

DEPARTMENT OF DEFENSE  
CHEMICAL AND BIOLOGICAL  
DEFENSE PROGRAM

ANNUAL REPORT TO CONGRESS  
April 2007



This report was coordinated and prepared by the Office of the Under Secretary of Defense for Acquisition, Technology and Logistics and the Assistant to the Secretary of Defense for Nuclear and Chemical and Biological Defense Programs in accordance with 50 USC 1523 and related requirements.

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April 2007

It is our responsibility to provide our Warfighters the best capability and support in the world. America remains a nation at war. The Armed Forces of the United States are engaged in a global war on terrorism while simultaneously deterring further attacks on Americans here at home. In doing so, our military faces many challenges, but one in particular—the threat posed by weapons of mass destruction (WMD)—is among our greatest challenges.

The Department of Defense (DoD) is pursuing a comprehensive strategy to counter this threat. The purpose of this strategy is to build readiness for current and future challenges. The Chemical and Biological Defense Program (CBDP) is a critical component supporting both the national strategies and DoD strategies. The program exists to provide chemical and biological defense capabilities in support of the goals and objectives of our national military strategies, ensuring that the Department's operations are unconstrained by chemical or biological effects.

To effectively execute this program, the Department is depending upon continued congressional support in three priority areas:

- Stable funding for the Transformational Medical Technologies Initiative to fully exploit the advanced science and technology innovation necessary to successfully counter future genetically engineered biological weapons.
- Adequate long-term investment in the Research, Development, Test, and Evaluation (RDT&E) infrastructure to enhance our RDT&E capabilities, including the modernization and construction of laboratories and test facilities to ensure we develop advanced countermeasures against current and emerging chemical and biological threats.
- Consistent resources for the overall program itself to ensure that, year after year, we are able to field the improved defensive capabilities essential to ensure our military can operate in any environment, unconstrained by chemical or biological weapons.

With the support of the President, the Secretary of Defense, and Congress, we have developed and resourced an integrated CBDP to best serve the Nation, to build readiness for current and future challenges, and to sustain our armed forces in time of war.

To continue countering the existing and future threat from hostile WMD and to meet the critical operational needs of our military, the Department requires the full support of the resources requested in the program budget.

A blue ink signature of Kenneth J. Krieg, written in a cursive style.

Kenneth J. Krieg

Under Secretary of Defense for  
Acquisition, Technology and Logistics



## PURPOSE OF THE REPORT

The Chemical and Biological Defense Program (CBDP) provides U.S. forces the best capability and support in the world. The CBDP is a key component of national and defense strategies aimed at defending the nation from the hostile use of weapons of mass destruction (WMD)—particularly chemical and biological (CB) weapons—against U.S. citizens, military forces, friends, and allies. The CBDP seeks to ensure that Department of Defense (DoD) operations are unconstrained by chemical and/or biological effects by providing CB defense capabilities to build readiness for current and future challenges. (see *Figure 1.*)

The program depends on support in three priority areas:

- (1) Stable funding for the Transformational Medical Technologies Initiative (TMTI);
- (2) Adequate long-term investment in the Research, Development, Test, and Evaluation (RDT&E) infrastructure, including laboratories and test facilities; and
- (3) Consistent, predictable, and sustained resource levels for the CBDP.

This annual report of the Department of Defense Chemical and Biological Defense Program describes how the Department is executing the CBDP and provides the context for a management framework that seeks to identify and balance investment priorities against risks over time. The report provides detailed information and assessments regarding:

- (1) the overall readiness of the armed forces to fight in a CB warfare environment, along with efforts undertaken and ongoing plans to improve such readiness; and
- (2) the requirements for the CBDP, including requirements for training, detection, protective equipment, decontamination equipment, medical prophylaxis, and treatment of casualties resulting from the use of CB weapons.

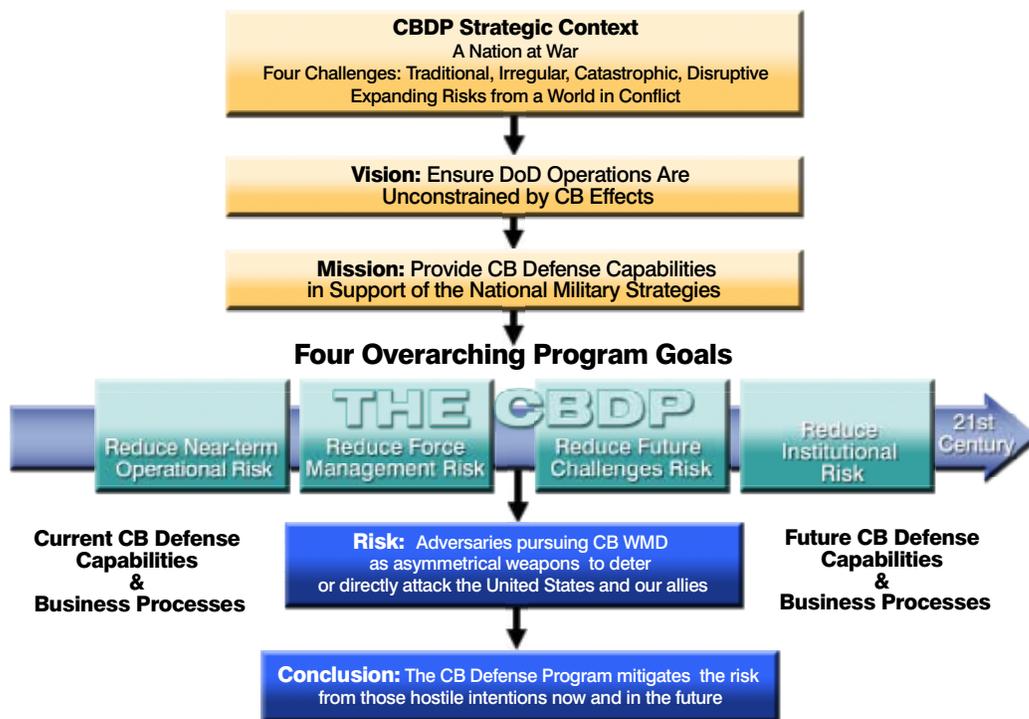


Figure 1. CBDP Strategic Context

## STRATEGIC CONTEXT

### STRATEGIC REALITY

We are a nation at war. For the foreseeable future, the CBDP anticipates expanding risks (see *Figure 2*) from a world in conflict, fueled primarily by these global drivers:

- Increasing competition for limited resources, particularly in underdeveloped regions with rapidly growing populations that creates internal displacements, refugee flows and humanitarian emergencies.
- Expanding reach of often amorphous nonstate actors (terrorist organizations, criminal gangs, religious fanatics, ethnic groups, etc.), all increasingly operationalized by global communications and financial resources, and all actively seeking to exploit societies weakened by ineffective governance.

- Persistent obstruction from rogue states (Iran, North Korea, Cuba, and others) determined to exercise influence on the international stage by sowing physical chaos and political turmoil.

### PREMISE

The United States possesses overwhelming military capabilities. In response, adversaries are pursuing chemical-biological-radiological-nuclear (CBRN) WMD as a comparatively cheap, easy-to-deploy, and disproportionately influential tool to deter U.S. power asymmetrically or to attack the United States directly. *With the support of the President, the Secretary of Defense, and the Congress, we have developed and resourced the CBDP, an integrated program to best serve the nation, to build readiness for current and future challenges, and to sustain U.S. forces in time of war.*



Figure 2. DoD Security Environment

## ACTIVE PLAYERS

A wide spectrum of opposing and supporting actors directly affect the CBDP:

- **Antagonists.** Rogue states such as North Korea and Iran have WMD programs designed both as an asymmetrical counter to the U.S. and as a source of illicit revenue. Similarly, intelligence reporting consistently documents the interest of terrorist groups such as Al Qaeda in obtaining chemical, biological, and radiological materials in order to inflict disproportionate psychological and physical impact on the United States and our allies. Even nominally friendly states, such as India and Pakistan, seek the perceived prestige offered by WMD, notably nuclear weapons. While no single antagonist offers an insurmountable obstacle, in aggregate they constitute a daunting and ever-evolving problem set for the CBDP to manage.
- **Protagonists.** The United States and its Western partners, particularly North Atlantic Treaty Organization (NATO) countries, are essentially united in opposition to the further spread of WMD technology and resources, despite being in occasional disagreement about preferred tactics and strategy. International bodies, such as the United Nations (UN) and the European Union, are also generally sympathetic, if often not particularly operationally effective. Within the executive branch, there is comprehensive presidential and departmental leadership that provides detailed guidance and resources to pursue WMD defense in general and the CBDP in particular. DoD's Total Force approach to the CBRN defense mission creates synergy between Active and Reserve components. In sum, the CBDP has significant allies, but generating efficient unity of effort among them is a challenge.

## PASSIVE CONSTRAINTS

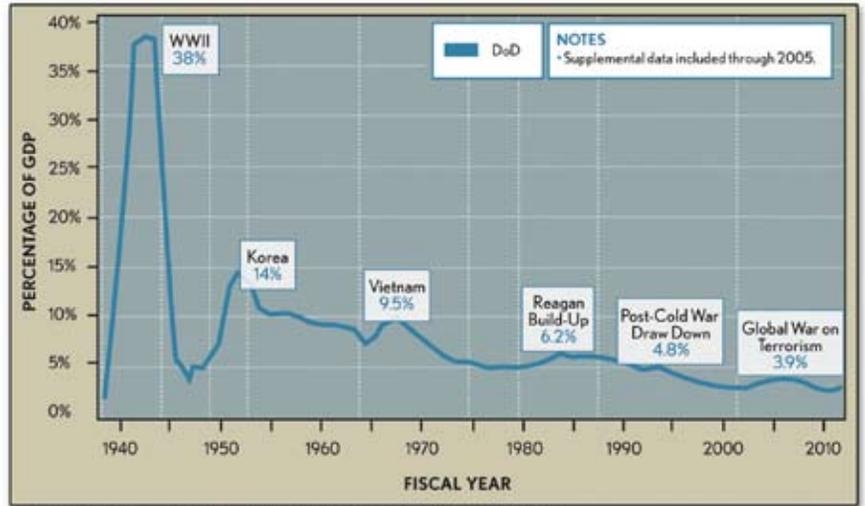
Other less-obvious factors exert more indirect yet also significant influence:

- **International Complexity.** Treaties registered with the UN more than tripled between 1970 and 1997, and the number of international institutions increased by two-thirds from 1985 thru 1999. At the same time, those entities became more

complex, more interrelated with often overlapping areas of responsibility, and more closely linked to transnational networks and private groups. The global scope of the CB threat necessitates effective multi-lateral cooperation to present an efficient, unified response to proliferation and use. However, the cited complexity of the world stage makes it difficult for the CBDP to maximize needed international policy integration, research and development (R&D), or financial burden-sharing, a situation which is exacerbated by opponents who exploit their membership in international organizations to actively undermine multilateral cooperation.

- **Different Perspectives.** Another constraint is created by the differing priorities and perspectives of various U.S. government branches and departments, which may impede effective interagency cooperation and burden-sharing. For example, the military may emphasize preventive medicine in support of military operations, while civilian planners may focus on effective responses to terrorist attacks. As a result of these different perspectives, DoD emphasizes pretreatments and vaccines rather than therapeutics, and may have different information architectures to support military operations rather than civilian life.
- **Competing Fiscal Priorities.** Through 2025, the United States is forecast to maintain not only one of the highest population growth rates among developed countries ranging between 0.7 and 1.0 percent, but it also has an aging population, necessitating expanded long-term investment in nondefense health care, social services, and R&D. Within DoD, the requirement to provide pensions and medical care for millions of retirees is imposing similar financial demands. Further, DoD's need to simultaneously transform and recapitalize U.S. forces while prosecuting conventional operations in Iraq and Afghanistan and unconventional warfare against global terrorism also strains finite resources. The resultant national economic competition affects funding for the CBDP and potentially dilutes its long-term ability to promptly counter threats emerging from the accelerating explosion of global scientific competency and technological innovation.

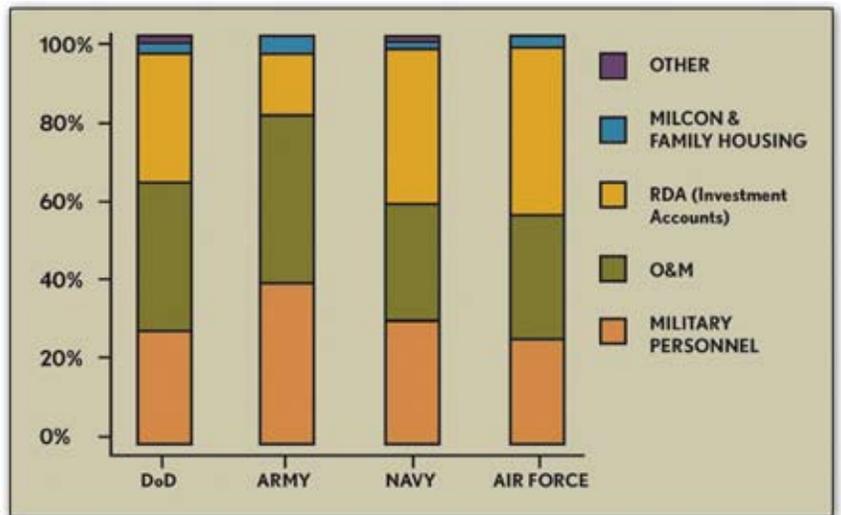
- *National Budget.* The Office of the Secretary of Defense, Comptroller, projects 2007 Defense spending will be 3.9 percent of Gross Domestic Product (GDP), continuing a downward trend. Defense resources have not kept pace with the growth in GDP. Between 1968 and 2005, GDP increased over 300 percent (from \$3.7 to \$11 trillion), while defense spending increased only 62 percent, (from \$358 to \$523 billion). (See *Figure 3.*)



Source: National Defense Budget Estimates for FY 2006, Office of the Under Secretary of Defense (Comptroller), April 2005.

Figure 3. DoD Outlay as a percentage of U.S. GDP

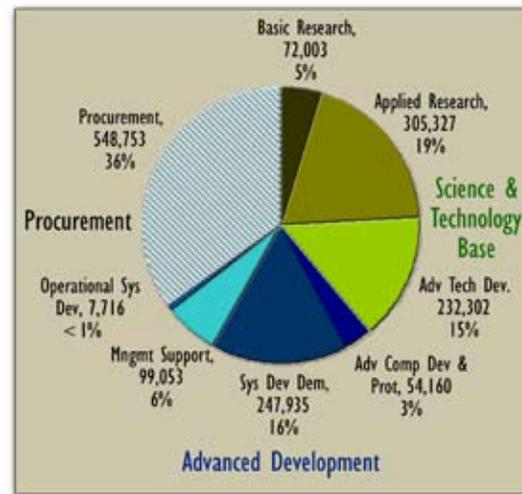
- *Defense Budget.* The buying power of DoD will decline by approximately \$92 billion over the next ten years, according to a U.S. defense industry consensus forecast. After adjusting for inflation, DoD's raw spending power is expected to decline by about \$80 billion over the next five years alone. Additionally, much of national defense funding is committed to sustaining people, maintaining vital infrastructure, and preparing equipment for combat deployment. As a result, annual funding for investment accounts must compete with these other equally pressing priorities. (See *Figure 4.*) Also, according to projections in its 2007 budget proposal, DoD plans to reduce its spending for R&D from \$72.5 billion this year to \$71.2 billion in 2011. After inflation is taken into account, this is a cut of 11.6 percent from 2006.



Source: National Defense Budget Estimates for FY 2006, Office of the Under Secretary of Defense (Comptroller), April 2005.

Figure 4. Investment Dollars

- *CBDP Budget.* The CBDP received \$1.5 billion in fiscal year 2007 (FY07), an increase of \$84 million above the initial budget request. Although this is encouraging recognition of the importance of CBD to national security, future program funding must be similarly stable and insulated from the broadly negative funding trends cited above. Continued support for the FY08 President's Budget Request for the CBDP will be a key part of the national strategies to counter the threats from CB weapons. (See *Figure 5.*)



Based on FY08 President's Budget Request (February 2007) \$1.570 Billion

Figure 5 Chemical and Biological Defense Program

## THE CHALLENGE

Today's environment of global conflict is not unique. The human struggle for power and influence remains much the same as it has been throughout history. What has changed, and changed dramatically for the worse, is the expanding roster of antagonists who have access to, or who are actively seeking, WMD with the capacity to inflict catastrophic damage. It is this increasingly dangerous strategic context that gives the CBDP its particular urgency to our nation. Of all the forms of WMD, CB weapons are among the cheapest and easiest to produce quickly and to deploy with the greatest likelihood for catastrophic effect. The challenge is compounded by the ease of disseminating knowledge related to developing WMD, increasing the dual-use nature of technologies, and the rapid technological advancements that continue to lower the threshold for acquiring WMD, and developing novel threats through various techniques, including genetic engineering. Thus, relevant implications for the CBDP are as follows:

- The nation will continue to be engaged in a long struggle of continuous, evolving conflict against adversaries employing irregular, catastrophic, and disruptive strategies, including terror, asymmetric attacks, and WMD to challenge, marginalize, erode, and paralyze U.S. power.
- As a result, military forces must be prepared to deal with the full spectrum of threats. More specifically, they must be able to operate in all WMD environments, unconstrained by CB effects.

- In particular, units that have been designated to be available for employment need CBD equipment and training to be ready for immediate deployment from the U.S.'s power projection infrastructure. Therefore, the CBDP must provide improved defensive capabilities in support of the national military strategies and force generating base.
- Building capabilities to manage risk and ensure U.S. forces are ready to meet current and future WMD challenges remain paramount, requiring stable funding for the TMTI; adequate long-term investment in the RDT&E infrastructure, including laboratories and test facilities; and consistent, predictable, and sustained resource levels for the CBDP.
- Failure to invest in the right CBDP capabilities—by improving doctrine, training, material, leaders, people, facilities, and infrastructure—will increase risk for our nation. The ability of the CBDP to respond to new and emerging threats is critically dependent on continued support of integration and awareness of revolutionary advances in science and technology (S&T) such as genetic engineering and nanotechnology.

These implications combine to underscore a strategic national security imperative to place the highest priority on sustaining and further improving DoD's CBDP.



## ORGANIZATION OF THE REPORT

*Chapter 1* describes the accomplishments, processes, and issues related to overall program management and oversight.

*Chapter 2* provides information on medical and non-medical CB defense requirements and research, development, and acquisition programs. This chapter outlines plans and strategies for the development and acquisition of capabilities in each of the program commodity areas, including contamination avoidance, individual protection, collective protection, modeling and simulation, decontamination, medical chemical and biological defense, and research, development, and acquisition efforts to address homeland defense and provide for force protection. This chapter also provides a description and assessment of the test and evaluation infrastructure of the CBDP, including an overview of the capabilities and limitations of the current infrastructure and proposed investments that began with the FY06 budget to improve the infrastructure.

*Chapter 3* provides an analysis of DoD's CB defense logistics posture. The analysis reviews the status of quantities, characteristics, and capabilities and limitations of all fielded CB defense equipment, industrial base requirements, procurement schedules, and problems encountered. *Annex H* provides detailed logistics data.

*Chapter 4* assesses and documents the status of CB defense education, training, exercises and doctrine conducted by the Services, individually and jointly, in order to ensure the readiness of the Armed Forces. Each of the Services' training standards and programs are included. In accordance with Section 1702 of Public Law 103-160 (the FY94 National Defense Authorization Act),

CB warfare defense training activities of the DoD have been consolidated at the U.S. Army Chemical School.

*Annexes A* through *G* provide detailed information on Joint- and Service-unique CB defense equipment, including contamination avoidance, biological defense systems, information systems, protection, decontamination, medical programs, and homeland security and installation protection programs. *Annex H* supplements Chapter 3 and provides detailed logistics data. This annex reflects the logistics status at the end of FY06. Assessments were conducted during FY06 to determine the specific warfighter requirements based on the warfighting requirements and additional mission requirements for force protection, consequence management, and homeland security. Detailed descriptions are provided for systems and equipment that have been fielded, are in production, or are under development. *Annex I* provides a summary of funds appropriated, budgeted, and expended by the DoD CBDP. *Annex J* provides a statement regarding chemical and biological defense programs involving human subjects as required by 50 U.S. Code Section 1523. As detailed in the annex, no such testing has been conducted in over two decades, and none is planned. *Annex K* provides information on the status of DoD efforts to implement the Chemical Weapons Convention, which was ratified by the United States and enforced as of 1997. This annex also includes a summary of plans and activities to provide assistance to other countries in response to an appeal by another State Party to the Chemical Weapons Convention, pursuant to Article X of the Chemical Weapons Convention. *Annex L* provides the text of the congressional language requiring this report. *Annex M* provides a list of the many acronyms and abbreviations used throughout this report.



# EXECUTIVE SUMMARY

It is our responsibility to provide our warfighters the best capability and support in the world. America remains a nation at war. The armed forces of the United States are engaged in a global war on terror while simultaneously deterring further attacks on Americans here at home. In doing so, our military faces many challenges, but one in particular—the threat posed by weapons of mass destruction (WMD)—is among our greatest.

DoD is pursuing a comprehensive strategy to counter this threat. The purpose of this strategy is to build readiness for current and future challenges. The Chemical and Biological Defense Program (CBDP) is a critical component supporting both the national strategies and department's strategies. The program exists to provide chemical and biological defense capabilities in support of the goals and objectives of our national military strategies, ensuring that DoD operations are unconstrained by chemical or biological effects.

To effectively execute this program, the department depends on continued congressional support in three priority areas:

- Stable funding for the Transformational Medical Technologies Initiative (TMTI) to fully exploit the advanced science and technology innovation necessary to successfully counter future genetically engineered biological weapons.
- Adequate long-term investment in the RDT&E infrastructure to enhance our research, development, test and evaluation capabilities, including the modernization and construction of laboratories and test facilities to ensure we develop advanced countermeasures against current and emerging chemical and biological (CB) threats.

- Consistent resources for the overall program itself to ensure that, year after year, we are able to field the improved defensive capabilities essential to ensure our military can operate in any environment, unconstrained by chemical or biological weapons.

With the support of the President, the Secretary of Defense, and the Congress, we have developed and resourced an integrated CBDP to best serve the nation, to build readiness for current and future challenges, and to sustain our armed forces in time of war.

To continue countering the existing and future threat from hostile WMD and to meet the critical operational needs of our military, the department requires full support for the resources requested in the program budget.

This report is provided in accordance with 50 U.S. Code Section 1523. (The complete reporting requirement is detailed in *Annex L*.) The report describes the accomplishments, initiatives, management, and oversight of the CBDP, as well as strategies and plans for the development and acquisition of capabilities in each of the program commodity areas for the near term, midterm, and far term; a description and assessment of RDT&E programs and infrastructure; an analysis of CB defense logistics posture; and CB defense education, training, exercises, and doctrine.

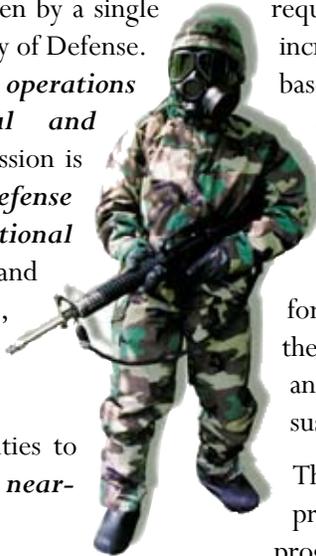
This report also demonstrates compliance with the Government Performance and Results Act (GPRA) by providing a performance plan, which is integrated into the overall structure of the report. The performance plan provides an assessment of the overall program for the most recently completed fiscal year (FY06).

Since its establishment in 1994 following congressional passage of the FY94 National Defense Authorization Act

(50 U.S. Code, Section 1522), the CBDP has integrated research, development, and acquisition (RDA) funds into defense-wide accounts that are overseen by a single office within the Office of the Secretary of Defense. The CBDP vision is to ***ensure DoD operations are unconstrained by chemical and biological effects***. The program's mission is ***to provide chemical and biological defense capabilities in support of the national military strategies***. The vision and mission statements guide the program, and its activities and are supported by four corporate goals:

- Goal 1:** Provide CB defense capabilities to the warfighter to ***reduce near-term operational risk***.
- Goal 2:** ***Reduce force management risks*** through enhanced joint CB defense education, training, and exercises.
- Goal 3:** Develop transformational CB defense technologies to ***reduce future challenges risk*** to DoD operations and forces.
- Goal 4:** ***Reduce institutional risk*** by improving DoD CB defense management practices – become a high-performance organization.

These goals reflect the CBDP's implementation of DoD's balanced scorecard concept, which provides a management and oversight framework to balance investment priorities against risks over time.



The CBDP budget request for FY08 is \$1.570 billion. An overview of the budget is provided in ***Annex I***. This request focuses on ***reducing the future challenges risk*** by increasing resources for the science and technology base. The CBDP seeks to ensure that DoD operations are unconstrained by chemical and/or biological effects by providing chemical and biological defense capabilities to build readiness for current and future challenges. The program depends on support in three priority areas: (1) stable funding for the TMTI; (2) adequate long-term investment in the RDT&E infrastructure, including laboratories and test facilities; and (3) consistent, predictable and sustained resource levels for the CBDP.

The CBDP employs multiple complementary processes to monitor performance and provide programmatic adjustments. First, the Planning, Programming, Budget and Execution System is employed to ensure program performance goals and targets are implemented. The CBDP annual report to Congress as well as assessments by the Joint Requirements Office-CBRN Defense also play key roles. Additionally, each materiel solution's progress is measured by monitoring specific performance goals and targets in the planning years, and the results of the data analysis are compared against performance goals, operational goals, corporate goals, and the overall CBDP mission. These processes support the objective of fielding improved CB defense equipment to our military forces.

## COMPELLING NEEDS

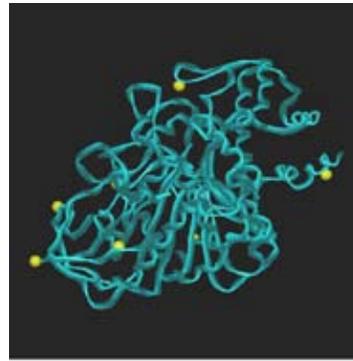
### Transformation



To achieve its objectives in response to global CB threats, the U.S. military must continue the transformation process. The *Transformation Planning Guidance* of April 2003 calls for transformational business and planning practices. Transformation challenges include management of defense, speed of mass (life and mobility) and information, fiscal barriers, values, and attitudes. The principles of jointness and developing an adaptable and responsive military carry over into CB defense.

It is extremely difficult to collect reliable intelligence on WMD programs and activities, which are closely guarded secrets. The prevalence of dual-use technologies and legitimate civilian applications means CB research efforts are easy to conceal and difficult to detect and monitor. Based on the demonstrated ease with which uncooperative states and nonstate actors can conceal WMD programs and related activities, the United States, its allies, and its partners must expect further intelligence gaps and surprises. Consequently, the United States must couple responses to known and validated threats with an aggressive and adaptive capability development process that anticipates potential novel and emerging threats.

## Science and Technology



*Recombinant Human  
Acetylcholinesterase*

CB defense requires new capabilities and technologies to meet and counter novel threats, including genetically engineered weapons. In 2007, funding was shifted from procurement to S&T to invest more heavily in preparing for future threats while sustaining and enhancing current force protection levels. The FY08 President's Budget reinforces this effort. The TMTI identifies multiple scientific approaches to deliver broad-spectrum therapeutics, genomic sequences of known threats, and rapid response countermeasure capabilities. TMTI is a first critical step in S&T efforts to defend and protect against the dangers of future CB threats. Additional initiatives in science and technology include the Transformational Countermeasures Technologies Initiative (TCTI), which focuses on the physical (nonmedical) aspects of CB defense, and the Nanotechnology Initiative, which cross-cuts medical and physical CB defense. Together, these initiatives address needs for advanced technologies for detection, individual protection, information systems, and decontamination capabilities. The new capabilities will reduce future risks in the future by leading to capabilities that will defeat genetically engineered biological threats and other as yet unknown threats.

# DOD CHEMICAL AND BIOLOGICAL DEFENSE PROGRAM PERFORMANCE PLAN

DoD's management priorities often focus on responses to near-term operational threats. A key purpose of the performance plan is to shift the emphasis to a more anticipatory approach that incorporates other factors into a comprehensive risk management framework. The balanced scorecard concept provides a risk management framework that demonstrates compliance with the Government Performance and Results Act and includes operational risks, while also addressing additional challenges that defense managers must consider to balance investment priorities against risks over time. DoD has tailored the balanced scorecard concept to four broad areas of risk management with performance management measures, all of which support the department's vision, mission, and goals and ensure an integrated collection of systems and capabilities in order to reduce overall program risk. DoD pursues an investment strategy that seeks to reduce overall program risk by balancing risk in each of the following areas.

- **Operational risk** stems from factors shaping the ability to achieve military objectives in a near-term conflict or other contingency. Within the CBDP, this includes investments in procurement and advanced development to address near-term needs. This is represented by Budget Activities 4, 5, and 7 and procurement accounts.
- **Force management risk** results from issues affecting the ability to recruit, retain, train, and equip sufficient numbers of quality personnel and sustain the readiness of the force while it accomplishes its many operational tasks. Force

management risk addresses investments to ensure sustainment of fielded systems and initiatives for CB defense education and training. This is represented by elements of various operations and maintenance accounts of the military departments, the Defense Logistics Agency, and the Defense Health Program. Resources for force management are not included within the budget of the CBDP; the CBDP leadership coordinates with the Services and Defense Agencies to ensure integration between acquisition programs and sustainment and force management activities.

- **Future challenges risk** derives from issues affecting the ability to invest in new capabilities and develop new operational concepts needed to dissuade or defeat mid- to long-term military challenges. Within the CBDP, this includes investments in the S&T base, Joint Capability Technology Demonstrations, and related efforts to address mid- to far-term needs. This is represented by Budget Activities 1, 2, and 3.
- **Institutional risk** results from factors affecting the ability to develop management practices, processes, metrics, and controls that use resources efficiently and promote the effective operation of the defense establishment. Within the CBDP, this includes investments in management activities to enhance the effective and efficient use of department resources, including investment in infrastructure to conduct research, development, and acquisition. This is represented by Budget Activity 6.

As illustrated in **Figure 6**, reductions in risk in one area may reduce total program risk. However, because of resource constraints, investment decisions must be made to make trade-offs among different accounts in a manner that ensures balance or reduces total risk.



Figure 6. Risk Management Strategy

The increased complexity of modern warfare demands that CB defense equipment be fielded in the most cost-effective and expeditious manner possible. Furthering that complexity, the evolving threat environment calls for a capabilities-based approach that requires identifying capabilities that U.S. military forces will need to conduct a range of military operations. Put simply, determination of each specific adversary's intentions and capabilities may not be possible, underscoring the need to smartly balance overall program risk.

## VISION, MISSION OF THE CBDP

The vision statement (*Figure 7*) provides focus and direction for CB defense RDT&E, and acquisition efforts. This vision encompasses a wide range of military environments and missions. These range from traditional battlefield force-on-force combat to homeland defense and civil support operations, and include special operations, anti-terrorism, force protection, consequence management, and other stability operations. Ultimately, the vision is focused on outcomes. That is, an effective CB defense capability will be one that facilitates the conduct of all DoD operations, in spite of a complex and varied CB threat, regardless of the range of operational environments.

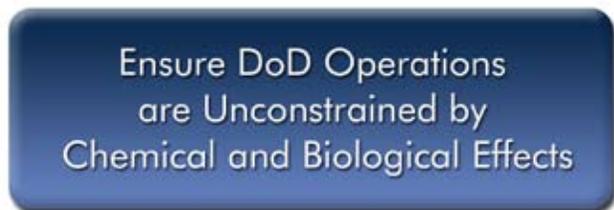


Figure 7. CBDP Vision

The vision is not focused on any specific chemical or biological threat. While it is focused on those CB agents that may be employed intentionally, it addresses classical threat agents as well as novel and emerging threats. The vision also encompasses various methods of delivery. Currently, CB defense capabilities impose some degree of burden on the user. The vision points forward to the development of capabilities free of such constraints and providing effective defensive capabilities that are transparent to the users.

As outlined in the 2006 Quadrennial Defense Review

(QDR), the Department has refined its Force Planning Construct to better reflect the nature of DoD's mission and tasks. In addition to normal force generation, sustainment and training activities, this updated wartime force planning construct calls for U.S. forces to be able to do the following:

- Defend the homeland
- Prevail in the war on terror and conduct irregular operations
- Conduct and win conventional campaigns

In each area, the Force Planning Construct accounts for activities that the department conducts continuously (steady-state) and those it conducts periodically (surge). The CBDP's mission (*Figure 8*) is to provide the capabilities needed to support military operations in each of these areas for various durations. RDA programs within the DoD CBDP aim to provide U.S. forces with the best equipment to ensure their survivability and mission accomplishment on any future battlefield where chemical or biological agents may be employed.

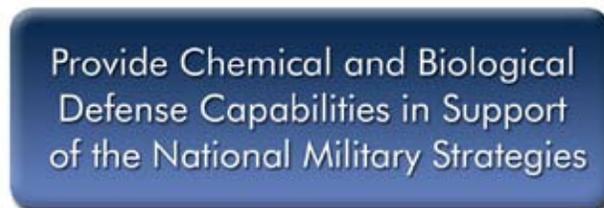


Figure 8. CBDP Mission

# CHEMICAL AND BIOLOGICAL DEFENSE GOALS AND FUNDING

## CBDP CORPORATE GOALS

The CBDP corporate goals used in *Figure 9* are a key element in providing a means to establish progress in fulfilling the program's mission.

- Goal 1: Provide CB defense capabilities to the warfighter to reduce near-term operational risk. Field and sustain required capability solutions within budget and on schedule to meet Joint Acquisition Objectives.
- Goal 2: Reduce force management risks through enhanced Joint CBRN defense education, training, and exercises. Create a Joint CB defense force through the CBRN education and training and exercise initiative.
- Goal 3: Develop transformational CB defense technologies to reduce future challenges risk to DoD operations and forces. Develop and support an S&T base program that integrates the DoD and other federal agency CB defense research efforts.
- Goal 4: Reduce institutional risk by improving DoD CB defense management practices – become a high performance organization. Fully implement continuous process improvement methods within the DoD CBDP.

Figure 9. CBDP Corporate Goals

Corporate goals provide the broad framework needed by the CBDP to meet warfighter requirements for CB defense operational capabilities. These goals provide strategic program direction for the development, acquisition, and fielding of CB defense equipment while reducing acquisition costs and time of development. *Figure 9* defines the corporate goals (and provides a summary of the key focus areas that support these goals.) To implement the goals of the program, the CBDP seeks to ensure that DoD operations are unconstrained

by chemical and/or biological effects by providing CB defense capabilities to build readiness for current and future challenges. The program depends on support in three priority areas: (1) stable funding for the TMTI; (2) adequate long-term investment in the RDT&E infrastructure, including laboratories and test facilities; and (3) consistent, predictable, and sustained resource levels for the CBDP.

## JOINT CBRN DEFENSE FUNCTIONAL CONCEPTS AND OPERATIONAL CAPABILITY GOALS

The Joint Staff Joint Requirements Office for CBRN Defense (JRO-CBRND) completed a Capabilities-Based Assessment (CBA) of Joint CBRN defense warfighting operational capabilities during 2005. This assessment provides a structured process that aligns programs with national security strategies and departmental strategies. In addition, it brings the process in line with the Joint Capabilities Integration and Development System (JCIDS)—the Department's process for defining and developing system requirements. The focus of the CBA is on the passive defense portion of the Combating WMD mission, as outlined in the National Military Strategy for Combating WMD. (Similar assessments are being conducted for consequence management and radiological and nuclear defense. CBAs are updated every three years.) Joint warfighter CBRN defense capability requirements are divided into four functional concept areas—Sense, Shape, Shield, and Sustain, as described in *Figure 10*. These functional areas represent an integrated network of capabilities to support the warfighter. Core capabilities for *Sense* include reconnaissance, detection and identification (contamination avoidance); *Shape* includes information systems; *Shield* includes individual and collective protection, and medical prophylaxes and pretreatments; and *Sustain* includes decontamination, restoration, and postexposure medical capabilities (i.e., therapeutics and diagnostics).

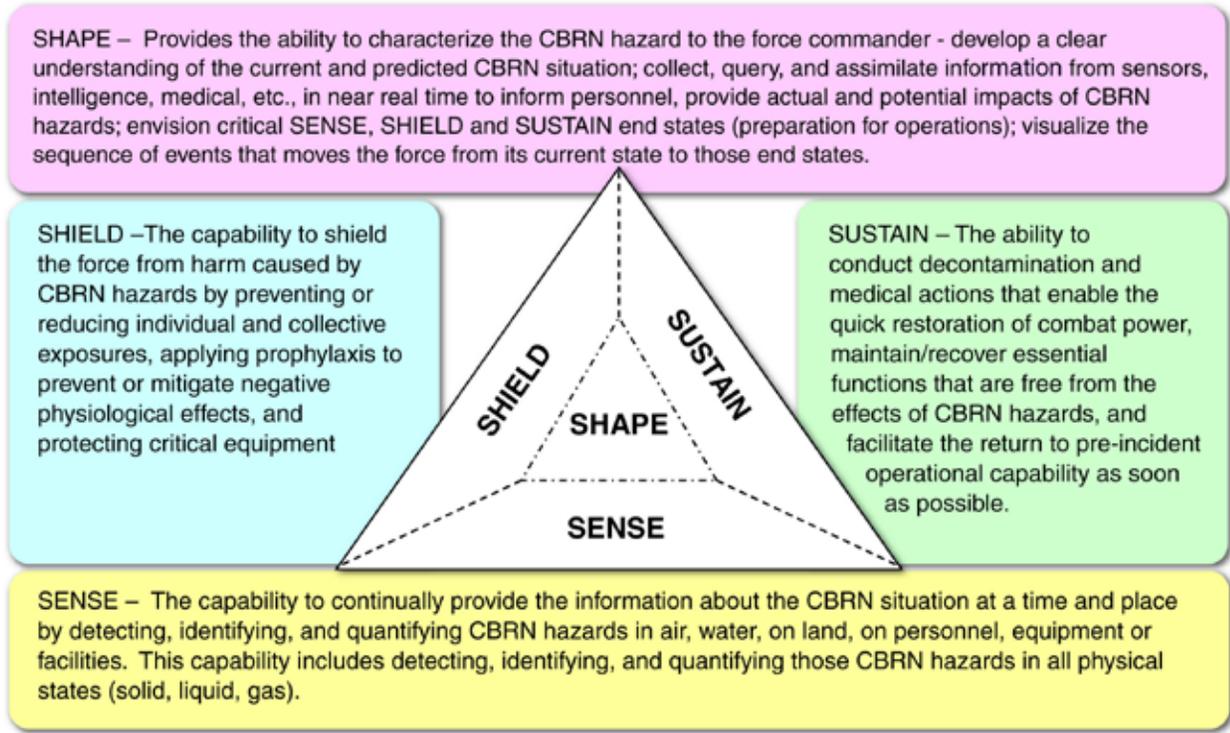


Figure 10. Joint CBRN Defense Enabling Concept and Supporting Core Capabilities

CBRN defense operational capability goals, as defined in the 2005 CBA, are aligned under the four functional concept areas (*Figure 11*). Assessments are under way to determine whether additional goals may be needed, or if existing goals need to be tailored to support evolving

mission areas, including consequence management and homeland security. Specific projects and programs within advanced development and procurement are associated with one or more of the operational goals.

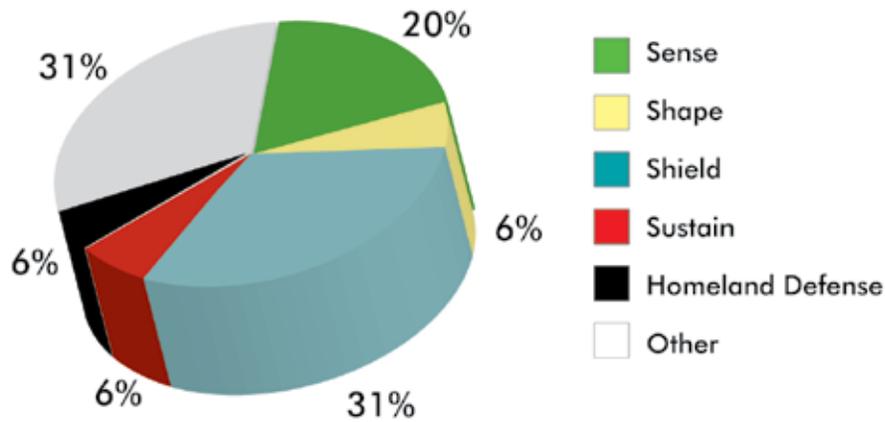
SENSE	SHAPE	SHIELD	SUSTAIN
1. Point Detection (Chemical, Biological, and Radiological)	4. Integrated Early Warning	7. Respiratory and Ocular Protection	11. Individual Decontamination
2. Stand-off Detection (Chemical, Biological, and Radiological)	5. Battlespace Management	8. Percutaneous Protection	12. Equipment Decontamination
3. NBC Reconnaissance	6. Battlespace Analysis	9. Expeditionary Collective Protection	13. Fixed Site Decontamination
		10. Medical Prophylaxes	14. Medical Diagnostics
			15. Medical Therapeutics

Figure 11. CBRN Defense Operational Goals

## CBDP FUNDING

As illustrated in *Figure 12*, the total CBDP investment for FY08 is \$1.570 billion. In FY07, the department restructured funds within this investment portfolio. The FY08 program continues the investment and focuses on *reducing the future challenges risk* by increasing resources for the S&T base. The overall program risk optimizes a balance among the competing needs of the department. To implement the goals of the program, the CBDP seeks

to ensure that DoD operations are unconstrained by chemical and/or biological effects by providing chemical and biological defense capabilities to build readiness for current and future challenges. The program depends on support in three priority areas: (1) stable funding for the TMTI; (2) adequate long-term investment in the RDT&E infrastructure, including laboratories and test facilities; and (3) consistent, predictable, and sustained resource levels for the CBDP.



Sense	\$308.111
Shape	\$91.415
Shield	\$488.676
Sustain	\$101.223
Homeland Defense	\$86.418
Other	\$494.406
<b>CB Defense Program Total</b>	<b>\$1,570.249</b>

(Dollars in Millions)

Note: Homeland Defense includes: Installation Protection Program, Military Mail Screening Program, and the WMD–CSTs.

“Other” includes: Dugway Proving Ground funds; Joint Concept Development and Experimentation Program; management support for the joint organizational offices; Joint Test Infrastructure Working Group; Laboratory Infrastructure; test equipment, strategy and support; and science and technology funds that may be applicable to two or more of the functional areas.

Figure 12. FY08 President’s Budget Request for the CBDP

The investment in the Shield capability area includes the TMTI investment. Investment in the Sense area was decreased due to a delay in the procurement of future biological standoff detection systems, and homeland defense also decreased, due to a reduction in funding for the Installation Protection Program.

**SUMMARY OF KEY PERFORMANCE METRICS**

**Measuring Progress Toward Operational Goals (Operational Risk)**

The investment in RDA is critical to the successful implementation of national security and military strategies for combating WMD, the global war on terrorism, and homeland security. At the end of FY06, there were 38 programs of record within the CBDP. For FY07, 37 of these programs are projected (from an annual perspective) to be on track to meet program cost, schedule, and performance parameters. This annual

assessment, conducted by the Joint Program Executive Office for Chemical and Biological Defense (JPEO-CBD), incorporates the consideration of risk within the following categories:

- Cost
- Schedule
- Performance
- Funding
- Contracts
- Test & Evaluation
- Logistics
- Production
- Management
- Interoperability

The department is making overall progress in the acquisition programs, as illustrated in *Figure 13*, and consequently, is making progress towards advancing the capabilities for U.S. forces. *Table 1* illustrates progress across the broad range of capabilities that provide a comprehensive approach to managing risk.

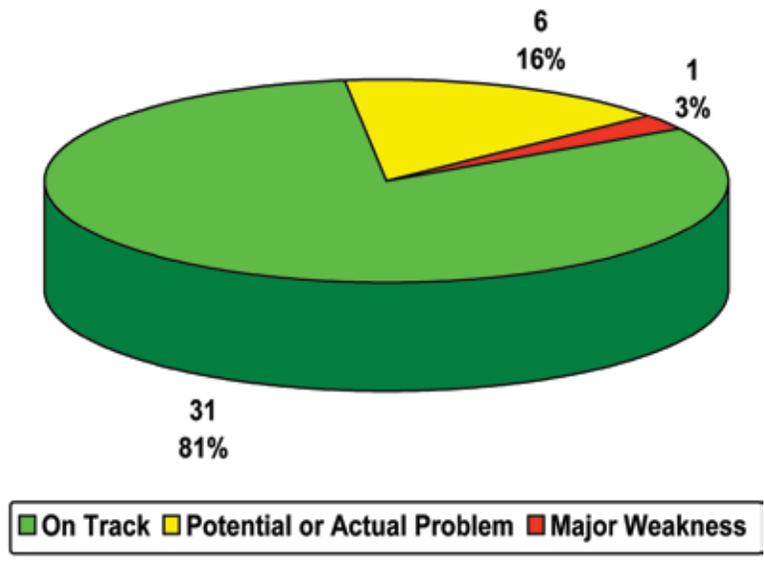


Figure 13. Summary Status of Acquisition Programs Demonstrates Overall Progress

Table 1. Summary Status of Acquisition Programs Demonstrates Overall Progress

JPM Collective Protection	
Shipboard Collective Protection System (SCPE)	G
Joint Collective Protection Equipment (JCPE)	G
Collectively Protected Field Hospitals (CPFH)	G
Joint Expeditionary Collective Protection (JECP)	G
Chemical Biological Protective Shelter (CBPS)	G
JPM Guardian	
Analytical Laboratory System (ALS)	G
Unified Command Suite (UCS)	G
Installation Protection Program (IPP)	G
JPM Individual Protection	
Joint Service Air Crew Mask (JSAM)	Y
Joint Service Lightweight Integrated Suit Technology (JSLIST) Ensemble	G
Joint Service Mask Leakage Tester (JSMLT)	G
Joint Service Chemical Environment Survivability Mask (JSCESM)	G
Joint Protective Aircrew Ensemble (JPACE)	G
Joint Service General Purpose Mask (JSGPM)	Y
JPM NBC Contamination Avoidance	
Joint Service Lightweight Standoff Chemical Agent Detector (JSLSCAD)	R
Joint Chemical Agent Detector (JCAD)	Y
Stryker NBC Recon Vehicle (NBCRV)	G
Joint Service Light NBC Reconnaissance System (JSLNBCRS)	G
Joint Chemical Biological Radiological Agent Water Monitor (JCBRAWM)	G
M93/M93A1 NBC Recon Vehicle (FOX)	G
JPM Information Systems	
Joint Effects Model (JEM)	Y
Joint Operational Effects Federation (JOEF)	G
Joint Warning and Reporting Network (JWARN)	Y
JPM Chem-Bio Medical Systems	
Anthrax Vaccine Adsorbed (AVA)	G
Recombinant Botulinum A/B Vaccine (rBot)	G
Smallpox System	G
Plague Vaccine	G
Skin Exposure Reduction Paste Against CW Agents (SERPACWA)	G
Joint Biological Agent Identification & Diagnostic System (JBAIDS)	G
Advanced Anticonvulsant System (AAS)	G
Improved Nerve Agent Treatment System (INATS)	G
pBioscavenger	G
Bioscavenger Increment II	G
JPM Decontamination	
Joint Service Transportable Decontamination System (JSTDS) - SS	G
Joint Service Personnel Decontamination System (JSPDS)	G
Joint Material Decontamination System (JMDS)	G
JPM Biological Defense	
Joint Biological Standoff Detection System (JBSDS)	Y
Joint Biological Point Detection System (JBPDS)	G

The overall rating of each program is assessed by JPEO-CBD and is based on a variety of factors tailored to the individual program. The overall assessment is based on whether the programs are on track (green), facing potential or actual problems (yellow), or have major weaknesses (red) compared to requirements defined in the Acquisition Program Baseline (APB) document for each program.

The vast majority (81%) of the programs are on track to meet defined and approved program requirements. Only six programs are identified as having potential or actual problems. However, appropriate solutions to these problems are within the Joint Program Manager’s ability to solve. For example, two of these programs—the Joint Warning and Reporting Network (JWARN) and the Joint Effects Model (JEM)—are at risk as a result of the deliberate decision to synchronize the schedules and planned fielding of these programs with the Joint and Service command and control programs with which they must interface. The realignment caused schedule delays

in the short term, but will result in enhanced overall performance and integration.

One program—Joint Service Lightweight Standoff Chemical Agent Detector (JSLSCAD)—faces major weaknesses. While JSLSCAD represents an improvement over currently fielded capabilities, it faced technical limitations in its performance during testing. As a result, JSLSCAD requirements are being re-evaluated to determine whether the program should continue in support of modified requirements or whether other options (including program cancellation) would be appropriate. The program decision will be reviewed by the Joint Requirements Oversight Council during FY07.

RDT&E progress within the programs is illustrated within *Figure 14*. The predominance of programs entering/completing Operational Testing or completing/conducting a Milestone C Decision Review in FY06 and FY07 indicates significant near-term program RDT&E completion and product fielding.

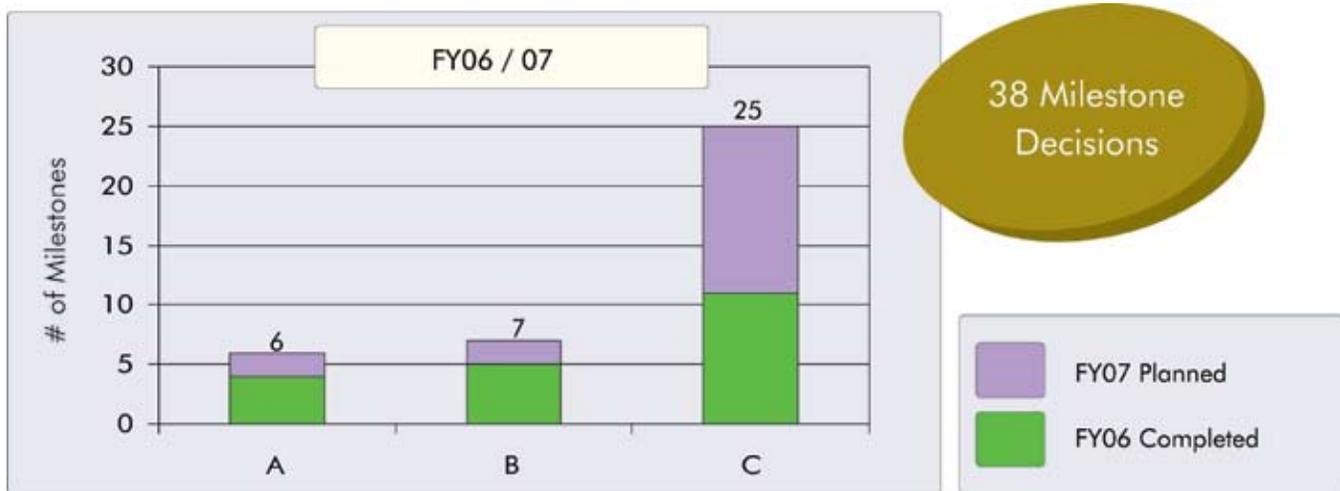


Figure 14. Milestone Decisions

In FY06 and FY07, 16 new capabilities are or will be fielded to the operational forces. These capability upgrades range across the spectrum of nuclear, biological, and chemical defense and include major detection, decontamination, medical, warning and prediction, and individual protection capabilities. Acquisition flexibility

and customer focus within the programs of record are illustrated in **Figure 15**. Concurrent with program-of-record events and development, a wide spectrum of capability has been generated during FY06 to meet the immediate needs of operational forces.

1. Joint Service Chemical Environment Survivability Mask	9. Fox Survivability upgrade
2. Joint Service General Purpose Mask	10. Stryker NBC Reconnaissance Vehicle
3. Joint Service Decon System - Small Scale	11. Analytical Laboratory Suite (ALS) Block 1 Upgrade
4. Joint Service Personnel Decontamination System/ Reactive Skin Decontamination Lotion (RSDL)	12. Battlefield Anti-Intrusion Detection System (BAIS) AN/PRS9 (FUE 2QFY06)
5. Joint Biological Agent Identification & Diagnostics System	13. Mobile Detection Assessment Response System (MDARS) (1QFY07)
6. Joint Service Mask Leakage Tester	14. JSLIST Block 2 Glove Upgrade (FY07)
7. Joint Effects Model Block I	15. Alternative Footwear System (AFS) / Integrated Footwear System (IFS) (FY07)
8. Joint Service Light Nuclear, Biological, Reconnaissance System	16. Joint Service Aircrew Mask (JSAM) (FY07)

Figure 15. CBDP Capability Fieldings (FY06 and FY07)

In addition to monitoring progress by tracking programs of record, other assessments of DoD's current and projected CBD capabilities took place. In August 2005, the Joint Requirements Office (JRO) completed the report *Chemical, Biological, Radiological, and Nuclear Defense (CBRND) Functional Needs Analysis/Functional Solution Analysis*. This report, also referred to as the CBA, is structured in accordance with the Chairman of the Joint Chief of Staff Instruction (CJCSI) 3170.01D, *Joint Capabilities Integration and Development System (JCIDS)*. The 2005 CBRND CBA was coordinated with the services and the Combatant Commands and was approved by the Joint Requirements Oversight Council (JROC). The CBRND CBA contains the most comprehensive and current assessment of DoD's current and projected CBRN defense capabilities and is therefore used here as the basis for the assessment of CB operational risk.

The JCIDS process provides a structured methodology that defines functional tasks, capabilities to perform the tasks, capability gaps, and potential nonmateriel and

materiel solutions. Based on national defense policy and centered on a common joint warfighting construct, the analyses initiate the formal development of integrated joint capabilities, to include the identification and justification of requirements necessary to initiate development and acquisition. The requirements are derived from an analysis of existing joint force operations and include doctrine, organization, training, materiel, leadership and education, personnel, and facilities (DOTMLPF) capabilities and deficiencies.

**Table 2** provides a summary of the results of the analysis. This assessment provides a summary of current capability levels of U.S. forces and planned capabilities at all levels of war. The 2005 CBRND CBA did not address any materiel deficiencies at the strategic or operational levels of war, so ratings for those levels are based solely on assessments of DOTMLPF capabilities. This assessment assumes planned schedules will be achieved and threshold key performance parameters (KPPs) will be met for all systems. Investment decisions are based on optimizing

Table 2. JROC Capability Based Assessment of CBRN Defense

Operational Area (Tactical level)	Overall Capability		
	Current	Near/Mid (FY06-11)	Far (FY12-20)
SENSE			
SHAPE			
SHIELD			
SUSTAIN			
<b>OVERALL</b>			

capability performance and reducing overall program deficiencies. The assessment provides an evaluation of CBRN defense:

by *Operational Area*—Sense, Shape, Shield, and Sustain

by *Level of War*—Strategic National, Strategic Theater, Operational, and Tactical<sup>1</sup> and

by *Time*—current, near term/midterm (FY06-11), and far term (FY12-20)

In qualitative terms, green, amber, and red typically indicate the following about the capabilities within each area:

-  “Green” indicates a full capability to perform the task to the designated standard(s).
-  “Amber” indicates a partial capability to perform the task to the designated standard(s).
-  “Red” indicates little or no capability to perform the task to the designated standard(s).

A summary of the results of the 2005 CBRN Defense CBA is shown in **Table 2**. The overall capability in each operational area is rated as amber through the far term.

<sup>1</sup> As defined by the Universal Joint Task List (UJTL), the strategic level of war is divided into two sublevels: strategic national, which encompasses DoD, service, and interagency tasks, and strategic theater, which encompasses combatant command tasks. Establishing these sublevels provides clarity and focus for task development and execution. At this level, a nation, often as a member of a group of nations, determines national or multinational (alliance or coalition) security objectives and guidance, and develops and uses national resources to accomplish these objectives.

At the operational level of war, campaigns and major operations are planned, conducted, and sustained to accomplish strategic objectives within theaters or areas of operations.

At the tactical level of war, battles and engagements are planned and executed to accomplish military objectives assigned to tactical units or task forces.

While the overall ratings do not change through the far term, the assessments are based on current and projected capabilities that will allow U.S. forces to operate against current and projected threats, respectively. Thus, even as capabilities improve, they must contend against transforming threats.

Additionally, this table provides an aggregate summary of material and non-material activities. The CBDP supports and directs research, development, and acquisition of material solutions while leveraging nonmaterial approaches. For example, inadequate doctrine or training may lower the rating for a task, even if material solutions exist. One example of this is found in a Shield task that involves protecting individuals from CBRN hazards. The CBA notes that DoD operations increasingly involve U.S. and non U.S. civilians who play an important role in supporting U.S. forces and therefore must be protected. However, military doctrine and training programs were not designed to ensure that the unprecedented number of civilians that were employed in early 2003 to support operations against Iraq were adequately prepared for CBRN defense. The information that follows in this report details the various measures being taken to address shortfalls identified in the JROC CBA. Consistent resource levels, as detailed in the FY08 President’s Budget Request, and congressional support for the overall program will be critical to the department’s ability to field improved defensive capabilities and to ensure U.S. forces can operate in any environment, unconstrained by chemical or biological weapons.

Table 3. JSTO-CBD Panel Assessment of CB Defense Technology Areas

Defense Technology Objective	Panel Rating
CB.35 Standoff Bio Aerosol Detection	GREEN
CB.37 CB Agent Water Monitor	AMBER
CB.42 Environmental Fate of Agents	GREEN
CB.45 Self-Detoxifying Materials	AMBER
CB.46 Recombinant Ricin Vaccine	AMBER
CB.50 Lightweight Integrated CB Detection	GREEN
CB.51 Low Level CW Agent Exposure	GREEN
CB.53 Wide-Area Aerial Reconnaissance for Chemical Agents	GREEN
CB.54 Therapy for Smallpox	GREEN
CB.55 CB Hazard Environment Prediction	GREEN
CB.56 Methodology for BW Agent Detection and Diagnostics Systems	GREEN
CB.57 Nontraditional Nerve Agent Medical Countermeasures	GREEN
CB.58 Western and Eastern Equine Encephalitis Vaccine	GREEN
CB.59 Therapeutic Strategies for Botulinum Neurotoxins	AMBER
CB.60 Vaccine Technologies for Filovirus Exposure	GREEN
CB.61 Advanced Air Purification System	GREEN
CB.62 Hazard Prediction with Nowcasting	GREEN
CB.63 Therapeutic Strategies for Filovirus Infection	GREEN
CB.64 Detection/Assessment of Genetically Engineered Biothreats	GREEN

### Logistics and Training Capabilities (*Force Management Risk*)

Critical CB defense capabilities for the warfighter are provided through the operations and sustainment (O&S) accounts of the military departments, in addition to the RDA funds of the CBDP. *Logistics Risks Assessments* are provided in **Chapter 3** of this report. These assessments provide information on capabilities in stock and available to the warfighter at the end of FY06 and planned for future years.



Data on personnel training and education is provided in **Chapter 4** of this report. Additional information on exercises, training standards, and related CB defense training activities is also detailed. A key aspect of the program is the establishment of the CBRN Education and Training Integration -Directorate.

### Developing and Deploying Transformational Capabilities (*Future Challenges Risk*)

The CBDP addresses risks from future challenges through research conducted in the S&T base. In early 2006, the Joint Science & Technology Office for Chemical/Biological Defense (JSTO-CBD) conducted a stakeholder's review of the science and technology program and provided an assessment of Defense Technology Objectives (DTOs). The results are summarized in **Table 3**. In particular, the JSTO panel identified DTOs CB.42, CB.60, and CB.61 as excellent performance areas.

During 2007, the DoD will be phasing out the use of DTOs as the basis of science and technology base performance. Two key measures will include (1) a series of expert panel reviews and (2) a measure of the number of technologies transitioned. One of the key measures of success of the science and technology base is the demonstration and transition of advanced capabilities to the materiel developer for eventual production and fielding. JSTO-CBD and JPEO-CBD currently maintain over 40 Technology Transition Agreements (TTAs) to facilitate the exchange of information and ensure successful transition of new technologies and capabilities. **Table 4** provides a summary of actual and planned technology for transition to the materiel developer.

Table 4. Actual & Planned Technologies Transferred to JPEO-CBD

	Core Programs				Test and Evaluation			
	FY06	FY07	FY08	FY09	FY06	FY07	FY08	FY09
Detection	1	0	2	0	0	3	0	2
Information Systems	1	5	4	1	0	0	0	4
Protection	0	2	6	0	0	1	3	5
Decon	0	1	1	0	0	0	2	0
Threat Agent Sciences	1	0	0	0	0	4	0	1
Diagnostics (Systems)	4	4	4	4	0	0	0	0
Diagnostics (Assays)	0	8	8	8	0	0	0	0
Diagnostics (Hardware)	0	2	2	0	0	0	0	0
Pretreatments	1	0	2	1	0	0	0	0
Therapeutics	0	0	2	0	0	0	0	0
Totals	8	14-18	23-27	6-10	0	8	5	12

A key programmatic decision of the 2006 QDR (Quadrennial Defense Review) was the direction to implement a \$1.5 billion Transformational Medical Technologies Initiative (TMTI) over FY07–11 to develop broad-spectrum medical countermeasures against the threat of genetically engineered bioterror agents. The TMTI focuses on broad-spectrum defenses against intracellular bacterial pathogens and hemorrhagic fevers. The TMTI builds on efforts started in FY06 as a result of the Enhanced Planning Process. It shifts the investment balance to reduce future risks and decrease overall program risk by maintaining a balance among countermeasures against near- and far-term threats. Additional initiatives will include developing advanced detection and deterrent technologies and facilitating full-scale civil-military exercises to improve interagency planning for complex homeland security contingencies.



In a parallel effort, the S&T program will initiate plans for the investigation into nanotechnology, biotechnology, information technology, and cognitive sciences (NBIC) in an effort to advance CB defense capabilities through revolutionary and innovative areas of research. This program has been titled “The Transformational Countermeasures Technologies Initiative” or TCTI. The intent of this program is to leverage NBIC developments to provide a fully

integrated protective ensemble to protect the future warfighter in a highly mobile force, and to expand this

concept to CB defense capabilities to protect fixed and semi-fixed facilities. Up to one-third of the physical S&T funds will directly support technologies in this cross-cutting initiative.

### Improving Management Practices (Institutional Risk)

Managing institutional risk deals with factors affecting the ability to develop management practices, processes, metrics, and controls that use resources efficiently and promote effective operations. Following are key management activities that are being pursued to manage institutional risk.

*Streamlining the decision process* — **Chapter 1** of this report describes the CDBP’s management and oversight structure. The most significant change in the management structure was the program reorganization that was approved on April 22, 2003. This reorganization streamlined the decision process by reducing the number of Milestone Decision Authorities (MDAs) from nine to one. From April 22, 2003, through May 9, 2006, Defense Acquisition Executive (DAE) oversight was implemented through a tailored index of systems labeled “Sentinel Systems” that sought to measure performance of CDBP functional areas based on the criticality, complexity, and cost of individual programs. On May 9, 2006, the DAE suspended the Office of the Secretary of Defense’s (OSD’s) use of the Sentinel oversight systems, delegated full MDA for all CDBP programs to the Army Acquisition Executive (AAE) and designated the CDBP

a Special Interest program in accordance with DoD Instruction (DoDI) 5000.2. This MDA authority was further delegated by the AAE to the JPEO-CBD on June 7, 2006. In July 2006, the CBDP implemented an alternative review process, which is detailed in *Chapter 1*.

*Program Balance* — *Annex I* of the annual report of the CBDP provides information on RDA funding. DoD annually reviews the program budget to ensure that program activities are balanced among science & technology, advanced development, and procurement to ensure technology transitions as well as to ensure capabilities are being developed to address near-term, midterm, and far-term operational needs.

*Improving Test & Evaluation Infrastructure* — *Chapter 2* of this annual report provides information on the DoD test and evaluation (T&E) infrastructure. In the FY07 President’s Budget Submission, budget needs for the T&E

infrastructure were integrated with the RFA programs. Based on technology needs and directions, this budget restructured acquisition programs, and integrated the T&E capabilities to execute these programs. The programs were time and funding sequenced so that the technologies could be demonstrated and transitioned in synchronization with the T&E capabilities. Thus, the program milestones were based on the availability of not only the financial resources, but also the technology and T&E resources needed to execute the programs. *Figure 16* illustrates the significant number of test events sponsored by the CBDP and occurring at a variety of locations for operational testing (OT), developmental testing (DT), combined test events, and clinical testing (for medical systems requiring Food and Drug Administration [FDA] approval).

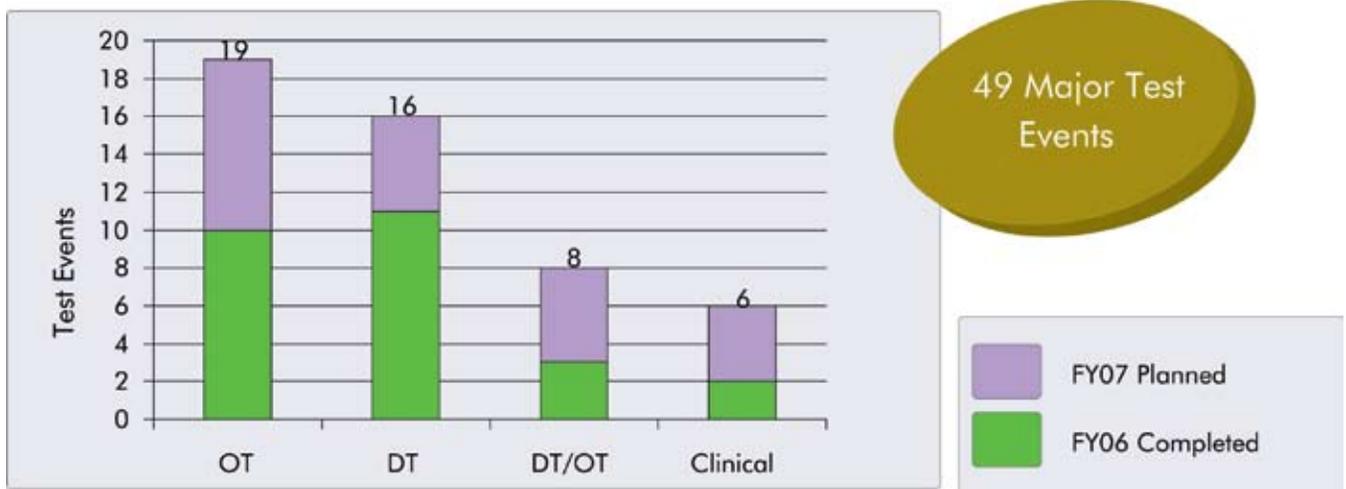


Figure 16. Major Test Events



