Department of Defense Chemical and Biological Defense Program Science and Technology Strategy

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Department of Defense (DoD) Chemical and Biological Defense Program (CBDP)
Science and Technology (S&T) Strategy
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This Chemical and Biological Defense (CBD) S&T Strategy articulates the way forward for the entire CBDP S&T community and defines an integrated S&T strategy. It is intended to provide a framework that gives all members involved in the CBD S&T program a shared purpose and shared goals. It is also intended to provide our customers and partners who include the Combatant Commanders; the Acquisition and Sustainment Community (JPEO-CBD); industry, academia, and our allies an understanding of the CBD S&T priorities.

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FOREWORD

This document describes the Joint Chemical and Biological Defense Program (CBDP) Science and Technology (S&T) Strategy. The Strategy is intended to serve as a guide for planning and implementing S&T investments needed for Chemical and Biological Defense (CBD) from the near and mid term (1-5 years) through the far term (5-15 years), including transitioning of technologies to Advanced Development and providing scientific information to the CBD community.

This document was produced by the Joint Science and Technology Office – Chemical and Biological Defense (JSTO-CBD), using an open planning process with input from subject matter experts from the CBD community. The individuals who participated in the development of this document are identified in Appendix D.

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List of Acronyms

ATD	Advanced Technology Demonstration
AS/CA/UK/US	Australia, Canada, United Kingdom, United States
BAA	Broad Agency Announcement
CBD	Chemical and Biological Defense
CBDP	Chemical and Biological Defense Program
CBR	Chemical, Biological and Radiological
CBRN	Chemical, Biological, Radiological and Nuclear
COI	Community of Interest
COCOM	Combatant Commander
CONOPS	Concept of Operations
DARPA	Defense Advanced Research Projects Agency
DDR&E	Director, Defense Research and Engineering
DHHS	Department of Health and Human Services
DHS	Department of Homeland Security
DoD	Department of Defense
DOE	Department of Energy
DTRA	Defense Threat Reduction Agency
FDA	Food and Drug Administration
FFRDC	Federally Funded Research and Development Center
GAO	Government Accountability Office
IC	Intelligence Community
IDA	Institute for Defense Analyses
ILIR	Independent Laboratory/Independent Research
IPL	Integrated Priority List
JFOC	Joint Future Operational Capabilities
JPEO-CBD	Joint Program Executive Office for Chemical and Biological Defense
JPL	Joint Priority List
JSTO-CBD	Joint Science and Technology Office for Chemical and Biological Defense
JRO	Joint Requirements Office
LOE	Limited Objective Experiment
MDAP	Major Defense Acquisition Program

NATO	North Atlantic Treaty Organization
NIAID	National Institute for Allergy and Infectious Diseases
NIH	National Institutes of Health
OSA(CBD&CDP)	Office of the Special Assistant for Chemical and Biological Defense and Chemical Demilitarization Programs
PD-TESS	Product Director for Test Equipment, Strategy, and Support
PSG	Program Strategy Guidance
QDR	Quadrennial Defense Review
RDA	CBDP Research, Development, and Acquisition Plan
RDT&E	Research, Development, Test and Evaluation
S&T	Science and Technology
T&E	Test and Evaluation
TAS	Threat Agent Science
TCTI	Transformational Countermeasures Technology Initiative
TEMA	Test and Evaluation Management Agency
TMTI	Transformational Medical Technologies Initiative
TTCP	the Technical Cooperation Program
WMD	Weapons of Mass Destruction

Executive Summary

In the spring of 2007, the Joint Science and Technology Office for Chemical and Biological Defense (JSTO-CBD) developed a Joint Chemical and Biological Defense Program (CBDP) Science and Technology (S&T) Strategy. This Strategy is intended to serve as a guide for planning and implementing S&T investments needed for Chemical and Biological Defense (CBD) from the near and mid term (1-5 years) through the far term (5-15 years), including transitioning of technologies to Advanced Development and providing scientific information to the CBD community. This effort utilized an open planning process with input from CBD subject matter experts (see Appendix D).

The CBDP S&T Strategy is aligned with strategic guidance provided by the National Security Strategy, March 16, 2006; the Quadrennial Defense Review (QDR), February 2, 2006; the National Military Strategy to Combat Weapons of Mass Destruction, March 24, 2006; the Military Strategic Plan for the War on Terrorism, February 6, 2006; the 16th Chairman Joint Chief of Staff Guidance to the Joint Staff – Shaping the Future, October 1, 2005; the CBDP Research, Development and Acquisition (RDA) Plan; the Joint Requirements Office for CBRN Defense Modernization Plan 2004; the Capabilities Based Assessments and resulting Joint Requirements Office (JRO) Joint Priority List; and FY 2008-2013 Program Strategy Guidance, March 15, 2006. The Strategy builds on the vision and mission of the JSTO-CBD and defines the strategic framework for S&T investment to implement, execute, integrate, and transition technologies that will achieve the JSTO-CBD scientific and programmatic goals and objectives.

The CBDP S&T Strategy provides guidance to better:

- Facilitate investment decisions across technical areas and performing organizations
- Identify CBD core S&T capabilities within the Department of Defense (DoD) laboratories, institutes and centers
- Identify and leverage promising science and technology trends
- Facilitate JSTO staffing decisions and DoD CBD S&T workforce development
- Provide a basis for program performance metrics
- Permit detailed execution planning
- Guide interagency coordination and outreach

Introduction and Background

The Joint Science and Technology Office for Chemical and Biological Defense was established in 2003 under the Special Assistant for Chemical and Biological Defense and Chemical Demilitarization Programs, OSA (CBD&CDP). JSTO-CBD fills a crucial role by managing and integrating CB S&T programs aimed at developing scientific knowledge and technological solutions to reduce the chemical, biological and radiological (CBR) threat to the military and defend the homeland.

The development of medical and physical CB countermeasures requires long-term investment in the pursuit of fundamental scientific knowledge, as well as the development of complex technologies. Ideas and approaches that seem promising at the theoretical level or as implemented in model systems do not always lead to workable solutions. Moving innovation and transitioning technology from the laboratory to the battlespace not only takes time; but also requires thoughtful strategies involving the JRO, JPEO-CBD, TEMA, the Combatant Commanders, and the Service laboratories; and continuous, rigorous, and disciplined analyses of how, when, and where to expend resources.

The CBDP S&T Strategy aligns with the long-term goals of the CBDP and the paths envisioned for pursuing those goals. The Strategy also supports the near and mid-term goals of the CBDP RDA Plan and provides a framework to develop, coordinate, integrate, and meet the programmatic objectives as expressed by:

- Services and Combatant Commanders (COCOM)
- Joint Capabilities-Based Assessment (capability gaps)
- Joint Program Executive Office for CB Defense (JPEO-CBD)

The Strategy is derived from a thoughtful mix of innovative insights and requirements. In the near term, the CBDP will focus on meeting requirements to transition technologies to programs of record as quickly and efficiently as possible. In the far term, the CBDP focus will be driven more and more by scientific advances and technical innovations. This change in focus will couple the incorporation of novel technologies in the response to specific threats, with the parallel development of complementary approaches targeted at minimizing the effects of broad classes of CB agents.

The Strategy incorporates two fundamental requirements – 1) to maintain consistency with JSTO-CBD practices, and 2) to increase the transition potential of technology solutions to the warfighter. These requirements support the traditional passive defense and consequence management missions executed by the DoD CBDP and may also provide collateral benefits to other CB technology requirements within the broader framework of combating WMD, such as elimination, interdiction, offensive operations, and active defense.

JSTO-CBD has identified six guiding principles for achieving excellence. These guiding principles are:

- Know where we are – describe current state based on data, beliefs, and assumptions
- Project optimal futures – define desired potential end states and implications
- Find value – use sound earned-value management practices
- Close the gaps – identify well-defined shortfalls and required changes
- Design the fixes – shape the workforce and align the organization
- Implement with accountability – implement metrics-based performance measures

The CBDP S&T Strategy accomplishes three key aims: 1) it identifies goals and objectives for the CBDP S&T effort, 2) it recommends strategic actions and 3) it defines core DoD S&T research capabilities. Goals and objectives are treated in detail in the body of the Strategy while the core research capabilities are defined in Appendix A.

Previous studies (1999 – 2007) have been conducted by the National Academy of Sciences, the Defense Science Board, Director of Defense Research and Engineering (DDR&E), and the Institute for Defense Analyses (IDA) to identify core capabilities that should reside in the Service laboratories. These studies have primarily focused on maintaining a continuous supply of trained scientists that are at the forefront of the scientific knowledge that defines DoD core research capabilities required by CBDP S&T. The Strategy considers three factors in determining what elements of the CBDP infrastructure are to be considered core research capabilities. A CBDP core capability supports surety, is associated uniquely with the CBDP, and must be available on short notice. The Strategy seeks to combine facilities, equipment, expertise and procedures into the definition of a capability. These criteria are discussed in more detail in the goals and objectives section of the Strategy.

The core S&T research capabilities identified in the Strategy are a subset of the core capabilities for the CBDP as a whole. These capabilities may be already established within the DoD or may need to be acquired. The JSTO-CBD will be an advocate for the Service laboratories to the OSA (CBD&CDP) concerning critical infrastructure shortcomings related to an identified core capability. In addition, the JSTO-CBD will support the establishment and maintenance of state-of-the-art research facilities and associated intellectual capital within the DoD to foster world-class mission-critical research.

The Technical Area Matrices (see Appendix A) identify the CBDP Core Research Capabilities. Each technical area matrix identifies a technical thrust area associated with the development of biological, chemical and radiological countermeasures in the Medical or Physical CBDP S&T programs. For each thrust area, national capability requirements are identified that define a set of desired military capabilities to be developed by the CBDP. Based on these requirements, the JSTO-CBD, with input from the core working group of subject matter experts, has determined the set of enabling technologies that are priority investment areas in the Strategy. The Strategy recognizes that core S&T capabilities must be strategically sustained within the DoD in order to ensure that the CBDP can draw upon these capabilities in a rapid, secure and cost-effective manner.

Vision and Mission

The JSTO-CBD mission is to

> ***manage and integrate the discovery, development, demonstration, and transition of science and technology to effect chemical and biological defense solutions for the Department of Defense while serving as the focal point for science and technology expertise. The JSTO provides the most innovative capabilities by collaborating with mission partners, the Services, other government agencies, industry, and academia.***

The JSTO-CBD seeks to achieve this mission by

> ***being the leading authority in Chemical and Biological Defense with recognized expertise in the development of future technology solutions that render the impact of chemical and biological hazards ineffective.***

To ensure success, the JSTO-CBD has established a set of fundamental goals and objectives, as summarized below.

Goals and Objectives

Three of the four goals for the CBDP S&T Strategy are derived from the roles and responsibilities assigned to DTRA in the CBDP Implementation Plan for the Management of the Chemical Biological Defense Program dated 22 April 2003. The fourth goal, Achieve Enterprise Excellence, is an enabling goal to facilitate mission success. The four goals are:

- Transition Technologies – Identify and exploit technology opportunities to transition capabilities into future acquisition programs and current product improvements.
- Ensure a Robust S&T Base – Maintain and leverage a robust S&T base to respond to DoD CB S&T needs. JSTO-CBD will work with stakeholders to identify critical CB S&T core capabilities either unique to the DoD laboratories or which must be acquired from external performers in order to respond to urgent needs of the DoD.
- Answer Science Questions – Manage and integrate research that addresses discrete data gaps or methodology issues within the CB S&T, test and evaluation (T&E), or advanced RDA programs. Support the development of Concept of Operations (CONOPS) and policy positions with sound scientific information.
- Achieve Enterprise Excellence – Achieve Enterprise Excellence for the DoD CBDP by building strategic collaborations with the traditional CB community of interest (COI) and non-traditional participants, and executing business functions effectively, efficiently, and in a timely manner.

Goal 1: Transition Technologies

Objective 1a. Evolutionary technologies and concepts

A. Description

Development of enhanced warfighting capabilities requires S&T investments in innovative technologies that are directly driven by joint warfighting needs. Toward this end, the JSTO-CBD will collaborate with the JRO, the JPEO-CBD, and Major Defense Acquisition Programs (MDAP) to develop and execute a balanced CBD S&T program which is responsive to Joint Service needs, that acquires and validates data in support of policy and doctrine, and transitions technologies to Joint acquisition programs. These capabilities are derived from the Joint Future Operational Capabilities (JFOC) and the Joint Requirements Office for CBRN Defense Modernization Plan 2004.

As part of this effort, the JSTO-CBD will achieve a balance between requirements "pull" and technology "push." Technology push entails investing in basic (6.1) research and identifying and exploiting opportunities in advanced (6.3) technology development. Projects within the S&T portfolio that are categorized as requirements "pull" will be aligned with the JRO requirements to address capability needs and with JPEO and MDAPs to address technology gaps. The Strategy will guide detailed implementation and execution plans that will identify the transition points of technology to advanced development within each Program Objective Memorandum (POM) period. In

conjunction with the JRO and JPEO, the JSTO-CBD has developed a *Technology Transition Handbook* to guide this process.

An essential element of the transition process is to manage risk. According to several recent Government Accountability Office (GAO) reports ("*Stronger Practices Needed to Improve DOD Technology Transition Processes ,*" GAO-06-883, "*Major Construction Projects Need a Consistent Approach for Assessing Technology Readiness to Help Avoid Cost Increases and Delays,*" GAO-07-336, and "*Assessments of Selected Weapons Programs,*" GAO-07-406SP), ensuring sufficient technology, and manufacturing maturity levels in acquisition programs is an excellent way to avoid cost overruns. The JSTO-CBD will use DoD defined evaluation criteria to assign an initial maturity level to each funded project (termed Technology Readiness Levels) and follow up with annual Technology Readiness Assessments. The JSTO-CBD will also address Manufacturing Readiness Levels where appropriate. Additionally, for Physical S&T, Test & Evaluation (T&E) requirements will be identified for methodology and capability development applicable to the technology to be transitioned. The analogous system in the Medical S&T is the Food and Drug Administration (FDA) process, which is managed by the Advanced Developer (JPEO-CBD).

B. Strategic Actions

Transition mature technologies in the near term to the following programs of record:

- Medical Diagnostics
  - Joint Biological Agent Identification and Diagnostic System
- Medical Pretreatments and Therapeutics
  - Bioscavenger chemical agent treatment
  - Advanced Anticonvulsant System (AAS)
  - Improved Nerve Agent Treatment System
- Detection
  - Joint Biological Tactical Detection System
  - Joint CBR Agent Water Monitor
  - Joint Biological Point Detection System (Incr II)
  - Joint Service Lightweight Standoff Chemical Agent Detector (Incr II)
  - Joint Biological Standoff Detection System (Incr II)
  - Joint Service CBR Reconnaissance System/Nuclear, Biological, Chemical (NBC) Recon Vehicle
- Information Systems
  - Joint Warning and Reporting Network
  - Joint Effects Model
  - Joint Operational Effects Federation
- Protection and Hazard Mitigation
  - Soldier as a System - Ground
  - Joint Expeditionary Collective Protection
  - Joint Material Decontamination System

Objective 1b. Revolutionary capabilities to support the CBDP

A. Description

The JSTO-CBD was directed by the 15 March 2006, Fiscal Year 2008-2013 (FY08-13) Program Strategy Guidance (PSG) for the CBDP, to *"Identify and exploit revolutionary, rather than evolutionary, technologies. Maintain a robust technology research effort. Develop and present a strategy for a research program that identifies and exploits technology opportunities, identifies and responds to new and emerging CBRN threats, and nurtures knowledge development. Seek out and take advantage of advances in areas such as* ***information management****,* ***nanotechnology****,* ***bioengineering****,* ***multifunctional materials****, and* ***human performance*** *studies."*

To achieve this objective, investments must be made to support the discovery and development of fundamentally new technologies and novel approaches that redefine the current scientific state of the art. The focus is to provide capability options to the Joint and Service Combat Development Community, the MDAPs and the COCOMs. These options may not yet be identified on the Integrated Priority List (IPL), the CBRN Defense Joint Priority List (JPL) or in the JPEO-CBD programs of record.

B. Strategic Actions

- Balance Technology Risk
  - Balance technology risk with large increases in capability
  - Accept higher risk if it supports high enough payoff in the event of success
- Promote new approaches by supporting revolutionary initiatives
  - Promote the transition of products within the Transformational Medical Technologies Initiative (TMTI) program
    - Develop and maintain a business strategy and research roadmap
    - Develop novel, FDA-licensed, broad-spectrum medical countermeasures and platform technologies
    - Develop genomic databases
    - Use technology scanning processes to identify technologies for potential addition to the TMTI portfolio
  - Implement an innovative business plan for TMTI
    - Integrate the management of S&T research and advanced development in a single program office
    - Proactively partner with the pharmaceutical and biotechnology commercial firms, academia and other government agencies to accelerate product development
  - Adopt approaches that are successfully demonstrated in the TMTI program into the remainder of the Medical S&T program
  - Develop the Transformational Countermeasures Technologies Initiative (TCTI)
    - Develop and maintain a business strategy and research roadmap
    - Identify strategic partnerships and stakeholders, their responsibilities, and a schedule for project execution

    - Grow a robust basic research program that emphasizes potential advances in nanotechnology, biotechnology, information technology, and cognitive sciences and convergence of these technological areas
    - Identify early applied research topics in the areas of computational chemistry and biology, in situ sensing, "smart" and reactive materials, and information systems
  - Encourage innovative thinking to develop new revolutionary initiatives that have the potential to provide either new approaches for solving old challenges (better, faster, cheaper) or new and revolutionary capabilities.

Goal 2: Ensure a Robust S&T Base

Objective 2a. A revitalized workforce for the CBD S&T program

A. Description

The successful execution of the CBD S&T program requires a highly trained workforce of scientists, engineers and program managers. The JSTO-CBD will maintain a robust investment in basic research areas to educate, recruit and retain the CBDP technical workforce. The JSTO-CBD will develop staffing requirements in accordance with the DTRA Strategic Workforce Plan to meet future internal staffing needs. The JSTO-CBD will design a strategy to increase the visibility of the CBDP through the implementation of an active outreach program to educate other government agencies, academia and industry on the importance of the CBDP to national security and JSTO-CBD's critical role in this process.

B. Strategic Actions

- Reach out to Academia
  - Sponsor student applicants to the DoD Science, Mathematics, and Research for Transformation Defense Scholarship for Service Program
  - Encourage academic CBDP performers to collaborate with DoD laboratories, including having students perform research on-site
  - Partner with the National Science Foundation and other government agencies to include CBDP and JSTO-CBD representatives at the Science, Technology, Engineering, and Mathematics Educational Coalition career forums
  - Encourage and support CBDP and JSTO-CBD staff to participate on program and/or steering committees for science meetings, with the goal of creating CBD-related session topics
  - Actively participate in DTRA's student and postdoctoral recruiting events.
  - Actively support the DoD CB Defense Postdoctoral Fellowship program as implemented through the National Research Council Research Associateship Programs:
  - Explore options such as Summer Faculty Programs
- Partner with DoD laboratories, institutes and centers
  - Co-fund Independent Laboratory/Independent Research (ILIR) projects

  - Identify technology areas needed to support current and future S&T research capabilities
  - Encourage jointly-executed CBDP S&T programs between DoD laboratories and other CBDP performers (such as other government laboratories, federal laboratories, academia, and industry)
- Partner with other CBDP performers
  - Build collaborative relationships with other CBDP S&T performers and agencies (such as industry, the Department of Energy [DOE] National Laboratories and the Department of Homeland Security [DHS]) to:
    - establish jointly-supported postdoctoral research exchange programs
    - support exchange programs to encourage non-academic researchers to take sabbaticals at DoD laboratories,
    - encourage rotations of DoD scientists at external non-academic laboratories.
- Provide growth opportunities within JSTO-CBD
  - Create new recruitment paths such as details at JSTO-CBD and OSA(CBD&CDP)
  - Provide junior staff with broader experience by developing rotation assignments within JSTO-CBD or other CBDP programs
  - Provide opportunities for JSTO-CBD more responsible mid-career detailee positions to DoD laboratories, institutes and centers, JRO, JPEO, and other CBDP S&T performers.

Objective 2b. Support for core CBD research capabilities within the DoD Service laboratories

A. Description

DoD Service laboratories, institutes and centers provide core S&T capabilities that must be maintained to ensure the success of the CBDP. A CBDP core S&T research capability is one which meets three criteria: it 1) supports surety, 2) is associated uniquely with the CBDP, and 3) must be available on short notice.

Chemical and biological surety is a core S&T capability required by the CBDP from the DoD Service laboratories. Surety programs are often not in place or are inadequate at extramural research institutions to support CBDP research programs. By maintaining critical functions that require chemical or biological surety in the DoD Service laboratories, the CBDP ensures: 1) its access to core facilities, 2) that CB agents are handled securely, safety and in compliance with DoD Directives and Federal regulations, and 3) transparency within the CBDP, as well as nationally and internationally.

B. Strategic Actions

To ensure the availability of these capabilities and the efficient expenditure of funds, the JSTO-CBD will build strategic partnerships with the "core" Service laboratories. As part of this partnership, the JSTO-CBD will become an active advocate for the Service laboratories, institutes and centers to the OSA (CBD&CDP) concerning critical

infrastructure gaps that have been identified and prioritized by the Service labs in coordination with JSTO-CBD. The JSTO-CBD will make strategic investments and prioritize the assignment of CBDP projects to the Service laboratories to support core intellectual infrastructure as well as the establishment and maintenance of core state-of-the-art research facilities. In return, the Service laboratories with designated core research capabilities will partner with the JSTO-CBD to give priority to CBDP programs over other government agencies and laboratories. The JSTO-CBD will:

- Identify the core research capabilities (see Appendix A) that must be maintained within the DoD Service laboratories.
- Implement strategies to resource infrastructure needs that support the identified critical competencies at the DoD Service laboratories to ensure the success of DoD research missions. These strategies include POM preparation, advocating for priority facility needs in MILCON processes, direct JSTO-CBD funding and shared funding. Laboratory Needs Assessments will evaluate facilities, equipment and infrastructure critical to conducting core S&T research.
- Establish strategic partnerships with the core DoD Service laboratories to
  - Ensure CBDP projects have priority over other work in core facilities
  - Develop an agreement of costing and pricing structure for JSTO-CBD funded critical competencies at DoD Service laboratories.

Objective 2c. Balanced investment across the scientific disciplines for long-term and short-term impact on the Chemical and Biological Defense Programs

A. Description

The CBDP provides a balanced investment strategy that includes investment in procurement of capabilities to protect warfighters in the near-term (1-2 years), investment in advanced development in the mid-term (2-5 years), and investment in basic research and the S&T base through the far term (6-12 years). Investments across the CBDP are strategically balanced to produce an S&T portfolio consisting of needs-based basic research and opportunities-based applied research. Historically, investment in basic research has produced scientific and engineering breakthroughs that laid the foundation for new operational concepts and military capabilities. However, it should be recognized that basic research is not part of a sequential, linear process from basic research, through applied research, to advanced development and application. Instead, basic research, applied research, and advanced development should be viewed as continuing activities occurring in parallel, with numerous supporting connections throughout the process.

B. Strategic Actions

- Conduct basic research that may produce significant improvement in military capabilities. Basic research should provide core capabilities to ensure technological advances through the far term. The areas of interest may vary each year depending upon the long-term focus of the CBDP.
- Exploit leading edge technologies to ensure that the warfighter is equipped with state-of-the-art capabilities to defend against CB threats through the far term. This

includes support of a comprehensive science and technology base (applied research) program to ensure continued advances in CBD capabilities.

- The top priority of the Strategy is to address the well-characterized threats to leverage existing military equipment and materials that are suitable and effective for a more comprehensive capability or may be modified quickly to provide relevant increments of affordable broad spectrum capability (advanced development).
- Increased investment in the Test and Evaluation (T&E) infrastructure necessary to maintain the technological advantage against emerging threats.
- Leverage scientific research available in academia and other research institutions to benefit from the research programs of external organizations. This effort monitors the emergence of revolutionary technologies and focuses efforts to demonstrate and transition those revolutionary technologies to meet the needs of the CBDP.
- Address the valid needs of the CBPD Joint Program Managers and synchronize with the time lines of the acquisition programs. The S&T program must include novel approaches and cutting-edge technologies to meet future warfighter needs. Some projects may not align with a specific need and will serve as a means for the user to exploit future technology advances.

Goal 3: Answer Science Questions

Objective 3a. Expertise internal and external to the DoD is leveraged effectively

A. Description

The JSTO-CBD will promote collaboration with DoD organizations and other federal agencies (e.g., Defense Advanced Research Projects Agency [DARPA], DHS, Department of Health and Human Services [DHHS], DOE), Federally Funded Research and Development Centers (FFRDCs), international research centers, academia and industry to develop, and support its S&T portfolio. These collaborative efforts will serve to expand the defense technology base by leveraging a shared knowledge base to solve multiple S&T problems.

The JSTO-CBD will also target non-traditional CBDP S&T performers to broaden the performer base. Further, the JSTO-CBD will encourage more out-of-the-box thinking and strategies from both traditional and non-traditional performers to solve S&T problems. Processes and mechanisms targeted for specific sectors such as academia, industry, etc. will be used to attract the best performers. Many of the strategic actions defined below for the academic community will also be effective for promoting and maintaining the participation of industry and government laboratories outside the DoD sector in the CBDP.

B. Strategic Actions

The JSTO-CBD will strive to solicit innovative ideas from internal (DoD laboratories, institutes and centers) and external CBDP S&T performers.

- Leverage international S&T research through memoranda of understanding and numerous data exchange agreements, as well as other cooperative arrangements (e.g., The Technical Cooperation Program (TTCP), AS/CA/UK/US (Australia, Canada, United Kingdom, and United States) MOU, and NATO)
- Other government agencies and laboratories
  - Coordinate with DARPA, DHS, DHHS, the DOE Laboratories and other agencies to identify candidate technologies, develop joint S&T roadmaps, and establish memoranda of agreement for mutual use of research facilities.
  - Build strategic partnerships through memoranda of understanding and memoranda of agreement to conduct S&T related to the CBDP.
  - Basic research programs should be at least three years in length, but may be extended beyond three years if sufficient scientific progress is being achieved. In general, basic research projects will be expected to yield useful data within three years.
  - Provide a consistent program management structure and processes. Broad Agency Announcements (BAA) should be issued at regular and predictable intervals.
  - Standards, such as providing feedback on rejected proposals, will be consistently upheld.
- Academia
  - Increase the length of basic research programs, as above.
  - JSTO-CBD will provide (as with government agencies and laboratories) a consistent program management structure and processes. BAA announcements should be issued at regular and predictable intervals.
  - Standards, such as providing feedback on rejected proposals, will be consistently upheld.
  - Grants will be used as the principal mechanism for transfer of funds.

Objective 3b. Timely focused scientific answers to the user community

A. Description

The JSTO-CBD concentrates on defining the threat in scientific terms and, through experiments and computation, obtaining data on agent properties that will be useful for the development of protective technologies. The JSTO-CBD will conduct research on traditional threats as well as emerging non-traditional chemical agents and biological threats. The JSTO-CBD also supports the active evaluation and demonstration of technologies through Advanced Technology Demonstrations (ATD) and Limited Objective Experiments (LOE). These efforts support the development of Concepts of Operations (CONOPS) as well as the transition of mature technologies.

Not every S&T effort will be directly related to a specific transition or program of record. Some efforts will be aligned to a needed capability or provide understanding of basic phenomena necessary for application to future technology development, spiral technology insertion, or evolutionary acquisition. These supporting scientific efforts underpin the entire CBD S&T program and are necessary for understanding phenomena and answering science-related questions. Examples include development of test

methodology and instrumentation, agent simulants and programs such as Threat Agent Science (TAS). Selected aspects of these efforts will be included in the core S&T capabilities.

TAS addresses science questions involving the environmental fate of agents, low level toxicology, agent characterization, simulant development, and computational chemistry. Data acquired by the TAS program is critical to the development of CONOPS and the transition of mature technologies. It is imperative to construct, employ, maintain and safeguard a system for the storage and distribution of validated CBRN data. This "Data Backbone" will provide DoD with a shared knowledge base that will increase the ability of CBDP performers to more quickly develop new capabilities and technologies by having access to validated CBRN data.

To facilitate the rapid communication of focused scientific answers to specific questions, the JSTO-CBD will develop a technical reachback capability in which CBRN subject matter experts can be called upon to address pressing scientific questions pertaining to Combating WMD and Homeland Defense, and to identify and develop new technical areas of interest. The technical reachback capability will place its most immediate priorities on passive defense and consequence management, but could expand to provide input to WMD interdiction, elimination, and active defense.

B. Strategic Actions

- Threat Agent Science will mitigate operational risks from CB agents by generating information and addressing emerging threats.
- Develop a CBRN Data Backbone to provide the CBDP S&T community with reliable data, improve the efficiency of the program, and increase the effectiveness of the warfighter's CB defense capabilities.
- Employ CB technical reachback capabilities to address scientific questions pertaining to Combating WMD and Homeland Defense.
- Develop new technical areas of interest, to include contributions to WMD interdiction, elimination, active defense, passive defense and consequence management (passive defense and consequence management have priority).

Objective 3c. No technology surprise

A. Description

Disruptive military capabilities and challenges may come from adversaries who develop and use break-through technologies. To prevent technological surprise, the CBDP is responsible for developing data and methodologies to better understand (and thus better counter) emerging non-traditional chemical and biological threats. The possibility of technological surprise will be further minimized through the formation of strong partnerships with the intelligence community (IC), performance of systems analyses for critical areas of concern, and technology watch efforts.

The information gathered through technology watch activities will be integrated with the input from the IC to identify and prioritize areas of concern. Systems analysis approaches will integrate this information. Simulations of relevant threat scenarios will be generated to predict the most likely future threats, their intended applications, and the probable consequences to the warfighter. The results of the systems analyses will be used to drive investment decisions and establish specific strategies for dealing with future threats.

These specific strategies will support the TAS program and will result in investment roadmaps to deal with new and emerging threats. An emerging chemical threat gap analysis will facilitate implementation of the TAS strategy. The strategy for new and emerging threats such as non-traditional chemical agents and genetically engineered biological threats will focus on developing protective technologies while allowing the warfighter to successfully execute the mission. These strategies will cross-cut physical individual and collective protection, as well as medical countermeasures and diagnostic tests. The payoff from a directed and strategic investment in emerging threats is the prevention and/or mitigation of illness or injury following exposure to new, emerging and genetically modified CB agents.

B. Strategic Actions

- Establish a collaborative program with the IC to identify disruptive technologies and seek recommended courses of action. This program should be a permanent function of the S&T program and incorporate a systems analysis framework.
- Establish a technology watch program to monitor publicly available sources of information for leading technology indicators.
- Establish a collaborative program with experienced systems analysts who are able to handle classified information, have relevant CBDP expertise, and can integrate multiple sources of information to produce simulations of relevant threat scenarios. These scenarios and associated models will be used to make predictions of future CBDP threats and how they would be used against the warfighter.
- Develop a strategic investment plan for the TAS program. The JSTO-CBD will focus on countering anticipated threats, validated by the IC and technology watch activities and systems analyses that have the greatest potential to cause catastrophic health consequences. The direct payoff from the investment in emerging threats is the prevention and/or mitigation of illness or injury following exposure to new, emerging and genetically modified CB agents.
- Use tactical conflict simulation to develop metrics for comparing materiel and non-materiel solutions based on proposed or potential technological solutions.

Goal 4: Achieve Enterprise Excellence

Objective 4a: Collaboration with the traditional CB community of interest (COI) and non-traditional participants

A. Description

Partnerships are critical for a healthy S&T program. The JSTO-CBD is at the nexus of many different organizations, placing it in a unique position to create and foster collaborative CBD research. Thus, a strategy of collaboration that effectively combines technology monitoring, portfolio management and outreach will be pursued.

The Strategy will be driven by a robust technology monitoring effort that will reach beyond the CBDP's traditional sources of information to engage with the broader S&T community. The goal is to identify existing and/or novel and innovative technologies with the potential for developing transformational solutions. The JSTO-CBD will seek to build a set of strategic relationships with various international and US government agencies. It will engage in technology development programs with federal collaborators such as other non-CBDP DoD organizations (e.g., DARPA, DHS, DOE National Laboratories, and DHHS organizations such as the Centers for Disease Control [CDC], the National Institutes of Health [NIH] National Institute for Allergy and Infectious Diseases [NIAID], and the Biomedical Advanced Research and Development Authority [BARDA]) as well as international partners (e.g., the United Kingdom's Defense Science and Technology Laboratory). As appropriate, partners will be engaged to provide new ideas, conduct technology demonstrations, build innovative prototypes, and complete the work needed to transition technologies to military systems.

The JSTO-CBD will initiate a formal outreach program to communicate the CBDP portfolio and strategic objectives to potential collaborators (both technical and programmatic) in order to maximize the engagement of the program with strategic partners. As part of this program, the JSTO-CBD will identify potential areas of collaboration, including a clear description of the JSTO-CBD's current portfolio of projects. COCOMs and other customers will be engaged in the outreach activities to ensure communications accurately represent their views and the partnerships for outreach activities are responsive to their needs.

B. Strategic Actions

- Monitor Technology
  - Expand the JSTO-CBD's technology horizons by engaging a broader S&T community outside the mainstream CBDP
  - Find and exploit existing and/or novel technologies with the potential for developing transformational solutions
  - Monitor technology development in areas not funded by the CBDP
- Develop Strategic Partnerships
  - Engage in collaborative science and technology development programs with federal as well as international partners

  - Share promising technologies with non-DoD agencies for advanced development
  - Foster the best science regardless of performer to ensure the delivery of leading edge technologies (e.g., DoD Service laboratories, DOE National Laboratories, academia, industry, FFRDCs)
  - Develop long term strategic partners within the CB S&T COI (DOE National Laboratories, FFRDCs, DoD laboratories, institutes and centers) whose thorough understanding of CBD S&T needs will enable them to build requisite competencies to support the CBDP.
- Perform Outreach
  - Initiate a formal outreach program to communicate the CBDP portfolio and strategic objectives to potential collaborators (both technical and programmatic) in order to maximize the involvement of strategic partners
    - provide information on current and planned JSTO-CBD projects
    - provide annual review briefings
    - provide reports on completed projects
  - Engage COCOMs and other customers in outreach activities to ensure communications accurately represent their views and partners engaged in the outreach activities are responsive to their needs

Objective 4b: Effective and efficient business processes that enable the CBDP mission

A. **Description**

As the JSTO-CBD continues to grow, business processes and practices must continuously improve to best support the achievement of programmatic and technical objectives. Creative business practices will enhance the JSTO-CBD's ability to exploit S&T opportunities and rapidly transition technologies. Examples of business initiatives include Portfolio Management, Project and Product Development Management and Collaboration Management with established metrics.

B. Strategic Actions

- Conduct a review of JSTO-CBD internal business processes to identify possible improvements on an annual basis
- Establish more efficient business processes to improve the execution of the CBDP
- Establish an approval process for business practices through the Governance Committee which will also review new or modified processes at regular intervals
- Provide alternatives to the BAA process (e.g., block grants to strategic partners)
- Utilize the ATD and LOE processes to reduce technology risk

Management Framework

The JSTO-CBD's strategic management system consists of several key ongoing and interlinked activities that can serve to accelerate the achievement of JSTO-CBD's goals and objectives.

Strategic planning forms the basis of all strategic and tactical decision-making, resource allocation and capital investment. It serves to direct all CBDP S&T efforts.

The performance evaluation process is used to identify potential opportunities for improvement in program execution and process management. This process can also yield information that indicates the need to change the near-term objectives or long-term strategy. Because investments in S&T can yield results 5, 10 and 20 years in the future, annual performance measures must incorporate measures of both output and outcome, addressing a longer term view than fiscal year by fiscal year.

The implementation planning process guides the annual budget formulation and preparation of performance plans to achieve the goals and objectives. This is a cyclical process which impacts both strategic planning and performance evaluation.

The JSTO-CBD has incorporated four critical success factors into its planning to ensure success of the CBDP S&T Strategy. Implementation of these factors is a cornerstone of the program.

- Strong executive leadership
  - Ownership of the Strategy and the follow-on implementation
  - Visible strong support that promotes commitment and involvement from all partners within and outside JSTO-CBD
  - Team spirit
- Measurable goals and objectives
  - Consistent with the organization's strategy
  - Clear definition of program goals and objectives
  - Clearly defined criteria for measuring progress
- Clearly defined roles and responsibilities
  - Early identification of key stakeholders, internal and external to CBDP S&T
- Well-designed execution and continuous improvement plan
  - Transformation management as an integral part of the Strategy
  - Well-defined execution strategy and implementation strategy that is clear to all stakeholders
  - Program milestones designed to deliver products that meet established goals and objectives

Implementation

To implement the CBDP S&T Strategy, the JSTO-CBD is undertaking a two-step approach. The first step is the completion of this document, which establishes the goals and objectives that the JSTO-CBD will employ to ensure that the most appropriate technology is developed and transitioned for use against the highest priority CBR threats. This CBDP S&T Strategy considers the full spectrum of technology investment for both medical and non-medical capability areas. The Strategy will be reviewed bi-annually to incorporate changes in guidance, threats, technologies, and requirements.

The second step is to develop a JSTO-CBD S&T Implementation Plan. This Implementation Plan will outline the CB Defense S&T activities that reflect the highest priority capability needs, technology gaps, and timely technology transitions. The Implementation Plan will outline near-, mid- and long-term activities for research, development and transition of CBD technologies, consistent with the goals defined in this Strategy. The Implementation Plan will be reviewed annually to reflect changes in the threat scope and the availability of new or revolutionary technologies.

While JSTO-CBD leads the execution of the CBD S&T Implementation Plan, DoD recognizes that developing, acquiring, and utilizing CBD products to prepare for and respond to CBRN events will require significant resources and cooperation among many stakeholders, including Service laboratories, federal counterparts outside DoD, international partners, private industry and academia.

Conclusions

The commitment by the nation's top leadership to CBD is clearly articulated in the President's *National Military Strategy to Combat Weapons of Mass Destruction* and the *Joint Requirements Office for CBRN Defense Modernization Plan 2004.*

This S&T Strategy outlines the JSTO-CBD's approach for managing the DoD's CBD science and technology efforts. It provides strategic guidance for the JSTO-CBD and signals the organization's intentions and priorities to its federal and private partners. It articulates a strategy to develop and execute a robust, integrated, end-to-end CBD S&T enterprise that provides capabilities to protect against, respond to, and enable recovery from chemical, biological or radiological attacks. The JSTO-CBD will continue to engage stakeholders as it develops specific strategic initiatives to meet its goals and objectives.

APPENDIX A

DoD Core Research Capabilities Matrices

The Technical Area Matrices identify the DoD Core Research Capabilities. Each technical area matrix identifies a technical thrust area associated with the development of biological, chemical and radiological countermeasures in the Medical or Physical CBD S&T programs. The CBR matrices in the medical and physical thrust areas (column 1) summarize the national capability requirements that define the programmatic objectives in each thrust area, the enabling technologies that need to be fostered, leveraged or maintained in order to meet the requirements, and the core set of capabilities that must reside in the DoD laboratories, institutes and centers in order to ensure that the CBDP can draw upon them in a rapid, secure and efficient manner.

The national capability requirements define a set of desired military capabilities to be developed by the CBDP (column 2). These capabilities were derived from requirements as defined by the JRO, programmatic gaps to be filled in order to meet the requirements and technical insight into the future needs of the warfighter.

Based on these requirements, the JSTO-CBD, with input from the core working group of subject matter experts, has determined the set of enabling technologies that are priority investment areas in the Strategy (column 3). The enabling technologies are S&T subject areas that the CBDP must directly support or indirectly engage in order to meet the national capability requirements. Enabling technologies encompass a broad spectrum of expertise in strategic research areas in the biological and physical sciences, analytical methods, and research tools such as culture collections or animal models.

The Strategy recognizes that core S&T capabilities must be strategically sustained within the DoD (column 4). The technical matrices define this set of DoD core capabilities for each of the technical thrust areas. The Strategy considers three factors in determining what elements of the CBDP infrastructure are to be considered core research capabilities. A CBDP core capability supports surety, is associated uniquely with the CBDP, and must be available on short notice. The Strategy seeks to combine facilities, equipment, expertise and procedures into the definition of a capability. These criteria are discussed in more detail in the goals and objectives section of the Strategy (see Objective 2b).

Medical Countermeasures (Biological)

Thrust Area	(National) Capability Requirements	Enabling Technologies (Priority Technology Areas)	DoD Core Research Capabilities
Medical countermeasures (biological)	Develop multi-agent and single agent vaccine candidates, new vaccine platforms, adjuvants and alternative needle-free vaccine delivery systems Develop broad-spectrum and agent-specific therapeutics against biological agents Identify new ways to accelerate the drug/vaccine development cycle Ensure a robust S&T base in medical biological defense Develop/improve assays, reagents, protocols for existing and novel diagnostic platforms and assess 'next generation' diagnostic test platforms for military usefulness Develop integrated, automated sample preparation protocols Identify novel biomarkers of infection or exposure for assay development Identify technologies/protocols for the identification of poorly characterized/ genetically engineered biothreat agents	Aerobiology Animal model systems Biological surety Bioinformatics Cell biology Cell culture/Tissue culture Computational biology Culture collection & sample library Diagnostic specimen processing Genome sequencing Genomics Immunology *In-vivo* specimen generation Microbiology Medicinal chemistry Metabolomics Molecular biology Optical imaging Organic chemistry Pharmacology Proteomics Structural biology Synthetic organic chemistry Toxicology Veterinary Medicine Virology	Facilities having comprehensive biological surety (safety & security) programs and the technical expertise to enable critical S&T research with a broad array of select agents and toxins, including the following technologies and/or resources: Drug design, testing & evaluation Vaccine design, testing & evaluation Diagnostic assay design, testing & evaluation Aerobiology research facilities and technologies BSL-3/4 containment laboratories BSL-3/4 animal research facilities Appropriate animal model systems Culture collection & sample library Critical reagents GxP laboratories (GLP/GCP/GMP) Genome Sequencing

Medical Countermeasures (Chemical)

Thrust Area	(National) Capability Requirements	Enabling Technologies (Priority Technology Areas)	DoD Core Research Capabilities
Medical countermeasures (chemical)	Develop pre-treatments against chemical agents Develop therapeutics against chemical agents Develop countermeasures to non-traditional Agents (NTA) Develop improved methods for verification of CW agents in biomedical samples Identify ways to accelerate the chemical countermeasures development cycle Ensure a robust S&T base in medical chemical defense Develop/improve assays, reagents, protocols for existing and novel diagnostic platforms Develop improved methods for verification of CW agents in biomedical samples	Analytical chemistry Animal model systems Behavioral testing Biochemistry Bioinformatics Cell biology Cell culture/Tissue culture Chemical surety Computational biology Genomics Inhalation toxicology Inorganic chemistry *In-vivo* specimen generation Microbiology Medicinal chemistry Metabolomics Molecular biology Neuroscience Optical imaging Organic chemistry Pathophysiology Pharmacology Physiology Proteomics Structural biology Synthetic chemistry Toxicology Veterinary Medicine	Facilities having comprehensive chemical surety (safety and security) programs and the technical expertise to enable critical S&T research with a broad array of chemical agents, including the following technologies/resources: Animal testing facility Appropriate animal model systems Chemical agent synthesis capability Critical reagents Design, testing & evaluation of pre-treatments & therapeutics Diagnostic assay design, testing & evaluation GxP-compliant laboratories (GLP, GCP, GMP)

Medical Countermeasures (Radiological)

Thrust Area	(National) Capability Requirements	Enabling Technologies (Priority Technology Areas)	DoD Core Research Capabilities
Medical countermeasures (radiological)	Develop radioprotectants and post-irradiation therapeutic agents for ARS Identify ways to accelerate the medical radiological countermeasures development cycle Ensure a robust S&T base in medical radiological defense	Animal model systems Behavioral Science Biochemistry Biodosimetry Biomarkers Cell biology Cell culture/Tissue culture Computational biology *In-vivo* specimen generation Medicinal/clinical chemistry Metabolomics Microbiology Molecular biology Organic chemistry Pathophysiology Pharmacology Proteomics Radiation Biology Structural biology Synthetic chemistry Toxicology Veterinary Medicine	Facilities having an appropriate radiation source and the technical expertise to enable critical S&T research in radiological countermeasure development, including the following technologies/resources: Animal testing facility Appropriate animal model systems GxP-compliant laboratories (GLP, GCP, GMP)

Physical Countermeasures (Biological)

Thrust Area	(National) Capability Requirements	Enabling Technologies (Priority Technology Areas)	DoD Core Research Capabilities
Physical Countermeasures (Biological)	Develop detection systems for BWAs as aerosols, on surfaces and in liquids Develop advanced materials for individual and collective protection systems (fixed and mobile) Develop network infrastructures that provide integrated early warning and support for real-time reporting and decision making Develop hazard and environmental models that produce reliable/accurate predictions of the threat environment Build software tools that support planning and decision making, joint experimentation and reachback Understand the interactions of biological agents with substrates and environments, including the hazard presented to personnel Rapidly characterize current and emerging bioagents and develop simulants to expand our knowledge of potential emerging threats for non-state enemies Predict BWA physical properties such as environmental viability, re-	Adsorption/absorption Advanced materials Advanced spectroscopic methods Aerosol Science Aerobiology Agent characteristics Air purification technologies Assay automation Bioinformatics Biotechnology Cell biology Clinical science Cognitive science/Human response Computational biology/chemistry Data fusion Electromagnetic signature exploitation Environmental science Ergonomics Fluidics Genetics/Molecular biology Genomics Immunology Interactomics Knowledge management Metabolomics Material science Meteorology Microbiology Microelectromechanical arrays for spectral	Biological surety (safety and security) facilities with high containment levels, animal models and the accompanying technical expertise with handling BSL-3/4 bioagents, including: Appropriate animal model systems BSL-3/4 containment laboratories BSL-3/4 animal research facilities Critical reagents Culture collection & sample library Environmental live agent test capability Full scale decontamination test facility Range test and validation capability

Thrust Area	(National) Capability Requirements	Enabling Technologies (Priority Technology Areas)	DoD Core Research Capabilities
	aerosolization and toxicological effects. Evaluate detection, protection and hazard mitigation technologies under realistic conditions using full-scale ranges, live agent test facilities and material effects testing Predict environmental and materials effects of exposure to live agents and decontaminants Develop a portfolio of integrated nanoscience, bioscience, information sciences and cognitive sciences to support transformational CBD capabilities.	correlation Military worth methodologies Modeling and simulation Nano- and biotechnologies Nanocatalytic, self-cleaning and reactive materials Nanofibers, nanomembranes Optics Pathophysiology Pharmacodynamics Pharmacokinetics Photoacoustics Photothermal excitation Physical chemistry Physiology Proteomics Regenerative technology Sample collection Sensor integration Simulant development Software development Software/hardware interface development Synthetic organic chemistry Systems architecture Systems engineering Test and evaluation methodologies Toxicology Vapor permeable barrier development Veterinary medicine Virology	

Physical Countermeasures (Chemical)

Thrust Area	(National) Capability Requirements	Enabling Technologies (Priority Technology Areas)	DoD Core Research Capabilities
Physical Countermeasures (Chemical)	Develop detection systems for CWAs as vapors, on surfaces and in liquids Develop advanced materials for individual and collective protection systems (fixed and mobile) Develop network infrastructures that provide integrated early warning and support for real-time reporting and decision making Develop hazard and environmental models that produce reliable/accurate predictions of the threat environment Build software tools that support planning and decision making, joint experimentation and reachback Understand the interactions of chemical agents with substrates and environments, including the hazard presented to personnel Rapidly characterize current CWAs and NTAs and develop simulants to expand our knowledge of potential emerging threats for non-state enemies Predict CWA physical properties such as environmental viability, re-	Adsorption/absorption Advanced materials Advanced spectroscopic methods/algorithm development Aerosol Science Agent characteristics Air purification technologies Assay automation Bioinformatics Biotechnology Cell biology Clinical science Cognitive science/Human response Computational biology/chemistry Data fusion Electromagnetic signature exploitation Environmental science Ergonomics Fluidics Genetics/Molecular biology Genomics Immunology Interactomics Knowledge management Metabolomics Material science Meteorology Microbiology Microelectromechanical arrays for	Chemical surety (safety and security) facilities with high containment levels, animal models and the accompanying technical expertise with handling chemical agents, including: Appropriate animal model systems BSL-3/4 containment laboratories BSL-3/4 animal research facilities Chemical agent synthesis/surety facility Critical reagents Environmental live agent test capability Full scale decontamination test facility NTA facility

Thrust Area	(National) Capability Requirements	Enabling Technologies (Priority Technology Areas)	DoD Core Research Capabilities
	aerosolization and toxicological effects. Evaluate detection, protection and hazard mitigation technologies under realistic conditions using full-scale ranges, live agent test facilities and material effects testing Predict environmental and materials effects of exposure to live agents and decontaminants Develop a portfolio of integrated nanoscience, bioscience, information sciences and cognitive sciences to support transformational CBD capabilities.	spectral correlation Military worth methodologies Modeling and simulation Nano- and biotechnologies Nanocatalytic, self-cleaning and reactive materials Nanofibers, nanomembranes Optics Pathophysiology Pharmacodynamics Pharmacokinetics Photoacoustics Photothermal excitation Physical chemistry Physiology Proteomics Regenerative technology Sample collection Sensor integration Simulant development Software development Software/hardware interface development Synthetic organic chemistry Systems architecture Systems engineering Test and evaluation methodologies Toxicology Vapor permeable barrier development Veterinary medicine Virology	

APPENDIX B

Goals and Objectives

Goals

1. **Transition Technologies** – Identify and exploit technology opportunities to transition capabilities into future acquisition programs and current product improvements.
2. **Ensure a Robust S&T Base** – Maintain and leverage a robust S&T base to respond to DoD CB S&T needs. JSTO-CBD will work with stakeholders to identify critical CB S&T core capabilities either unique to the DoD Laboratories or which must be acquired from external performers in order to respond to urgent needs of the DoD.
3. **Answer Science Questions** – Manage and integrate research that addresses discrete data gaps or methodology issues within the CB S&T, test and evaluation (T&E), or advanced RDA programs. Support the development of Concept of Operations (CONOPS) and policy positions with sound scientific information.
4. **Achieve Enterprise Excellence** – Achieve Enterprise Excellence for the DoD CBDP by building strategic collaborations with the traditional CB community of interest (COI) and non-traditional participants, and executing business functions effectively, efficiently, and in a timely manner

Objectives

Goal 1: Transition Technologies
- Objective 1a. Evolutionary technologies and concepts
- Objective 1b. Revolutionary capabilities to support the CBDP

Goal 2: Ensure a Robust S&T Base
- Objective 2a. A revitalized workforce for the CBD S&T program
- Objective 2b. Support for core CBD research capabilities within the DoD military Service laboratories
- Objective 2c. Balanced investment across the scientific disciplines for long-term and short-term impact on the Chemical and Biological Defense Programs

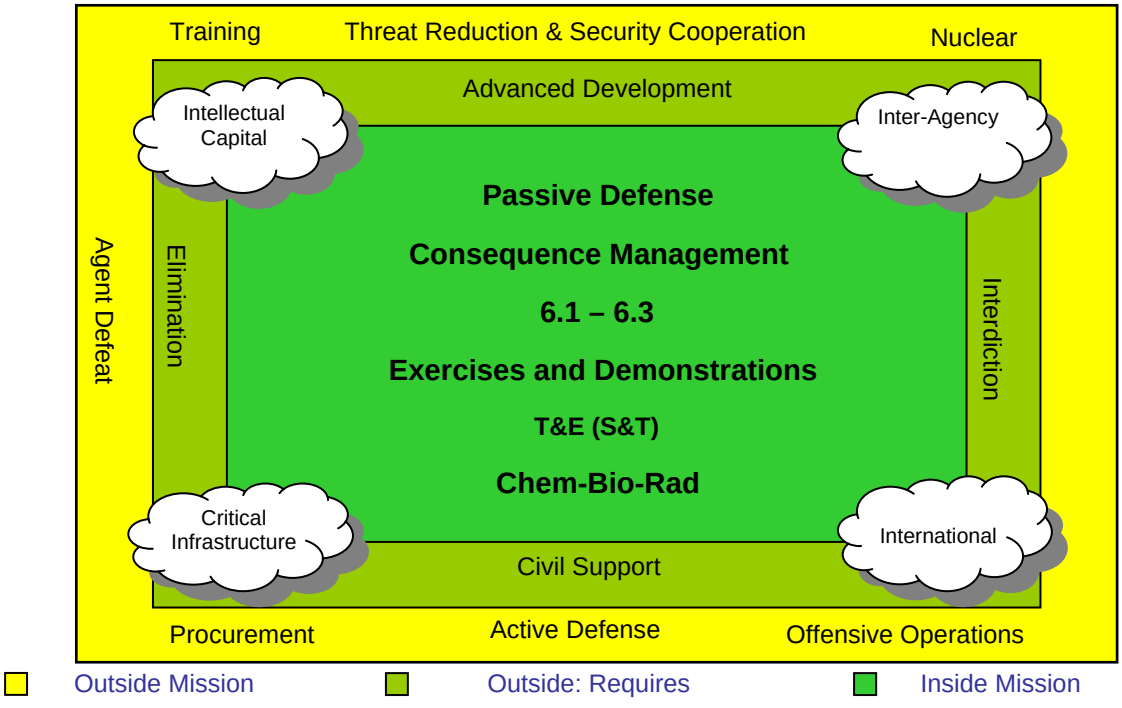
Goal 3: Answer Science Questions
- Objective 3a. Expertise internal and external to the DoD is leveraged effectively
- Objective 3b. Timely focused scientific answers to the user community
- Objective 3c. No technology surprise

Goal 4: Achieve Enterprise Excellence
- Objective 4a. Collaboration with the traditional CB community of interest (COI) and non-traditional participants.
- Objective 4b. Effective and efficient business processes that enable the CBDP mission.

APPENDIX C

Mission Space

The CBDP is an important element of the National Strategy to Combat Weapons of Mass Destruction, but only a part. The CBDP provides operational capabilities under the area of passive defense tailored to the unique characteristics of the various CB weapons, including emerging threats in support of counterproliferation. The CBDP provides capabilities to respond to WMD effects used against our forces deployed abroad and in the homeland in support of consequence management (CM). The CBDP S&T Strategy leverages CBDP strategy, joint operating and functional concepts, and architectures that emphasize common capabilities across the entire military operating continuum to meet passive defense, force protection, homeland defense, and CM CBRN defense requirements. The JSTO-CBD S&T activities related to radiological and nuclear defense are limited to medical research on radioprotections. The graphic representation below depicts the mission space of JSTO-CBD.



APPENDIX D

Core Working Group Membership

ORGANIZATION	LAST NAME	FIRST NAME	TITLE/RANK
USAMRICD	Baggett	Jack	Dr.
OSA(CBD&CDP)	Borkowsici	Nicki	Ms.
OSA(CBD&CDP)	Borowski	Bob	Dr.
AFRL	Channel	Stephen	Dr.
JSTO	Connell	John	Mr.
TEMA	Cornette	Jim	Dr.
ECBC	Corriveau	Joe	Dr.
OASD/HA	Culpepper	Randy	Dr.
NSWCDD	Gibbs	Roger	Mr.
JSTO	Handler	Frank	Dr.
Navy BUMED	Herzig	Tom	LCDR
USAMRIID	Hobart	Peter	Dr.
JPEO-CBD	Lalekos	Marisa	Ms.
OASD/HA	Lucas	John	Dr.
JSTO	Madden	Ryan	Mr.
PAIO	Mearns	Helen	Ms.
USAMRICD	Moore	Brian	LtCol
JSTO	Moore	Eric	Dr.
AF(SGR)	Murray	Bill	Mr.
OSA(CBD&CDP)	Parker	Laura	Dr.
JSTO	Prakash	Gyan	Dr.
JRO	Pramenko	Bill	Maj
JRO	Prouty	Richard	Mr.
NRL	Rose-Pehrsson	Susan	Dr.
AF(SGR)	Tsu	Horace	LtCol
ONR	Vodyanoy	Igor	Dr.
JSTO	Walker	Greg	Mr.
NRL	Whitman	Lloyd	Dr.
ECBC	Wienand	Joe	Mr.
JPEO	Wilhide	Curt	Mr.
OSA(CBD&CDP)	Woo	Andrea	Ms.
SNL	Young	Malin	Dr.