Department of Defense Chemical Biological Defense Program:

Integrating Joint Programs – Delivering Capabilities to the Joint Force

Mr. Jean Reed
Special Assistant for Chemical Biological Defense & Chemical Demilitarization Programs

June 27, 2006

The Chemical Soldier (1919)

World War I: The First Chemical Soldiers

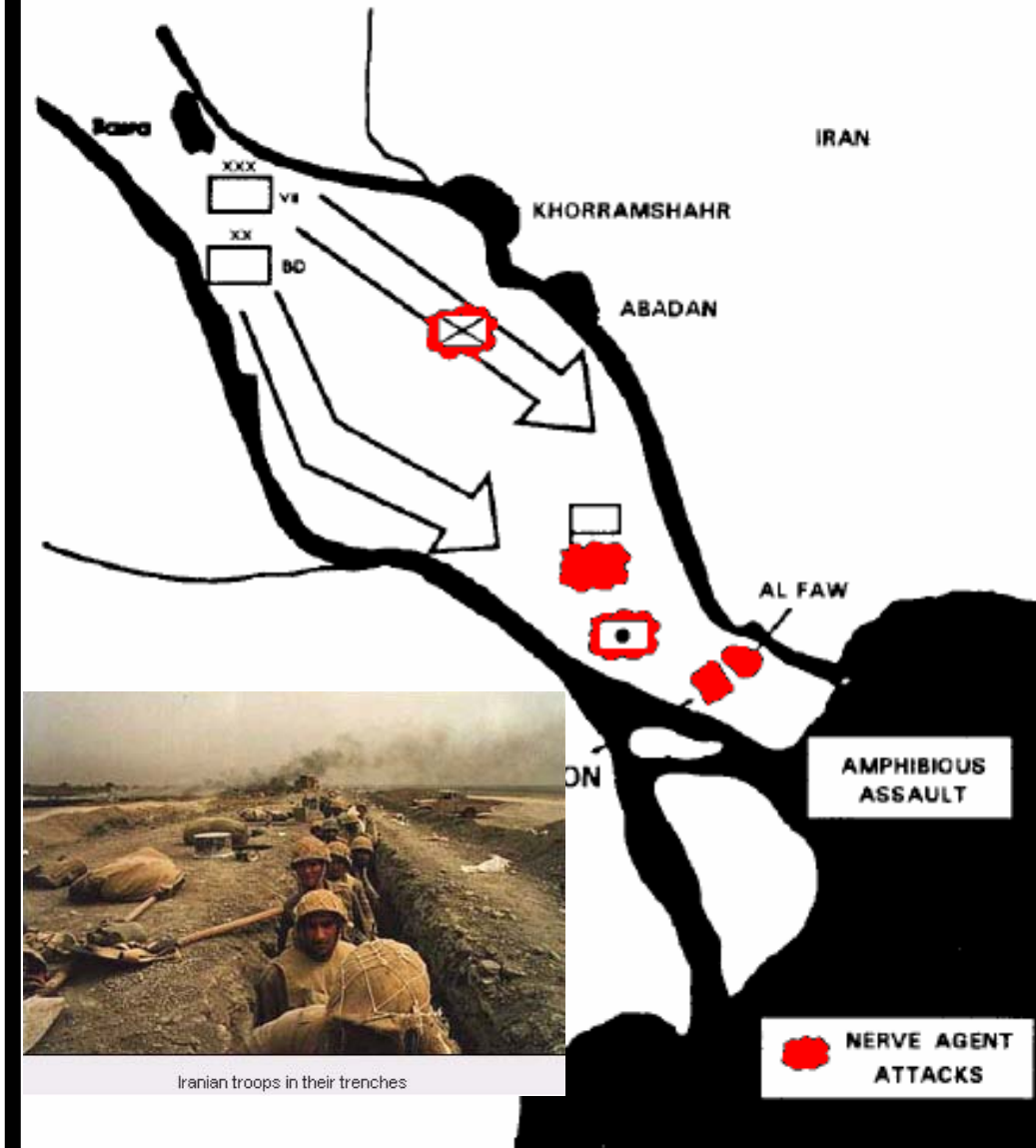
"Whether or not gas will be employed in future wars is a matter of conjecture, but the effect is so deadly to the unprotected that we can never afford to neglect the question."

General of the Armies
John J. Pershing, 1919

The Iraqi Use of chemical weapons drew widespread international attention to a threat that had been widely ignored.

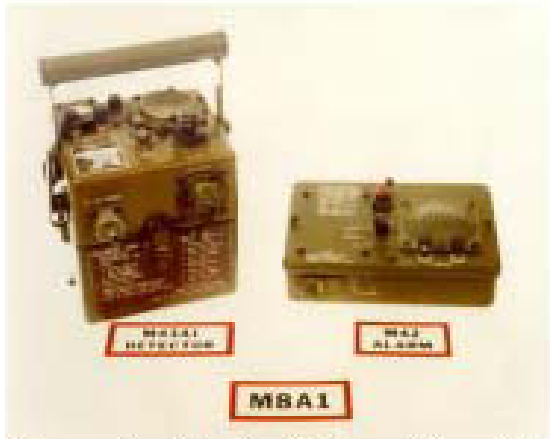
Nerve Gas Attack in Halabja (March 1988)

Battle for Al Faw (April 1988)



Iranian troops in their trenches

The NBC Soldier (1990-91)
Operation Desert Storm



CB Defense Deficiencies Identified in Operation Desert Storm

Detection	Individual Protection	Collective Protection	Decon-tamination	Medical
• No Organic Communication • Limited standoff detection • Limited liquid agent detection • Single biodetection technology • Limited HD detection • Limited recon • No individual detectors • High false alarm rate potential • Slow response time to HQ	<u>Masks</u> • Multiple masks for ground and vehicle functions • Limited aviator masks <u>Clothing</u> • Bulky • Superactiviated charcoal • Not launderable • Bulky accessories	• Few shelters • Very limited integrated ship & vehicle protection • Limited deployable collectively protected shelters for tactical applications	• Corrosive decontaminants • Environmentally hazardous sensitive equipment decon • Limited personal decon • Limited large area decon • Water-based decontaminants • Labor intensive	• Limited BD vaccines (Anthrax and Bot IND) • No CW prophylaxes • Limited CW pretreatment • Limited mustard agent pretreatment • Limited medical training for casualty management • Limited diagnostic capability

Chemical Biological Defense Program

- **Established by Congress**
  - **FY 1994 National Defense Authorization Act, P.L. 103-160 (50 USC 1522)**
- **Addresses critical organizational and technical shortfalls identified following Desert Storm**
  - **Single consolidated DoD wide program**
  - **Oversight centralized for efficiency and effectiveness**
  - **Initially joint efforts focused on fielding initial biological detection capabilities and procurement of personal protective equipment**

The Changing Nature of the Threat:
Non-Traditional Agents, Non-Traditional Delivery, and Non-Traditional Adversaries

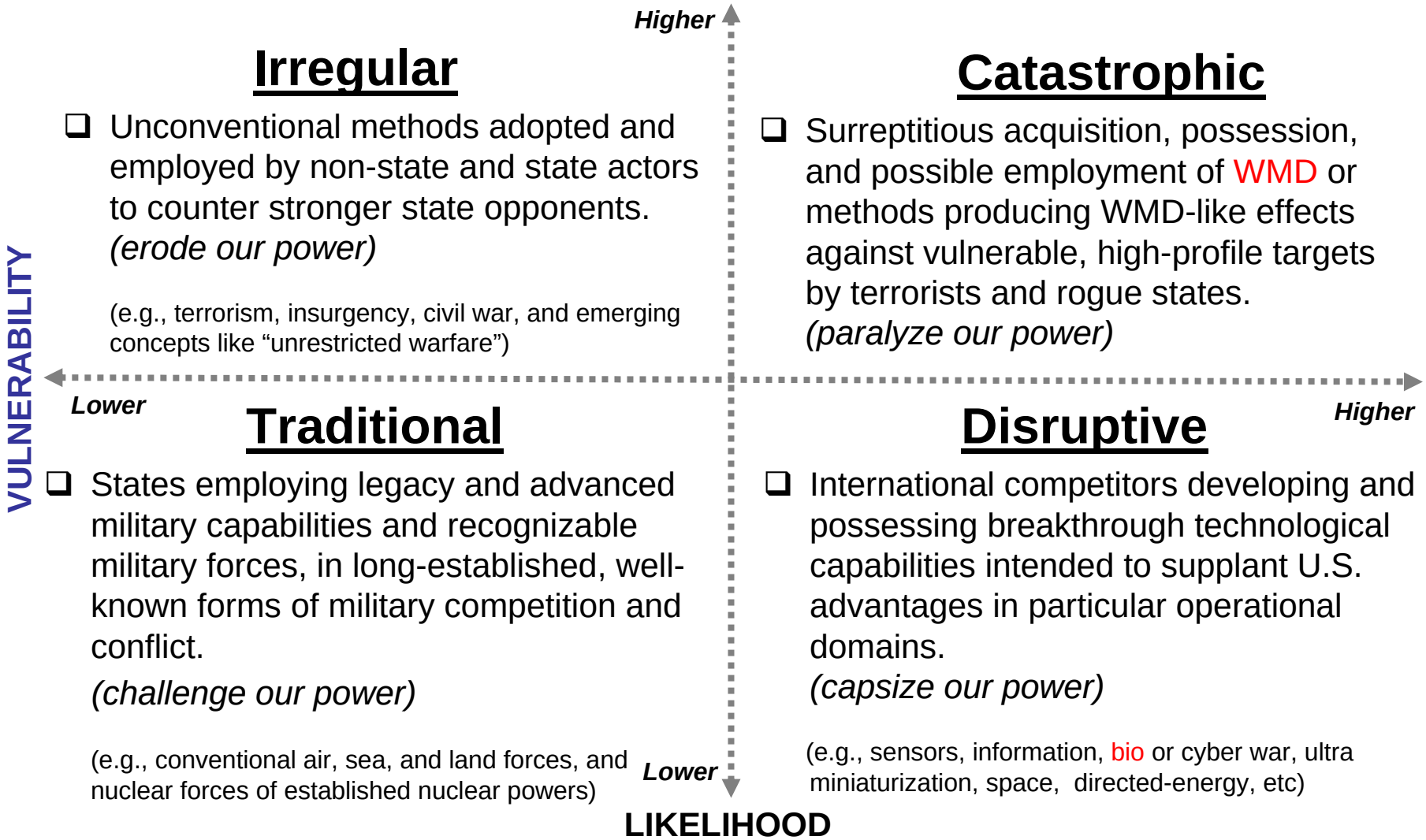
CB Defense Deficiencies Addressed since Operation Desert Storm

Detection	Individual Protection	Collective Protection	Decon-tamination	Medical
• Improved Organic Communication • Improved standoff detection • Improved liquid agent detection • Multiple bio-detection technology • Improved HD detection • Improved recon • No individual detectors • Low false alarm rate potential • Improved response time to HQ	Masks • Joint masks for ground and vehicle functions • More aviator masks Clothing • Reduced Bulk • Superactiviated charcoal (Carbon Spheres) • launderable • Integrated hood • Improved quantities	• Integrated ship & vehicle protection • Improved quantities of deployable collectively protected shelters for tactical applications	• Corrosive decontaminants • Environmentally hazardous sensitive equipment decon • Improved personal decon • Limited large area decon • Water-based decontaminants • Labor intensive	• Limited BD vaccines types (Anthrax and Bot IND, Smallpox), but improved supply • Limited CW prophylaxes • Limited CW pretreatment • Limited mustard agent pretreatment • Improved medical training for casualty management • Genetic and assay-based diagnostic capabilities; In-theater capabilities

The Future CBRN Warfighter

Defense Strategy

Security Environment: 4 Challenges



No hard boundaries distinguishing one category from another

Defense Strategy

Security Environment: 4 Challenges

Irregular

Catastrophic

Traditional

Disruptive

VULNERABILITY

Higher

Lower

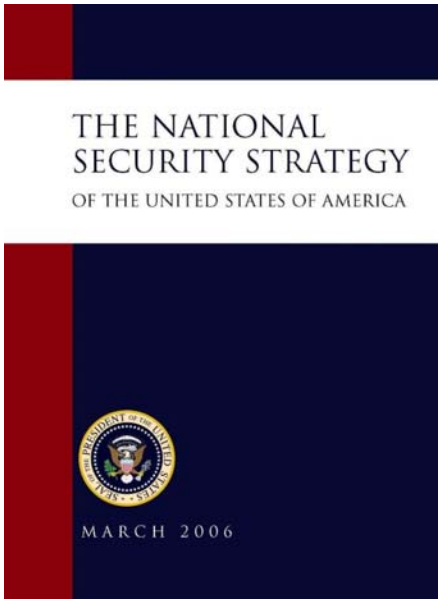
Lower

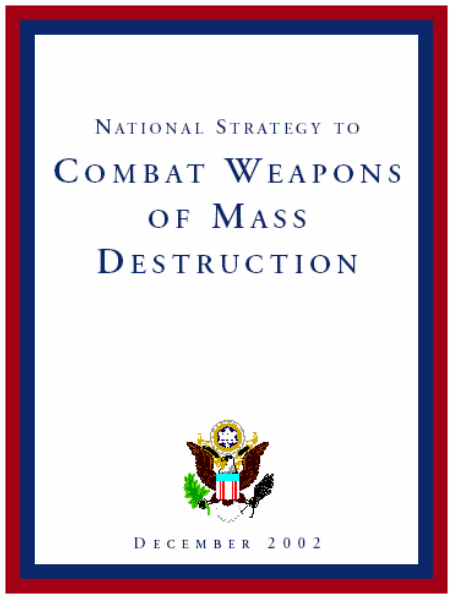
Higher

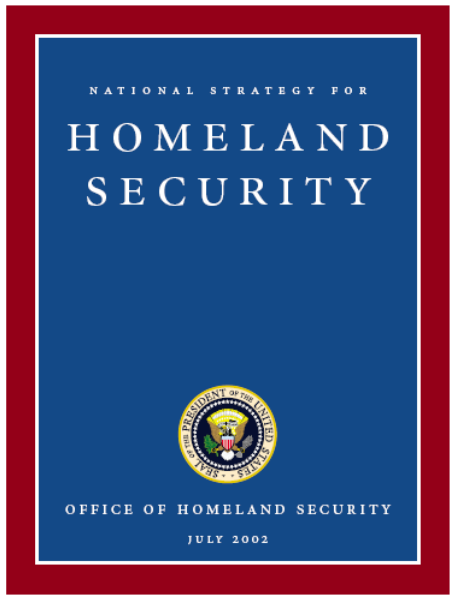
LIKELIHOOD

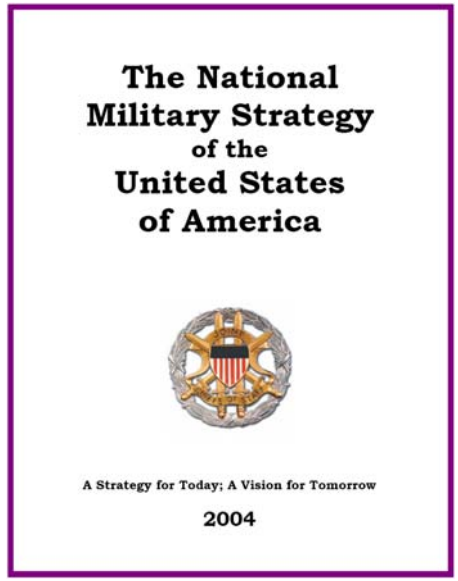
Key Strategic Guidance:

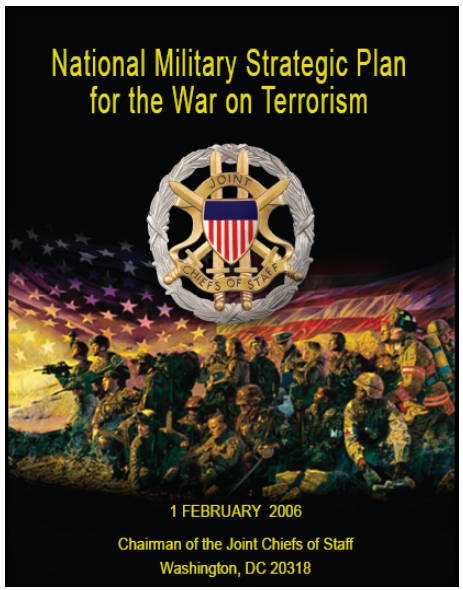
CBRN Defense is a Critical Component of National Strategies

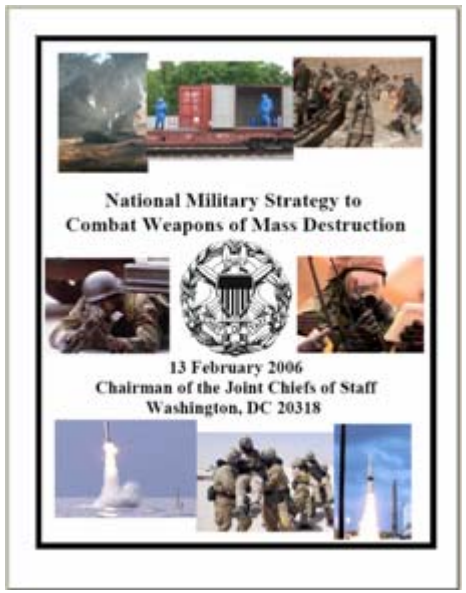


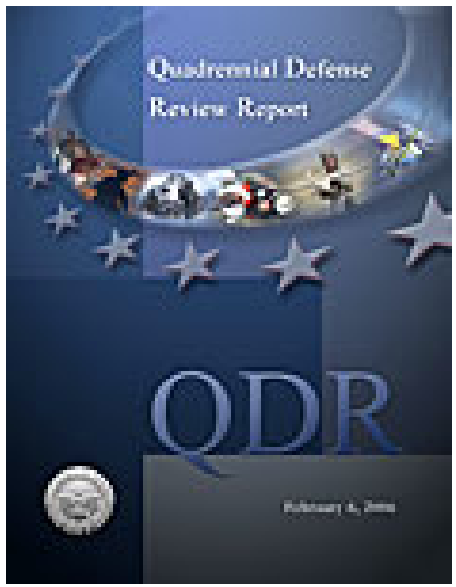


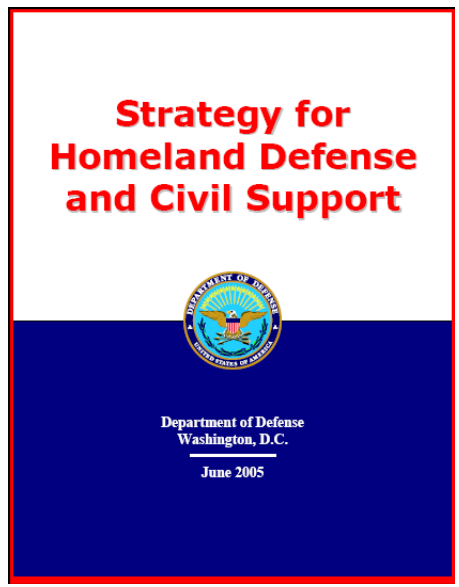








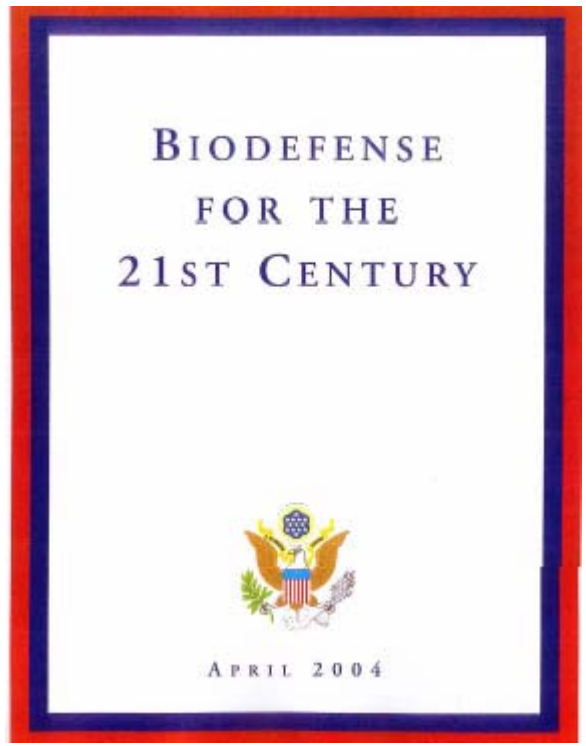




National Strategies Addressing Emerging Threats

Biodefense for the 21st Century, The White House, April 2004 (NSPD-33/HSPD-10)

- **"Preventing and controlling future biological weapons threats will be even more challenging. Advances in biotechnology and life sciences—including the spread of expertise to create modified or novel organisms—present the prospect of new toxins, live agents, and bioregulators that would require new detection methods, preventive measures, and treatments. These trends increase the risk for surprise"**
- **"The proliferation of biological materials, technologies, and expertise increases the potential for adversaries to design a pathogen to evade our existing medical and non-medical countermeasures. To address this challenge, we are taking advantage of these same technologies to ensure that we can anticipate and prepare for the emergence of this threat."**



Quadrennial Defense Review (QDR):

Vision for Combating Weapons of Mass Destruction

The future force will be organized, trained, equipped, and resourced to deal with all aspects of the threat posed by weapons of mass destruction. It will have capabilities to:

- **detect WMD, including fissile material at stand-off ranges;**
- **locate and characterize threats;**
- **interdict WMD and related shipments whether on land, at sea, or in the air;**
- **sustain operations under WMD attack; and**
- **render safe or otherwise eliminate WMD before, during or after a conflict.**

The Department will develop new defensive capabilities in anticipation of the continued evolution of WMD threats. Such threats include … genetically engineered biological pathogens, and next generation chemical agents. The Department will be prepared to respond to and help other agencies to mitigate the consequences of WMD attacks.

Quadrennial Defense Review (QDR):
Implementing the Combating WMD Vision

To achieve the characteristics of the future joint force…, the Department will:

- **Designate the Defense Threat Reduction Agency to be the primary Combat Support Agency for U.S. Strategic Command in its role as lead combatant commander for integrating and synchronizing combating WMD efforts.**
- **Expand the Army's 20th Support Command (CBRNE) capabilities to enable it to serve as a Joint Task Force capable of rapid deployment to command and control WMD elimination and site exploitation missions by 2007.**
- **Expand the number of U.S. forces with advanced technical render-safe skills and increase their speed of response.**
- **Improve and expand U.S. forces' capabilities to locate, track, and tag shipments of WMD, missiles, and related materials, including the transportation means used to move such items.**
- **Reallocate funding within the CBDP to invest more than $1.5 billion over the next five years to develop broad-spectrum medical countermeasures against advanced bio-terror threats, including genetically engineered intracellular bacterial pathogens and hemorrhagic fevers.**

CBDP Vision and Mission

VISION

Combat weapons of mass destruction through a strong chemical biological defense program.

MISSION

Provide chemical and biological 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.

Program Process & Organization

OSD provides oversight

OSD Mission: Lead, Guide, and Integrate the CB Defense Program

- Combatant Commanders
- Services

Joint Requirements Office (JRO)

Required Capabilities

Capability Needs

Prioritized Needs

Test & Evaluation

Joint Combat Developer

Solutions

S&T Gaps

Joint Science & Technology Office DTRA/CB

Joint Program Executive Office (JPEO)

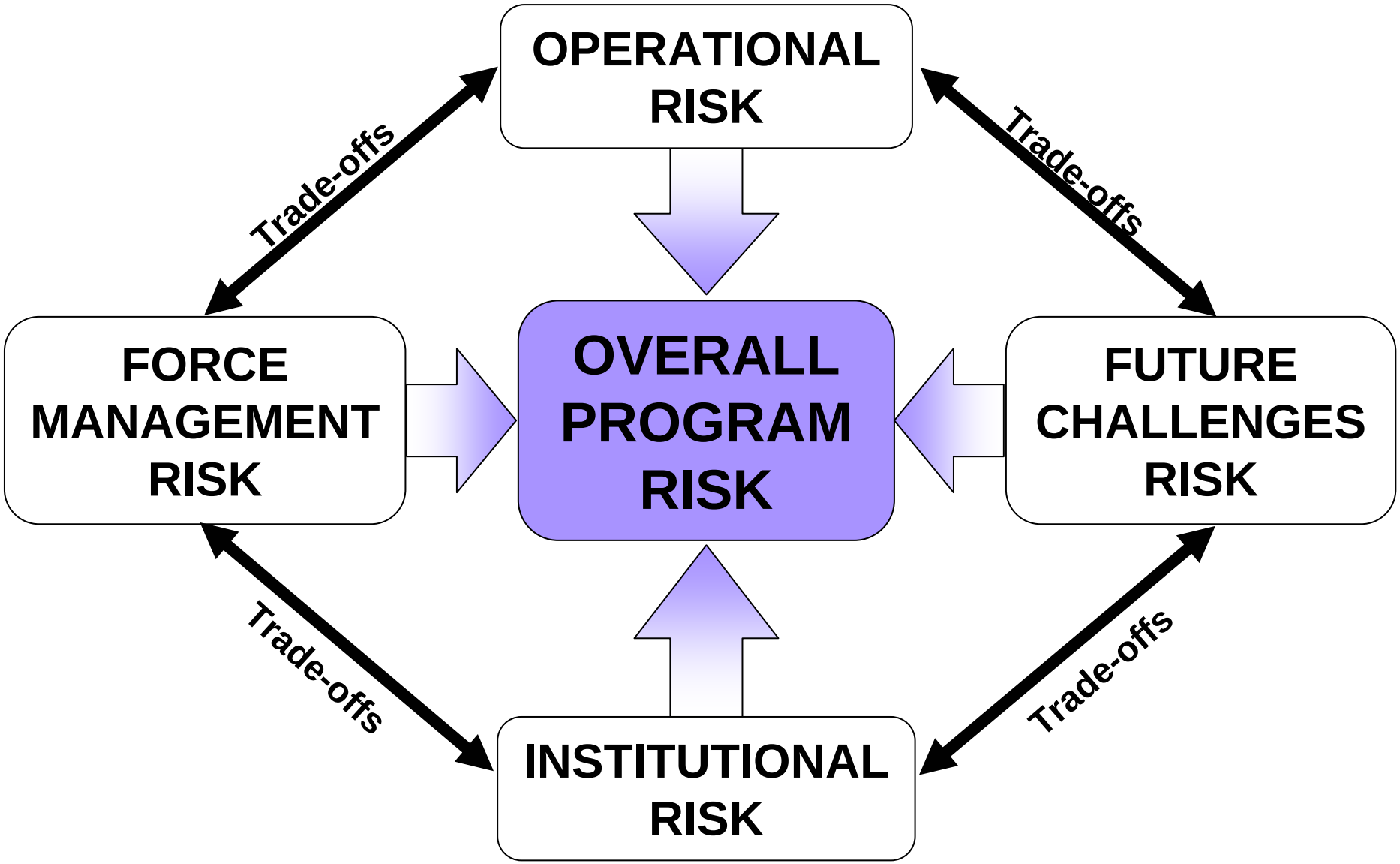
Solutions

Mature Technologies

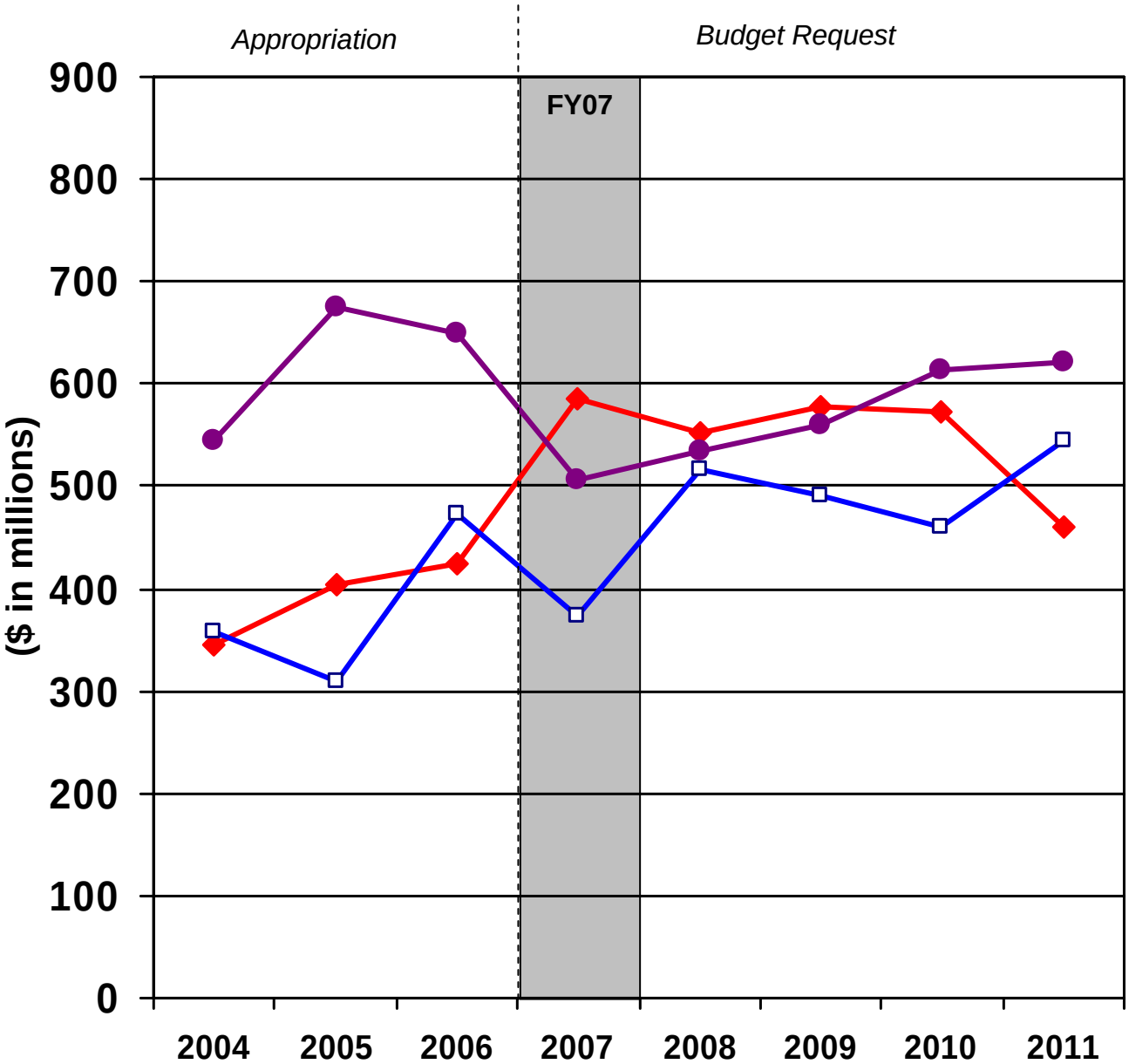
Interagency Activities

- **CBDP Formally Coordinates With:**
  - **Counterproliferation Program Review Committee (CPRC)**
  - **Technical Support Working Group (TSWG)**
  - **Department of Homeland Security (DHS), Science & Technology Directorate**
  - **National Institute of Allergies and Infectious Diseases (NIAID)**
  - **Centers for Disease Control (CDC)**
  - **U.S. Coast Guard**
- **Various Levels of Coordination/Cooperation Exist with:**
  - **National Security Council**
  - **Office of Science & Technology Policy**
  - **Department of Health and Human Services (including the Food and Drug Administration, and the Centers for Disease Control and Prevention)**
  - **U.S. Department of Agriculture**
  - **Department of Justice**

Managed Risk Strategy



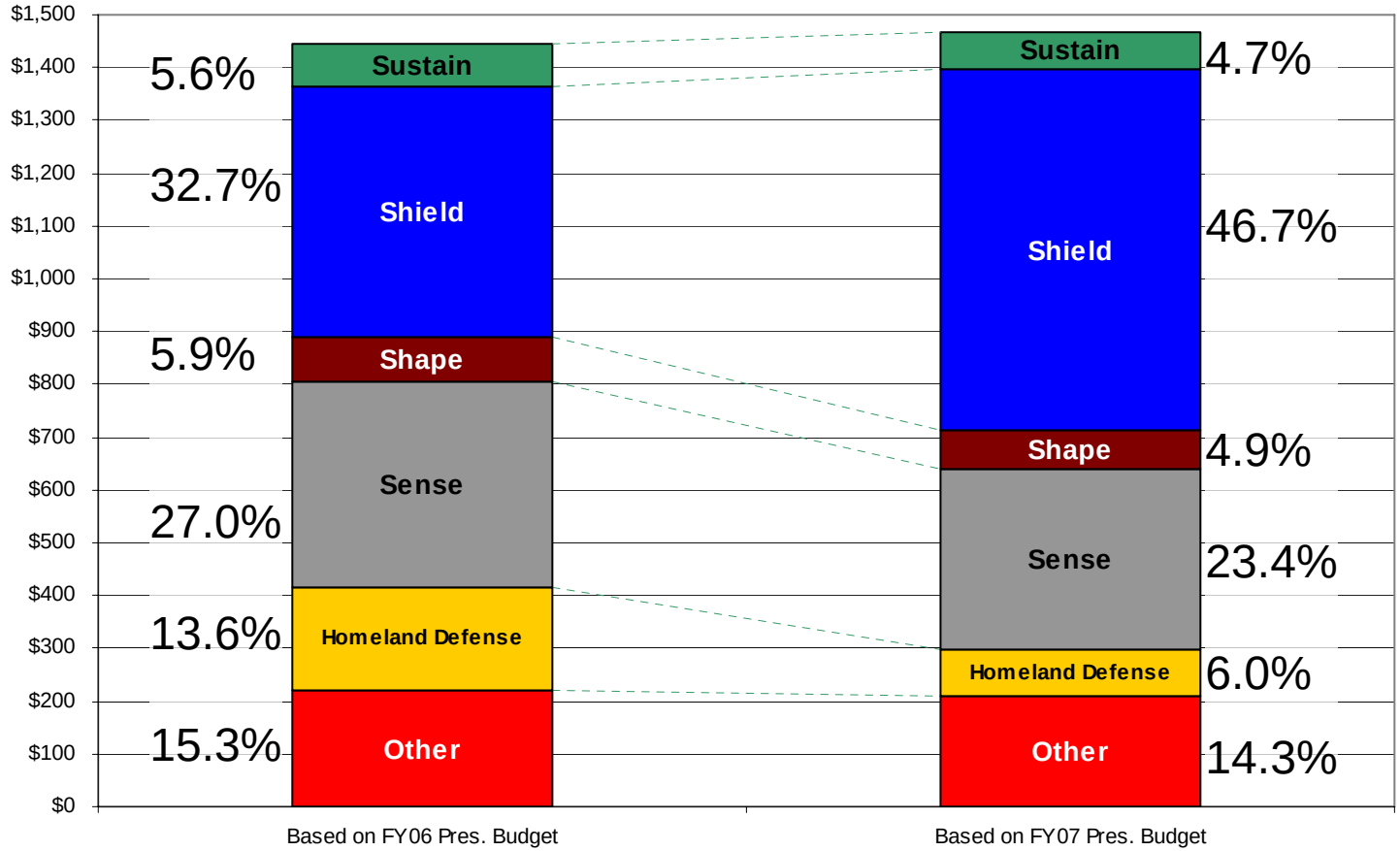
CB Defense Program Structure: FY2007 PB



FY07 Highlights

- **Near-Term Emphasis to Address Future Challenges (NTAs, Emerging Threats, Transformational Medical Technologies) and Improve the T&E Infrastructure**
- **Long term trend to Provide Advanced Capabilities to the Warfighter**

FY07 Resource Allocation:
Shifting Priorities (Impact of the QDR)



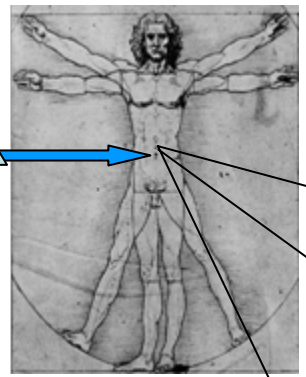
Funding shift to support the Transformational Medical Technology Initiative (TMTI)

	FY07 Budget Estimate	
($ in Millions)	Based on FY06 Pres. Budget	Based on FY07 Pres. Budget
Other	$221.2	$209.7
Homeland Defense (HD)	$195.6	$87.7
Sense	$389.5	$342.2
Shape	$85.1	$72.3
Shield	$471.6	$684.5
Sustain	$80.5	$69.0
TOTAL	**$1,443.5**	**$1,465.4**

Medical Countermeasures Against Advanced Bio Threats

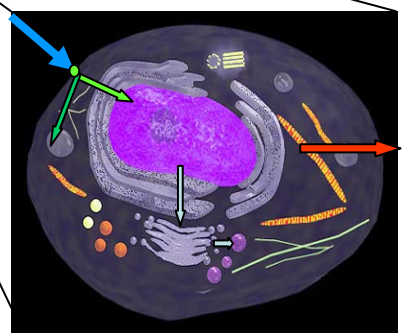
Today's Threats

- *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

TMTI Strategy Components

- **Systems biology – Integrates molecular and informatics**
- **Identified multiple scientific proven approaches**
  - **Genomics**
    - **Sequencing, resequencing, genomic inhibition**
  - **Proteomics**
    - **Antibodies against broadly conserved processes**
  - **Immune Products**
    - **Specific technologies under consideration**
  - **Metabolomics**
    - **Too early to apply**
- **Industry/Academic partners**
- **“DARPA-esque” execution**
- **Deliverables:**
  - **Two or more broad-spectrum therapeutics**
  - **Genomic sequences of all pertinent known threats**
  - **Platform for rapid response (characterization and manufacture of countermeasure against unknowns**

CBRN Education, Training, and Exercise Integration

MISSION

Lead and guide the integration of the DoD CBRN Defense Program Education and Training Initiatives

VISION

A comprehensively educated and trained Nation unified to effectively manage CBRNE threats.

- **Near-term goals (1-2 yrs)**
  - **Identify DoD CBRN Defense Education & Training Initiatives**
  - **Assess and Prioritize Gaps**
  - **Synchronize DoD CBRN Education and Training at all levels**
- **Long-term goals (3-5 yrs)**
  - **Expand initiatives to address broader set of threats and missions:**
    - **Combating WMD (including interdiction, elimination, and other mission elements)**
    - **CBRNE: (include "E" – High Yield Explosives)**
    - **Expand integration to include Federal Interagency's education, training, & exercise activities**

CBDP: The Way Ahead

- **Need to build on current strengths…**
  - **Integrated collection of systems**
  - **Multi-disciplinary approaches**
  - **Well developed doctrine and concepts for the military in operational environments**
- **…while recognizing a changing environment**
  - **Laboratory and other infrastructure may need overhaul**
  - **Operational environment must consider homeland**
    - **DoD now a key player, but no longer the biggest investment**
  - **Emerging and non-traditional threats may be critical**
  - **Congress will continue to play an active role**
  - **Industry may be increasingly important, though DoD-unique assets need to be identified and maintained**

CBDP: The Way Ahead

- **…and Planning for the Future**
  - **Need to balance investment between current risks (operational and procurement needs) and future risks (S&T and infrastructure)**
  - **Coordination with other agencies (DHHS, DHS, and others) for an effective national effort**
    - **DoD may play key role in transitioning technologies from laboratory concepts to field-ready systems, especially medical systems**
  - **Broad-spectrum, dual-benefit approaches will need to be evaluated in all areas**

Back up slides

Offsets to Fund Broad Spectrum Therapies for Novel Biodefense Threats

- **Reduced activities in core CBDP ($510M)**
  - **Identified efforts within the program that were sent back to the tech base for further development**
  - **Reduced procurement of consumables that were beyond initial issue**
  - **Reduced medical biological S&T activities made less necessary by broad spectrum efforts**
- **CBDP Installation Protection Program (IPP) ($760M)**
  - **$535M in CBDP procurement and $225M in Services O&M**
  - **IPP is being incorporated into an integrated national response capability with the DHS**
  - **Post-Katrina experience shows we must be fully part of the integrated response, and not just a base response**
  - **Revised IPP plan due to DEPSECDEF – June 2006**
- **The Secretary identified an additional $230M to complete funding our minimum requirement.**

Broad Spectrum Therapies for Novel Biodefense Threats

- $100M funding in FY06 – Down Payment
- $225M in FY07 – Funds Leading Edge Investment
  - **100% in Science and Technology**
  - Transformational Approaches will be applied – leverage genomics, proteomics and systems biology data explosion
  - Technical and program leadership from team of nationally recognized experts
  - **BW defense, microbiology, drug development**
  - **Will draw heavily from commercial and academic performers**
  - **Investment provided by offsets in procurement (primarily the Installation Protection Program and transfers from related science & technology investments**

Goal: Defeat of genetically engineered biological threat

CBDP Major Players

Dr. Dale Klein
ATSD(NCB)

Mr. Jean Reed
SA (CBD&CDP)

MG Howard Bromberg
JRO-CBRND

BG Steve Reeves
JPEO-CBD

Dr. Charles Gallaway
Director, JSTO

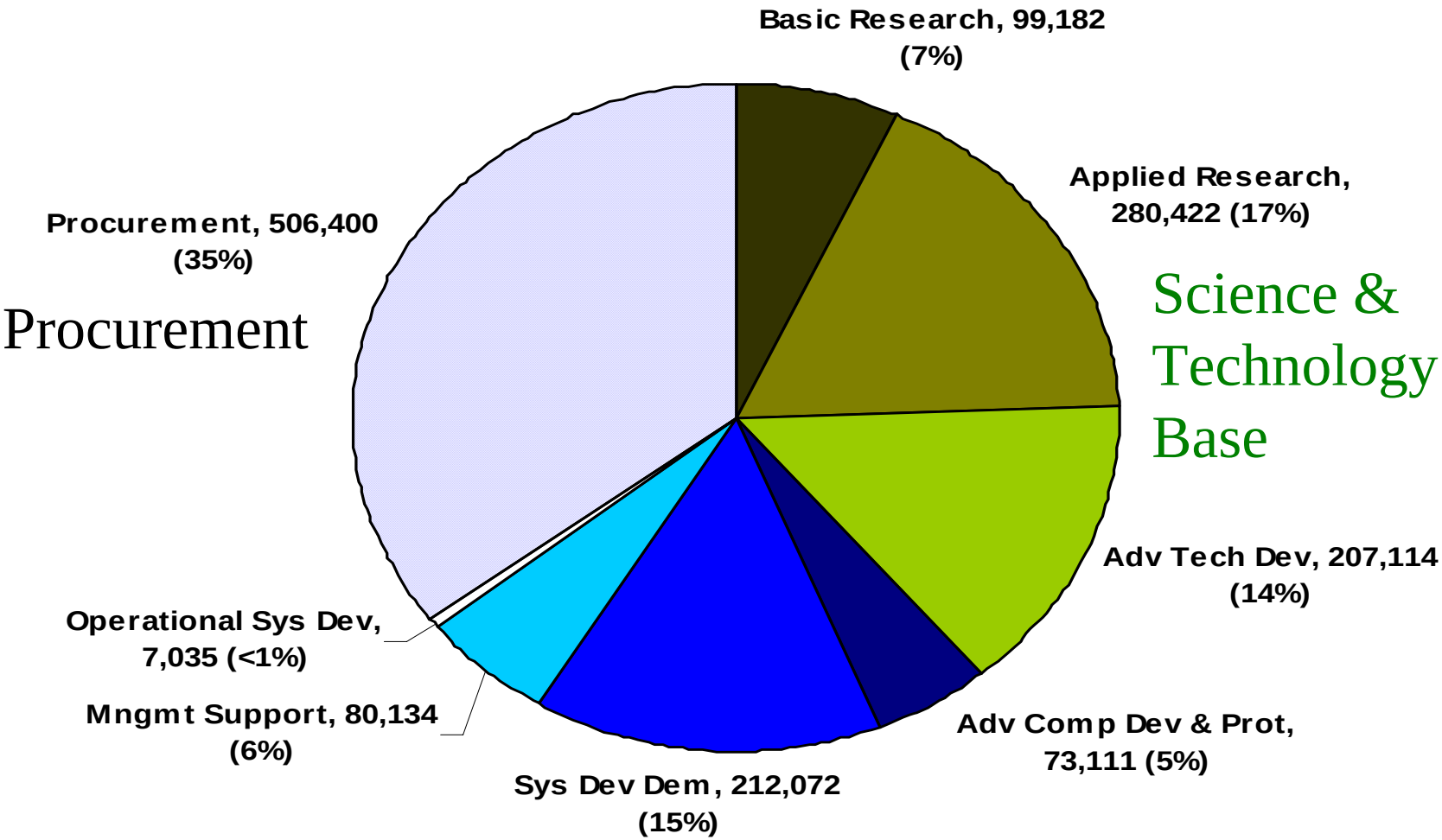
Mr. Walter Hollis
Joint T&E Executive Agent

BG Stan Lillie
Joint Combat Developer

Chemical Biological Defense Program

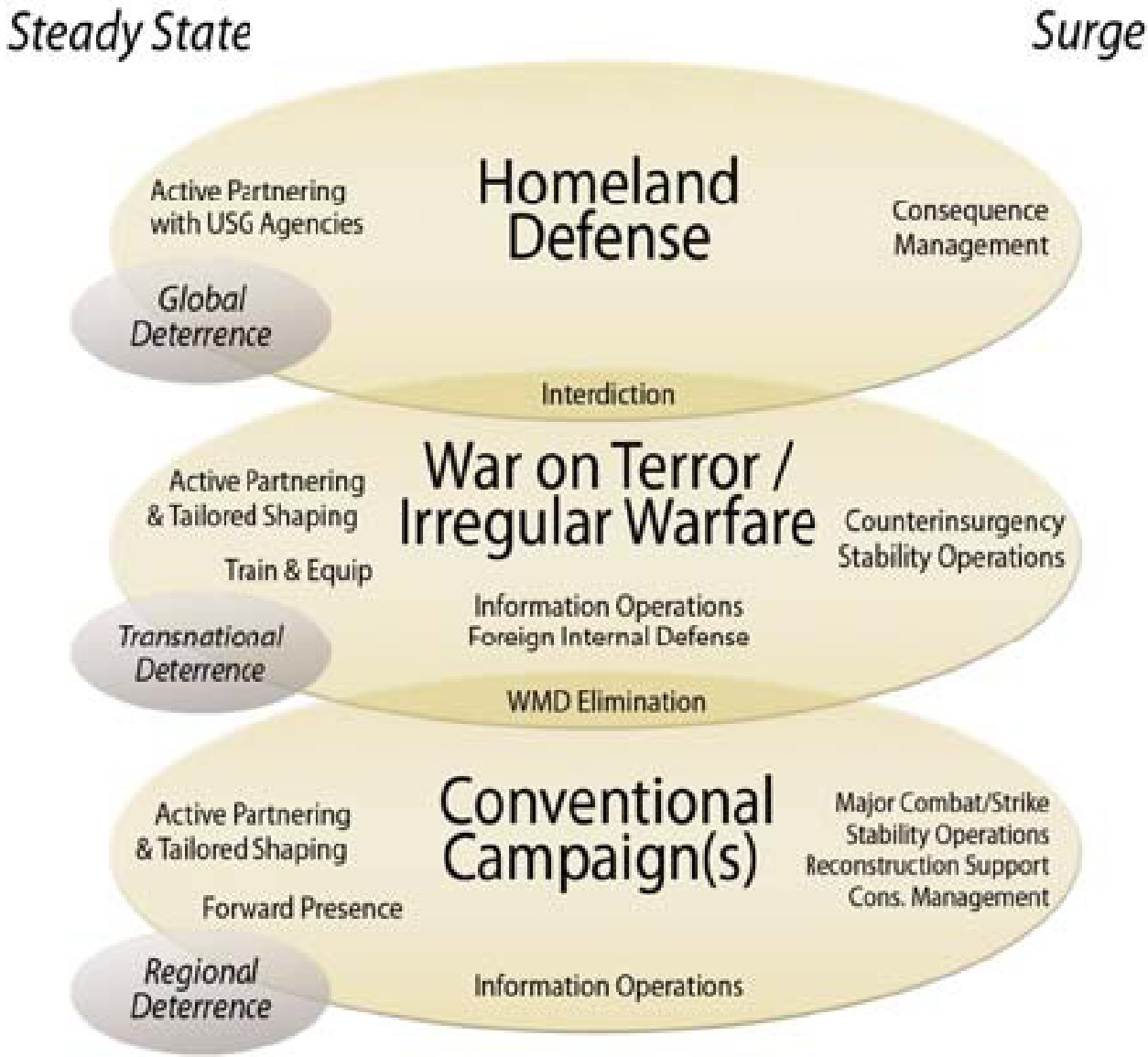
Based on FY07 President's Budget Request (February 2006)

$1.465 Billion



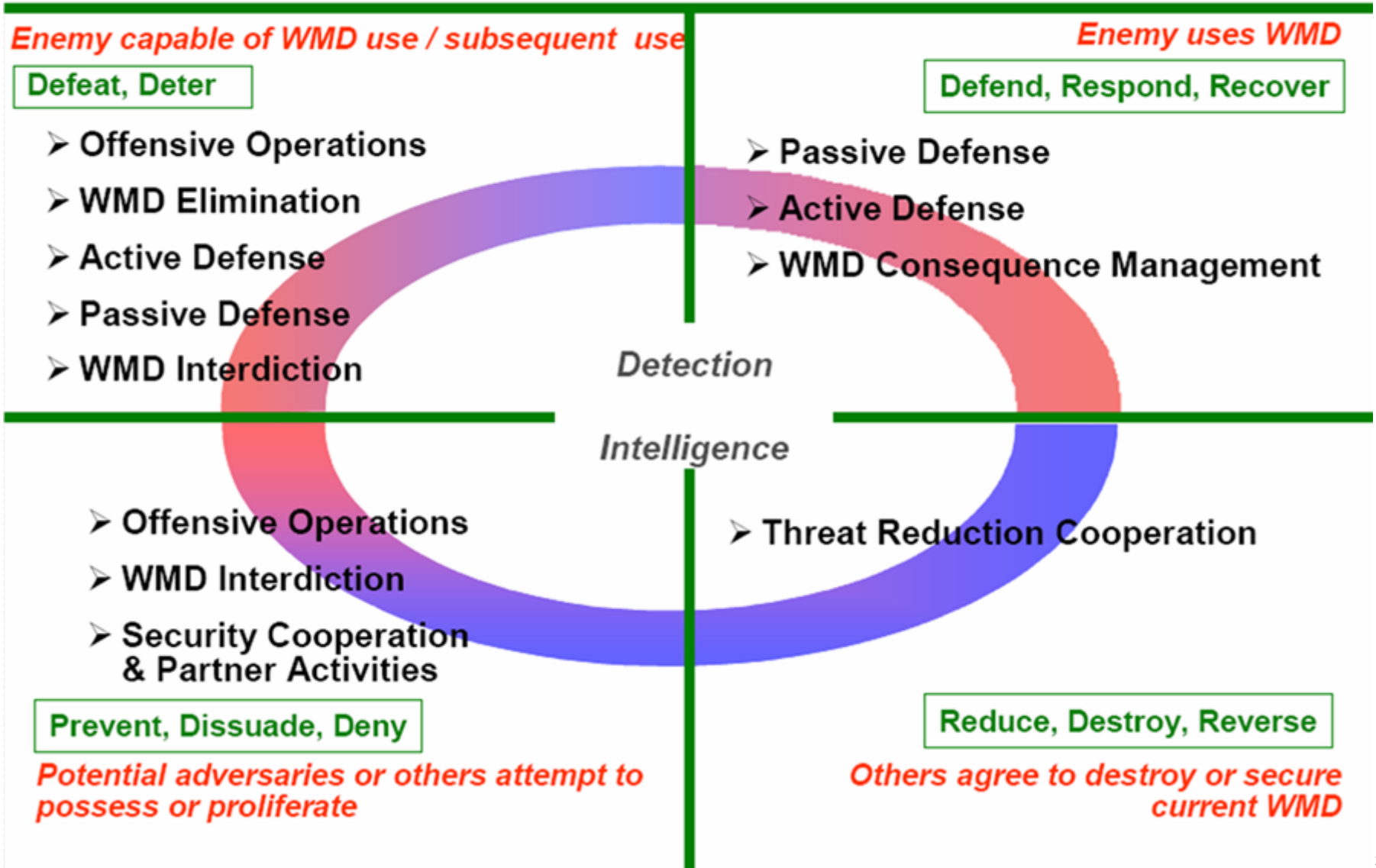
Force Planning Construct

2006 Quadrennial Defense Review

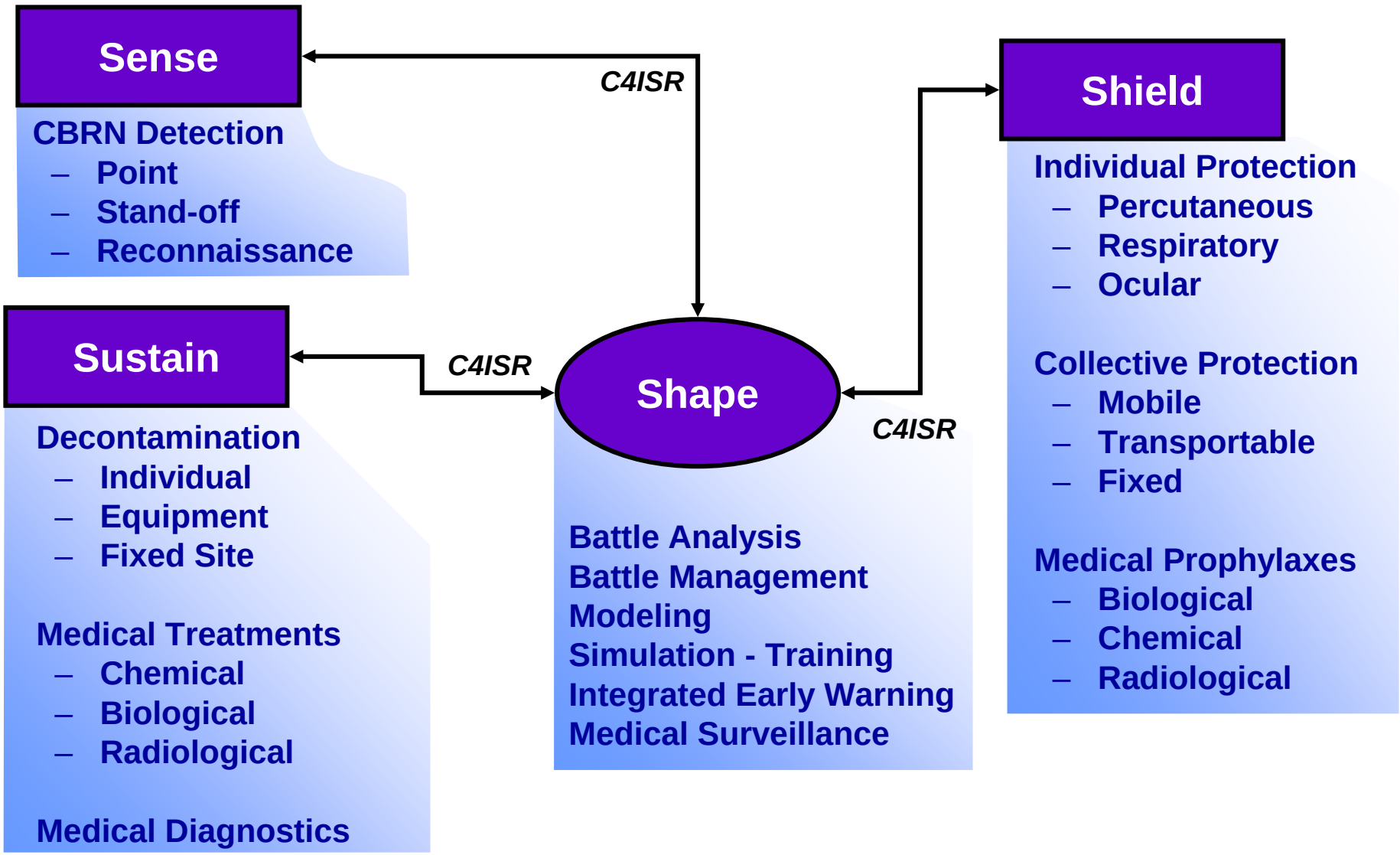


Combating WMD Mission:

Mission: Dissuade, deter, defend against & defeat those who seek to harm the United States, its allies and partners through WMD use or threat of use, and, if attacked, mitigate the effects and restore deterrence .

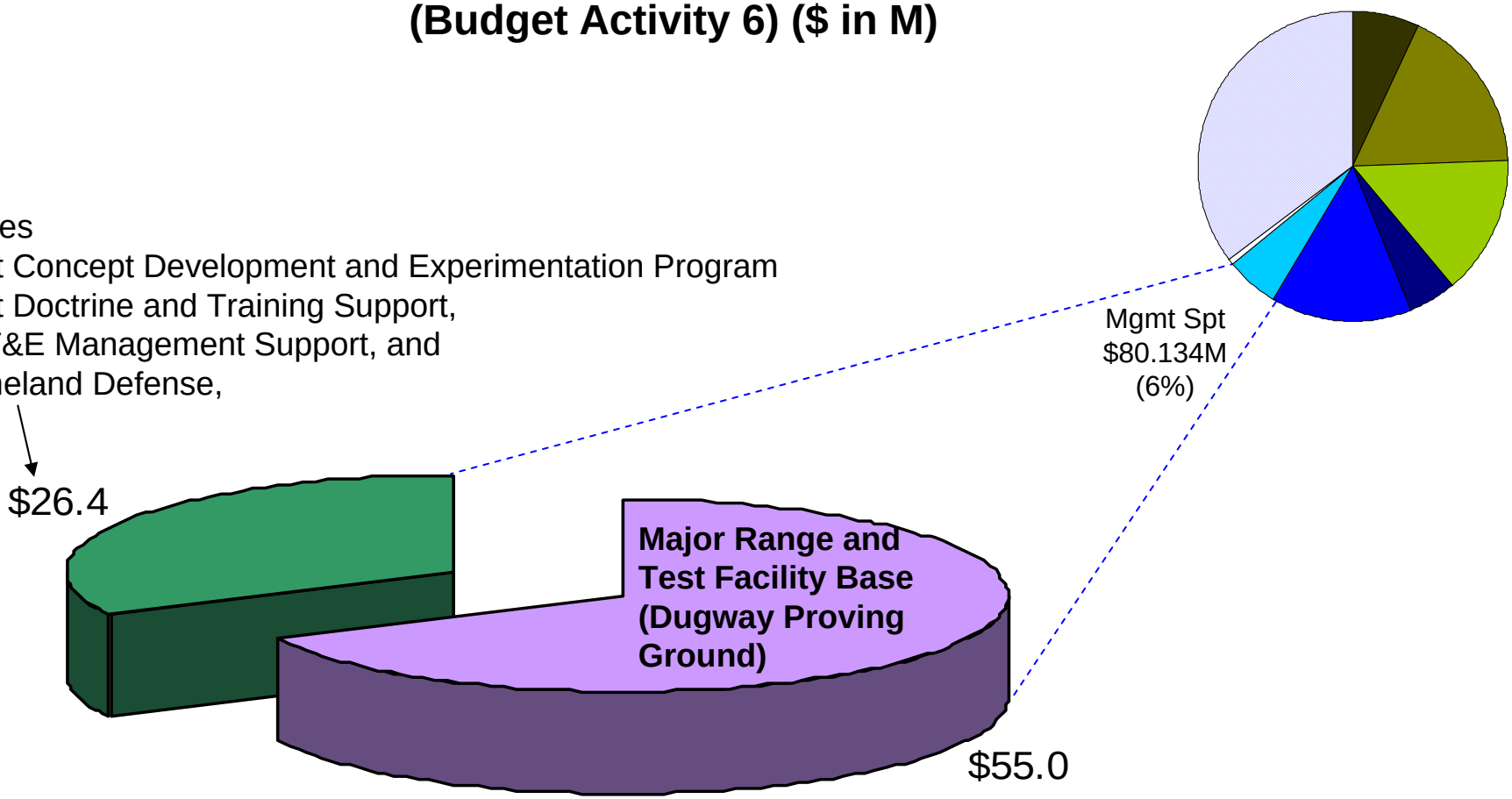


CBRN Defense
Operational Elements and Capabilities



RDT&E Management Support
(Budget Activity 6) ($ in M)

Includes
- Joint Concept Development and Experimentation Program
- Joint Doctrine and Training Support,
- RDT&E Management Support, and
- Homeland Defense,



Management account provides critical support for T&E Infrastructure in accordance with FY05 Statute to fund MRTFBs.

Broad Spectrum Therapies for Novel Biodefense Threats

- **Basic Research (BA1) $51M**
  - Directed at critical pathways in pathogen & host response
  - Identify the novel points of intervention
- **Applied Research (BA2) $109M**
  - Expand technologies – Microfluidics, nanotech, modeling
  - Develop artificial cell/artificial tissue models
- **Advanced Technology Development (BA3) $65M**
  - Expand drug discovery efforts & evaluate additional compounds
  - Develop transgenic animal models or alternate animal model systems
  - Enable rapid regulatory approval and rapid clinical development

Basis for Broad Spectrum Therapies for Novel Biodefense Threats

- **Biodefense 2020 Relman Panel**
  - **Highlighted the threat**
- **National Intelligence Estimate**
  - **Characterized the bioengineered threat**
- **Enhanced Planning Process**
  - **Identified FY06 funding for modest initiatives**
- **QDR analysis and recommendations**
  - **Established comprehensive solutions**
- **Interagency review**
  - **Scientifically feasible and executable**
- **Department QDR decision - $1.5B**

Installation Protection (Guardian) Study

- **Study will develop the following**
  - **Prioritized list of US military installations**
  - **Associated CBRNE capabilities packages for installation protection (IP)**
  - **Funding guidance to build and sustain an enhanced IP capability**
- **Focus of study**
  - **Utilizing both military and civilian assets for mission assurance against a range of CBRNE threats**
  - **How to make military assets available for civilian consequence management at local, regional and national levels**
- **Products**
  - **Area Analysis Findings**
  - **Needs Analysis Findings**
  - **Solutions Analysis Findings**
  - **Revised CBRNE IP plan to DEPSCEDEF – 30 June 2006**

QDR Built on Last Year's Enhanced Planning Process (EPP)

Areas of Additional Emphasis

Infrastructure Improvements	RDT&E Improvements
• CB T&E Facilities • NTA Test Chamber • USAMRIID (DHP)	• S&T for NTA detection • Bio detection • Medical Prophylaxis • Battle Analysis • Decontamination • Bio Defense Initiatives • Chem detection