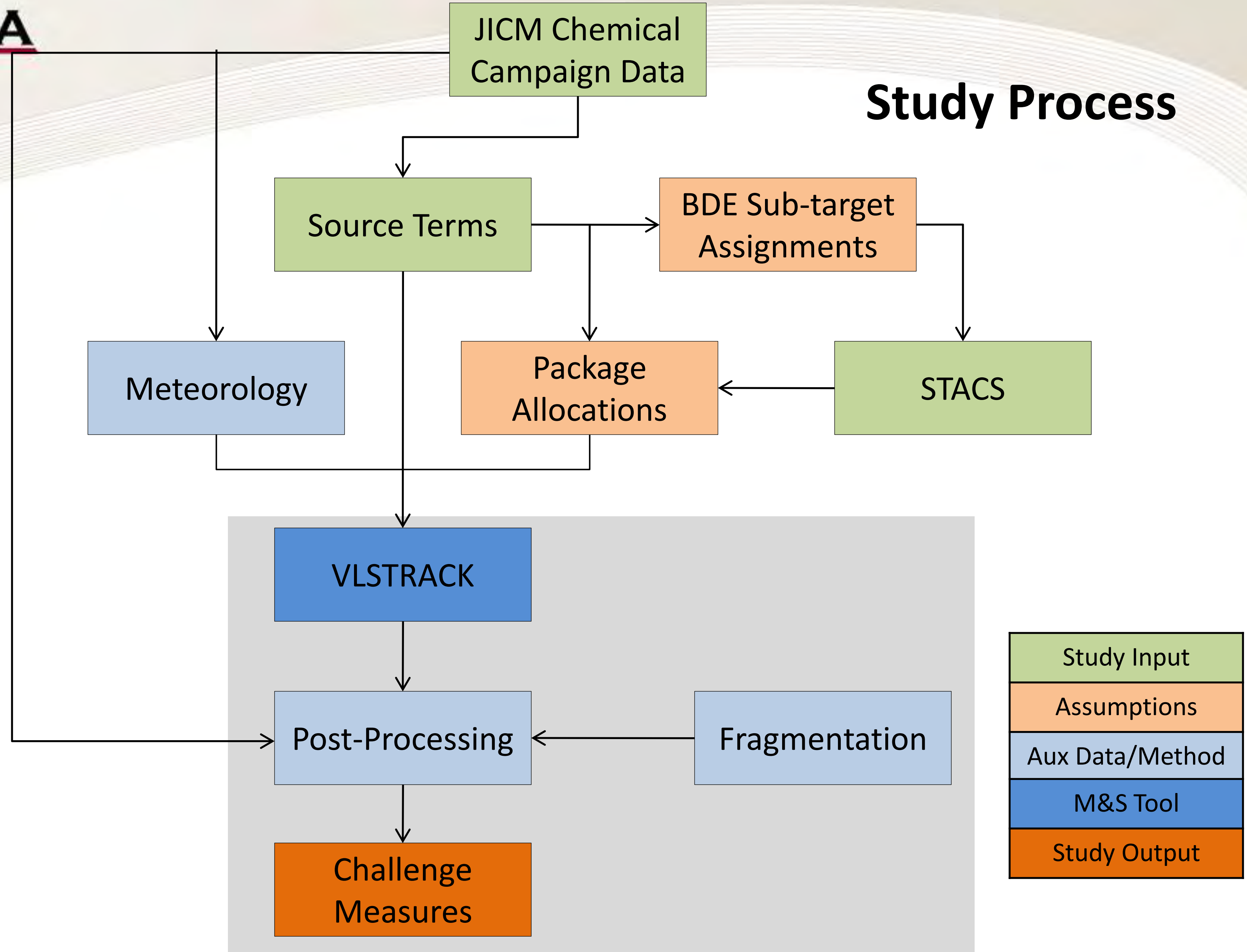
Study products

- Chemical Challenge Study Report
  - Complete discussion of assumptions and methodology
  - One complete example using graphics
  - Abstracts from full suite of cases
    - Tabulated target coverage at representative deposition, vapor concentrations and exposure levels
- Source Term Database
  - All inputs to VLSTRACK for Challenge Study attacks to facilitate reproduction of results

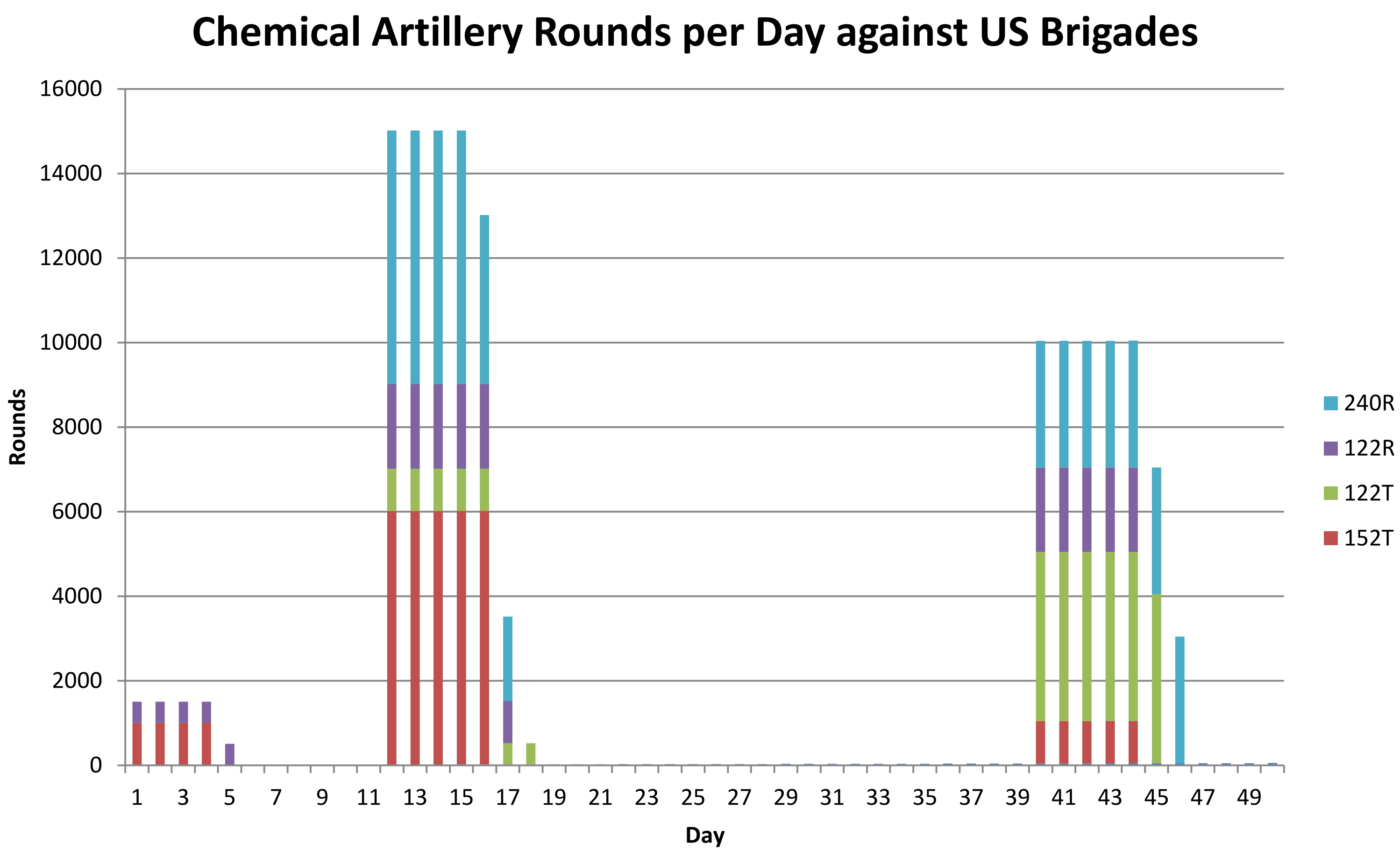
Campaign Challenge Calculations

- How do things change if you consider the chemical attacks different units experience over the course of a campaign?
- Using a chemical campaign developed by the Center for Army Analysis for use in the JICM model, we were able to produce campaign-level challenge distributions

Study Process

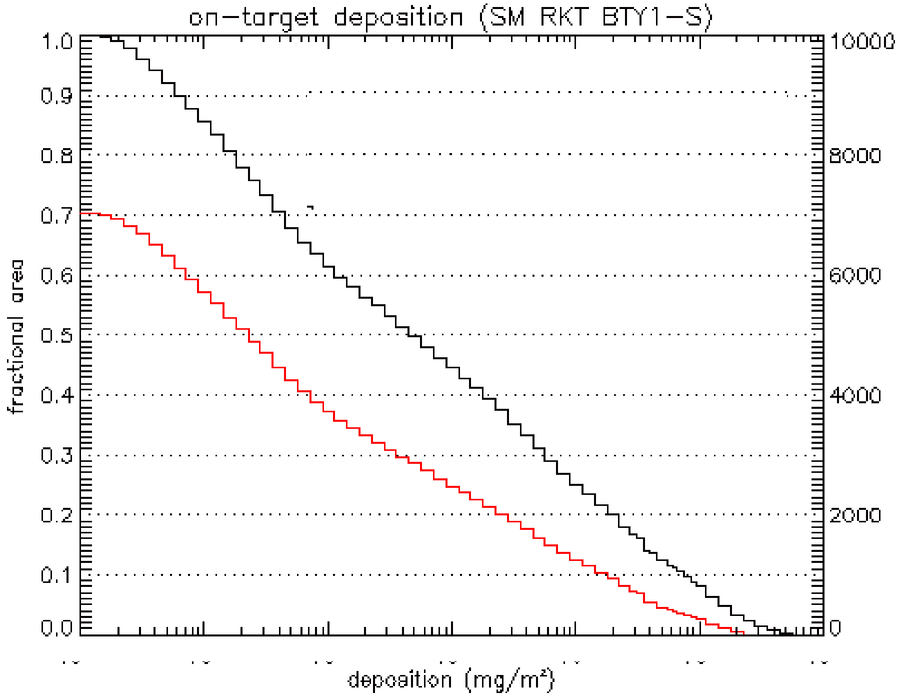


Notional Chemical Campaign



Output

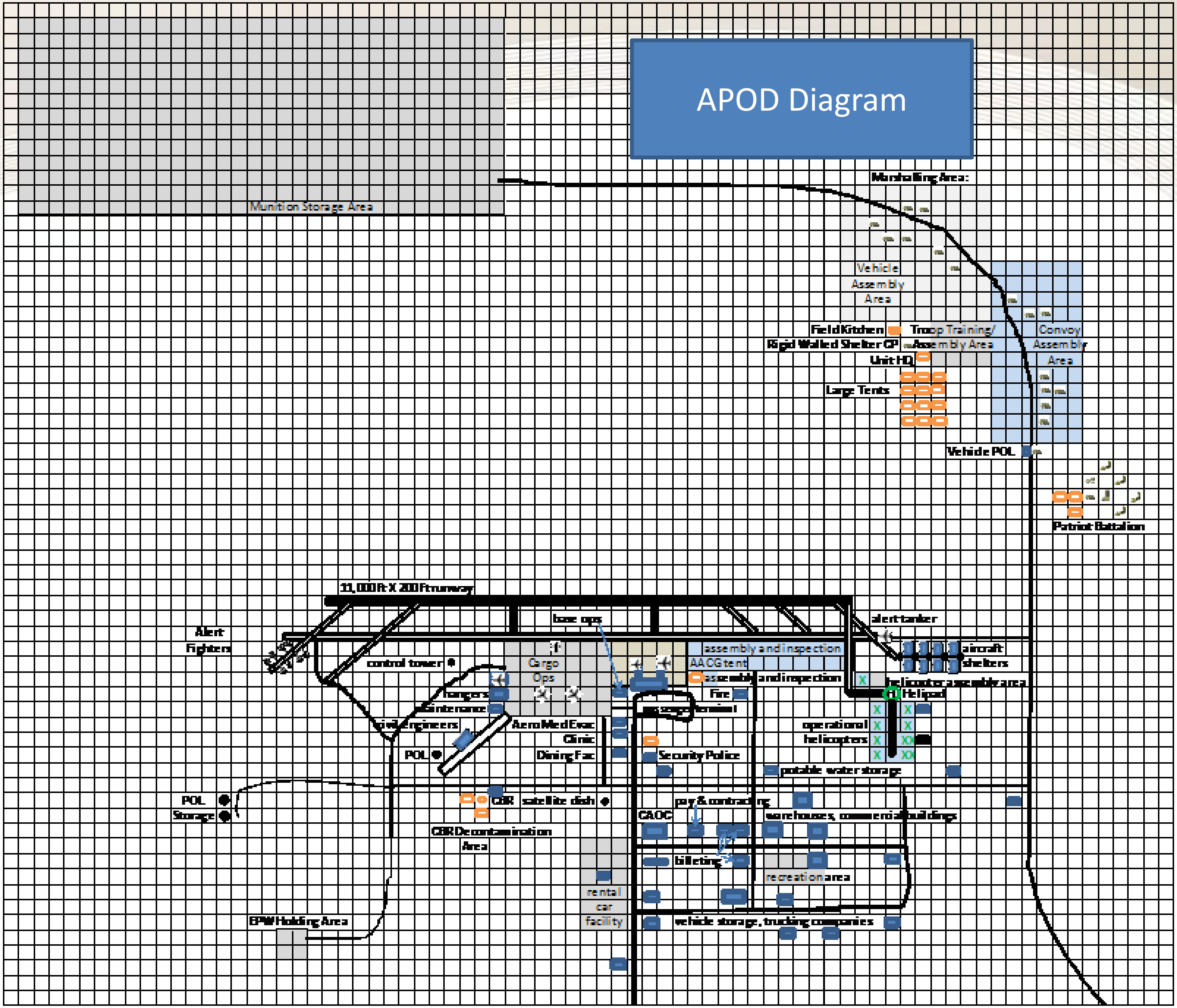
- This approach still produces distribution curves such as this, but based on multiple attacks, somewhat different target classes.



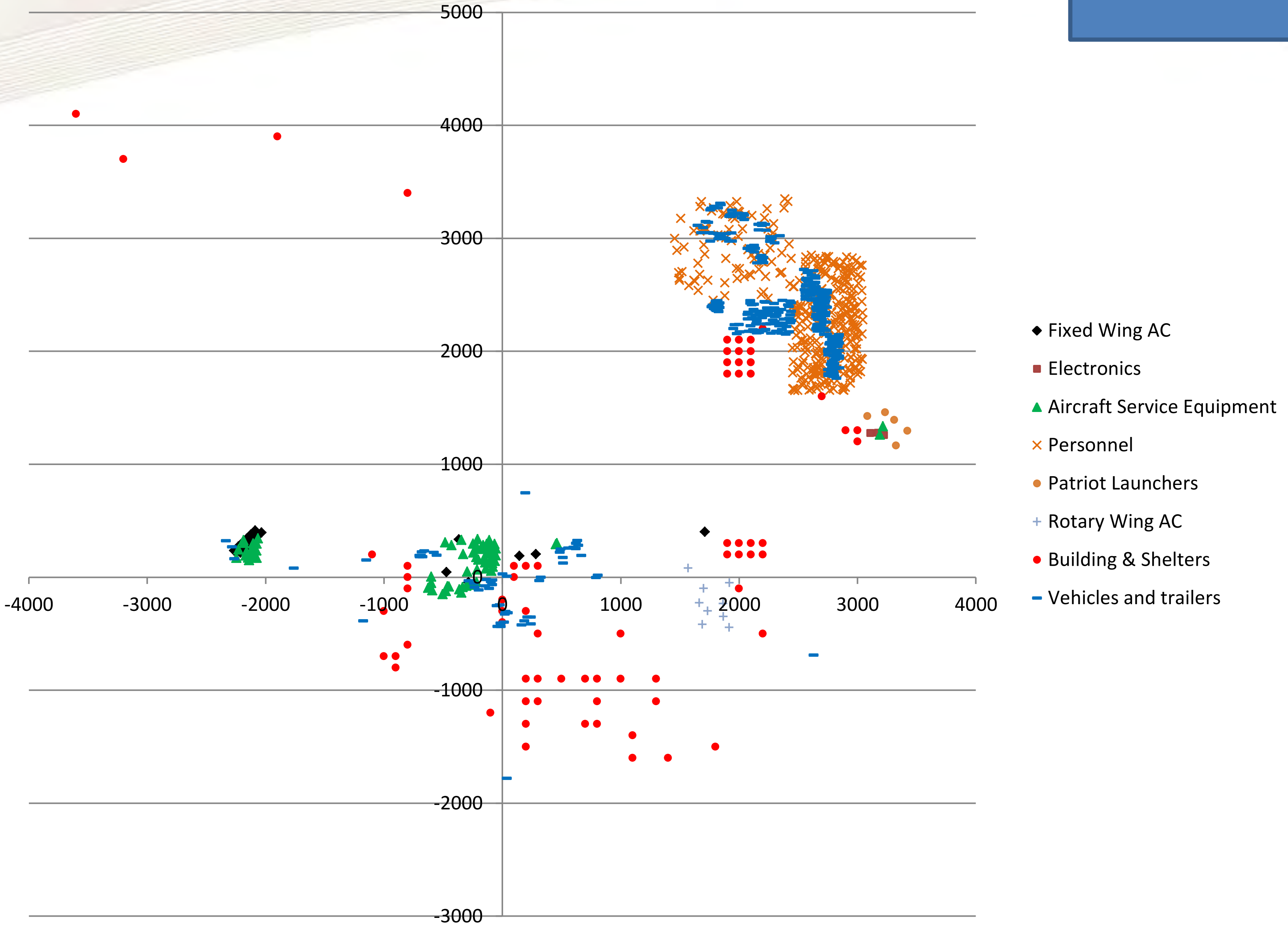
IDA | Planning Scenarios Study

- The studies previously discussed used notional targets and measured challenge in terms of area coverage. This does not address what would happen if you consider specific types of entities (aircraft, combat vehicles, buildings, people…)
- Why do that? In many cases, types of entities, such as aircraft, are located near each other and not randomly on an airbase, hence the challenges they face are correlated because they are close together
- The Planning Scenarios study, which develops CB extensions of Defense Planning Scenarios, will also develop entity-level target detail, allowing more detailed examinations of challenges to particular classes of entities
- Entity-level vignettes (snapshots in time) have been developed for APOD, SPOD (with HBCT unloading), HBCT in offense, HBCT in defense)

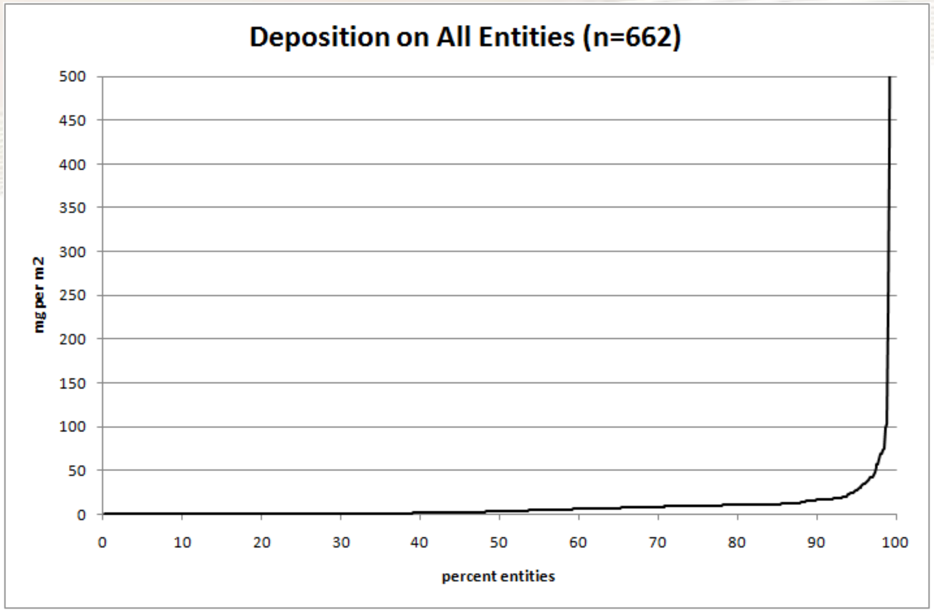
APOD Diagram

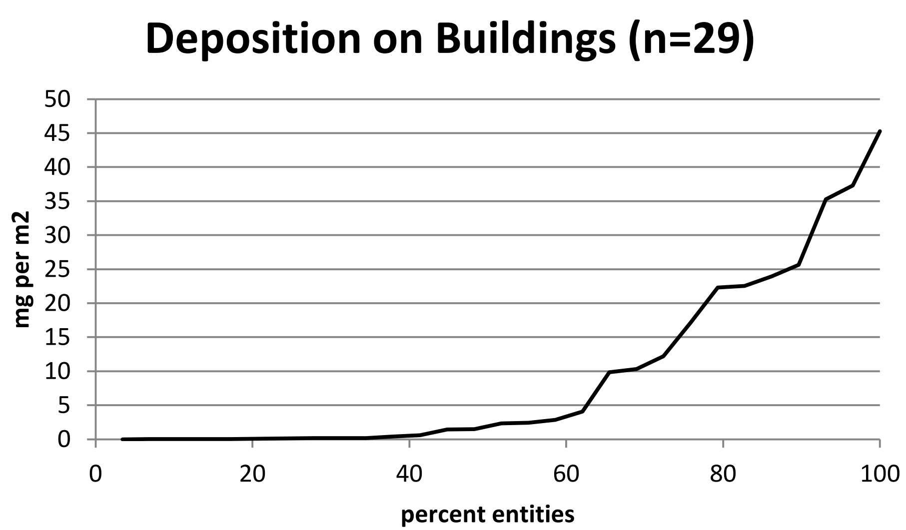


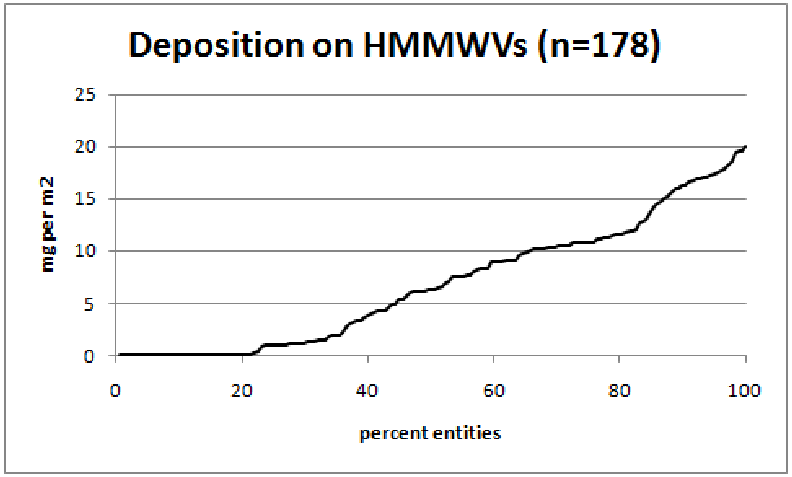
APOD Entities



Deposition Due to a Particular Chemical TBM Attack







IDA | Status

- Challenge Study has been published in Domestic and Exportable form (for use by ITF-46), is FOUO or FOUO//REL, along with a source term database (SECRET//NOFORN)
- Operational Challenge Study has been published, is classified SECRET//NOFORN
- NTA Challenge Study has been published, classified SECRET//NOFORN, but we consider some inputs now outdated (quick limited update done for JSTO)
- Defense Planning Scenarios study still in progress

Some Observations

- Old values (such as 10 g/m^2) may not have been transparent, but they are not necessarily wrong—they can be easily achieved locally under a number of conditions
- Considering casualties from fragmentation can change the challenge/risk trade-off by eliminating the highest challenge levels
- Entity analysis suggests that the distributions of challenge faced by widely dispersed entities (such as personnel) may be different from those that are collocated (such as aircraft)
- These approaches require metrics for operational risk (for example, what is the acceptability of a given level of contamination) as well as someone or body willing to set thresholds

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U.S. Army Research, Development and Engineering Command

Chemical Biological Material Effects (CBME) Database

17 May 2011

TECHNOLOGY DRIVEN. WARFIGHTER FOCUSED.

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CBRN Team
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Outline

- Background
- CBME Database Features
- CBME Database Challenges
- CBME Database Future
- Database Previews
- Demonstration
- Conclusion
- Questions

CBME Database Background

- CBME database was developed in response to Public Law 108-375 to create a Chemical and Biological Contamination Survivability (CBCS) policy and a <u>centralized database.</u>
- Development performed under guidance of an Executive Steering Committee (ESC) chaired by the Army Research Laboratory Survivability Lethality Analysis Directorate (ARL/SLAD)
- Joint multi-service and agency representation on ESC directed development and database architecture

CBME Database Background

- Database structure and objective data content defined by “Materials and Properties Matrix” from CBME Materials Sub-Group
- ARL/SLAD collaborated with the Chemical Biological Radiological and Nuclear Defense Information Analysis Center (CBRNIAC, Battelle) CBME database development effort
- CBME database maintenance resourced by DATSD (CBD&CDP) as per DoDI 3150.09 through PAIO, ARL/SLAD and CBRNIAC

CBME Database Features

- The CBME database contains a wealth of information on the effects of chemical agents, biological agents, decontaminants and simulants, for materials used in defense critical systems
- Material effects data addresses hardness and decontaminability issues in support of design, test, and evaluation of DoD systems
- This dedicated source for material effects data can significantly reduce the cost and risk associated with fielding Chemical and Biological (CB) survivable systems
- Data is available to qualified government and contractor personnel via web based, user friendly easily accessible site

CBME Database Features

- Extensive data repository includes material effects on over 560 materials
- Database content has been extracted from legacy databases and current literature (data identified through searches and reviewed for relevance)
  - Chemical Defense Material Database
  - Air Force Material Effects Database
  - Edgewood Chemical Biological Center
  - West Desert Test Center
  - Naval Surface Weapons Center
  - Defense Technical Information Center
  - CBRNIAC

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CBME Database Features

- Multiple query systems are available to quickly identify data of interest
- Database query results can to be exported in Excel format to user‟s desktop for analysis
- Most source documents are available for download and several additional CBR Contamination Survivability reference documents are also available
- Literature searches are ongoing, and the CBME is continuously updated with new data

CBME Database Challenges

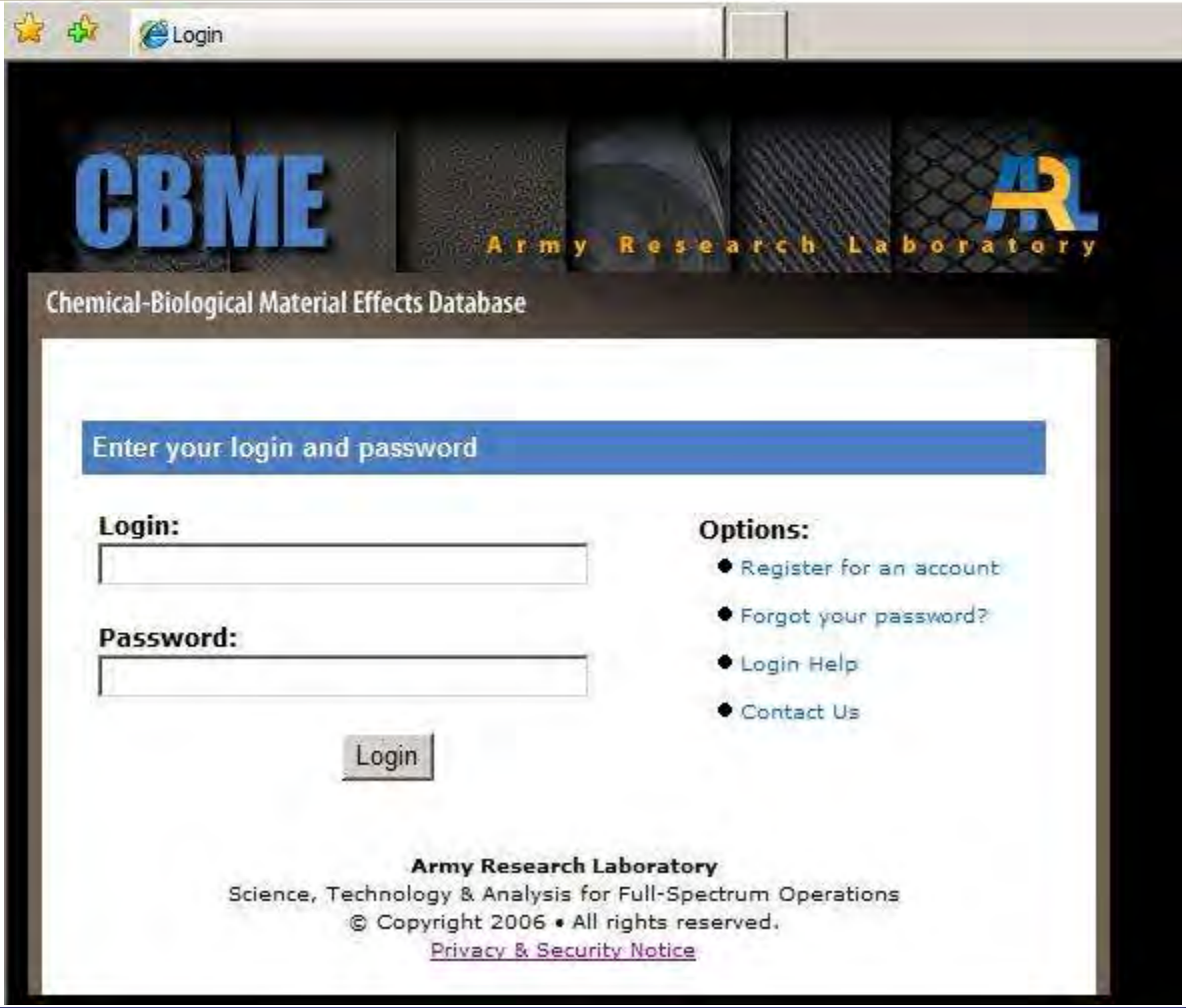
- Data voids exist, some content is dated
- Current data distribution level is Government and Government Contractor only
- New CBME Database site will be at the Government level only
  - This will broaden the field of current, relevant, and available data from existing search sources
    - Some previous documents excluded due to distribution restrictions will now be available

CBME's Future

- Value of CBME depends on new test data
- Government agencies and contractors need to ensure their material effects test data is sent to DTIC for inclusion
- Sharing your data is a win win solution for the entire community

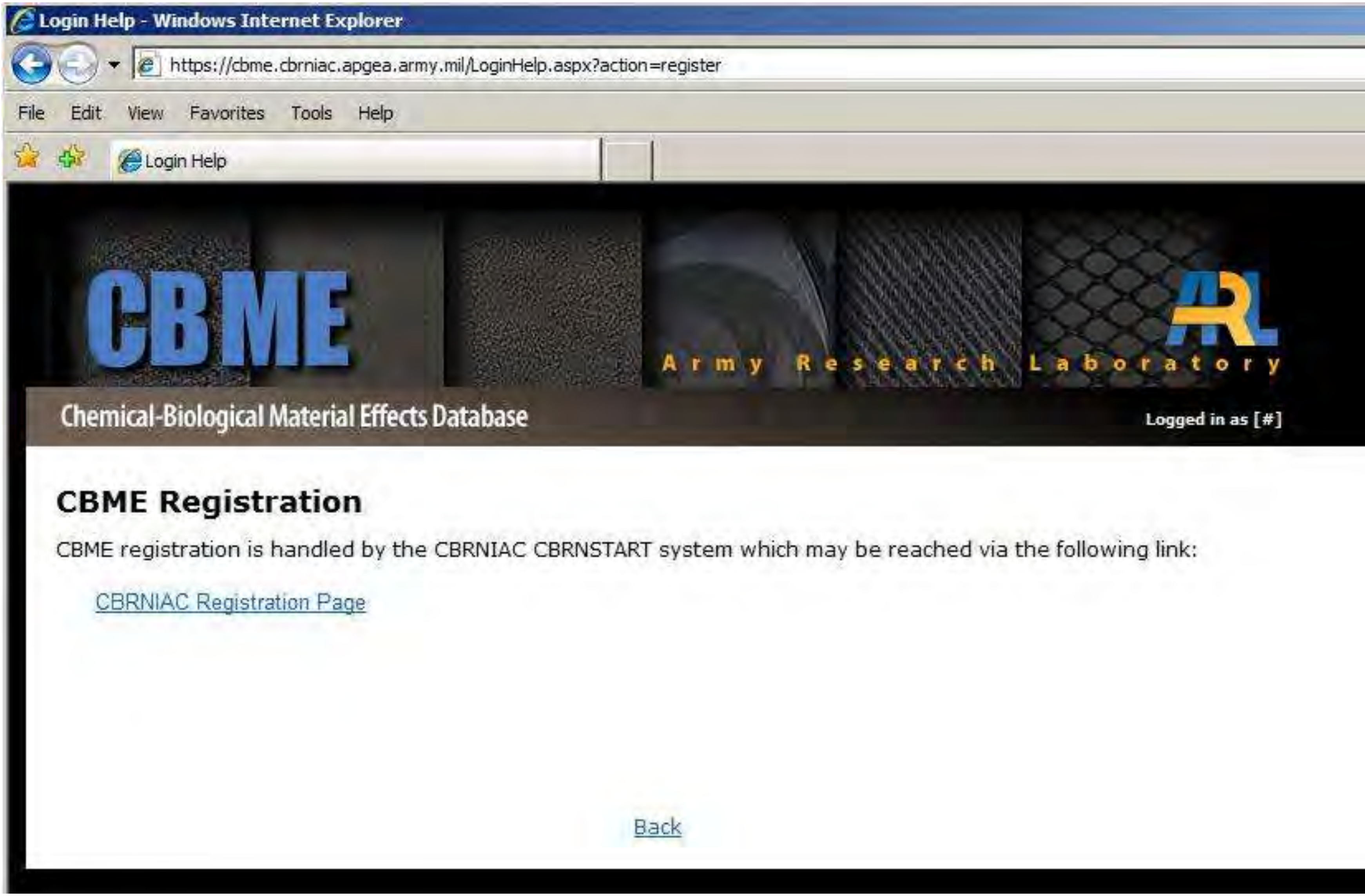
CBME Database Preview

CBME Login & Register for an Account



URL: https://cbme.cbrniac.apgea.army.mil/

Register for an Account



Register for an Account

Registration Notice

To ensure the privacy of our users and the security of our data, we are using a multi-step registration process for this system and all sites which are contained in it. Because this process will take some time, please be patient. The steps to register are the following:

1. Enter and submit basic information, such as name, business/organization name and address, work reference information, phone numbers, fax numbers, e-mail address(es), and (optionally) shipping and billing addresses. After submitting the required basic information, the system will send an e-mail to the business e-mail address that you enter. You must read and respond to that e-mail within three (3) calendar days to validate your account or we will delete the account.
2. When you respond to validate your account, you will then be given the option to choose the sites that you wish to access and supply any additional required/optional information for the chosen sites. Once you have submitted the required information, the system will send a notice of your application to the site administrator of each site you have chosen to access.
3. After receiving the notice that you have applied for access to a site, the site's administrator will review your basic and site-specific information and approve/disapprove your access to the site. This decision will be returned to you in an e-mail, one for each site to which you applied for access. If approved, you will be able to access the site once you have received the return e-mail from the site administrator. Please note that some site administrators may not accept accounts with business e-mails from juno.com, hotmail.com, or yahoo.com. Please also note that if you request access to many sites/communities in the system, you will receive many e-mails.

We take privacy and security seriously for this system. If you want to view our Privacy and Security Policy for this system (which applies to all sites in this system), please **click here**.

If you would like a detailed list of basic data required for registration along with the additional data needed for access to the CBRNIAC Database, please **click here**.

☐ Please check this box to show that you have read this registration notice.

Next -> Close

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ARL

Registration

User Registration

page help

Please enter the following user data. Required fields are marked with an asterisk(*). For help, click the Page Help button above.

Information collected from this form is subject to the policies outlined in our **Privacy and Security Policy**. *This information will be used to verify your identity and access to sites within the system.*

Basic Information

Prefix: Mr. | *First/Given Name | MI | *Last Name/Surname | Suffix (e.g., Sr., Jr., III)

*Organization/Business Name | *Organization Type: Academia (US)

*I am a: DoD Employee | Job Title/Role | Business URL

Phone / Fax / Email

*Work Phone Number | Second/DSN Phone Number | Fax Number

*Primary/Work Email | Classified Email (SIPRnet)

AKO Email | Other Email Addresses (separated by commas)

Business Address

Please enter the following business address data. Please do not enter personal address data.

Attention Line or Office Symbol/Code/Mail Stop

Click here if you need help entering an APO or FPO address.

*Street Address

*City | *State/Province: Select... | *Zip/Postal Code | *Country: Select...

Mailing Address / Unclassified Shipping Address

If you plan to receive unclassified materials from us, please enter the following information.

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CBME Homepage

CBME

Army Research Laboratory

Chemical-Biological Material Effects Database

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About CBME

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The CBME Database is sponsored by the Department of Defense Chemical and Biological Defense Program under the oversight of the Deputy Assistant to the Secretary of Defense for Chemical and Biological Defense and Chemical Demilitarization.

The Database has been developed to help designers and developers with the task of incorporating Nuclear, Biological, and Chemical Contamination Survivability (NBCCS) into system design and development. The database system contains data from technical reports on over 550 materials that have been exposed to CW agents. The database details the effects of CW agents and decontaminants on specific properties of materials. There is an extensive ongoing review of test data and documentation not currently included in the database, and additional extracted data will be added in future updates.

What's New on CBME

The nomination process has been updated but not activated on-line. Following final approval of the nomination process the CBME database nomination process will be activated.

Try It Out: Since there will be a lead time before the Nomination process has been approved and activated, the development team has left a single testing Nomination in the database so that users may try out the Endorsement process. It can be found quickly by going to Browse and then selecting 'Current Nominations' in the drop-down list. The Endorsements are located on the last tab.

Infrastructure Updates: Implementation of the Nominations and Endorsements functionality required extensive updates to the CBME database and User Authentication services. This work will be most noticeable when reviewing the details of a Nomination.

Data Updates: Data from 12 documents were added to the database. This resulted in 7 new materials, 8 new challenges, and 1403 new test entries. New test entry total is 51,387.

CBME Metrics

Category	Number
Materials in Database:	564
Challenges in Database:	272
Test Entries:	51387
Nominations:	1
Test Locations:	7

Documents Available for Download

CBME Information Pamphlet
Material Effects Testing TOP 8-2-502
CBME Test Data Template
DoD Military Handbook 784 (140 MB)
Multiservice CBRN Decontamination Manual
CBME User Manual

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'What's New' Section on Homepage

ARL

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What‟s New section lists the most recent updates to the database

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CBME Metrics on Homepage

Chemical-Biological Material Effects Database

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Infrastructure Updates: Implementation of the Nominations and Endorsement User Authentication services. This work will be most noticeable when reviewing

Data Updates: Data from 12 documents were added to the database. This res New test entry total is 51,387.

Currently there are over 560 materials, 51,000 test entries and 270 challenges entered in the CBME

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Reference Documents on Homepage

ARL

What's New on CBME

The nomination process has been updated but not activated on-line. Following final approval of the nomination process the CBME database nomination process will be activated

Try It Out: Since there will be a lead time before the Nomination process has been approved and activated, the development team has left a single testing Nomination in the database so that users may try-out the Endorsement process. It can be found quickly by going to Browse and then selecting 'Current Nominations' in the drop-down list. The Endorsements are located on the last tab.

Infrastructure Updates: Implementation of the Nominations and Endorsements functionality required extensive updates to the CBME database and User Authentication services. This work will be most noticeable when reviewing the details of a Nomination.

Data Updates: Data from 12 documents were added to the database. This resulted in 7 new materials, 8 new challenges, and 1405 new test entries. New test entry total is 51,387.

CBME Metrics

Category	Number
Materials in Database:	564
Challenges in Database:	272
Test Entries:	51387
Nominations:	1
Test Locations:	7

Documents Available for Download

CBME Information Pamphlet
Material Effects Testing TOP 8-2-502
CBME Test Data Template
DoD Military Handbook 784 (140 MB)
Multiservice CBRN Decontamination Manual
CBME User Manual

Reference documents are available for download

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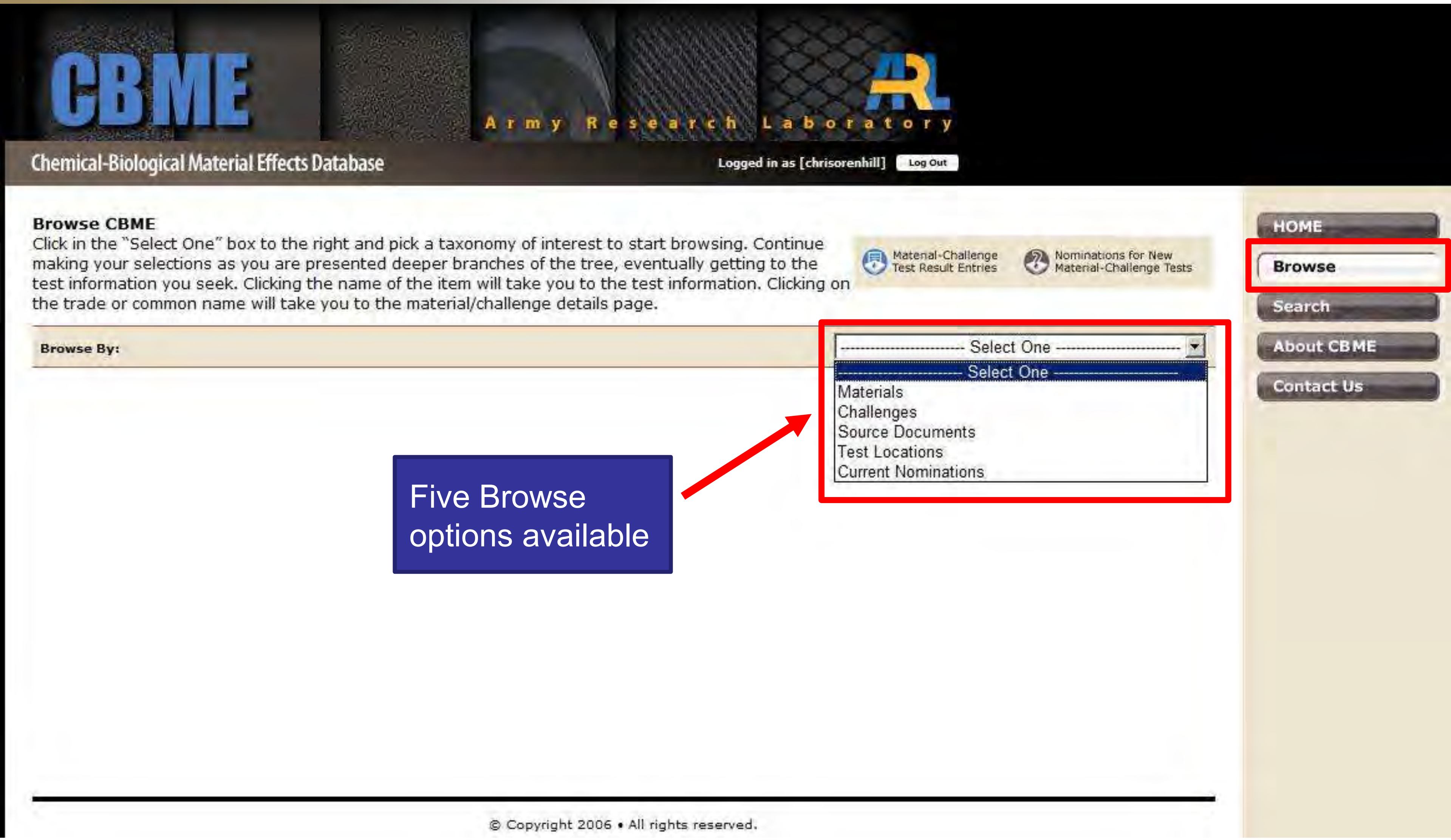
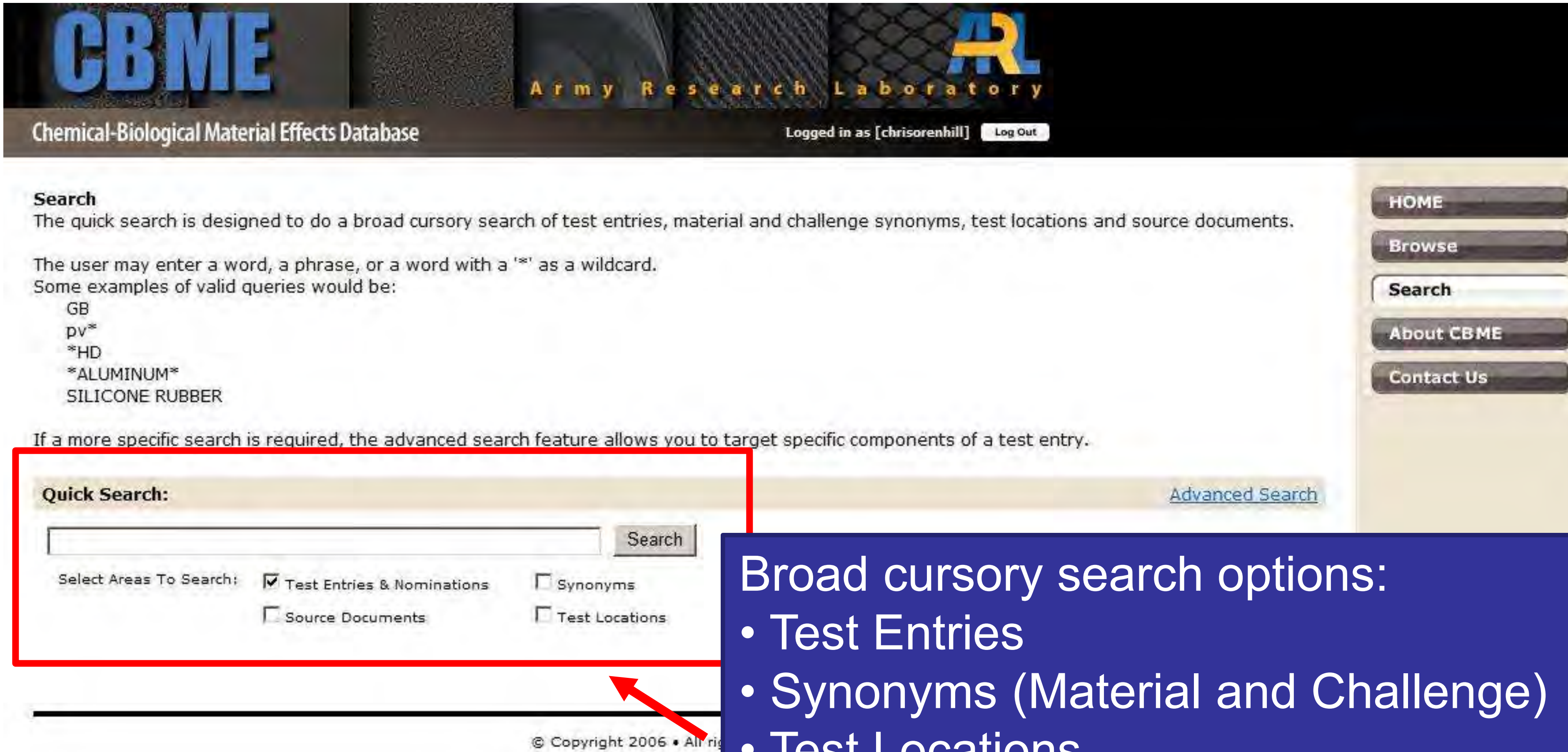
Browse Feature



TECHNOLOGY DRIVEN. WARFIGHTER FOCUSED.

Quick Search Feature



Broad cursory search options:

- Test Entries
- Synonyms (Material and Challenge)
- Test Locations
- Source Documents

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Advanced Search Feature

CBME

Army Research Laboratory

Chemical-Biological Material Effects Database

Logged in as [chrisorenhill] Log Out

HOME
Browse
Search
About CBME
Contact Us

Search

The quick search is designed to do a broad cursory search of test entries, material and challenge synonyms, test locations and source documents.

The user may enter a word, a phrase, or a word with a '*' as a wildcard.
Some examples of valid queries would be:

GB
pv*
*HD
ALUMINUM
SILICONE RUBBER

If a more specific search is required, the advanced search feature allows you to target specific components of a test entry.

Quick Search: Advanced Search

Search

Select Areas To Search:
- [x] Test Entries & Nominations
- [ ] Synonyms
- [ ] Source Documents
- [ ] Test Locations

The advanced search allows for a more detailed search

TECHNOLOGY DRIVEN. WARFIGHTER FOCUSED.

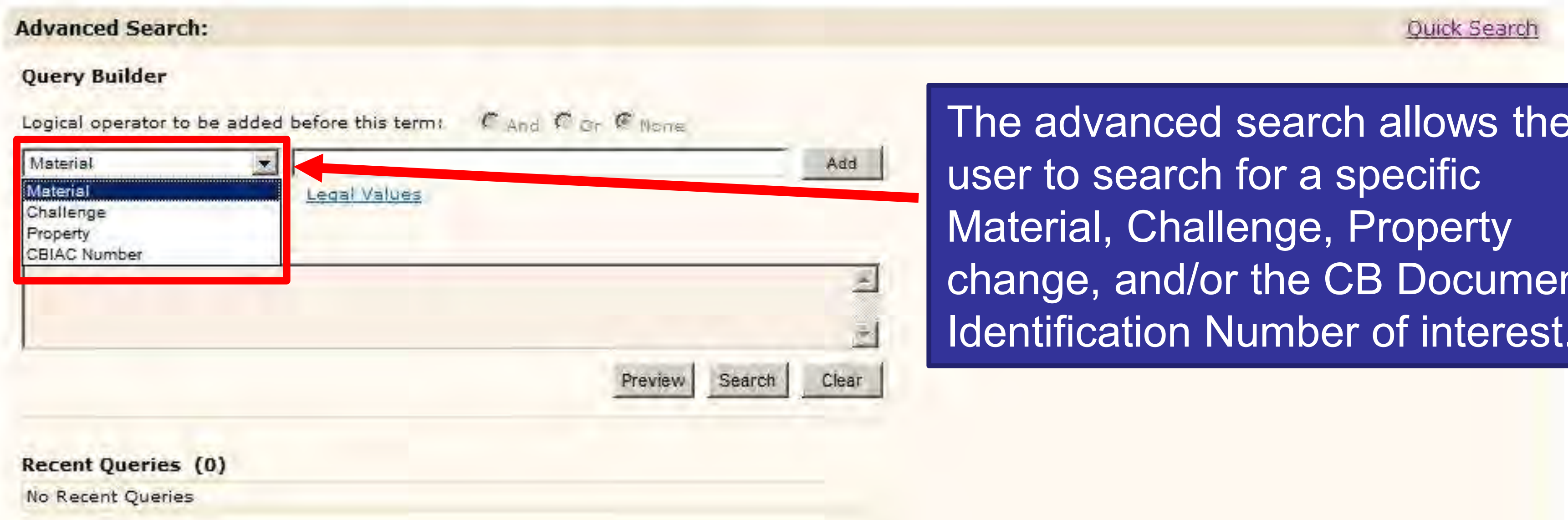
Advanced Search Feature

Search
The powerful tools in the advanced search allow you to build complex searches by connecting new and historical statements together. Statements can focus your search to materials, challenges, and properties. Stringing statements together into one query can target your search to test entries that are extremely focused towards a specific goal. If more general information is desired, fewer statements can be used or the Quick Search feature can be employed.

Steps for building a query:
1) Select the taxonomy from the drop-down box.
2) Enter a word, a phrase, or a word with a '*' as a wildcard. (click Legal Values to view available search terms)
3) Press the Add button to add the fragment to the Current Query box.
4) Preview search results by clicking the Preview button, or click Search button to view the list of Test Entries that match this query.

You can continue to build up more complex searches by adding new fragments (repeat steps 1-3). Select the appropriate logical operator (AND, OR) to join the new fragment to the Current Query. You can also combine results of previous searches by using the Recent Queries table. Click on the query # to post it to the Current Query box. The currently selected operator will be added to any search string already in that box.

Clicking the Clear button will empty the Current Query box and reset the Query Builder to defaults.
Click the Delete link to remove any individual query from the Recent Queries list.
Click the View link to show the list of Test Entries that match this query.



The advanced search allows the user to search for a specific Material, Challenge, Property change, and/or the CB Document Identification Number of interest.

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Advanced Search Feature – Sample Search

ARL

Search

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Advanced Search: Quick Search

Query Builder

Logical operator to be added before this term: And Or None

Material | pvc | Add

Legal Values

Current Query

Preview Search Clear

Recent Queries (0)

No Recent Queries

Let"s perform a search for:
- PVC
- HD
- Weight

Advanced Search Feature – Sample Search

Search

The powerful tools in the advanced search allow you to build complex searches by connecting new and historical statements together. Statements can focus your search to materials, challenges, and properties. Stringing statements together into one query can target your search to test entries that are extremely focused towards a specific goal. If more general information is desired, fewer statements can be used or the Quick Search feature can be employed.

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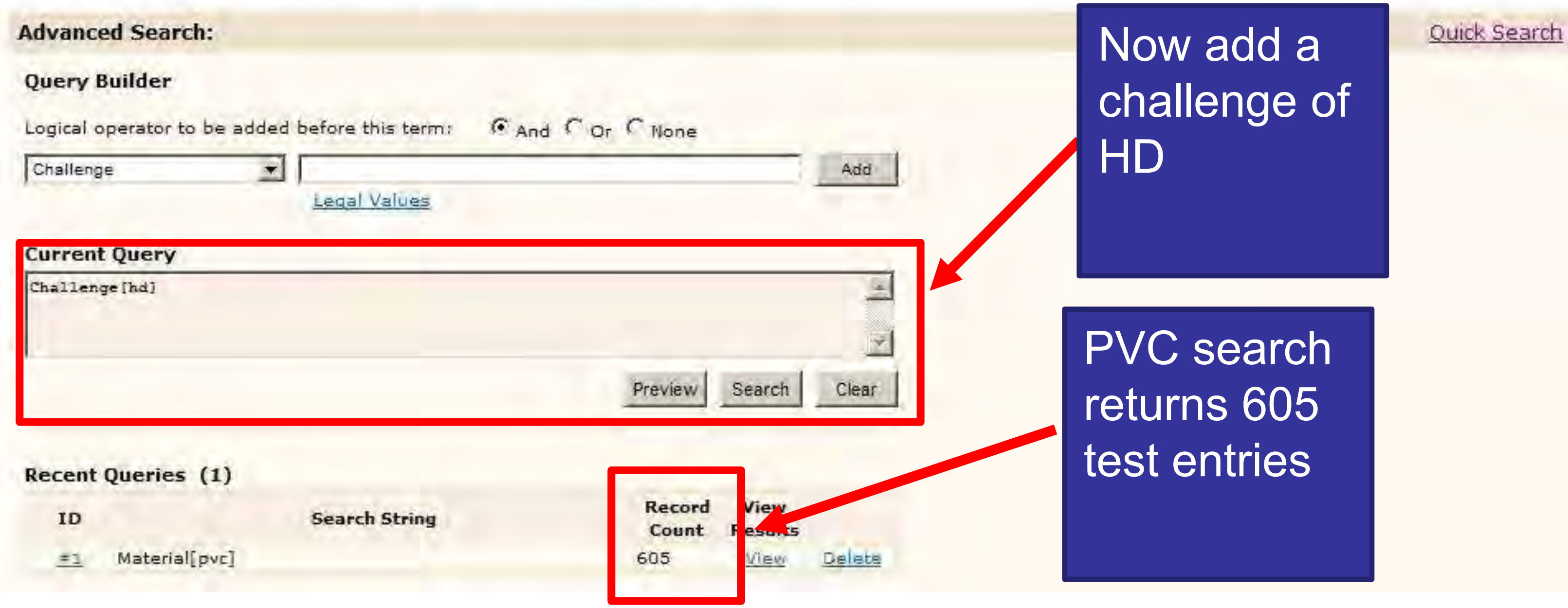

Now add a challenge of HD

PVC search returns 605 test entries

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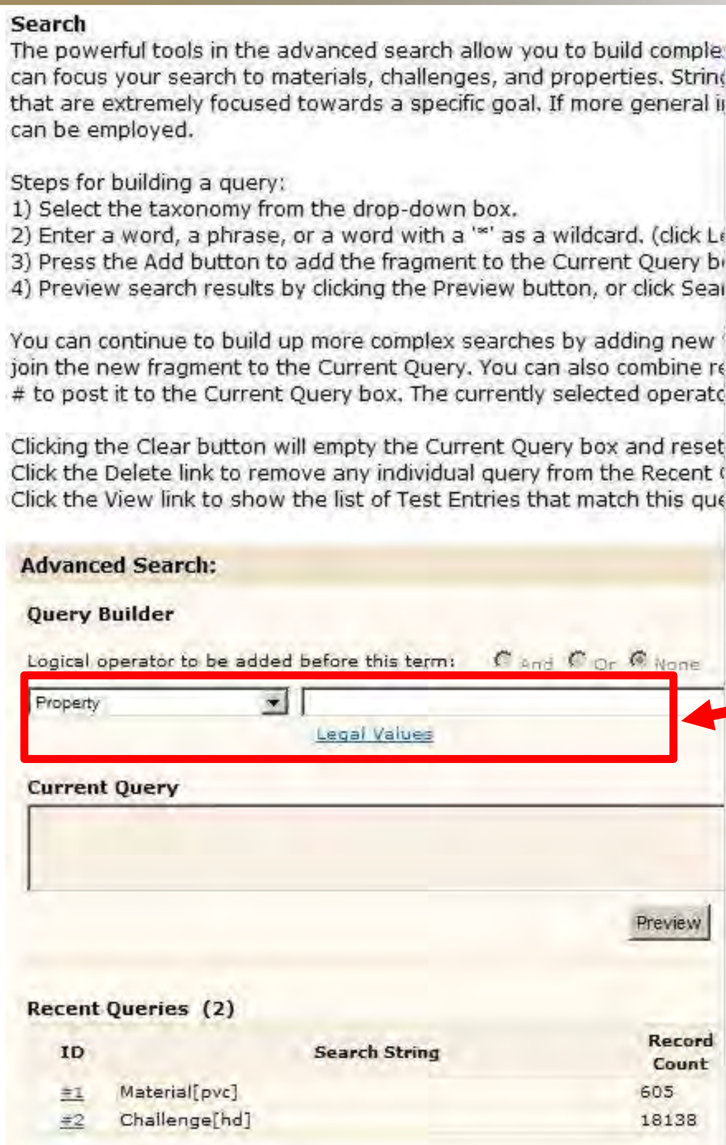
Advanced Search Feature – Sample Search



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3) Press the Add button to add the fragment to the Current Query b
4) Preview search results by clicking the Preview button, or click Sea

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join the new fragment to the Current Query. You can also combine r
to post it to the Current Query box. The currently selected operat

Clicking the Clear button will empty the Current Query box and reset
Click the Delete link to remove any individual query from the Recent
Click the View link to show the list of Test Entries that match this que

Advanced Search:

Query Builder

Logical operator to be added before this term: And Or None

Property

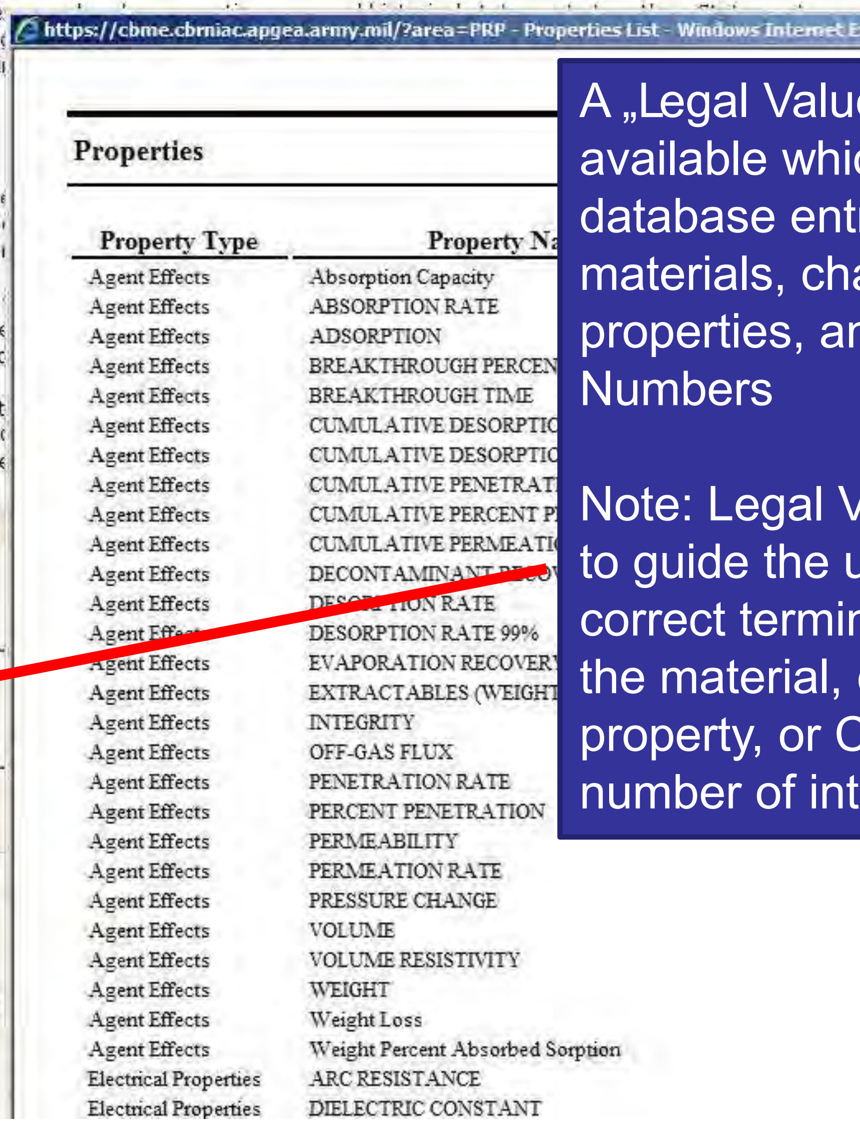
Legal Values

Current Query

Preview

Recent Queries (2)

ID	Search String	Record Count
#1	Material[pvc]	605
#2	Challenge[hd]	18138



https://cbme.cbrniac.apgea.army.mil/?area=PRP - Properties List - Windows Internet Ex

Properties

Property Type	Property Na
Agent Effects	Absorption Capacity
Agent Effects	ABSORPTION RATE
Agent Effects	ADSORPTION
Agent Effects	BREAKTHROUGH PERCEN
Agent Effects	BREAKTHROUGH TIME
Agent Effects	CUMULATIVE DESORPTIO
Agent Effects	CUMULATIVE DESORPTIO
Agent Effects	CUMULATIVE PENETRATI
Agent Effects	CUMULATIVE PERCENT P
Agent Effects	CUMULATIVE PERMEATIO
Agent Effects	DECONTAMINANT RECOV
Agent Effects	DESORPTION RATE
Agent Effects	DESORPTION RATE 99%
Agent Effects	EVAPORATION RECOVERY
Agent Effects	EXTRACTABLES (WEIGHT
Agent Effects	INTEGRITY
Agent Effects	OFF-GAS FLUX
Agent Effects	PENETRATION RATE
Agent Effects	PERCENT PENETRATION
Agent Effects	PERMEABILITY
Agent Effects	PERMEATION RATE
Agent Effects	PRESSURE CHANGE
Agent Effects	VOLUME
Agent Effects	VOLUME RESISTIVITY
Agent Effects	WEIGHT
Agent Effects	Weight Loss
Agent Effects	Weight Percent Absorbed Sorption
Electrical Properties	ARC RESISTANCE
Electrical Properties	DIELECTRIC CONSTANT

A „Legal Values" link is available which lists all database entries for materials, challenges, properties, and CBIAC Numbers

Note: Legal Values helps to guide the user to the correct terminology for the material, challenge, property, or CBIAC number of interest

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Advanced Search Feature – Sample Search

Search

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Click the View link to show the list of Test Entries that match this query.

Advanced Search: Quick Search

Query Builder

Logical operator to be added before this term: And Or None

Material | Add

Legal Values

Current Query

Material[pvc] AND Challenge[hd] AND Property[weight]

Preview Search Clear

Building a query with PVC, HD and Weight

Recent Queries (3)

ID	Search String	Record Count	View Results	
#1	Material[pvc]	605	View	Delete
#2	Challenge[hd]	18138	View	Delete
#3	Property[weight]	2063	View	Delete

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Advanced Search Feature – Sample Search

ID	Search String	Record Count	View Results	
#1	Material[pvc]	605	View	Delete
#2	Challenge[hd]	18138	View	Delete
#3	Property[weight]	2063	View	Delete
#4	Material[pvc] AND Challenge[hd] AND Property[weight]	9	View	Delete

This results in 9 test results

Viewing Search Results

Current Query...

Material[pvc] AND Challenge[hd] AND Property[weight]

SEARCH RESULTS

Export Results ▾ Show Options

Row Count: 9

	Type	Material	Challenge	Property	Property Value	Percent Change	Date
View Details		PVC	HD	WEIGHT		207%	Feb 01, 1981
View Details		PVC	HD	WEIGHT		204.2%	Feb 01, 1981
View Details		PVC	HD	WEIGHT		417.9%	Feb 01, 1981
View Details		PVC	HD	WEIGHT		68.9%	Feb 01, 1981
View Details		PVC	HD	WEIGHT		284.2%	Feb 01, 1981
View Details		PVC	HD	WEIGHT		307%	Feb 01, 1981
View Details		PVC	HD	WEIGHT		159.7%	Feb 01, 1981
View Details		PVC	HD	WEIGHT		180.1%	Feb 01, 1981

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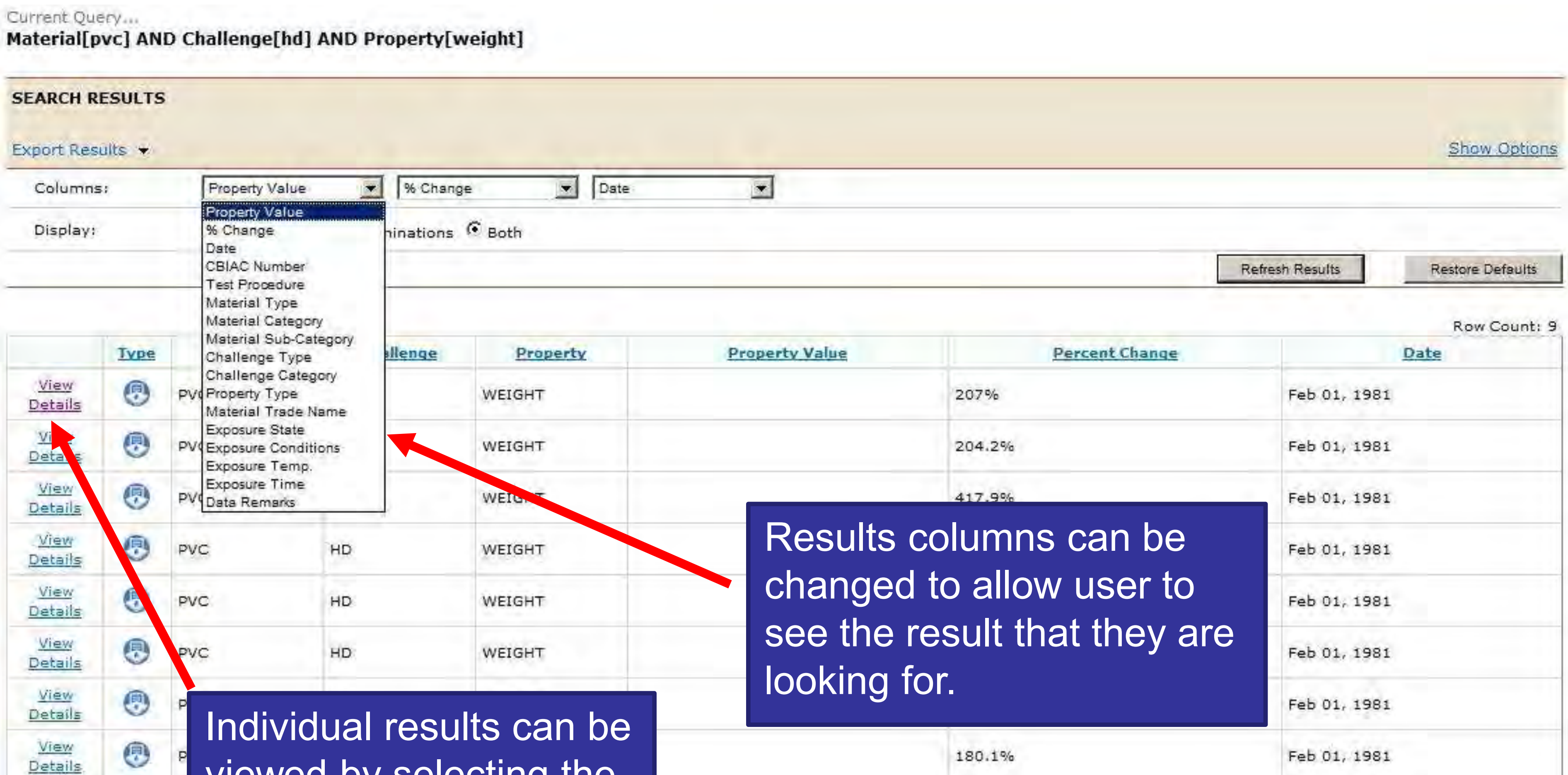
Viewing Search Results



Results columns can be changed to allow user to see the result that they are looking for.

Individual results can be viewed by selecting the view details.

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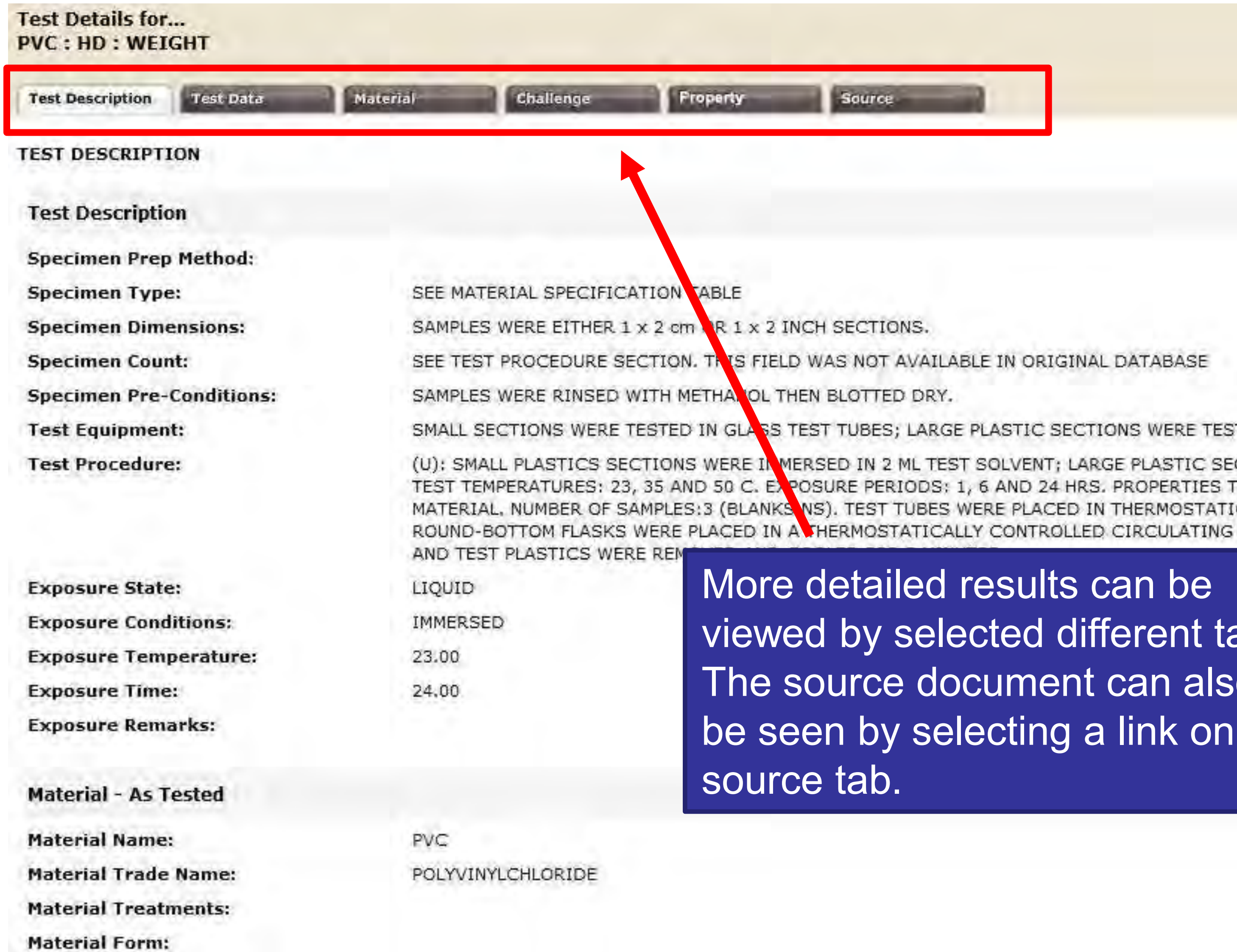
Viewing Search Results



More detailed results can be viewed by selected different tabs. The source document can also be seen by selecting a link on the source tab.

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Viewing Search Results

ARL

CB ME

Army Research Laboratory

Chemical-Biological Material Effects Database

Logged in as [chrisorenhill]

Test Details for...
PVC : HD : WEIGHT

Test Description | Test Data | Material | Challenge | Property | Source

SOURCE

CBIAC Number:	CB-008776
DTIC Number:	A096960
Title:	Compatibility of Plastics with Mustard (HD), Thiodiglycol, VX Hydrolysis Products, DS-2, HTH, and Tetrachloroetl
Authors:	Albizo, Johnnie M. Davis, George T. Quinn, Harry S. Niitsuma, Betty J.
Performing Organization:	CHEMICAL SYSTEMS LABORATORY, ABERDEEN PROVING GROUND, MD
Performing Organization Report Number:	ARCSL-TR-80069
Sponsoring Organization:	COMMANDER/DIRECTOR, CHEMICAL SYSTEMS LABORATORY, ATTN: DRDAR-CLJ-R, ABERDEEN PROVING GRO
Sponsoring Organization Report Number:	COMMANDER/DIRECTOR, CHEMICAL SYSTEMS LABORATORY, ATTN: DRDAR-CLJ-R, ABERDEEN PROVING GRO
Contract Number:	
Date Published:	2/1/1981 12:00:00 AM
Document Classification:	U

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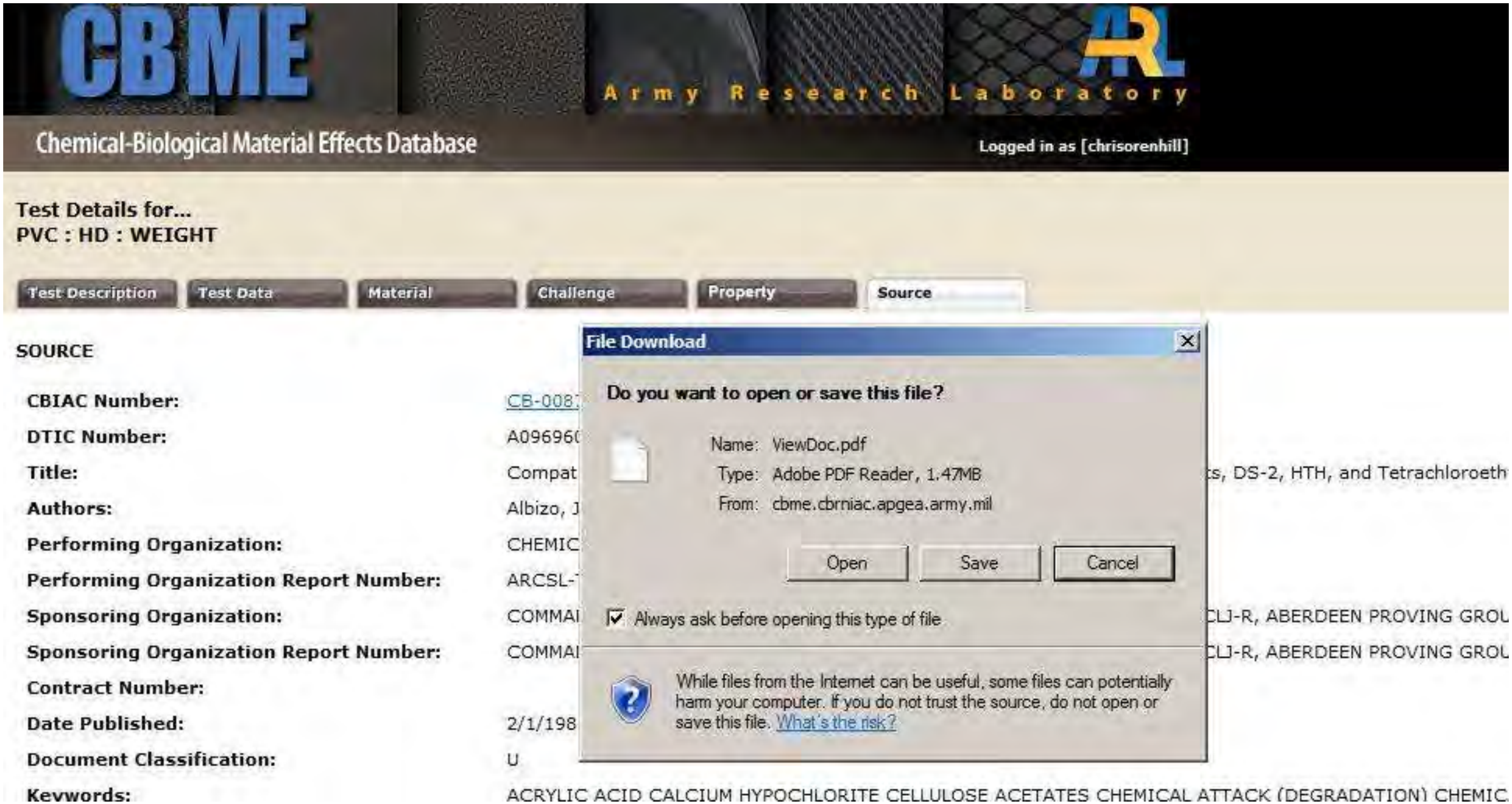
Viewing Search Results



US ARMY RDECOM

Document Number CB-008776

ARL

UNCLASSIFIED

SECURITY CLASSIFICATION OF THIS PAGE (When Data Entered)

REPORT DOCUMENTATION PAGE — READ INSTRUCTIONS BEFORE COMPLETING FORM

1. REPORT NUMBER: ARCSL-TR-80069
2. GOVT ACCESSION NO.: AD-A096 960
3. RECIPIENT'S CATALOG NUMBER:
4. TITLE (and Subtitle): COMPATIBILITY OF PLASTICS WITH MUSTARD (HD), THIODIGLYCOL, VX HYDROLYSIS PRODUCTS, DS-2, HTH, AND TETRACHLOROETHYLENE
5. TYPE OF REPORT & PERIOD COVERED: Technical Report, October 1979–March 1980
6. PERFORMING ORG. REPORT NUMBER:
7. AUTHOR(s): Johnnie M. Albizo, George T. Davis, Harry S. Quinn, Betty J. Niitsuma
8. CONTRACT OR GRANT NUMBER(s):
9. PERFORMING ORGANIZATION NAME AND ADDRESS: Commander/Director, Chemical Systems Laboratory, ATTN: DRDAR-CLB-CA, Aberdeen Proving Ground, Maryland 21010
10. PROGRAM ELEMENT, PROJECT, TASK AREA & WORK UNIT NUMBERS: Task 1L162706A553, Technical Area 3-5
11. CONTROLLING OFFICE NAME AND ADDRESS: Commander/Director, Chemical Systems Laboratory, ATTN: DRDAR-CLJ-R, Aberdeen Proving Ground, Maryland 21010
12. REPORT DATE: February 1981
13. NUMBER OF PAGES: 54
14. MONITORING AGENCY NAME & ADDRESS (if different from Controlling Office):
15. SECURITY CLASS. (of this report): UNCLASSIFIED
15a. DECLASSIFICATION/DOWNGRADING SCHEDULE: NA
16. DISTRIBUTION STATEMENT (of this Report): Approved for public release; distribution unlimited
17. DISTRIBUTION STATEMENT (of the abstract entered in Block 20, if different from Report):
18. SUPPLEMENTARY NOTES

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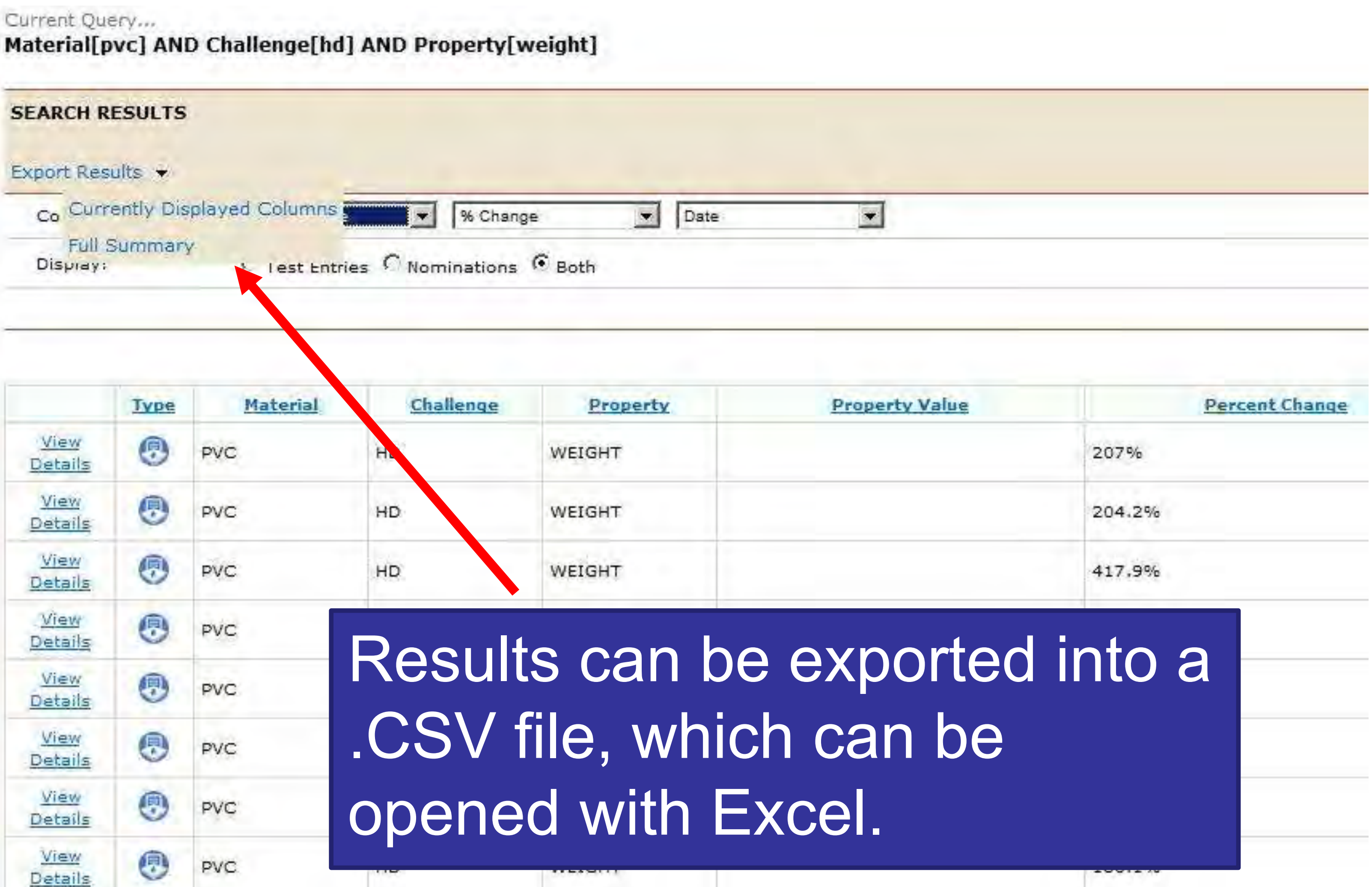
Notice Given When Access to Source Document is Restricted

Example of message given when user is unable to access a source document

US ARMY RDECOM

Exporting Search Results



Results can be exported into a .CSV file, which can be opened with Excel.

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Exporting Search Results

ARL

C14

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	
1	Type	Material	Challenge	Property	Property \	% Change	Date	CBIAC Nu	Test Proc	Material T	Material C	Material S	Challenge	Challenge	Property T	Material T	Exposure	E
2	TE	PVC	HD	WEIGHT		207%	02/01/198	CB-00877	(U): SMA	Plastics	Thermopla		Chemical	Blister Ag	Agent Effe	POLYVIN	LIQUID	I
3	TE	PVC	HD	WEIGHT		204.20%	02/01/198	CB-00877	(U): SMA	Plastics	Thermopla		Chemical	Blister Ag	Agent Effe	POLYVIN	LIQUID	I
4	TE	PVC	HD	WEIGHT		417.90%	02/01/198	CB-00877	(U): SMA	Plastics	Thermopla		Chemical	Blister Ag	Agent Effe	POLYVIN	LIQUID	I
5	TE	PVC	HD	WEIGHT		68.90%	02/01/198	CB-00877	(U): SMA	Plastics	Thermopla		Chemical	Blister Ag	Agent Effe	POLYVIN	LIQUID	I
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7	TE	PVC	HD	WEIGHT		307%	02/01/198	CB-00877	(U): SMA	Plastics	Thermopla		Chemical	Blister Ag	Agent Effe	POLYVIN	LIQUID	I
8	TE	PVC	HD	WEIGHT		159.70%	02/01/198	CB-00877	(U): SMA	Plastics	Thermopla		Chemical	Blister Ag	Agent Effe	POLYVIN	LIQUID	I
9	TE	PVC	HD	WEIGHT		180.10%	02/01/198	CB-00877	(U): SMA	Plastics	Thermopla		Chemical	Blister Ag	Agent Effe	POLYVIN	LIQUID	I
10																		
11																		
12																		
13																		

Once the data is in Excel, the user can manipulate and sort the data as desired

Demonstration

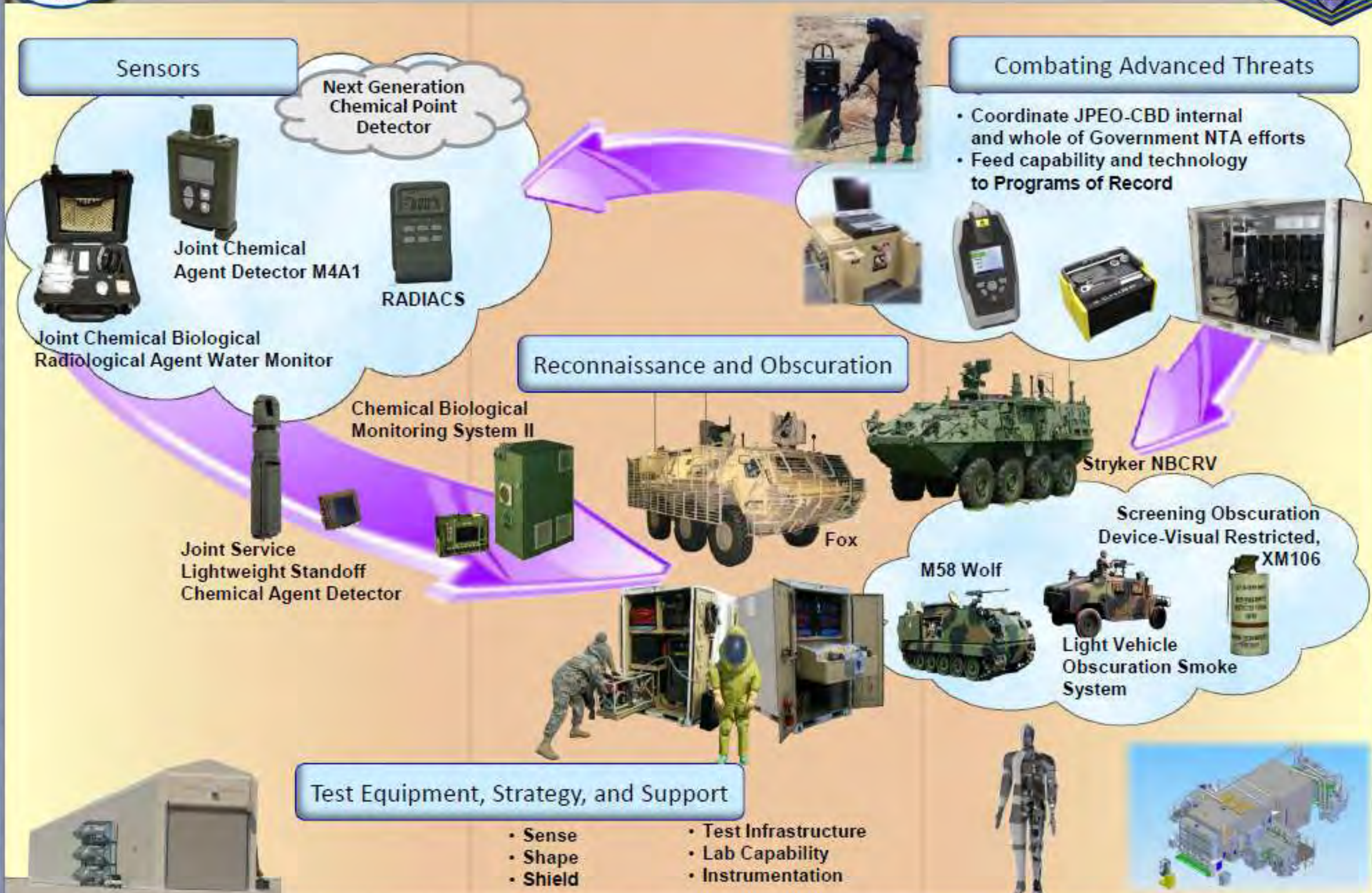
Conclusion

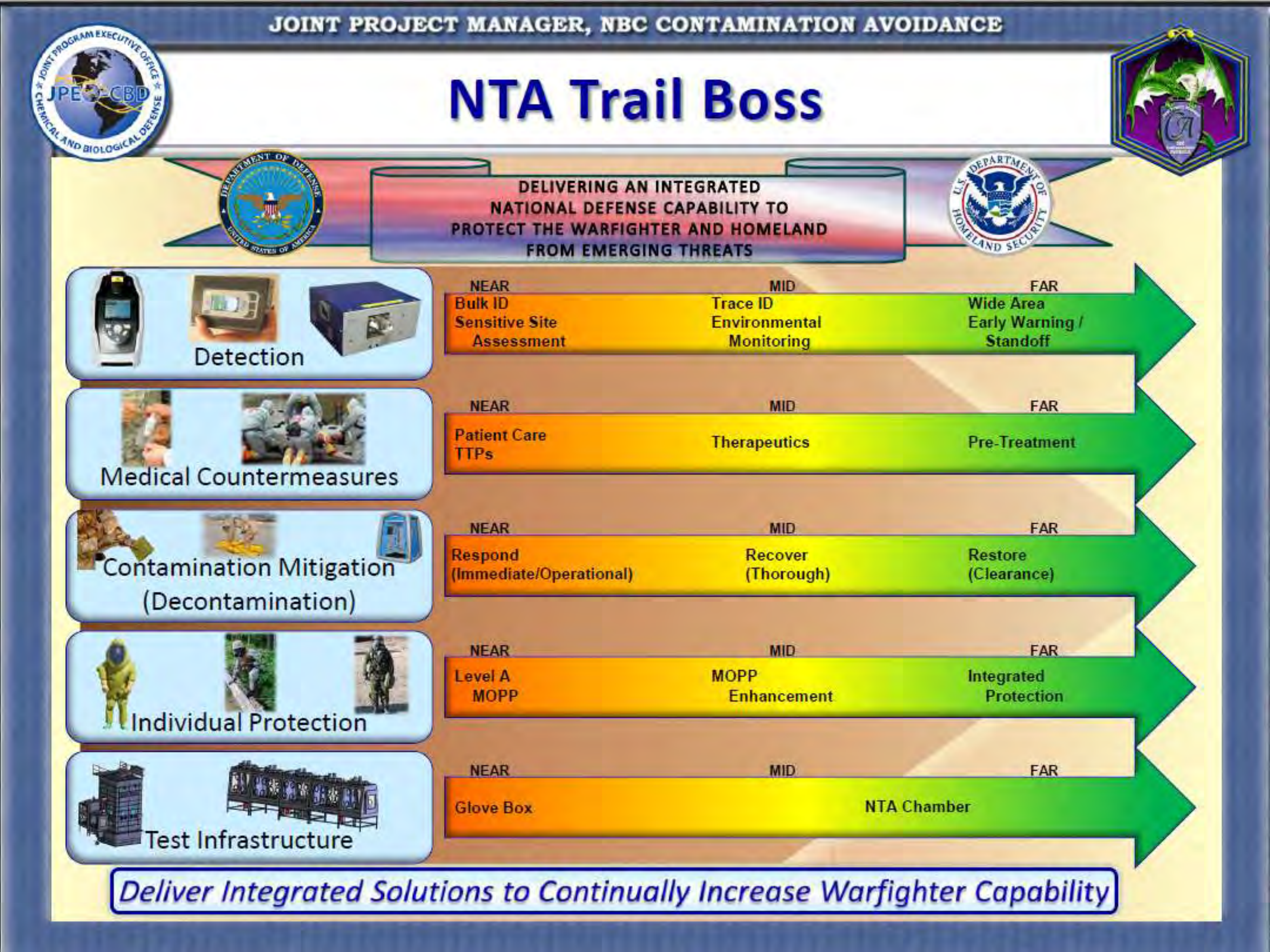
CBME database enables users to:

- Easily search for CB effects on materials
- Customize search results
- Download
  - Source documents
  - Results for further evaluation

Questions

Joint Product Manager / Product Directors




JOINT PROJECT MANAGER, NBC CONTAMINATION AVOIDANCE
NTA Trail Boss
DELIVERING AN INTEGRATED NATIONAL DEFENSE CAPABILITY TO PROTECT THE WARFIGHTER AND HOMELAND FROM EMERGING THREATS
Detection
NEAR
Bulk ID
Sensitive Site Assessment
MID
Trace ID
Environmental Monitoring
FAR
Wide Area
Early Warning / Standoff
Medical Countermeasures
NEAR
Patient Care TTPs
MID
Therapeutics
FAR
Pre-Treatment
Contamination Mitigation (Decontamination)
NEAR
Respond (Immediate/Operational)
MID
Recover (Thorough)
FAR
Restore (Clearance)
Individual Protection
NEAR
Level A MOPP
MID
MOPP Enhancement
FAR
Integrated Protection
Test Infrastructure
NEAR
Glove Box
MID
NTA Chamber
FAR
Deliver Integrated Solutions to Continually Increase Warfighter Capability

Chemical Biological Medical Systems Overview

May 18, 2011

Presented to:

CBRN Survivability for Weapon Systems Conference

National Defense Industrial Association (NDIA)

LTC Philip L. Smith
Joint Product Manager
Joint Vaccine Acquisition Program (JVAP)
Chemical Biological Medical Systems (CBMS)
philip.l.smith@us.army.mil

Agenda
CBMS Overview

- Mission/Organization
- Core Competencies
- Warfighter Needs
- Integrated DoD Acquisition & FDA Regulatory Processes
- Product Development
- CBMS Products
- Medical Capabilities
- Take Aways

Chemical Biological Medical Systems (CBMS) Organization

Deliver safe, effective and robust medical products that protect U.S. forces against validated CBRN threats. We apply government and industry best practices to develop or acquire FDA-approved products within rigorously managed cost, schedule and performance constraints.

Develop, produce & stockpile *FDA-Licensed vaccine systems* to protect the Warfighter from biological agents

Develop and integrate chemical, biological, radiological, and nuclear (CBRN) technologies to enable early warning, identification, and continued situational awareness of potential global health threats

Rapidly provide the Warfighter and the Nation robust & affordable FDA-approved lifesaving medical countermeasure drug capabilities against chemical, biological, radiological & nuclear threats

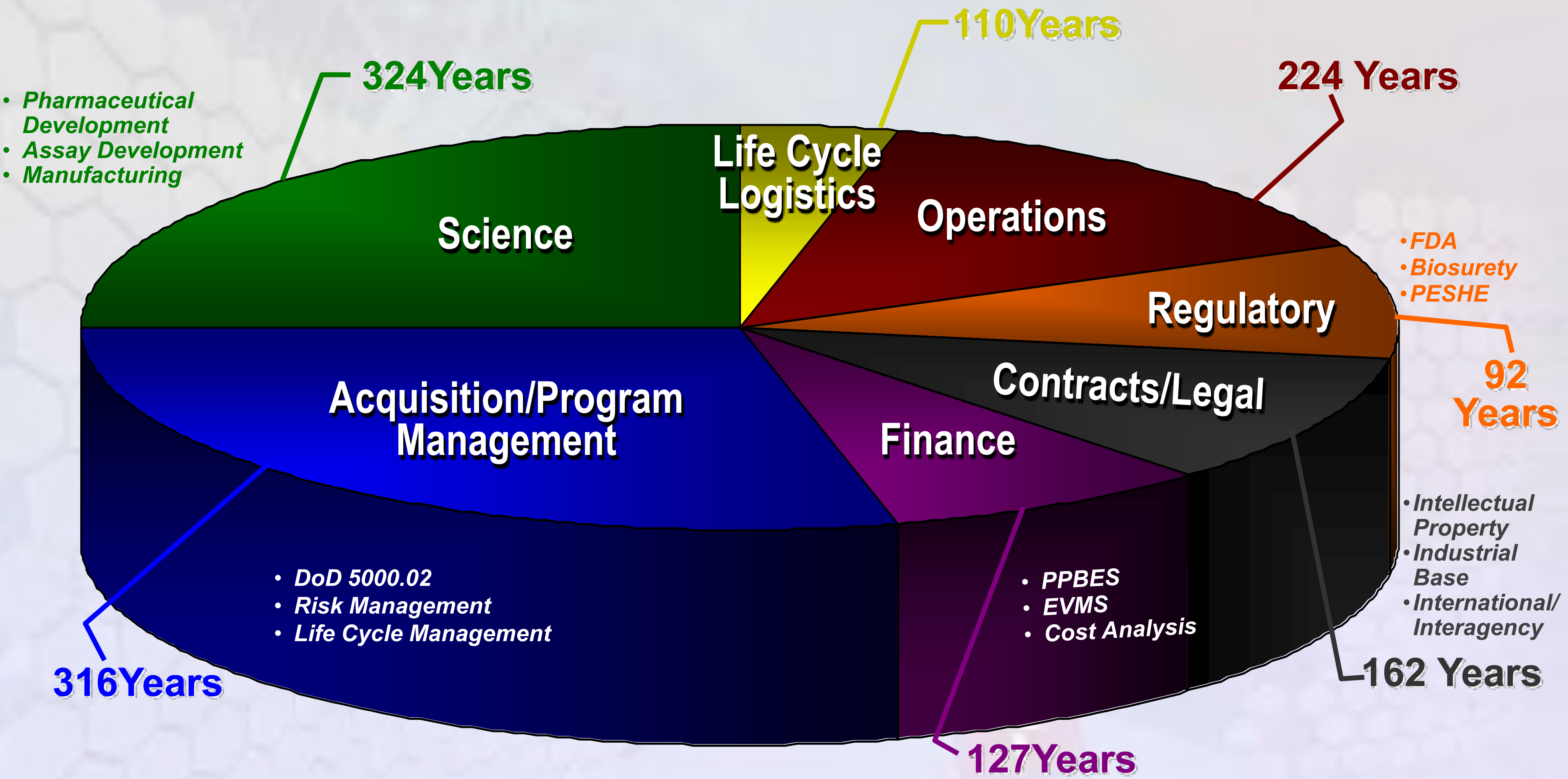
Provisional

Meeting the Warfighter needs through the development of FDA-approved products

CBMS Command Staff

CBMS Core Competencies

1355 Person Years of Advanced Drug Development Experience
All functional units are co-located!



Warfighter Needs

Requirements Identified

Acquisition Documents

- Initial Capabilities Document (ICD)
- Capability Development Document (CDD)
- Capability Production Document (CPD)
- Key Performance Parameter = FDA Licensure

Science & Technology (S&T) Development

Advanced Development

FDA Licensure Process

Warfighter ⟶ Requirements ⟶ JRO ⟶ Requirements Documents ⟶ S & T ⟶ JPEO-CBMS

Product Development and the Animal Rule

TRADITIONAL LICENSURE PATHWAY

•Safety, immunogenicity, and efficacy in humans

ANIMAL RULE LICENSURE PATHWAY

Animal Rule vaccine development requires integrated clinical and non-clinical programs

•Safety and immunogenicity in humans
•Safety, immunogenicity, and efficacy in animals

- **Allows for approval of products in which efficacy testing in humans is unethical**
- **Extensive Animal Model Development**
  - Efficacy is demonstrated in more than one, well defined animal model
  - Well controlled animal studies provide data that are likely to predict a benefit in humans

Integration of DoD Acquisition Model & FDA Regulatory Process

	MRL 1 - 4 / TRL 1 - 4	MRL 5 - 6 / TRL 5 - 6	MRL 7 - 8 / TRL 7	MRL 9 / TRL 8	MRL 10 / TRL 9
DoD	Materiel Solution Analysis	Technology Development	Engineering & Manufacturing Development	Production & Deployment	Operations & Support
FDA	Research/ Discovery	Pre-Clinical/Clinical Development	Clinical Development	Regulatory Submission	Post Licensure

Lab Scale Production

Initial Assay Development

MDD

Proof of Concept Animal Studies

Transitions to Advanced Development (CBMS Medical)

Milestone A

IND Submission - Product Commitment

Investigational New Drug

DoD 5000.02 Documentation
- ICD
- TDS
- AoA

Process Development & Pilot Lot Production

Manufacturing Scale Up

- Indication(s) for Use
- Route(s) of Administration
- Manufacturing Process (initial)

Clinical Assay Development

Dose Range, Schedule & Safety in Animals

Phase 1 Human Trials (safety)

Animal Efficacy Trials

Transitions to Advanced Development (Non-Medical)

Milestone B

DoD 5000.02 Documentation
- CDD
- LCMP
- APB
- etc.

Validation & Demo Lots

Consistency Lots

Milestone C

FRP *(Drugs)* Full Rate Production

LRIP *(Vaccines)* Low Rate Initial Production

Phase 2 Human Trials (safety/dose/schedule)

Phase 3 Human Trials (expanded safety)

Pivotal Animal Efficacy Studies

Biologic License Agreement

BLA → FDA Review → Licensure

New Drug Application

NDA → FDA Review → Licensure

FRP Full Rate Production

Phase 4 Post Marketing Surveillance

DoD 5000.02 Documentation
- CPD
- LCMP
- APB
- etc.

Warm Base Manufacturing

Stockpile

Sustain

IOC Initial Operational Capability

FOC Full Operational Capability

Emergency Use Authorization (EUA) May Be Considered

- Development timelines are in line with industry standard

- The product sponsor is the only direct interface with the FDA
- DoD has no special relationship with the FDA
- TRLs agreed to by DoD and HHS

LEGEND: DoD FDA

MRL = Manufacturing Readiness Levels

TRL = Technology Readiness Levels

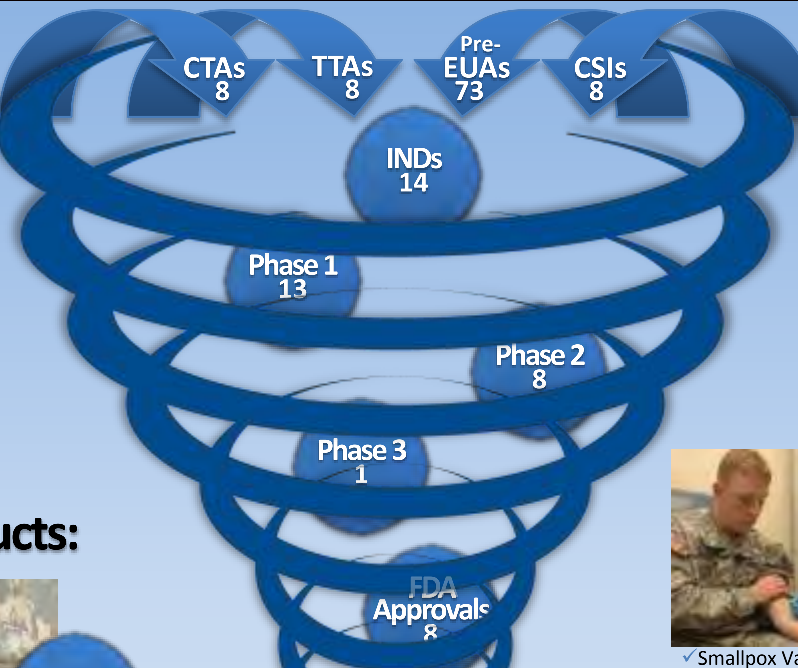
CBMS Products

- **Joint Vaccine Acquisition Program (JVAP)**
  - Anthrax Vaccine Adsorbed
  - Filovirus Vaccine
  - Plague Vaccine
  - Recombinant Botulinum A/B Vaccine
  - Smallpox Vaccine
  - Vaccinia Immune Globulin
- **Biosurveillance**
  - Critical Reagents Program (CRP)
  - Joint Biological Agent Identification & Diagnostic (JBAIDS)
  - Next Generation Diagnostic System (NGDS)
- **Medical Identification & Treatment Systems (MITS)**
  - Advanced Anticonvulsant System (AAS)
  - Bioscavenger
  - Centrally Acting Nerve Agent Treatment System (CANATS)
  - Improved Nerve Agent Treatment System (INATS)
  - Inhalation Atropine (IA)
  - Medical Radiation Countermeasures (MRADC)

Medical Capabilities Delivered to the Warfighter

Partner Inputs:

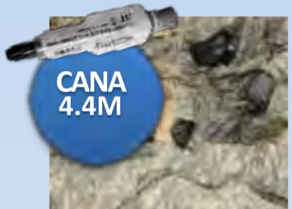
- ✓ 8 – Capability Transition Agreements (CTAs)
- ✓ 8 – Technology Transition Agreements (TTAs)
- ✓ 73 – Assays for Pre-Emergency Use Authorization (EUAs)
- ✓ 8 – Relevant Congressional Special Interest Projects (CSIs)



CBMS Expertise:

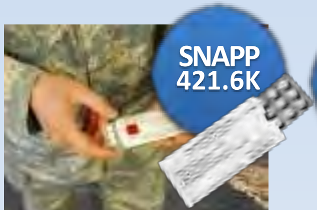
- ✓ 14 – Investigational New Drugs (INDs)
- ✓ 13 – Phase 1 Clinical Trials
- ✓ 8 – Phase 2 Clinical Trials
- ✓ 1 – Phase 3 Clinical Trials
- ✓ 3 – Phase 4 Clinical Trials
- ✓ **8 – Food & Drug Administration (FDA) Approvals**
  - ✓ 1 – New Drug Application (NDA)
  - ✓ 1 – Biological License Application (BLA)
  - ✓ 6 – 510(k)s

Results in Fielded Products:



✓Convulsant Antidote for Nerve Agents (CANA)

✓Antidote Treatment Nerve Agent Autoinjector (ATNAA)



✓Soman Nerve Agent Pretreatment Pyridostigmine (SNAPP)

✓Critical Reagents Program (CRP) Assay Kits: Electrochemiluminescence

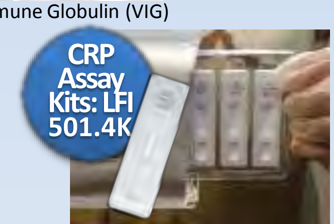
✓Joint Biological Agent Identification Diagnostic System (JBAIDS)

✓Joint Biological Agent Identification Diagnostic System (JBAIDS)

✓Smallpox Vaccine (SPX)

✓Vaccinia Immune Globulin (VIG)

✓Anthrax Vaccine Adsorbed (AVA)



✓Critical Reagents Program (CRP) Assay Kits: Lateral Flow Immunoassays (LFI)

✓Critical Reagents Program (CRP) Assay Kits: Polymerase-Chain Reaction (PCR)

Take Aways

- **CBMS protects the Warfighter by developing and delivering FDA licensed CBRN medical countermeasures**
- **Focus on shortening the requirement to fielding timeline**
  - Partnering with international and other government agencies
  - Using DoD and industry best practices
    - Seamless transition from Science &Technology to Advanced Development
  - Total Life Cycle management

- **Successes from FY2002 to date**
  - 8 Food & Drug Administration (FDA) Approvals
  - 14 Investigational New Drugs (INDs)
  - 1 Emergency Use Authorization (EUA)
  - 73 Pre-Positioned EUAs
- **12 FDA Approvals in the next 5 Years**

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Guardian Overview
Survivability Conference
17-18 May 2011

VISION

- Be the Joint Guardian: Always present, never seen. A joint enabler preparing for the worst and poised to save lives and act decisively when the "unthinkable" occurs.

MISSION

- Provide integrated capability to vigilantly protect our homeland, deployed forces and coalition partners, to enable rapid response, mission execution and restore our way of life.

IMPERATIVES

- CBRN focused, All Hazards capable to Prevent, Protect, Respond and Recover.
- Plan, Equip and Train to support the Warfighter’s requirements to conduct Elimination, Interdiction, Passive Defense and Consequence Management.

RESILIENCE IS A DETERRENCE

Joint Product Manager, Chemical, Biological, Radiological and Nuclear (CBRN) Installation Protection Program

Provide Joint CBRN:

- Detection
- Identification
- Protection
- Response
- Information Management

Joint Product Manager, Consequence Management

Support Department of Defense Weapons of Mass Destruction (WMD) Response Units Providing:

- Advanced Analytics
- Information Management
- Communications
- Commercial –off-the-Shelf Life Cycle Management
- Protection
- Detection/ID
- Survey/Monitoring

Joint Product Manager, Joint Operations Support (CBRNE)

Unique single Integrating PM for 20th Support Command, providing:

- CBRN
- Explosive Ordnance Disposal
- National Technical
- Nuclear Forensics
- Joint Task Force - Elimination

Product Manager, Force Protection Systems

Provide the Army Physical Security Force protection capability:

- Automated Installation Entry
- Anti-intrusion
- Explosive Detection
- Tactical Force Protection
- Integrated Force Protection Suites

Product Director, Interim Integrated Base Defense:

Execute the Joint Capability Technology Demonstration to field

- Integrated and interoperable physical/ Force Protection/CBRN protection and response capability

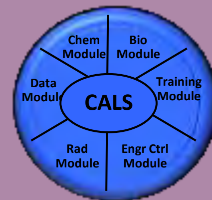
Guardian Portfolio

PM IPP / EMP2

Common Operating Picture

Emergency E911

Mass Notification System



CALS

Mobile Labs

PM CM

COTS Life Cycle Mgt Program

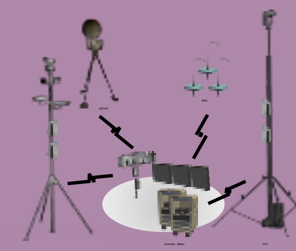
PM FPS

Integrated Commercial Intrusion Detection System (ICIDS)

Automated Installation Entry (AIE)

Non-Intrusive Inspection Systems (NII)

Mobile Detection Assessment Response System (MDARS)



Force Protection Suite (FP Suite)

Battlefield Anti-Intrusion System (BAIS)

Lighting Kit, Motion Detector (LKMD)

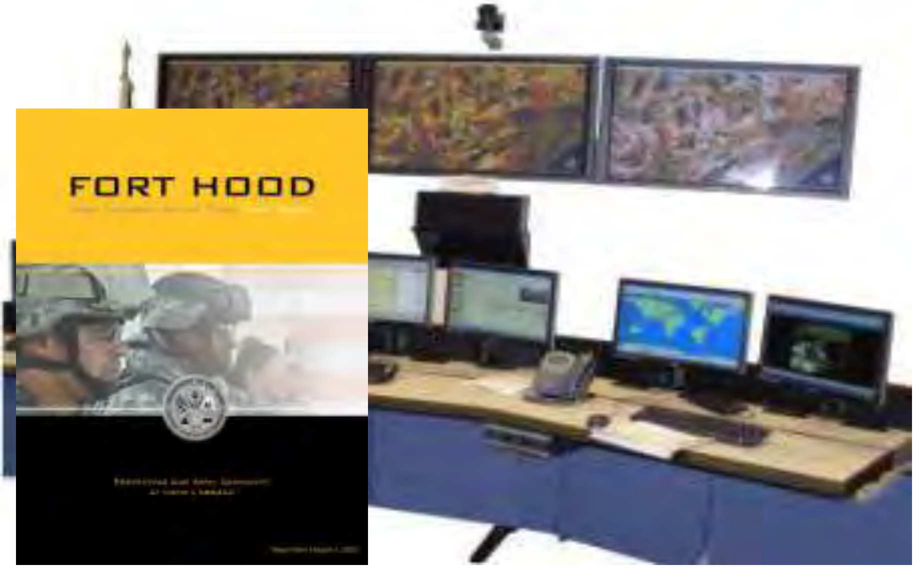
Rapid Deployment Integrated Surveillance System (RDISS)

PM JOSC

RAD / NUC

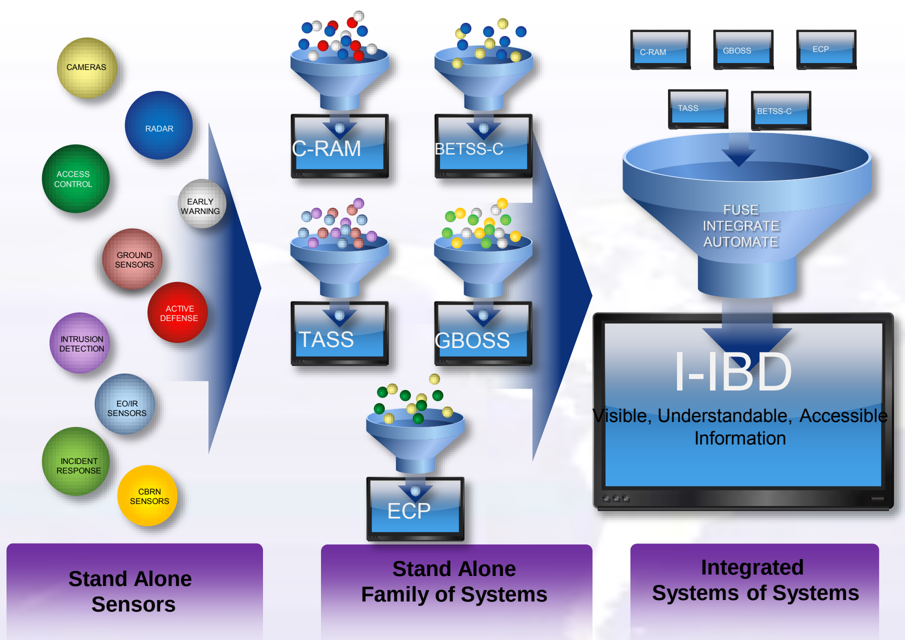
EOD

Emerging Programs



Emergency Mgt Protection Program (EMP2)

- Common Operating Picture (COP) capability for installation Emergency Operation Centers
- Mass Warning and Notification (MWNS) to notify all installation personnel within 10 minutes of incident verification
- Enhanced 911 (E911) to notify dispatcher of caller's location and to broadcast emergency notifications out to designated locations



Joint Integrated Base Defense Vision

- Nested within the Integrated Unit Base Installation Protection (IUBIP) Framework
- Establishes an enterprise approach to support common capabilities across the entire operational spectrum (Fixed, Simi-fixed, Expeditionary sites)
- Fusion, Integration, Automation

Future Chemical/ Biological Ensemble Ground Soldier System (FCBE-GSS) Technology Demonstration

2011 CBRN Survivability Conference

Andra Kirsteins
FCBE-GSS Technology Manager
Natick Soldier Research, Development & Engineering Center, Natick, MA

17 May 2011

FCBE-GSS Demo Presentation Overview

- ❑ Background & Objectives
- ❑ System(s) overviews
- ❑ Technical & User Demonstration
- ❑ Results Overview
- ❑ Summary

FCBE-GSS Background

- **Collaborative effort between:**
  - **DTRA JSTO-CBD** -Defense Threat Reduction Agency Joint Science & Technology Office Chemical & Biological Defense
  - **NSRDEC**-Natick Soldier Research Development and Engineering Center
  - **PEO-Soldier**-Program Executive Office Soldier
  - **JPEO-CBD**-Joint Program Executive Office for Chemical & Biological Defense (JPM-P , JPM-IS)
- **MOA signed 25 Mar 08**
- **Technology Transition Agreement** in place with Joint Project Managers for Protection (JPM-P), and Information Systems (JPM-IS) and Program Executive Office- Soldier (PEO-Soldier)
- **Multi-agency partnership** (includes ECBC, ARIEM, ATC, AEC, SPAWAR-Pacific, industry)

Systems Integration

Demonstrate integration of CB individual protection technologies into a " Warfighter System" using GSS (Nett Warrior) as the demonstration platform

***Integrate* CB Protection into the helmet**

- Leverage technologies from JSTO-CBD funded programs; Heads-up ATO (NSRDEC) and industry

***Integrate* CB protection into "duty uniform like" ensemble:**

- Achieve equivalent thermal performance to the Flame Resistant Combat Uniform (FR-ACU) and determine best achievable CB performance *(Identify Trade-offs)*
- Integrate materials from industry and JSTO-CBD S&T Programs (Integrated Protective Fabric System)

***Integrate* CB sensors and warning and reporting system with the Future GSS Network (Nett Warrior)**

- Improve Situational Awareness

***Integrates* and compatible with Combat Gear**

- Load carriage; body armor; communications; electronic equipment; future Nett Warrior network

Different Needs – Time Driven

Immediate Need

Quick donning capability
Enough protection to exfil from threat

Notional Scenario:
Infantry unit encounters a Chemical IED

Short Duration PRIMARY FOCUS OF TECH DEMO

Quick donning capability
Long duration protection

Notional Scenario:
House clearing operation encounters a clandestine chemical lab

Long Duration

Notional Scenario:
Chemical reconnaissance team gathers samples

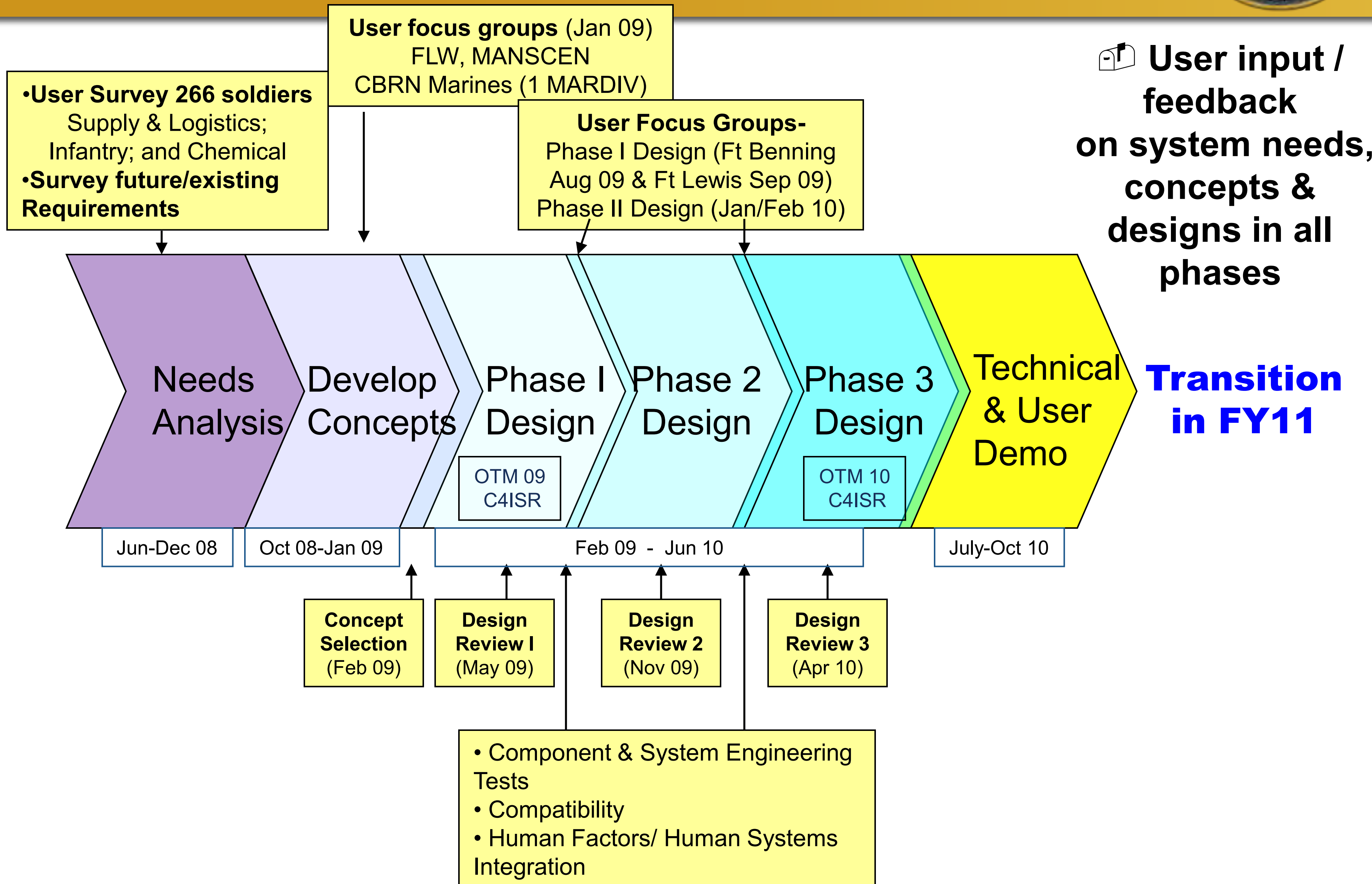
Notional Scenario:
Deliberate Decontamination of personnel or equipment

Time, weight, size are not priority issues
Enough protection to exfil from threat

Time, weight, size are not priority issues
Long duration protection

Deliberate Need

Systems Engineering Process & Timeline



FCBE-GSS Demo Concepts

Government Led Concepts

4 Ensemble Designs	2 CB Head-Gear Integrated Designs	CB & GSS Sensor & Network Integration
• Industry materials (CBCU & CBUG) • IPFS Materials (CBCU-IPFS) • NSRDEC laminate (E-FRACU over CBUG) • Industry boots & gloves	• CB RAM (low profile & duration) • CB PRISM	• JCAD • JOAC • JWARN and GSS

Industry

Industry Materials	4 Ensembles Requisitioned	Integrated Ensemble Concept Design	CB Integrated head-gear Solution
• Request for Information • Approximately 41 materials evaluated • Materials used in gov't concepts	• Manufacturer off-the-shelf design concepts	• Contract awarded to develop CB Integrated Combat Uniform Concept Ensemble that is optimized for thermal performance	• Contract awarded to explore ground variant concept of the MACH. • Focuses on exploring split mask concept for CB integrated head-gear

Chemical/Biological Combat Uniform (CBCU)

Design

- Low thermal burden CB protective combat uniform
- Multiple venting strategies
- Tortuous path waist interface
- Cowl neck integration design
- Worn with the CB PRISM Head Gear

Materials

- Torso: 10.6 oz/sqyd Activated Carbon Stretch material
- Sleeve/Trouser: Woven, nylon/cotton outer-shell laminated to activated carbon layer- 10.3 oz/sqyd

Integrated Protective Fabric System (IPFS)

Design

- Low thermal burden CB Combat Uniform
- Multiple venting strategies
- Cowl Neck Integration Design

Materials

- Integrates Materials from IPFS S&T Program (DTRA/NSRDEC)
  - CWA Protection (barrier, sorptive and reactive material technologies)
  - Top surface antimicrobial treatments (kills spores, bacteria, fungi, *viruses*)
  - Integrated aerosol filter material
- Torso: Tri-Laminate Stretch Material (Newsorb)
- Sleeve/Trouser:
  - Shell- CleanShell Finished Para-aramid textile
  - Inner Layer-Thin membrane (PVAM) &activated carbon laminate material

Chemical/Biological Protective Integrated System Mask (CB PRISM)

Design

- Integrated Head Gear System Leveraging a HeadsUp-ATO helmet design
- Don mask without removing helmet
- Full-time filter – No hot swap capability
- Twin-filter design integrated into the helmet liner
- Split axial flow filter design, to maximize surface area.

Materials

- Filter :Impregnated, activated carbon in a flexible webbing and electret particulate media
- Activated Carbon Stretch material used in cheek

Chemical/Biological Undergarment (CBUG)

Design

- Low thermal burden undergarment design
- Worn under the duty uniform
- Worn with the CB RAM and CB balaclava
- Concealable protective system
- Deliberate donning scenarios

Materials

- 10.6 oz/sq2 Activated Carbon Stretch material

Enhanced Flame Resistant Army Combat Uniform (eFRACU)

Design

- FRACU design with closures modified for CB protection
- Worn over the CBUG
- Layered System for additional CB protection
- Worn with the CB RAM and CB balaclava

Materials

- Outer Layer: Flame Retardant Nonwoven Material (60/40 FR Rayon, Para-aramid)
- Inner Layer: 6.0 oz/sqyd carbon stretch material
- Composite weight: 9.2 oz/sqyd

Chemical/Biological Rail Attaching Mask (CB RAM)

Design

- Integrated face piece system with HeadsUp-ATO helmet design
- Don mask without removing helmet via helmet rails
- Escape mask or riot control type use
- Filters embedded in mask result in low profile
- Split axial flow filter design with lower surface area than PRISM

Materials

- Filter :Impregnated, activated carbon in a flexible webbing and electret particulate

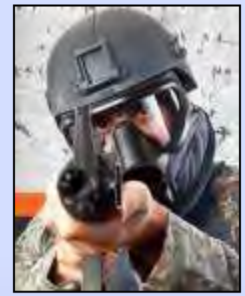
Approach for Technical and User Demonstration

Baseline ensembles/ components include in all testing

Demonstrate Objectives

Technical

- System



- Component

User

Operationally Relevant Environment

- Individual and Collective Tasks
- Full systems, including combat gear
- 13 Infantry and Chemical MOS Soldier participants

PAO# U11-260

User Demonstration Main Events

Individual Task Performance

- Road March
- Portability Course
- MOUT
- Grenade Throw
- Automatic Weapon Firing (blanks & simulator)
- Cognitive Activities (Pre and Post-exertion)
- Timed Donning
- Range of Motion
- Vehicle Operations

User Demo Excursions

Scenarios provide a variety of doctrinally sound venues in which participant soldiers evaluate the performance of technologies and capabilities in an operationally relevant environment

- **Conduct Presence Patrol** (performed by Rifle Squad/ Fire Team based on threat and area
- **Conduct a Cordon and Search -** conducted at Company level, based on threat and area.
- **Sensitive Site Assessment (SSA) -** Performed by SSA Team and supported by Combat Units to provide area isolation and security

FCBE-GSS Ensembles Thermal & Chem Performance

US ARMY RDECOM

% Improvement in Warfighter Predicted Endurance Time (Thermal) compared to CB Baseline Ensemble

Heat Strain Decision Aid Modeling Results

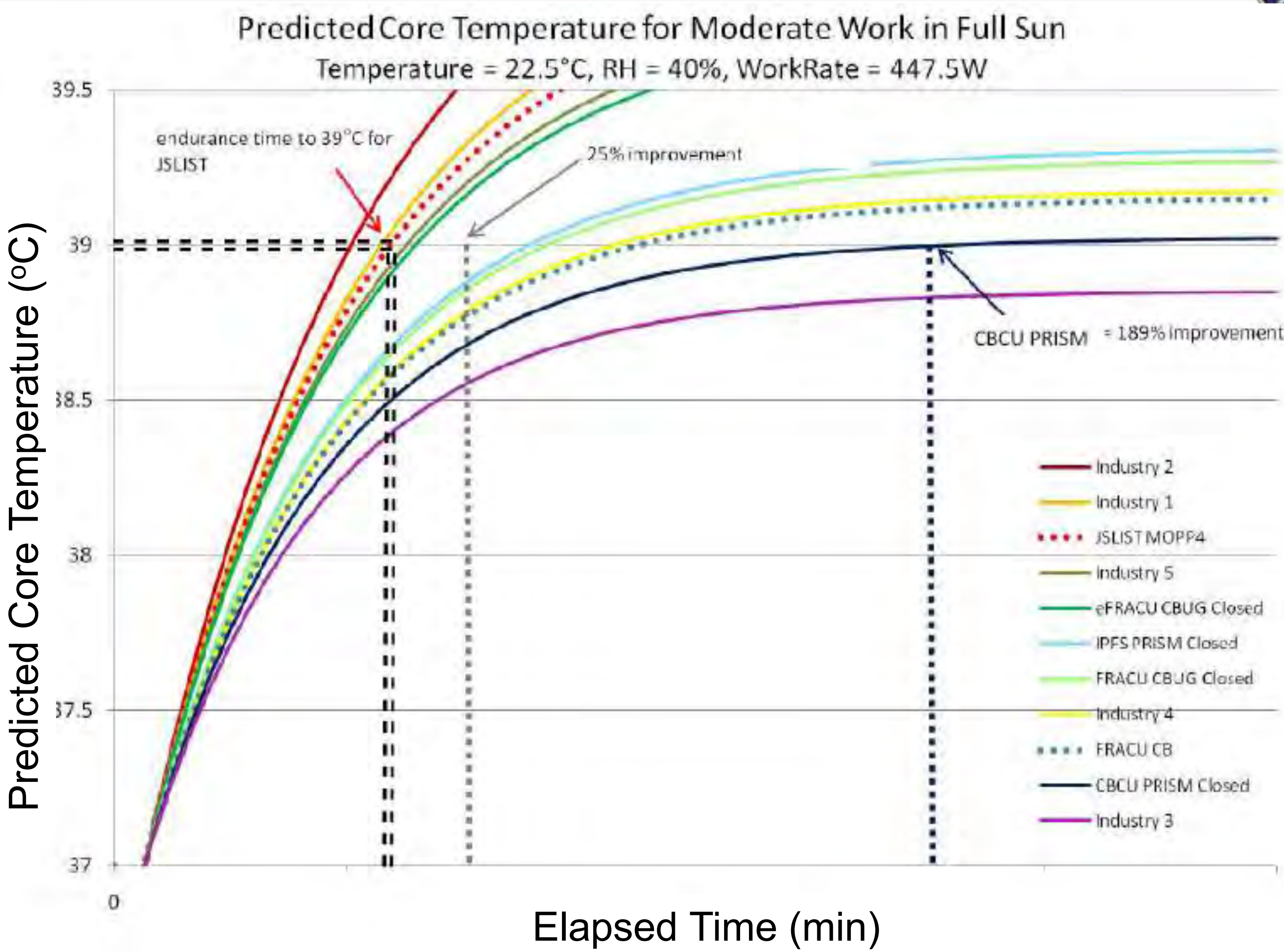
USARIEM

All Testing Performed with Full Combat Load

Air temp (C)	22.5	30	40	User Demo Thermal Comfort Data (% increase)	Protection Compared to CB Baseline
RH %	40	25	12.5		
Work rate (W)	447.5	435	435		
	full solar	full solar	full solar		
Industry #2	-15	-17	-20		Reduced*
Industry #4	-4	-9	-14		Reduced*
JSLIST MOPP4	--	--	--	--	--
Industry #4	3	-2	-5		Reduced*
Industry #5	6	2	-4		N/A
eFRACU CBUG	8	5	0	8	Same
IPFS PRISM	49	27	13	38	Reduced
FRACU CBUG	54	34	21	24	Same
FRACU CB	86	48	29		--
CBCU PRISM	189	70	38	35	Reduced
Industry #3	317	98	36		Reduced*

* Industry ensemble CB Protection Data limited to AST and MIST limited replicates

FCBE-GSS Ensembles Thermal Performance



CB Integrated Head-Gear General Findings

CB PRISM Integrated Filter Concept

- Advantages:
    - Filter removed from front of face
    - High surface area available for filtration and lower breathing resistance
    - Integration- mask, head gear and components
    - Improved Mask/helmet stabilization
    - Don mask without removing helmet
    - Cowl neck, to integrate helmet/mask and garment, provides for better thermal comfort especially in non-CB mode where it is rolled up in a stowed configuration. <u>Overall good user acceptability of cowl in terms of comfort</u>
- Disadvantages
    - Potential/unknown impacts to helmet performance
    - Filters cannot be changed during missions
    - Larger helmet surface area introduces interference issues
    - Filter ducting system may introduce leakages
    - Sound localization & weapons compatibility reduced

CB Integrated Head-Gear General Findings

CB RAM- Helmet attached filter concept for lower challenge & duration scenarios

Advantages

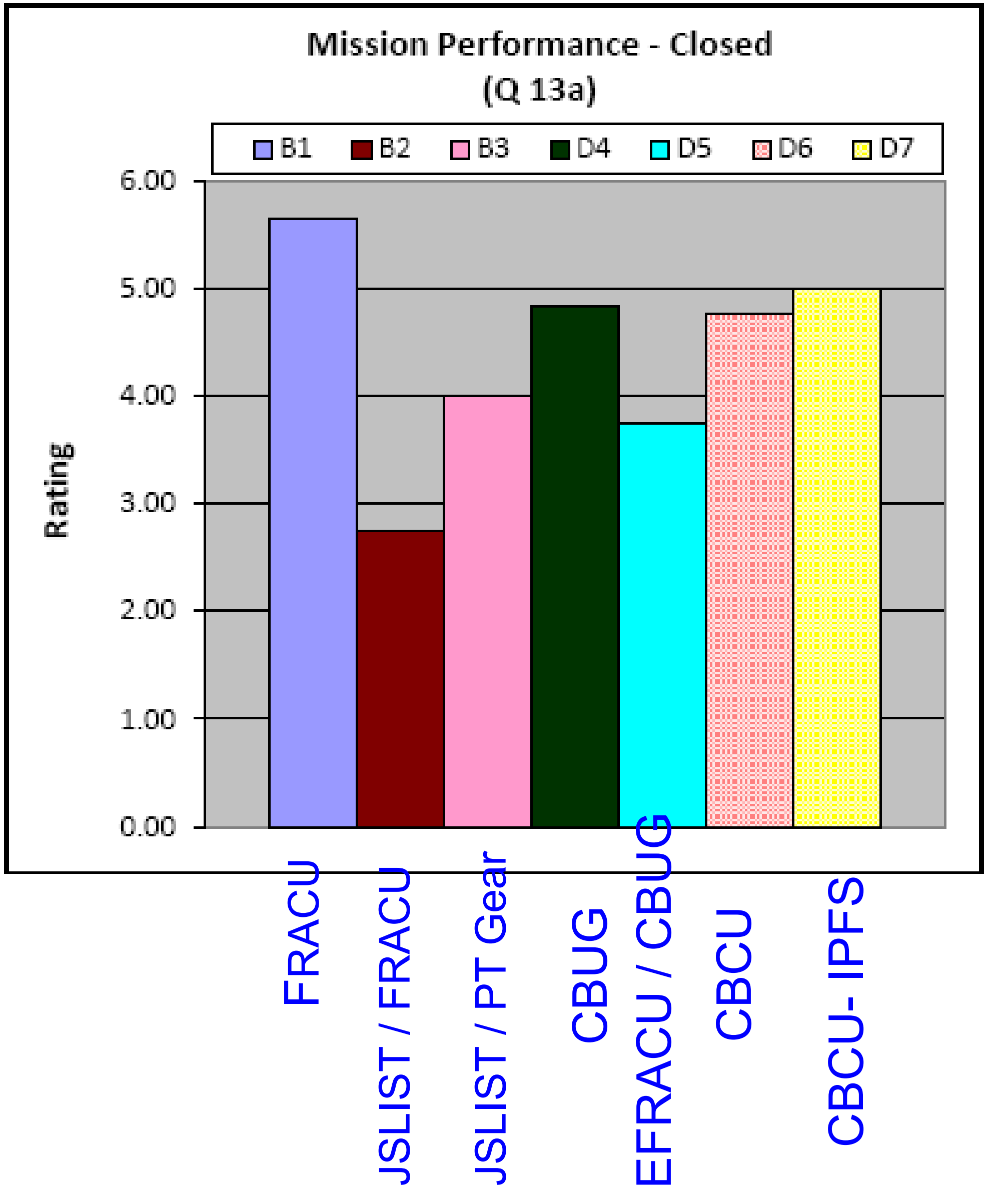
- Lower profile minimizes interface with weapons and sighting systems
- Reduced bulk - Lower weight
- Integration- mask, head gear and components
- Improved Mask/helmet stabilization
- Don mask without removing helmet (if balaclava already worn)
- CB RAM concept favored by users
- MIST data suggests balaclava offers good protection

Disadvantages

- Filter will require to grow from CB RAM design to even meet lower challenge level and duration scenarios. Significant improvements to sorbent media technologies required.
- Embedded filter not replaceable
- Requires wearing balaclava under helmet
- Balaclava requires helmet removal to don mask and reduces thermal comfort

User Demo Findings- Example

Increasing Performance



Soldiers rating of:

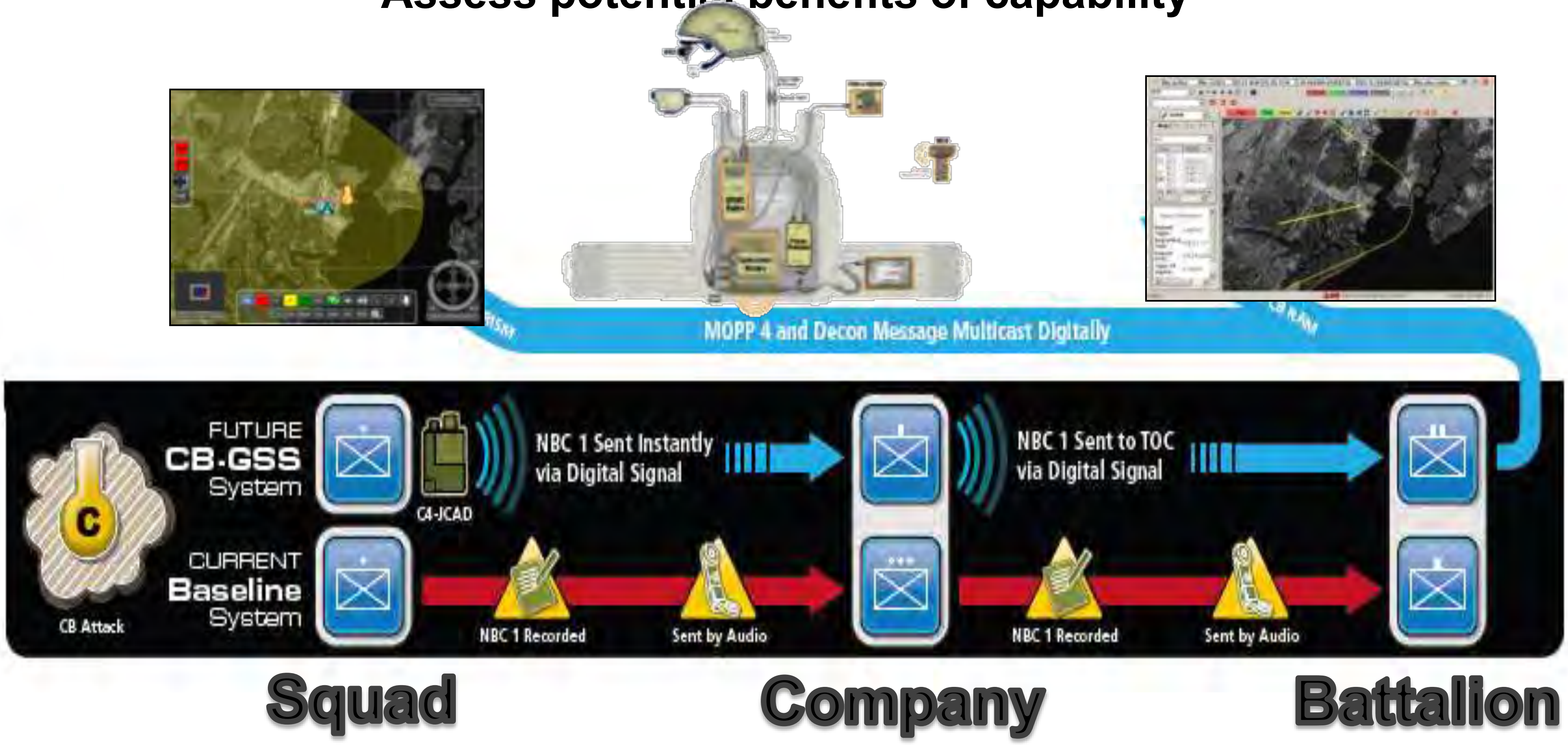
Overall Ability (of Soldiers) to accomplish Mission Critical tasks and movements effectively

CB Sensor & Network Integration

<u>Increase Situational Awareness for the Warfighter</u>

- Demonstrate ability to integrate sensors and networks (JWARN/Future Nett Warrior)

- Assess potential benefits of capability



CB Sensor & Network Integration

- **Demonstrated sensor and network integration with the S&T version of the Nett Warrior Platform (Soldier Domain Technologies (SDT))**
  - Joint Chemical Agent Detector (JCAD) integrated onto the Ground Soldier platform via Common CBRN Sensor Interface (CCSI) protocol and using the JCID on a Chip Software version
  - SDT and JWARN Networks integrated
  - Automated sensor information sent as NBC messages to and from the Soldier
  - Real time CBRN Situational Awareness information displayed on the Soldier Map

- **Future Goal: integrate wearable sensors on/in the uniform**

** JCAD is not designed to be a wearable sensor but was used to demonstrate sensor & network integration and assess improvements to situational awareness*

CB Network Preliminary Data

Soldier Display during MOUT Operations

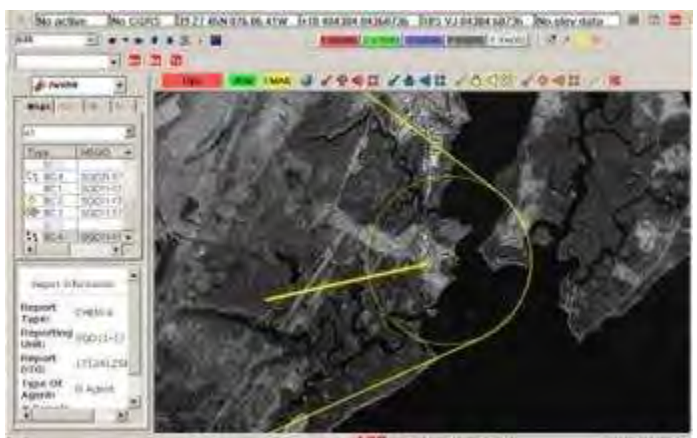
Increased CBRN Situational Awareness for the Warfighter

Soldier Display

Soldier Receives NBC Warning Message

Soldier Receives Initial Hazard Prediction

JWARN used to calculate the initial hazard prediction where the information is sent to the Soldier Display



Information flow between JWARN and the on-Soldier Display with relevant CBRN Information.

Summary

- ❑ **Integration of CB protection into "duty-uniform like" concepts feasible**
- ❑ **Reductions in thermal burden achievable through optimization of designs and materials**
  - Use of strategically placed vents aid in reducing thermal burden of protective garments in reduced protective posture but necessitates improved closure designs
- ❑ **Total combat load reductions demonstrated between 4.4-8 lbs (compared to current baseline CB ensemble)**
- ❑ **Integration of helmet and mask feasible**
- ❑ **Conformal filter technology allows for novel approaches to CB integrated head-gear design**
- ❑ **Improvements to situation awareness possible through CBRN sensor and warning integration with on-Soldier communications-** *Machine to Machine communications feasible and could reduce NBC message transmission times*
- ❑ **Formal transition to JPM-P for UIPE Increment I, JPM-IS and PEO Soldier planned for 3Q 2011**

Questions?

DoD Nuclear Survivability Program

Dr. John Kuspa

May 20, 2011

History of DoD Nuclear Survivability

- DoD nuclear survivability is firmly rooted in the Cold War
  - Strategy was to defeat a peer adversary
  - To counter the Soviet threat, DoD maintained very strict survivability standards ensured with rigorous testing and maintenance

- Collapse of Soviet Union significantly altered role/need for nuclear survivability
  - With no perceived threat, there was little incentive to harden systems; <u>but plenty of savings</u>

History of DoD Nuclear Survivability (cont)

- **The relaxing of DoD survivability standards: 1991-1996**
  - DoDD 4254 "Acquisition of Nuclear Survivable Systems" mandated that:

    "DoD components shall ensure that the nuclear survivability of non-major systems is evaluated for possible operational impacts on critical functions supporting vital missions."

    - Directive also spelled our responsibilities for oversight and management of nuclear survivability
      - Each DoD Component developing or procuring a system was responsible for verifying nuclear survivability/hardness and to develop hardness maintenance/sustainability over each system"s lifetime
  - In 1991, the DoD 5000 series was first published to address the post-Cold War environment
    - Nuclear survivability was now to be addressed in a "cost-effective manner"
    - Specific responsibilities for nuclear survivability oversight and management were no longer identified

History of DoD Nuclear Survivability (cont)

- **The rise of COTS: 1996-2002**
  - <u>All</u> references to <u>nuclear</u> survivability were deleted in the 1996 5000-series revision
    - *"Unless waived by the Milestone Decision Authority, mission critical systems shall be survivable to the threat levels anticipated in their operational environment."*
    - With survivability no longer emphasized, U.S.-Russian détente and the push for rapid acquisition through COTS, survivability was quickly dumped by program managers, the Services, etc.

  - The 2000 revisions did not address how to acquire nuclear survivable systems nor did they assign OSD responsibility for oversight

History of DoD Nuclear Survivability (cont)

- **Alarm bells: EMP Commission 2001**
  - By 2000, nuclear survivability became a casualty of cost-cutting, COTS usage, and the “Cold War” perception
    - This was aggravated by the “capabilities” based, spiral development acquisition strategy
  - Congressional hearings and inquiries on the matter were met with unsatisfactory responses by DoD
  - 2001 Defense Authorization Bill established an EMP Commission to assess the EMP threat to the United States, U.S. ability to recover, and recommend protection steps
    - Two iterations of Commission: final report released in 2009
  - Efforts of Commission shed light onto overall nuclear survivability decline within DoD and the vulnerability of our national infrastructure (lead issues for DHS, DOE, White House)

DoDI 3150.09 *CBRN Survivability Policy*

- My position created within NCB/Nuclear Matters office in 2006
  - Key goals to accomplish:
    - Re-introduce nuclear survivability as a key parameter into DoD Directives, Instructions, and Manuals
    - Assign responsibilities for CBRN Survivability
    - Re-establish acquisition processes for nuclear survivability; especially CBRN mission critical systems
    - Require annual survivability reports from the Services and MDA
    - Establish the CBRN Survivability Oversight Group Nuclear (CSOG-N) to oversee DoD CBRN survivability policy
  - DoDI 3150.09 was approved in 2008 to accomplish the above tasks

DoDI 3150.09's Scope

DoDI 3150.09

DoDI 3150.3 (1994)

Nuclear C3 & Nuclear Delivery Systems (must be survivable)

well beyond NUC threats

CBR

PERSONNEL

Major Combat Systems

Ships, Aircraft, Family of Combat Vehicles, Missiles, etc.

CBR

Other Systems & Equipment

Personnel Protection, C3, Conventional Comm Ctrs, Major HQs, MHE

Supporting Infrastructure

Ports, Airfields, Bases, transportation nodes, electric power assets, …

MISSION CRITICAL EQUIPMENT

Mission-Critical Equipment Process

Services & MDA identify/report status of CBR & Nuclear Mission Critical Equip. and Infrastructure

Annual report to ATSD(NCB) & CJCS on system status changes each year

Oversight via CSOG-N

JROC
JCIDS

Requirements developments process considers CBR & Nuc surv. requirements

Legacy systems are assessed for survivability, and corrections made as mission and funds allow

Acquisition processes review compliance with CBR & Nuc survivability requirements

DAB

CBRN survivability demonstrated through combination of tests, evaluations, assessment, studies, and analyses

Systems fielded to CBR & Nuc surv. standards

Illustrative Mission Critical Report Overview

ORG	Total CBRN MSN Critical	Legacy & New Systems	Total Nuc & EMP	Nuclear Hard Requirement	EMP Survivability Requirement	HM/HS Program
Army	127	72/55	104	69	98	13
Navy	173	160/13	171	10	173	10
Air Force	199	191/8	47	40	47	24
MDA	67	62/5	65	14	20	24
Total	**566**	**485/81**	**387**	**133**	**338**	**71**

Annual Mission Critical Report

(format revised for 2010)

		Mission Critical Environment						Acquisition Management Info							OPTIONAL	
Report Item #	*Mission Critical System Name (regardless of threat environment)*	*"CBRN Mission Critical"*	*Chemical*	*Biological*	*Radiological*	*Nuclear*	*EMP*	*ACAT*	*Last Milestone / Program Review*	*Material Sol'n Analysis*	*Technology Development*	*Engineering & Manufacturing*	*Production and Deployment*	*Operations & Support*	*Rad Hard Microelectronics*	*HPM/RF Energy Mitigation?*
a	b	c	d	e	f	g	h	i1	i2	j	k	l	m	n	o1	o2
1	Widget #1	Y	N	N	N	N	N	II	02/07	N	Y	Y	Y	N	N	N

	Survivability Status & Funding to Identify and Mitigate Vulnerabilities																			
	Chemical		*Biological*		*Radiological*		*CBR HM/HS*		*Nuclear Blast*		*Nuclear Thermal*		*Nuclear Prompt Radiological*		*EMP*		*Pumped Belts / Disturbed*		*Nuclear HM/HS*	
Report Item #	*Compliance*	*Funding*	*Compliance*	*Funding*	*Compliance*	*Funding*	*Compliance*	*Funding*	*Compliance*	*Funding*	*Compliance*	*Funding*	*Compliance*	*Funding*	*Compliance*	*Funding*	*Compliance*	*Funding*	*Compliance*	*Funding*
a	q1	q2	r1	r2	s1	s2	t1	t2	u1	u2	v1	v2	w1	w2	x1	x2	y1	y2	z1	z2
1	P	P	NA	NA	P	[illegible]	P	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	P	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]

a	**Documented Survivability Requirements (Priority of Program)**	*What is the survivability requirement (in ROC, ICD, CDD, CPD, RDD, JUON, JROC Interest, KSA, KPP) and CONOPs environment? (OPTIONAL: Identify priority or tier-level, as appropriate, used by Service or MDA management.*
b	**Information on Last Milestone / Program Review (column I)**	*Milestone / Program Review and applicable documentation (e.g., ADM, TDS, AS, Pgm Baseline, TEMP, ...)*
c	**Plan for achieving CBRN survivability**	*Text indicating the approach to achieving system survivability (e.g., through hardening, timely resupply, redundancy, mitigation techniques, or a combination)*
d	**How compliance is determined**	*Explanatory text on how survivability status is validated (e.g., last test or evaluation, plans for next test, ...)*
e	**Follow-on system (planned or under consideration)**	*Enter "Report Item #" for cross reference, and vice versa.*
f	**<u>At least for Nuclear Weapon Delivery Systems and Nuclear Command and Control Systems:</u> What critical mission-support equipment is related to this item?**	*"None." Or report here or as a separate item any (1) sets, kits, & outfits; (2) material handling equipment; (3) electronic or other keying or enabling devices; (4) etc. that are essential for mission accomplishment and their CBRN survivability status, as appropriate.*
g	**COCOM support for, or requirements for, this item to be CBR, or Nuclear, or EMP survivable.**	*Which COCOMs have submitted requirements or expressions of need (JUONS/ONS/UNS, IPLs, CDD, etc.) apply to this item's CBRN survivability?*
h	**Issues or concerns to note**	*Explanatory text on matters the Department or Agency wishes to highlight (e.g., inadequate test facilities or infrastructure, ...)*

Successes and Drivers since 3150.09 (2008)

- **CSOG-N Principals**
  - Flag-level oversight of processes
- **Testing of aircraft (E-4B & B-2)**
  - **<u>Aug 2010</u>**: Verified E-4B survivability to MIL-STD 2169B
  - Used MIL-STD 3023 (DRAFT) as test approach & protocol
  - E-4B Aircraft passed with flying colors
  - **<u>Mar-Apr 2011</u>**: B-2 bomber just completed initial testing: test results due soon.

- **Congressional interest**
  - Testimony of senior leadership on HEMP
  - House EMP Caucus: Focus on infrastructure (EMP on electrical grid)
  - DoD reports on EMP -- 2009, 2011, 2013, 2015
  - GAO investigating CBRN survivability program & process

2011 Actions under the CSOG-N

- **3150.09 Revision**
  - Our office, in conjunction with NCB/CBD, is beginning a revision of the current DoDI
  - Items addressed in the revised instruction:
    - COCOM input/assessments of the MCRs
    - Specific language to generate renewed interest in nuclear effects within wargames & simulations
- **S&T Roadmap for Mission Assurance**
  - Infrastructure
  - DCIP
- **Resurrecting nuclear survivability standards (next slide)**

Focus Example: Resurrecting Standards

- **MIL-STDs were largely weakened or ignored**
  - Many nuclear survivability standards now provide only general guidance:
    - *"Compliance shall be verified by system, subsystem, and equipment-level tests, analyses, or a combination thereof."*
  - In 2007, USSTRATCOM requested DTRA develop an upgraded and extended HEMP survivability standard
    - Goal was to provide <u>quantifiable mission assurance</u>
  - MIL-STD 3023 "HEMP Protection for Military Aircraft" provides a set core of requirements/metrics for hardening and testing aircraft to a fixed design margin
    - Contention on fixed vs. tailorable design margins

- <u>Other standards on the way: maritime and space</u>

"Technology Strategy for Mission Assurance in Electromagnetic Pulse Environments"

- ODDRE (now ASD(R&E) asked NM to lead the development of an „S&T Roadmap for EMP Hardening".
- Vision: Provide a mean for promulgating technology solutions across the DoD and the Interagency to enable a more coherent and focused portfolio of EMP mission assurance programs.
- What: Strategic-level document that:
  - provides overall guidance to the Office of the Secretary of Defense (OSD), the Services, Combatant Commands and technology managers throughout the DoD
  - will inform the Department of Energy, Department of Homeland Security and the Office of Science and Technology Policy.
  - will inform decision makers about the vulnerability of our systems and provide strategies for reducing those vulnerabilities
  - identifies areas of current and future science and technology that address EMP survivability needs for the next 15 years.
- Goal: Publish by 1 August 2011 -- ***Still time for your ideas!***

Points of Contact on Nuclear Survivability in ODASD(Nuclear Matters)

- Dr. John Kuspa, Chief, Nuc. Survivability, ATL-NCB-NM, 703-693-9409; John.Kuspa@osd.(smil.)mil, Pentagon 3B884
- Dr. Greg Simonson, Special Asst to DASD(NM) from LLNL, 703-693-4291; Greg.Simonson@osd.(smil.)mil
- Dr. Lisa Andivahis, contract support to ODASD(NM), Lisa.Andivahis.CTR@osd.(smil.)mil; 703-697-3097
- Mr. Zach Becker, contract support to ODASD(NM), Zach.Becker.CTR@osd.(smil.)mil; 703-614-9098

Questions?

Joint Chemical, Biological, Radiological, and Nuclear Defense
PROGRAM ANALYSIS AND INTEGRATION OFFICE

CBRN DEFENSE

CBRN Survivability

May 2011

Helen Mearns
Research, Development, and Acquisition Manager
410-436-5743

Agenda

- Background
  - Why CBRN Survivability?
- DoD Policy and Procedures
  - What is CBRN Survivability?
- Oversight
  - We are here to help

Background

The Government Accountability Office (GAO) issued report GAO-03-325C, *Chemical and Biological Defense: Sustained Leadership Attention Needed to Resolve Operational and System Survivability Concerns*, May 2003

- found each Service had its own approach to CB Contamination Survivability
- recommended the DoD develop a formalized, systematic, and enforceable approach for all of the Services
- and resulted in the…

Ronald W. Reagan National Defense Authorization Act for Fiscal Year 2005

- SEC. 1053. Survivability of Critical Systems Exposed to Chemical or Biological Contamination

Background

GAO issued report GAO-06-592, *Chemical and Biological Defense: DoD Needs Consistent Policies and Clear Processes to Address the Survivability of Weapon Systems Against Chemical and Biological Threats*, April 2006

DoD Directive S-5210.81, *United States Nuclear Weapons Command and Control, Safety, and Security (U)*, August 8, 2005

National Security and Homeland Security Presidential Directive (NSPD 51, HSPD 20), *National Continuity Policy*, May 9, 2007

- The Secretary of Defense, in coordination with the Secretary of Homeland Security, shall provide secure, integrated, Continuity of Government communications to the President, the Vice President, and, at a minimum, Category I executive departments and agencies

CBRN DEFENSE

DoD Policy and Procedures

DoD Instruction 3150.09, *The CBRN Survivability Policy, September 17, 2008 incorporating Change 1, August 17, 2009*

- It is DoD policy that:
  - CBRN mission-critical systems be CBRN survivable IAW their capabilities documents' survivability requirements
- CBRN Survivability
  - The capability of a system to avoid, withstand, or operate during and/or after exposure to a CBR environment (and relevant decontamination) or a nuclear environment, without losing the ability to accomplish the assigned mission. CBRN survivability is divided into CBR survivability, which is concerned with CBR contamination including fallout, and nuclear survivability, which covers initial nuclear weapons effects, including blast, EMP and other initial radiation and shockwave effects.

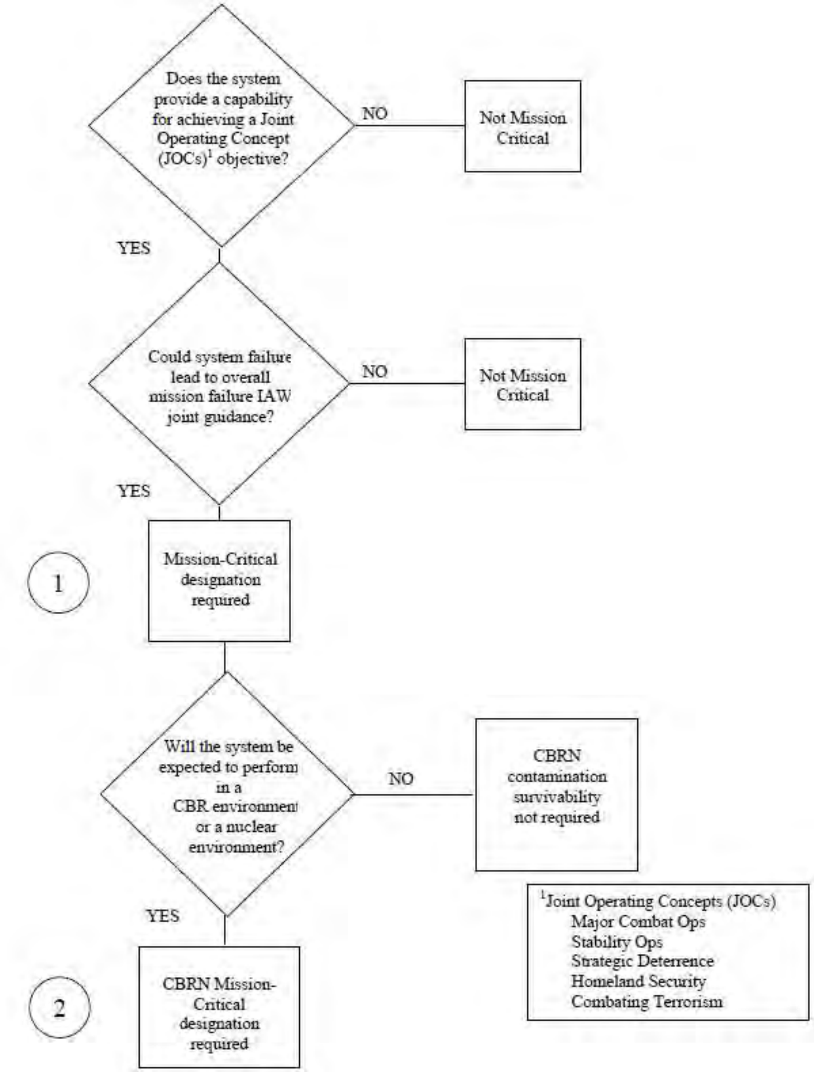
DoD Policy and Procedures

Mission-Critical System*

- A system whose operational effectiveness and operational suitability are essential to successful mission completion or to aggregate residual combat capability. If this system fails, the mission likely will not be completed. Such a system can be an auxiliary or supporting system, as well as a primary mission system

CBRN Mission-Critical

- That subset of mission-critical systems with operational concepts requiring employment and survivability in a CBR environment or a nuclear environment



*Original source DAU; codified in DoDI 3150.09

DoD Policy and Procedures

- CBRN Survivable Systems
  - All CBRN mission-critical systems under development are required to address CBRN survivability at each milestone
  - Legacy CBRN mission-critical systems undergoing capability document review are also required to address CBRN survivability
  - All other legacy CBRN mission-critical systems may be made CBRN survivable
  - NC2 CBRN mission-critical systems must be nuclear hardened and have a continuing HM/HS program

- CBR or N survivability may be accomplished by hardening, timely resupply, redundancy, mitigation techniques (including operational techniques), or a combination thereof

DoD Policy and Procedures

- CBR Contamination Survivability
  - The capability of a system to withstand CBR contaminated environments, decontaminants, and decontamination processes, without losing the ability to accomplish the assigned mission.
  - A CBR contaminated survivability system is hardened against chemical or biological agent(s) or radiological contamination and decontaminants. It can be decontaminated and is compatible with individual protective equipment.
  - The three elements of CBR contamination survivability are CBR hardness, CBR compatibility, and CBR decontaminability.

- Nuclear Survivability
  - The capability of a system to withstand exposure to a nuclear environment without suffering loss of ability to accomplish its designated mission throughout its life-cycle.

DoD Policy and Procedures

Military Departments are required to

- **Validate sponsor's designation of CBRN mission-critical systems in capabilities documents**
- Identify legacy CBRN mission-critical systems and develop and implement a plan to assess their survivability
- Ensure an HM/HS program is established and maintained
- Provide an annual report to OSD and JS
- **Establish CBRN survivability criteria for threshold and objective requirements IAW Service standards, standardization agreements, or CBRN Survivability Oversight Group standards**
- **Test and evaluate CBRN survivability**
- Ensure that survivability requirements are addressed in acquisition strategies, program baselines, and T&E master plans
- Ensure that doctrine and training to support the policy are reflected in force-on-force simulations
- Provide representation to the CBRN Survivability Oversight Group

CBRN DEFENSE

DoD Policy and Procedures

Chairman of the Joint Chiefs of Staff is required to

- Appoint a principal POC to coordinate the DoD CBRN Survivability Policy
- **Review CBRN mission-critical systems' capabilities documents** to ensure CBRN survivability is addressed
- Ensure that, for programs identified as "JROC interest," the JROC will **validate the system designation** as CBRN mission critical (and change it as necessary) and **validate the CBRN survivability requirements**
- Ensure multi-Service CBRN mission-critical systems have integrated CBRN survivability requirements
- **Provide guidance to MilDeps and COCOMs** in the identification of legacy CBRN mission-critical systems that should be CBRN survivable
- Ensure that joint doctrine and training support the DoD CBRN Survivability Policy in force-on-force simulations and wargames
- **Establish mandatory KPP for nuclear survivability**
- Review the CBRN survivability reports provided by the MilDeps
- Provide representation to the CBRN Survivability Oversight Group

DoD Policy and Procedures

DoD Instruction 3150.09, *The CBRN Survivability Policy*

Procedures – Sponsors

- Decide whether a new system is CBRN mission-critical
- Include the system's designation and justification in capabilities documents
- Include objective, quantitative, measurable, and testable system CBRN survivability performance attributes with threshold and objective requirements
- Submit capabilities documents for review to the "Gatekeeper" of the JCIDS process

DoD Policy and Procedures

DoD Instruction 3150.09, *The CBRN Survivability Policy*

Procedures – JROC

- JROC interest programs
  - Validate system designation (and may change the designation)
  - Validate CBRN survivability requirements
  - Validate CBRN survivability capabilities if identified as KPP
- If arbitration of a non-JROC interest program is required, FCB will adjudicate
- Service requirements authority will validate CBRN survivability requirements for non-JROC interest mission-critical systems

DoD Policy and Procedures

DoD Instruction 3150.09, *The CBRN Survivability Policy*

Procedures – Materiel Developers

- Design an acquisition strategy that satisfies CBRN survivability requirements while balancing cost, schedule, and performance
  - MDAs shall assess compliance at each milestone decision review based on the approved AS and APB
- Work with the T&E community to develop T&E master plans that realistically address the requirement to test and evaluate, model, or assess CBRN survivability requirements
- Ensure test data are provided to DTIC for inclusion in the CB material effects database

Oversight

ASD(NCB)/Hon. Weber

- Chairman of the CBRN Survivability Oversight Group (CSOG)

DATSD(Nuclear Matters)/Mr. Henry

- Chairman of the CSOG-NM
- CSOG-NM AO – Dr. John Kuspa (COMM: 703-693-9409, e-mail: John.Kuspa@osd.mil)

DATSD(Chemical and Biological Defense)/Dr. Parker

- Chairman of the CSOG-CBR
- CSOG-CBR AO – Ms. Helen Mearns (COMM: 410-436-5743, e-mail: helen.mearns@us.army.mil)

Open Discussion

Back Up

Ronald W. Reagan National Defense Authorization Act for Fiscal Year 2005 (excerpt)

SEC. 1053. Survivability of Critical Systems Exposed to Chemical or Biological Contamination

(a) Requirement for Implementation Plan – Not later than 120 days after the date of the enactment of this Act, the Secretary of Defense shall submit to the Committee on Armed Services of the Senate and the Committee on Armed Services of the House of Representatives a plan, for implementation by the Department of Defense, that sets forth a systematic approach for ensuring the survivability of defense critical systems upon contamination of any such system by chemical or biological agents

Back Up

Ronald W. Reagan National Defense Authorization Act for Fiscal Year 2005 (excerpt - continued)

SEC. 1053. Survivability of Critical Systems Exposed to Chemical or Biological Contamination

(b) Content – At a minimum, the plan under subsection (a) shall include the following:

(1) Policies for ensuring that the survivability of defense critical systems in the event of contamination by chemical or biological agents is adequately addressed throughout the Department of Defense

(2) A systematic process for identifying those systems which are defense critical systems

(3) Specific testing procedures to be used during the design and development of new defense critical systems

Back Up

Ronald W. Reagan National Defense Authorization Act for Fiscal Year 2005 (excerpt - continued)

SEC. 1053. Survivability of Critical Systems Exposed to Chemical or Biological Contamination

(b) Content – At a minimum, the plan under subsection (a) shall include the following:

(4) A centralized database that –

(A) contains comprehensive information on the effects of chemical and biological agents and decontaminants on materials used in defense critical systems; and

(B) is easily accessible to personnel who have duties to ensure the survivability of defense critical systems upon contamination of such systems by chemical and biological agents

Back Up

Ronald W. Reagan National Defense Authorization Act for Fiscal Year 2005 (excerpt - continued)

SEC. 1053. Survivability of Critical Systems Exposed to Chemical or Biological Contamination

(c) Defense Critical System Defined – In this section, the term 'defense critical system' means a Department of Defense system that, as determined by the Secretary of Defense, is vital to an essential defense mission

CBRN DEFENSE

Back Up

DoD Instruction 3150.09, *The CBRN Survivability Policy*

- Assigns responsibilities for the execution of the policy
- Establishes processes for ensuring the survivability of CBRN mission-critical systems
- Describes how CBRN mission-critical systems will be identified, reviewed, and considered
- Provide definitions of decontaminability, hardness, compatibility, and decontamination
- Aligns with the Defense Critical Infrastructure Program to identify mission-critical systems
- Requires MilDeps and the Missile Defense Agency to report annually
- Establishes the CBRN Survivability Oversight Group
- Applies to all CBRN mission-critical systems regardless of ACAT

CBRN DEFENSE

NAVY Survivability Roundtable
18 May 2011

OPNAV N867




ATFP/CBRND PROGRAMS

18 May 2011

Mike krzoska
CBRND
N867B1

NAVY Survivability
18 May 2011

NAVY MISSION CRITICAL LIST

- 2011 NAVY MCL TASKER assigned via TV4
- Focus will be on answering "unknowns" items
- Plan to conduct legacy systems mapping of DDG-51 Class Destroyers

NAVY CSOG ENGINE (May 11)

- Documents currently under CSOG Review
- Torpedo Warning System (TWS) CDD
- Countermeasure Anti-Torpedo (CAT) CDD

INSTRUCTION REVIEW

- OPNAVINST 9070.1 – Survivability Policy for Surface Ships and craft of the US Navy
- Draft Review is in progress – integrating afloat survivability in keeping with DODI 3150.09
- Discussions within OPNAV and NAVSEA scheduled for 29 APR

Unclassified

RO: Matt Richter, LCDR, N867B, 571-256-8049

CBRN Survivability Conference

Joint Program Executive Office for Chemical and Biological Defense (JPEO-CBD)

Jess A. Scarbrough
Brigadier General, USA
Joint Program Executive Officer
for Chemical and Biological Defense
703.681.9600

May 17, 2011

Agenda

- JPEO-CBD: The Organization
- Trail Boss Functions Overview
- MDAP: Formation & Support
- Closing: Future Missions

JPEO-CBD: The Organization

CBD Program Leadership

Under Secretary of Defense (Acquisition, Technology & Logistics)
Dr. Ashton Carter

Assistant Secretary of the Army for Acquisition, Logistics & Technology
Hon. Malcolm Ross O'Neill

Joint Program Executive Officer for Chemical & Biological Defense
BG Jess Scarbrough

Assistant to the Secretary of Defense (Nuclear & Chemical & Biological Defense Programs)
Hon. Andrew C. Weber

Deputy Assistant to the Secretary of Defense for Chemical & Biological Defense
Dr. Gerald W. Parker

Deputy Assistant to the Secretary of Defense for Nuclear Matters
Mr. Steve Henry

Director for the Defense Threat Reduction Agency & U.S. Strategic Command Center for Combating Weapons of Mass Destruction
Mr. Kenneth A. Myers III

Director, Joint Science and Technology Office for Chemical and Biological Defense
Dr. Alan Rudolph

Chairman, Joint Chiefs of Staff

Admiral Mike Mullen

Director for Force Structure, Resources & Assessment, J8 The Joint Staff

Lt Gen Larry Spencer USAF

Director, Joint Requirements Office CBRN Defense

BG Lucas Polakowski, USA

Joint Combat Developer

COL Vance Visser

Secretary of the Army

Mr. John McHugh

CBDP Test and Evaluation Executive

Mr. James C. Cooke

—— Operational Control

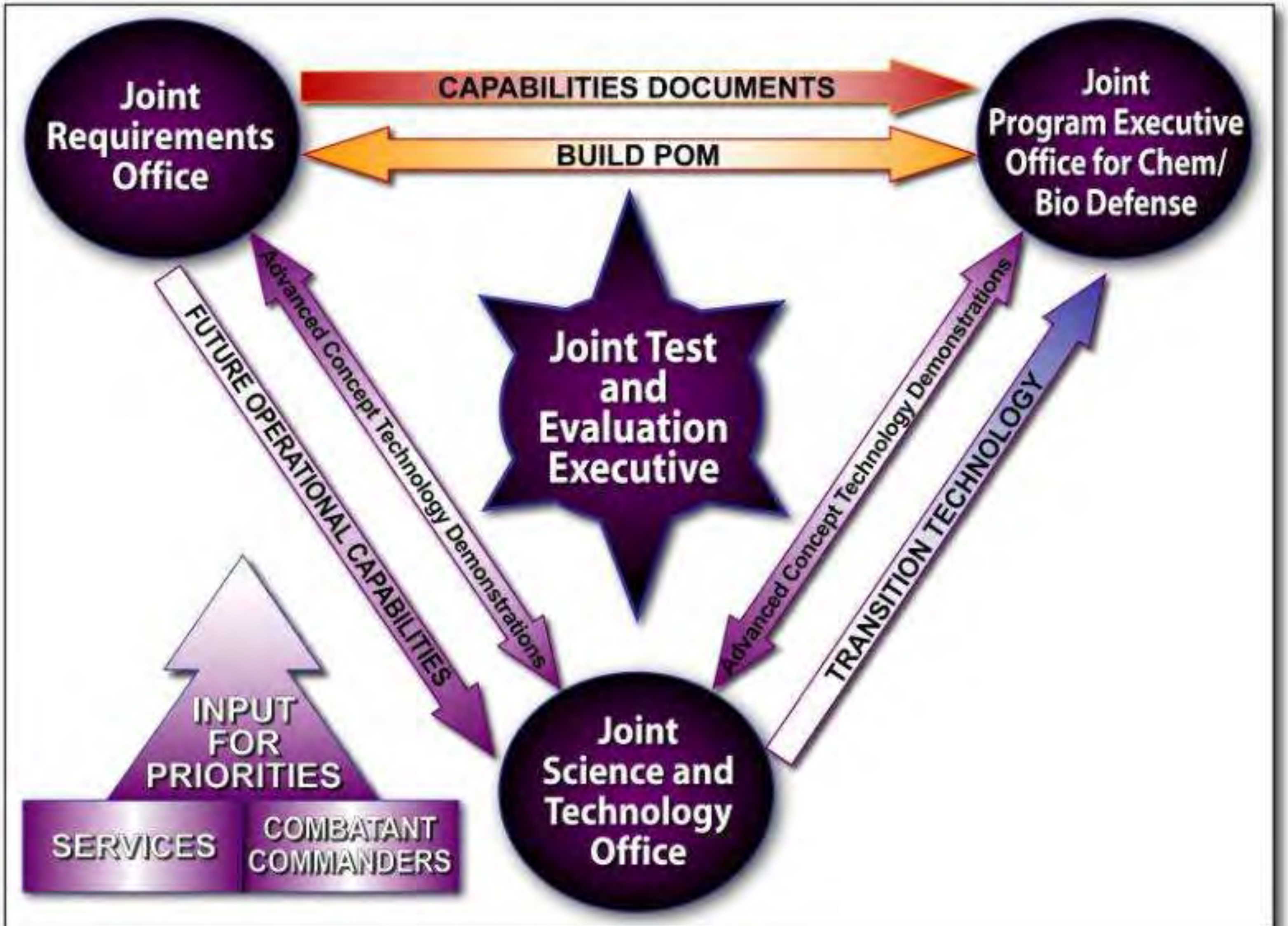
- - - Oversight

DoD CBDP Background

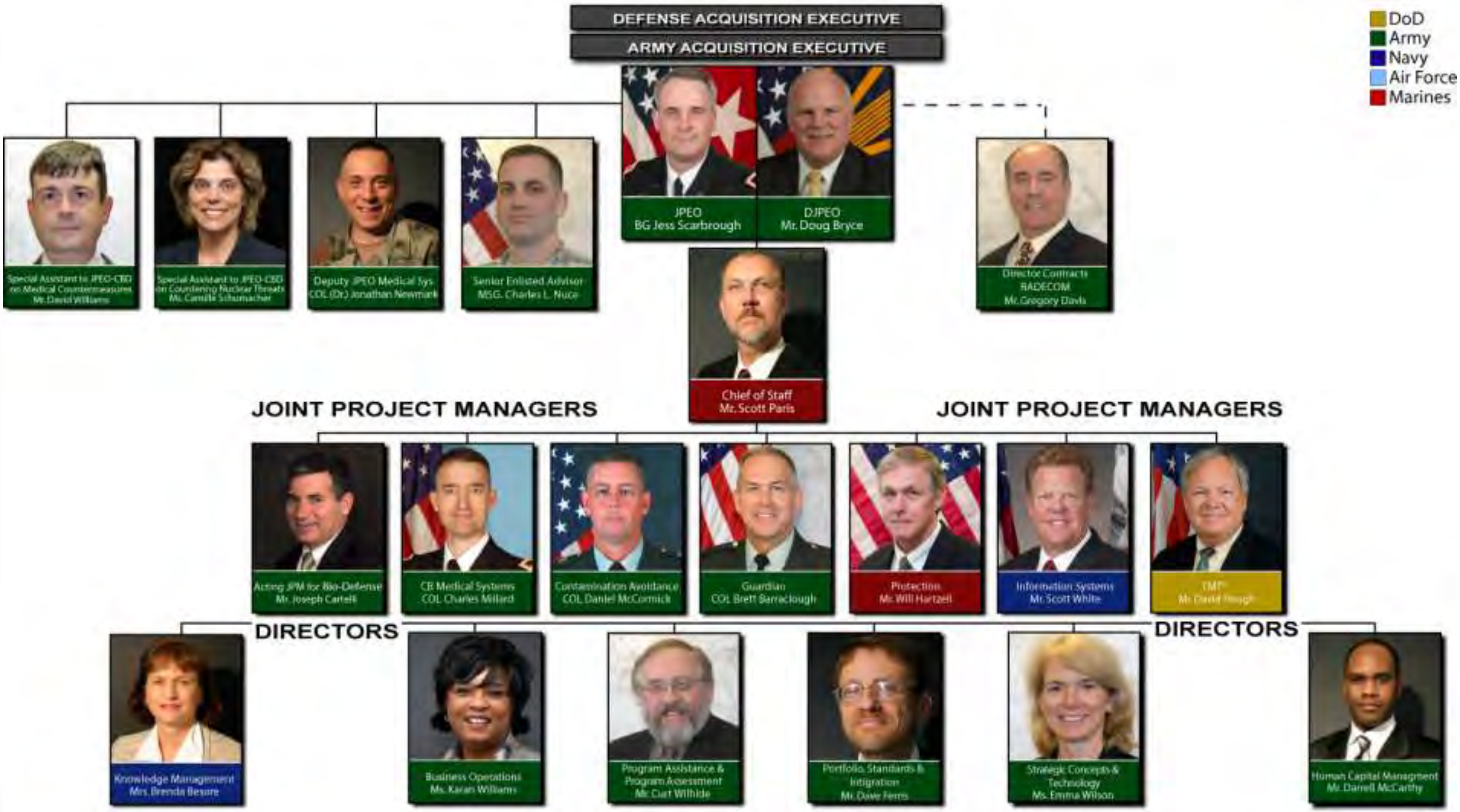
- Established by Congress – 1994 National Defense Authorization Act, Public Law 103-160
- Consolidates all DoD Chemical and Biological (CB) Defense Efforts into Defense-Wide Funding Accounts Overseen by a Single Office Within the Office of the Secretary of Defense
- Established the Department of the Army as the Executive Agent
- JPEO-CBD Portfolio consists of 50% non-medical equipment (CBRN Individual Protection, Detection, Force Protection, Decon, etc.) and 50% Medical Countermeasures (Vaccines, Medical Treatment)
- Program Re-organized in April 22, 2003

ASD(NCB) Provides Oversight of the Program

Required Capabilities, Science & Technology, and Acquisition



The Joint Program Executive Office for Chemical and Biological Defense

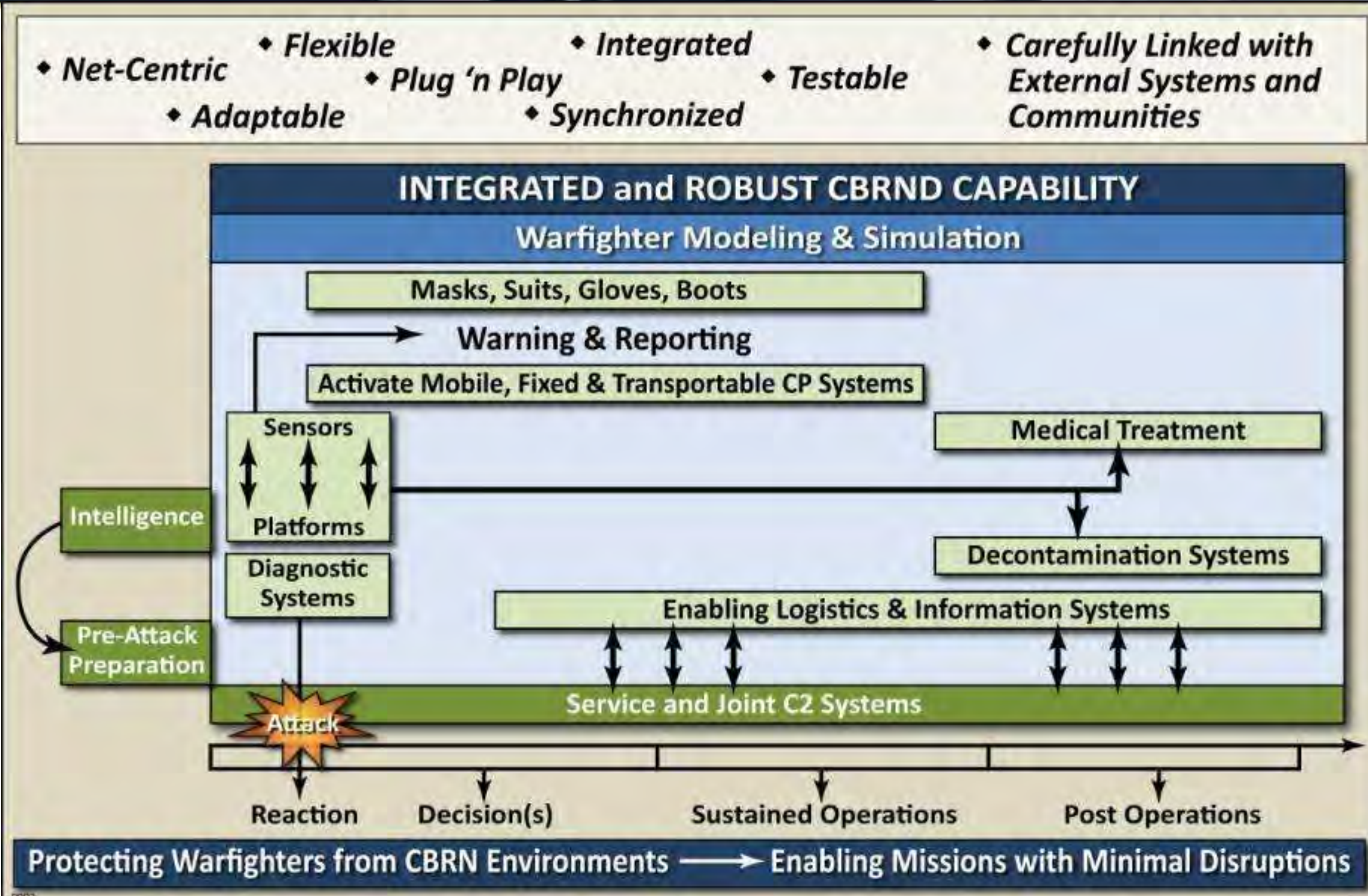


** Transformational Medical Technology*

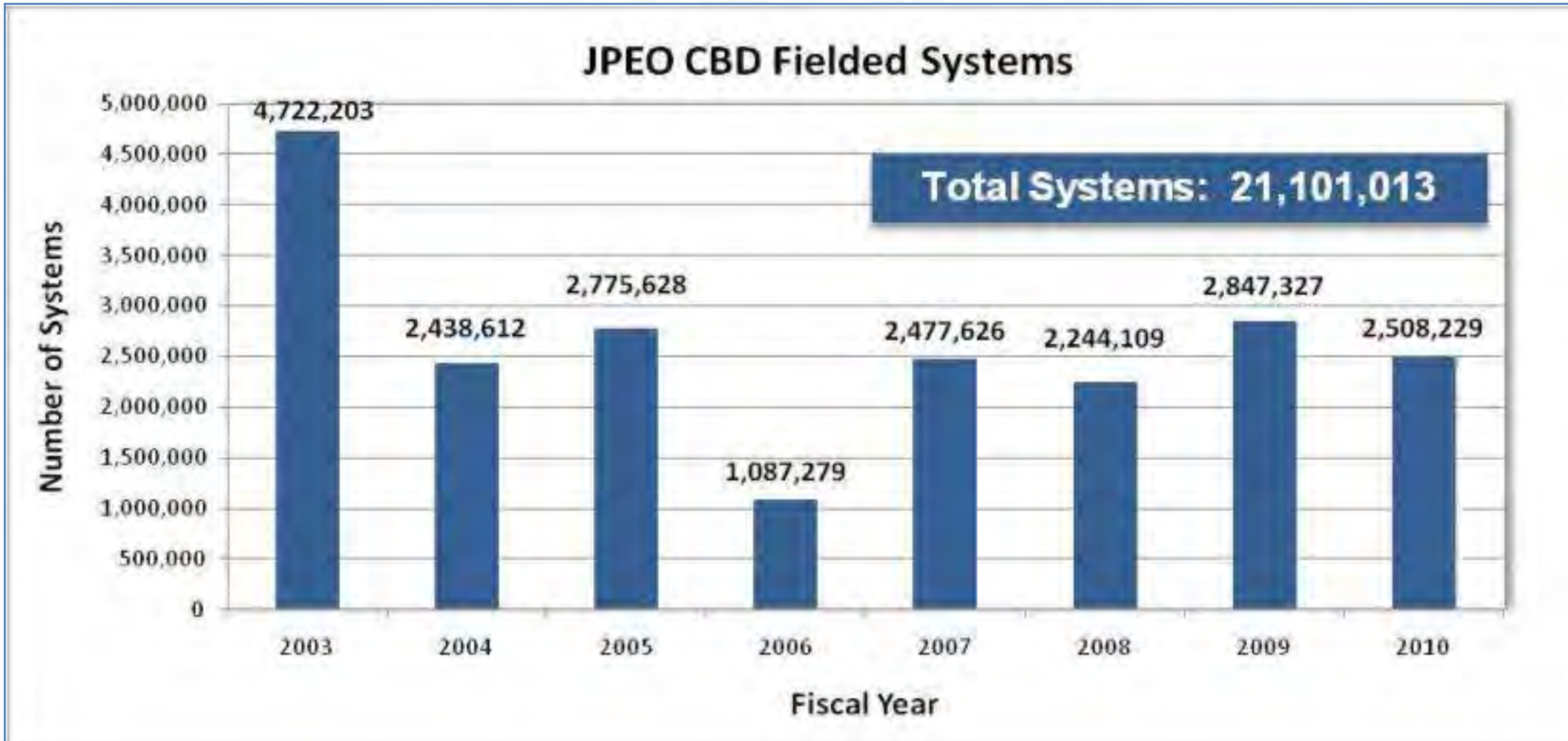
The JPEO CBD Enterprise: Delivering Integrated Broad Spectrum Capability

0008

CBRN Portfolio of Systems



Addressing CBRN Threats with Successfully Fielded Systems

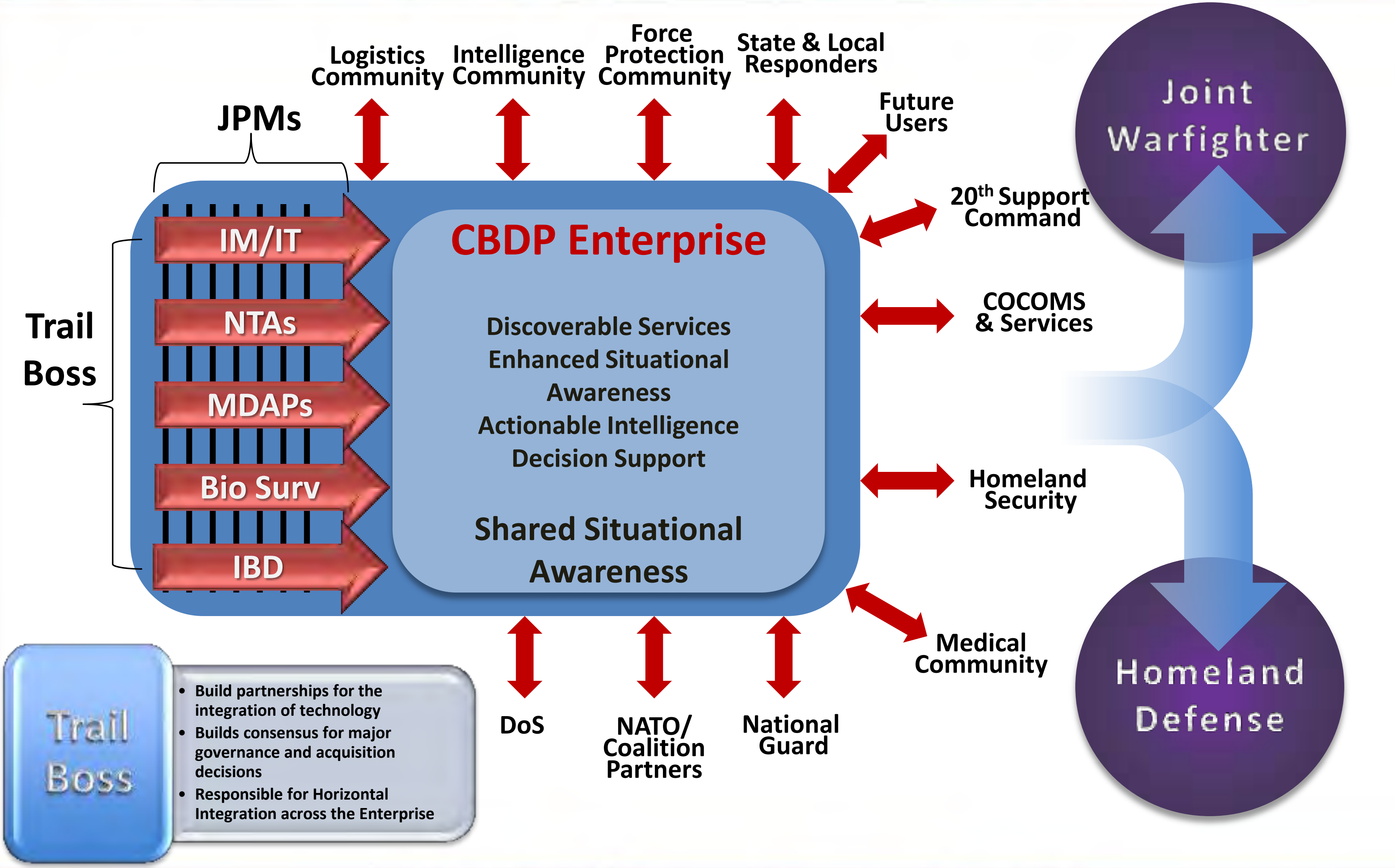


- Biological Detectors
- Chemical Detectors
- Bio-Medical Systems (JBAIDS)
- Vaccines (Anthrax & Smallpox)
- Collective Protection
- Individual Protection Equipment
- Installation Protection Program
- Consequence Management Systems
- Decontamination (Equipment & Individual)
- Information Systems

** As of Jan 21, 2011*

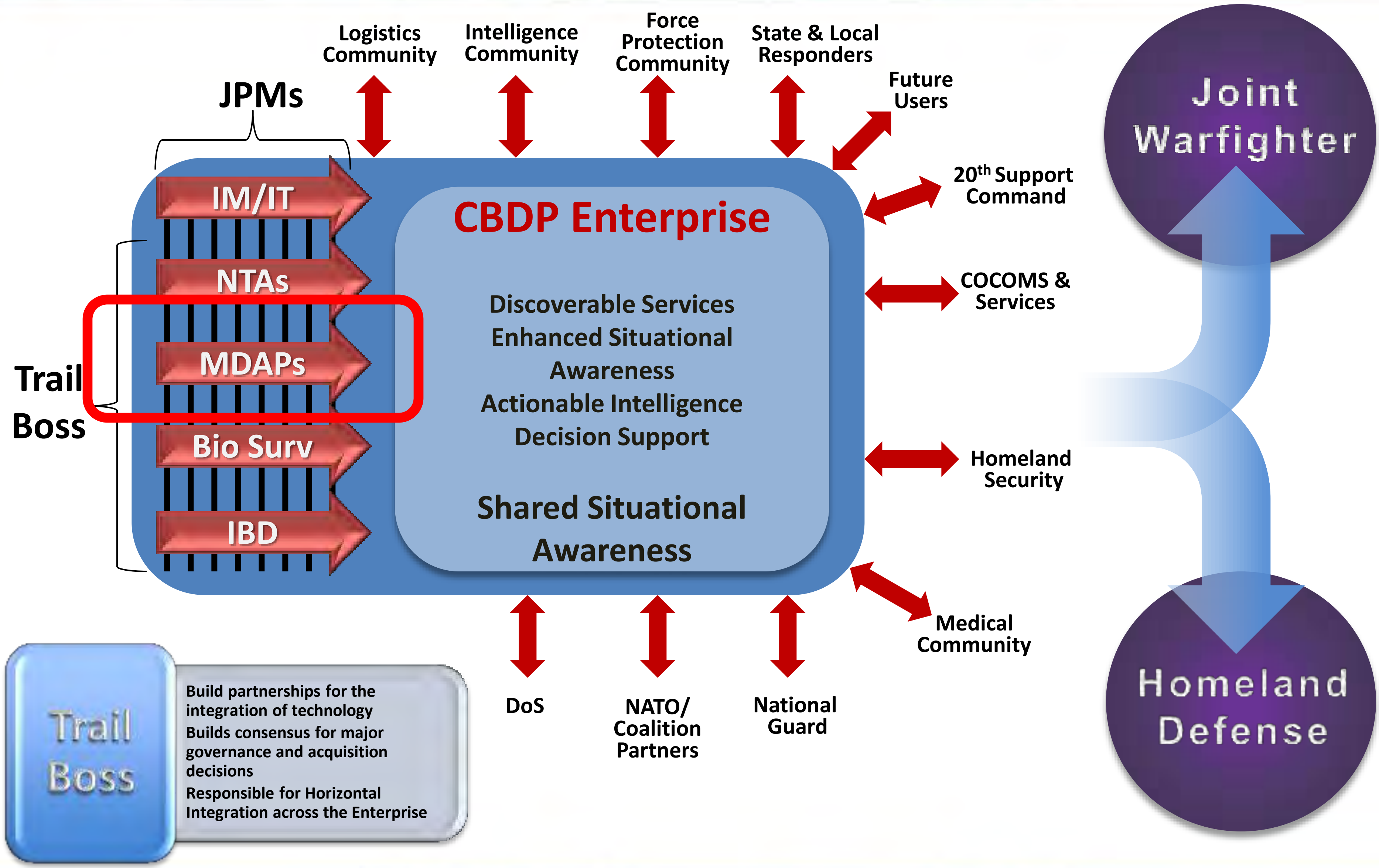
Trail Boss Functions Overview

Trail Boss
CBDP Enterprise Management

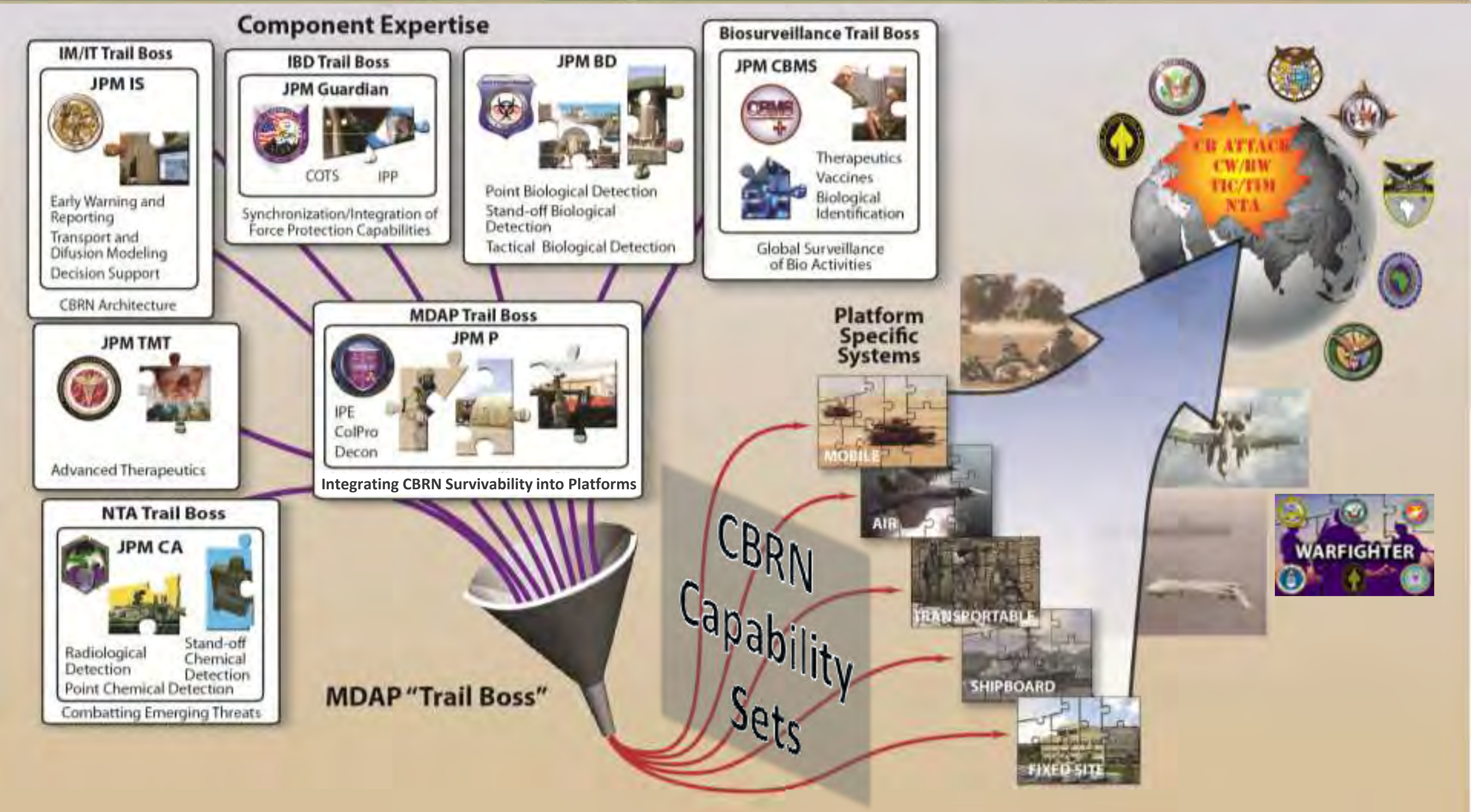


MDAP Formation & Support

The Trail Boss Concept



MDAP Trail Boss Concept



Maximize DoD Return on Investment by Leveraging JPEO-CBD Expertise and Product Portfolio to Provide Programs with CBRN Survivability Capabilities

CBRN Survivability Policy

- **DODI 3150.09**
  - **AT&L Policy Directive for CBRN Survivability for mission-critical systems**
- **DODI 5000.02**
  - **AT&L Affirms PM's need to address CBRN Survivability**
- **JCIDS Manual**
  - **Validates CBRN Survivability as a user requirement**

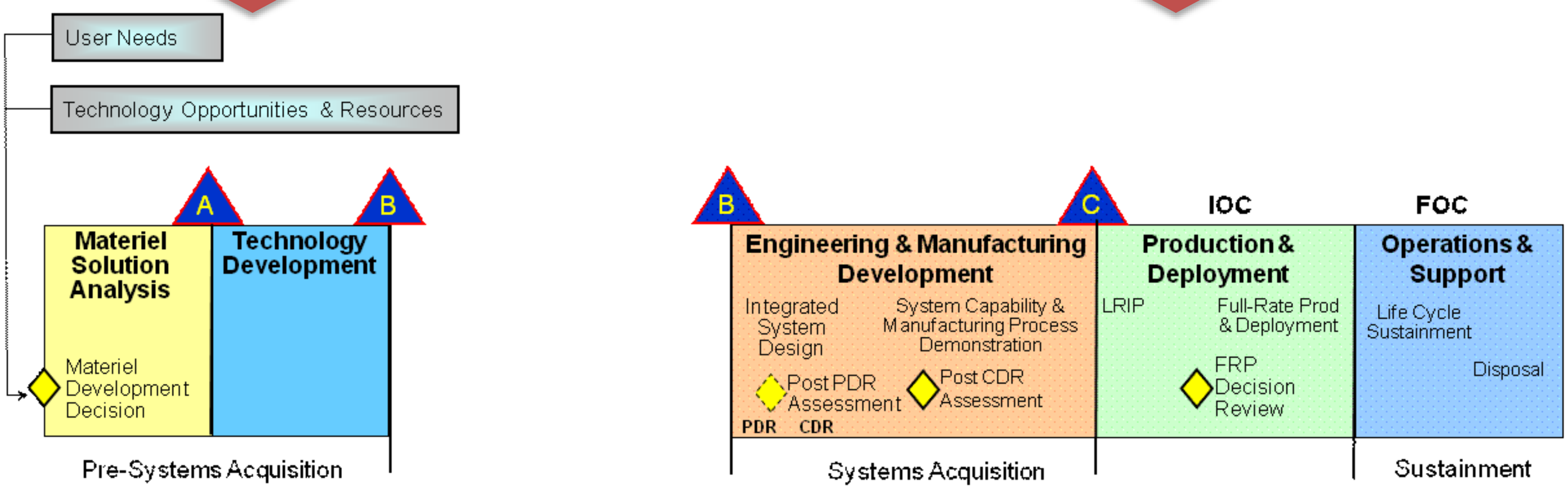
Putting Theory Into Practice

Best to Engage MDAP Trail Boss Prior to CDD

- Ensures effective engagement
- Allows optimization of Survivability requirements prior to EMD

MDAP Trail Boss can Still Help, if Engaged After CDD

- Managing expectations
- Affecting necessary design changes to meet Survivability requirements
- Providing SME support



Help Us to Help You – *Engage Early if Possible*

Closing: Future Missions

Advanced Threat Defense

- **Current Effort**
  - The Advanced Threat (AT) Box augments the fielded JNBCRS Increment 2 system to provide necessary NTA defense capability for dismounted reconnaissance missions
  - First of four Rapid Fieldings occurred on 24 JAN 2011 (181 CHEM CO, Ft Hood)
  - Second fielding to 101st CHEM CO, Ft Bragg – Scheduled for completion on 26 MAY 2011
  - Last two fieldings possibly delayed by CRA
    - 3rd Fielding: 63rd CHEM CO at Ft Campbell
    - 4th Fielding: 172nd CHEM CO at Ft Riley
- **Future Effort**
  - Mission Based System Engineering (SE) capability analysis for identification of strategic drivers to influence follow-on improvements and/or PORs
  - Augment CSTs with optimized NTA equipment set
  - Acquisition strategy to guide development of capability designed to defeat next advanced threats

Chemical Threats

Traditional Threats

- Chemical warfare agents (nerve, blood, and blister)
- Agents designed for military operations/ applications
- Toxic industrial materials (TIMs) hazards/Toxic Industrial Chemicals (TICs)

Advanced Threats

- Non-traditional Agents (NTA)
- Asymmetric applications and/or engagements

Biological Threats

Traditional Threats

- Bacterial pathogens:
  - Anthrax
  - Multi-drug Resistant Anthrax
  - Plague
  - Tularemia
- Viral pathogens:
  - Smallpox
  - Ebola
  - Marburg
- Toxins:
  - Botulism
  - Ricin
  - SEB

Emerging Threats

- Current and emerging diseases:
  - Venezuelan Equine Encephalitis
  - Glanders
  - Melioidosis
  - Brucellosis
  - Cholera
  - Pandemic flu
  - SARS
  - Drug-resistant TB
  - Malaria

Enhanced Threats

- "Bioprospecting" to find particularly virulent strains in nature
- Cultivating particularly virulent strains of pathogens in the laboratory

Advanced Threats

- Adding, deleting or mutating genes to engineer pathogens that are more resistant, transmissible and virulent
- Creating viruses de novo

JPEO-CBD Radiological/Nuclear (RN) Status and Path Forward

- **Issue: No identified DoD RN advanced developer for existing validated requirements**
- **Solution: Consolidation of RN advanced development mission under JPEO-CBD (Re-designation to JPEO-CBRND)**
  - **Fosters Integrated CWMD integrated solutions (prevention, protection, response)**
  - **Leverages efficiencies from established JPEO-CBD organizational and acquisition processes**
    - **Utilizes existing CBDP life-cycle acquisition structure**
    - **Continues synergy of existing CBRN Elements**
      - **JRO-CBRN (requirements)**
      - **DTRA (technology development)**
- **Path Forward:**
  - **JPEO-CBRND name change and mission codified by the ongoing change in DoDD 5160.05**
  - **Establish separate defense wide funding for RN programs**
  - **POM UFR submission for FY13-17 for programs supporting Countering Nuclear Threats, National Technical Nuclear Forensics and Medical Radiological mission areas.**
  - **Army RN Mission Area:**
    - **Transition JCTD successes (such as STIRS) into Joint programs**
  - **DoD RN Mission Area:**
    - **Continue to engage Services and COCOMs for support on RN requirements, priority and funding**
    - **Work with STRATCOM and JRO to transform Services' capability gaps into Joint requirements**
    - **Establish JPM-RN chartered to develop, procure, field and provide life-cycle sustainment support**

The BEST Technology and Equipment

At the RIGHT PLACE

At the RIGHT TIME

At the RIGHT COST

BG Jess A. Scarbrough

http://www.jpeocbd.osd.mil

JPEO-CBD

Joint Program Executive Office for
Chemical & Biological Defense
(703) 681-9600

Acronyms

JPM D – Joint Project Manager Decon

JPM CA – Joint Project Manager Contamination Avoidance

JPM CP – Joint Project Manager Collective Protection

JPM CBMS – Joint Project Manager Chemical Biological Medical Systems

JPM GN – Joint Project Manager Guardian

JPM IP – Joint Project Manager Individual Protection

JPM IS – Joint Project Manager Information Systems

ACADA/M22 - Automatic Chemical Agent Alarm

AFS - Alternative Footwear System

AIE - Automated Installation Entry

ALS 1 - Analytical Laboratory System

BAIS - Battlefield Anti-Intrusion System

FP SUITE – Force Protection Suite

ICAM - Improved Chemical Agent Monitor

ICIDS III - Integrated Commercial Intrusion Detection System

IFS - Integrated Footwear System

IPP - Installation Protection Program

JB2GU nFR - JSLIST Block 2 Glove Upgrade non Flame-Resistant

JBAIDS - Joint Biological Agent Identification and Diagnostic System

JBPDS - Joint Biological Standoff Detection System

JCAD - Joint Chemical Agent Detector

JCBRAWM - Joint Chemical Biological Radiological Water Monitor

JEM Incr 1 - Joint Effects Model Increment 1

JNBCRS-2 - Joint NBC Reconnaissance System Increment II

JPACE - Joint Protective Aircrew Ensemble

JSGPM - Joint Service General Purpose Mask

JSMLT - Joint Service Mask Leakage Tester

JSPDS (RSDL) - Joint Service Personnel/Skin Decontamination System (Reactive Skin Decontamination Lotion)

JSPDS Training Lotion - Joint Service Personnel/Skin Decontamination System

JSTDS-SS - Joint Service Transportable Decontamination System Small Scale

M31E2 BIDS - Biological IntegratedDetection System

NIIS – Non Intrusive Inspection System

XM98 JBPDS - Joint Biological Point Detection System

Acronyms

20th Supt Cmd (CMEL) – 20th Support Command (CARA Mobile Expeditionary Laboratories)

AAS – Advanced Anticonvulsant System

AIE – Automated Installation Entry

AIE II – Automated Installation Entry Increment 2

AVA – Anthrax Vaccine Adsorbed

BAIS – Battlefield Anti-Intrusion System

Bioscavenger Inc. 2 – Bioscavenger Increment 2

CALS – Common Analytical Laboratory System

CARA – CBRNE Analytical Remediation Agency

CBPS – Chemical Biological Protective Shelter

CBRNE – Chemical, Biological, Radiological, Nuclear, and Explosives

CM/HD – Consequence Management/Homeland Defense

COTS-LCMP (CSPA) – Commercial Off-the-Shelf - Life Cycle Management Program (Chemical and Biological Defense Small Project Acquisition)

CPFH – Collectively Protected Field Hospitals

CPSBKFT – Collective Protection Systems Backfit

DFoS – Decontamination Family of Systems

DRSKO – Dismounted Reconnaissance Sets, Kits, and Outfits

Acronyms

FOTOD – Family of Tactical Obscuration Devices
HFV MCM – Hemorrhagic Fever Virus Medical Countermeasures
HRDS – Human Remains Decontamination System
ICIDS – Integrated Commercial Intrusion Detection System
INATS – Improved Nerve Agent Treatment System
IPAT – Integrated Program Assistance Team
IPP – Installation Protection Program
JBAIDS – Joint Biological Agent Identification and Diagnostic System
JBPDS – Joint Biological Point Detection System
JBSDS – Joint Biological Standoff Detection System
JBTDS – Joint Biological Tactical Detection System
JCAD M4E1 – Joint Chemical Agent Detector M4E1
JCBRAWM – Joint Chemical, Biological, Radiological Agent Water Monitor
JC3 – Joint Chemical and Biological Coverall for Combat Vehicle Crewman
JECP – Joint Expeditionary Collective Protection
JEM – Joint Effects Model
JLCMR – Joint Life Cycle Management Review
JMDS – Joint Material Decontamination System
JSAM APACHE – Joint Service Aircrew Mask, Apache Variant

Acronyms

JSAM FW – Joint Service Aircrew Mask Fixed Wing Variant
JSAM RW – Joint Service Aircrew Mask Rotary Wing Variant
JSGPM – Joint Service General Purpose Mask
JSLIST – Joint Service Lightweight Integrated Suit Technology
JSLSCAD – Joint Service Lightweight Standoff Chemical Agent Detector
JSTDS-SS – Joint Service Transportable Decontamination System- Small Scale
JWARN – Joint Warning and Reporting Network
LKMD – Lighting Kit, Motion Detector
MDAP – Major Defense Acquisition Programs
MDARS – Mobile Detection Assessment Response System
MRADC – Medical Radiation Countermeasure
PDTESS – Product Director Test Equipment, Strategy and Support
rBV A/B Vaccine – Recombinant Botulinum A/B Vaccine
SOD-VR – Screening and Obscuration Device, Visual, Restricted Terrain
SSA – Software Support Activity
Stryker NBCRV – Stryker Nuclear, Biological, Chemical Reconnaissance Vehicle
UCS – Unified Command Suit

2010 DoD Strategic Plan For T&E Resources
Nuclear Weapons Effects (NWE) Focus Area

Dr. Suzanne V. Strohl

Briefing To The 2011 CBRN Survivability Conference

May 17-18, 2011

Overview

- TRMC Establishment
- Strategic Plan Law and Guidance
- Inputs to and Outputs of the Strategic Plan
- Strategic Plan Systems Engineering Approach
- Domain and Focus Area Working Groups
- 2010 Strategic Plan & CBRN T&E Standards
- 2010 Strategic Plan & The NWE "Focus Area"
  - Strategic Plan & Strategic Planning Process
  - Linkage To The CSOG-N & CSOG-N T&E Sub-Group – 2010 Strat Plan & Future Strat Plans
  - NWE Infrastructure Per The 2010 Strategic Plan
- Where We Are Today In The CSOG-N Process – *TRMC Perspective*

TRMC Establishment

- The 2003 NDAA, directed the SecDef to establish a DoD-level resource management organization
- DoD Directive (DoDD) 5105.71 established the TRMC as a DoD Field Activity under the authority, direction, and control of the USD(AT&L)
  - Review and provide oversight of proposed DoD budgets and expenditures for T&E facilities and resources
  - Develop a biennial Strategic Plan reflecting the needs of DoD with respect to T&E facilities and resources
  - Review the Services' proposed T&E budgets for adequacy and certify that they are in compliance with the Strategic Plan
  - Administer CTEIP and the Test And Evaluation/Science And Technology Program
- Nuclear Weapons Effects (NWE) has been a "Focus Area" in the last three DoD Strategic Plans (2007,2009, 2010) and will continue as a "Focus Area" in Strategic Plans – 2012 and beyond as long as there is a NWE requirement

Strategic Plan Law and Guidance

U.S. Code
Title 10, Section 196 (d)

"…**The strategic plan shall be based on a comprehensive review of the test and evaluation requirements** of the Department and the adequacy of the test and evaluation facilities and resources of the Department to meet those requirements…."

Six statutory requirements:

(1) An assessment of the T&E requirements of the Department for the period covered by the plan.
(2) An identification of performance measures associated with the successful achievement of T&E objectives for the period covered by the plan.
(3) An assessment of the T&E facilities and resources that will be needed to meet such requirements and satisfy such performance measures.
(4) An assessment of the current state of the T&E facilities and resources of the Department.
(5) An itemization of acquisitions, upgrades, and improvements necessary to ensure that the T&E facilities and resources of the Department are adequate to meet such requirements and satisfy such performance measures.
(6) An assessment of the budgetary resources necessary to implement such acquisitions, upgrades, and improvements.

Inputs to and Outputs of the Strategic Plan

Top-Down Inputs

IPLs
STAR
MDAP
GDF
QDR
NSS

Requirements Assessment & Analysis

Strategic Plan

T&E Capability Needs:
- ✓ T&E Facilities
- ✓ T&E Workforce
- ✓ T&E Investments

Inform Congress for Appropriations and Legislation

T&E Operations and Investments

T&E Budget Certification

T&E Investments

TEMPs
KPPs
CDDs

I&M Reviews

MRTFB Infrastructure Review

Reliance Process

Service Briefs

MDAPs

Bottom-up Inputs

Strategic Plan
Systems Engineering Approach

Translating Statute into Process

Legal Requirements of Statute

Comprehensive Review	Assessment of primary DoD T&E Requirements	Assessment of T&E facilities and resources	Itemize upgrades and improvements	Assessment of budgetary resources
Review MDAPS and National-level priorities; Assess for impacts to DoD T&E	***What are the primary DoD T&E requirements?***	***What is the current state of DoD T&E Infrastructure?***	***What facilities and resources are needed to meet T&E requirements?***	***What investments are needed to fulfill resource demands?***

Strategic Planning Goal 1: **Research Areas and Working Group Outreach**

Strategic Planning Goal 2: **Identify DoD T&E Requirements**

Strategic Planning Goal 3: **Review current T&E Infrastructure**

Strategic Planning Goal 4: **Identify T&E Capability Needs**

Strategic Planning Goal 5: **Provide Recommended Actions**

Systematically Map End-to-End

Strategic Plan
Systems Engineering Approach

Institutionalize approach establishing a standard to link:
Warfighter requirement needs → testing → back to mission capability

Stakeholder & Interests

OSD, Executive, DIA, S&T	*AT&L, COCOMs*	*DT&E, DOT&E, Experts*	*SE, MDAP, T&E Users*	*Services, OMB, CAPE, Congress*
What are the emerging trends and threats?	*What are the capability requirements and warfighter needs?*	*What tests are needed given likely missions and future demands?*	*What resources and facilities are required to facilitate T&E?*	*What investments are being made to fulfill resource demands?*
Global Context & Challenges Threats & Trends Strategic Objectives Complex Operating Environments	**Warfighter Missions / Needs** Technology Development (ACTD) Acquisition	**T&E Capability Requirements** Current (available) vs. Future Need (for current acquisition programs and future warfighter needs)	**T&E Resource Enablers** Funding Infrastructure Skill sets Processes	**Programs & Investments** T&E S&T Service POM CTEIP

Systematically Map End-to-End

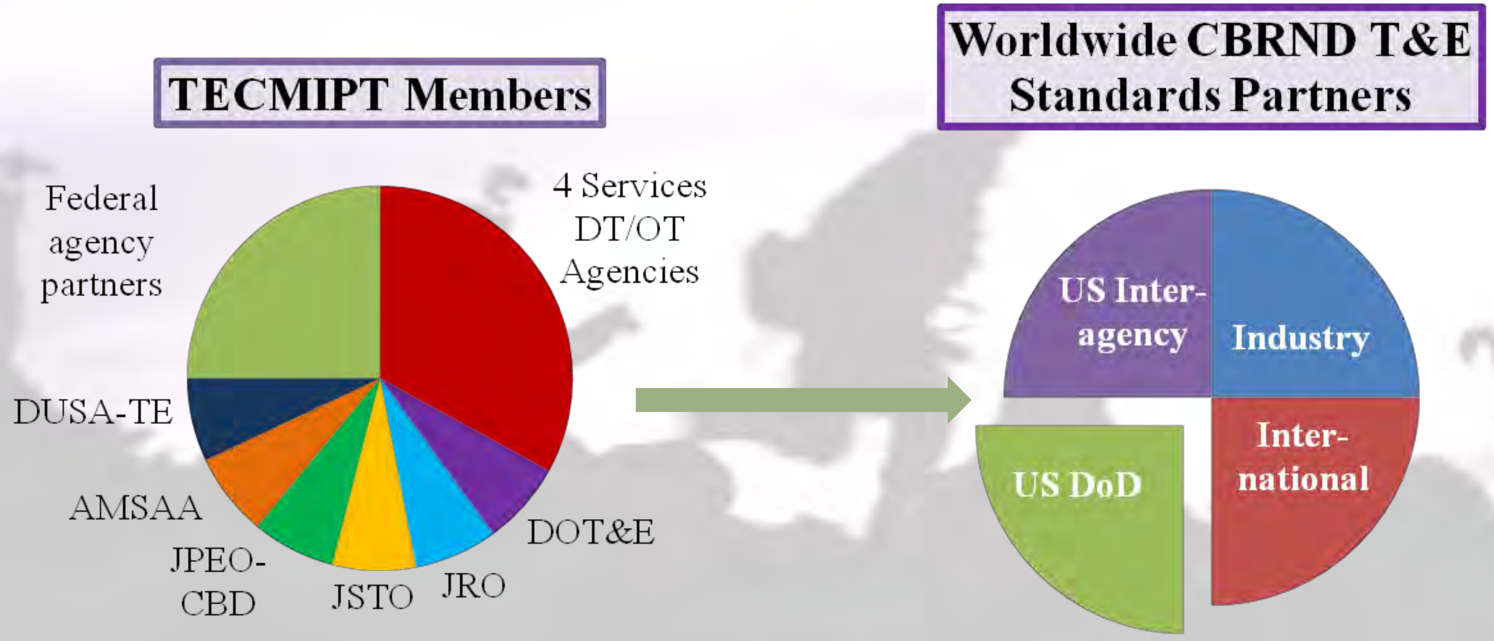
Domain and Focus Area Working Groups

Capability Areas	Served by established DoD Working Groups
Air, Land, Sea	Reliance Panels
Space and Missile Defense	SMD JAT, IIPT, OIPT, WG Successor to JAT/OIPT
Cyberspace	IO EXCOM
Artificial Intelligence	Strategic Planning Working Group
Biometrics	DoD PEO Biometrics T&E WIPT
Chemical-Biological Warfare	**CSOG-ChemBio, Rad/Nuc T&E Standards - DUSA TE CBRND TECMIPT**
Directed Energy	DETEC Working Group
Electronic Warfare / C-IED / Anti-Access	Strategic Planning Working Group, JIEDDO, and JTB
Hypersonics	Joint Technology Office on Hypersonics IPT
Nuclear Weapons Effects	**CSOG-N, Defense Science Board**
Spectrum Stewardship	Range Spectrum Requirements Working Group (RSRWG) and the C-Band Working Group
Testing in Joint, Net-Centric, and Distributed Test Environments	TRMC T&E/S&T Program Net-Centric Test Technology Area, TRMC-led DIACAP Tiger Team
Targets and Threats	Threat Systems Working Group (TSWG), Target Investment Working Group (TIWG), Reliance Panel
Unmanned and Autonomous Systems	UAS Task Force, Joint Program Robotics Office, and Joint Ground Robotics Integration Team (JGRIT)

2010 Strategic Plan and CBRND T&E Standards

DoD Process for Establishing T&E Standards

- CBRND T&E Executive establishes DoD CBRND T&E standards, through T&E Capabilities and Methodologies IPT (TECMIPT)
  - Interagency partners now participating in TECMIPT process
- SMEs in TECMIPT CBRN commodity area sub-groups provide rigor to T&E standards development



Rad/Nuc TECMIPT Sub-Group Interagency Members

DoD

- Defense Threat Reduction Agency (DTRA)
- Joint Program Executive Office for Chemical and Biological Defense (JPEO-CBD)
- Joint Requirements Office, CBD (JRO-CBD)
- Army T&E Command (ATEC)
- Air Force Operational T&E Command (AFOTEC)
- Navy Commander, Operational T&E Force (COMOPTEVFOR)
- Marine Corps Operational T&E Activity
- Naval Surface Warfare Center, Dahlgren Division (NSWC-DD)
- White Sands Missile Range (WSMR)
- US Army Radiation Standards Laboratory (RSL)
- Dugway Proving Ground (DPG), West Desert Test Center (WDTC)

Department of Homeland Security (DHS)

- Domestic Nuclear Detection Office (DNDO)

National Institute of Standards and Technology (NIST)

Environmental Protection Agency (EPA)

Department of Energy (DOE) National Laboratories:

- Pacific Northwest National Laboratory (PNNL)
- Oak Ridge National Laboratory (ORNL)
- Idaho National Laboratory (INL)

Rad/Nuc T&E Standard Near-Term Priorities

1. Review existing Rad/Nuc consensus T&E standards currently used by federal agencies. Combine, modify and/or update as necessary and provide interagency concurrence on T&E standards for:
   a. Detection: The CAPAT has identified five detection technologies to be addressed first:
      - man-portable systems (i.e. backpacks and Radiation Isotope Identification Devices (RIIDs))
      - Aerials systems
      - Vehicle-mounted systems
      - Personal Radiation Detectors (or PRDs, also referred to as Pagers)
      - Boat-mounted systems.

   b. Rad/Nuc personal protection systems, to include dosimeters and individual protective ensembles

   c. Rad/Nuc decontamination systems

2. Support PM procurement of COTS items
   a. Develop a Rad/Nuc T&E program for COTS vendor participation to reduce redundant government testing
   b. Identify and leverage existing government test data for COTS equipment that can be shared across agencies.

Rad/Nuc T&E Standard
Mid and Long-Term Priorities

1. Identify/Prioritize Rad/Nuc T&E capability gaps , develop requirements (Test and Evaluation Capability Needs (TECN) statements) for new Rad/Nuc T&E infrastructure to fill the gaps

2. Develop and/or review the validation plans and reports for the infrastructure in accordance with the "CDBP T&E Standards Development Plan" and the TECMIPT SOP.

3. Identify T&E standardization goals for:
   - Rad/Nuc pre- and post-detonation forensics
   - Effectiveness of filtration for survivability in collectively protected spaces

2010 Strategic Plan and the NWE Focus Area

TRMC Interest in DoDI 3150.09 and the CSOG-N Processes

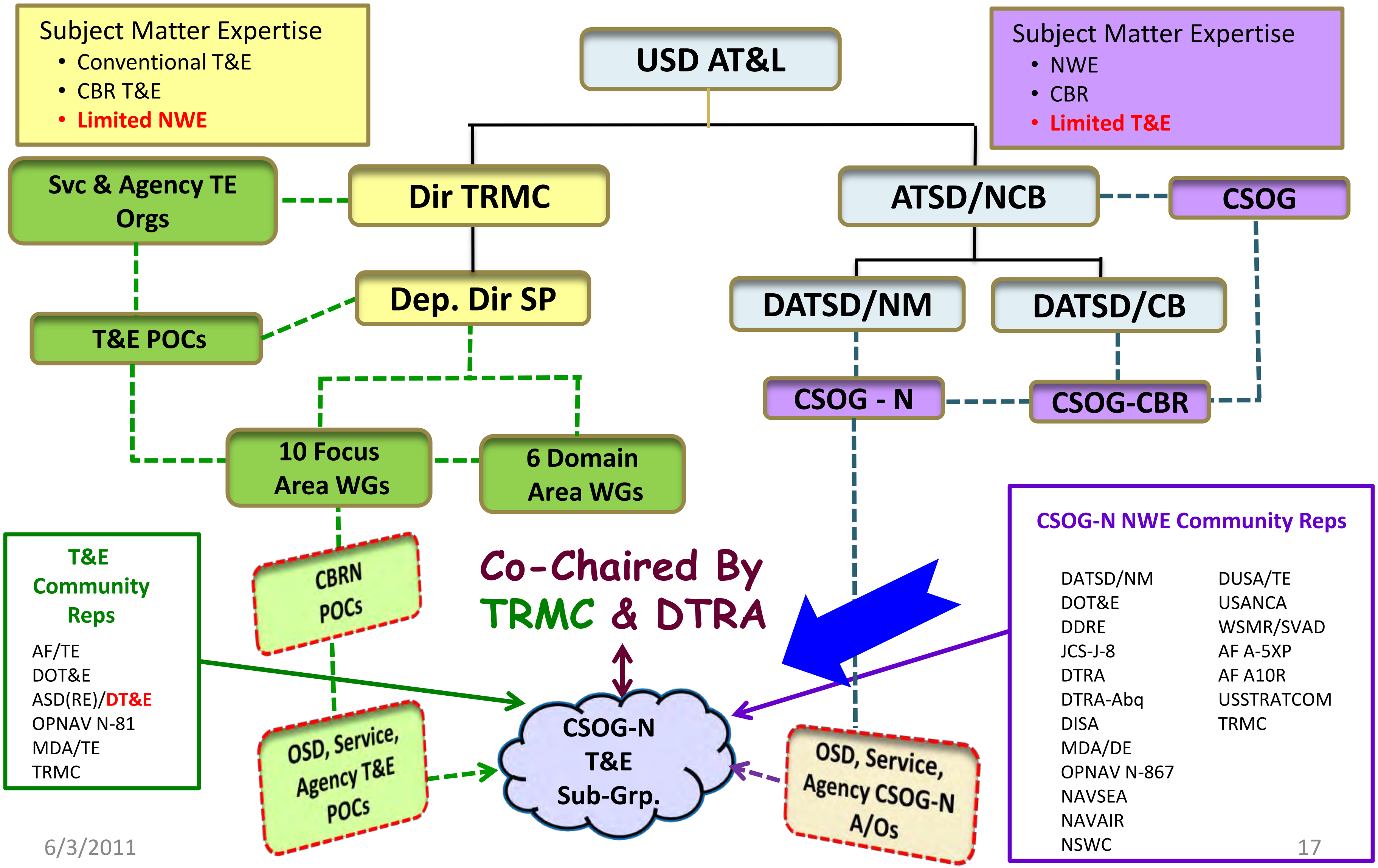
- **Why a NWE Focus Area?**
  - Genesis of TRMC interest based on *the same concerns that drove DoD to the **new DoDI 3150.09** , the **CSOG process**, and establishment of the permanent DSB Task Force on **Survivability of DoD Systems and Assets to EMP and other Nuclear Weapons Effects***
  - 11 Senior, “Flag” Level Task Force Studies, and Congressional Commission Studies focused on the Department’s Nuclear Enterprise and the need for paying more attention to both the Nuclear Enterprise and the nuclear survivability requirements of systems
    - ***All studies found a systemic atrophy across the Department regarding “Things Nuclear”***
- **To date, the Strategic Plans have deferred any assessment of the adequacy of the NWE test infrastructure** because the processes to refocus the Department on nuclear survivability were just beginning and “**user**” NWE test requirements were lacking
  - Requires assessment of **“user needs” versus adequacy of test infrastructure**
  - **“User test needs” are just evolving** as the Service/Agency Mission Critical Lists mature
- TRMC is collaborating with DATSD/NM in the CSOG-N process and are participating in the on-going permanent DSB on nuclear survivability
  - The Department is analyzing the Service/Agency Mission Critical Lists (2010 Version & Expected Mid Year Update) to extract NWE test infrastructure needs
- **Bottom Line Goal: To be able to assess infrastructure adequacy in future Strategic Plans based on “user needs”**

2010 Strategic Plan For T&E Resources

(30 November 2010)

- The 2010 Strategic Plan was developed **in-parallel** with on-going CSOG activity and released for publication on 30 Nov 10
- NWE Focus Area
  - **Documents the Department's re-emphasis on the Nuclear Enterprise**
    - Past Senior TF Studies
    - DoDI 3150.09 , CSOG-N, and DSB Implementation Plans
  - **Defers assessment of T&E Resource Adequacy** pending anticipated "requirements" evolving from the CSOG-process
- CSOG-N T&E WG formed to address T&E and T&E resource issues/needs resulting from the CSOG –N process ***for future Strategic Plans***
  - Co-Chaired by TRMC and DTRA
  - Membership from T&E, OSD nuclear communities, Services, and MDA
  - Kick-off meeting held on 14 Feb 10; 2nd meeting held on 14 Jul 10
  - Will provide a "user requirements vetting forum" for EMP, X-ray, gamma ray, neutron, blast, thermal, disturbed environments simulators in the 2012 Strategic Plan
  - **Assures DoD and DOE limited set of simulators is sustained to meet anticipated testing requirements expected to evolve from the CSOG-N process**
  - Currently analyzing the 2010 MCLs and assessing the data therein
  - Process will be re-invigorated in late summer or early fall after the MCLs mature

CSOG-N T&E Sub-Group



Framework for the CSOG-T&E Sub-Group

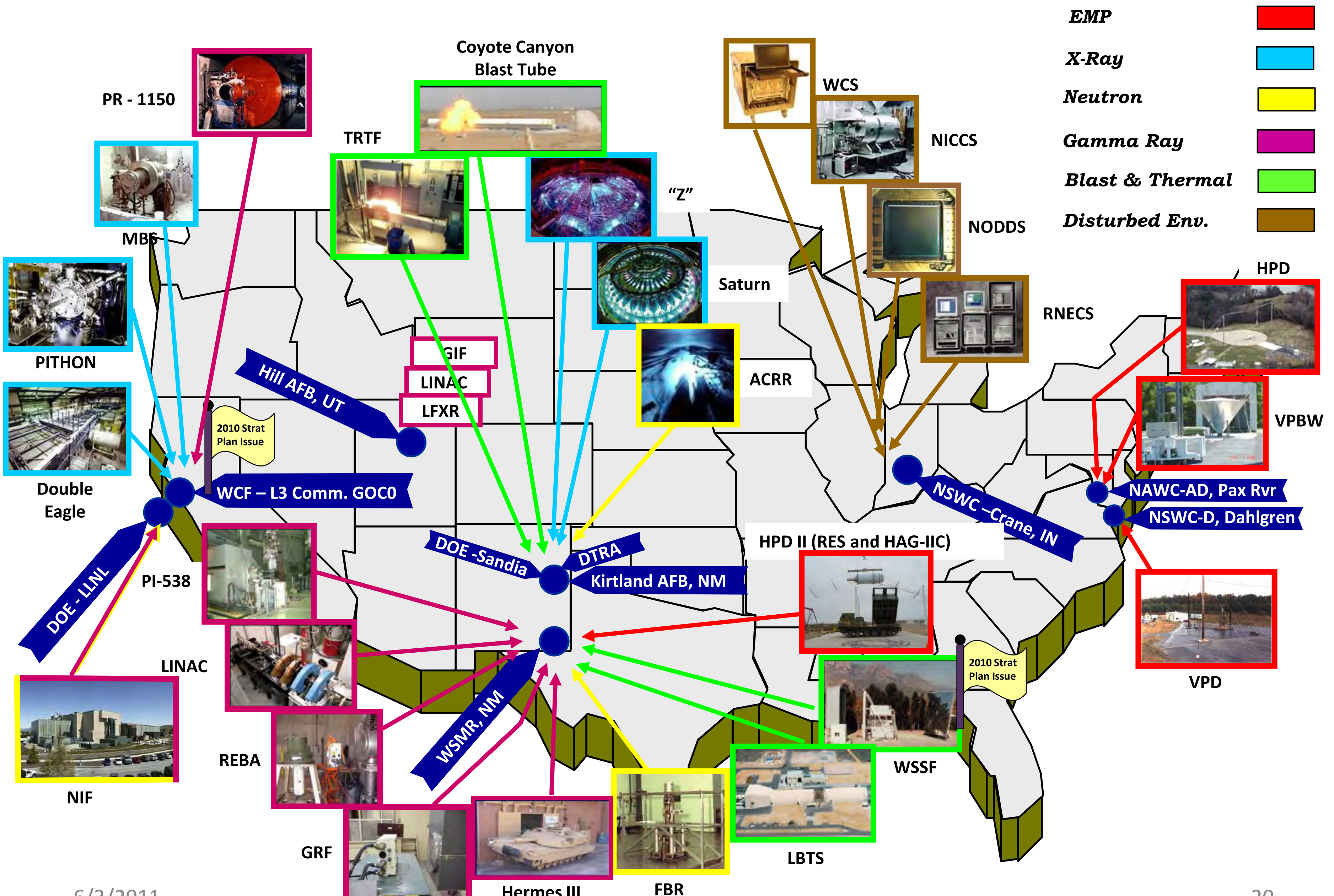
- **The Way Ahead –** Questions we hope to be able to answer in future Strat Plans
  - Which Mission Critical Systems have **nuclear "operate though" requirements?**
    - **HEMP,** X-ray, Gamma Ray, Neutron, Blast, Thermal, Disturbed Environments
  - Will the **"operate thru" capability** be achieved by **TTP** and/or **hardening?**
    - Nuclear Command And Control (NC2) system facilities and equipment, must be nuclear hardened and have a continuing Hardness Maintenance And Hardness Surveillance (HM/HS) program
  - For systems with **nuclear hardness requirements:**
    - What is the plan to assess their **vulnerability and survivability?**
    - Which," if any" **HEMP,** X-ray, Gamma Ray, Neutron, Blast, Thermal, Disturbed Environment simulators will be needed?
  - For legacy systems with vulnerabilities that will be resolved by "hardening," **which simulators will be needed to assess hardening adequacy?**
  - Which simulators will be needed for any **planned or existing HM/HS programs?**
- **Output** will get more granular over time **and will feed:**
  - The development of future DoD Strategic Plans For T&E Resources
  - The Permanent DSB on Nuclear Survivability
  - Follow-on CSOG-N processes (future updates to Mission Critical Lists)

NWE Recommendations –2010 Strategic Plan

Recommended Actions *(from the 2010 Strategic Plan)*

- TRMC will continue to collaborate with DATSD (NM) through the CSOG-N, CSOG-N T&E Sub-group, and Permanent Nuclear Survivability DSB Processes over the coming years to identify NWE test requirements, assess the adequacy of the NWE simulation infrastructure, and identify capability needs of NWE test resources. **TRMC recommends the DSB monitor NWE test and simulation infrastructure, as well as the availability of a skilled workforce.**
- Infrastructure Capability Need: **White Sands Solar Furnace**
  - **Recommended Action:** TRMC monitor the Army plan to bring the Solar Furnace back to full operational capability.
- Infrastructure Capability Need: **DTRA's West Coast Facility (WCF)**
  - **Recommended Action:** DTRA (with assistance from the CSOG-N T&E Sub-group and the DSB Task Force on Nuclear Survivability) should develop and implement a new facility sustainment plan based on projected program needs before the current contract with L-3 Communications expires in January 2013.
- Identifies **an initial baseline set of core NWE T&E facilities** that need to be sustained pending the DoDI 3150.09, CSOG-N implementation process, and DSB Nuclear Survivability Task Force Review. **(see Next VGs)**

NWE Simulators Addressed in 2010 Strategic Plan



Core Facilities that Need to be Sustained (per 2010 Strategic Plan)

NW Environment	Test Facilities	Use
Prompt and Modified Neutron	SNL SPR III (or equivalent)* SNL ACRR WSMR FBR (also combined gamma) LANSCE, IBL, and RTNS	For nuclear warhead subsystem space simulations For nuclear warhead components For ground and air systems, missiles, satellites and interceptors For component tests and model validation
Prompt Cold X-rays (Plasma Radiation Source)	SNL Upgraded SATURN and/or DTRA WCF Double Eagle** LLNL NIF and/or SNL ZR	For space system components/optics For future RV/RB materials and interceptors
Prompt Warm/Hot X-rays (Bremsstrahlung source)	SNL Upgraded Saturn and/or DTRA WCF PITHON** DRTA WCF** & AEDC Modular Bremsstrahlung Source (MBS)	For medium dose electronics and cables For hardness surveillance and low-dose boxes
Prompt Gamma & Gamma Total Dose (GDT)	HERMES III DTRA WCF Pulserad 1150* * WSMR Pulserad 538 Hill AFB Pulserad 958 WSMR REBA WSMR LINAC GRF-GTD Eldorado-GDT	High dose-rates for strategic systems Low dose-rates for satellites and interceptors GDT for systems and large components GDT for electronic devices and components

Sustain until an alternative is available, tested and certified

***Not Currently Available**

Core Facilities that Need to be Sustained (per 2010 Strategic Plan) – cont'd

NW Environment	Test Facilities	Use
EMP	WSMR HPD-2, HAG-1 WSMR Advanced HPD (AHPD) WSMR Pulse Current Injection Fac. (PCI) NAWC HPD, VPBW	For Army systems New E1 HEMP waveform facility For life cycle HA/HM/HS testing For large ground and air systems
SREMP	HERMES III Current Injection Test (CIT)	For Army vehicles and field C3 systems For installations and equipment
Impulse	LIHE Flyer-plate (Magnetic or LIHE)*	For RV/RB internal components/mounts For future RV/RB aeroshells
Blast, Thermal, and Shock	WSMR LBTS SNL Thunder Range WSMR Solar Furnace*	For ground vehicles, structures, antennae For RV/RB systems
Disturbed Atmospheric RF/IR/Visible	NSWC Advanced Channel Scintillation (ACS) Nuclear Optical Dynamic Display System (NODDS) Radar Nuclear Corrupter & Simulator (RNECS)	For MILSATCOM, interceptor in-flight comm. and seekers
Combined Radiation Environments	WSMR Combined Radiation Environment (CRE) Facility	Provides an exoatmospheric gamma-neutron environment for synergistic testing

**Sustain until an alternative is available, tested and certified

*Not Currently Available

Where We Are Today In The CSOG-N Process (TRMC Perspective)

- **Services/Agencies have identified 400+ CBRN Mission Critical Systems (MCSs)**
- **What we hope to glean from the Mission Critical System Lists (MCLs) is a macro view of:**
  - MCSs with mission requirements to operate through a nuclear and/or EMP environments
    - Which have documented "Hardness Requirements" for survivability
    - Which will use TTPs for survivability
  - MCSs with HM/HS programs
  - Which MCSs have been tested for survivability and which need to be tested
  - The MCLs are still maturing and in many cases lack detail – impetus for a mid-year update
- **A sub-set of these systems will require DoD and/or DOE NWE simulator capabilities**
  - To assess the vulnerability of legacy Mission Critical Systems
  - To assess the hardness of Mission Critical Systems with nuclear hardness requirements (both legacy and new)
  - To Support Hardness Maintenance/Hardness Surveillance Programs
- **Depending on the system, vulnerability/hardness assessments may be required for:**
  - Electromagnetic Pulse (EMP) and High Altitude EMP (HEMP) effects
  - X-Ray Effects
  - Gamma Ray Effects
  - Neutron Effects
  - Blast & Thermal Effects
  - Disturbed Environment Effects
- **DoD and DOE have simulators for these effects but their adequacy is dependent on user requirements (capacity and technical requirements)**

NWE Conclusion –2010 Strategic Plan

- The DoD initiative to identify and correct deficiencies of systems with requirements to operate through nuclear (including EMP) environments is still at the beginning stage.
- TRMC will continue collaboration with DATSD (NM) in these activities and expects more definitive NWE test and test resource requirements to emerge over the next two years.
- For this Strategic Plan, the NWE test facilities and simulators identified in Table B9-1 require sustainment to meet evolving NWE test requirements as they emerge from the DoDI 3150.09 implementation process

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Questions ?

Backup

NWE “Drivers” (Re-awakening To NWE)

Flag Level Studies Addressing NWE Within DoD

- **2004 - Rpt of Commission To Assess The Threat To The US Of EMP Attack – Dr. Graham**
- **Dec 06 - DSB Report on Nuclear Capabilities, - Gen Welch (Ret) /Dr. Foster**
- **Oct 07 - Joint DSB/TRAC TF The Nuclear Weapons Effects National Enterprise - Dr. John/Joe Braddock**
- **May 2007- DoD IG Report No. 07-INTEL-07, Audit of DoD EMP Testing & Survivability Capabilities (SECRET),**
- **Feb 08 - Permanent DSB TF on Nuclear Surety – Rpt on Unauthorized Movement of Nuclear Weapons – Gen Welch (Ret)**
- **April 08 - Report of Commission To Assess The Threat To The US Of Electromagnetic Pulse Attack – Dr. Graham**
- **Summer 08 - AF Blue Ribbon Review of Nuclear Weapons Policies & Procedures – Peyer**
- **Sep 08 - DSB Task Force on Nuclear Skills – ADM Chiles**
- **Sep 08 – AF Nuclear TF Rpt on “Reinvigorating the AF Nuclear Enterprise” – MG Alston, SecAF Donley, Gen. Schwartz**
- **Sep 08/Dec08 - Rpt of the SecDef TF on DoD Nuclear Weapons Mgt,– Hon. James Schlesinger**
  - **AF Review**
  - **DoD Wide Review**
- **Sep 08 - SecDef/SecDOE White Paper on “National Security and Nuclear Weapons in the 21st Century” – Hon. Robert Gates/Samuel Bodman**
- **Dec 08 - Permanent DSB TF on Nuclear Surety, Nuclear Wpns Inspections, Gen Welch (Ret)**
- **Sep 08 - DoDI 3150.09, Chemical, Biological, Radiological, and Nuclear (CBRN) Survivability Policy**
- **2009 – Service/Agency Response To DoD EMP Action Plan & CBRN Policy – Mission Critical Facilities**
- **Apr 2009 – DSB Permanent Task Force on Survivability of DoD Systems & Assets To Electromagnetic Pulse EMP & Other Nuclear Effects, Dr John +**

USMC IMPLEMENTATION OF THE CBRN SURVIVABILITY POLICY DODI 3150.09

CWO5 CURT ROGERS
CBRN Defense
United States Marine Corps

AGENDA

- DODI 3150.09
- PROCESS
- USMC IMPLEMENTATION
- PROPOSED CBRN SURVIVABILITY ROADSHOW
- QUESTIONS

DODI 3150.09

- CBRN SURVIVABILITY POLICY
  - SYSTEM ALLOWED FOR CBRN TO BE WAIVED
  - POLICY TO ENSURE APPROPRIATE LEVEL OF VISIBILITY AND WAIVERABILITY
- ASSIGNS RESPONSIBILITIES FOR EXECUTION OF POLICY
  - USD (AT&L) POLICY OVERSIGHT
  - ATSD (NCB)
    - CHAIRS CBRN SURVIVABILITY OVERSIGHT GROUP (CSOG)
    - USMC PROVIDES REPRESENTATION (GO/0-6)
    - CSOG ACTION OFFICERS WORKING GROUP
      - TWO GROUPS: CBR AND N (USMC NO N REP/USN)
      - MEET QUARTERLY TO DISCUSS SERVICE IMPLEMENTATION
      - CLASSIFICATION SECURITY GUIDE COMPLETED
    - ESTABLISH, MAINTAIN, AND UPDATE A NUCLEAR AND CBR DATABASE (PHENOMENOLOGIES, MATERIALS EFFECTS, DAMAGE ASSESSMENT CRITERIA)

PROCESS

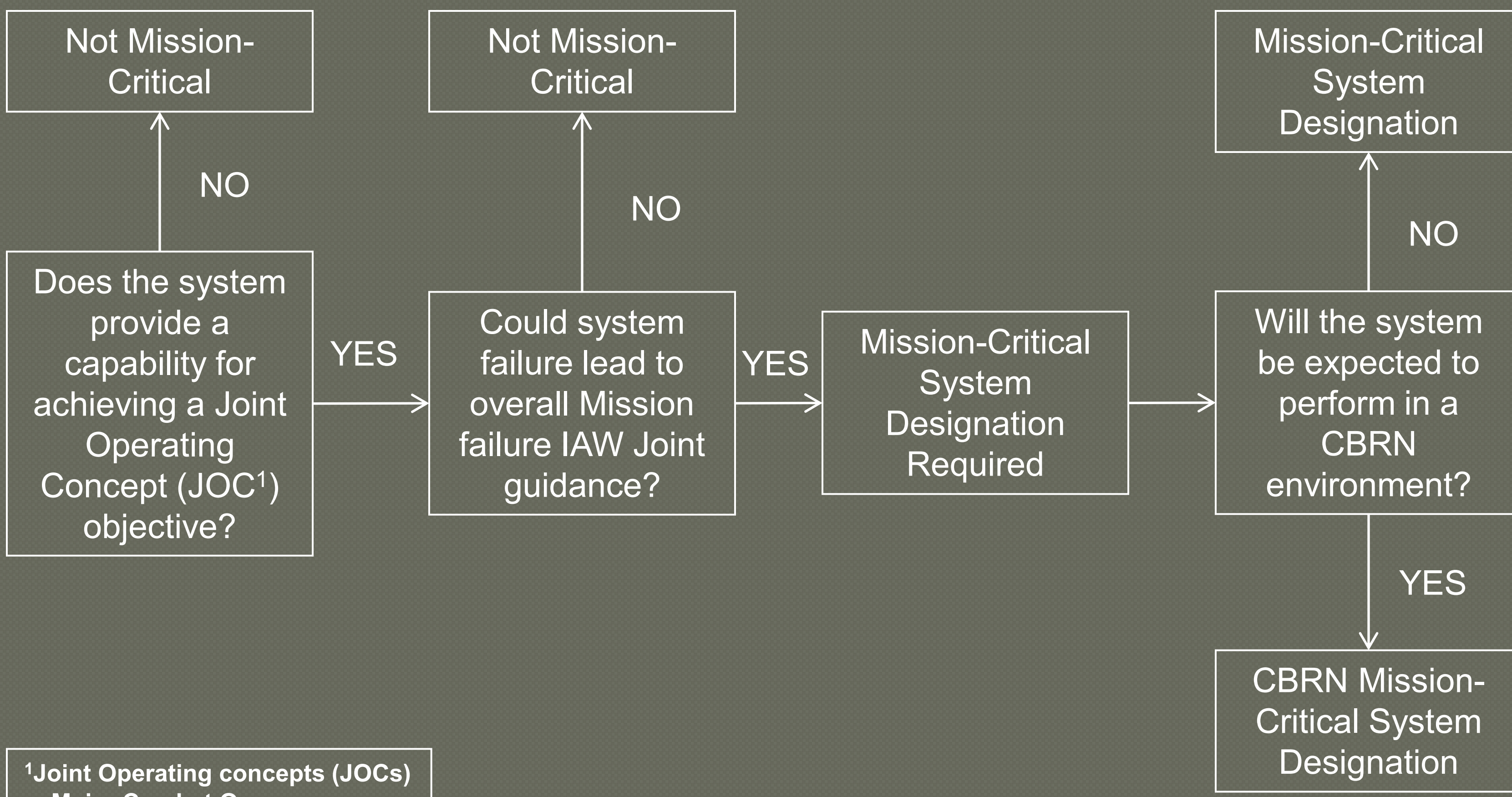
MISSION CRITICAL DESIGNATION

- IS NEW SYSTEM MISSION CRITICAL
- IS NEW SYSTEM CBRN MISSION CRITICAL
  - INCLUDE OBJECTIVE, QUANTITATIVE, MEASURABLE, AND TESTABLE CBRN SURVIVABILITY PERFORMANCE ATTRIBUTES (THRESHOLD AND OBJECTIVE (T/O) REQUIREMENTS)
  - GATEKEEPERS VALIDATE CBRN SURVIVABILITY REQUIREMENTS
- SYSTEMS DESIGNATED JROC INTEREST/JROC WILL VALIDATE CBRN MISSION CRITICAL DESIGNATION AND REQUIREMENTS
- SYSTEMS DESIGNATED NON JROC INTEREST/FCB ADJUDICATION FOR CBRN MISSION CRITICAL DESIGNATION
- SERVICE REQUIREMENTS AUTHORITY WILL VALIDATE CBRN MISSION CRITICAL REQUIREMENTS FOR NON JROC INTEREST MISSION CRITICAL SYSTEMS

LEGACY SYSTEMS

- ADDRESS DEFICIENCIES/MATERIEL SOLUTIONS/FUNDS
- NON MATERIEL SOLUTIONS

PROCESS



[1]**Joint Operating concepts (JOCs)**
- **Major Combat Ops**
- **Stability Ops**
- **Strategic Deterrence**
- **Homeland Security**
- **Combating Terrorism**

PROCESS

- NUCLEAR AND CBR MATERIELS DATABASE (DECONTAMINATION)
- CBRN TESTING PROTOCOLS
- CBRN INTEGRATION ON “OTHER” PLATFORMS
- SURVIVABILITY POLICY PRIMARILY FOR “NON” CBRN SYSTEMS (CBRN SYSTEMS ARE ALREADY MADE TO BE SURVIVABLE IN A CBRN ENVIRONMENT)

USMC IMPLEMENTATION DoDI 3150.09

- Formally integrated CBRN Survivability into the Acquisitions Process identified in MCO 3900.15_ the Expeditionary Force Development System (USMC JCIDs Order).
- All new acquisitions formally assessed for CBRN Survivability within the EFDS process.
- Continue to participate in the review and update of DODI 3150.09.
- Continue to determine and designate CBRN Mission Critical Programs/Equipment.
- Continue to assess the CBRN Survivability capabilities of Mission Critical Programs/Equipment.
- Currently in the process of creating requirements for any Mission Critical Programs/Equipment with CBRN Survivability Shortfalls (none identified at this time).

PROPOSED ROADSHOW

PURPOSE

- CLARIFY DODI WRT USMC PROCESS
- CLARIFY REPORTING REQUIREMENT
- SYNCHRONIZE CD&I AND MCSC VIEW OF DODI AND THE “NON” CBRN IMPLICATIONS FOR THE ACQUISITION PROCESS
- FAMILIARIZE PM’S WITH:
  - DATABASES FOR MATERIELS, TESTING PROTOCOLS, OTHER TOOLS
  - AVAILABILITY OF THE JOINT PROGRAM EXECUTIVE OFFICE (JPEO) TO INTEGRATE CBRN ELEMENTS INTO SYSTEMS

QUESTIONS

US ARMY RDECOM

DoD R&D Laboratories –
Making Warfighter Materiel Solutions Better

EDGEWOOD CHEMICAL BIOLOGICAL CENTER
A U.S. Army RDECOM Laboratory

TECHNOLOGY DRIVEN. WARFIGHTER FOCUSED.

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17 April 2011

Approved for Public Release

AGENDA

- Learning at Conferences
- Suggestions on Working with DoD Labs
- Sample DoD Lab
  - ECBC: Core Competencies

Why do People Attend Conferences?

<u>Recent research suggests:</u>

- Learning
- Networking
- Meeting new people
- Face-to-face meetings
- Booths with new products

#1 Reason to go to Conference:
Partying & Schmoozing?

What Makes Good Conferences?

Recent research suggests:

- Enable as much active participation of as many participants as possible
- Facilitate personal networking
- New and exciting information that can't be presented elsewhere differently

How do Adults Learn?

Average Retention Rate	Learning Methods
5%	Lecture
10%	Reading
20%	Audio-Visual
30%	Demonstration
50%	Discussion
75%	Practice By Doing
90%	Teach Others/Use the Learning

Learning at Conferences

- Facilitate personal networking:

Meet the person next to you and ask . . .

Where are you from and why the heck are you here????

Learning at Conferences

• Enable as much active participation of as many participants as possible

- ➢ Anybody meet someone with an interesting reason for being here?
- ➢ Any other DoD lab people here?

Suggestions on Working with DoD Lab

- Identify problem to be solved or questions to answer
- Find DoD lab core competencies
- Ask lab to identify other partners that can "augment" core competency for best solution

What's a Lab Core Competency?

- DoD lab core competencies typically based on "what end products are required" to succeed in the warfighting mission
- Can be research, engineering, operations but fundamentally supports warfighting products and missions

DoD Laboratories

DoD Laboratories offer unique facilities coupled with military focus to provide Warfighters the best solutions to accomplish their mission

67 DoD Laboratories:

1. **Aeromedical Research Laboratory**
   Fort Rucker, AL
2. **Armament Research, Development, and Engineering Center**
   Picatinny Arsenal, NJ
3. **Communications and Electronics Research, Development, and Engineering Center , APG, MD**
4. **Army Material Systems Analysis Activity**
   Aberdeen Proving Ground, MD
5. **Army Geotechnical and Structures Lab**
   Vicksburg, MS
6. **Army Construction and Engineering Research Lab**
   Champaign, IL

67 DoD Labs (cont'd)

7. Army Cold Regions Research and Engineering Lab
   Hanover, NH
8. Army Coastal and Hydraulics Lab
   Vicksburg, MS
9. Army Information Technology Lab
   Vicksburg, MS
10. Army Environmental Lab
    Vicksburg, MS
11. Aeroflightdynamics Directorate
    Moffett Field, CA
12. Army Sustainment Command
    Rock Island, IL
13. Army Research Institute for the Behavioral and Social Sciences
    Arlington, VA

67 DoD Labs (cont'd)

14. Army Research Institute of Environmental Medicine
    Natick, MA
15. Army Research Laboratory
    Adelphi, MD
16. ARL - Army Research Office
    Durham, NC
17. Aviation and Missile Research, Development, and Engineering Center
    Redstone Arsenal, AL
18. Edgewood Chemical Biological Center
    Aberdeen Proving Ground, MD
19. Engineer Research and Development Center
    Vicksburg, MS

67 DoD Labs (cont'd)

20. Army Institute of Surgical Research
    Fort Sam Houston, TX
21. Army Medical Research Institute of Chemical Defense
    Aberdeen Proving Ground, MD
22. Army Medical Research Institute of Infectious Diseases
    Fort Detrick, MD
23. Natick Soldier Research, Development, and Engineering Center
    Natick, MA
24. Simulation and Training Technology Center
    Orlando, FL
25. Space and Missile Defense Technical Center
    Huntsville, AL

67 DoD Labs (cont'd)

26. Tank Automotive Research, Development, and Engineering Center
    Warren, MI
27. Walter Reed Army Institute of Research
    Silver Spring, MD
28. Army Topographics Engineering Center
    Fort Belvoir, VA
29. Marine Corps Warfighting Laboratory
    MCB Quantico, VA
30. Naval Health Research Center
    San Diego, CA
31. Naval Medical Research Center
    Silver Spring, MD
32. Naval Research Laboratory
    Washington, DC

67 DoD Labs (cont'd)

33. Naval Undersea Warfare Center - Newport Division
    Newport, RI
34. Naval Undersea Warfare Center - Keyport Division
    Keyport, WA
35. Space and Naval Warfare Systems Center - Pacific
    San Diego, CA
36. Space and Naval Warfare Systems Center - Atlantic
    Charleston, SC
37. SPAWAR Space Field Activity
    Chantilly, VA
38. Naval Air Warfare Center Aircraft Division - Patuxent River
    Patuxent River, MD
39. Naval Air Warfare Center - Training Systems Division
    Orlando, FL
40. Naval Air Warfare Center Aircraft Division - Lakehurst
    Lakehurst, NJ

67 DoD Labs (cont'd)

41. Naval Air Warfare Center Weapons Division - China Lake
    China Lake, CA
42. Naval Air Warfare Center Weapons Division - Point Mugu
    Point Mugu, CA
43. Naval Surface Warfare Center- Carderock Division
    Carderock, MD
44. Naval Surface Warfare Center- Dahlgren Division
    Dahlgren, VA
45. Naval Surface Warfare Center- Pt. Hueneme Division
    Port Hueneme, CA
46. Naval Surface Warfare Center- Indian Head Division
    Indian Head, MD
47. Naval Surface Warfare Center- Corona Division
    Corona, CA
48. Naval Surface Warfare Center- Panama Division
    Panama City, FL

67 DoD Labs (cont'd)

49. Naval Surface Warfare Center- Crane Division
    Crane, IN
50. Naval Surface Warfare Center- EODTechDiv
    Indian Head, MD
51. Naval Surface Warfare Center- Philadelphia
    Philadelphia, PA
52. Naval Submarine Medical Research Laboratory
    Groton, CT
53. Naval Aerospace Medical Research Laboratory
    Pensacola, FL
54. Naval Health Research Center - Environmental Health Effects Laboratory
    Wright-Patterson AFB, OH
55. Air Force Research Laboratory
    Wright-Patterson AFB, OH

67 DoD Labs (cont'd)

56. Air Force Office of Scientific Research
    Arlington, VA
57. Air Vehicles Directorate
    Wright-Patterson AFB, OH
58. AFRL - Directed Energy Directorate
    Kirtland AFB, NM
59. AFRL - Human Effectiveness Directorate
    Wright-Patterson AFB, OH
60. AFRL - Information Directorate
    Rome, NY
61. AFRL - Materials and Manufacturing Directorate
    Wright-Patterson AFB, OH

67 DoD Labs (cont'd)

62. **AFRL - Munitions Directorate**
    Eglin AFB, FL
63. **ARFL - Propulsion Directorate**
    Wright-Patterson AFB, OH
64. **AFRL - Sensors Directorate**
    Wright-Patterson AFB, OH
65. **AFRL - Space Vehicles Directorate**
    Kirtland AFB, NM
66. **Armed Forces Radiobiology Research Institute**
    Bethesda, MD

ECBC – CB Research Critical Core Capabilities & Facilities

1. **Aerosol Physics**
   – Measure and develop models to predict aerosol particle transport phenomena
2. **CB Agent Spectroscopy/Algorithm Development**
   – Research the detection of CB materials –point & standoff
3. **Chemistry & Bioscience of CB Warfare**
   – Fully understand agent properties (persistence, environmental fate/effect, etc) & how to decontaminate
4. **Emerging threat Science/Technology/Testing**
   – Research emerging toxics threats and challenge COTS/GOTs equipment – suggest improvements

Aerosol Test Facilities

Standoff Detection Technology Evaluation Facility

Advanced Chemistry Laboratory

Phase II of ACL – Third Wing

Bioengineering Facility

ECBC – CB Research Critical Core Capabilities & Facilities

5. Filtration Sciences

– Determine more efficient means to protect from toxic airborne respiratory hazards

6. Inhalation Toxicology

– Measure and model human toxicity levels to est. equipment performance criteria

7. Org for the Prohibition of Chemical Weapons (OPCW) Lab

– 1 of 2 labs in U.S. allowed to identify chemical compounds prohibited by the CWC

8. Single Small-Scale Facility

– Only U.S. declared facility allowed to produce CW agents for DoD protective purposes.

McNamara Life Sciences Bldg.

Forensic Analytical Center

Single Small-Scale Facility

ECBC - Facts

- Nations principal R&D resource for non-medical CB Defense
- Hazardous operations incident rate (1.17) falls below the industry average (2.5)
- $1.8B specialized and unique laboratories
- 1.8 M ft^2 of lab and chamber space
- 435 certified chemical surety hoods
- 68 BSL-2 and BSL-3 hoods
- Chemical Transfer Facility (CTF) was designated as the only U.S. declared Single Small Scale Facility under the CWC
- The only source of CASARM standards
- Large Scale Secure Cryogenic Storage and Archiving
- Technology Transfer – hundreds of agreements in 2010 (CRADAs, TSAs, OGAs)

ECBC – Infrastructure Benefits

- Specialized & unique labs can adapt to unique customer needs
- Single Small Scale Facility ensures agents are available for customer testing
- CASARM standards ensure unknowns can be identified accurately and test agent materials are of the correct type
- Ability to test and assist to improve COTS /GOTS
- Possesses unique infrastructure and knowledge not maintained by commercial industry

The following are indirectly related to infrastructure :

- High lab safety rate ensures customer projects are completed on time & in a safe manner
- Collaboration with Intel Community ensures tests are conducted and models created against real relevant threats
- Broad experience establishing CRADAs, TSAs, OGAs, MOUs, etc.

Learning at Conferences

- <u>Be careful who you listen to:</u>
  - ***An amazing invention but who would ever want to use it?*** (President Hayes on invention of telephone)
  - ***There is no reason for any individual to have a computer in his home.*** (Ken Olsen, co-founder of Digital Equipment Corp)
  - ***The truth is that no database will ever replace your daily newspaper and no computer network will change the way government works*** (Newsweek Magazine article, 27 Feb 1995)