SOLUTIONS

U.S. Army Edgewood Chemical Biological Center Annual Report | 2012 Edition

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TECHNOLOGY DRIVEN. WARFIGHTER FOCUSED.

Message from the Technical Director

Director's Preface

Joseph D. Wienand | ECBC Technical Director

The future of our nation's need for a credible defensive posture against chemical, biological, radiological, nuclear and explosive (CBRNE) threats relies significantly on the people and specialized infrastructure at Edgewood Chemical Biological Center (ECBC).

The world has seen that terrorist events are very unpredictable and the uncertainty of which groups or nations could possess weapons of mass destruction (WMD) continues to be a complex intelligence issue. President Barack Obama stated in the National Security Strategy that there is "no greater threat to the American people than weapons of mass destruction." One thing is certain, if the United States maintains a strong defensive stance against CBRNE threats most of the state or non-state organizations considering the use of WMDs will think hard before engaging our Armed Forces and nation with these destructive weapons. In other words, a strong defense is our best offense against CBRNE threats.

The Center's core competency is safely working with known chemical and biological threats, and based on our cadre of technical competencies we are well positioned to address these and other emerging threats. Whether it's deploying engineers at the Product Integration Facility at Bagram Airfield, Afghanistan or destroying World War II munitions in conjunction with the Australian Ministry of Defence, ECBC has the technology and the resources to face the enduring and emerging threat head on. In 2012, the workforce rose to numerous challenges and developed a homemade explosive kit detector that will fit in the pocket of our warfighters and has partnered with the Japanese Ministry of Defense to improve an existing chemical agent detector. The Center is thus able to provide the Department of Defense (DoD) and nation with the critical capabilities to systematically improve our detection capability.

ECBC is a values based organization and our mandate is to live the Army values of Loyalty, Duty, Respect, Selfless Service, Honor, Integrity and Personal Courage (LDRSHIP). Our employees live these values and the values of safety as they carry out the mission of ECBC and thus stand side-by-side with our customer, military members from all services.

Our employees maintain exceptional scientific, engineering and operational expertise with actual CBRNE materials, which is unparalleled by any research and development center in the world. This is most directly demonstrated by the outstanding accomplishments in 2012 that are reflected in the following pages. From expertise in safely handling the world's most toxic compounds to recognition of our accomplishments in science, technology, engineering, operations, or in enabling supporting functions, our people have once again demonstrate exceptional achievements.

The following pages are a culmination of prominent contributions to the world at-large made in 2012, illustrating why ECBC is an irrefutable national asset that continues to demonstrate innovative practices that benefit the taxpayers, homeland, clients and our primary customer, the warfighter.

Overview

As the nation's principal research and development resource for non-medical chemical biological (CB) defense, ECBC supports all phases of the acquisition lifecycle—from basic and applied research through technology development, engineering design, equipment evaluation, product support, sustainment, field operations and demilitarization—to address its customers' unique requirements. ECBC's science and technology expertise has protected the United States from the threat of chemical weapons since 1917. Since that time, the Center has expanded its mission to include biological defense and emerges today as the nation's premier authority on CB defense. Due to the Center's inventiveness, ECBC's reputation and agency relationships remain strong today.

ECBC has full-time employees located at three different sites in the United States: the Edgewood Area of Aberdeen Proving Ground, Mass., Pine Bluff, Ark., and Rock Island, Ill. As a research, development and engineering center under the U.S. Army Research, Development and Engineering Command, ECBC is unique in its ability to advance the mission of the warfighter and other stakeholders by leveraging unique expertise, specialized equipment and state-of-the-art facilities.

Mission

Integrate lifecycle science, engineering and operations solutions to counter CB threats to U.S. Forces and the nation.

Vision

To be the premier resource for CBRNE, uniting and informing the national defense community.

Strategic Goals

Ensure that ECBC sustains and grows the core competencies required to counter enduring and emerging chemical and biological threats.

Create success for warfighter and CBRNE clients by consistently delivering quality customer service.

Grow and develop the workforce to ensure the continued competencies of the organization to meet evolving CBRNE defense needs.

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Chemistry and Biological Sciences

ECBC Receives Federal Laboratory Consortium Award for TAC-BIO

ECBC received an Award for Excellence in Technology Transfer from the Federal Laboratory Consortium for its work on the Tactical-Biological Detector (TAC-BIO) in 2012. The TAC-BIO program resulted in five patents addressing state-of-the-art optics and optical interrogation techniques. It provides a biological agent detector that, when compared to other detectors, costs nearly 10 percent less, is 50 percent smaller, weighs 80 percent less and uses only 4 percent of the energy.

The low-cost, compact TAC-BIO is a biological agent sensor designed by ECBC to rapidly detect the presence of an airborne biological threat, and to provide an early warning to minimize exposure and casualties to U.S. Armed Forces.

Prior to the TAC-BIO, most biological agent detectors used large and costly ultraviolet (UV) lasers to extract optical signals from threat aerosols. However, a shift toward a low-cost detector began in 2002 when the Defense Advanced Research Projects Agency (DARPA) began to develop Semiconductor Ultraviolet Optical Sources (SUVOS), a type of light-emitting diode that could replace UV lasers.

TAC-BIO began with funding from DARPA to explore the potential development of a biological agent detector based on SUVOS technology. Funding from the Defense Threat Reduction Agency (DTRA) allowed ECBC scientists and engineers to advance the design toward a mature, Technology Readiness Level 6 product.

“I’m very proud of the work our Research and Technology Directorate and Engineering Directorate teams have done on the TAC-BIO and the paradigm shift it has driven to low-cost biological agent detectors,” said David Sickenberger, a recently retired ECBC supervisory chemist with the Research and Technology Directorate who led the TAC-BIO team.

ECBC transitioned the TAC-BIO into industry, specifically General Dynamics Armament and Technical Products and Research International, Inc., in 2009 and 2010, respectively. The ECBC Technology Transfer team played an integral role in these transitions by managing the licensing process and engaged a Department of Defense partnership intermediary, TechLink, for resources on publicizing the availability of the system to interested industry organizations.

Work continues to make the product simpler, more durable in all weather conditions and more capable of detecting smaller particle sizes at lower concentrations. Other potential licensees continue to be interested, which will allow for further modification of the TAC-BIO system prior to wide distribution and fielding. ■

Fifth National Bio-Threat Conference Focuses on Solving Real-World Problems

The Fifth National Bio-Threat Conference, a collaborative interagency effort held March 27–29, 2012, provided a forum for dialogue between government, industry, academia and first responders to address critical issues in environmental sampling, bio-detection, clinical diagnostics and biosurveillance.

"What makes this conference stand out from others is its focus to solve real-world problems of service members and emergency responders," said Peter Emanuel, Ph.D., one of the conference organizers and chief of ECBC's BioSciences Division. "Each organization showcased research and technologies that ensure our service members, first responders and laboratory technicians are prepared and well-equipped against emerging biological threats."

According to Emanuel, much of the discussion revolved around biosurveillance, a collection of programs and capabilities that allow experts to recognize an outbreak before it becomes a pandemic.

"For a topic as complex as biosurveillance, it is key to use a multidisciplinary approach, share information and collaborate," he stated. "There is no better place than the Bio-Threat Conference to harness the brightest ideas, because we always have world-class experts from many different disciplines and organizations contribute to leading-edge biological defense solutions."

"ECBC has a long tradition of solving problems for emergency responders," he said. "We've always been a key player in developing smart solutions to counter emerging biological threats."

One of ECBC's closest partners, the Joint Program Executive Office for Chemical and Biological Defense (JPEO-CBD), co-hosted the conference and led multiple discussions that addressed next-generation biosurveillance techniques and improvements.

"This conference was very valuable to what we are trying to accomplish within the Department of Defense," said LTC Jennifer Nicholson, JPEO-CBD director for Biosurveillance Strategic Initiatives. "The biosurveillance mission is very diverse, and therefore it is beneficial to have a wide range of organizations here that look at problems from various angles."

Sponsors and major contributors to this conference included the Department of Homeland Security, the Environmental Protection Agency and the JPEO-CBD's Joint Project Manager (JPM) Biological Defense and JPM Guardian. ■

Senior Scientist Advises NATO Panel on Sensing, Builds International Collaboration Opportunities

Augustus W. Fountain, III, Ph.D., ECBC's senior research scientist for Chemistry, is garnering international recognition for ECBC while helping to advance defense science and technology.

Fountain was appointed in 2009 to serve a three-year term as the U.S. representative at large to the North Atlantic Treaty Organization (NATO) Research and Technology Organization (RTO) Sensors and Electronics Technology Panel. One of just five U.S. representatives to the panel, Fountain advises NATO countries—as well as members of the Partnership for Peace—on technical approaches to CBRNE sensing.

"Participating on the Sensors and Electronics Technology Panel provides a great forum for us to identify international opportunities for collaboration and cooperation," said Fountain.

Fountain serves as the panel mentor for a biological background study that is being led primarily by Norway. "The United States, Canada, Germany and Turkey are participating, and Australia is also involved," he said. "We're about a year into the study, and the group is putting together a report to provide NATO with guidance on the future of biological aerosol sensing." ECBC's Dottie Paterno is the U.S. representative on the study.

Service on the Sensors and Electronics Technology Panel involves semiannual meetings accompanied by frequent virtual communication throughout the year. The meetings concentrate on a theme and involve a technical conference, RTO business and collaboration discussions focused on NATO's technology needs.

"At the fall 2011 meeting, I was asked to write a technology watch paper on graphene-based sensors for chemical sensing," Fountain said. "Technology watch papers focus on topics of interest that help advise NATO on what technology areas they should be monitoring—whether for defensive reasons, their own advantages or new capabilities that a nation is trying to propose."

"This effort is an excellent opportunity for ECBC to be better known as a trusted expert internationally," said Joseph L. Corriveau, Ph.D., director of Research and Technology at ECBC. "I'm very happy that Dr. Fountain is such an integral member of the panel and is building international collaboration." ■

Tsunami Spotlights DTRA Technology Development Supported by ECBC

A catastrophic event spotlighted a technology being developed by the DTRA, ECBC and others that garnered the 2011 DTRA Director's Annual Team Award (Large Team) in recognition of its noteworthy contribution to the agency.

On March 11, 2011, tragedy struck Japan when a massive earthquake-driven tsunami flowed over the Fukushima Daiichi nuclear power plant, causing power outages and dangerous radiation contamination. DTRA received a request for forces from U.S. Pacific Command to conduct airborne radiation detection and monitoring of Fukushima.

The Weapons of Mass Destruction Aerial Collection System (WACS) was one of several U.S. capabilities identified and requested by name by the government of Japan as a potential technology to rapidly and effectively stabilize the situation at the Fukushima Nuclear Power Plant. The system was ready to deploy in only six days.

"WACS is the first all-in-one chemical, biological, radiological and nuclear (CBRN) unmanned aircraft system for locating, intercepting and collecting CBRN materials," said Britt Kelley, Unmanned Aircraft Systems integration manager and WACS program manager at DTRA.

The original chemical collection with real-time chemical detection/identification work was conceived and developed by the ECBC in collaboration with Science Applications International Corporation and Smiths Detection-Watford. ECBC's "rapid prototyping" accelerated engineering and manufacturing ability enabled the team to machine the shell and wing pods that contain the system components in only a few days in response to the Fukushima disaster.

Though ultimately WACS was not employed, the Japanese Minister of Defense personally thanked DTRA during a visit in 2011 for its willingness to provide support in a time of crisis.

The outstanding performance of the WACS system provided the basis for Kelley to initiate a technology transition agreement and proceed with a plan to transition WACS to the U.S. Army. U.S. Forces Korea signed a WACS concept of operations to implement the system into its procedures. ■

Groundbreaking Joint Facility Opens a New Chapter of Shared Resources and Collaboration in Proteomics and Genomics for ECBC and MRICD

ECBC and the U.S. Army Medical Research Institute of Chemical Defense (MRICD) together launched the Proteomics Core Facility in October, an unprecedented shared resource designed to support basic and applied research projects that will apply a broad but integrated biological approach to a wide variety of CBRNE issues.

"Both ECBC and MRICD needed to expand its proteomics and genomics toolsets," said Jennifer Sekowski, Ph.D., diplomate of the American Board of Toxicology, molecular toxicologist and ECBC lead for standing up the Proteomics Core Facility. "Rather than duplicate the capabilities, why not build them in one joint facility? This allows us to more easily share our resources, provide new training opportunities, and expand the amount and type of research we both can do."

Together, the organizations will support the DTRA and Joint Science and Technology Office (JSTO), the National Institutes of Health (NIH) and other sponsored research in the areas of whole genomic sequencing and finishing, whole transcriptome analysis (RNA-Seq), expression analysis and microRNA. With the newly added equipment, ECBC and MRICD can extend their research utilizing mass spectrometry-based proteomics, high content image analysis of cells and tissues and gel-based imaging.

"This revolutionary joint capability is a wonderful illustration of the cooperation and collaboration across the Aberdeen Proving Ground Edgewood campus," said Mr. Joseph Wienand, ECBC's Technical Director. "In this time of fiscal awareness, it is a great example of our nation's leading scientists working together to share resources and save funding while working toward the common goal of the protection of our soldiers and our nation."

Colonel Bruce Schoneboom, MRICD Commander, is excited to see this unique facility officially launch. "The fact that two organizations came together to build a joint capability is a wonderful testament to the true spirit of collaboration in support of common scientific research, and I hope that this serves as a great example for other installations," said Col. Schoneboom. "I am very excited to see the great strides the talented MRICD and ECBC staff will take in proteomics and genomics research."

The initial infrastructure funds to create the Proteomics Core Facility originated from the Office of the Assistant Secretary of Defense for Chemical and Biological Defense, and was augmented by both ECBC and MRICD investments. One key goal is the support of the DTRA/JSTO FY13 Systems Biology programs, which are aimed at toxicological target discovery. ■

Chemical, Biological, Radiological, Nuclear and Explosives Analysis and Testing

ECBC Improves Chemical Detectors through M3TD Program

In 2012, ECBC provided leadership for the Multi-Mission Multi-Threat Detection (M3TD) program—one that will benefit the warfighter by improving the performance of chemical agent detectors.

Funded by the Joint Project Manager for Nuclear, Biological and Chemical Contamination Avoidance (JPM NBC CA), the M3TD program provides multiple chemical agent detector companies an opportunity to utilize ECBC expertise and laboratories to test their detectors against a broad range of chemical challenges. It also helps improve the industrial knowledge base and assess the technical maturity of systems designed to detect and identify chemical warfare agents and emerging threat compounds. The M3TD program supports the analysis of alternatives for the Next Generation Chemical Detector (NGCD), and will assist in NGCD's goal of improving upon the detection and identification of emerging threats.

"The M3TD program provides an opportunity for a large number of companies that develop chemical agent detectors to enhance their technical knowledge base, and update and improve their technologies toward emerging threats," said ECBC chemist Roderick Fry, Ph.D.

The program was a multi-directorate effort within ECBC, and required cooperation amongst the Center's Engineering (ENG), Program Integration (DPI) and Research and Technology (R&T) directorates. For example, detector expertise and laboratory operations were provided by the ENG and R&T Directorates; technical reach back to R&T was required for the basic science and technology data on emerging threat compounds; R&T's Technology Evaluation Branch was the independent evaluator/assessor for the testing; and DPI was heavily involved in safety, surety, security and environmental support leading up to the testing phases of the program.

Nineteen different detectors were purchased by JPM NBC CA from 16 different companies that are participating in the M3TD program. The program has two test phases —data collection and technology assessment. Since ECBC completed the data collection stage at the end of the 2012 fiscal year, the companies that developed the detector now have the opportunity to add the data to their detector libraries and improve their algorithms to better identify a broad spectrum of threats. The detectors will then be evaluated by JPM NBC CA for technical and performance maturity in the technology assessment phase of the program. ■

Test Division Branches Increase Efficiency for Customers

ECBC's Permeation and Analytical Solutions Branch (PASB), Protective Equipment Test Branch (PETB) and Test, Reliability and Evaluation Branch (TREB) have teamed up to create a process to reduce costs for their customers.

"These three test branches are coming together to build one repository of information and become a one-stop shop for [ECBC] customers," said Brian MacIver, PASB branch chief.

The idea for this teamwork came in 2010 when the Tank Automotive Command-funded Joint Equipment Assessment Program, now called Joint Program Executive Office for CB Defense Enterprise Fielding & Surveillance (JEFS) Directorate, customer approached the three Engineering Directorate test branches for support. At that time there was no established method for collecting and co-locating data that could be quickly accessed to ensure systems were working correctly and data was accurate. Given this, the branches embarked on a plan to make it easier for the customer to establish procedures, deliver test items and obtain data.

Today, the branches now share detailed information about project progress via the Center's intranet—CBConnect. Workbooks are also being created internally to evolve data processing, so that thousands of data points can be systematically sorted to give the operator quick reference on whether systems are functioning properly.

In order for the process to be successful, a structure incorporating skill sets from the different branches was also established in which an overarching branch chief will oversee the entire process and a test administrator will add uniformity to the data being entered.

Additionally, the branches continually assess and upgrade infrastructure to provide new test capability. For example, the PETB has added new chemical fume hoods and upgraded carbon test fixtures to handle a variety of new chemical compounds, including toxic industrial chemicals and materials. "These new testing systems will allow us to…increase our accuracy and test capacity," said Jonathan Grzeika, a chemist with PETB.

The focus is to increase the customer base by being more competitive through responsiveness; being more competitive means reducing costs to the customer and maintaining the precision and quality of the product.

"Working together will provide a consolidated analysis training program, drive down costs, provide timely and uniform reporting and increase our efficiencies," MacIver concluded. ■

Dismounted Reconnaissance Sets, Kits, and Outfits Help Warfighters Assess Chemical Biological Threats

Imagine a team of soldiers or Marines conducting a sensitive site assessment of a dilapidated chemical factory in the Middle East. The site may contain unknown Toxic Industrial Chemicals (TICs) or possible precursors to chemical or biological agents. Or perhaps a team of sailors are required to board and search a non-descript Mediterranean fishing vessel at sea and discover clandestine laboratory equipment. Today these warflighters have limited capability to assess these threats. In the future, these same service members will use the enhanced capabilities provided by the Dismounted Reconnaissance Sets, Kits, and Outfits (DR SKO).

When fielded, the DR SKO will provide a dismounted reconnaissance system with enhanced CBRN defense capability for all military services, packaged in modular cases and shipping containers. The system can meet any Warfighter configuration required.

The U.S. Army DR SKO Project Management Team located at ECBC will deliver 444 DR SKO systems to joint warfighters. The team works under the JPM NBC CA.

“Our system provides a modular baseline suite of modern detection, identification, and protection equipment to support the ever changing threat environment, especially for toxic industrial hazards,” said Edward Conley, DR SKO system manager.

Identifying user requirements included identifying test requirements. Connie Wolf, test manager, emphasized that the DR SKO program thrives due to the team cohesiveness and collaboration with the stakeholders.

“An upfront relationship with the independent evaluators, such as the Army Test and Evaluation Command is essential to a successful test and evaluation program,” Wolf said.

Marines and sailors had the opportunity to assess the system during operational assessments at Fort Hood, Texas and Moyock, N.C.

The production and development phase is planned for Fiscal Year 2014 during which the first unit fielding is scheduled. Fielding DR SKO will help close the capability gap by delivering significantly enhanced, government verified, full-spectrum CBRN dismounted reconnaissance equipment adapted for employment by each service. ■

Chemical, Biological, Radiological, Nuclear and Explosives Materiel Acquisition

Hard to Fit? ECBC has the Easy Solution

When it comes to masks and special equipment for the Warfighter, one size does not always fit all. Some servicemen and women need custom tailored clothing and equipment, and not having that equipment can cost opportunities and even jobs. Cindy Learn, an engineer with ECBC Protection Engineering Division's Joint Service Respirator Sustainment and Test Technology Branch, recalls comforting a distraught servicewoman over the phone when her deployment was in jeopardy because of an ill-fitting mask.

"The standard protective mask did not fit the small frame of her face," Learn said. "A warfighter cannot be deployed without a mask that fits properly and securely to the face."

Thanks to the Hard to Fit program, rejuvenated by Learn and others in her branch, that same servicewoman was able to obtain a protective mask specially adjusted to fit her face just in time for deployment.

"I remember her being so grateful we were able to help her get the right mask," Learn said. "Many do not realize there are infinite different shapes and sizes of faces, and having a protective mask that fits well is essential to any deployable mission. Not being able to get your hands on the right fitting mask could be a career ender for some."

With a team motto of "No warfighter left behind," members of the Hard to Fit Program make it their mission to ensure all deployable personnel have the correct-sized mask. Hard to Fit is a an Army G-8 funded program housed within ECBC's Protection Engineering Division. The program fits members of the Army, Navy and Marine Corps, as well as civilians who have mask requirements for their jobs.

According to Learn, the group fit 100 people in 2011 and 47 in 2012.

"We have issued only one Non-Deployable Memorandum since I started working with this program in 2006. We do our best to attain the mask with the best fit for those who need them."

The process of fitting and ordering the needed sizes usually takes two to three weeks, but the group is working to accelerate the process. Once a person obtains their mask from Hard to Fit, it is theirs to keep for life. ■

BioTechnology Branch Recognized by DoD for Standardization Efforts

ECBC's BioTechnology Branch was recognized for developing and validating an Antibody Quality Management System by the Deputy Assistant Secretary of Defense for Systems Engineering and received one of five 2012 Defense Standardization Awards at a Pentagon awards ceremony on March 14, 2012.

Antibodies that are able to recognize and bind specific biological entities, such as bacteria, viruses and toxins play a key role in biological agent detection and diagnostic devices for the DoD. The effectiveness of an antibody in a given assay platform critically depends on whether its biophysical properties are within well-defined parameters that equate to its predicted function.

Now, U.S. Army scientists have established a standard for characterizing the biophysical properties of antibodies. The BioTechnology Branch, in support of the DoD JPEO-CRP, has implemented an Antibody Quality Management System that has received ISO 17025:2005 certification for analyzing the biophysical properties of antibodies that enable program managers to make early decisions in accepting or rejecting antibody production lots.

"The biggest challenge we faced in implementing our Antibody Quality Management System," said Roy Thompson, BioTechnology Branch chief and quality program champion, "was training the mind-set of research scientists to enthusiastically focus on the exacting day-to-day requirements for documentation and accurate record-keeping an ISO-certified Quality Management System requires."

With the Antibody Quality Management System in place, there is significantly more certainty in trusting the results of antibody-based detection and diagnostic assays and less worry that negative assays are due to unreactive antibodies.

At $100 per milligram replacement cost, remanufacturing just one gram of antibody due to quality issues costs the DoD CRP $100K. With inventory volumes commonly exceeding 5 grams (5000 milligrams) per antibody, and the CRP selling antibodies for $600–$700 per milligram, the market value of the CRP inventory easily exceeds hundreds of millions of dollars.

The value of the BioTechnology Branch's Antibody Quality Management System and standardization of testing has also been recognized by others for its added value. The DARPA selected the BioTechnology Branch as its independent test laboratory to evaluate methods for improving antibody stability and affinity in its Antibody Technology Program, and the Defense Threat Reduction Agency-Joint Science and Technology Office has provided additional funding for developing new methods for physically characterizing antibodies and other proteins. ■

ECBC Industrial Base Office and AMC Industrial Base Capabilities Division Form Strategic Partnership

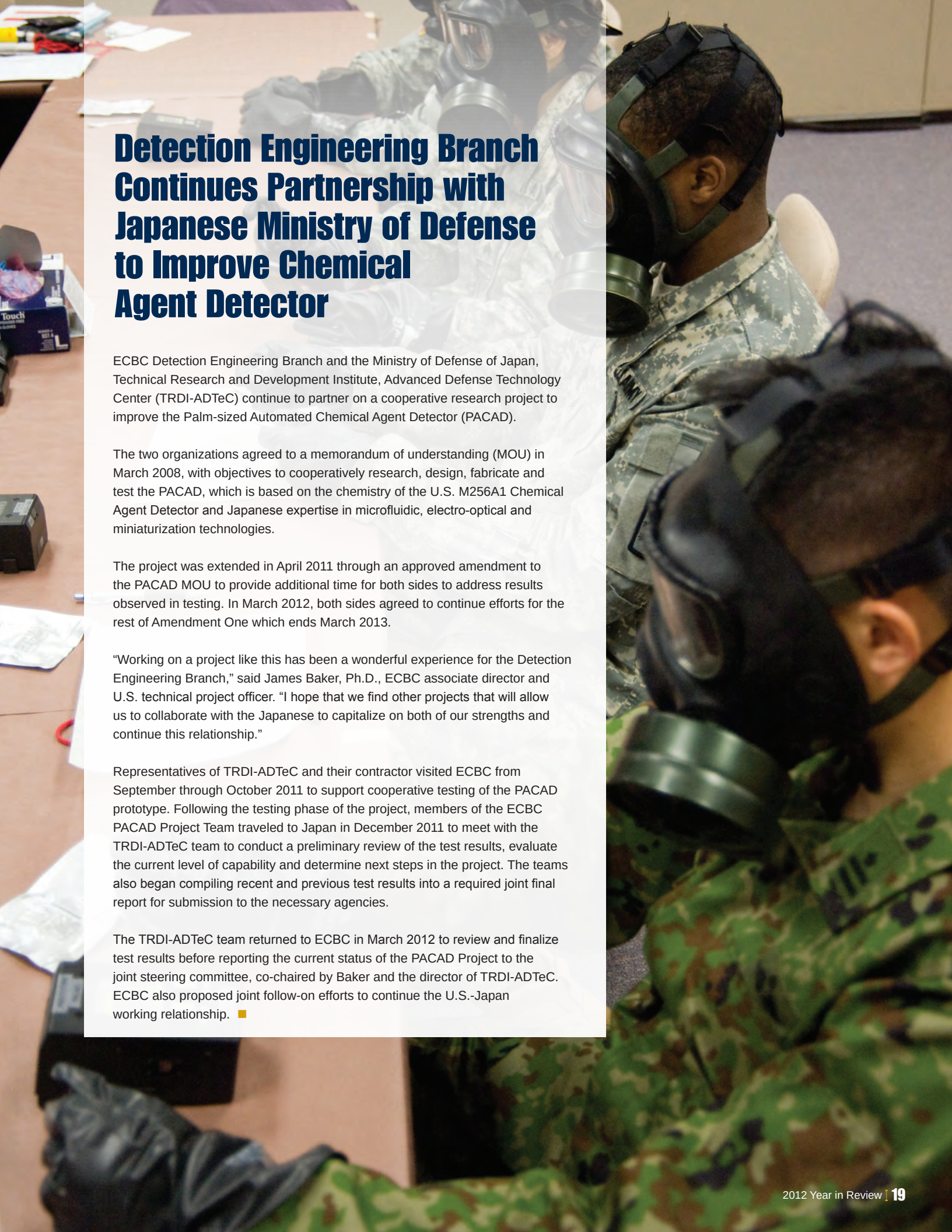
Large-scale emergencies have the potential to interfere with the sustainment of the U.S. Army Industrial Base Program (IB). However, thanks to a recent partnership between the ECBC Industrial Base Office (IBO) and the U.S. Army Materiel Command's (AMC) Industrial Base Capabilities Division (IBCD), the Army IB Program will remain functional despite the occurrence of unforeseen disasters. As a part of this new partnership, the ECBC IBO—located at Rock Island Arsenal—now serves as a second line to AMC, providing mission-critical functions in the event of an emergency that downgrades AMC IBCD's ability to provide program sustainment.

The Continuity of Operations Plan (COOP) is activated when any unplanned event or emergency directly impacts the ability of the AMC IBCD to execute the Army's IB Program. AMC IBCD and ECBC IBO's relationship began five years ago with a memorandum of agreement (MOA) designating ECBC IBO as an internal branch of AMC IBCD that assists with the management of tasks, project plans and assessments. The synergy and customer support produced from this interagency MOA influenced AMC IBCD in January 2012 to designate ECBC IBO as the COOP Alternative Activity for the Army's IB Program.

"In today's information intensive environment, it is critical to have backup plans to ensure seamless program operation and sustainment," said Eric Hoover, ECBC IB team leader. "The COOP MOA provides this function not only between AMC IBCD and ECBC IBO but also to other internal and external customers."

The resulting COOP MOA provides a business process between the two agencies, ensuring that mission-critical functions are performed by ECBC IBO in the event of a disaster impacting Headquarters, AMC. The scope of the MOA encompasses ll actions required for continuity of operations to include joint planning, preparatory measures, response actions, and restoration activities to maintain industrial base capabilities, U.S. Army readiness and survivability of the warfighter.

"The selection of ECBC IBO was not only a great tribute to the hard work of our staff, but also a reflection of our customer's appreciation and trust for the excellent services provided," said Hoover. ■



Detection Engineering Branch Continues Partnership with Japanese Ministry of Defense to Improve Chemical Agent Detector

ECBC Detection Engineering Branch and the Ministry of Defense of Japan, Technical Research and Development Institute, Advanced Defense Technology Center (TRDI-ADTeC) continue to partner on a cooperative research project to improve the Palm-sized Automated Chemical Agent Detector (PACAD).

The two organizations agreed to a memorandum of understanding (MOU) in March 2008, with objectives to cooperatively research, design, fabricate and test the PACAD, which is based on the chemistry of the U.S. M256A1 Chemical Agent Detector and Japanese expertise in microfluidic, electro-optical and miniaturization technologies.

The project was extended in April 2011 through an approved amendment to the PACAD MOU to provide additional time for both sides to address results observed in testing. In March 2012, both sides agreed to continue efforts for the rest of Amendment One which ends March 2013.

“Working on a project like this has been a wonderful experience for the Detection Engineering Branch,” said James Baker, Ph.D., ECBC associate director and U.S. technical project officer. “I hope that we find other projects that will allow us to collaborate with the Japanese to capitalize on both of our strengths and continue this relationship.”

Representatives of TRDI-ADTeC and their contractor visited ECBC from September through October 2011 to support cooperative testing of the PACAD prototype. Following the testing phase of the project, members of the ECBC PACAD Project Team traveled to Japan in December 2011 to meet with the TRDI-ADTeC team to conduct a preliminary review of the test results, evaluate the current level of capability and determine next steps in the project. The teams also began compiling recent and previous test results into a required joint final report for submission to the necessary agencies.

The TRDI-ADTeC team returned to ECBC in March 2012 to review and finalize test results before reporting the current status of the PACAD Project to the joint steering committee, co-chaired by Baker and the director of TRDI-ADTeC. ECBC also proposed joint follow-on efforts to continue the U.S.-Japan working relationship. ■

Employees Sustain Growth of Product Integration Facility at Bagram Airfield, Afghanistan

ECBC not only creates equipment for the warfighter at home in the United States; ECBC employees are also deploying to Bagram Airfield, Afghanistan, to offer technical assistance in theater. Warfighters can bring any equipment with which they are having technical issues with to the Center's specialized Product Integration Facilities (PIF) where ECBC employees will troubleshoot and correct issues. The Center's efforts are part of the U.S. Army Research, Development and Engineering Command (RDECOM) Field Assistance Science and Technology (RFAST) program.

This RFAST program deploys civilian engineers and technicians to Bagram Airfield for three to six months to give the warfighter face-to-face assistance with all technical equipment needs. The program's mission is to streamline communication between the warfighter and the technical professionals to troubleshoot issues with equipment. The technicians and engineers stationed abroad can examine equipment, identify capability gaps and work directly with the warfighter to develop working solutions efficiently.

ECBC's Advanced Design and Manufacturing Division (ADM) assisted with the setup of the Afghanistan PIF, and along with other RDECOM organizations, supported personnel members' day-to-day functions. Together, engineers and technicians work closely with the Joint Program Office (JPO) for Mine Resistant Ambush Protection, the Program Manager for Forward Looking Infrared, the Program Manager for Tactical Vehicles and the Program Manager for Assured Mobility Systems to find on-the-spot solutions.

Kevin Washok of ADM helped set up the RFAST program at Bagram Airfield in Summer 2011. Some of the initial responsibilities of organizing the PIF included determining what services the Bagram site would offer and how the RFAST mission would work in Afghanistan, including coordination with continental United States resources such as the RDECOM PIFs, program managers and ECBC's safety community. Andrew Cote of ECBC's Safety and Health Office helped Washok establish a safety program at Bagram modeled after ECBC's Safety Program.

"Having ECBC engineers and technicians stationed abroad gives warfighters the advantage of having their needs quickly met, and gives the technical workers immediate insight and ideas on how to improve the equipment they build," Washok said.

In Summer 2012, ADM deployed its fifth engineer to the RFAST program with more to follow. ■

Science and Technology for Emerging Threats

Engineers Collaborate to Create Mobile Device-Powered Training Options for the Warfighter

The mobile application: teachers use it to instruct, football players study their plays on it and now soldiers can use it as an inclusive device for training refreshers, an easy-to-carry installation manual and more.

"The Department of the Army and Army customers are looking to increase use of mobile devices for warfighters," said COL Raymond Compton, formerly ECBC's military deputy. "On one small mobile device, a warfighter [can have] a full library of information…to support a device or even to support the operation of a full vehicle."

ECBC's Advanced Design and Manufacturing Division's Conceptual Modeling and Animation Branch, Technology and Systems Integration Branch and Engineering Drawing Development Branch have partnered to meet this desire by creating two mobile applications—one for the Husky Mounted Detection System Surrogate (HMDSS) and another for the Mobile Counter Improvised Explosives Device Training (MCIT).

Both mobile applications were handed over to the Joint Improvised Explosives Device Defeat Organization (JIEDDO) in 2012. The HMDSS application allows warfighters to practice operating a Husky vehicle on an improvised explosives device routing mission without needing to utilize real equipment. The MCIT application allows warfighters to participate in an interactive training that is otherwise only conducted in trailers in select geographic locations.

The mobile application do not replace actual training, but supplement it. "Maybe it's been a few months between the in-person training and a warfighter is about to operate the vehicle again and needs a quick reminder—a real-life vehicle may not be available, so the warfighter can train from wherever he is on an iPad," Conceptual Modeling and Animation Branch Chief Jeff Warwick, explained.

The HMDSS and MCIT are continental United States devices intended to be used by soldiers directly. The HMDSS mobile application will be delivered by JIEDDO to support locations where HMDSS vehicles are being used for training. The MCIT is being used as both a marketing tool for the system by JIEDDO as well as a direct informative device by soldiers on various bases. ■

Center Improves Usability of Homemade Explosive Kit Detector

In less than two months' time, ECBC's Innovative Development Engineering Acquisitions (IDEA) Team and Advanced Design and Manufacturing Division's Engineering Design and Manufacturing Team created a new model of a homemade explosives kit detector, the Colorimetric Reconnaissance Explosive Squad Screening (CRESS) detector.

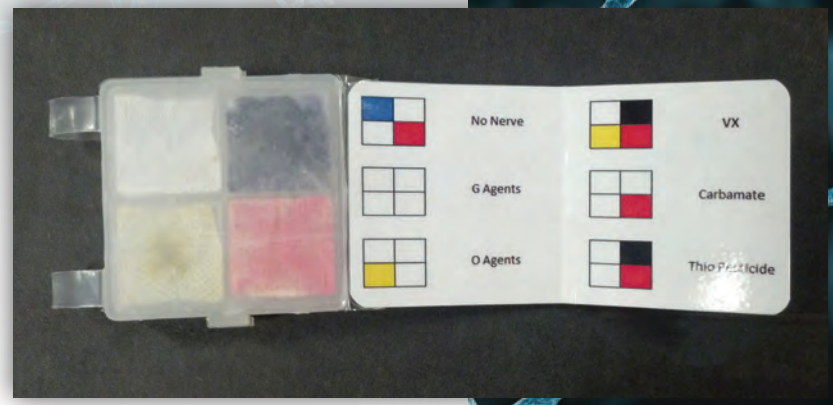
Initially funded by the U.S. Army under the objective of detecting unknown bulk explosives, the CRESS Kit is a pocket-sized detector that uses colorimetric technology to identify unsophisticated, homemade substances, such as ammonium nitrate, commonly used in improvised explosives overseas.

The CRESS Kit has two plastic halves that fold together and click into place. One half is a sticky paper used for collecting samples and the other side contains tubes filled with the colorimetric substance. Once folded together, the two halves crush the tubes which allow the technology to identify the substance, whether or not it is part of a harmful mixture, in approximately 30 seconds.

The new model adjusts how the ampoules are activated, and improves the device's overall usability and intuitive design. It also contains diluted forms of the chemicals frequently used by warfighters from which they can test the CRESS Kit. Additionally, the teams are working to implement edits to the device's user manual. Rather than reading dense lines of directions in fine print, easy-to-follow pictorial directions will be used that can be readily understood by the end-user.

"The old directions were 20 lines long and in small print," said James Genovese, chief of the IDEA Team. "When a warfighter is in an emergency and needs to learn how to use something, there may not always be time to stand and read through every little thing. These new picture directions will enable the warfighter to easily glance down at the manual, learn how to use the device and proceed with testing the substance. Results need to happen quick and fast in theater, so we want to make it as easy as possible." ■

Inventors Pave Way for Enhanced Nerve Agent Detection, Awarded Patent



ECBC's James Genovese, leader of the Innovative Development Acquisition Team; Robin Matthews, co-inventor and member of the Applied Detection Technology Team; and Science Applications International Corporation contractor Kwok Ong were awarded an official patent for their latest accomplishment, the Rapid Agent Identification of Nerve Agent detector (RAIDON).

The new technology bridges a capability gap in the world of chemical detection by supplementing currently fielded, tactical chemical detection devices. It permits quick discrimination between classes of nerve agents in the field environment once they are identified.

Currently, a device called the M256A1 Kit is used across the (DoD) to provide a chemical vapor detection capability at low cost, with minimal training and without the need for a power source. An improved version, the M256A2 Kit, entered production in Fiscal Year 2010 to provide a standard detection method for low-volatility solid and liquid agents in the field.

"The RAIDON provides the nerve agent classification information lacking in the existing kits by leveraging the field-proven technology and form/function of the M256A1 Kit," said Genovese. "Once the M256A1 shows nerve agent identification, tactical users can then quickly identify and discriminate nerve agent types in the field without having to use sophisticated detectors."

The inventor trio work on the RAIDON began in 2005 when Genovese recognized a requirement and growing need in both the medical and intelligence communities for identifying the speciation of nerve agents. Fielding a detector that is capable of expedient discrimination of nerve agent classes in theater permits more effective medical responses and protective measures tailored to the detected agent's characteristics.

This detector is small and simple to use. It is inexpensive with no power requirements and is configured so the warfighter can easily carry it in an available pouch. The kit employs a simple color-producing reaction similar to the M256A2 Chemical Agent Detector.

"It is simple and gets the capability to the warfighter. We are not afraid to try creative and retro methods," Matthews said. ■

Chemical Biological Handling and Surety

COBRA Training Facility Provides Emergency Responders Valuable ChemBio Education

ECBC participates in a unique collaboration that aids in protecting citizens nationwide by training civilian emergency responders at the Center for Domestic Preparedness (CDP) in Anniston, Ala.

The CDP began operations in 1998, originally under the Department of Justice (DOJ) and then became a part of the Department of Homeland Security (DHS) upon its inception. While remaining in the DHS, the CDP currently resides under the Federal Emergency Management Agency (FEMA). The COBRA training facility is the only place in the nation where civilian emergency responders can train in a chemical environment using the nerve agents GB and VX.

CDP training is fully funded by DHS for state, local and tribal responders. To date, through both resident and nonresident training, more than 712,000 responders from every state and several countries abroad have been trained to respond, manage and cleanup in the case of a CBRNE attack.

ECBC supports the mission of the COBRA training facility through an interagency agreement between DHS and the Army Materiel Command the major command under which ECBC falls. This includes providing an onsite liaison with the CDP who can aid in military equipment procurement, technical expertise in chemical and biological warfare and work to establish a standards program to help the CDP operate the surety program under a code of safety.

The CDP's training programs and facility upgrades continue to provide the very best in advanced hands-on training for America's emergency responders. Keeping current with emerging threats, ECBC recently assisted CDP with integrating non-pathogenic biological materials into the COBRA training facility and updating facilities to provide a more realistic training environment.

"It's been an honor to share in the success of CDP expanding their training program to include non-pathogenic biological materials and further enhance the training available to first responders throughout the nation," said Jennifer Sollenberger, acting Safety and Health Manager. ■

Photo Credit | FEMA

Beyond Chemical, Biological, Radiological, Nuclear and Explosives

Center Forms Technology Commercialization Partnership with Allied Minds Federal Innovations

In Spring 2012, as part of a move to more efficiently commercialize laboratory-produced technologies and services, ECBC partnered with Allied Minds Federal Innovations, Inc. (AMFI).

The new ECBC-AMFI partnership is among the first to respond to President Barack Obama's October 2011 memorandum challenging federal laboratories to accelerate their transfer of technology to other institutions for the purpose of improving economic growth and the global competitiveness of U.S. industries.

By leveraging technologies from ECBC's intellectual property (IP) portfolio for multiple commercial applications, the cooperative research and development agreement (CRADA) between ECBC and AMFI goes beyond the norm. For IP, the norm is traditionally meant to connect government agencies with private companies to develop only a single product or service.

"The intellectual output of more than 200 U.S. government research labs represents an under-utilized national asset," said Chris Silva, AMFI chief executive officer. "Unlocking the commercial value of intellectual property through our relationship with ECBC will result in the creation of companies, job opportunities and a stronger, more competitive U.S. economy."

The CRADA aims to create start-up businesses or multi-use products and services. To do so, the partners are hosting a series of product development and commercialization sessions that will assess the marketability and adaptability of ECBC inventions. Once identified as viable—through the financial backing and management expertise of AMFI—the technologies will proceed for further research, development and commercialization.

"By partnering with AMFI, the Center is now poised to help improve the commercialization of critical technologies and to potentially stimulate our nation's economy," said ECBC Technical Director Joseph D. Wienand.

The first product selected by the partners for development is a sensor originally designed to recognize biological pathogens from safe distances, but could also be adapted to help characterize the environment or measure pollution. This "bio-sensor" illustrates how the partnership will merge ECBC IP with AMFI marketing know-how to generate inventions that have potential to impact not only the warfighter but the U.S. economy as a whole.

ECBC and AMFI marked the start of their five-year CRADA in a ceremony at Aberdeen Proving Ground (APG), Md., April 2012. ■

ECBC Transitions to New Financial System

In April 2012, ECBC began its transition to the General Fund Enterprise Business System (GFEBS) the Army's new financial and cost accounting system.

GFEBS is a web-enabled resource planning system that will allow ECBC to share financial, asset and accounting data across the Army.

Since April, ECBC has transitioned, or created, more than 5,000 Work Breakdown Structures (WBS), or charge accounts, under GFEBS. This accounted for about $250 million managed by 306 account users. Some of these were accounts used in the previous accounting system, others were newly developed accounts.

"In September, we had also successfully placed in GFEBS all accounting transactions for credit cards, travel, contracts and payroll," ECBC's Chief Financial Officer Justin Johnson stated. "By October 2012, all accounting transactions Center-wide were being carried out using GFEBS."

Once completed, GFEBS will be one of the world's largest enterprise financial systems, managing approximately $140 billion in spending by both the Army's Active and Reserve components.

"This is a great step forward in putting into place an Army-wide single source accounting tool," Johnson explained. "This system greatly enhances our ability to conduct business on a day-to-day basis. It provides ECBC users and employees better tools, and resources to manage costs associated with ECBC resources, projects, facilities and personnel.

For the first time, the Army will have a single authoritative source for financial and related non-financial data for its entire general fund. The system will standardize transactional input and business processes across the Army to enable cost management activities; provide accurate, reliable, and real-time data; and tie budgets to execution. ■

ECBC Partners with University of Delaware to Improve Care for Wounded Warriors and Civilians

In early 2012, ECBC and the University of Delaware (UD) entered into a cooperative research and development agreement (CRADA) to collaborate on an orthopedic rehabilitation project that will improve care for wounded warriors and civilians.

The joint project will generate personalized rehabilitation devices (orthopedic braces) for wounded warriors who receive treatment at DoD and Department of Veterans Affairs (DVA) medical treatment facilities, as well as for civilians.

"We are very pleased and honored to collaborate with the University of Delaware on this project," said Kevin Wallace, chief of the Technology and Systems Integration Branch of the Center's ADM Division, who has spearheaded the initiative. "Combining the expertise of their staff with our rapid manufacturing facilities and expertise made sense. It is one more way we can support the warfighter and concurrently support the civilian population as well."

To accomplish this, ADM and the University's College of Health Sciences are working together to create virtual prototype modeling processes and rapid-manufacturing methods leading to the fabrication of personalized orthopedic braces for lower-limb rehabilitation.

The ECBC-UD partnership was sparked after faculty member Steven Stanhope, Ph.D., of the UD College of Health Sciences research team, remembered a visit he had made to ECBC's ADM Division when he directed the National Institutes of Health Biomechanics Laboratory. He recalled ADM's rapid-prototyping and free-form fabrication capabilities, and immediately considered ECBC for the project.

The process of free-form fabrication uses a laser and plastic powder to build a custom model. Each piece is based from a computer-aided design reflecting the cross sections of the final piece. This process allows not only for a custom-fit piece, but drives the cost of a handmade brace down from approximately $15,000 a pair to $3,000 to $4,000 a pair.

"The CRADA between University of Delaware and ECBC unites remarkable capabilities in rehabilitation science with cutting-edge technologies in free-form rapid manufacturing," said Stanhope. "Realizing that wounded warriors will benefit from this joint effort is especially exciting and truly rewarding." ■

ECBC Empowers Teachers to Develop Highly-skilled STEM Talent for Future Jobs

With the recent completion of the Base Realignment and Closure Commission Plan at APG, Md., the installation has turned into a much larger technology hub for the Army's research, development, testing and evaluation mission. To ensure there are enough technically skilled workers to meet future APG requirements, senior leaders at ECBC are dedicated to developing a future science, technology, engineering and math (STEM) talent pool capable of delivering innovative solutions.

Aiming to enrich kindergarten through 12th-grade STEM curricula and competitions with meaningful experiences, more than 200 ECBC subject matter experts (SMEs) engaged with nearly 1,000 educators and more than 9,000 students as mentors, career fair exhibitors, guest speakers, project judges, "scientists in the classroom" and curriculum advisors.

During 2011–12, the main focus of ECBC's educational outreach efforts was to help math and science teachers meet their goals in the classroom. The Center's "Adopt-a-SME Program" allowed them to tap the expertise of U.S. Army scientists and engineers, who work on some of the most cutting-edge solutions against potential chemical and biological threats.

With funding from the National Defense Education Program (NDEP), ECBC scientists and engineers trained teachers from Cecil County on a digital 3D math learning tool as well as a Math Sports and Math Forensics module to help enhance STEM lessons, and ultimately pique students' interest in science and math.

To spark students' interest for STEM disciplines in their earliest stages, NDEP sponsored ECBC employees to support elementary school teachers in Harford County with the implementation of the Engineering is Elementary program. SMEs at the Center developed and conducted hands-on STEM activities that challenged elementary students to solve a problem by applying the engineering process. Such activities included building walls, experimenting with earthworms and developing alarm systems.

In addition, ECBC partnered with the Defense Threat Reduction Agency's Joint Science and Technology Office to launch the inaugural Joint Science and Technology Institute that immersed 6 teachers and 23 students in real-world science and engineering projects.

Going forward, the Center aims to expand its STEM outreach collaboration with organizations across the defense and intelligence community. ■

Developmental Opportunities Elevate ECBC Workforce

People are ECBC's greatest operational asset, bringing innovative ideas and creative problem solving strategies to the forefront of the Center's mission to combat emerging CB threats for the nation.

ECBC's Workforce Management Office (WMO) offers numerous programs for employees from mentoring and mid-level career development to leadership cohorts and executive trainee opportunities.

"When we invest in our employees, we invest in the future of the Center. Developing leadership skills across the Center not only encourages cross-collaboration but expands networking opportunities for personnel," said Mary Martinez, WMO chief.

The Executive Trainee Program gives qualified applicants a six month experience working for the Office of the Technical Director before spending another six months at the Pentagon. Serving as a senior technical expert and action officer, trainees review technical documents, exploit advances in science and technology, and engage subject matter experts with suggestions on how to improve the Center's CB Defense and Chemical Demilitarization mission.

Mike Palko, an executive officer in the program, applauded the all-encompassing experience as a way to better understand the Center's strategic planning and its relationship with RDECOM headquarters.

"It's one of those experiences where you get to see everything across the center: what we do, who does it and where we do it. It's a great way to get visibility on all the great work ECBC is doing in the CB defense community to support the Warfighter," said Palko.

With a specialized workforce of 1,198 civilian employees, more than half have advanced degrees, including 312 who hold a doctorate or master's. ECBC taps into its talent pool by offering a Mentoring Program that builds a strong workforce infrastructure able to sustain change as the Center works to counter evolving CB threats to U.S. forces and the nation.

Jennifer Sollenberger, acting Safety and Health Office manager, was a mentee in the 2003 and mentor in 2012, where she provided guidance to a lower-level employee exploring possible career paths.

"As a mentor one of my biggest achievements is having that relationship with my mentee," said Sollenberger. "It really shows how leadership is supportive of employees and they do want them to improve and grow." ■

Chemical, Biological, Radiological, Nuclear and Explosives Munitions and Field Operations

A Year of Successful Support in Australia

ECBC's CB Applications and Risk Reductions (CBARR) Business Unit's commitment to global chemical and biological operational support has brought CBARR to two sites in Australia in support of the Australian Department of Defence (ADoD)—the former Columboola Depot and Defence Site Maribyrnong (DSM). Collaborative relationships under multiple CRADA were established with various Australian firms in order to execute the missions.

Beginning in December 2009, the CBARR team supported the ADoD at Columboola, Queensland. The Columboola project took more than two years to complete and had several phases.

"The CBARR team has diligently put in months worth of work away from their families in support of the Australian government's mission to eliminate chemical hazards in their country," said Timothy Blades, deputy director of ECBC's Directorate of Program Intergration and CBARR Operations Director.

Initially, 144 munitions previously unearthed at Columboola were identified as artillery shells containing mustard agent. CBARR worked with the U.S. Army Chemical Materials Agency to support munitions assessment in preparation of destruction. A subsequent deployment by CBARR destroyed the munitions using an Explosive Destruction Technology from February to May 2011.

Near the end of the investigative survey a 100-pound bomb was discovered, which previously contained mustard agent. Luckily, it was determined to only contain residual contamination and the CBARR team successfully decontaminated the contents prior to final site demobilization.

As summer ended, CBARR concluded their work at Columboola and moved on to their second project—DSM, located near Melbourne.

In September 2012, ECBC's CBARR team began performing an assessment and investigation of the DSM site used by the Defence Science Technology Office (DSTO). The DSTO previously operated out of 44 buildings for approximately 50 years with chemical agent laboratories supporting the research and development chemical warfare agent and related materials. These buildings are no longer operational and must be rendered safe.

The ECBC CBARR team will be working with the ADoD and Organisation for the Prohibition of Chemical Weapons, while partnering with Golder Associates to complete the assessment and ultimate decomissioning of the former laboratories through the winter of 2013.

"ECBC offers the ADoD professional staff and state-of-the-art equipment to safely and effectively perform agent operations making not just their country safer, but the entire world," Blades said. ■

CBARR Surpasses Customer Expectations

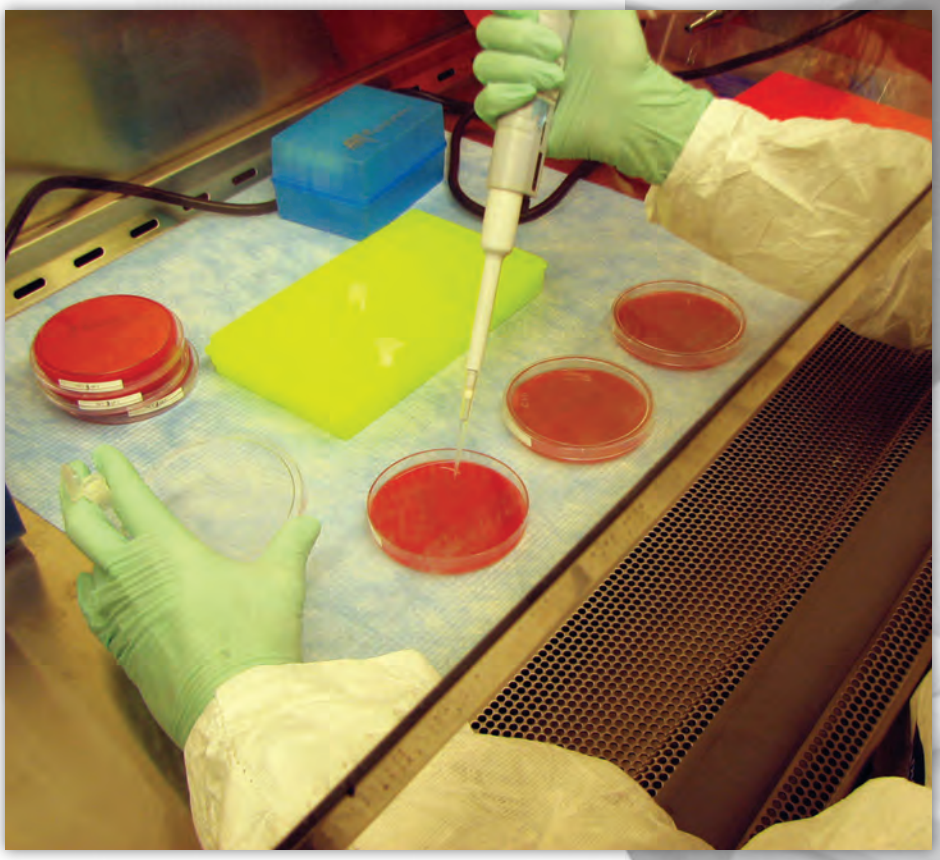
The CBARR Business Unit epitomizes why the ECBC is able to meet the needs of customers while surpassing expectations: Teamwork.

Drawing resources from the Center's R&T Directorate and Engineering Directorate, the DPI, under which CBARR falls, utilized talented in-house scientists and engineers to collaboratively support test efforts to evaluate the efficiency of biological decontamination products on hardened military equipment. The Joint Project Manager Protection (JPMP) awarded the project to CBARR, who provided the customer with test results that will be used to successfully identify the general purpose decontaminants that meet their needs for moving forward with the acquisition process.

"The success is in the great teamwork. While the testing is ongoing, ECBC has consolidated and fortified the Center's potential for future biological decontamination efficacy work. It's a win-win for all," said Deborah Menking, CBARR project manager.

ECBC provides customers with unparalleled expertise that stretches across three directorates, offering integrated CB solutions in a safe, secure and environmentally sound manner. For the JPMP project, the Engineering Directorate manufactured the test bed materials while R&T produced and tested the Vaccinia virus. DPI was then able to perform the biological efficacy decontamination testing for the bacterial spore and vegetative cell.

In order to accomplish customer goals, the Center designed test procedures and methodologies for the decontamination of five vendor products using three biological microorganisms—*B. anthracis, Pantoea agglomerans* vegetative cell and Vaccinia virus Western Reserve—to test on five military-relevant materials. Challenge amounts of biological agent were dispensed onto the test bed materials and decontaminated, followed by extraction and a quantitative analysis comparing the pre-and post-contamination levels on the materials. These test methods and protocols were also verified and validated by previous CBARR work.



"ECBC offers a seamless beginning-to-end process for any kind of CB research, development and analysis. We have the capability to conduct research and turn our results into a practical, life-saving solution for the warfighter," said Menking. ■

CBARR supports Albanian Armed Forces in Tirana

In the heart of the Mediterranean along the Adriatic Sea in Southeastern Europe, a two-star general in the Albanian Armed Forces sat down and had coffee with ECBC's CBARR Business Unit. It was less of a formal meeting and more of a grateful exchange between the two parties. The high-ranking general thanked CBARR for providing the team of experts and necessary equipment to safely carry out the destruction of a recently discovered stockpile of chemical warfare agents (CWA). CBARR personnel were appreciative of the opportunity to develop relationships and create a successful working partnership with Albanian laboratory personnel.

"We were incredibly appreciative of the on-site rapport we developed with the Albanian laboratory staff," said Ray Diberardo, CBARR project manager. "We were able to establish a good working relationship that enabled us to execute the operation in a safe and environmentally sound manner."

The collaborative effort between the Central Laboratory, Logistics Brigade and Albanian Armed Forces led to the successful destruction of 11 chemical agents during a two-week project in July. CBARR personnel implemented a proven, environmentally sound infrastructure in Tirana, setting up all of the analytical capabilities and engineering controls that ensured the safe destruction of CWAs.

"The challenge of working in foreign country is being able to communicate and work effectively with laboratory and support personnel," said Diberardo. "It was a natural partnership with the Albanians. We are happy to have the opportunity to provide support and lead international efforts."

Prior to destruction, CBARR personnel assessed the conditions of the work site and designated locations for storage, detoxification and analysis of the chemical agents. Once the site passed a pre-operations survey by senior team members that verified all supplies and safety protocols were in place, a chemical analysis was conducted on each of the agents to confirm chemical identity, quantify chemical concentrations and establish a baseline for which destruction goals could be measured.

The operation in Albania demonstrates CBARR's ability to provide chemical and biological solutions for customers worldwide as it leads ECBC's mission to enduring and emerging CBRNE defense needs in a safe and secure manner. ■

Deployable T-30 Makes First Trip to the West Coast, Safely Destroy Munitions in City Setting

Piers 90 and 91 of the former Naval Supply Depot in Seattle can get busy in April, the time when cruise ships depart for Alaska and fishing vessels travel to the Pacific Ocean. The northern most port in the contiguous U.S. was more than just a populous city last April, it was home to ECBC's CBARR Business Unit.

For three weeks, CBARR personnel supported the U.S. Army Corps of Engineers, Omaha District, in a remediation project that included the on-site destruction of conventional recovered munitions at the Port of Seattle. Remedial investigation of the non-chemical munitions was required to determine the nature of the munitions and the extent of the explosives in order to executive proper response actions.

This was the first time the 160,000-pound Transportable Detonation Chamber T-30, which is owned by the U.S. Army and operated by CBARR, was deployed on a long distance mission to the west coast. The T-30 is a mobile, contained detonation chamber that destroys munitions in a safe and environmentally sound manner, and was critical to the success of the operation in the densely populated port city of Seattle.

"That's what CBARR brings to the table. Our experienced personnel are able to mobilize and setup a site very quickly thereby lowering the costs to our customers," said Ray DiBerardo, CBARR project manager. "Utilizing a transportable system is a huge asset that enables us to provide a one step destruction solution of conventional munitions to customers anywhere and the high throughput allows us stay on schedule to meet their needs."

One five-inch Navy projectile and multiple three-inch, five-inch and 40-millimeter casings were safely destroyed on-site by the T-30 during the three-day operation at one of the busiest ports crucial to the U.S. economy. An improved detonation process and particulate filter system optimized system performance, which integrated recent advancements in fragmentation control and donor charge design. Secondary wastes were also limited and no liquid process wastes resulted from the T-30 operation. ■

2012 Accomplishments

2012 Fiscal Year Technical Reports

Award for Excellence in Technology Transfer from the Federal Laboratory Consortium
For ECBC's work on the Tactical-Biological (TAC-BIO) Detector

Baltimore Federal Executive Board Excellence in Federal Career Awards
In recognition of federal employees exhibiting excellence in job performance

Silver

Randy Kuchta
Engineering Technician

Bronze

Vanessa Funk
Biologist

Kevin Washok
Engineering Technician

Corey Piepenburg
Mechanical Engineer

Army Materiel Command Safety Award for fiscal year 2011
For having one of the most effective overall safety programs within the Command

ECBC Excellence in Safety Award
Awarded to an individual, team or office that has made significant contribution to safety over the past two years

Terry D'Onofrio, Ph.D.
Research Chemist

Office of the Secretary of Defense Award for Excellence
For recognition of individuals who have made significant contributions to the mission of the Joint Services

Warren Gardner, Ph.D.
Scientist

Federal Women's Program Award
For activity most support of Federal Women's Program goals

STEM Educational Outreach Hero Awards
Honoring ECBC employees and their support of programs and initiatives targeted toward furthering science, technology, engineering and math education within and beyond Maryland's Cecil and Harford Counties

Emerging Threat Aerosol Toxicity
The research is focused on assessing the toxicity of emerging threats from an aerosol exposure. The principal goal of the program is to develop human estimates for aerosol exposure to support operational planning and threat assessment.

Robert Kristovich
Acting Chief of the Analytical Toxicology Branch

Utilization of Complementary UPLC-MS Methodologies to Describe the Hydrolysis and Metabolism of Emerging Threat Agents
Identification, measurement, and relative reaction rate characterization of the breakdown products of several compounds subjected to in vitro incubation with both an aqueous buffer and human liver microsomes, using a high mass resolution quadrupole/time-of-flight mass spectrometer equipped with metabolomics software.

Richard Lawrence
Research Chemist, Analytical Toxicology Branch, Toxicology and Obscurants Division, ECBC R&T Directorate

2012 R&T Publications

Tandem Mass Spectrometry - Applications and Principles. InTech I February 2012
Comparative proteomics of tandem mass spectrometry analyses for bacterial strains identification and differentiation

Jabbour, R. Wade, M. Deshpande, S. Stanford, M. Zulich, A. Snyder, P.

Chemistry & Biology I Volume 19, Issue 4, Page 449-455 I April 20, 2012
Structure-based design of supercharged, highly thermoresistant antibodies
www.cell.com/chemistry-biology/abstract/S1074-5521(12)00077-4

Miklos, A. Buckley, P. Calm, A. Welsh, H. et al.

CBRNe World I April 2012
South Central: Evaluation of Chemical Biological Capabilities in Latin America

Sagripanti, J-L. Hoffman, D. Larenas, J. Lara, S.

Department of Defense ECBC-TR-932 | May 2012
Regression model for MODTRAN with applications to inactivation of microbes suspended in the atmosphere by solar ultraviolet radiation

Ben-David, A. Sagripanti, J-L.

Applied Surface Science | Volume 258, Issue 15, Page 5778–5785 | May 15, 2012
Sulfur dioxide and nitrogen dioxide adsorption on zinc oxide and zirconium hydroxide nanoparticles and the effect on photoluminescence
http://www.sciencedirect.com/science/article/pii/S0169433212003388

Peterson, G. et al.

Applied Spectroscopy | Volume 116, Issue 27, Page 7279-7286 | June 2012
Comparison of visible and near-infrared raman cross-sections of explosives in solution and in the solid state
www.ingentaconnect.com/content/sas/sas/2012/00000066/00000006/art00006?token=00531c0323a37beee4a36e58654624317b4255744621 7e6b3f245c5e4e2663433b393f6a333f256610c

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Journal of Physical Chemistry | Volume 116, Issue 27, Page 7279-7286 | July 12, 2012
Reaction of nerve agents with phosphate buffer at pH7
www.pubs.acs.org/doi/abs/10.1021/jp3024809

Creasy, W. Fry, R. McGarvey, D.

Journal of Chemical and Engineering Data | Volume 57, Issue 7, Page 1970-1977 | July 2012
Thermophysical properties of VX and RX
www.pubs.acs.org/doi/abs/10.1021/je200891j

Tevault, D. Brozena, A. Buchanan, J. Buettner, L. Abercrombie-Thomas, P.

Applied and Environmental Microbiology | Volume 78, Page 8272 | September 21, 2012
Detection and tracking of a novel genetically-tagged biosimulant in the environment
http://aem.asm.org/content/early/2012/09/17/AEM.02006-12.abstract

Emanuel, P.	Buckley, P.	Sutton, T.	Edmonds, J.	Bailey, A.	Rivers, B.
Kim, M.	Ginley, W.	Keiser, C.	Doherty, R.	Kragl, F.	Narayanan, F.
Katoski, S.	Paikoff, S.	Leppert, S.	Strawbridge, J.	VanReenen, D.	Biberos, S.
Moore, D.	Phillips, D.	Mingioni, L.	Melles, O.	Ondercin, D.	Hirsh, B.
Bieschke, K.	Harris, C.	Omberg, K.	Rastogi, V.	Van Cuyk, S.	Gibbons, H.

Laser Science | LTh4F.5 | October 14, 2012
Spectral and Time-Resolved Near Infrared (1-2 µm) Laser Induced Breakdown Spectroscopy for Chemical Sensing
www.opticsinfobase.org/abstract.cfm?URI=LS-2012-LTh4F.5

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Genomic Comparison of Escherichia coli O104:H4 Isolates from 2009 and 2011 Reveals Plasmid, and Prophage Heterogeneity, Including Shiga Toxin Encoding Phage stx2
www.plosone.org/article/info%3Adoi%2F10.1371%2Fjournal.pone.0048228

Broomall, S.	Hubbard, K.	Insalaco, J.	Krepps, M.	McNew, L.	Rosenzweig, C.N.
Gibbons, H.	et al.				

2012 Technologies Transferred to Industry

Low Volatility Hazard Kit (LVH)

Inventor | James Genovese Commercialization Partner | Trutech, Inc.

Licensed Patent | U.S. Patent No. 7,036,388, entitled Sample Heater Assembly and Method of Use Thereof

TAC-BIO

Inventor | David Sickenberger, et al. Commercialization Partner | Lighthouse Worldwide Solutions.

Licensed Patent | U.S. Patent 6,967,338 Application Serial No10/720877 filed November 24, 2003 Issued November 22, 2005 and entitled “Micro UV particle detector”

U.S. Patent 7,375,348 Application Serial No 11/268758 filed November 3, 2005 Issued May 20, 2008 and entitled “Micro UV detector”

U.S. Patent 7,567,391 Application Serial No 11/748817 filed May 15, 2007 Issued July 28, 2009 and entitled “Radiation source with self-aligning optics”

U.S. Patent 7,852,469 Application Serial No 11/867190 filed October 4, 2007 Issued December 14, 2010 and entitled “Particle detector”

2012 Awarded Patents and Patent Licensing Agreements

2012 Fiscal Year Filings I 24 Invention Disclosures Filed I 20 Patent Applications Filed
4 Provisional Patent Applications Filed I 16 Patents Issued

#8,057,761 I **Detecting Nerve Agents and Determining the Types Thereof**

James A. Genovese
Chemist

#8,076,150 I **Methods and Apparatus for Chemical Detection Training**

Mark D. Brickhouse, Ph.D.
Former Supervisory Chemist

David R. Pawlowski▪

Abraham L. Turetsky
Retired Research Chemist

#8,080,404 I **Enzymatic Decontamination**

Lawrence J. Hyttinen
Chemical Engineer

Daniel G. Wise
Aerospace Engineer

#8,124,936 I **Standoff Chemical Detector**

William M. Lagna, Ph.D.
Chemist

#8,129,149 I **Rapid and Sensitive Method to Measure Endonuclease Activity**

James A. Genovese
Chemist

Robin L. Matthews
Engineering Technician

Kwok Y. Ong
Retired Chemist

#8,146,446 I **Concentrator Device and Method of Concentrating a Liquid Sample**

Charles H. Wick, Ph.D.
Retired Research Physical Scientist

#8,151,630 I **Quantitative Fit Test System and Method for Assessing Respirator Biological Fit Factors**

Jonathan P. Eshbaugh
Researcher

Paul D. Gardner
Supervisory Physiologist

#8,161,797 I **Sampling Device for Low-volatility Hazardous Chemicals**

Stephen J. Comaty▪

James A. Genovese
Chemist

Edward M. Rychwalski
Former Biologist

#8,164,742 I **Photopolarimetric Lidar Dual-beam Switching Device and Mueller Matrix Standoff Detection System and Method**

Jerold R. Bottiger, Ph.D.
Retired Research Physicist

Pascal I. Limg
Programmer

Jonathan C. Schultz
Electronic Technician

Arthur H. Carrieri
Research Physicist

David J. Owens
Electrical Engineer

Michael V. Talbard
Mechanical Technician

Kevin C. Hung
Programmer

Erik S. Roese
Electrical Engineer

▪ *Contractor*

#8,168,386 | **Methods for Detecting Venezuelan Equine Encephalitis Virus TC-83 and Its Use as a Biological Agent Simulant**

Jennifer R. Horsmon
Biologist

Kevin P. O'Connell, Ph.D.
Research Microbiologist

#8,177,199 | **Aerosol Generator**

John C. Carpin, Ph.D.
Research Biomedical Engineer

#8,188,257 | **Direct Quantification of Ribosome Inactivating Protein**

Russell M. Dorsey
Research Microbiologist

#8,191,398 | **Vapor Generator Safety Release Device**

Robin L. Matthews
Engineering Technician

#8,205,483 | **Residual Life Indicator**

David Friday, Ph.D.
Chemical Engineer

Christopher J. Karwacki, Ph.D.
Chemist

Gregory W. Peterson
Research Chemical Engineer

Marc Shrewsbury
Technician

#8,220,392 | **Launchable Grenade System**

Noel Gonzalez▪

Edgardo Maldonado▪

William G. Rouse
Retired Mechanical Engineer

Daniel J. Hartman▪

#8,224,581 | **Methods for Detection and Identification of Cell Type**

Jacek P. Dworzanski, Ph.D.
Bioinformatics Software Analyst

Patrick E. McCubbin Ph.D.
Senior Scientist

Charles H. Wick, Ph.D.
Retired Research Physical Scientist

Michael F. Stanford, Ph.D.
Research Physicist

Alan W. Zulich
Supervisory Physical Scientist

Jacek P. Dworzanski, Ph.D.▪

Rabih E. Jabbour, Ph.D.
Research Chemist

▪ *Contractor*

2012 Workforce Figures

As of September 30, 2012

Manpower

Civilians (1,198)

Onsite Contractors (340)

Total Manpower ⁞ **1,538**

Average Age ⁞ **45.49**

Average Years of Scientists and Engineers Experience ⁞ **16.30**
(average years of service of total workforce)

Average Years of Experience Workforce ⁞ **16.40**

Expertise*

of Government Employees

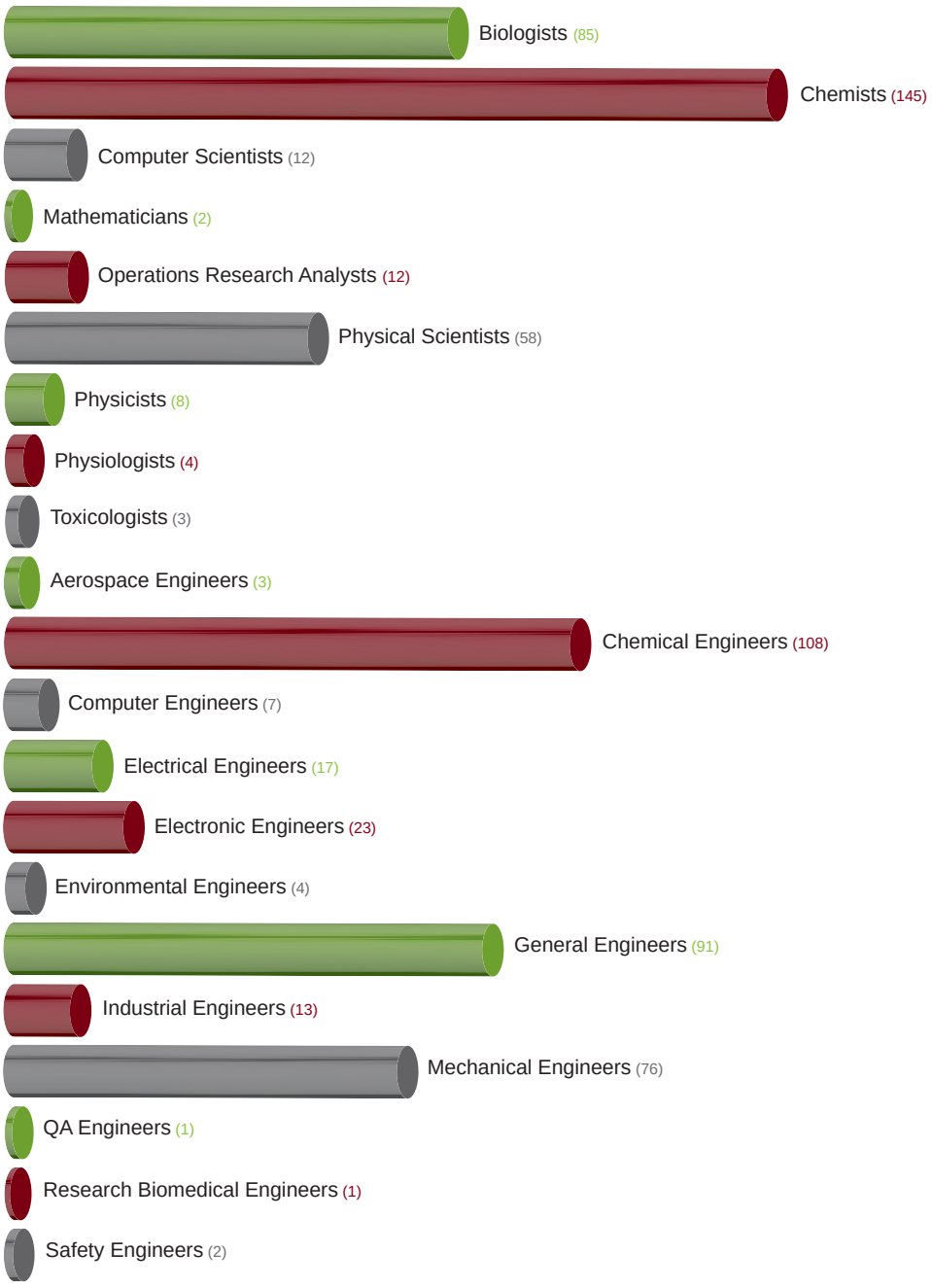
* *Numbers are based on 1,198 civilians*

Degrees

Held by Government Employees

Ph.D. | **95**
Master | **217**
Bachelor | **515**
Associate | **68**

Scientists and Engineers*



Numbers are based on 1,198 civilians

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