CBRNIAC Newsletter

Chemical, Biological, Radiological & Nuclear Defense Information Analysis Center

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Decontamination Operations in a Nuclear Mass Casualty Scenario: Observations from Ardent Sentry 2007

Play by Play of the "Big Game" Key to CBRNE Success

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Decontamination Operations in a Nuclear Mass Casualty Scenario:

Observations from Ardent Sentry 2007

by Michael L. Snyder and Thomas J. Sobieski

The Joint Requirements Office for Chemical, Biological, Radiological and Nuclear (JRO-CBRN) Defense is the single office within the Department of Defense (DoD) under the Chairman of the Joint Chiefs of Staff to be responsible for the planning, coordination and approval of joint chemical, biological, radiological and nuclear (CBRN) defense operational requirements, medical and non-medical, and to serve as the focal point for Service, combatant command, and Joint Staff requirements generation. These responsibilities include development of CBRN defense operational requirements, joint operational concepts and architectures for passive defense, consequence management, force protection and homeland security. This article is sponsored by the JRO-CBRN Defense.

At 10:00 am on May 10, 2007, in the northeast corner of the city of Indianapolis, Indiana near the city of Lawrence, a terrorist group smuggled in and detonated a nuclear device in an American city. The local, state and Federal governments were presented with many complex challenges as a result of this catastrophic event. Among the most challenging tasks was the need to quickly and completely decontaminate large numbers of the population. The Department of Defense (DoD) is capable of providing decontamination in support of civil authorities. However, effective employment of DoD's decontamination capabilities requires a full understanding of the special circumstances of a homeland event and the doctrinal differences between battlefield decontamination operations and Defense Support to Civil Authorities (DSCA). This was the scenario for **Ardent Sentry 2007 (AS07) exercise**.

This article, sponsored by the JRO-CBRN Defense, focuses on two perspectives of the DoD decontamination mission for planning considerations:

1) The differences in conducting decontamination in a DSCA environment versus that done by DoD units in their traditional wartime role.

2) Additional considerations on mass decontamination tasks due to the DSCA environment.

This article describes the challenges associated with decontamination in a DSCA environment; the impact of DSCA on decontamination tasks; and some specific observations about managing the civilian population, controlling runoff and dealing with personal effects. This article highlights the need for better understanding by DoD planners and units regarding the unique challenges of supporting civilian authorities with decontamination.

Background

AS07 was a Chairman Joint Chiefs of Staff (CJCS) designated, U.S. NORTHERN COMMAND (USNORTHCOM) sponsored, U.S. Joint Forces Command (USJFCOM) supported exercise. Based on Department Homeland Security (DHS) National Planning Scenario #1 (Nuclear Detonation (NUDET)—10-Kiloton (KT) Improvised Nuclear Device), AS07 primarily focused on exercising USNORTHCOM's ability to execute DoD Chemical, Biological, Radiological, Nuclear and Explosive (CBRNE) response plans at the Operational level. For the first time, AS07 also included a separate but simultaneous Field Training Exercise (FTX) designed to allow selected DoD units to train with their civilian counterparts.

Since 2004, the JRO-CBRN Defense has been providing CBRN and Consequence Management (CM) subject matter experts (SME) to support the Combatant Commands' (COCOMs') and their subordinates' training and exercise programs. The JRO-CBRN Defense has also partnered with several non-DoD government agencies to enhance their knowledge on DSCA procedures.

In the months leading up to AS07, the JRO-CBRN Defense provided USNORTHCOM J7 and USJFCOM J7 with technical assistance in developing the effects of the nuclear detonation for the exercise and observed battle staff operating procedures at selected command and control locations. Exercise development included collaborating with Exercise Planners from the Indiana Department of Homeland Security (INDHS) to build the documents and scenario injects needed to drive the DoD response to Federal Requests for Assistance. It was recognized during the planning process and exercise execution that further discussion of the above two perspectives of DoD decontamination would benefit the CBRN response community and emergency responders in general.

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AS07 was conducted May 10-17, 2007. The simulated NUDET was a no-notice terrorist event that occurred in the northeast corner of the city of Indianapolis near the city of Lawrence. The scenario used scripted weather, census data from 2000, and computer modeling which determined that the 10KT surface burst created casualties estimated at 15,000 dead and 21,000 injured. The injured included those affected by the blast, thermal radiation, prompt radiation, and the subsequent radioactive fallout.

The 10KT NUDET and subsequent effects resulted in the declaration of an Incident of National Significance (INS), the appointment of a Principal Federal Official (PFO) by DHS and a subsequent Presidential Disaster Declaration (PDD). Per the National Response Plan (NRP), DHS and Federal Emergency Management Agency (FEMA) Region V established a Joint Field Office (JFO) at Camp Atterbury (located approximately 43 miles south of Indianapolis). The Defense Coordinating Officer (DCO) and Defense Coordinating Element (DCE) from FEMA Region V joined the JFO as part of the Coordinating Staff. Joint Task Force Civil Support (JTF-CS) was deployed to Camp Atterbury to provide command and control over all DoD forces deployed (real world and notionally) to support the local, state, and federal response. Elements of the DoD CBRNE Consequence Management Response Force (CCMRF) were also deployed to conduct CM operations in concert with first responders from Marion County, Indiana, the INDHS, elements from the Indiana National Guard CBRNE Enhanced Response Force Package (CERFP) and Civil Support Teams (CSTs). This FTX was conducted at the Muscatatuck Urban Training Center (MUTC) located approximately 25 miles southeast of Camp Atterbury.

Defense Support of Civil Authorities (DSCA)

In a terrorist use of Weapons of Mass Destruction (WMD) scenario, the DoD is ready to assist the local, state, and federal response efforts. The DoD fulfills its DSCA mission by responding to Requests for Federal Assistance (RFA) in accordance with the NRP and DoD policy and guidance. The NRP provides the coordinating framework for support provided under the Robert T. Stafford Disaster Relief and Emergency Assistance Act (PL 93-288) (Title 42 United States Code Section 5121, et. seq.) and the Economy Act (Title 31 United States Code Section 1535). Within the NRP, the DoD is a support agency to all 15 Emergency Support Functions (ESFs) and a Cooperating Agency to the majority of NRP Support and Incident Annexes. Pursuant to the above, when requested, the DoD supports the Primary Agency by providing manpower and equipment, in concert with other federal agencies, necessary to meet the needs of the responding local and state officials. *USNORTHCOM CONPLAN 2501 DEFENSE SUPPORT OF CIVIL AUTHORITIES (DSCA)*, dated 11 April 2006, describes the manner in which DoD forces provide that support.

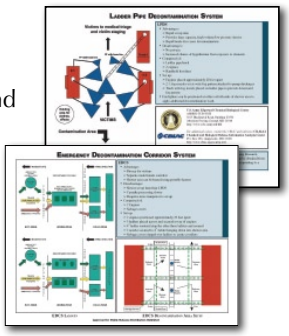
Decontamination in a DSCA Environment

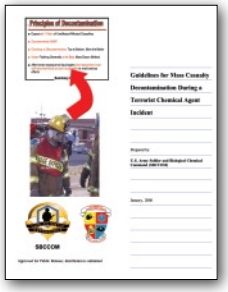
In a large scale, catastrophic event, where local, state, and regional capabilities are overwhelmed, the Federal Government with DHS as the lead agency practice to quickly provide assistance to local and state efforts in mitigating the effects. To accomplish this, DHS may request support from Title 10 DoD forces, activated reserves, and possibly federalized National Guard. Orchestrating DoD capabilities in collaboration with other existing capabilities is the function of the JFO.

In the AS07 scenario, DoD decontamination capabilities were used (notionally) to either augment or provide relief in place for decontamination operations initially started by local first responders and National Guard units in State Active Duty (SAD) or Title 32 status. This highlights the importance of the need for DoD decontamination units to learn and understand how civilian first responders approach expedient mass decon operations.

The pre- 9/11 focus on responding to and remediation of hazardous material spills demonstrated a very capable and thorough decontamination process. These procedures and systems, however, were equipment and manpower intensive and had various but limited throughput capacities, usually 50 – 100 people per hour. By comparison, the current decontamination throughput capabilities of Department of Defense (DoD) units, such as the Marine Corps Chemical/Biological Incident Response Force (CBIRF) and Army Chemical Decontamination units, vary between 250 - 400 soldiers per hour[1].

Recognizing the need to effectively decon much greater numbers, civilian first responders developed methods using currently available equipment to increase their mass decontamination capability. Two of the more common approaches are the Emergency Decontamination Corridor System (EDCS) and the Ladder Pipe Decontamination System (LDS). Both have been documented in publications by the Army Soldier and Biological Chemical Command[2] (SBCCOM) and the Chemical, Biological, Radiological, and Nuclear Defense Information Analysis Center (CBRNIAC). In January 2000, SBCCOM published "Guidelines for Mass Casualty Decontamination During a Terrorist Chemical Agent Incident"[3]. Although the Guideline reviewed these capabilities in respect to a chemical event, it offers several principles of decontamination (pg ii of the Guideline) which are also applicable to a NUDET scenario. They are:





- Expect a 5:1 ratio of unaffected: affected casualties
- Decontaminate as soon as possible
- Disrobing is decontamination; top to bottom, more is better
- Water flushing generally is the best mass decon method
- After known exposure to a liquid agent, first responders must self-decontaminate as soon as possible to avoid serious effects.

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Drawing on the innovation of various Fire Departments, section 4.4 of the SBCCOM Guideline also provides excellent schematics, photos, and procedures for mass decontamination via the LDS and EDCS and commonly used first responder equipment[4]. Similarly, CBRNIAC cites two products: the Emergency Decontamination Corridor and Ladder Pipe Decontamination Systems (CR-04-12), published in May 2004, and Best Practices and Guidelines for Mass Personnel Decontamination (SOAR -03-10) published in June 2003. CR-04-12 is a laminated card that provides site layout diagrams for each system and quick reminders on the advantages and disadvantages of each.

Like the SBCCOM publication, SOAR 03-10 focuses on response to and decontamination of victims due to chemical or biological incidents. However, its sections on general decontamination principles, setups, and managing incident sites are useful for application to a nuclear scenario as well. Of importance to note is that these systems primarily use equipment common to Fire Departments (to include DoD installation fire departments) but not to DoD decontamination units.

This disparity in capability within DoD forces is to be expected, as the installations' Fire Departments are trained and equipped much like their civilian counterparts and routinely collaborate with them through mutual assistance/aid compacts (as directed through DoD instructions/guidelines). DoD decontamination units, on the other hand, are equipped and trained for their warfighting mission. These facts serve to highlight the need for all of the possible DoD response community to become familiar with the equipment and procedures of civilian expedient mass decontamination to adequately fulfill their expected supporting roles according to the NRP.

The Impact of DSCA on Decontamination Tasks

While developing the scenario in conjunction with representatives from the Indiana Department of Homeland Security Training Division and the city of Indianapolis Department of Public Safety, it was learned that decontamination efforts in the DSCA environment require special considerations by military CBRN planners in the following areas:

- Determining who needs to be decontaminated
- Multi-site operations
- Integration of decontamination operations with other plans
- Disposition of runoff
- Disposition of personal effects
- Accountability
- Crowd control

The CBRNE expert needs to be keenly aware of the full context in which DoD decontamination capabilities will be employed in a DSCA environment. Incorporating the above considerations into the staff pre-planning and command guidelines will serve to strengthen the execution of mass decontamination operations.

Other information sources of best practices to amplify and support these considerations include the Department of Homeland Security (DHS) Lessons Learned Information Sharing (LLIS) Website (www.LLIS.gov). DHS LLIS Website contains an archive of best practices from all jurisdictions of interest to the response community at large. One such citation, entitled: "Radiological Dispersal Device Incident Response Planning: Decontamination," provides some insights into the topical discussions presented here.

Determining who needs to be decontaminated:

In the AS07 scenario, modeling estimated that a total of 21,000 citizens were within the area defined as the evacuation zone due to the fallout created by the nuclear detonation. Some of these citizens would be evacuating immediately, while those further downwind may shelter in place, and be evacuated at a later time.

It is reasonable to assume that not all of the 21,000 personnel within the evacuation zone will be contaminated. Identifying those who are 'clean' will greatly reduce the resources needed and expended. This pre-screening process can be expected to be complicated by several factors in a no-notice event. For example, many victims or potential victims will have self evacuated creating the issue of how to communicate to them, locate them, treat them, and deal with any cross contamination precipitated by their evacuation. Additionally, first responders, some of which will be victims themselves, or become victims due to exposure, will arrive late and uncoordinated because of degraded communications due to electro-magnetic pulse and system overloading.

Multi–site operations:

To effectively respond to the magnitude of need, several mass decontamination sites will likely be established around the plume perimeter. While the DoD is not the primary agency responsible for coordinating the operations of the multiple sites, military leaders prepared to provide support and/or relief to any operation or even take over full operation of a particular site will improve and maintain the efficiency and success of the process. Locations, access routes, capabilities on each site will expedite requests for support by civil authorities.

Integration of decontamination operations with other plans:

Decontamination operations must be integrated into the whole mitigation/recovery process. Successful decontamination operations include planning initial medical triage and follow-on medical care; and subsequent transport, clothing, feeding, and sheltering for all those who process through prescreening.

From a medical standpoint, establishing ambulatory and non - ambulatory decontamination lines is just one aspect of the process. Consideration needs to be given on how close triage facilities and transportation staging areas should be established to the decontamination area so that wind shifts do not threaten operations. Provisions for food and water for those awaiting transportation needs to be planned along with the collection of trash, and the proper consolidation and disposal of contaminated clothing and personal effects. Coordination with ESF 8 (Public Health and Medical Services) and the American Red Cross on pick up/transport is recommended in order to prevent overcrowding at the decontamination site.

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Disposition of Runoff:

The need to quickly process large numbers through the decontamination line makes containment of the runoff a challenge. Conventional hazardous material decontamination operations contain runoff to prevent contamination of the environment. Runoff issues revolve around the type of contaminant and remediation coordination with the proper environmental agencies. A hard surface with the proper grade to reduce cross-contamination is essential to the success of containing the runoff. ECDS and LDS operate as high volume/low pressure systems, and generate significant amounts of runoff.

Proper location selection and configuration are crucial to enabling continuous decontamination operations as well as reducing the amount of post-decon remediation that needs to occur. In the DSCA environment, CBRNE Staff Officers must consider environmental impacts when planning and executing decontamination operations. There are numerous Federal and State laws such as the CERCLA "Good Samaritan" Law (and other) policies/laws that may impact the decisions of CBRNE planners. One source published by The Environmental Protection Agency (EPA) in July 2000: "First Responders' Liability to Mass Decontamination Runoff"[5] provides an excellent synopsis of the issue and has links to more detailed information.

Disposition of Personal Effects:

The need to quickly and efficiently decontaminate large numbers of people creates the need to deal with large amounts of personal effects that will require final disposition as victims' process through the decontamination line. Jurisdictional decisions referencing the disposition of personal effects will need to be addressed within the planning in the JFO. What is to be done with identity items such as licenses, credit cards, and other personal information items will need to be determined consistent with local protocols. Protocols for the screening/disposition of vehicles must be in place as well.

Accountability:

In every event, ascertaining the disposition of all affected/displaced/killed/injured people is a major concern. A nuclear detonation scenario of this magnitude will most certainly be a worst case scenario especially due to the large numbers of displaced residents seeking decontamination. Complicating the need to track people through evacuation, decontamination, transport, and follow up medical care is the fact that they may have also been stripped of any identification they had. In the initial chaos of a "no notice" event, such protocols may not have been in place in the rush to meet other priorities. In any case, typical DoD decontamination procedures do not address this task but may be expected to support it in a DSCA response.

Crowd control:

Crowd control is essential for effective mass decontamination operations. Local law enforcement is vectoring victims to the various mass decontamination sites that have been established upwind of the blast and outside the projected plume path. Communicating to the victims the necessity to move through the decontamination processes in an orderly and efficient manner will be a challenge. While Title 10 forces are prevented from performing law enforcement duties in accordance with the Posse Comitatus Act, the planning and operation of a mass decontamination station needs to address the potential need for crowd control and coordination for support from civilian law enforcement.

Summary

The procedures and capabilities to expediently conduct mass decon have undergone dramatic changes in recent years. Although DoD is not the lead agency responsible for coordinating the overall decontamination effort in a catastrophic scenario such as a NUDET, the DoD will most likely be called upon to establish their own mass decon site(s) or to augment existing operations that were previously established by local/state first responders.

This creates the need to understand the operational employment concepts and equipment that may be employed by civilian first responders such as the LPDS and the ECDS. Additionally, practicing the task of actually having to decontaminate thousands of people is not often done; therefore, periodic review of mass decontamination plans with special consideration of the aforementioned areas allows planners to incorporate new policies, procedures and equipment. This article is intended to synopsize and illuminate issues and potential problems that can accompany the need to quickly decontaminate thousands of people. We train not to just train; we train because we are reminded that we may have to execute this scenario for real someday.

Footnotes

[1] From CBIRF organizational brief and statements made by CCMRF Task Force Response personnel at the CCMRF Commanders Conference hosted by Joint Task Force-Civil Support, Ft Monroe, VA 28-30 Aug 07.

[2] In 2003, SBCCOM was renamed the U.S. Army Research, Development and Engineering Command (RDECOM).

[3] Available at http://www1.va.gov/vasafety/docs/July25-2000-DASHOCall.pdf

[4] Additional analysis by Dennis K. Sullivan, B.A., CEM, CHMM, Assistant Director University of Louisville Dept. of Environmental Health and Safety. Briefing available at www.ehss.vt.edu/HazWasteConf/PresentationsPDFs/PRESENTATIONMassDecontamination_DennisSullivan_UnivLouisville.pdf.

[5] Document number EPA550-F-00-009. Available at www.epa.gov/ceppo

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Visit JRO-CBRN Defense on the web at https://jro-cbrnd.cbiac.apgea.army.mil/Home.aspx.

Play by Play of "The Big Game" Key to CBRNE Success

By Tech. Sgt. Andrew Stephens, JTF-CS Public Affairs

Members of the CBRNE Consequence Management Response Force use an aerial map of Atlantic City, New Jersey, during a planning session as part of Joint Task Force Civil Support's CCMRF Commander's Conference Rock Drill, January 15-17, 2008. The Rock Drill simulated a nuclear explosion in Atlantic City, New Jersey, and was designed to allow each part of the CCMRF to demonstrate what their movements and actions would be during such a scenario. Photo by Staff Sgt. Chris Hale

It's the day of the big game and all the players are on the field. A "Jumbotron" tracks all the activity. Coaches sit erect in their seats, as their players move across the field, ever closer to the end zone. No nervous looks betray their hearts, but everyone understands the gravity of the game.

But things aren't what they seem. To an uninformed bystander, it looks like a war contained on a simple gridiron, but on closer scrutiny, one sees that the players present aren't fighting each other – they're fighting *together*. This isn't football; it's a consequence management exercise. And this isn't an entertainment venue; the driving scenario behind this game a 10-kiloton bomb detonated by terrorists in Atlantic City, New Jersey, at 9 p.m. on a Tuesday night. Down to the wire, the lives of thousands could rely on the conceptual lines of Joint Task Force Civil Support's (JTF-CS's) 2008 CCMRF Conference, held Jan. 15-17, 2008 at Joint Forces Command's Joint Warfighting Center.

The term "CCMRF" translates into a mouthful of military meaning; "CBRNE Consequence Management Response Force," with the acronym CBRNE standing for Chemical, Biological, Radiological, Nuclear and high-yield Explosive. JTF-CS and the CCMRF team represent some of America's best CBRNE planners and Title 10 armed forces units capable of providing logistics, aviation and medical support, all focused on resolving this worst-case scenario. All colors and designs of military uniforms are present, as well as many civilian participants from numerous state and federal agencies.

When a CBRNE event happens in the continental United States, the CCMRF team assembles under JTF-CS to support the primary federal agency in charge of the overall response. JTF-CS is the Department of Defense's (DoD's) only standing joint headquarters dedicated to anticipating, planning, integrating and responding to CBRNE events. Once JTF-CS has been directed to deploy, what would

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follow would be a choreographed ballet of U.S. military personnel to provide life support and response to the civilian populace.

"This conference is a historical event," said Col. Robert E. Freehill, Defense Coordinating Officer for Federal Emergency Management Agency Region II, which includes the area played in the conference. "Representatives from Department of Homeland Security and FEMA are participating, as well as representatives from law enforcement, state and federal officials from the state of New Jersey plus different military services are all actively involved in this unique DoD effort. This conference is a tremendous step in building partnerships and will definitely enhance interoperability among all agencies."

A 10-kiloton detonation in Atlantic City — as terrifying a scenario as it is — is an ideal example of the type of event that musters the CCMRF. The 2008 CCMRF Conference is known as a rock drill, harkening back to the tabletop wargames of Patton, LeMay and Nimitz, but on a vastly larger scale. There are no spectators for a rock drill; every person present is a participant and can raise questions. And the learning curve is steep. Like most CBRNE scenarios, the fate of a city and its residents hangs in the balance.

"You should go out of here with a huge list of questions about things that you want to continue working on," said Maj. Gen. Daniel "Chip" Long Jr, JTF-CS commander to the assembled personnel at the opening of the conference. "These next two days will be pretty intense. You have the opportunity to observe, ask questions and take something away. If you don't walk away with something, then you only have yourself to blame."

Three large maps cover the floor. The largest, a map of the entire United States, shows the location of all DoD assets nationwide that could be tapped by JTF-CS. Wooden flags mark the name of the unit and, as the scenario heats up, the flags are moved to their destination points on the map. A second map is a massive color graphic of major military staging sites and airports around the exercise's ground zero. The third map is of ground zero itself, with enough resolution to show streets, buildings and hospitals. Six projection televisions, including the "Jumbotron" that provides a bird's eye view of all three maps, provide additional information. Together, the information presented demonstrates the efficiency of communication and command needed to coordinate a massive response effort.

In the real world, the Atlantic City scenario would be a *national event* and become in a very short period of time a labor-intensive relief effort that would require tens of thousands of military personnel as well as thousands of civilian relief workers. Once state officials request DoD assistance and the president consents, a whirlwind of activity follows. The CCMRF exists in the heart of that whirlwind, but there's no chaos in this vortex of troop movement and logistics. The rock drill allows JTF-CS leadership to focus on those lines of command, capability and communication, ensuring that all present can stay within a set framework and on schedule; not an easy feat, considering the diverse effects of such an event.

Every conceivable aspect is explored during the rock drill, both in the timeline open forum that everyone participates in, to the break-out sessions. The break-out groups examine aspects of the response ranging from the effects of an electromagnetic pulse (which might fry the circuit boards of most computers) to where command posts and decontamination facilities can be established (schools are ideal, as children won't be attending class after an event) to legal parameters that are (and are not) open to JTF-CS personnel. At the end of the exercise, all operational gaps are identified and resolved in exercise, expediting a real-world mission when it happens so that JTF-CS can ensure assistance gets to where it's needed most.

"Much of consequence management operations is built around established relationships with federal, state and local partners," said Lt. Col. Robert Cunniff, Future Operations Officer for NORTHCOM. "JTF-CS has bridged the gap through execution of this rehearsal. Continued exercises at the tactical level as well as the operational level will be critical to ensuring key leaders understand the complexities of CBRNE consequence."

So when it comes time for the Big Game, there will be no fumbles. The game book will be pulled out and followed to the letter. When CCMRF capabilities are assembled and exercised, the home team always has the advantage.

JTF-CS, headquartered at Ft Monroe, Virginia, is a standing joint task force charged with providing operational control of DoD forces deployed to support a primary federal agency during a CBRNE incident. Its mission is to save lives, prevent injury and provide temporary critical life support.

For additional information or an interview, please contact JTF-CS public affairs at (757) 788-6633.

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DTRA's Remote Material Sampling Tests Successful

An unmanned aerial vehicle is launched from the Navy ship. The Discrete Jupiter tests typically involved two unmanned aerial vehicles—one to photograph and film the area before and after the release, and one to collect samples of airborne material. Photo by Jeff Donohoe, Applied Research Associates.

The Defense Threat Reduction Agency (DTRA) successfully tested a new way to collect material samples in the air after a potential biological detonation. This information can be used in the battlefield to keep troops, allies and civilians safer in the event of a biological release.

DTRA's Biological Combat Assessment System (BCAS) program office conducted the tests, called Discrete Jupiter, January 28 — January 30, 2008 at Eglin Air Force Base, Florida. The tests successfully showed that samples could be collected using an Unmanned Aerial Vehicle (UAV) and analyzed remotely. Two UAVs launched from a Navy ship and flew to the designated release point. One UAV took video and photographs of the target before and after the release. The other intercepted a simulated biological plume and collected a plume sample. Both UAVs returned to the ship and were decontaminated. Scientists on board the ship, a Naval Air Systems Command 38 vessel equipped with a biological assessment mobile laboratory, were able to retrieve the material samples and analyze them. As an extra precaution, scientists also sent samples to a remote laboratory to confirm results.

"This application of technology will be important to combatant commanders since it provides them near-real time battle damage assessment capability for counterforce strikes against weapons of mass destruction targets dedicated to research, production or storage of biological warfare agents," said Major Jeff Gadway, the BCAS program manager.

In addition to collecting material from the UAV, DTRA also collected air samples at various altitudes and on the ground. "By taking different types of samples, we were able to confirm the results were consistent with what was actually collected by the unmanned aerial vehicle," said Aaron Perea, project manager. "In addition to analyzing material

Simulated hazardous materials are shot into the air during the Discrete Jupiter tests at Eglin Air Force Base, Florida on Jan. 28-30. An unmanned aerial vehicle flies through the plume and collects material, which is later analyzed on board a Navy ship. Photo by Manny Davila, Applied Research Associates.

Continued pg. 11

After it flies through the plume and collects the samples of suspected biological hazards, the unmanned aerial vehicle returns to the ship so the samples can be analyzed for the Discrete Jupiter tests. The crane arm extends to catch the unmanned aerial vehicle. Photo by Jeff Donohoe, Applied Research Associates.

Once it returns to the ship (which is anchored in the Gulf of Mexico) the unmanned aerial vehicle is decontaminated for the next Discrete Jupiter test. Photo by Jeff Donohoe, Applied Research Associates.

on the ship, we sent all results to the U.S. Army Dugway Proving Ground Laboratory for analysis. Both labs confirmed positive results for contamination of the simulated biological material."

In the field, this type of air sampling would identify biological hazards, such as anthrax or Ebola, or explosive hazards. For the Discrete Jupiter tests, no actual hazardous materials were used. Instead, products with characteristics similar to hazardous materials were used. For example, two common soil biotic constituents, *Bacillus subtilis* (Bg) and MS2 bacteriophage, were used to simulate hazardous biological substances.

Neither soil bacterium used in the tests is considered toxic to humans, animals or plants, and all tests were conducted in accordance with the Eglin AFB environmental assessment.

Discrete Jupiter tests were initiated when U.S. Pacific Command asked DTRA for a way to sample and analyze debris resulting from military strikes on suspected weapons of mass destruction facilities.

Working first with U.S. Pacific Command, then with the U.S. Forces Korea, DTRA developed the tests as part of the BCAS Advanced Technology Demonstration (ATD), whose purpose is to design, develop, fabricate, integrate and demonstrate a system to locate, track, collect, detect, identify, characterize and safely return biological weapon aerosolized agents released during weapons of mass destruction (WMD) strikes for analysis.

Discrete Jupiter tests involve all three branches of the military. DTRA is the system developer and U.S. Forces Korea is the operational manager. Third Fleet, San Diego, is the operational exercise manager. U.S. Pacific Command is an adviser and the originator of the BCAS requirements. Other participants include the 46th Test Wing at Eglin AFB; Dugway Proving Ground, Utah; and Edgewood Chemical Biological Center, Maryland. DTRA contracted with Boeing Phantom Works, St. Louis, to develop and operate the UAV combat assessment system.

The BCAS ATD program began in June 2003, and is expected to conclude in 2008. This is the second and final series of tests. The first took place Feb. 12-23, 2007. ◈

For additional information about Discrete Jupiter, see http://www.dtra.mil/newsservices/fact_sheets/fs_includes/pdf/Discrete_Jupiter.pdf

DTRA combines Department of Defense resources, expertise and capabilities to address the WMD threat. DTRA safeguards America and its allies from WMD by providing capabilities to reduce, eliminate and counter the threat and mitigate its effects. This Department of Defense combat support agency is located at Fort Belvoir, Virginia, and operates worldwide.

For additional information visit DTRA online at http://www.dtra.mil/

CBRNIAC
Chemical, Biological, Radiological & Nuclear Defense Information Analysis Center

Serving the CBRN Defense and Homeland Security communities

Calendar of Events

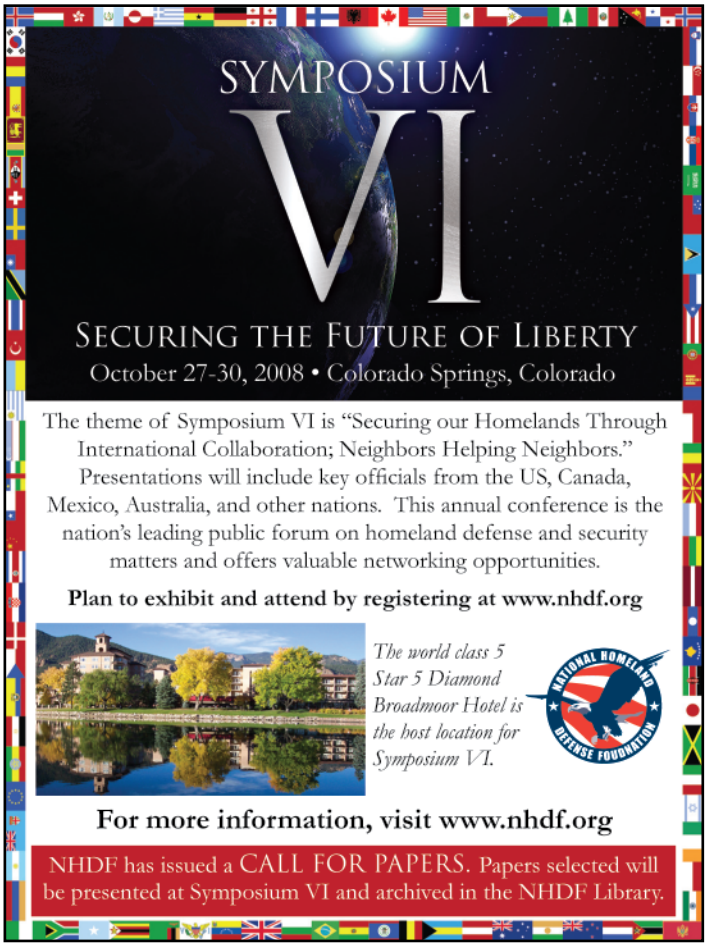
Do you have a Chemical and/or Biological Defense or Homeland Security course or event to add to our Calendar? Submit the pertinent information via email to **cbrniac@battelle.org** *or online at* **http://www.cbrniac.apgea.army.mil/info/posting_request.php**. *The CBRNIAC reserves the right to reject submissions. For a more extensive list of events, view our online calendar at* **http://www.cbrniac.apgea.army.mil/info/calendar_06.php.**

August 4-8
2008 Boulder Conference on Surface and Dermal Sampling
Boulder, CO
http://www.astm.org/cgi-bin/SoftCart.exe/filtrexx40.cgi?U+mystore+tvxb6551+-P+EVENT_ID+1080+/usr6/htdocs/astm.org/SYMPOSIA/callforpapers.frm

August 5-6
DoD STINFO Program Manager 2008
Fort Belvoir, VA
http://www.dtic.mil/dtic/training/schedule.html

August 11-15
DoD Fire & Emergency Services Training Conference
Denver, CO
http://www.iafc.org/displaycommon.cfm?an=1&subarticlenbr=742

August 13-15
Targeted Immunotherapeutics and Vaccine Summit
Cambridge, MA
http://www.healthtech.com/imt/vac.aspx



August 13-15
Novel Vaccines: Bridging Research, Development, and Production
Cambridge, MA
http://www.healthtech.com/imt/vac.aspx

August 13-17
Advanced Technology Applications for Combat Casualty Care (ATACCC)
Location TBD
https://www.usaccc.org/ATACCC/localinfo.htm

August 14-16
Fire-Rescue International (FRI) 2008
Denver, CO
http://www.iafc.org/displaycommoncfm?an=1&subarticlenbr=741

August 18-19
Systems Integration in Biodefense
Washington, DC
http://www.healthtech.com/Conferences/2007/btr/index.asp

August 19-21
LandWarNet 2008
Fort Lauderdale, FL
http://www.afcea.org/events/landwarnet/landing.asp

September 4-5
Disruptive Technologies Conference
Washington, DC
http://www.ndia.org/Template.cfm?Section=8920&Template=/ContentManagement/ContentDisplay.cfm&ContentID=22894

September 7-10
ACHMM National Conference
Minneapolis, MN
http://www.continuinged.ku.edu/achmm/mn08/index.php

September 7-12
COURSE: Medical Management of Chemical and Biological Casualties
Ft. Detrick and Aberdeen Proving Ground, MD
https://ccc.apgea.army.mil/courses/in_house/BrochureMCBC.htm

September 8-11
NEMA 2008 Annual Conference
Portland, OR
http://www.nemaweb.org/

September 9-10
2008 Homeland Security Symposium and Exhibition
Arlington, VA
http://www.ndia.org/Template.cfm?Section=8490&Template=/ContentManagement/ContentDisplay.cfm&ContentID=24621

Continued pg. 13

September 9-12 **2008 ASTHO-NACCHO Joint Conference**
Sacramento, CA
http://www.astho.org/?template=2008_asthonaccho_meeting.html&PHPSESSID=373b44e3aa8ce861fb0602701c4cc357

September 10-11 **DoD STINFO Program Manager 2008**
Fort Belvoir, VA
http://www.dtic.mil/dtic/training/schedule.html

September 10-11 **COURSE: Hospital Disaster Life Support (HDLS)**
Washington, DC
http://www.web.sitelms.org/view_event.php?event_id=2

September 13-16 **International Crisis Management Symposium on CBRN and Emerging Infectious Diseases**
Choshi, Chiba, Japan
http://www.cis.ac.jp/~nbc/

September 14-15 **CBRN-E 2008**
Prague, Czech Republic
http://www.smi-online.co.uk/events/overview.asp?is=1&ref=2884

September 14-19 **ISRP 14th International Conference**
Dublin, Ireland
http://www.isrp.com/dublin/index.html

September 22-24 **CBRNe World 2008 Conference and Exhibition**
Bucharest, Romania
http://www.cbrneworld.com/

September 22-26 **COURSE: Field Management of Chemical and Biological Casualties**
Aberdeen Proving Ground, MD
https://ccc.apgea.army.mil/courses/in_house/brochureFCBC.htm

September 29 - October 1 **Biomarker Discovery Summit 2008**
Philadelphia, PA
http://www.healthtech.com/bmks/overview.aspx

October 1-3 **International Conference on Biosciences and Bioengineering (ICBB) 2008**
Venice, Italy
http://www.waset.org/icbb08/

October 5-7 **AUSA Annual Meeting & Exposition**
Washington, DC
http://www.ausa.org/webpub/DeptIndustry.nsf/byid/KGRG-6ENKSP

October 13-17 **2008 Virginia Hazardous Materials Conference and Expo**
Hampton, VA
http://virginiahazmat.org/displayconvention.cfm

3rd National Conference on Environmental Sampling and Detection for Bio-Threat Agents

The Department of Defense's Chemical Biological Medical Systems, Joint Project Manager for Biological Defense, and Technical Support Working Group, the Department of Homeland Security, the Centers for Disease Control and Prevention, and the Environmental Protection Agency have organized the Third National Conference on Environmental Sampling and Detection for Bio-Threat Agents to create a forum for dialogue between government, industry, academia, and first responders to address critical issues in environmental sampling and bio-detection.

Why attend?

- First responders from military and civil defense can exchange techniques, ideas, and lessons learned
- Industry professionals will demonstrate new and innovative equipment and methodologies
- Leaders in the sampling and detection communities can exchange strategies for defending our homeland

For additional information:
Call: 410.297.2300
E-mail: info@sampling-conference.com
Visit: www.sampling-conference.com

December 2-4, 2008

Contract Awards

500,000 Joint Service General Purpose Masks
Avon Protection Systems, Inc.
Cadillac, MI
$22,431,374 May 16, 2008
By U.S. Army Research, and Development Command, Aberdeen Proving Ground, MD

Antibody Treatment For Smallpox Virus
La Jolla Institute for Allergy & Immunology
San Diego, CA
$7,100,000 May 8, 2008
By The National Institutes of Health, Bethesda, MD

Dual-Use Technologies Project
Florida Gulf Coast University
Fort Myers, FL
$1,500,000 April 11, 2008
By Florida's Twenty-Fifth Congressional District, Miami, FL

Development of Anthrax Vaccine Patch
Iomai Corp.
Gaithersburg, MD
$943,856 (Cost Reimbursement) April 8, 2008
By U.S. Army Medical Research and Material Command, Fort Detrick, MD

Chemical Warfare Protection Technology
University of Colorado at Boulder
Boulder, CO
$1,200,000 April 8, 2008
By Defense Threat Reduction Agency, Fort Belvoir, VA

Produce and Test Joint Biological Point Detection Systems (JBPDS)
General Dynamics Armament and Technical Products
Charlotte, NC
$43,000,000 April 7, 2008
By U.S. Army Research, Development and Engineering Command Acquisition Center, Aberdeen Proving Ground, MD

Automatic Chemical Agent Detector Alarm (ACADA) Units
Smiths Detection
Edgewood, MD
$10,000,000 March 31, 2008
By Department of Defense, Washington, DC

Research in Science and Engineering, Under the Fiscal 2008 Defense Experimental Program to Stimulate Competitive Research (DEPSCoR)
State Academic Institutions From: Arkansas, Delaware, Idaho, Kansas, Kentucky, Louisiana, Maine, Montana, Nebraska, Nevada, New Hampshire, North Dakota, Oklahoma, South Dakota, South Carolina, Tennessee, West Virginia received awards.
$15,700,000 March 26, 2008
By Department of Defense, Washington, DC

Continued Development of Protexia®: Broad Spectrum Chemical Nerve Agent Prophylaxis
PharmAthene, Inc.
Annapolis, MD
$5,800,000 March 26, 2008
By U.S. Army Space and Missile Command, Huntsville, AL

Chemical Vapor Sampler Systems
Battelle Memorial Institute
Columbus, OH
$5,949,373 March 18, 2008
By U.S. Army Research, Development and Engineering Command, Aberdeen Proving Ground, MD

M4 JCAD
Smiths Detection
Edgewood, MD
$23,800,000 March 17, 2008
By Department of Defense, Washington, DC

Engineering and Manufacturing Development for the Stryker Mobile Gun System and Nuclear Biological Chemical Reconnaissance Vehicle
GM GDLS Defense Group, LLC
Sterling Heights, MI
$32,665,000 March 5, 2008
By U.S. Army Tank-automotive and Armaments Command, Warren, MI

Enzyme and Mass-Spectrometry-Based Technologies for Hazardous Chemical Detection
ICx Technologies
Arlington, VA
$17,150,000 February 28, 2008
By U.S. Army Research Office, Research Triangle Park, NC

Hazardous Materials Identification Equipment (HazMatIDs and APD2000s)
Smiths Detection
Edgewood, MD
$7,200,000 February 27, 2008
By U.S. Air Force Civil Engineer Support Agency, Tyndall Air Force Base, FL

Assist With Preparedness Efforts for All Hazards Including Acts of Bioterrorism and Pandemic Outbreaks
L-3 Communications
New York, NY
$215,000,000 February 27, 2008
By Centers for Disease Control and Prevention, Atlanta, GA

Perform Laboratory Operations for the Destruction of the U.S. Army Chemical Stockpile Stored at the Newport Chemical Depot in Newport, IN
Southwest Research Institute
San Antonio, TX
$15,600,000 February 13, 2008
By Parsons Infrastructure & Technology Inc., Pasadena, CA

Spartans Make Their Home in Texas

by Cathy Kropp

They call themselves Spartans. "As the Spartans of the past, we too are trained and ready to respond when our nation calls," said Col. Vance P. Visser, commander of the 48th Chemical Brigade. Marking the first time since World War I that a brigade-level headquarters has been available to command and control chemical forces in support of a war, the 48th Chemical Brigade was activated in September 2007. Headquartered at Ft. Hood, Texas, these modern-day Spartans include close to 2,800 CBRN (chemical, biological, radiological and nuclear) Soldiers in five battalions with 27 operational companies spread across nine military installations.

While fully supporting operations in Iraq and Afghanistan, the brigade is simultaneously training to demonstrate its initial operational capability during an exercise in September 2008. Still, to support the Army's overall modularization and the revolutionary transformation of Army's Chemical, Biological, Radiological, Nuclear and High Yield Explosives (CBRNE) assets, more growth and reorganization may be in the brigade's future.

As part of the Army's overall modular transformation the 20th Support Command (CBRNE), higher headquarters for the 48th Chemical Brigade, is initiating a comprehensive review of its subordinate chemical and EOD organizations and evaluating strategies that combine both the CBRN and the explosive ordnance disposal capabilities within standardized multi-capable expeditionary CBRNE brigades and battalions. This same valuable mix has already been proven effective in the 48th Chemical Brigade's technical escort battalions.

Of the five battalions in the brigade today, two are technical escort battalions. Technical escort battalion assets are strategically responsive, rapidly deployable and can be tailored to the specific mission. They are designed to rapidly respond to mitigate and eliminate CBRNE hazards both at home and overseas. Each specially trained and equipped CBRNE response team has the capability to sample, detect, and monitor CBRN hazards. They are able to mitigate initial hazards, package hazardous material for transport, provide technical escort of that package, and decontaminate themselves and their equipment. They also have the capability to render unexploded ordnance safe, or when necessary eliminate or disable CBRNE hazards or production facilities. Their analysis, munitions assessment, and CBRNE advice are invaluable to the decision makers they support.

The remaining three conventional chemical battalions, in both heavy and light configurations, are outfitted with various arrays of specialized reconnaissance, smoke, Biological Integrated Detection Systems (BIDS) or decontamination companies to support the operational force.

The primary mission of these conventional units is to improve the survivability and mobility of ground forces. Using CBRNE vehicles and equipment, such as the Fox and Stryker CBRN reconnaissance vehicles, reconnaissance units are able to detect, identify and mark areas of chemical and radiological contamination. Recon units also collect and transport air, water and ground samples to identify nuclear, biological and chemical contamination and convey real-time detailed hazard information to supported commanders.

Like recon, smoke units are employed to increase warfighter survivability. Their mission is to buy maneuver time for friendly forces and to protect assembly areas and other high-priority targets. Using equipment such as the M56 and M58 smoke generation systems, these units can lay vast amounts of obscurants as camouflage, a decoy or to counter new generation smart weapons.

The BIDS consists of biological detection, identification and sampling equipment. The BIDS units are capable of detecting when a biological attack has occurred and can also provide presumptive identification of biological agents and produce a sample for detailed analysis at a laboratory.

The final possible configuration of a conventional chemical company is as a decontamination unit. The primary mission of a decontamination unit is to return units to the field for future combat operations. Using equipment such as the M12A1 and M17 decontamination apparatus the units can rapidly decontaminate a vehicle and return it to the fight. The units are undergoing a significant modernization effort to enable them to conduct hazard response operations.

However, impressive equipment and technology are not the sole indicators of success. As Visser points out, "humans are more important than hardware; quality is better than quantity; CBRNE forces cannot be mass produced; and competent CBRNE forces cannot be created after emergencies occur."

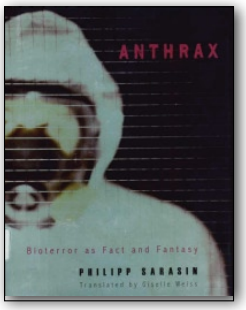
With a full-time focus on countering CBRNE threats at home and abroad, the Spartans of the 48th Chemical Brigade are using the lessons learned in today's operations to transform and evolve to meet the needs of the nation to combat the WMD and CBRNE threats of tomorrow.

"We stand ready with sharp swords and polished shields to deploy on short notice anywhere in the world to provide CBRNE support to protect the nation," said Visser. "Spartans, leading to victory!"

New CBRNIAC Information Resources

Sarasin, Philipp. **Anthrax: Bioterror as Fact and Fantasy**. Cambridge, MA: Harvard University Press, 2006.

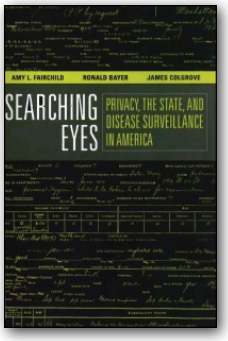
"Sarasin, in offering a European's view of the U.S. reaction to the anthrax scare, argues that while threats of bioterrorism are real, they are disproportionate to the fantasmal fears and illusions that now permeate American politics and culture. In short, fear of bioterror has contaminated modern American life." *(Inside Cover)*



CB-065320
ISBN 0-674-02346-3
Harvard University Press
79 Garden Street
Cambridge, MA 02138
Phone: (800) 405-1619

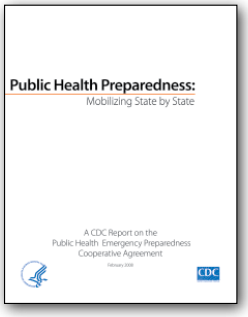
Fairchild, Amy L., Bayer, Ronald and Colgrove, James. **Searching Eyes: Privacy, The State and Disease Surveillance in America**. Berkeley, CA: University of California Press, 2007.

"Meticulously researched, this book provides the first overarching account of the evolution of public health surveillance in the United States, from the debates over tuberculosis and venereal disease at the start of the twentieth century to the tensions over AIDS and bioterrorism at century's end." (*Lawrence O. Gostin, Georgetown University)*



CB-063837
ISBN 978-0-520-25325-4
University of California Press
2120 Berkeley Way
Berkeley, CA 94704
Phone: (510) 642-4247

Coordinating Office for Terrorism Preparedness and Emergency Response. **Public Health Preparedness: Mobilizing State by State**. Washington, DC: Centers for Disease Control and Prevention, 2008.
http://emergency.cdc.gov/publications/feb08phprep/pdf/feb08phprep.pdf

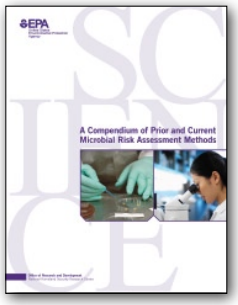


"In 2002, Congress authorized funding for the Public Health Emergency Preparedness cooperative agreement (hereafter referred to as the cooperative agreement) to support preparedness nationwide in state, local, tribal, and territorial public health departments... CDC administers the cooperative agreement and provides technical assistance to public health departments. This report outlines progress and challenges." (*Executive Summary)*

CB-066343
Coordinating Office for Terrorism Preparedness and Emergency Response
Center for Disease Control and Prevention
1600 Clifton Road
Atlanta, GA 30333
Phone: (404) 639-3311

Threat and Consequence Assessment Division, National Homeland Security Research Center. **A Compendium of Prior and Current Microbial Risk Assessment Methods For Use as a Basis for the Selection, Development, and Testing of a Preliminary Microbial Risk Assessment Framework**. Cincinnati, OH: United States Environmental Protection Agency, 2007.
http://www.epa.gov/nhsrc/pubs/reportMRA112707.pdf

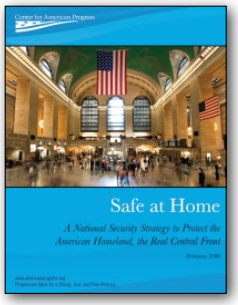
"One of the most important issues facing EPA's National Homeland Security Research Center (NHSRC) is the development of a biological risk assessment methodology. No consensus based methodology exists for evaluating biological threat contaminants and establishing cleanup levels. This Compendium of Prior and Current Microbial Risk Assessment Methods is one of the first steps toward establishing such a methodology." (*Executive Summary)*



CB-066183
Threat and Consequence Assessment Division
National Homeland Security Research Center
United States Environmental Protection Agency
26 West Martin Luther King Drive
Cincinnati, OH 45268
Phone: (513) 569-7907

Crowley, P.J. **Safe at Home: A National Security Strategy to Protect the American Homeland, the Real Central Front**. Washington, DC: Center for American Progress, 2008.
http://www.americanprogress.org/issues/2008/02/pdf/safe_at_home.pdf

"A comprehensive and balanced strategy to protect the homeland encompasses five strategic objectives: prevent terrorist attacks; reduce our vulnerability to terrorism; prepare to respond and recover from an attack or natural or man-made disasters; sustain homeland security consistent with American values; and shape the global environment to reduce the threat of terrorism." (*Executive Summary)*

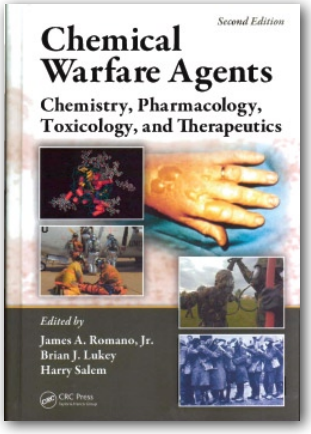


CB-066681
Center for American Progress
1333 H Street NW
10th Floor
Washington, DC 20005
Phone: (202) 682-1611

Scientists Contribute to Two Publications

Scientists at the U.S. Army Medical Research Institute of Chemical Defense (USAMRICD) recently contributed to two publications on the subject of chemical warfare agents (CWA).

The first publication is a book entitled **Chemical Warfare Agents: Chemistry, Pharmacology, Toxicology, and Therapeutics**. It is an update of the 2001 book **Chemical Warfare Agents: Toxicity at Low Levels**. According to the publisher, CRC Press, this second edition "explores the latest methods and products for preventing, diagnosing, and treating the acute and chronic effects of toxic CWA exposure." It was edited by former USAMRICD commanders Col. (ret) James A. Romano, Jr., and Col. Brian J. Lukey, as well as by Dr. Harry Salem from the U.S. Army Edgewood Chemical Biological Center.



USAMRICD scientists authored or coauthored several chapters for the book across a broad range of the topics covered. Among these subject matter experts were Dr. John McDonough, Dr. James Dillman III, Mr. Donald Maxwell, Dr. David Lenz, Dr. Clarence Broomfield, Dr. David Yeung, Dr. Douglas Cerasoli, Dr. Robert Kan, Ms. Tracey Hamilton, Dr. Michael Adler, Dr. Charles Hurst, Dr. William Smith, Dr. James Apland, Dr. Sharad Deshpande, Mr. James Nicholson, Lt. Col. Jaime Anderson, Dr. Benedict Capacio, Mr. J. Richard Smith, Col. Harry Slife, Jr., Dr. Edward Clarkson, Dr. Ernest Braue, Jr., Dr. Lucille Lumley, and Dr. David Moore. The chapters they contributed to discuss the medical effects of exposure to vesicating agents, the development of bioscavengers as medical protection against chemical agents as well as other novel approaches under development, and the psychological impact of chemical warfare and terrorism. Additionally, chapters by USAMRICD scientists cover skin decontamination, low-level exposure, the actions of botulinum neurotoxin and its medical countermeasures, and domestic preparedness for CWA terrorist attacks. USAMRICD scientists also coauthored chapters on the application of genomic, proteomic, and metabolomic technologies in medical countermeasure development and the possible application to CWA injury of novel approaches being used in the treatment of neurological disorders.

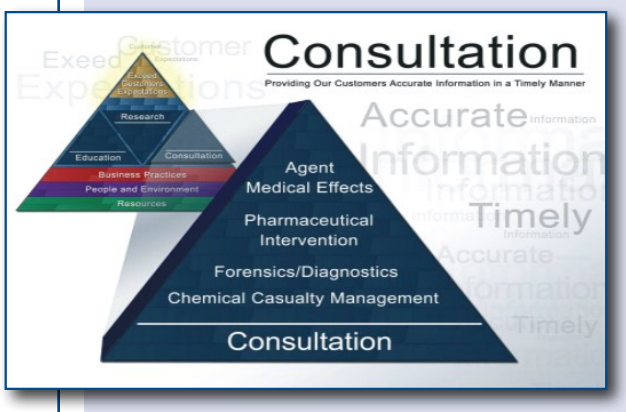
In addition, three scientists from the institute's Medical Diagnostic and Chemical Branch, Capacio, J. Richard Smith, and Richard Lawrence, authored three articles in the January/February issue of the **Journal of Analytical Toxicology (JAT)**, which is devoted to analytical methods and biomarkers used to assess chemical agent exposure. Capacio and Smith were also co-authors on two articles in collaboration with scientists from the Centers for Disease Control and Prevention. Much of the research featured by Capacio, Smith, and Lawrence describes the development of gas chromatographic–mass spectrometric methods to analyze the interaction of plasma proteins and the chemical warfare agent sulfur mustard as a means of verifying exposure. Smith also worked with Yeung, Lenz, Cerasoli, and Richard Sweeney of USAMRICD's Physiology and Immunology Branch, to develop an approach to examine the interaction of plasma proteins and the nerve agent soman. Other advancements in detection methods highlighted in their JAT papers are the ability to verify very low levels of exposures and the ability to confirm exposures for a longer period of time after the exposure than was previously possible.

Office of Consultative Services

By Dr. Margaret Filbert, USAMRICD

As the Department of Defense lead laboratory for the development of medical countermeasures against chemical threat agents, the U.S. Army Medical Research Institute of Chemical Defense (USAMRICD) is increasingly called upon to provide expert analytical and consultative services related to medical chemical defense research and to the medical management of chemical casualties. The institute's growing national and international customer base includes other government agencies, academia, pharmaceutical companies and commercial enterprises. To fulfill this expanding mission, the USAMRICD has established an Office of Consultative Services (OCS). The OCS represents a core capability of the institute and formalizes the consultative process by integrating the service into our business operations. Fees for services are necessary to reimburse the institute for the time and effort required to research and answer queries.

A request for consultative services can be initiated by sending an email to mricd-taskerPOC@amedd.army.mil or by accessing the USAMRICD webpage, http://usamricd.apgea.army.mil/, and clicking on the link to Consultations. This link has a template for the preparation and submission of a statement of work. Upon receipt of a request, the OCS will prepare an estimate of the cost to respond. Once the customer accepts the estimate, a subject-matter expert is assigned to prepare the response. USAMRICD's OCS can be contacted at 410-436-3628 for more information.



In the News

Cornell Fiber Scientist Receives Federal Grants to Create Fabrics to Render Toxic Chemicals Harmless

nanotechwire.com
May 25, 2008
"Cornell fiber scientist Juan Hinestroza is working with the U.S. Government to create fabrics made of functional nanofibers that would decompose toxic industrial chemicals into harmless byproducts."
http://nanotechwire.com/news.asp?nid=6023

Seeing Molecules Change Shape

Stu Borman
C&E News
May 19, 2008
A faster, more powerful way to observe molecular shape changes over time has been developed by a team of spectroscopists. The microwave spectroscopy technique, devised by Brooks H. Pate and coworkers at the University of Virginia, Charlottesville, and reported in *Science* (2008, 320, 924), should be applicable to studies of reaction dynamics…Pate and coworkers' new chirped-pulse FT microwave method (CP-FTMW)… hopes to develop CP-FTMW for other applications, such as detecting low-level chemical warfare agents in air.
http://pubs.acs.org/cen/news/86/i20/8620notw1.html

Bioterrorism Detection Gets a Boost

Barbara Ha
JHU Newsletter
April 17, 2008
"Hospitals are likely to be the first line of defense against a bioterrorism scare if one were ever to occur…Hopkins researchers have made a great leap forward with the development of a new test for potentially dangerous bacteria."
http://media.www.jhunewsletter.com/media/storage/paper932/news/2008/04/17/Science/Bioterrorism.Detection.Gets.A.Boost-3334305-page2.shtml

Nerve Agent Detector on a Chip

James Mitchell Crow
Chemical Technology
April 16, 2008
"A microfluidic device that can identify exposure to sarin could help identify individuals needing treatment at sites of terrorist attack."
http://www.rsc.org/Publishing/ChemTech/Volume/2008/05/Nerve_agent_detector.asp

HHS Names First Director of the Biomedical Advanced Research Development Authority

HHS News Release
April 14, 2008
"The Department of Health and Human Services today announced the selection of Robin Robinson, Ph.D., as the first director of the Biomedical Advanced Research Development Authority (BARDA), which was established in 2007 in the HHS Office of the Assistant Secretary for Preparedness and Response."
http://www.hhs.gov/news/press/2008pres/04/20080414a.html

Retired NY Firefighter Invents and Patents Portable Air Shield (PASS)

Valerie Gotten
California Newswire
April 14, 2008
"The week-long experience of retired N.Y. firefighter Jim Thomsen after 9/11…made him determined to develop a protective Air Shield that might someday reduce the danger of inhaling toxic dust…U.S. Patent office issued patent #7326387 for the Air-Shield technology…(PASS)."
http://californianewswire.com/2008/04/14/CNW1288_190539.php

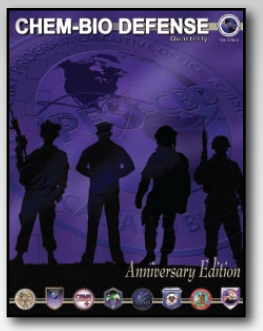
Professor Develops Device for Chemical Identification

Autumn Buys
BYU NewsNet
April 14, 2008
"A BYU chemistry professor has developed a device able to identify the chemical composition of a substance. The device works by collecting a sample…matches them to one of the chemicals listed in its internal database. The names and amounts of each chemical appear on a small screen…The whole process takes less than 10 minutes."
http://nn.byu.edu/story.cfm/68330

Continued pg. 22

Vol. 5 No. 2 of the Chem-Bio Defense Quarterly Magazine is Now Available!

Vol. 5 No. 2 Chem-Bio Defense Quarterly Magazine



As the Joint Program Executive Office for Chemical and Biological Defense celebrates five years of existence, this issue of the Chem-Bio Defense Quarterly features interviews with senior leaders in the Chemical and Biological Defense Program, including Maj. Gen. Larry D. New, Deputy Director for Force Protection, Force Structure, Resources and Assessment Directorate, Joint Requirements Office; Mr. Peter Bechtel, Director, Army Nuclear and Combating Weapons of Mass Destruction Agency and Dr. Darrell Galloway, Director, Chemical and Biological Technologies Directorate, Defense Threat Reduction Agency.

To view the electronic version, visit: http://www.jpeocbd.osd.mil/page_manager.asp?pg=4&sub=0

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PANTHER Sensor From MIT Lincoln Laboratory Quickly Detects Pathogens

By Anne Trafton, MIT News Office

Researchers at Massachusetts Institute of Technology (MIT) Lincoln Laboratory have developed a powerful sensor that can detect airborne pathogens such as anthrax and smallpox in less than three minutes.

The new device, called PANTHER (for **PA**thogen **N**otification for **TH**reatening **E**nvironmental **R**eleases), represents a "significant advance" over any other sensor, said James Harper of Lincoln Lab's Biosensor and Molecular Technologies Group. Current sensors take at least 20 minutes to detect harmful bacteria or viruses in the air, but the PANTHER sensors can do detection and identification in less than 3 minutes.

The technology has been licensed to Innovative Biosensors, Inc. (IBI) of Rockville, Maryland. In January, IBI began selling a product, BioFlash, that uses the PANTHER technology.

"There is a real need to detect a pathogen in less than three minutes, so you have time to take action before it is too late," said Harper, the lead scientist developing the sensor.

The PANTHER sensor uses a cell-based sensor technology known as CANARY (after the birds sent into mines to detect dangerous gases), and can pick up a positive reading with only a few dozen particles per liter of air.

The device could be used in buildings, subways and other public areas, and can currently detect 24 pathogens, including anthrax, plague, smallpox, tularemia and *E. coli*.

"There's really nothing out there that compares with this," said Todd Rider of Lincoln Lab's Biosensor and Molecular Technologies Group, who invented the CANARY sensor technology.

Rider started developing CANARY in 1997 when he realized that there were no sensors available that could rapidly detect pathogens. His idea was to take advantage of nature's own defense system—specifically the B cells that target pathogens in the human body. "B cells in the body are very fast and very sensitive," Rider said.

The CANARY concept uses an array of B cells, each specific to a particular bacterium or virus. The cells are engineered to emit photons of light when they detect their target pathogen. The device then displays a list of any pathogens found.

CANARY is the only sensor that makes use of immune cells. Other available sensors are based on immunoassays or PCR (polymerase chain reaction), which take much longer and/or are not as sensitive as CANARY.

This prototype of the PANTHER device is about one cubic foot and weighs 37 pounds. Photo courtesy of MIT Lincoln Laboratory.

Rider and colleagues first reported the success of CANARY (which stands for **C**ellular **A**nalysis and **N**otification of **A**ntigen **R**isks and **Y**ields) in the journal Science in 2003. Since then, they have been working to incorporate the technology into a portable device that could be used in a variety of settings where environmental threats might exist.

The new device, PANTHER, takes the CANARY technology and combines it with an air sampler that brings pathogens into contact with the detector cells. The prototype sensor is about a cubic foot and weighs 37 pounds and is well suited to building-protection applications. With minor modifications it could also enhance biological detection capabilities for emergency responders.

CANARY has been tested in rural and coastal environments as well as urban ones. It could eventually be used on farms or in food-processing plants to test for contamination by *E. coli*, salmonella, or other food-borne pathogens.

Another potential application is in medical diagnostics, where the technology could be used to test patient samples, giving rapid results without having to send samples to a laboratory.

"Instead of going to the doctor's office and waiting a few days for your test results, with CANARY you could get the results in just a minute or so," said Rider.

The research on PANTHER was funded by the Defense Threat Reduction Agency. ◈

A version of this article appeared in MIT Tech Talk on March 5, 2008 at http://web.mit.edu/newsoffice/2008/techtalk52-18.pdf

This article can be found on the MIT News Office website at http://web.mit.edu/newsoffice/2008/canary-0303.html

U.S.NRC
UNITED STATES NUCLEAR REGULATORY COMMISSION
Protecting People and the Environment

Backgrounder
Office of Public Affairs
Telephone: 301/415-8200
E-mail: opa@nrc.gov

Dirty Bombs

Background
A "dirty bomb" is one type of a "radiological dispersal device" (RDD) that combines a conventional explosive, such as dynamite, with radioactive material. The terms dirty bomb and RDD are often used interchangeably in the media. Most RDDs would not release enough radiation to kill people or cause severe illness - the conventional explosive itself would be more harmful to individuals than the radioactive material. However, depending on the scenario, an RDD explosion could create fear and panic, contaminate property, and require potentially costly cleanup. Making prompt, accurate information available to the public could prevent the panic sought by terrorists.

A dirty bomb is in no way similar to a nuclear weapon or nuclear bomb. A nuclear bomb creates an explosion that is millions of times more powerful than that of a dirty bomb. The cloud of radiation from a nuclear bomb could spread tens to hundreds of square miles, whereas a dirty bomb's radiation could be dispersed within a few blocks or miles of the explosion. A dirty bomb is not a "Weapon of Mass Destruction" but a "Weapon of Mass Disruption," where contamination and anxiety are the terrorists' major objectives.

Impact of a Dirty Bomb
The extent of local contamination would depend on a number of factors, including the size of the explosive, the amount and type of radioactive material used, the means of dispersal, and weather conditions. Those closest to the RDD would be the most likely to sustain injuries due to the explosion. As radioactive material spreads, it becomes less concentrated and less harmful. Prompt detection of the type of radioactive material used will greatly assist local authorities in advising the community on protective measures, such as sheltering in place, or quickly leaving the immediate area. Radiation can be readily detected with equipment already carried by many emergency responders. Subsequent decontamination of the affected area may involve considerable time and expense.

Immediate health effects from exposure to the low radiation levels expected from an RDD would likely be minimal. The effects of radiation exposure would be determined by:

- the amount of radiation absorbed by the body;
- the type of radiation (gamma, beta, or alpha);
- the distance from the radiation to an individual;
- the means of exposure–external or internal (absorbed by the skin, inhaled, or ingested); and
- the length of time exposed.

The health effects of radiation tend to be directly proportional to radiation dose. In other words, the higher the radiation dose, the higher risk of injury.

Protective Actions
In general, protection from radiation is afforded by:

- minimizing the time exposed to radioactive materials;
- maximizing the distance from the source of radiation; and
- shielding from external exposure and inhaling radioactive material.

Sources of Radioactive Material
Radioactive materials are routinely used at hospitals, research facilities, industrial and construction sites. These radioactive materials are used for such purposes as diagnosing and treating illnesses, sterilizing equipment, and inspecting welding seams. The Nuclear Regulatory Commission together with 33 "Agreement" States, which also regulate radioactive material, administer over 21,000 licenses of such materials. The vast majority of these materials are not useful as an RDD.

Control of Radioactive Material
NRC and state regulations require owners licensed to use or store radioactive material to secure it from theft and unauthorized access. These measures have been greatly strengthened since the attacks of September 11, 2001. Licensees must promptly report lost or stolen high-risk radioactive material. Local authorities also assist in making a determined effort to find and retrieve such sources. Most reports of lost or stolen material involve small or short-lived radioactive sources not useful for an RDD.

Past experience suggests there has not been a pattern of collecting such sources for the purpose of assembling an RDD. It is important to note that the radioactivity of the combined total of all unrecovered sources over the past 5 years (when corrected for radioactive decay) would not reach the threshold for one high-risk radioactive source. Unfortunately, the same cannot be said world-wide. The U.S. Government is working to strengthen controls on high-risk radioactive sources both at home and abroad.

Risk of Cancer
Just because a person is near a radioactive source for a short time or gets a small amount of radioactive dust on himself or herself does not mean he or she will get cancer. Any additional risk will likely be extremely small. Doctors specializing in radiation health effects will be able to assess the risks and suggest mitigating medical treatment, once the radioactive source and exposure levels have been determined.

There are some medical treatments available that help cleanse the body of certain radioactive materials. Prussian blue has been proven effective for ingestion of cesium-137 (a radioactive isotope). In addition, potassium iodide (KI) can be used to protect against thyroid cancer caused by iodine-131 (radioactive iodine). However, KI, which is available as an "over the counter" pill, offers no protection to other parts of the body or against other radioactive isotopes. Medical professionals are best qualified to determine how to best treat symptoms.

Continued pg. 21

Dirty Bombs *cont.*

Other Contact information

A number of federal agencies have responsibilities for dealing with RDDs. Their public affairs offices can answer questions on the subject or provide access to experts in and out of government. Their web sites and phone numbers are:

Department of Homeland Security:
Phone: 202-282-8010; http://www.dhs.gov/

Department of Energy:
Phone: 202-586-4940; http://www.energy.gov/

Environmental Protection Agency:
Phone: 202-564-9828; http://www.epa.gov

Nuclear Regulatory Commission:
Phone: 301-415-8200; http://www.nrc.gov

Federal Emergency Management Agency:
Phone: 202-646-4600; http://www.fema.gov

Department of Justice:
Phone: 202-514-2007; http:// www.usdoj.gov

Federal Bureau of Investigation:
Phone: 202-324-3691; http://www.fbi.gov

Department of Health and Human Services:
Phone: 202-690-6343; http://www.hhs.gov

Transportation Security Administration:
Phone: 571-227-2829; http://www.tsa.gov/public/

National Nuclear Security Administration:
Phone: 202-586-7371; http://www.nnsa.doe.gov/

For **Dirty Bombs– Backgrounder** and **FAQs**, see http://www.nrc.gov/reading-rm/doc-collections/fact-sheets/dirty-bombs-bg.pdf#view=FIT

For additional information, see:

Radiation Protection
http://www.nrc.gov/about-nrc/radiation.html

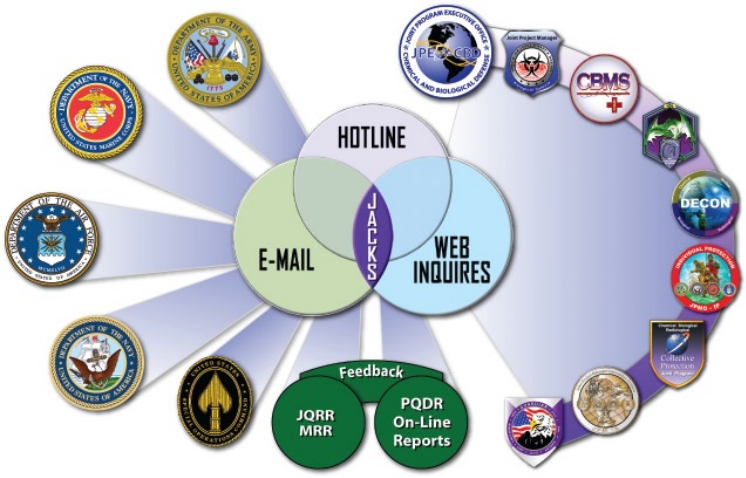
Radiation and National Security
http://www.nrc.gov/about-nrc/radiation/rad-nat-security.html

Chemical Biological Radiological Nuclear Information Resource Center

The Chemical Biological Radiological Nuclear Information Resource Center (CBRN-IRC) provides customers with a single entity for obtaining information to support their respective missions. The Joint Program Executive Officer for Chemical and Biological Defense (JPEO-CBD) recognized an opportunity to provide Warfighters, Government Employees, First Responders and other CBRN community personnel with a single interface for information regarding CBRN Defense Equipment. The JPEO-CBD therefore established the CBRN-IRC in late 2006. The mission of the CBRN-IRC is to serve as a continuously operating one-stop resource to provide current, relevant and accurate information to the CBRN Community. The CBRN-IRC objective is to assure that all inquiries receive service that is prompt, professional, relevant, and accurate.

Requests for information come into the IRC via telephone, Web Inquiry or E-mail. The value added to the CBRN community by the JPEO-CBD is reduction of hours expended by the community to individually find authoritative CBRN support personnel and accurate information. Additionally, an economy of scale result is achieved due to the reduction of isolated call centers segregated throughout the CBRN-IRC community. A single call to the CBRN-IRC is all that's needed. The CBRN-IRC personnel work on behalf of the needs of the inquirer to conduct the necessary research and answer customers' request for information. As the awareness of the CBRN-IRC's mission and existence increases, so do the requests for help. The success of the CBRN-IRC is apparent due to the continuous improvement framework under which it operates as well as the customer surveys submitted after each inquiry that are being returned have averaged above 92% positive feedback since CBRN-IRC implementation.

You can contact the CBRN-IRC at cbrn@conus.army.mil, or 1-800-831-4408, or research online at https://jacks.jpeocbd.osd.mil/



Antidote to Lethal Germ 'Closer'
Angela Saini
BBC News
May 12, 2008
"Scientists are on their way to developing an effective antidote for botulinum toxin - one of the world's most feared biological weapons."
http://news.bbc.co.uk/go/pr/fr/-/2/hi/science/nature/7395731.stm

Enzyme-Coated Plastic Could Mean Self-Cleaning Fabrics
NewScientist.com News Service
May 12, 2008
"A way to attach a coating of 'live' enzymes onto plastic and other materials could lead to clothes that digest stains as soon as they occur, or kitchen surfaces able to kill bacteria…enzyme-coated materials could have a wide range of uses, including self-healing materials or protective suits able to digest chemical or biological hazards."
http://technology.newscientist.com/channel/tech/dn13873-enzymecoated-plastic-could-mean-selfcleaning-fabrics.html?feedId=online-news_rss20

Safe 'Green' Decontamination Method Detoxifies Nerve Agents in Chemical Weapons and Pesticides
ScienceDaily
April 11, 2008
"Research by two Queen's University scientists has resulted in an exciting new method for rapidly and safely destroying toxic agents such as chemical weapons and pesticides."
http://www.sciencedaily.com/releases/2008/04/080408132133.htm

Bacteria Tails Could Protect Against 'Dirty' Bomb
Debora MacKenzie
NewScientist.com News Service
April 11, 2008
"A drug made out of Salmonella can protect mice and monkeys from high doses of radiation. It might help protect rescuers who have to enter a radioactive area after attack with a nuclear or 'dirty' bomb, and also cancer patients undergoing radiation therapy."
http://www.newscientist.com/channel/health/dn13652-bacteria-tails-could-protect-against-dirty-bomb-.html?feedId=online-news_rss20

Researchers Pursuing Nasal Anthrax Vaccine
Serena Gordon
U.S. News & World Report
April 10, 2008
"American researchers have developed a nasal spray anthrax vaccine that provides protection against the potentially deadly bacterium, at least in mice."
http://health.usnews.com/usnews/health/healthday/080410/researchers-pursuing-nasal-anthrax-vaccine.htm

Cleaning Up After Nerve Agents
The Engineer Online
April 1, 2008
"A new decontamination agent devised by U.S. chemists can deactivate toxic chemicals such as nerve agents and pesticides leaving only non-toxic, easily disposable by-products… a destruction method based on dealkylating agents."
http://www.theengineer.co.uk/Articles/305349/Cleaning+up+after+nerve+agents.htm

Splinternet Launches Dirty-Bomb Detector
United Press International
March 25, 2008
"…Splinternet Holdings Inc. announced the launch of a new sensor technology for the detection of dirty bombs…new GammaTect Plus integrated gamma radiation detection sensor system."
http://www.upi.com/International_Security/Industry/Briefing/2008/03/25/splinternet_launches_dirty-bomb_detector/1906/

Three-Minute Anthrax Sensor
Katherine Bourzac
Technology Review
March 18, 2008
"A new detector uses living cells that light up in the presence of airborne bioterror agents, such as anthrax and smallpox."
http://www.technologyreview.com/Biotech/20431/

Land and Sea Tests Verify Effectiveness of Boeing Biological Detection System
PressMediaWire
March 10, 2008
"The U.S. Defense Threat Reduction Agency and Boeing have demonstrated successfully that Scan Eagle unmanned air vehicles modified to look for biological warfare agents can effectively intercept, detect and fly through simulated biological plumes or clouds to collect airborne agents."
http://pressmediawire.com/article.cfm?articleID=18250

Pathogen Detector
The Engineer Online
March 5, 2008
"Researchers at MIT Lincoln Laboratory have developed a sensor that can detect airborne pathogens such as anthrax and smallpox. The new device, called PANTHER (for PAthogen Notification for THreatening Environmental Releases), represents a 'significant advance' over any other sensor…"
http://www.theengineer.co.uk/Articles/304874/Pathogen+detector.htm

UB's Bioblower Closer To Protecting Soldiers From Biological Attack
Ellen Goldbaum
University of Buffalo News Release
February 28, 2008
"A powerful air sterilization technology developed at the University at Buffalo has killed every biological agent with which it has been challenged, including airborne spores, viruses and bacteria in independent tests conducted for the U.S. Department of Defense."
http://www.buffalo.edu/news/fast-execute.cgi/article-page.html?article=91890009

Smiths Detection Selected for Improved Point Detection System (IPDS) II Evaluation
TMC Net
February 25, 2008
"Smiths Detection, part of the global technology business Smiths Group, today announced its Military unit has been selected to participate in the first major phase of Increment 2 of the Improved Point Detection System (IPDS) program."
http://www.tmcnet.com/usubmit/2008/02/25/3289226.htm

New Items on the CBRNIAC Website

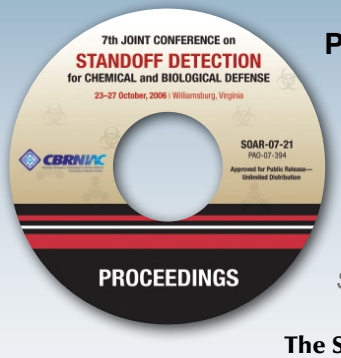
New 2008 CBRNIAC Product Catalog

Use our online shopping cart to select the CBRNIAC information products that can help you with your mission!

http://www.cbrniac.apgea.army.mil/products/

Latest issue of USANCA's *Combating WMD Journal*

http://www.cbrniac.apgea.army.mil/links/usanca.php

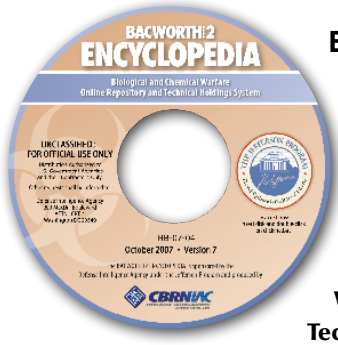


Proceedings of the 7th Joint Conference on Standoff Detection for Chemical and Biological Defense

Approved for Public Release; Distribution Unlimited

SOAR-07-21 7-2007 $25.00

The Seventh Joint Conference on Standoff Detection for Chemical and Biological Defense, held October 23-27, 2006, in Williamsburg, VA, was organized by the Joint Science and Technology Office in cooperation with the Joint Program Executive Office for Chemical and Biological Defense, Joint Requirements Office, U.S. Army, U.S. Navy, U.S. Air Force, U.S. Marine Corps and other CBD organizations. The objective of the conference was to bring together operational personnel and material developers and practitioners to review the state-of-the-art in science and technology for chemical and biological (CB) standoff detection/identification and related activities. The results of this conference, along with critical CB standoff detection assessments currently being conducted by the Joint Nuclear, Biological and Chemical (NBC) Defense community, will serve as the basis of a comprehensive Joint Department of Defense strategy for the development of the next generation of CB detection standoff systems and concepts. The conference consisted of over 70 invited and contributed papers.
http://www.cbrniac.apgea.army.mil/products/item.php?id=75



BACWORTH 2 Encyclopedia

U.S. Government Agencies and their Contractors Only; Unclassified; For Official Use Only

HB-07-04 10-2007 $75.00

The **Biological and Chemical Warfare Online Repository and Technical Holdings (BACWORTH) 2 Encyclopedia** contains detailed data on 86 CB agents, toxins, and riot control agents. Entries include both at-a-glance summaries and detailed description levels. There are also 16 overview functional chapters addressing critical CB defense topics in a non-agent specific format. The Encyclopedia cites more than 1,500 references. Each Agent entry covers 13 key topics. This edition supersedes HB-00-01, HB-03-02, and HB-04-03 which are no longer available.
http://www.cbrniac.apgea.army.mil/products/item.php?id=28

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