



Department of Defense: Chemical and Biological Defense Program

Col Pro 2005

**COL Debra Thedford, USA
Director, Chemical and Biological Defense Programs
Office of Deputy to the Secretary of Defense for
Chemical and Biological Defense**

June 21, 2005

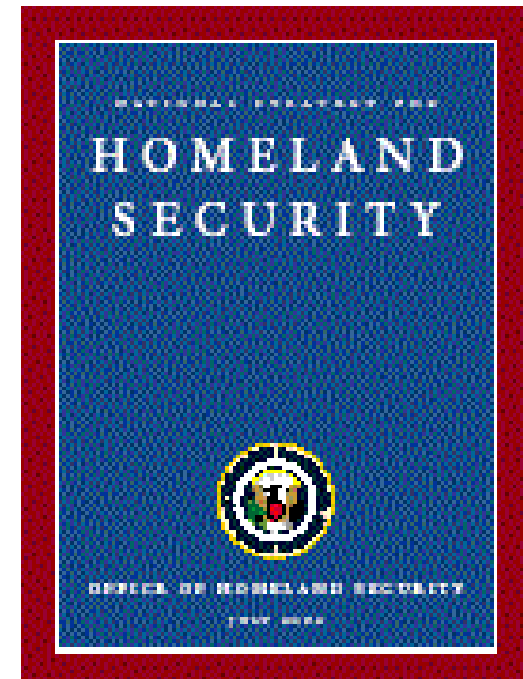
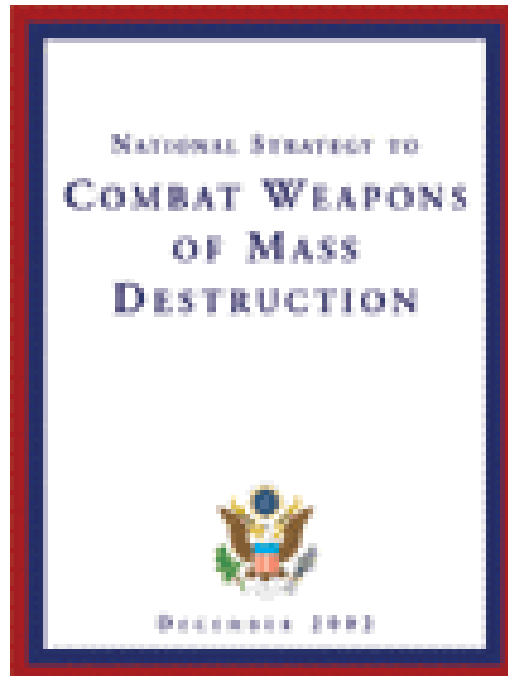
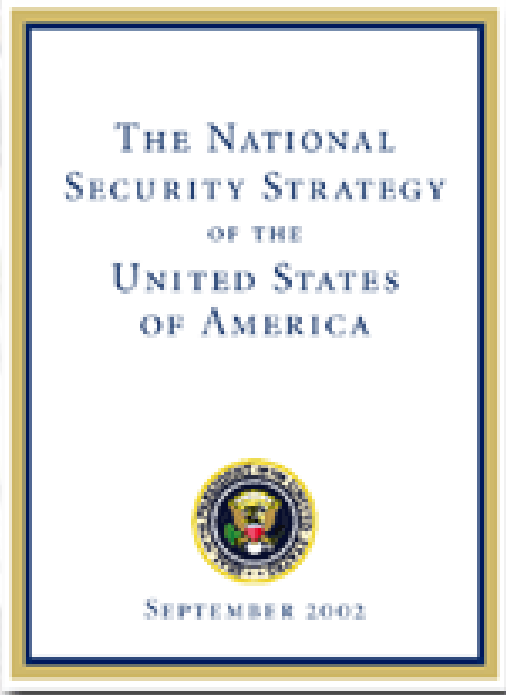
Global War on Terror

“Today, the gravest danger in the war on terror, the gravest danger facing America and the world, is outlaw regimes that seek and possess nuclear, chemical, and biological weapons. These regimes could use such weapons for blackmail, terror, and mass murder. They could also give or sell those weapons to terrorist allies, who would use them without the least hesitation.”

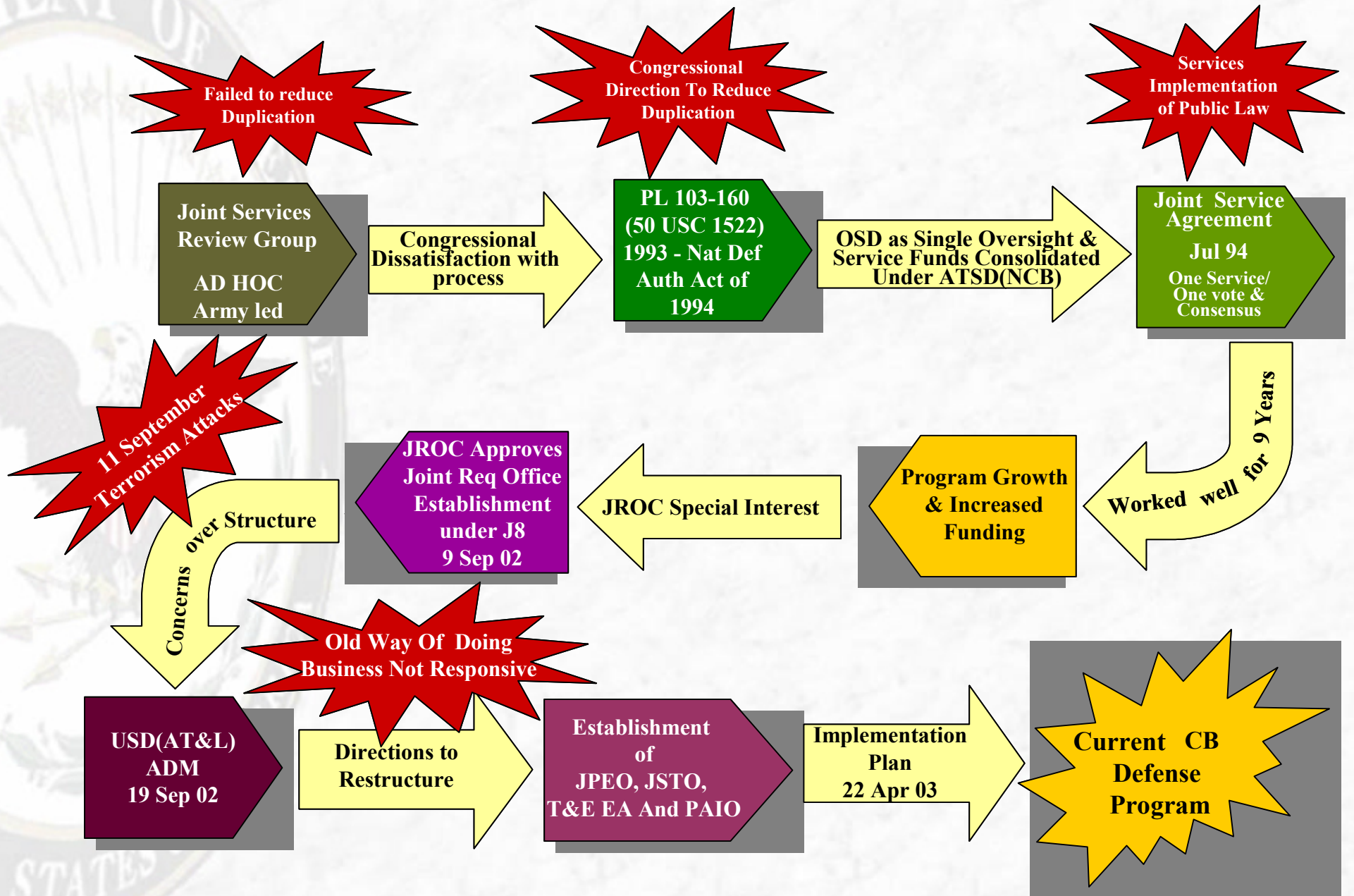


*- President George W. Bush,
2003 State of the Union*

Recent Strategic Guidance



Joint CBDP Background



CBDP

Vision and Mission

VISION

Combat Weapons of Mass Destruction through a Strong Chemical, Biological, Radiological, and Nuclear Defense Program

MISSION

Provide CBRN defense *capabilities* to effectively execute the National Strategy for Combating Weapons of Mass Destruction. Ensure all capabilities are integrated and coordinated within the Interagency community

CBDP Major Players



Dr. Dale Klein
ATSD(NCB)



Dr. Klaus Schafer
DATSD(CBD)



MG Howard Bromberg
JRO-CBRND



BG Steve Reeves
JPEO-CBD



Dr. Charles Galloway
Director, JSTO

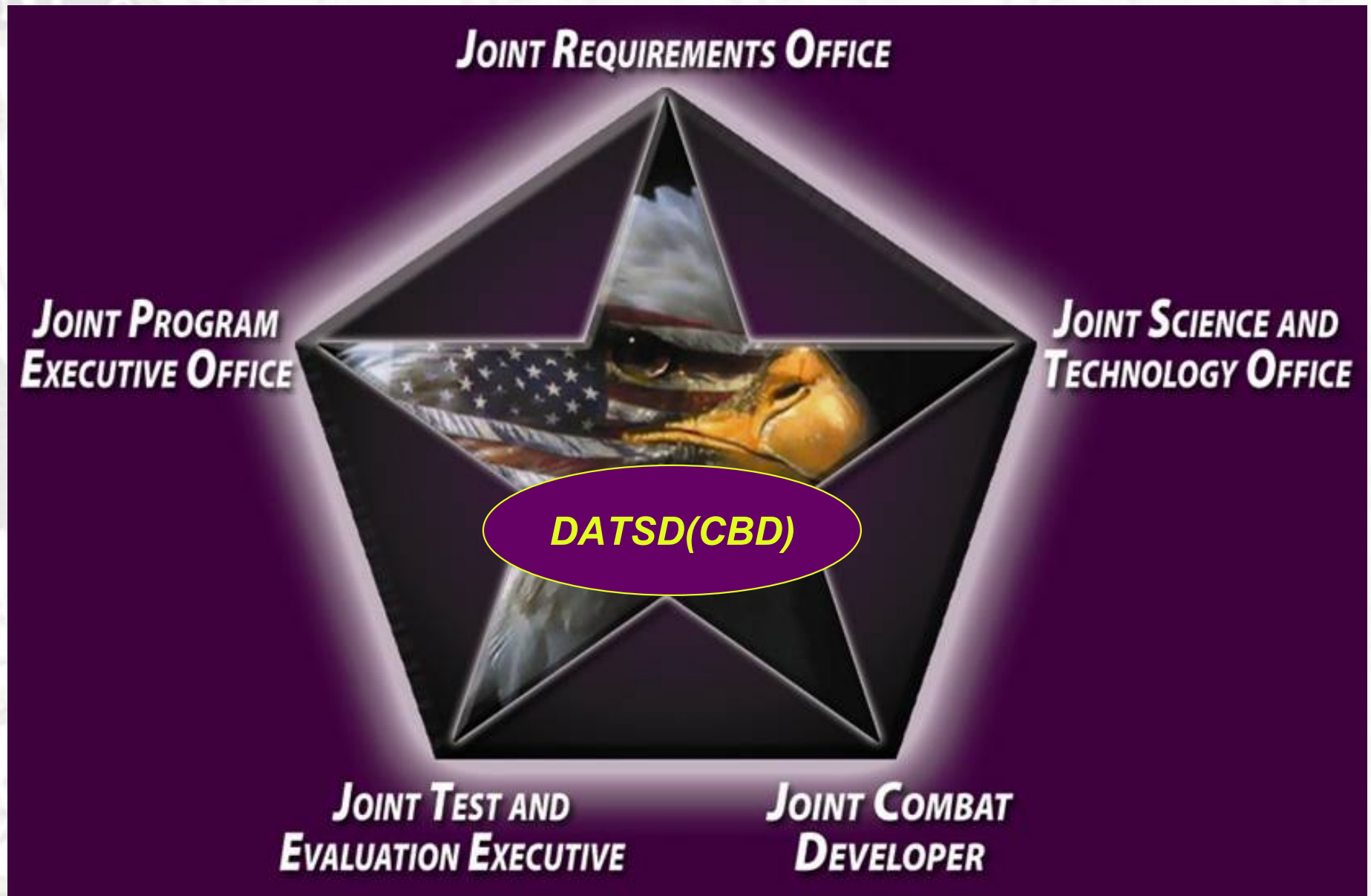


Mr. Walter Hollis
Joint T&E Executive Agent

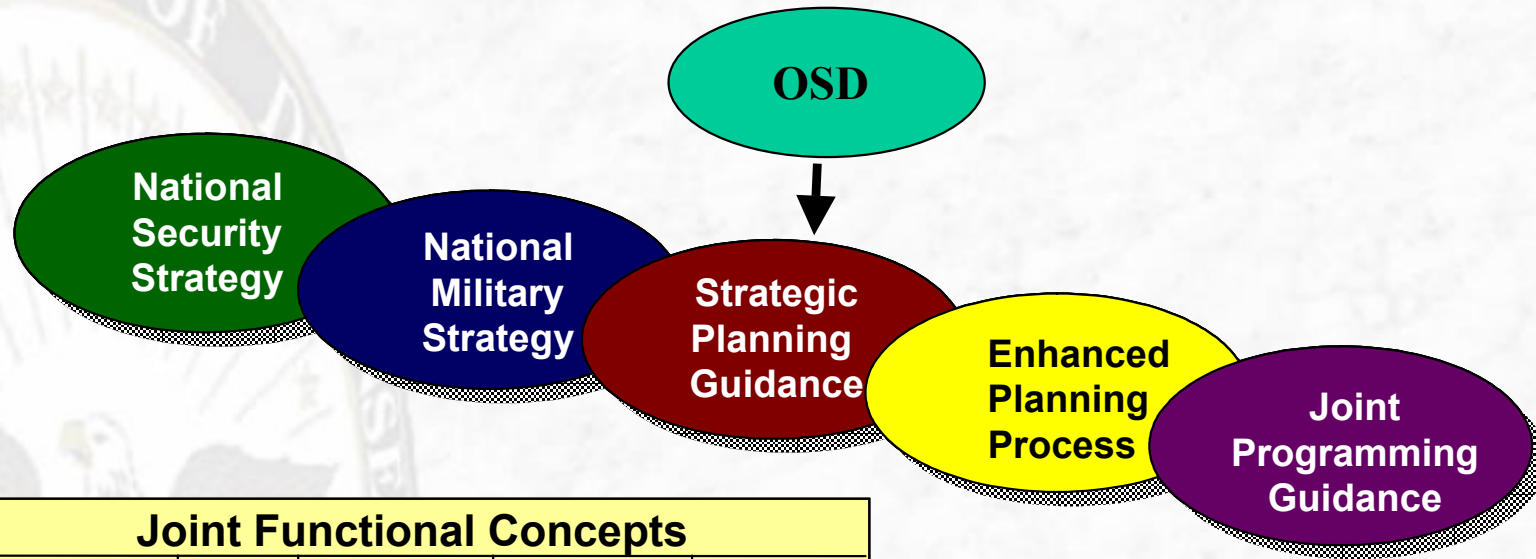


BG Stan Lillie
Joint Combat Developer

Chemical and Biological Defense Program (CBDP) Program Organization



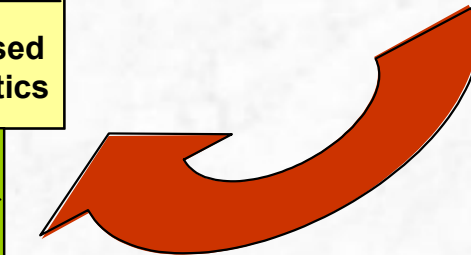
CBDP Policy Drivers



Joint Functional Concepts				
Protection	C2	Battlespace Awareness	Force Application	Focused Logistics

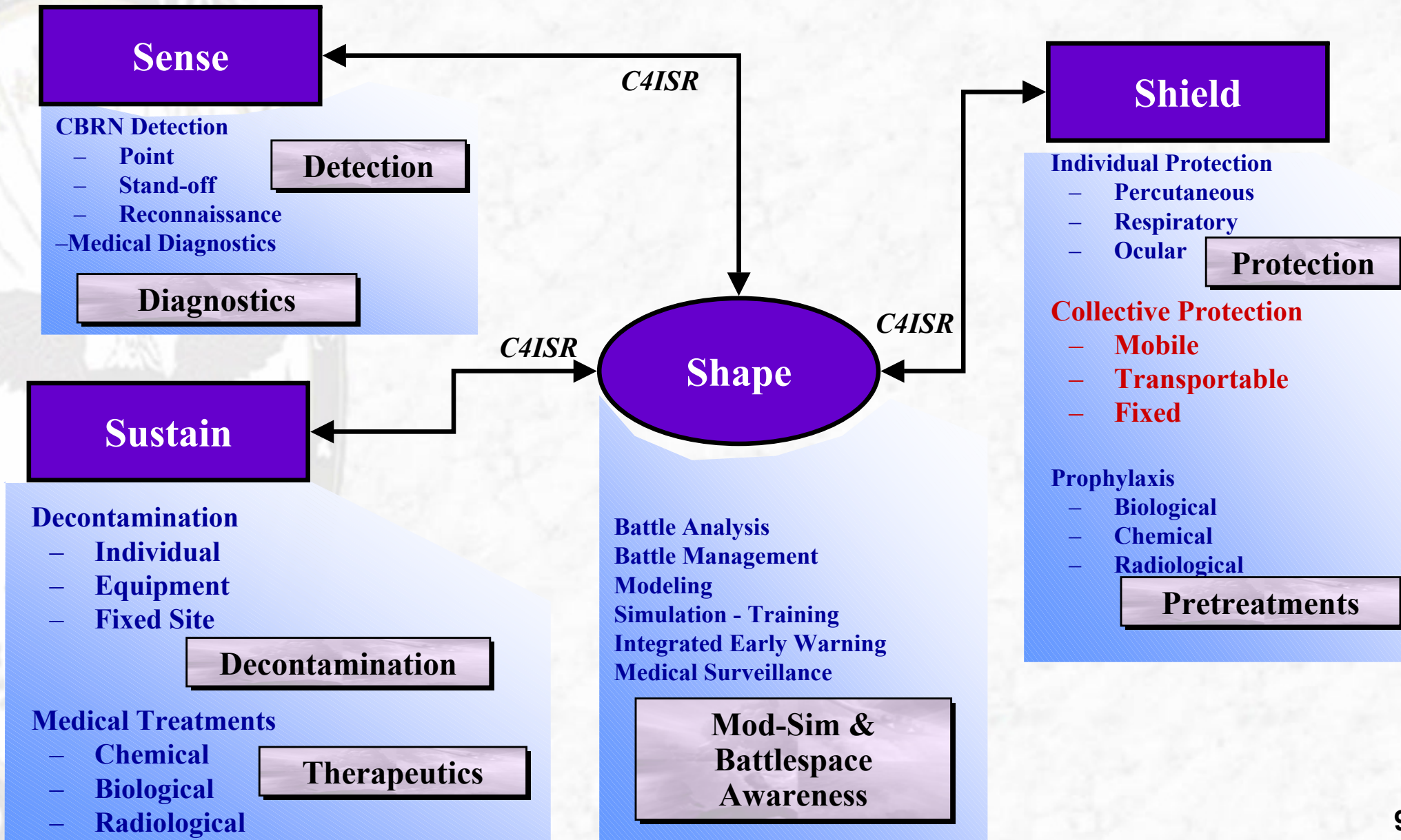
Joint Operating Concepts			
Major Combat Ops	Stability	HLS	Strategic Deterrence

Joint CBRN Defense Concept			
Sense	Shape	Shield	Sustain

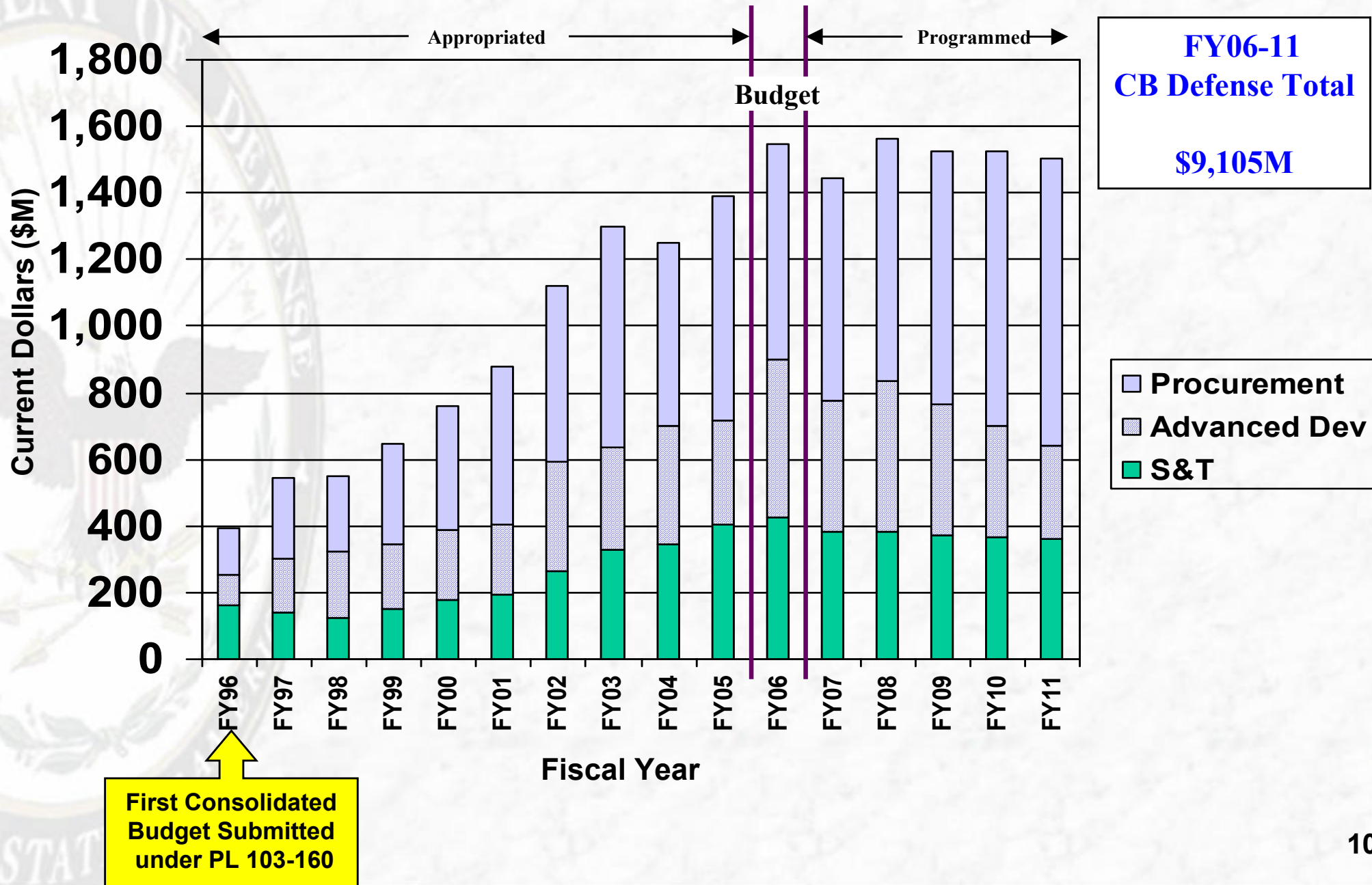


***Chemical Biological
Defense Program***

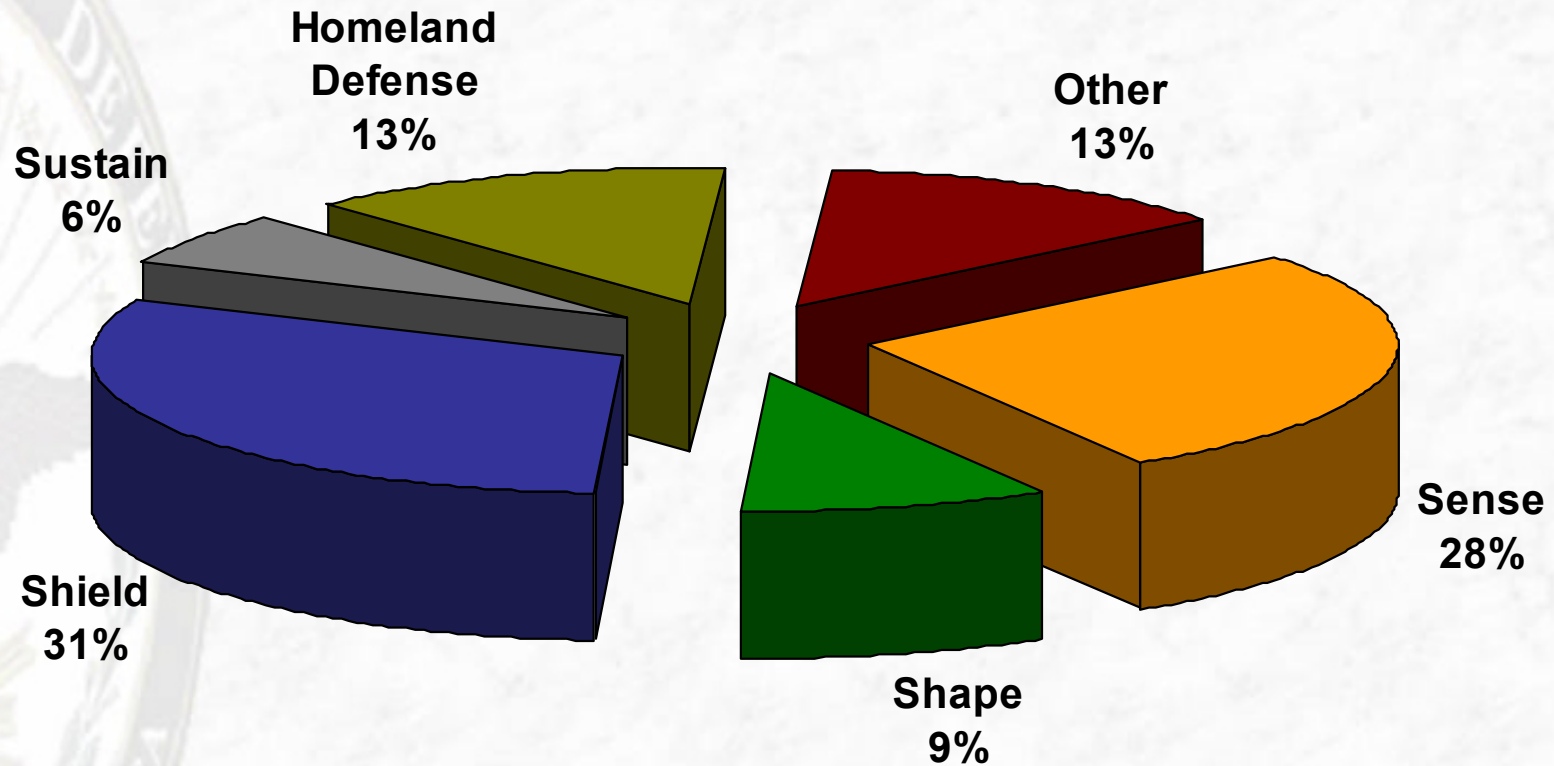
Requirements to Ensure Battlefield Capabilities



DoD CB Defense Program Funding



FY06 Resource Allocation Capability Areas

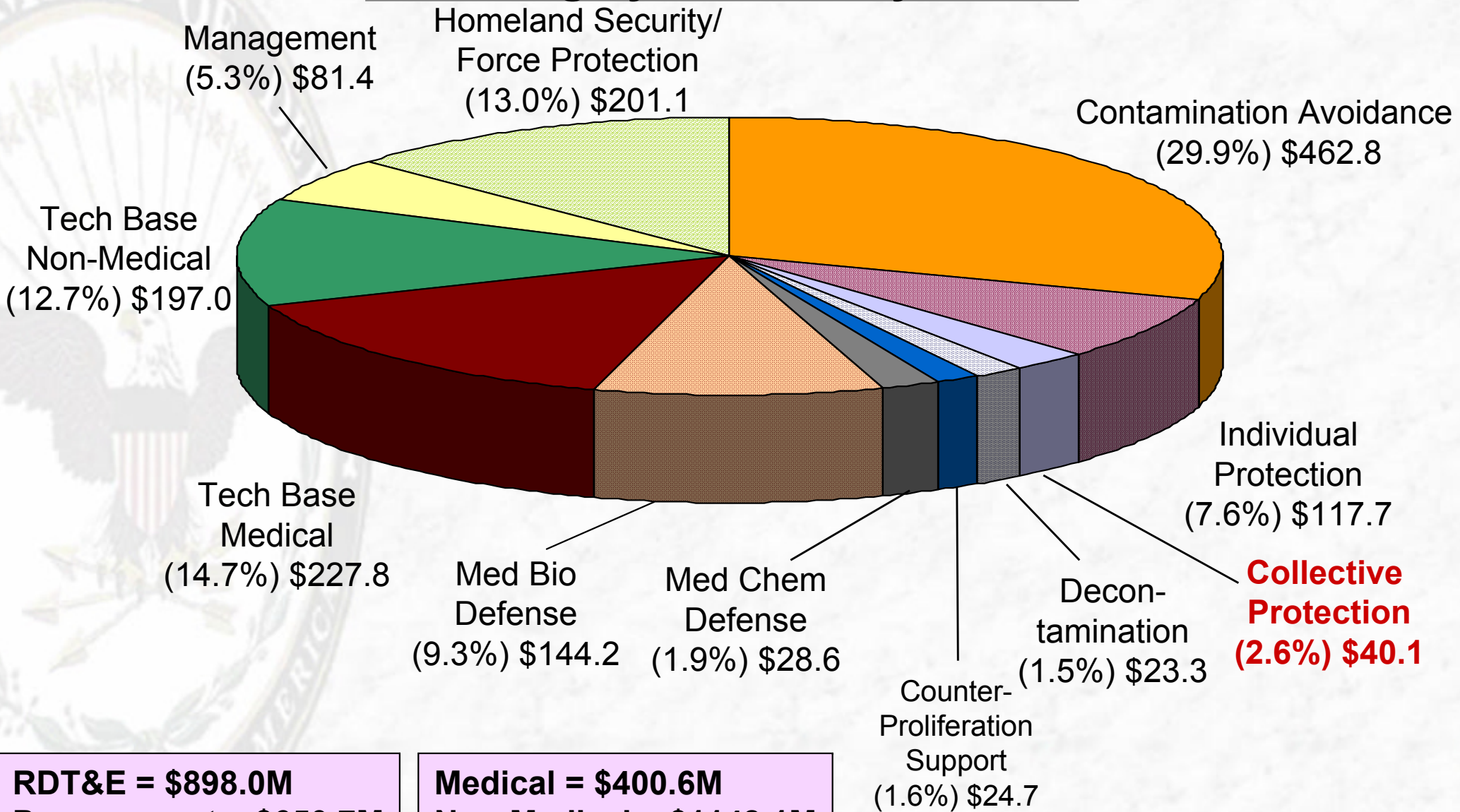


■ Sense ■ Shape ■ Shield ■ Sustain ■ Homeland Defense ■ Other

Total Funding FY06: \$1.5B

DoD Chemical/Biological Defense Program FY2006 PB (\$M)

Funding by Commodity Area



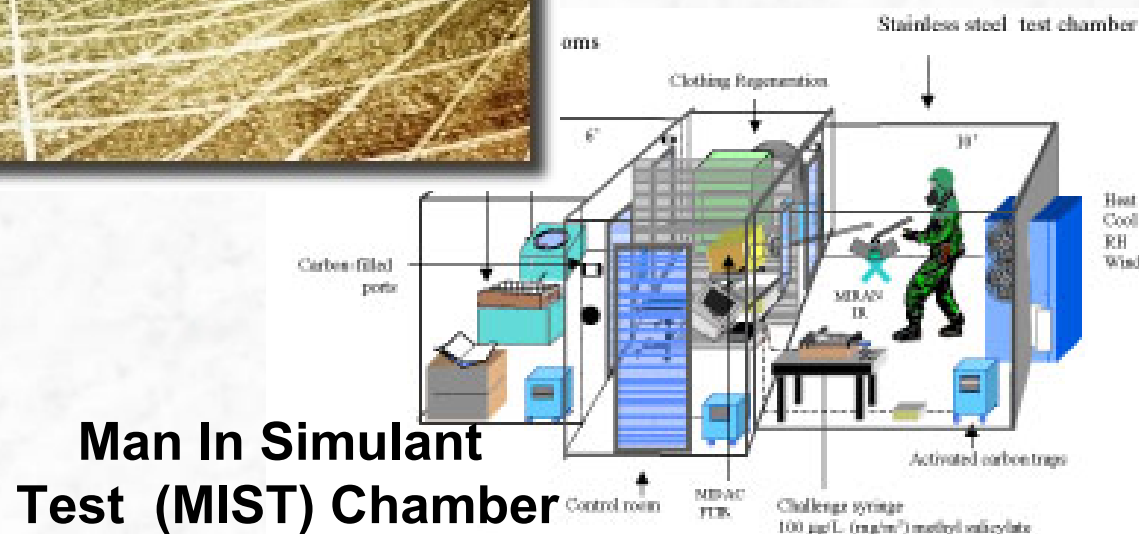
RDT&E = \$898.0M
Procurement = \$650.7M
Total = \$1548.7M

Medical = \$400.6M
Non-Medical = \$1148.1M
Total = \$1548.7M

Enhanced Planning Process (EPP): Key Results

Infrastructure Improvements	RDT&E Areas of Additional Emphasis
<ul style="list-style-type: none">• CB T&E Facilities• Non-Traditional Agent (NTA) Test Chamber• USAMRIID (Defense Health Program)	<ul style="list-style-type: none">• S&T for NTA detection• Bio point and standoff detection• Medical Prophylaxis• Battle Analysis• Decontamination• Bio Defense Initiatives• Chem point detection

T&E Infrastructure Investment



The methods of weapons employment are diverse and may change as radically as the potential types of threat agents.

Crop Dusting



Commercial Backpack Sprayer



Packages & Mail



Infected Individual ("Suicide" Bioterrorism?)



Contaminated Food/Water



Industrial/ Military Sprayers



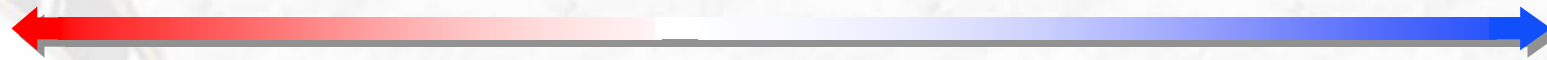
Submunitions/ Missiles



CB Agent Threat Spectrum

CLEARLY CHEMICAL

CLEARLY BIOLOGICAL



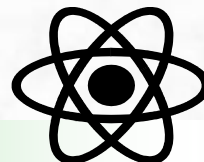
CW

BW

CLASSIC CHEMICAL	EMERGING CHEMICAL	BIOREGULATOR	TOXIN	PATHOGEN
BLOOD VESICANT	PROTECTION DEFEATING	PAIN	PLANT	BACTERIA
NERVE	PHYSICAL INCAPACITANT	SLEEP	BACTERIAL	VIRUSES
PSYCHOLOGICAL INCAPACITANT (BZ)	TOXIC INDUSTRIAL CHEMICAL AND MATERIAL	BLOOD PRESSURE	VENOM	RICKETTSIAE
CHOKING		MOOD ENHANCERS	MARINE FUNGAL ALGAL	GENETIC ENGINEERED MICRO-ORGANISMS



Traditional Nuclear

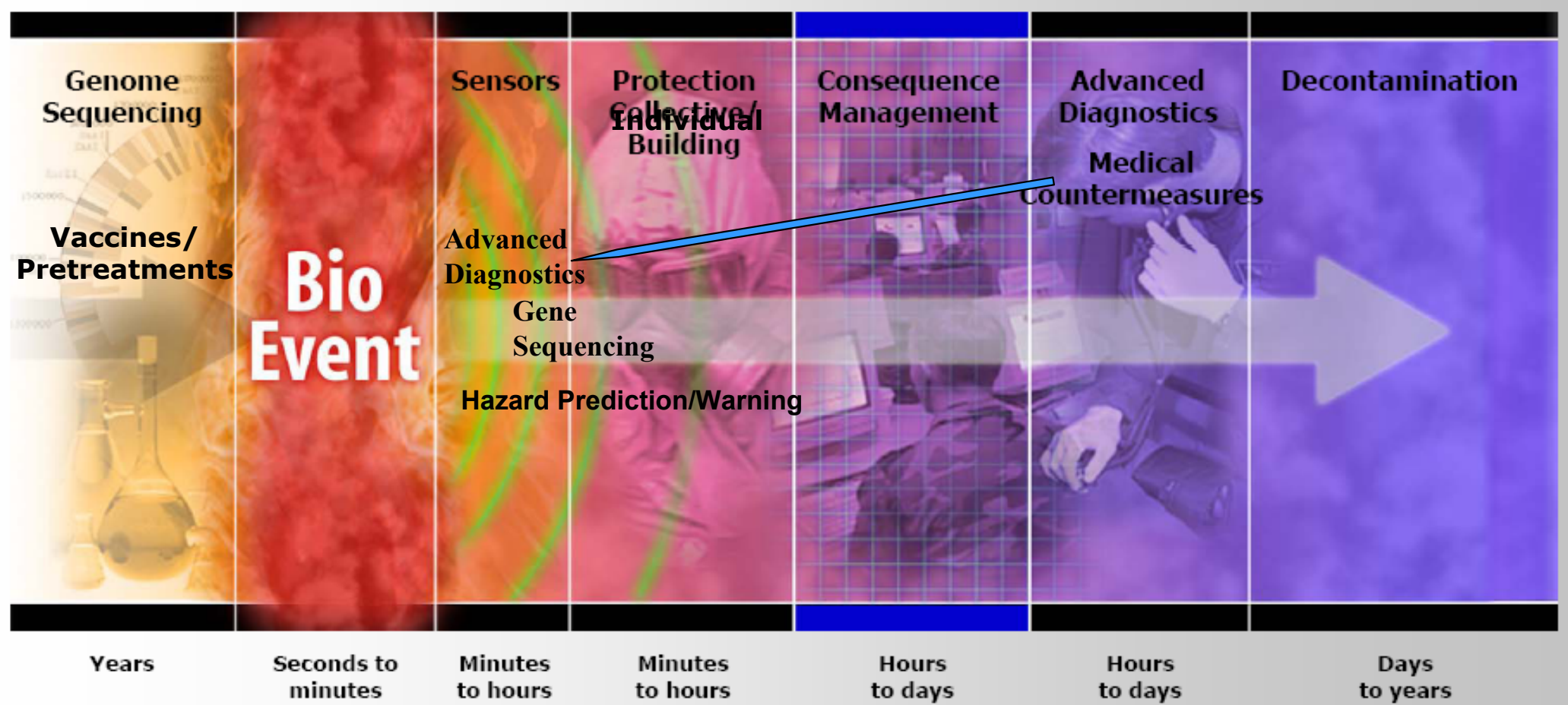


Asymmetric Weapons

**Nuclear Bombs
Nuclear Missiles
Tactical Nukes**

**Radiological Dispersion Devices
Improvised Nuclear Devices
Nuclear Power Plants**

DoD Biological Defense Efforts



Leveraging the State-of-the-Art

- Proteomics
- Genomics
- Metabolomics
- Toxicogenomics
- Multi-spectral analysis
- Bioinformatics
- PCR/Immuno-assays
- Microarrays
- Nanomaterials
- Broad Spectrum disinfectants
- Multi-agent vaccines
- Epidemiology
- Self-decontaminating coatings

Partnerships & Cooperation to Leverage the State-of-the-Art

- Service Labs
- International Industry
- Academia
- Other Federal Agencies

Future Emphasis: Systems Biology

Today's Threats

Anthrax
Smallpox
Botulinum
Plague
Tularemia
Ebola/Filo
Hemorrhagic Fever
Encephalitis
SARS
Influenza
Ricin/SEB, others

Modes of Action

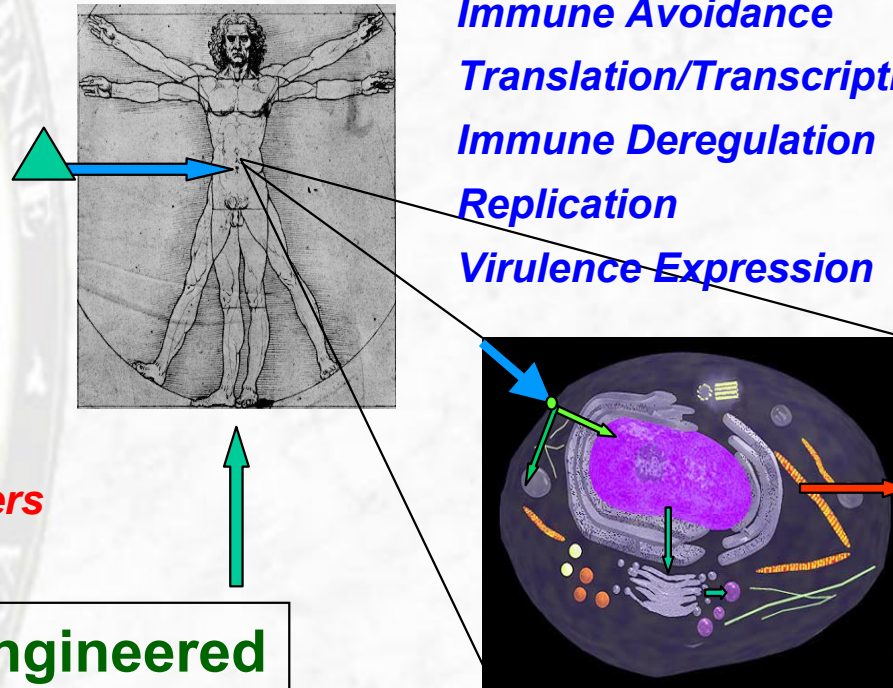
Receptor Binding
Signal Transduction
Decoys
Immune Avoidance
Translation/Transcription
Immune Deregulation
Replication
Virulence Expression

Parallel Systems Approach

Solutions

Target Agent Commonalities

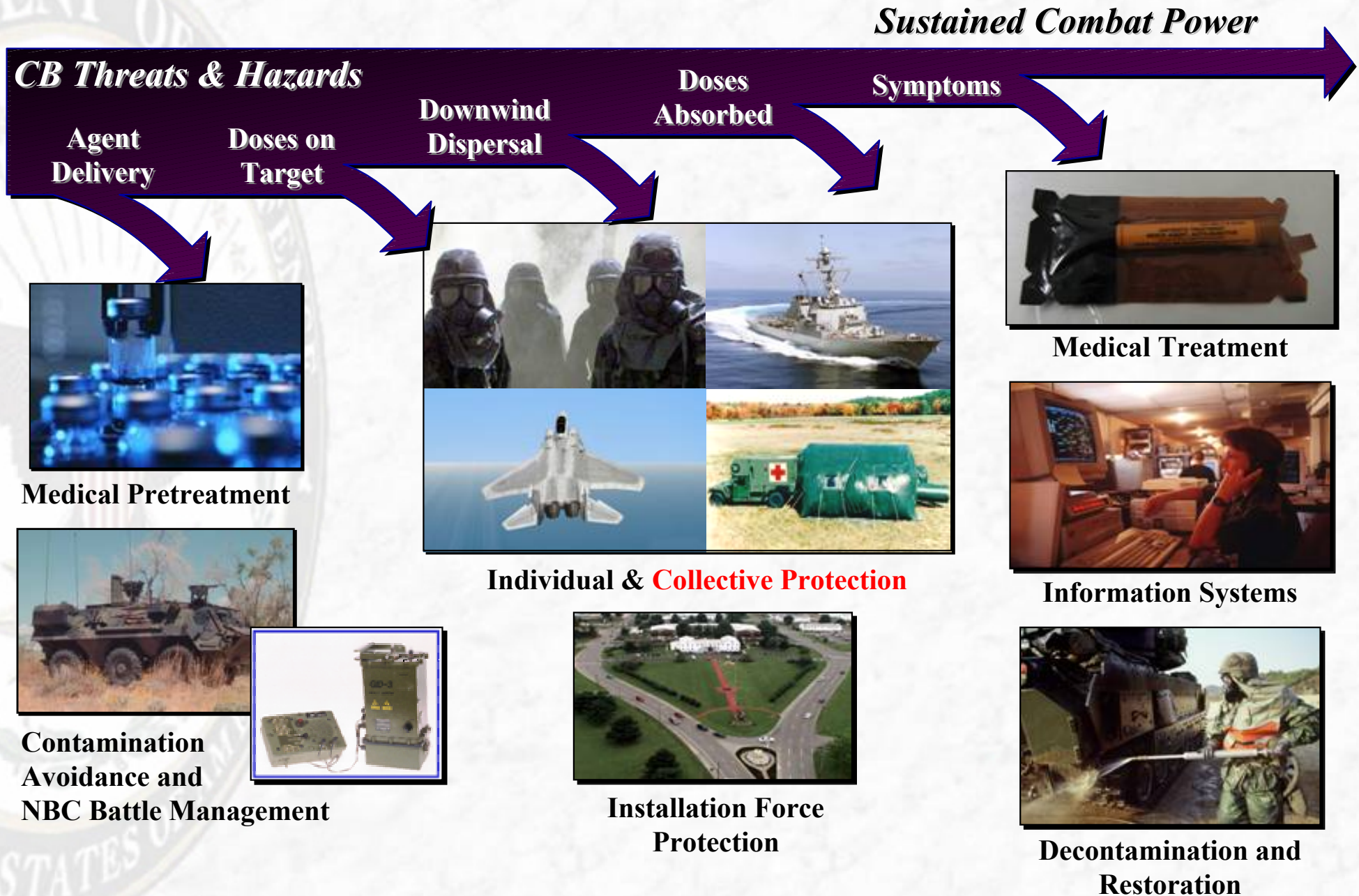
- Block Key Receptors
- Inhibition by Small Molecules
- Modulate Immunity
- Change Gene Expression
- Block Protein Actions
- Modulate Physiologic Impacts



Bioengineered

One **PIECE** at a time → Process Analysis → Broad Spectrum

Chemical and Biological Defense Program: An Integrated Collection of Capabilities is Needed to Counter the Threats

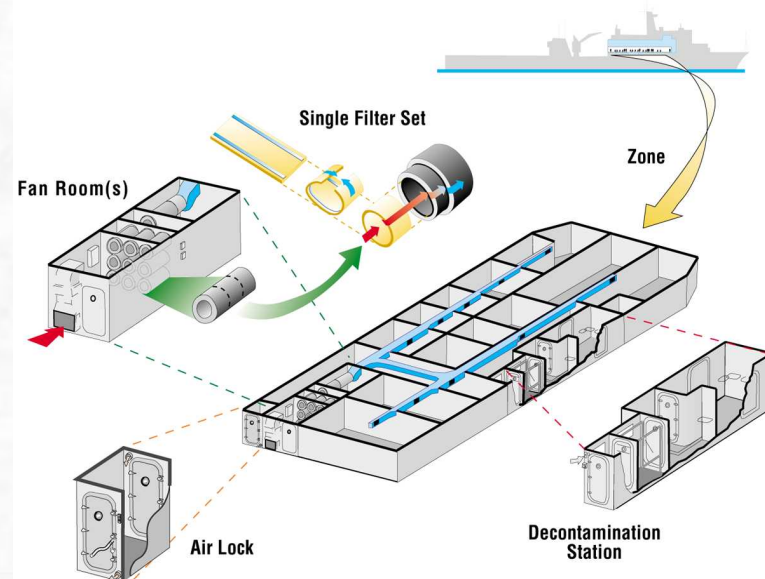


Collective Protection



◆ System needed when:

- Sustained operations are required for critical nodes
- Internal equipment needs protection from contamination
- Long duration operations are expected in contaminated area
- Operations require a clean environment, e.g., medical support



Collective Protection Modernization Strategy

Fielded Capabilities	NEAR (FY06-07)	MID (FY08-11)	FAR (FY12-21)
<ul style="list-style-type: none"> • Transportable Collective Protection Systems (TCPS) • M20A1/M28 Simplified CP Equipment (CPE) • CB Protective Shelter (CBPS) (Medical) • CP DEPMEDS • <i>Chemically Hardened air Transportable Hospital (CHATH)</i> • <i>(CP EMEDS) Medium General Purpose Tent System</i> • Collective Protection for Small Shelter System (CP-SSS) • Shipboard Toxic Free Areas (Collective Protection System Backfit) 	<ul style="list-style-type: none"> • Rapid insertion of technology improvements into existing equipment (JCPE) • <i>Marine Corps -Protection for all Expeditionary Fighting Vehicles</i> • <i>Army – CBRN protection for tactical Medi-cal units (CBPS).</i> - <i>Collective protection for advanced vehicle concepts.</i> • <i>Air Force - Upgrade/install collective protection into existing rest/relief shelters will use CP-SSS.</i> • <i>Navy - Backfit ships with contamination free protected zones - (Collective Protection System Backfit)</i> 	<ul style="list-style-type: none"> • Improved filters to extend filter life, reduce maintenance and reduce logistical burden • Reduced logistics burden, improved protection against current and future threats • Improved current collective protection filters and equipment (JCPE) • Joint Expeditionary Collective Protection initial increment capabilities • Lighter, more mobile, easier setup, more affordable shelters • Improved technologies from DARPA's Immune Building Program 	<ul style="list-style-type: none"> • JCPE follow-on increments • Regenerable/advanced protective filtration for vehicles/vans/shelters

Science & Technology Base: Collective Protection

Near Term Objectives

- **NBC Filtration (Vapor & Particulate)**
 - Increased Capacity
 - Decreased Weight
 - Reduced Pressure Drop
 - Reduced Water Vapor Induced Degradation
 - Expanded Protection Capability (TICs)
 - Reduced Logistics Burden
 - Reduced Cost
 - Reduced Power
- **Tentage**
 - Decreased Weight
 - Improved Decontamination
 - Reduced Closure Leakage
 - Improved Closure Durability
 - Reduced Cost

Long Term Objectives

- **Protection Transparent to the User**
 - No/Low Maintenance
 - Integrated into all critical systems
 - Continuous Operation
 - Greatly Extended NBC Filtration Element Change Interval
 - Protection against current and future agents

Success in Collective Protective will require continued leveraging of related technology areas (materials, power, etc.)

Collective Protection for Civilians

- Shelters should be relatively low cost
- Standards need to be defined
- Ease of set up and use is critical
- Deployment should be accompanied by civil alert or warning system
 - May be analogous to warning systems in place near chemical demilitarization sites.



Wally, the Shelter in Place Turtle
(<http://www.wally.org>)

Remember Wally's three simple steps how to "Shelter In Place"

1. Go inside. Turn off heater or air conditioner.
2. Turn on the radio or TV for more information.
3. Stay off the telephone to keep phone lines open for emergency use.

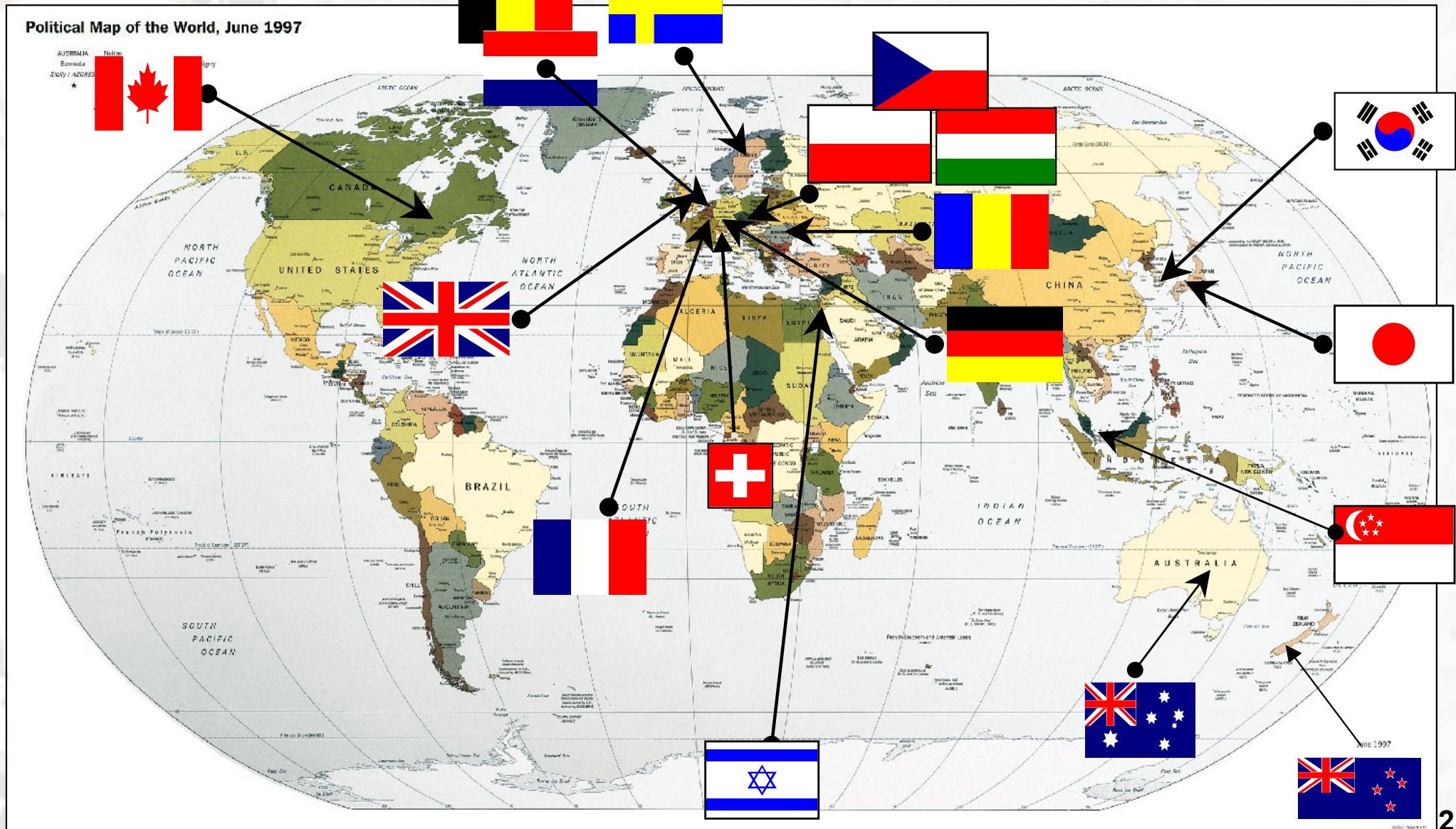
Stay inside, safely sheltered in place, until you hear the "all clear" message that the chemical emergency is over.

Immune Buildings



- **Program goals:**
 - to protect the human inhabitants of such buildings in the event of an attack;
 - to restore the building to full function as quickly as possible after the attack; and
 - to preserve forensic evidence for treatment and retaliation.

WMD Defense Cooperative Focus Worldwide



Research and Development Agreements In Place



- **Ecotoxicology (Sweden)**



- **Smallpox Vaccine Development (Canada)**



- **CB Suit Technologies (Singapore)**
- **CB Agent Water Monitor (Singapore)**



- **Collective Protection (United Kingdom)**

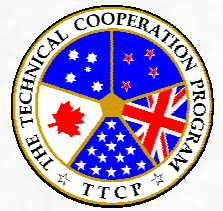


CBR MOU

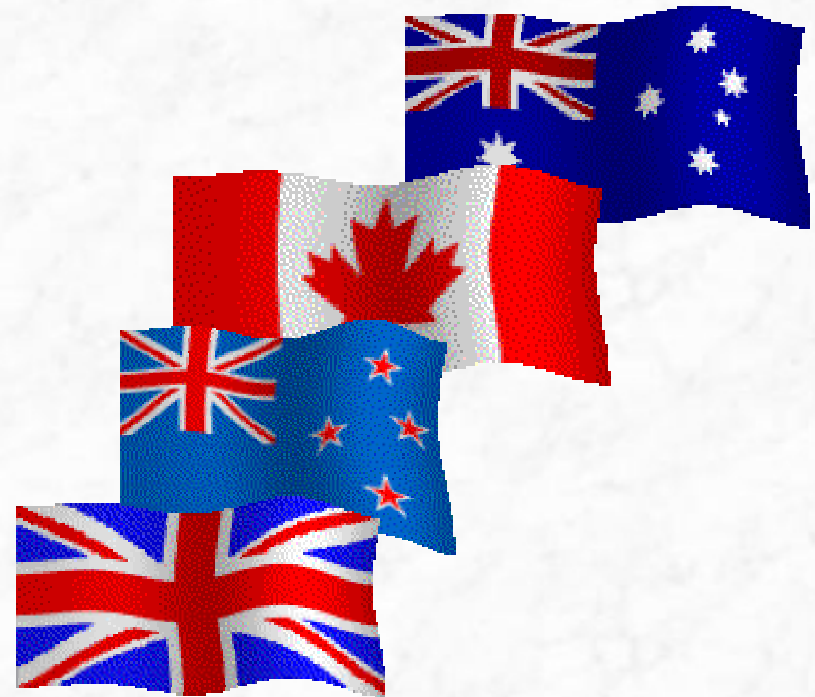
- **Trinational MOU Among US, Canada, United Kingdom**
- **Established in 1980, Updated MOU, Includes New Capability, Signed 1 June 2000**
- **Makes Rational Use of US/UK/CA Resources in CBD Defense**
- **Addresses Critical Issues in**
 - **Requirements for CBD Materiel**
 - **Doctrine Related to the Employment of CBD Materiel**
 - **Cooperative Development of CBD Materiel**
 - **Joint Acquisition of CBD Materiel**



The Technical Cooperation Program

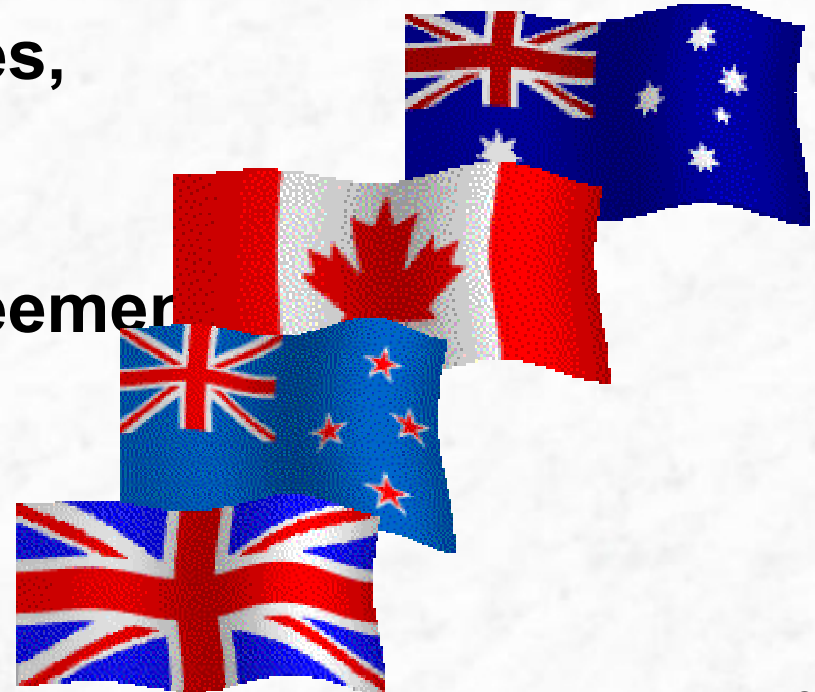


- **Established in 1948, Brings Together Defense Related Research in U.S./UK/CA/AS/(NZ)**
- **Chemical, Biological and Radiological Defense Group Lead for CBR Defense Research**
- **Seven Subordinate Groups Focusing on All Aspects of CBR Defense**
 - **Medical Countermeasures**
 - **Biological Detection**
 - **Toxicology**
 - **Radiological Defense**
 - **Individual Protection**



International Standardization

- **Standardization of Procedures, Equipment and Doctrine Through Two Mechanisms**
 - NATO Land Group 7
 - American British Canadian Australian (ABCA) Armies
- **Both Develop Common Practices, Equipment Specifications, Test Protocols, etc, through the Establishment of Standard Agreements**
 - STANAGS (NATO)
 - QSTAGS (ABCA)



Summary

- **The threat will remain diverse and evolving**
- **Traditional approaches will still be needed...**
- **...but innovative approaches will also be needed to counter emerging threats.**
 - **Multi-purpose technologies**
 - **Low-cost systems**
- **Integration is needed**
 - **With full scope of other CB defense capabilities**
 - **With other agencies and nations**
 - **With related technology areas**
- **Continue to articulate value and benefits of collective protection**



Questions?

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<http://www.acq.osd.mil/cp/index.html>