



EDGEWOOD CHEMICAL AND BIOLOGICAL FORENSIC ANALYTICAL CENTER



The Edgewood Chemical and Biological Forensic Analytical Center is the new name of the organization that was formerly called the Army Materiel Command Treaty Laboratory (AMCTL). The name was changed to better reflect the evolving mission of the laboratory within the newly created U.S. Army Soldier and Biological Chemical Command. The Forensic Analytical Center is one of three chemical laboratory operations within the Research and Technology Directorate of the Edgewood Chemical and Biological Center.

The AMCTL was established in 1994, and the original plans for the laboratory were based on discussions and negotiations ongoing at the time regarding the Chemical Weapons Convention (CWC). Those plans assumed that there would be many intrusive inspections carried out by the Technical Secretariat of the Organization for Prohibition of Chemical Weapons (OPCW) and that sampling and analysis would be part of most inspections. At the time of the negotiations, on-site analysis for chemical warfare materials was not possible for most of the negotiating countries. Samples were to be collected at the inspection site and shipped to OPCW designated laboratories for analysis. Those assumptions drove decisions on size and capabilities of the laboratory. Since the laboratory was created the prospect for bilateral inspections between the Former Soviet Union and the United States has faded, and the proposed frequency of sampling and analysis in CWC inspections has diminished. As a result, the business projection used in the planning of the AMCTL never materialized.

The Forensic Analytical Center has since applied its strong sampling and analysis capabilities to meeting other customer needs, as well as standing ready in the event of a need for these unique capabilities during an OPCW inspection in the United States. The Department of the Army's CWC Compliance program is still the top priority mission of the laboratory, but it is recognized by all that it cannot be its only function.

The Forensic Analytical Center offers customers high quality analysis of materials relating to chemical and/or biological warfare, backed by its internationally recognized ISO 9001 registration and ISO Guide 25 accreditation. Further evidence of the outstanding analytical capabilities are the four consecutive perfect scores achieved in international proficiency tests sponsored by the OPCW.

The CWC includes toxins as scheduled chemicals, and the Forensic Analytical Center has already developed some capabilities for analysis of that class of compounds. Detection and identification of biological agents is another capability being developed within the Forensic Analytical Center. While biological warfare is outside the area of consideration by the CWC, the ability to collect, receive, and handle samples from the field requires the biological capabilities. It is becoming increasingly difficult to categorize the threats from some sources as being clearly chemical or biological, therefore, we must be able to handle both.

Current customers of the Forensic Analytical Center include all the other branches of the Armed Forces, the Defense Threat Reduction Agency, the Chemical Biological Rapid Response Team, the Federal Bureau of Investigation Laboratory Division, the Federal Aviation Administration Technical Center, the Program Manager for Chemical Demilitarization, and the Cooperative Threat Reduction program.

The change in the name of the organization reflects the broader application of the laboratory's services and a commitment to provide customers definitive results that will withstand the scrutiny of review.



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This document is distributed to over 900 addressees throughout the Joint Services, industry, and academic R&D community and would be a good vehicle to publicize what is going on where you are. Please submit articles to Technical Director, Edgewood Chemical Biological Center, ATTN: AMSSB-RAS-C, Aberdeen Proving Ground, MD 21010-5424, or by electronic mail to the Corporate Enhancement Team at cet@sbccom.apgea.army.mil. All submissions are accepted at the discretion of the editor and are subject to editing. This document is prepared for publication by the Corporate Enhancement Team:

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INTERAGENCY AGREEMENT BETWEEN SBCCOM AND THE DEPARTMENT OF JUSTICE

An Interagency Agreement between the Department of Justice, Office of Justice Programs, Office for State and Local Domestic Preparedness Support, and Department of Defense, Soldier and Biological Chemical Defense Command was approved on December 23, 1998. This agreement, signed by Ms. Laurie Robinson (Assistant Attorney General) and Mr. J. H. Zarzycki (as Edgewood Chemical Biological Center's Director), marks the first of a series of newly established customer based relationships, and one of the primary focuses of the Business Development Team (within the Edgewood CB Center).

The Interagency Agreement sets out conditions under which projects of joint interest to the Office of Justice Programs and SBCCOM will be conducted. In particular, as part of the Office of Justice Programs' overall mission to enhance the capabilities of state and local emergency personnel responding to weapons of mass destruction incidents, the Center for Domestic Preparedness was established at Fort McClellan, AL. The Center for Domestic Preparedness is a federal entity, a component of the Office for State and Local Domestic Preparedness Support, and is designed as a federal training center to prepare emergency first responders, emergency management officials, and state and local community leaders and managers to respond to acts of terrorism involving weapons of mass destruction and hazardous materials. Through this agreement, Office of Justice Programs and Office for State and Local Domestic Preparedness Support is drawing from the experience and resources of SBCCOM to assist in the implementation of their mission of providing assistance to state and local

first responders through equipment, training, technical assistance, and exercises.

Thus far, SBCCOM support to the Department of Justice has included scientific, technical, and general management expertise regarding the Center for Domestic Preparedness, and specifically, the transition of the U.S. Army operated Chemical Decontamination Training Facility to a U.S. Department of Justice operated Chemical Ordnance Biological Radiological (COBRA) Facility located at the Center for Domestic Preparedness. The SBCCOM Edgewood Chemical Biological Center's Safety Surety Office is providing chemical agent, biological, and radiological risk management support to this effort. Contractual administration and management is also being provided to the Center for Domestic Preparedness, with the recent award of several procurement actions to support the instruction and training of courses taught at the Center for Domestic Preparedness.



Dr. James J. Savage, Edgewood Chemical Biological Center, and Mr. L. Z. Johnson, Director, Center for Domestic Preparedness at the COBRA Facility, Fort McClellan, AL, in January 1999.

SBCCOM will continue to assist in all phases of transition at the Center for Domestic Preparedness COBRA Facility to eventually include the packaging and transport of chemical agent from the Edgewood Chemical Biological Center to Fort McClellan, AL, for use in training in a live agent environment.

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DOMESTIC PREPAREDNESS

Ms. Suzanne Milchling, Domestic Preparedness Office, attended the National Domestic Preparedness Office (NDPO) Training Meetings in January. Training program objectives and milestones established at the December meeting were reviewed. One milestone is to develop a comprehensive listing of Weapons of Mass Destruction (WMD) related training available to first responders. The compendium of training courses developed by SBCCOM and the federal partners for the Domestic Preparedness Program was chosen as the baseline for this effort. Participants were asked to provide NDPO with information to update the compendium. In February, a meeting was chaired by COL Hardy of J-34 and attended by a wide cross-section of DoD Antiterrorism and Force Protection personnel to begin development of the WMD CD training tools. The contractor, ITA, Incorporated, will convert the draft DoD version of the WMD First Responder Training Materials into interactive training CDs. The training materials are largely based on the Domestic Preparedness course materials. SBCCOM will provide the draft CDs to the team members. We have noticed a significant increase in DoD requests for WMD training and awareness materials. To support these requests, we have provided the Threat Assessment Tool, the Installation Planning Tool, the WMD Annex, the DP Basic Awareness and FBI videos, and the DP training suite. We will soon replace the DP training suite with the draft DoD training materials.

In January, Amy Smithson and Leslie Ann Levy of the Stimson Center visited SBCCOM to gather information for an upcoming Stimson Report on the Domestic Preparedness Program. They requested and were furnished training material, city after-action reports, and copies of briefing material on the training, exercises, help line, chemical and biological improved response, equipment testing, Chemical Biological Rapid Response Team, and Technical Escort Unit. Interviews were also conducted with personnel in management positions.

In January, a student at the U.S. Army War College met with us to gather information on our Domestic Preparedness Program. The student is also a policeman in Chicago and is investigating protection of first responders as his War College project.

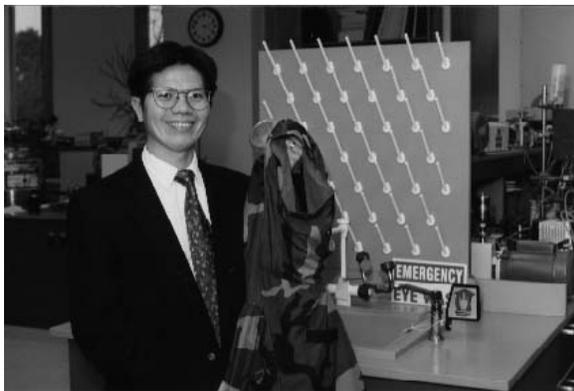
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NATICK SCIENTISTS ARE THE BRAINS BEHIND THE MEMBRANES

Under a Joint Service Defense Technology Objective (DTO), entitled “Advanced Lightweight Chemical/Biological (CB) Protection,” scientists at the Natick Soldier Systems Center are making historic strides in developing CB protective gear for the soldier. This new generation of lightweight chemical and biological protective clothing is based on selectively permeable membrane technology. The two membrane systems being investigated are the amine-based membrane/fabric system and the cellulose-based membrane/fabric system from W.L. Gore & Associates, Inc., and Akzo Nobel, respectively. Natick scientists Quoc Truong, Dr. Eugene Wilusz and Dr. Donald Rivin are the driving forces behind the development of this new protective gear. In other words, they are the brains behind the membranes.

The selectively permeable membrane technology will reduce or eliminate the use of carbon in CB protective clothing. Since carbon adds weight and bulk, the protective overgarments fabricated from the new materials are dramatically lighter than their predecessors.



Mr. Quoc Truong shows off the new garment, which is considered a technological breakthrough.

The new protective overgarments weigh 51 percent less than the standard battledress

overgarments (BDO) and 45 percent less than the Joint Service Lightweight Integrated Suit Technology (JSLIST) overgarment. In addition to being lighter weight, the new garments are easier to launder and take up less package volume. Thus, the new protective gear will be an improvement over its predecessors from a logistical standpoint as well.

The novel materials provide protection against highly toxic compounds, including offensive chemical and biological agents. Incredibly, the resultant thin, lightweight, flexible material system also allows moisture vapor to pass through the clothing, thus providing relief from heat stress through evaporative cooling. The system is



Dr. Eugene Wilusz and Dr. Donald Rivin hold up the thin, lightweight, flexible material system that also allows for the passage of moisture vapor.

waterproof as well, and therefore, will provide protection from wet weather.

The end result of the project will be the development of a CB protective duty uniform for the soldier, thus eliminating the need for a chemical-protective overgarment. The novel materials will also be incorporated into gloves and socks.

According to Mr. Truong, “Protective clothing is now worn over the Battle Dress Uniform (BDU).

In the future, however, the selectively permeable membrane will allow the BDU itself to be the protective garment; thus, eliminating the need for an overgarment, especially in a high-threat scenario. As a result, the logistics burden, the weight, and the cost of the clothing system, as well as heat stress will be reduced.”

The two membrane technologies have been tested extensively and successfully on the Thermal Manikin. Soldiers, who have assessed the new ensemble for comfort and durability in limited field tests, have rated it highly.

In addition to the warfighter, the new protective clothing systems will also be useful to environmental cleanup personnel, emergency responders, medical personnel, industrial-chemical handlers, and pesticide handlers. The material could also be used as a sophisticated filter, separating chemicals from water vapor and/or other chemical species.

Natick Scientists Mr. Truong, Dr. Wilusz, and Dr. Rivin are the pioneering scientists who are working with selectively permeable membranes for the purpose of replacing heavier, carbon-based suits. Due to this technological breakthrough, similar research and development efforts are being collaboratively conducted with several academic and industry partners.

The work of scientists Mr. Truong, Dr. Wilusz, and Dr. Rivin underscores Natick’s commitment to the soldier and to SBCCOM’s motto, *Cum Scientia Defendimus*.

This article was authored by Jane Benson.

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IMPROVED TOXICOLOGICAL AGENT PROTECTIVE ENSEMBLE (ITAP)

The Improved Toxicological Agent Protective ensemble (ITAP) is a state-of-the-art chemical protective ensemble developed for use by U.S. Army Technical Escort Units (TEU), and U.S. Army Chemical Activity/Depot personnel. The ITAP ensemble is an Occupational Safety and Health Administration/Environmental Protection Agency (OSHA/EPA) Level B, integrated, protective ensemble, capable of providing complete body protection from toxic chemical and biological warfare agents, industrial chemicals, oxidizers, and rocket fuels.

The ITAP ensemble is capable of providing up to one hour of skin and respiratory protection to workers operating in Chemical Warfare Agent environments. The ensemble will be used in peace and wartime conditions during recovery, rendering safe, storage, and disposal of chemical and biological weapons in combat and industrial environments and if an item is involved in an accident/incident. The U.S. Army Soldier and Biological Chemical Command (SBCCOM) developed the ITAP ensemble under the management of the Project Manager (PM)-Soldier at Fort Belvoir, Virginia.

Four subsystems combine to make up the ITAP ensemble: a one-piece suit, breathing system,¹ a Personal Ice Cooling System (PICS), and a Compact Air Supply System (CASS) when a filtered air mode is required.

- The suit is a one-piece garment with integral booties, front fastener closure, and glove assembly.

¹One-hour Interspiro™ Self-Contained Breathing Apparatus (SCBA).



The ITAP is a state-of-the-art chemical protective ensemble.

The ITAP suit has a splash proof zipper with closure in the upper portion of the body and includes a splash hood and overvest. The ITAP suit is a modified commercial item. The suit fabric is made of five alternating layers of Nomex® and Teflon®. The encapsulating suit design has a middle layer of fluoropolymer which, when exposed, indicates wear. The material provides up to one hour of protection against chemical warfare agents, industrial chemicals, petroleum, oils, and lubricants. The material has static dissipative properties, is self-extinguishing, and flame resistant. The ITAP suit has a reduced solar load because of its light gray color.

- The Interspiro™ Self-Contained Breathing Apparatus (SCBA) was approved by the National Institute for Occupational Safety and Health, and it is currently being used by Air Force and Army Fire Fighters. It consists of a 60-minute air cylinder, a breathing valve, a pressure gauge, a connective hose and tubing, a shoulder harness,

and a waist belt. The SCBA is worn over the ITAP suit and weighs approximately 35 pounds. It will be used as an alternative to the Compact Air Supply Systems (CASS) when a higher level of respiratory protection than is provided by a filtered air mode is required. The SCBA is a common component also used with the Self-contained Toxic Environment Protective Outfit (STEPO) ensemble and the Joint Firefighting Integrated Response Ensemble (JFIRE) ensemble.

- The Personal Ice Cooling System (PICS) removes metabolic heat from the users body, allowing personnel to work in the ITAP suit with a reduced risk of heat stress. The PICS consists of a pump unit, plastic bottle, connective hose and tubing, a suit pass through, and a shirt with tubing running throughout. The PICS unit is a closed-loop system, which uses ice water as a coolant. The ice water is circulated through tubing that runs throughout the PICS cooling shirt. The PICS provides approximately 30 minutes of cooling, depending on the air temperature and the individual. The PICS can be used for longer periods if the ice bottle is periodically replaced which can be performed within a contaminated environment. The PICS requires three D-Cell batteries as a power source to operate. The PICS weighs approximately 15 pounds fully charged including the cooling shirt. The cooling shirt comes in four sizes and is designed to fit the 5th percentile Army female through 95th percentile Army male. The PICS is also a common component used with the STEPO ensemble.

- The Compact Air Supply System (CASS) is a small lightweight unit providing a continuous flow of clean, filtered air for breathing. The CASS is designed for use on standard NBC respiratory protection apparatus (i.e., M40 Mask). The Edgewood Chemical Biological Center developed the CASS blower unit for aviation use. The ITAP ensemble will use the CASS during the filtered air mode to reduce the risk of agent exposure by maintaining positive pressure and airflow to the mask and suit.

The ITAP ensemble can be worn in two configurations². For specific components of the configurations, see the following table.

ITAP CONFIGURATIONS		
CONFIGURATION ACRONYM*	SCBA (LEVEL B)	FILTERED AIR MODE (LEVEL C)
COMPONENTS:		
Splash Suit	X	X
Over Vest	X	
Splash Hood	X	
SCBA (1-hr)/CW Mask	X	
M40 Mask (GFE)		X
Communication System	X	
Compact Air Supply System (CASS) ³		X
Personal Ice Cooling System (PICS)	X	X

The ensemble is designed to be modular and can be configured in CASS or SCBA mode to meet mission needs. Currently, the ITAP ensemble uses the commercial communication system available with the Interspiro™ Self-Contained Breathing Apparatus (SCBA). The ITAP ensemble will also use the M3 TAP Gloves, M2A1 TAP Boots, and M40 mask from the M3 TAP Ensemble.

The ITAP program began in 1994 with concept approval from the 19th Army Clothing Equipment Board (19th ACEB-Memorandum of Record dated April 1994). A market survey was initiated to identify potential Industrial Hazardous Material (HAZMAT) chemical protective ensembles and materials that met U.S. Army's requirements. No

² TAP Boots and Gloves are worn in both configurations.

³ CASS is worn only in the filtered air mode.

commercial ensemble was found that fulfilled the Army requirements. The former Natick Research, Development and Engineering Center (NRDEC) (now the Soldier Systems Center, SBCCOM) identified six materials through a market survey that had potential for the ITAP suit. After conducting a thorough material analysis and early user evaluation, two highly probable candidate suits were selected. In 2QFY95, a three-phase research and development contract was awarded for the ITAP ensemble containing a production option for up to 2,000 suits. After early user evaluations, there was a down selection to one final ensemble. Final user evaluations and technical tests were completed on the ITAP ensemble in December 1998.

The ITAP maintenance concept will use organic maintenance and supply support for the suit, PICS, CASS and the SCBA w/CW Kit. Maintenance performed will consist of operator preventive maintenance checks and services (PMCS), unit level, and direct support level maintenance. Electronic technical manuals will be developed for the suit/system, PICS, CASS, and SCBA w/CW Kit. Communication system interface information will be included in the suit/system manual. SBCCOM, Rock Island is the primary inventory control agent (PICA) for the suit, CASS, CW Kit, and PICS; and the secondary inventory control point (SICA) for the SCBA.

The ITAP ensemble will be fielded under modified total package fielding procedures in accordance

with the materiel fielding plan. Units identified in the materiel fielding plan will receive the suit, CASS, initial spares, support equipment, and technical manuals. SBCCOM's Integrated Materiel Management Center will coordinate delivery and equipment hand-off. The SCBA is already in use by the chemical activity depots and technical escort units, and the PICS will be fielded with the STEPO system.

The ITAP program will employ an innovative approach to provide high quality training while holding down program costs. Instructors, and a select group of users, will attend Instructor and Key Personnel Training (IKPT) provided by the contractor. SBCCOM's Integrated Materiel Management Center will provide new equipment *train-the-trainer* training at sites designated in the fielding plan. This training will enable key personnel to train others in the operation and maintenance of the ITAP ensemble. Computer-based training will be developed to support institutional and sustainment training.

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STATIC DISPLAY OF NBC FILTRATION SYSTEM ON M1A1 ABRAMS TANK

On March 22nd, the Armored Systems Modernization (AMS) Team hosted a static display at the Edgewood Area of APG of a full-scale pre-prototype advanced NBC Collective Protection (CP) filtration system mounted on an M1A1 Abrams tank. The display featured two M1A1 Abrams tanks, one with the advanced NBC collective protection system using Pressure/Temperature Swing Adsorption (P/TSA) filtration technology along with a current fielded M1A1 with the standard NBC filtration so that a “side-by-side” visual comparison could be made. There was also a poster board presentation and the opportunity to climb inside the vehicles.



Advanced NBC collective protection system using Pressure/Temperature Swing Adsorption (P/TSA) filtration technology.

The ASM and CB Filtration teams have been working for the past 10 years to mature advanced vapor filtration systems to replace current carbon filters in CP applications. Research efforts focused on developing a fundamental knowledge of the advanced filtration technologies (PSA, CatOx, and TSA), developing performance prediction mathematical models, and obtaining scale-up information.

It was believed, and later confirmed, that flow rates (ca. 1 cfm for lab-scale and 100 cfm for full-scale systems) would affect the performance of the technologies. This performance impact needed to be quantified to confirm the suitability of the various advanced filtration technologies for actual application. Prior attempts to integrate a full-scale system onto a combat system test-bed were not successful due to test-bed failures. The integration of the P/TSA system on display onto the M1A1, and subsequent successful testing, is one of the first successful rigorous integration/testing programs of advanced NBC filtration systems on an operational system.



Mr. Jim Zarzycki (left), Technical Director of the Edgewood CB Center, Mr. Jeff Hoene (center), ASM Team, and Mr Michael Parker, (right), Deputy to the Commander of SBCCOM.

The display was a success as approximately 25 distinguished visitors attended including the Deputy to the Commander of SBCCOM, the Technical Director of the Edgewood CB Center, the Director and Deputy Director of Research and Technology Directorate, and Director of the Engineering Directorate, representatives of the Secret Service and the USMC's Advanced Amphibious Assault Vehicle (AAAV) development program.

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MODULAR DECONTAMINATION SYSTEM TO ENTER INTO ARMY CHEMICAL DEFENSE INVENTORY

As we move into the 21st century, our troops face an ever increasing possibility that the enemy may use relatively inexpensive weapons of mass destruction. To counter the ever increasing chemical and biological threat, our soldiers must receive early warnings, be protected in a manner that will allow them to continue engagements in an NBC environment, and have at their disposal an effective means for decontamination.

For the decontamination of equipment, SBCCOM recently completed the development of the Modular Decontamination System (MDS).



Modular Decontamination System

The MDS consists of an M21 Decontaminant Pumper (DP) and two M22 High Pressure Washers (HPW). Both systems are diesel powered and conform to the Army's one fuel forward policy.

A Milestone III In Process Review (IPR) was held at SBCCOM's Edgewood site in December 1998. Representatives from the U.S. Army Test and Evaluation Command, Operational Evaluation Command, the U.S. Army Training and Doctrine Command, and SBCCOM agreed to Type Classification-Standard. The Decision

Memorandum was signed on December 22, 1998, by the Executive for Acquisition and Readiness. The program is now proceeding to the production phase with production contracts planned for this Fiscal Year (FY99). First Unit Equipped (FUE) is scheduled for FY00.

The M21 Decontaminant Pumper (DP) is used for the application of the decontaminant. It is a low-pressure system that pumps and sprays DS2 and liquid field expedients such as bleach and diesel fuel. It uses a diaphragm type chemical pump that is belt driven by the diesel engine. It will deliver decontaminants in all required temperatures and environmental conditions.



M21 Decontaminant Pumper

The decontaminants are at rates between one and four gallons per minute using two spray wands and are easily, and efficiently, applied by spray wands in lieu of mops and buckets. After the surface is sprayed, the operators use electrically-powered brushes (in lieu of brooms) to mix the decontaminant with the agent to accelerate the removal or neutralization process. The brush heads rotate at approximately 350 rpm under load and are easily maneuvered and replaced by the operator.

The M21 has two accessory cases. A hose case provides storage for all of the needed hoses, hose

reels, spray wands, and spray nozzles. A second case is compartmentalized and contains the motorized electrically-powered brush wand assemblies, a NATO slave connector, spare brush heads, and 75-foot power cords. Both cases include extension assemblies to ensure that most surfaces of large equipment may be reached without the need for climbing onto the equipment.

The M22 HPW is used before and after the decontaminant is applied. The first HPW in the decon line is used to remove gross contamination such as mud and grease, so that the decontaminant can be applied directly to the surface of the equipment. The second HPW is used to rinse off the applied decontaminant. The M22 HPW is capable of delivering hot or cold water at up to 3,000 pounds per square inch (psi) using two spray wands and a rate of 5 gallons per minute using the two spray wands. The water pressure and temperature can be adjusted by the operator. The system is also equipped with a liquid injector system. The injector system is useful for deicing, or with a liquid detergent, removing caked on dirt or grease.



M22 High Pressure Washers

The M22 not only has the capability to heat water but can also produce wet steam. Steam may be used on sensitive surfaces of aircraft, rubber, and field gear. Water for the process may be drawn from a natural source (lake or steam) or from a

3,000-gal water bladder that is provided with the system. The M22 can also deliver up to 40 gallons per minute of cold water through its high-volume pump. This feature is used to accelerate the decontamination process when water is not a scarce commodity. In addition, the HPW can be adapted to be used with the standard Army 125 gpm diesel-powered water pump to draw water into the water bladder or for direct application through the high-volume hose nozzle. A personnel showering bar is also included with the system.

The M22 also includes two accessory cases. The first contains the hose reels, high-volume hoses, and the suction strainer. The second accessory case contains various items such as spray wands, hydrant adapters for decon in urban areas, a suction hose, and nozzles. An extendable wand is included to clean surfaces up to 10 feet from the ground, and a shower bar with a hot and cold mixing valve assembly is included to provide showers for up to eight people.

The MDS will replace the M12A1, first fielded in 1965, in smoke/decon companies and in some heavy divisions. It is not, however, a panacea to the decontamination challenge — it is for exterior surfaces of equipment and not for large ground areas, interior surfaces, or for sensitive equipment.

The M21 and M22 working together compliment the doctrine outlined in Army FM 3-5 and act as the neutralizing force for returning contaminated equipment back to the battlefield. With the Modular Decontamination System, our forces are provided greater mobility and are relieved of some of the logistical burden and labor intensiveness associated with the current decontamination process.

Mr. Rennie Bucci, Team Leader for the MDS program, wishes to acknowledge the contributions of all the MDS team members, especially Mr. Mark Shifflett, Mr. Jeff Matthews, and



Ms. Sandra Quinn for their work principally on the XM21; and to Ms. Heidi Wheeler and

Mr. Nolan Shaver for the XM22. Mr. Dat Nguyen provided overall Integrated Logistics Support management, Mr. Bill Childers, the quality management, and Ms. Sandi Casteel administrative support.

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The M-56 offers the division a unique capability to defeat smart weapons and to screen itself from sensors'

-- Lt. Col. Thomas Woloszyn, the 82nd Airborne Division's chemical officer.



Members of the 21st Chemical Company work with a civilian manager to test a smoke system on Sicily Drop Zone. The system was heavy-dropped for the first time. At left, soldiers of the 21st await the drop.

Staff photos by Justin Carlson

82nd is smokin'

By Tanya S. Blank

Staff writer

Even armies with all the high-tech weapons systems they can field have a hard time defeating one of the oldest battlefield tactics: smoke.

Last month, the 82nd Airborne Division's 21st Chemical Company became the first unit in the Army with the new Infrared and Visual Smoke System. The company has 18 units of the system, called the M-56 Smoke Generator.

Traditionally, smoke has been used in battle to blind and confuse the enemy, camouflage troop movements and maneuvers, and decoy the enemy. But the Army's new system does much more.

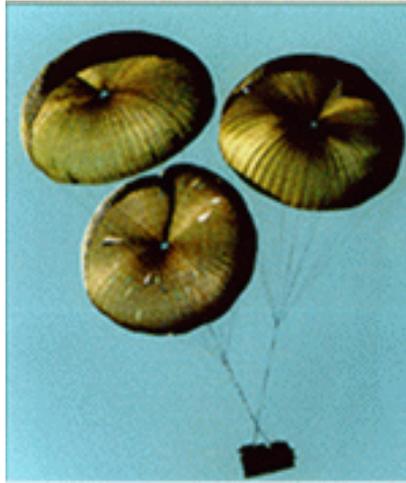
The M-56 is the Army's first smoke generator that can defeat infrared weapon's systems.

"The M-56 offers the division a unique capability to defeat smart weapons and to screen itself from sensors," said Lt. Col. Thomas Woloszyn, the 82nd Airborne Division's chemical officer.

The system is the Army's first smoke generator that can defeat infrared weapons systems. The Army's old M-157A2 system had only visual capability.

Ground-up graphite in the M-56 smoke absorbs thermal energy that smart weapons systems need to function.

“It acts like a sponge sucking up energy,” said John Green of the Smoke/Obscurants office, where the system was developed. The smoke generator system took eight years to develop. Green’s office is part of the U.S. Army Soldier, Chemical and Biological Command at Aberdeen Proving Ground, MD. The smoke generator can be placed on the back of the M-1113 Humvee, which is also new. The system costs \$145,000. Over the next five years, 267 systems will be fielded in units throughout the Army. Fort Bragg soldiers say the new system is easier to operate than the old. “On the old ones, we had to play and tinker with them to keep them running,” said Cpl. Keven Cox of the 21st Chemical Company, “We can adjust the fog level without worrying about the engine overheating.”



Here it comes:
The Modified Humvee, called an M-1113, carrying the M-56 smoke generator, descends slowly to the drop zone held by three parachutes after being dropped from a C-130.



1st Lt. Henry Padley of the 21st leads his units in securing the area and removing the packing from the smoke unit and the extended capacity Humvee on which it is mounted.

The system can produce 90 minutes of smoke without refueling.

One smoke generator can blow enough smoke to cover 50 football fields. The question for the 82nd unit was whether it could survive being air dropped from a C-130. Last month, soldiers with the 21st Chemical Company got a chance to find out. Beneath three huge cargo parachutes, a brand new 10,380 pound M-1113 Humvee with the M-56 Smoke generator System strapped to its back floated to the ground at Fort Bragg’s Sicily Drop Zone. The vehicle and generator landed in one piece, albeit with a cracked windshield. Once on the ground, getting the vehicle off the rigging platform took a bit of muscle. Soldiers, who had parachuted in, pushed, shoved, jumped on and rocked the vehicle to no avail. The driver revved the engine. The Humvee wouldn’t budge. A Red Cross truck finally came to the rescue and pulled the Humvee off its rigger platform. After a few minutes, the Humvee looked like a rocket ready to blast off as white billows covered the drop zone.

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Mechanics boost smoking habits

Carolee Nisbet/SSG Steve Snyder
Public Affairs Staff

The Army's many chemical units don't want to quit smoking -- they just want to do it more efficiently.

And in Directorate of Logistics Maintenance shops off Texas Avenues, teams of mechanics are upgrading smoke generator sets to make that happen.

"What we're doing is a modification work order that will allow the systems to work better, longer and on different types of fuel," said Bill Betts, project manager from Aberdeen Proving Grounds.

Betts and a crew of seven are working on 48 sets, replacing fog oil tanks and a variety of the connective and operating hardware on each high mobility multi-purpose wheeled vehicle.

With modifications in place, the sets will produce fog for 90 minutes in winds up to 40 miles per hour, he said.

The fog is pumped out of two chambers on the back of each HMMWV; and is used to provide cover for soldiers advancing on open terrain.

The fog is almost like a steam cloud, Betts said, produced by heating a special type of oil that's almost like baby oil.

"It's highly refined, with all things like benzene and toluene taken out," he said. "That doesn't mean it's a good thing to breathe over long periods, because the

smoke is actually very small droplets of the oil, and droplets of anything aren't good for your lungs."

The upgrade also means that the systems will operate on jet and diesel fuel as well as regular gasoline, making the systems more versatile and adaptable to battlefield situations.

Betts said crews are rotating through the maintenance facility off Texas Avenue to complete work on the sets, a project that will take a little more than a month.

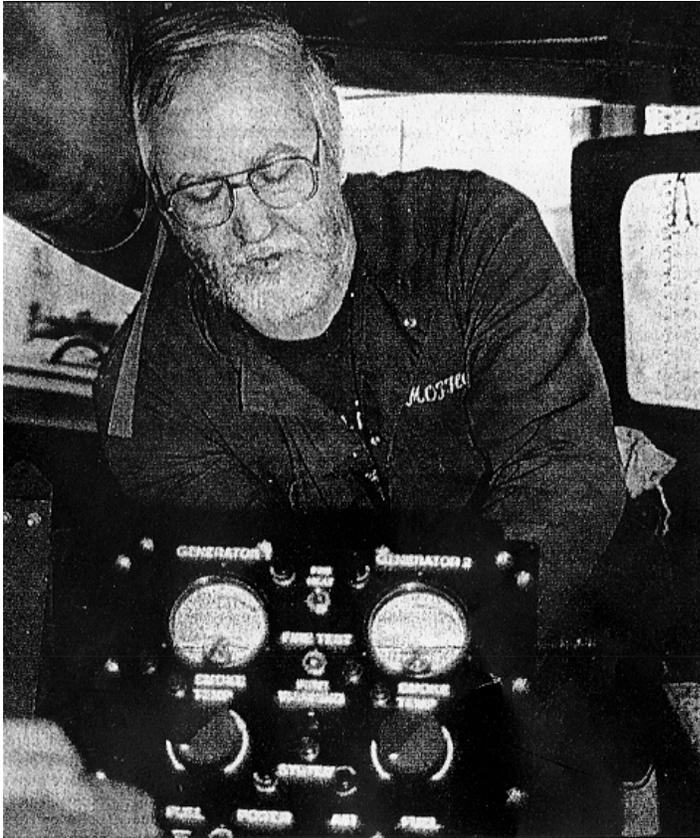
"It takes about 15 man hours to complete one upgrade," he said. "Right now, we're working on equipment from the 357th and 411th Chemical Companies, both part of the 77th Reserve Support Command."

Once installation of the upgrades is complete, the vehicles are taken out to the ranges for a test smoke. The clouds were so dense, visibility was limited to less than 15 feet -- a sure sign of the success of the upgrades.

George McClellan, chief of DOL's Maintenance Division, said the project is one of several underway in his shops.

"We're doing a rebuilding program on 5,000 gallon fuel tankers," McClellan said. "It's a contract with U.S. Army Reserve Command. There are ten right now, and could be more coming."

McClellan said DOL has also won a bid to repair differentials on more than 300 HMMWV under the Internal Sustainment Maintenance Program.



IN CONTROL — Technician Jim Bina, of Rock Island Arsenal's SBC Command, wires in a control panel that's part of an ongoing upgrade at DOL Maintenance for smoke generator sets.

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PM-NBCDS CREATES "SMARTMAN"

What do you do when you need a special test fixture and all the ones in existence can't do the job? You make your own. This was the situation for the Joint Service General Purpose Mask team when the Product Manager for Masks of the Project Manager-Nuclear Biological Chemical Defense Systems (PM-NBCDS) was tasked with a program to conduct complete system agent challenge testing on current military CBW protective masks with accessories and clothing. When a test fixture was required, a market survey was conducted; and because of the unique

requirements of this testing, no suitable test fixture could be found.

Working on an extremely tight schedule, a performance specification and Statement of Work were written with a lot of customer input. Practicing the 1st customer service standard of the Enterprise, "Give customers what they want, not what we think they need," inquiries were made to in-house users (Research and Technology, Engineering, and PM-NBCDS teams), numerous government agencies, other services, and industry. Comments were solicited and received on the test

fixture's capabilities and features needed and wanted to make everyone's job of testing easier and better.

The most desired features were ease of operation and minimum maintenance with increased capabilities. These became the focus of the requirements in the performance specification and in the design decisions made at the start of work meeting and in weekly progress reports. Users actively participated in the process and the decisions, practicing the 6th customer service standard, "Involve customers in all phases of the process and decision making."

In less than 3 weeks after identification of the task, a contract was awarded



by the AMC Acquisition Center at APG; and shortly thereafter, the test fixture was designed, manufactured, assembled, and delivered in time for the initiation of the test program, practicing the 3rd customer service standard, "Be on schedule, at or below cost." The test manikin was installed in a chemical laboratory hood and initial comments were very favorable.

The official unveiling of the test fixture took place at the Joint Service IPT for the JSGPM at Brooks AFB, San Antonio, Texas. All service representatives had an opportunity to hear a presentation on the design and development effort and see the fixture first hand.

All representatives expressed a lot of interest as demonstrated by the flood of questions. All had some application for a test fixture of this type. It soon became the big hit of

the meeting. Some of the comments were "Best looking test fixture I ever saw," "Very professional looking;" and on the lighter side, "does it come in desert sand, camouflage or pure gold?" The fixture was sent originally to the U.S. Air Force's physiology laboratory for testing of mask systems, further exemplifying the flexibility of the fixture's uses. It's not just for agent testing. Some of the features that make this test fixture unique are:

- The fixture is made entirely of materials that have a smooth, nonporous surface that is resistant to contamination from repeated exposure to high concentrations of liquid and vapor Chemical Warfare agents (in particular Agents HD and GB) and decontamination solutions and be not toxic or hazardous to humans.

- The fixture is representative of the 50th percentile male (medium size) from approximately the mid-torso to the top of the head in all dimensions according to the 1988 Army anthropometric data base. This allows testing of masks along with accessories and clothing to see the effects of the various combinations on protection.

- The head portion is similar to the head form of the M14 Mask Leakage tester; however, it has all facial features of eyes, ears, nose, and head to secure a mask headharness, corrective



spectacles, and hood and simulates human features.

- The head portion of the fixture has a replaceable inflatable peripheral seal tube (bladder) that interfaces with the peripheral face seal of military masks and can be quickly and easily replaced using no tools or at most only common tools. The replacement is accomplished from the front of the head of the fixture without removing the head or any part of the fixture from the secure mounting in the plexiglass stand. The replacement can be accomplished in less than 2 minutes compared to the 45 minutes with the previous M-14 test head. All tubing is stainless steel for durability and maintenance-free operation.

- With a mask on the test fixture, there is no leak path to the exterior beyond the bladder seal or through the fixture from inside the mask. Therefore, all the tubing and mechanics are free of agent contamination and do not need to be decontaminated.

- The fixture has three sampling ports (two for the eye cavity and one for the orinasal cavity) as well as a pressure port for the orinasal cavity extending outward and located IAW the Joint Service Standardization Agreement for Quantitative Fit Factor Testing. These ports are 1/8-inch in diameter stainless steel pipe extending through the test fixture through the base extending downward approximately 2 ½ inches with a National Pipe Thread standard threaded end.

- The fixture also has a breathing port extending outward from the face front located in the orinasal cavity for simulated breathing allowing for breathing rates up to 100 lpm for evaluating a full range of breathing rates.

- All port ends on both the base and the face piece are easily identified as to function with markings and/or color-coded.

With these features, any and all types of masks (peripheral sealing and neck sealing, and partial masks) can be tested as well as clothing and

accessories that interface with the mask. It is our hope that this or a similar test fixture will become the standard for all types of testing (physiology, simulant, and agent testing) in the future, thereby making comparison of data from different test agencies more meaningful. In fulfilling an immediate need, we may have also fulfilled a more important long-term need of providing a test fixture “standard” for use by DOD, NIOSH, and NFPA. In addition, we also are looking at standardized test methods and procedures for agent testing of all types of chemical materiel. This goes hand-in-hand with our core competency and enhancing our position as the center of excellence for CB matters.

This project demonstrated the fact that teaming can work and work very well. With the full support, cooperation, and assistance of many people including users, engineers, support personnel, contracting and the contractor, ILC Dover Inc., we have a success story. Everyone is a winner. We achieved the 2nd customer service standard, “Provide products and services that meet or exceed customers’ requirements” and expectations.

Oh by the way, in case you were wondering about the name “SMARTMAN” for the test fixture. It is an acronym for “SiMulant Agent Resistant Test MANikin.”

For more information about “SMARTMAN;” and if you know of another application for your testing and would like to order one, please contact us.

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Fieldings

 <p><i>M56 Smoke Generator</i></p>	<p>181st Chemical Co, Ft Hood, TX 63rd Chemical Co, Ft Campbell, KY 314th Chemical Co, Ft McClellan, AL</p> <p>POC: Randal H. Loiland AMSSB-PM-RSM-M, DSN 584-2806</p>	<p>Jan 99 Mar 99 May 99</p>
 <p><i>M58 Smoke Generator</i></p>	<p>172nd Chemical Co, Ft Riley, KS 89th Chemical Co, Ft Carson, CO 46th Chemical Co, Ft Hood, TX</p> <p>POC: Peter F. Annunziato AMSSB-PM-RSM-L, DSN 584-2362</p>	<p>Jan 99 Feb 99 Apr 99</p>
 <p><i>M157A2 Motorized Maintenance Work Order (MWO) Retrofit Kit</i></p>	<p>357th Chemical Co, USARC, Ft Dix, NJ 411th Chemical Co, USARC, Ft Dix, NJ 300th Chemical Co, USARC, Morgantown, WV</p> <p>POC: Janice A. Nordin AMSSB-PM-RSM-V, DSN 584-2838</p>	<p>Mar 99 Mar 99 Jun 99</p>
 <p><i>Biological Integrated Detection System P31</i></p>	<p>7th Chemical Co, Ft Polk, LA</p> <p>POC: Bruce W. Jezek AMSSB-RBD, DSN: 584-3351</p>	<p>May 99</p>
 <p><i>M93A1 FOX/MICAD</i></p>	<p>1st CAV, Ft Hood, TX 4th ID, Ft Hood, TX III Corps, 44th Chemical Co, Ft Hood, TX</p> <p>POC: MAJ John M. O'Regan AMSSB-PM-RNN-T, DSN 584-6551</p>	<p>Jan 99 Mar 99 Jun-Jul 99</p>

 <p><i>M40A1/M42A2 Mask</i></p>	<p>Connecticut NG, Hartford, CN Alabama NG, Montgomery, AL Mississippi NG, Biloxi, MI Oregon NG, Portland, OR 88th RSC (MN/WI) St. Paul, MN/ Ft McCoy, WI Minnesota NG Camp Ripley, MN Wisconsin NG, Ft McCoy, WI Minnesota NG, Camp Ripley, MN 70th RSC, Yakama, WA</p> <p>POC: MAJ John M. O'Regan AMSSB-PM-RNN-M, DSN 584-6551</p>	<p>Feb 99 Mar 99 Apr 99 Apr 99 May 99 May 99 Jun 99 Jun 99 Jun 99</p>
 <p><i>M45 Aircrew CB Protective Mask</i></p>	<p>Chemical School, Ft McClellan, AL Aviation School, Ft Rucker, AL</p> <p>POC: MAJ John M. O'Regan AMSSB-PM-RNN-M, DSN 584-6551</p>	<p>Jun 99 Jun 99</p>
 <p><i>M48 CB Apache Aviator Mask</i></p>	<p>Chemical School, Ft McClellan, AL Aviation School, Ft Rucker, AL</p> <p>POC: MAJ John M. O'Regan AMSSB-PM-RNN-M, DSN 584-6551</p>	<p>Jun 99 Jun 99</p>
 <p><i>M41 Protection Assessment Test System</i></p>	<p>Nevada NG, Reno, NV Connecticut NG, Hartford, CT North Dakota NG Missouri NG, Jefferson City, MO 63rd RSC, USAR, Los Angeles, CA USAR, Seattle, WA USAR, Ft McCoy, WI Wisconsin NG</p> <p>POC: Michael E. Busch AMSSB-REN-EM, DSN 584-5773</p>	<p>Nov 98 Feb 99 Mar 99 Mar 99 Apr 99 May 99 May-Jun 99 May-Jun 99</p>

 <p><i>Improved Chemical Agent Monitor</i></p>	<p>Tech Escort Battalion, APG-EA, MD Chemical School, Ft McClellan, AL 11th Chemical Co, Ft McClellan, AL 209th MP Co, Ft McClellan, AL Signal School, Ft Gordon, GA</p> <p>POC: MAJ John M. O'Regan AMSSB-PM-RNN-M, DSN 584-6551</p>	<p>Jan 99 Feb 99 Feb 99 Feb 99 Feb 99</p>
 <p><i>M22 Automatic Chemical Agent Alarm</i></p>	<p>Special Forces, Ft Benning, GA Special Forces, Ft Lewis, WA Special Forces, Ft Campbell, KY</p> <p>POC: MAJ John M. O'Regan AMSSB-PM-RNN-A, DSN 584-6551</p>	<p>Feb 99 May 99 Jun 99</p>

HELP LINES/TOLL-FREE NUMBERS

	<i>Telephone No.</i>	<i>fax no.</i>
Chemical Maintenance	Germany 0130810280 Korea 0078-14-800-0335 CONUS 1-800-831-4408	1-410-436-3912 (TOLL CALL)
Smoke/Obscurants	1-888-246-1013	1-410-436-2702 (TOLL CALL)
CB Helpline (NONEMERGENCY TECHNICAL ASSISTANCE)	1-800-368-6498	1-410-436-0715 (TOLL CALL)
Environmental Quality	1-410-436-6588 (TOLL CALL)	1-410-436-8484 (TOLL CALL)
Operational Forces Interface Group (OFIG)	1-508-233-5341 (TOLL CALL) DSN 256-5341	

END ITEM UPDATES

OPERATIONAL FORCES INTERFACE GROUP (OFIG) VISITS FORT CAMPBELL: In February, Mr. Roy Albert of the Edgewood CB Center traveled to Fort Campbell, KY, with the Natick OFIG to survey soldiers from the 101st Airborne (Air Assault) Division. Most had just returned from training at the National Training Center; however, some came from Korea, Panama, and Bosnia. In 2 days, over 300 soldiers completed surveys on equipment. The CB equipment surveyed was the M256 Detector Kit, M8A1 Alarm, M272 Water Test Kit, M291 and M295 Decon Kits, and M40/42 Masks. Some of the soldiers spent extra time with us discussing the equipment and their needs. They were very appreciative that we were out there asking them for their input. The OFIG will complete the data analysis and provide information to PM NBC Defense Systems and the Engineering Core Team on their items.

PARTNERING WITH FIELD UNITS:

In November 1998, the Natick Soldier Center shipped two General Purpose Solar Covers to the 3rd Special Forces Group for use in Ghana and the Ivory Coast. The solar covers will be used to protect soldiers from the harsh solar loading found in many tropical and desert environments and will be included in their standard deployment package. The *African Continuous Response Initiative* is a State Department program led by the 3rd Special Forces Group to train eight African countries on peace keeping. The Natick Soldier Center has worked with the State Department on solar cover support since early September at the request of the 3rd Special Forces Group.

In December 1998, the 46th Corps Support Group received the eight GEN-2 Solar Hex prototypes fabricated by the Natick Soldier Center for use in Joint Task Bravo humanitarian operations. The covers provide protection for soldiers from harsh solar loading found in tropical and desert environments. The CSM from the 46th Corps Support Group requested assistance in late November after visiting a solar shade display sponsored by SBCCOM's Logistics Assistance Representatives. The GEN-2 Hex was developed by the Natick Soldier Center using 6.2 Continuous Process Improvement funding. Applications include heavy equipment operations, field expedient ammo sites, cooking facilities, staging sites, and vehicle maintenance points.

VALUE ENGINEERING CHANGE PROPOSALS (VECP):

M1A1 Air Purifier Precleaner and M2A2 Air Purifier – ECPs are being prepared to cancel military specifications MIL-P-0050085 and MIL-P-50085 for the M1A1 Air Purifier Precleaner and MIL-P-0051070 and MIL-P-51070 for the M2A2 Air Purifier. These cancellations were coordinated with the Configuration Manager, and the action was taken to comply with a memorandum from the Defense Standardization Program Office concerning Overage Interim Documents.

M28 Collective Protection Equipment – The last two ECPs, releasing the “Type II” M28 CPE for the Air Force, were approved in December 1998. The ECPs included the Type II center, end, and CPE supply airlock liner sections; they will be incorporated into the FY99 M28 CPE procurement (primarily for Air Force quantities).

M8 Pot, Smoke, TA, Training – An ECP was approved for changes to resolve the deflagration and short burn time issues. Pine Bluff Arsenal is to prepare two additional ECPs, one to address the current configuration of the delay tube and the other to add the permanent marking of the smoke mix batch numbers on the pot.



Once these ECPs are approved, Pine Bluff Arsenal is to proceed with fabrication of three lots of pots. Pending success of these pots the materiel release will be staffed and full production initiated.

SUPPLY MANAGEMENT ARMY-OPERATING AND SUPPORT COST REDUCTION (SMA-OSCR):

M22 Automatic Chemical Agent Alarm (ACADA) – An SMA-OSCR proposal for low risk engineering changes to the ACADA M88 Detector unit was approved in February. This is the second SMA-OSCR approval received by the ACADA Team.

OPERATING AND SUPPORT COST REDUCTION (OSCR) PROPOSAL:

SR119 Dye – An OSCR proposal to study the use of SR119 Dye (or other similar material) as a spray-on application to detect chemical agent contamination was prepared by IMA Officer, LTC Allen McKinney during his 2-week assignment with the Detection and Decontamination Core Team. The study would determine a matrix carrier capable of applying SR119 Dye (or a similar material) to surfaces of vehicles and weapons in a battlefield environment for the identification of lethal chemical contamination. The reagent could be applied on equipment by using military or commercial applicators such as spray tanks or dry chemical fire extinguishers.

EQUIPMENT UPDATES:

Binary Materiel – In December 1998, the last eight truck loads of excess stockpiled binary materiel left Umatilla Chemical Depot (UMCD) enroute to processing at Hawthorne Army Depot to meet Chemical Weapons Convention requirements. This historic movement was completed 4 months ahead of schedule; shipments began in November 1997 and had to be completed by April 1999. A media event was held to commemorate the event and five reporters attended: two local television stations and three local newspaper media. It was followed by a luncheon in the city of Hermiston for local elected officials.

Joint Services Lightweight Integrated Suit Technology (JSLIST) – All agent trials performed in the Aerosol Vapor Assessment Group fixtures for Phase IB of the product improvement are complete and data reduction is ongoing. P3I is a liquid/vapor test that challenges swatches of candidate fabrics with chemical agent. Protective fabric swatches of new, worn, and contaminated (with fuel or synthetic excrement) are challenged with liquid chemical agents to measure their effectiveness. JSLIST, sponsored by Program Manager-Soldier, evaluates candidate-clothing materials for new protective overgarments for service personnel.

Joint Service Lightweight Standoff Chemical Agent Detector (JSLSCAD) – Dr. George Famini, SBCCOM International Office, met with members of the JCAD Program Management team at Brooks AFB in January to discuss current and future international involvement in the JCAD program. CPT Tim Dawson, the JCAD project manager, is the U.S. member to the Chemical Detection Working Group of the US/UK/CA MOU on Chemical Biological Defense. CPT Dawson sees the value, and the difficulties, of incorporating foreign countries in U.S. development programs. However, the JCAD program is benefitting substantially through open exchange with the UK LCAD program under the MOU. The JCAD team is interested in additional foreign involvement, especially as the JCAD proceeds into production. As the majority of the current international agreements involving chemical and biological defense materiel research and development are with SBCCOM, the JCAD team requested our advice on international cooperation in this area.



Our Engineering Directorate's Computer-Aided Engineering Team developed a conceptual design for a universal mounting system for the JSLSCAD. The system is adaptable to a variety of applications, including a tripod configuration and a telephone pole, wall, or vehicle mount configuration. The design will be adapted as the JSLSCAD itself is refined.

Fox Reconnaissance Vehicle – In February, a contract was awarded to continue logistics support the Fox for both the Army and Marine Corps through January 31, 2000. Compliance with Y2K and a revised scope of work addressing contractors on the battlefield were included in the award. The Fox is a German manufactured vehicle, and most spare parts are provided by German firms.

Chemical Agent Monitor (CAM) – Our Computer-Aided Engineering Team, teaming with the CAM Team, designed a prototype field- refillable sieve breather and sieve pump body assembly for the CAM. The new design will reduce logistics support requirements and improve performance of the many thousands of CAMs that are currently fielded.

M256A1 Chemical Agent Detector Kit – The Detection and Decontamination Core Team received FY99 RDTE Pollution Prevention Program funding to investigate the removal of Mercuric Cyanide from the mustard test of the M256A1 Kit. TrueTech, Inc., will manufacture 60 kits that do not contain mercuric cyanide for testing. If this effort is successful, an alternative to the current copper chloride/aluminum heating system of the M256A1 Kit, without hardware change, will be explored.

M273 Maintenance Kit – M273 Kits, NSN 5180-01-108-1729, with lot numbers TG198E102L001 and TG198F102L001, contain defective Test Paddles, which may not have an adequate concentration of simulant to set off the M43A1 Chemical Agent Alarm. The manufacturer, Intellitec, will produce replacement Test Paddle Kits for the 4,788 affected M273 Kits in the field. It is anticipated that Intellitec will be mailing the Replacement Kits to the field by the end of 2QFY99. The 212 M273 Kits in depot will be reworked by Intellitec and should be completed by the end of 2QFY99.

M312 Maintenance Kit, CBR Equipment: Test Paddle – The adoption package for the M312 Kit was completed and forwarded to the Edgewood CB Center's Technical Director for approval. The M312 Kit contains five test paddles, which are used during Preventive Maintenance Checks and Services for the M43A1 Chemical Agent Detector. The M312 Kit along with the Maintenance Kit, CBR Equipment: Air Filter, M293, will replace the Maintenance Kit, CBR Equipment, M273. Existing M273 Kits will be used until exhaustion or until the shelf life expires. Use of the M312 Kit will result in cost savings from not having to dispose of good air filters along with expiring test paddles.

M34A1 Sampling Kit – The Edgewood CB Center's Safety/Surety Office completed a Safety Assessment Report (SAR) for the M34A1 Kit. The sampling kit is for taking soil, vegetative, and water samples of suspected or known agent-contaminated areas and getting the samples sealed, labeled, and safely out of the area for analysis. This kit updates the M34 kit and has several improvements such as plastic jars versus glass vials and elimination of the fiberboard box carrier. The primary hazard associated with the use of the kit were reflected in the SAR and involve the risks associated with actually sampling in an agent environment. Based on the results of the SAR, the kit is considered safe to test.

M8A1 Chemical Agent Alarm Mod Kits – A quantity of 18,115 M8A1 Modification Kits, part number 5-15-19014, are available for free issue. The Mod Kit includes two tethers to attach the rain shield and flow meter to the handle of the M43A1 Detector. This change will help prevent these items from being lost or damaged. The Mod Kit also includes a jumper wire to be added to the back of the M43A1 Detector horn. This change will allow the horn volume to be totally silenced, which would provide a safer field environment under certain



circumstances. Complete instructions are provided. The tether mod can be done at any level in a short period of time. The horn mod can be easily done by direct support or depot maintenance in about half an hour. To obtain a free Mod Kit, e-mail Rebecca Morse at morser@ria.army.mil. For technical information, email Loren Morse at morsel@ria.army.mil.

M43A1 Battery Box –The “skunk works” proposal for completion of the M43A1 Battery Box was selected for funding. This project will result in the development and documentation of the battery box design modifications needed to address the current design deficiencies noted during the battery box test and evaluation conducted under the FY98 “skunk works” program. The objective is to provide the soldier in the field an alternate power source for the M43A1 Chemical Agent Detector that will increase system readiness and supportability while decreasing overall life cycle costs. This concept was originally developed based on a request from the user’s representative for an alternative to the BA-3517/U battery. This project will produce the final design technical documentation that will be used to support the adoption of the new battery box as the primary M43A1 power source.

AN UDR-13 Pocket Radiac – The contractor continues to produce ahead of schedule. We recently fielded 86 units to the Chemical School and achieved First Unit Equipped. We received a request from the Johnson Space Center for test data and a sample to evaluate for possible use as a crew dosimeter on the space station.

M40A1 Chemical-Biological Protective Masks –

The integrated SBCCOM/TACOM-ACALA Individual Protection Team awarded the Program Year 4 requirements of the multiyear contract with ILC Manufactured Products Division in January. The quantity was 46,076 M40A1 masks for a total of \$4,007,690. Delivery of these masks will begin in January 2000.

An urgent U.S. Navy requirement for 60 M40A1 Masks was filled by selling the customer required repair parts and technical manuals to assemble complete masks. (The mask can be assembled from stocked repair parts.) Normal practice would be to use a Military Inter-service Purchase Request (MIPR) to buy the mask. However, the MIPR would require a payback loan and it could not be processed in the required need time. Cost of the mask provided by the repair part approach was slightly higher than a MIPR transaction, but the repair parts approach was the only way to ship on time and meet customer requirements.

M40 Mask Outserts –

In December 1998, the SBCCOM (RI) IPT discussed the pending buy of M40 Mask Outserts: clear, tinted, and laser and agreed to incorporate acquisition reform initiatives in this buy. A multi-year buy for the three outserts to reduce acquisition cost/lead times and to conduct a market research to verify any availability of equivalent commercial items are planned. Past performance evaluators will also be generated due to the criticality of producing agent-resistant hard-coated polycarbonate lenses.

A total of 29,734 sets of clear and neutral outserts were recovered from field returned unserviceable M40 Series Mask and posted to SBCCOM accountable records. The recovered assets resulted in saving of \$256,460 when compared to cost of new procurement. The outserts provide physical protection to the mask lens and protection against sun glare when using the neutral set.

M40A1/M42A2 Mask Carriers – SBCCOM Individual Protection Team completed a market research for commercial carriers equivalent to the M42A2 Mask Canister Carrier. Some prominent manufacturers of commercial mask equipment were contacted to determine the existence of commercial items similar to or equivalent to the government canister carrier. The vendors contacted reported no knowledge of items of this



kind produced by their company or their competitors other than the military version of the canister carrier. This response was anticipated since the canister carrier was developed specifically for the M42 Series Mask (combat vehicle mask) to accommodate the C2/C2A1 and NATO equivalent canisters.

M41 Protection Assessment Test System (PATS) –

The U.S. Air Force contracted with the Test, Measurement, and Diagnostic Equipment Primary Laboratory at Redstone Arsenal to repair and calibrate their M41 PATS. The PATS is used to assess the fit of the MCU-2/P and M40 Series CB Protective Mask. This increased business for the Army Primary Standards Laboratory when combined with U.S. Army M41 PATS requirements should increase operational efficiency.

In December 1998, TSI, Inc., was awarded a delivery order for FY99 Joint Services requirements of the M41 PATS under a 5-year Indefinite Delivery, Indefinite Quantity contract. The contract provides for deliveries of 900 PATS for the U.S. Army and the U.S. Air Force between April 1999 and April 2000.

A Conditional New Materiel Release was issued for FORSCOM and TRADOC in August 1994, for USASOC in March 1995, and for USARC and ARNG in 1995. An ***Unconditional*** New Materiel Release, replacing the Conditional NMR, was approved by the Materiel Release Review Board in January 1999.

M28 Collective Protection Equipment – The M28 CPE System Manager approved funding for combining, reformatting and verification of the current draft Technical Manuals (TMs) for the M28 CPE and the CPE Supply Airlock. Reformatting (to meet new DA requirements) and verification of the TMs is required for DA publication of those documents. In addition to the reformatting, the revised TMs will incorporate new customer requirements for the M28 CPE system (e.g., addition of the CP DEPMEDS configuration, disk clamps, modified filter adapters, and bump-thru doors).

Airbeam Bare Base Shelters – In February, the Natick Soldier Center in partnership with the Air Force Research Laboratory (Tyndall AFB) demonstrated two airbeam shelters sized similar to a 32-foot long TEMPER tent. The demonstration took place at an Air Expeditionary Force Battlelab exercise held at Nellis AFB. The prototypes demonstrated two competing airbeam technologies already demonstrated in a Large Area Maintenance Shelter and the Chemically Biologically Protected Shelter program. The Army and Air Force currently have a joint Defense Technology Objective to scale up the technology for large maintenance shelters exceeding 80 feet width. This demonstration was an attempt to illustrate how this technology can deliver a TEMPER replacement that is half the weight and quickly deployable.

M84 Gas Particulate Filter Unit (GPFU) – In January, a contract was awarded to Hunter Manufacturing for 11 M84 GPFUs as part of a Foreign Military sale to Saudi Arabia. The M84s will be used to support the Hawk Missile System. This was an urgent requirement that needed to be awarded by the end of January to meet fielding requirements. A letter contract was awarded in 5 days thanks to the combined effort of SBCCOM and TACOM-ACALA.

200 CFM Filter Sets – In January, a contract option was processed to procure 2,108 filter sets, NSN 4240-01-369-6533. Total dollar value is 1.44 million dollars. The primary user of this gas filter set is the Navy's Shipboard Collective Protection Systems.

M19 Particulate Filter – There are 1,466 M19 Particulate Filters at AQ5, which are in condition code 'J,' awaiting sample testing and upgrade. Due to successful testing of like Lot numbers from Blue Grass Army Depot earlier in the year, 1,276 of the 1,466 will be upgraded to 'A' condition code with no testing necessary.



This will provide \$49,868 worth of serviceable assets and will allow for the immediate release of 193 back orders. This filter is currently in a buy position and is used in the M1A1-19 Precleaner and Particulate, which is used in military, tracked vehicles, crew cabs and various vehicle mounted shelters and bodies.

M291 Skin Decontamination Kits – The M291 Kit allows soldiers to decontaminate their skin through physical removal, absorption, and neutralization of toxic agent with no long-term harmful effects. Review of shelf life test data determined that the M291 Kits manufactured by Rohm and Haas that were due to expire in January can be extended for one more year, saving the user the cost of replacing the widely used kit. Inquiring users from Hawaii, Korea, and Fort Stewart were informed via email. A worldwide message is being prepared to tell the remaining users of this development.

M295 Apparatus Decontamination Kits – In January a contract modification for an additional quantity of 10,116 boxes of M295 Kits was awarded to Truetech, Incorporated, at a cost of \$5,492,381.04.

Sorbent Decontamination Systems (SDS) – Guild Associates, Inc., successfully demonstrated the production of a 15-lb batch of the carbon based sorbent using pilot scale equipment.

Armored Systems Modernization Smoke/Obscurant Protection – A contract was awarded to OptiMetrics to use the current Distributed Information Simulation (DIS) Node hardware and software to simulate and display smoke generators and obscurant clouds. This will allow definition of the work necessary to fully integrate the Vehicle Smoke Protection model into DIS and the display and simulation limitations and capabilities available through the DIS Node.

M56 Smoke Generator Ordnance School Trainer – Completed M56 roll around trainer for the Ordnance School. Trainer features entire M56 system, which was transferred from the host HMMWV, to an in-house designed mobile test stand that locates all components in their exact location relevant to the Hummer. The trainer is fully operational and can be moved by two soldiers to various locations.

M56 Smoke Generator Control Panel Trainer – Completed two M56/M58 Control Panel Trainers as part of an ongoing in-house development project for the Chemical School. The trainer can use any standard system control panel and will replicate the lighting sequencing normally seen during the operation of the system.

M58 Mechanical Mechanized Smoke/Obscurant Smoke Generator System (Wolf) – A new contract for 27 M8A3 Gas Particulate Filter Units was awarded by Rock Island Procurement in February to Hunter Manufacturing Company. These 27 units (FY98 buy) were to have been provided by the now bankrupt IDL company. An additional contract will be awarded to Hunter to cover the FY99 buy.

Riot Control Agent Neutralizer (RCAN) – The Center for Health Promotion and Preventive Medicine completed the Health Hazard Assessment (HHA) for the RCAN. The RCAN HHA covers two products: ALPEC “Bio-Shield” and ARMOR “Cool It.” The Commerce Business Daily RCAN Synopsis, which was published in January resulted in two additional RCAN products: the Guardian “Decon Aftercare” and the SWAT “Multi-Agent Teargas Neutralizer.” Phase I of this effort is to qualify as many products as possible that meet the RCAN Operations Requirements Document (ORD). The HHA will be amended when all products that meet the RCAN ORD are identified. The Naval Surface Warfare Center, Joint Warfare Applications Department, has a similar program. We contacted the Navy’s point of contact and provided her an information package on our RCAN program, which included the ORD and HHA documentation. She agreed to share program information and test data.



Recap of EDM System File Transfers to JEDMICS – At the beginning of 1998, we were still transmitting our engineering data to Rock Island by mailing aperture cards (microfilm). In March 1998, we replaced our hard copy and aperture card engineering data repository and Tech Data and Configuration Management System (TDCMS) with commercial product data management (PDM) based Engineering Data Management (EDM) system, which integrates the management of the electronic representations of the engineering document and its configuration management information. On March 26, 1998, 22 compact disks were downloaded from our EDM system, which contained all of our active engineering document image files and the corresponding Joint Engineering Data Management Information and Control System (JEDMICS) indexing information, and sent to the Rock Island JEDMICS for uploading. From March through September 1998, if the Rock Island site needed a current tech data package (TDP), the images files and JEDMICS indexing information for that TDP were downloaded from our EDM system and electronically transmitted to Rock Island. On September 25, 1998, a compact disk was downloaded from the EDM which contained all the image files and JEDMICS indexing information for the engineering documents we have released since the March download (2787 image files), and sent to the Rock Island JEDMICS for uploading. Since September 25th, a program is run daily to determine if there are newly released documents that have not been transmitted to Rock Island. If any are found, they are electronically transmitted to the Rock Island JEDMICS. Since September 25th, 35 such updates have been made (858 image files).

Facilities

Stereolithography Rapid Prototyping Lab – The new Computer-Aided Engineering Team’s Stereolithography Rapid Prototyping Laboratory is fully operational and available for project support. A few of the recent prototypes produced include JCAD mock-ups, prosthetic knee implants, structural bike components in support of CRDA, and Chemical Agent Monitor upgrade components.

Protection Factor Facility – Our Protection Factor Facility is upgrading its HVAC system for improvement in efficiency. The new system will allow the Corn Oil Chamber to be environmentally controlled and provide an improved filtration method for the challenge corn oil aerosol. The new system will also provide a “state-of-the-art” system that will be able to generate aerosol particles between 0.2 to 2 microns in size.

Chemical Defense Training Facility – The Edgewood CB Center’s Safety/Surety Office hosted a meeting to discuss issues regarding the transfer of the Chemical Defense Training Facility at Fort McClellan, AL, to the Department of Justice (DOJ). The DOJ will rename the facility the Chemical, Ordnance, Biological, Radiological/Nuclear (COBRA) Training Facility, and it will be used to train civilian emergency responders on what to do in the event of a terrorist attack. Our Safety/Surety Office will provide lead safety and surety support to the DOJ in this effort.



WEB SITE ON LINE

Please visit SBCCOM’s RDA Business Area on the world wide web. Our url address is:

http://www.apgea.army.mil/rda_new

BRIEFS

SAFETY VIDEO REVISED. Personnel from the Edgewood Center worked with the Maryland State Police Criminal Investigator for Harford County to help produce a “safe schools” video for local schools. In the video, scenes would be acted out depicting youth problem areas such as disorderly conduct, bringing guns to school, underage drinking and purchasing of alcohol, fighting in school, underage smoking and shoplifting among others. The video will be used in Harford County schools; and the plan is to contact State authorities to suggest using it in all Maryland schools. During the videotaping of one scenario staged at Maryland State Police Benson Barracks, local television station Channel 2, WMAR, sent a reporter to cover the story. Their very positive report aired on the late news, Monday, December 14, 1998.

RUSSIAN VARIOLA PROGRAM: The West Desert Test Center at Dugway Proving Ground has made significant progress in securing the Cooperative Threat Reduction (CTR) Program for production and testing of antibodies specific for smallpox virus (Variola). The program is a two-year proposal and has received strong support from the Joint Program Office (JPO) for Bio Defense in order to obtain phage display antibodies specific for Variola. A recent trip was completed to VECTOR Laboratory (Novosibirsk, Russia) with the U.S. State Department, to finalize testing protocols and finances related to this program. A visit was made to the molecular biology labs, as well as the Bio Safety Level 4 Suite. The facilities have the necessary trained people and most of the equipment. The CTR Program will provide the necessary equipment for completion of this work. This program has strong support from both PM-Bio, and JPO as a source for additional antibodies specific for Variola, and as a source of other Variola strains and isolates that can be used in testing specificity of current antibodies.

CUSTOMER SATISFACTION AT EDGEWOOD

“Satisfaction of our customers’ requirements defines quality for us.”

At the Edgewood CB Center, we are striving to improve customer satisfaction. Our customer service standards are listed below, and we expect every one to follow these seven rules when dealing with their customers, be they internal customers or external customers.

CUSTOMER SERVICE STANDARDS

1. Give customers what they want, not what we think they need.
2. Provide products and services that meet or exceed customers’ requirements.
3. Be on schedule, at or below cost, and provide complete and accurate data.
4. Respond to inquiries within 24 hours.
5. Handle complaints and emergencies IMMEDIATELY.
6. Involve customers in all phases of the process and decision making.
7. Provide customers easy avenues for comments, complaints, or information.

Remember our customer service email address is cu-team@apgea.army.mil

COOPERATIVE R&D WITH INDUSTRY AND ACADEMIA

Recent significant achievements and actions in our continuing commitment to *technology transfer* follow:

Northeastern Maryland Technology Council (NMTC)

Visit the Northeast Maryland Technology Council web site at:

www.geosol.com/nmtc/index.htm

APG Science and Technology Board

Through the APG S&T Board, Mr. Gross hosted an afternoon session of the winter American Apparel Manufacturers' Association (AAMA) conference in the Berger Laboratory Auditorium in February. MG Doesburg was the Keynote Speaker, giving an overview of SBCCOM. Mr. Phil Brandler, Technical Director of the Natick Soldier Systems Center, briefed on the Natick Center and the soldiers' uniforms of the future. Mr. Roy Albert briefed members of the AAMA's Apparel Research Committee (a Government contract committee) on technology transfer opportunities at SBCCOM, and provided them with information on how to interface with the Natick Soldier Systems Center technology transfer.

The APG Science and Technology Board has a web site at: <http://stb.apg.army.mil>.

Technology Transition Meeting

On February 9th, SBCCOM (NSC), Defense Supply Center Philadelphia, Marine Corps, TSM-Soldier, and PM-Soldier met to decide whether to insert infrared (IR) modifier technology into military clothing and individual equipment (CIE). The modifier technology was developed through NSC leveraging of industry initiatives and significantly improves near-IR protection of

synthetic based CIE against image intensifiers. Agreement was reached that the technology should be inserted into all synthetic CIE. Action is being taken in conjunction with industry partners to execute the implementation of this transition.

Cooperative R&D Agreement (CRDA)

A CRDA between the Edgewood CB Center and Boeing was signed to study and recommend a CB Filter for protection on the C-17 Aircraft.

In February, Natick Soldier Center met with Aspen Systems to discuss the possibility of entering into a CRDA to continue the flame resistant (FR) work (previously funded by Natick) on nylon fiber for applications other than uniforms, i.e., shelters, battings, sleeping bags, etc. The establishment of a CRDA would strengthen Natick's and Aspen Systems efforts by performing joint research and sharing facilities, thereby increasing the chances of successfully developing an FR nylon fiber for commercial and military applications.

We were contacted by Argon Electronics, the company that makes the CamSim. They are interested in using our patented technique for simulating a radiac instrument using a GPS and software. We are in contact with the General Counsel's office to explore a CRDA.

Testing Service Agreement (TSA)

Government laboratories are authorized, for an appropriate fee, to test materials, equipment, models, computer software, and other items for any person or entity, according to the Interim Draft Department of defense (DO) guidance implementing 10 U.S.C. 2539b, "Authority to Sell," April 17, 1997. To make this process effective and efficient here at the Edgewood CB Center, we prepared procedures, and we are having great success.



A Test Service Agreement was signed with Battelle for formulation and testing of pyrotechnic smoke mixes.

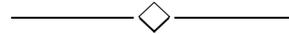
A memorandum requesting the release of XXX contractor chemical agent detectors, which are exposed to agent in vapor form, was forwarded to AMC Headquarters. The request was supported by an attached hazard analysis. The action is meant to support Test Service Agreements (TSAs) where private companies may contract for the use of Edgewood CB Center facilities and expertise to support their programs. Typically, chemical agent testing of prototype detectors requires the government to purchase the equipment since the XXX designation requires the item to remain under government control and makes it impossible to return the detectors to the contractor. This significantly increases the cost of new detection technologies to the government. Giving the contractor the option of receiving their equipment back will support the TSA initiatives this center has been directed to act upon, promote innovation in the items tested, and provide the DOD with a greater array of potential detection technologies to choose from. The hazard analysis shows that these goals can be accomplished without compromising contractors' safety/health.

Leveraging

Members of the Passive Detection Team recently demonstrated the results of a very impressive leverage and collaboration between the Edgewood CB Center, DSWA, DPG, MRC, and Block Engineering. Using only 20K of mission funding for additional optics and some tech support they were able to leverage about \$50M in programs and \$500K in existing hardware to demonstrate a new capability that can be used as a tool to cut cost and provide better product testing. The effort used the DSWA NODDS Array (developed for missile ATR testing), Mission Research's drive electronics (MRC designed for the Dynamic IR Science Projector, broad band ATR testing), ERDEC's CPN CB scenes, DPG's testing expertise, the Block 100 FTIR to project a modtran scene with GB spectra incorporated to a Block 100

interferometer (what is now called the "ILSCAD"), the Block 100 "saw" it and returned the predicted spectra. In addition, standard testing patterns requested by DPG could be projected. This capability is a useful tool for both the RD&E community as well as T&E.

POC: Mr. Roy C. Albert, Office of Research and Technology Applications, DSN 584-4438, commercial (410) 436-4438, email address is rcalbert@apega.army.mil



TECHNICAL INDUSTRIAL LIAISON

Small Business Innovation Research (SBIR)

The Army has received its final complement of SBIR money. As a result, Edgewood has received approval to award six new Phase II SBIR contracts. With that, our FY99 SBIR budget now exceeds \$4.0 M.

The DOD 99.1 SBIR Solicitation closed on January 13, 1999. It included a CBD section consisting of seven Army topics, five Navy topics, and six Air Force topics. This office received 34 proposals, which have been evaluated and seven were selected, addressing the following four topics:

- Computational Fluid Dynamic Modeling of Agent Transport Through Protective Clothing Systems (7 proposals received; 1 selected)
- High-Speed, Rugged Tuner for Low Costs, Standoff Chemical and Biological Detection (7 proposals received; 2 selected)
- Modular Microfluidic Packaging (7 proposals received; 2 selected)
- Nanoscale Electrochemical Biosensors (13 proposals received; 2 selected)

Proposals addressing the other three Army topics were sent directly to the Army Medical Research & Materiel Command.

The 99.2 SBIR solicitation will be open from May 1999 to July 1999.

Three new topics were forwarded to AR0 for inclusion in the 99.2 SBIR DOD solicitation. Those topics are:

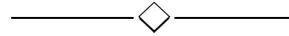
- Synthetic Receptors for Reagentless Biosensors
- Self-Contained Surface Bio-sampling Apparatus
- Microfabrication Based Biodetectors

POC: Mr. Marvin Hohenstein, Corporate Enhancement Team, Commercial (410) 436-2855 or DSN 584-2855

Broad Agency Announcement (BAA):

In mid-February, the new Edgewood BAA (BAA 99-1) was placed on our Web Site. It is accessible at <http://www.apgea.army.mil/RDA/baa99.html>. This BAA differs from previous ones in two ways. Whereas previous BAAs had definite closing dates, this BAA will remain open indefinitely. It will be updated periodically on the Web Site, as necessary. Secondly, this BAA does not request the submission of a full proposal but, rather, companies are invited to submit 5-page white papers. Full proposals will only be requested for white papers that receive a favorable technical review and for which funding is presently available.

POC: Mr. Ronald P. Hinkle, Technical Industrial Liaison, DSN 584-2031, commercial (410) 436-2031, or email rphinkle@apgea.army.mil.



Extramural Grant
(Managed by Army Research Office)

Dr. Sherif Kafafi, under an extramural grant sponsored by the Army Research Office, uses the DoD supercomputers at the Army Research Laboratory's Major Shared Resource Center to model the decomposition of Chemical Warfare Agents via thermal and enzymatic degradations. Dr. Kafafi developed a highly accurate method for computing properties of much larger molecular systems than any previous method. The DoD supercomputers were indispensable in testing and improving this approach reported in four publications in leading chemistry journals in less than a year. Dr. Kafafi is communicating his results and transitioning these new tools to Army scientists at the Army Research Laboratory and the Edgewood CB Center.



LAB RESEARCHER RECEIVES ARMY DISTINGUISHED SERVICE AWARD

Dr. Robert R. Karl Jr., right, a researcher in Advanced Chemical Diagnostics and Instrumentation (CST-I) shakes hands with Major General John Doesburg, SBCCOM, after presentation of a U.S. Army Distinguished Service Award. Dr. Karl received the award in January in a ceremony at the University House for his work in developing a laser-based system that mounts in an Army helicopter and can detect and characterize clouds of biological agents at a distance. The system can provide warnings of threats to troops in the battlefield.

MG Doesburg said in his remarks that he was here to “honor a distinguished American,” and went on to acknowledge the great accomplishments of Dr. Karl and his team. Dr. Karl has been working since the early 1990s on a light detection and ranging, or LIDAR, system that mounts in a helicopter and provides rapid detection of airborne biological agents at distances up to 18 miles. In all, Los Alamos has built three deployed production units and delivered them to the Army’s 310th Chemical Detachment in Fort McClellan, AL. The units also have been “type classified,” meaning they are listed as a standard U.S. Army Defensive Inventory item available to protect troops or civilians. Called Biological Standoff Detection Systems, the units are maintained in a high state of readiness for deployment anywhere in the world.

The units are mounted on skids for easy insertion and removal from Army UH-60 Blackhawk helicopters; they can search about a million acres per hour. As the helicopter travels across the field of interest, the BSDS fires pulses rapidly from a laser. When the laser light hits aerosols, some of the light is reflected back toward the helicopter. A telescope picks up this reflected energy and focuses it on a sensitive light detector. An onboard computer processes the signals and displays the results on a monitor. After only a short period of training, soldiers have demonstrated their ability to



Photo by LeRoy N. Sanchez

effectively operate this first-ever capability for standoff detection of biological aerosols. In a variety of tests, the BSDS successfully detected and tracked biosimulants (benign microbes used to stand in for agents such as anthrax, cholera, botulism, or other harmful agents) and distinguished between the biosimulant cloud and a cloud of dust. The system also tracked biosimulant clouds of very low density and was able to map features of the clouds, such as size, shape, relative concentration, and speed of movement. Dr. Karl designed the BSDS units so a single soldier can operate one. The units have been put through hundreds of hours of training and testing runs. The current version of the BSDS is safe to the human eye beyond about a mile and a half. Dr. Karl is currently involved in developing a version of the BSDS that shifts the laser output to a wavelength that is completely eye safe. He also is studying a version of the system that would use an ultraviolet laser beam, which would create a signature operators could use to further characterize the clouds.

--John R. Gustafson

Article taken from Los Alamos National Laboratory web page, Monday, Jan 25, 1999.

INTERNATIONAL COOPERATIVE R&D

Foreign Comparative Testing Program

Five proposals for FY00 funding under the Foreign Comparative Testing (FCT) Program have been submitted to DA. Summary proposals of these five have been previously screened by a DA level review committee and full proposals were requested. All five proposals will now be submitted to a DOD level review committee consisting of representatives from all services. All SBCCOM(E) proposals have been coordinated with the appropriate commodity area manager (CAM) of the Joint Service Materiel Group, and with representatives of the Joint Service Integration Group. Because of this, there is significant joint service interest in each of the proposals, and should increase the likelihood of funding. The five submitted proposals are: foreign civilian masks, masks for the JSAPM program, decontamination equipment, lightweight chemical detector, and a field portable flame photometric monitor.

Foreign Visitors

Mr. Paul Taylor, Director of the CBD Sector, Porton Down, UK, visited us in December to discuss the current level of cooperation between Porton Down and Edgewood. He expressed confidence that this level would continue. He received a briefing on the current efforts within the RDA Business Area, the Research and Technology Directorate, NBC Defense Systems and visited our Rapid Prototyping Team. Mr. Taylor commented that the level of complementary and overlapping programs between the two organizations was quite large and that an even stronger cooperation than is currently underway could be achieved. He was accompanied by Mr. James Platt and Mrs. Selina Wright of the UK Embassy.

Visit to Singapore Defense Science Organization

Dr. George Famini visited the Applied Chemistry Laboratory (ACL) of the Singapore (SN) Defense

Science Organization in November. The visit was at the invitation of the director of the ACL, Dr. Lee Fook Kay. The laboratory has been actively involved in chemical defense research (at the 6.1 and 6.2 levels) for approximately 10 years. During the visit, the topic of cooperation and collaboration between SBCCOM and DSO was discussed. The laboratory has made major investment in physical protection, water monitoring and purification, and treaty verification. Because this covers a variety of technologies, the potential of a fairly broad information exchange annex (IEA) was discussed. Dr. Lee strongly endorsed the idea of an IEA focusing on physical protection, detection, monitoring and decontamination, and will be forwarding the concept of an IEA on chemical and biological defense through his higher headquarters. In addition to an IEA, there is also the potential for a project agreement (under the US/SN TRDP MOU signed in May 1998) in the area of agent water monitoring. Singapore has developed a fully automated monitoring system based on solid phase microextraction and gas chromatography. This technology could benefit the agent water monitor program currently in tech base, and using SN technology, it may be possible to accelerate the US program. Singapore is extremely interested in collaborating with the US on this program, and is interested in a Project Agreement to finish the final development of the water monitor, including ruggedization and miniaturization. This effort will be further investigated over the next several months, and if feasible, should result in the first US/SN PA.

US/FR General Officers Working Group Meeting Held at Centre D'etudes du Bouchet

The annual US/FR NBC General Officers Working Group (GOWG) meeting was held in January at the Centre d'Etudes du Bouchet, Vert-Le-Petit, France. Dr. John Ferriter represented the US and COL Gilles Fernandez, the new director for CEB, represented France. The first day was dedicated to presentations by FR industry on

current capabilities and FR government/industry cooperation, from an industry perspective. Industries present were Giat (the host for the 25th), SP Defense and Proenigen. On the 26th, a review of all current US/FR cooperative efforts was held at CEB. All four current Data Exchange Agreements (DEAs) (151 on Biological Defense, 1281 on Defense Against Chemical Agents, 1285 on Chemical Threat Agents, and 1031 on Chemical Detection) were considered to be healthy, with a very good degree of activity. Some concern was expressed regarding 1285, and whether there is sufficient new threat agent information to justify a long term future for the DEA. Dr. Ferriter, with the concurrence of COL Fernandez, suggested the DEA begin to focus on toxic industrial chemicals as well as the "classical" chemical agents.

In addition to the DEAs, the current project agreement (PA) on laser standoff detection and the development of a PA on biological detection were discussed. For the former, the FR indicated some difficulty in meeting one of the critical milestones assigned to them. The US delegation was very disturbed, and requested both sides go back, review the progress of all tasks under the PA and provide a roadmap for completion of all tasks. Dr. Ferriter and COL Fernandez agreed to discuss the issues in a telephone call in the late February timeframe. For the biodetection PA, Dr. Ferriter indicated some concern that the US would be able to fully support a PA as it is currently being envisioned. Although committed to a cooperative PA on biological detection in general, he tasked Dr. Famini to review current tech base programs and develop a series of specific tasks that would be in line with current US projections for future technologies.

The next meeting of the US/FR NBC GOWG is scheduled for the US in the November 1999 timeframe.

Briefings to the Joint Venture Oversight Group (JVOG) on CB Defense Policy

Dr. Ted Warner, ASD (S&TR) and Mr. Brian Hawton, Deputy Policy Director, chaired the first JVOG meeting on CB Defense Policy in December at the Pentagon. This initiative was a direct result of a May announcement by Secretary Cohen and Secretary Robertson that the US and UK would hold joint meetings discussing CB defense policy. The JVOG meeting consisted of briefings from the technical CB defense community, the intelligence community, and the operational and joint staff dealing with CB issues. As part of the briefings from the technical community, Mr. Michael Parker provided an update of the current efforts under the trilateral MOU on CBD, and Dr. James Savage provided an update of the TTCP CBD Group activities. The JVOG complimented both efforts, stating that from a technical and materiel development standpoint, excellent cooperation was already in evidence, and requested that the JVOG would be available to address any concerns or problems faced by the two technical groups. Further, the JVOG agreed to establish three working groups under the JVOG, one on policy, one on operational assessments, and one on technical cooperation.

Multilateral Cooperative Programs

Quadripartite Working Group on Nuclear, Biological, and Chemical Defense (QWG/NBCD) – The U.S. Army has developed the third draft of QSTAG 991, Standard Tests for Measuring the Penetration of CW Agents Through Protective Clothing. The American, British, Canadian, and Australian (ABCA) Armies plan to adopt the test procedures contained in U.S. Test Operations Procedure (TOP) on Permeation and Penetration Testing of Air Permeable, Semi-Permeable, and Impermeable Materials with Chemical Agents or Simulants as the standard tests for measuring the penetration of CW agents through protective clothing. The third draft will be forwarded to the ABCA Armies for their review and comments. Once Armies' comments are received, a final draft will be developed and forwarded to the Primary Standardization Office for ratification action.



Quadripartite Advisory Publication (QAP) Being Developed for The American, British, Canadian, and Australian (ABCA) Quadripartite Working Group on Nuclear, Biological, and Chemical Defense (QWG/NBCD) – During the Executive Meeting of the QWG/NBCD, Canada was tasked to produce a QAP on the Status of the Integration of NBCD into Armies' Digitized Battlefield Projects. American, British, and Australian Armies are to provide national inputs to Canada for use in development of the QAP. The Office of the PM for NBC Defense Systems has been tasked to develop the U.S. input. A QAP is a document used in the ABCA arena when formal agreement between Armies to achieve and maintain specified levels of standardization in specified materiel and non-materiel fields is not necessary, but when the listing of national data (procedures, equipment specifications, etc.) would promote compatibility.

***North Atlantic Treaty Organization (NATO)
AC/225 Land Group 7 (NBC Defense)***

The 6th Meeting of NATO Land Group 7 was held at NATO HQ, Brussels, in March 1999. The U.S. Army Nuclear and Chemical Agency (USANCA), DOD Action Agent for Land Group 7, hosted a U.S. Position Meeting in February, in preparation for the March meeting. The Edgewood CB Center prepared U.S. Position Papers on the following agenda items in support of USANCA: Interchangeable Respirator Canisters; Challenge Subgroup; Revision of the Triptychs on Early Warning and Detection, and NBC Decontamination Equipment; Activities of Project Group 32, Hand-Held Test Kits; and the Biotechnology Data Bank. Mr. William Klein, the ECBC Representative to Land Group 7, attended both the U.S. Position Meeting and the Meeting in Brussels.

US/Swedish Project Agreement

Drs. George Famini and Ron Checkai met to work out the final details for a US/Swedish project agreement to cooperatively develop environmental toxicity data and fate and effects information for

chemical warfare agents and their precursors and breakdown products. Sweden is especially interested in the aquatic contamination and effects, and how the agents leach into the groundwater and aquifers.

Memorandum of Agreements

Memorandum of Agreement (MOA) was signed between the Joint Vaccine Acquisition Program Project Management Office (JVAP-PMO) and SBCCOM. This agreement funds the SBCCOM International Programs Office in the development and staffing of international agreements pertaining to vaccine development and acquisition.

Dr. George Famini met with John Anderson of the PM Joint Vaccine Acquisition Program (Ft Detrick) to discuss the proper procedures and protocols for the implementation of a tripartite project arrangement on variola development and acquisition. This PA is being developed under the auspices of the US/UK/CA CBR Memorandum of Understanding (MOU), which is expected to take effect in the April/May time frame. SBCCOM is providing support to the PM in the area of expertise in the development and staffing of international agreements.

Canada hosted the meeting of the Program Officers/Requirements Officers (PO/RO) in March. In preparation for this meeting, Mr. Parker, U.S. Program Officer, hosted a U.S. Position Meeting in February, to review the progress of the MOU. He received briefings on the ongoing International Task Forces (ITFs) on Assessment of Hazardous Materials; Medical Countermeasures to New Agents; Virus Materials; and Trinational Concept of Medical Defensive Operations on the Present CW Battlefield. He was also briefed on the Test and Evaluation Working Group, Site Remediation and Decontamination; Riot Control Grenade; Cooperative Opportunities on the Joint Biological Remote Early Warning System; the Antibody Development Working Group; the Joint Chemical Agent Detector/Lightweight Chemical Agent Detector; Implications of Genetic



Engineering; and the Medical Countermeasures Coordinating Team.

ITF 35 - Chemical Warfare Agent Medical Countermeasures

The 2nd meeting of International Task Force (ITF)-35 was held in January at the Canadian Embassy, Washington, DC. ITF-35's function is to define the tri-national medical concept of operations in a chemical warfare environment and possible medical countermeasures. To address one of the terms of reference information gaps, Mr. Jablonski briefed the ITF group on significant battlefield concentration challenge levels, particularly for compounds listed by the ITF-6 and ITF-34 groups. The briefing provided a summary of agent use, a threat and vulnerability schematic of key threat assessment variables, a summary of the hazard assessment process and a suggested range of possible exposure levels defined as high, medium and low (depending on agent volatility). This information was used in subsequent working group discussions among ITF-35 members during the meeting.

FOX Amendment

Dr. George Famini and Mr. David Lee attended a meeting in January at the AMC International Cooperative Program Activity to discuss the U.S. strategy for amending the current US/GE Memorandum of Agreement (MOA) on the FOX's Logistic support. A discussion was held on how to bring the United Kingdom and the Netherlands into the current MOA and how the U.S. involvement would be affected by the accession of these two countries. Dr. Famini and Mr. Lee, later in the month, attended a negotiating session with representative from Germany to develop a combined position. The United States agreed that although we will provide technical and legal representation at all quadripartite negotiating sessions, Germany would present our joint position.

The Technical Cooperation Program (TTCP) Technical Panel 9, Chemical and Biological Defense Group Meeting

The annual meeting of the Tech Panel 9 provides the single opportunity each year for face-to-face collaboration between United States, United Kingdom, and Canada Chem/Bio hazard prediction modelers. This year's meeting was held at the Defence Evaluation and Research Agency (DERA), Porton Down, UK in January. These meetings are used more as "working meetings", and much of the time is spent discussing future modeling development plans, writing the text of the reports for Tech Panel 9 1998-1999 tasks, and providing briefings of ongoing efforts. Among topics discussed included recent HPAC and VLSTRACK developments (including V&V), the new U.S. CB M&S Commodity Area Manager, the OSD review of U.S. CB hazard models, urban modeling plans and activities, and Canada and UK modeling efforts. Mr. Jablonski briefed on the Chemical Warfare Field Trial Archive Database (CWFTAD). The CWFTAD is a secure, password protected web-based database maintained by the CBIAC which was created to archive deteriorating documents maintained by the Operations Research and Analysis (ORA) Team. Mr. Jablonski's briefing proposed that the success of the CWFTAD to salvage the ORA Team's field trial database should be expanded to include databases maintained within the CB modeling community, thus providing a single shared resource for the entire community. The concept was well received, and several contacts were made.

TTCP Establishes Web Site

The Washington Deputies of The Technical Cooperation Program (TTCP) announced the formation of a home page for general information concerning TTCP at: <http://www.ttcp.osd.mil>

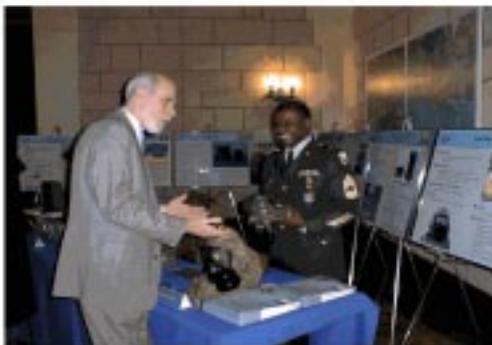
POCs: Dr. George R. Famini or Ms. Juanita M. Keesee, International Programs Office, Commercial (410) 436-2552/5376, DSN 584-2552/5376, email g r f a m i n i @ a p g e a . a r m y . m i l or jmkeesee@apea.army.mil.

SUPPORT FOR PRESIDENT CLINTON'S SPEECH AT THE NATIONAL ACADEMY OF SCIENCES

President Clinton has made defending the United States against chemical and biological weapons a top national security priority. The possibility that outlaw nations and terrorist groups will seek to use these weapons represents one of the greatest threats to American security in the 21st Century. The Administration has sought to defend against these threats through diplomatic and military means abroad and through increased preparedness at home. In his Fiscal Year 2000 budget — which includes \$10 billion to defend against terrorism and weapons of mass destruction — President Clinton will propose major increases in funding to strengthen America's defenses against the threat of biological and chemical weapons.

In January, President Clinton spoke on counterterrorism at the National Academy of Sciences in Washington, DC. "Because of the speed with which change is occurring in our society, we've got to be sure we do everything we can to close the gap between offense and defense," Clinton said.

NBC Equipment Demo - President's Speech on Anti-Terrorism



22 Jan 00

MSCI(P) Samuel Sharps



22 Jan 99

President Clinton

"We're doing everything we can in ways that I can — and ways that I cannot — discuss to try to stop people who would misuse chemical and biological capacity from getting that capacity," the president said.

"This is not a cause for panic," he added. "It is a cause for serious, deliberate, disciplined, long-term concern."

Warning that terrorists are seeking new tools of destruction, President Clinton said he will ask Congress for \$2.8 billion to help the United States guard against attacks via computers, viruses, or chemicals.

NBC Equipment Demo - President's Speech on Anti-Terrorism



22 Jan 09 Cpt(P) John O'Regan

NBC Equipment Demo - President's Speech on Anti-Terrorism



22 Jan 09 Cpt(P) John O'Regan

SBCCOM provided equipment display support for the President's speech, which drew significant national and local press and TV attention. Both Dr. John J. Hamre, Deputy Secretary of Defense, and Ms. Janet Reno, US Attorney General, were in attendance.

The display by the PM for NBC Defense Systems was in a prominent location; and SBCCOM personnel distributed over 50 VIP packages, which contained fact sheets on NBC systems, the Technical Escort Unit, and other equipment. PM NBC Defense provided a 15 minute interview with the Associated Press on NBC Defense equipment going to Rapid Assessment and Initial Detection (RAID) teams.

MAJ John O'Regan and MSG(P) Samuel Sharps received the support mission early on January 21st. They made all necessary coordination and ensured everything was in place for the morning's event in less than 24 hours.

RAID: Teams formed to combat weapons of mass destruction

The United States National Guard units have recently stepped into a new role of combating weapons of mass destruction. Rapid Assessment and Initial Detection (RAID) teams are being formed to be trained to respond to domestic incidents involving use of Weapons of Mass Destruction (WMD), particularly those involving the use of chemical, biological, or nuclear weapons.

Full-time National Guard members, upon completion of training and operation certification, will be on 24-hour availability with the ability to be deployed within 4 hours of an incident.

The mission of the team is to deploy to an area of operation in support of the local incident commander to: assess a suspected chemical, biological, or nuclear event; to advise civilian responders regarding appropriate actions; and facilitate requests for assistance to expedite arrival of additional state and federal assets to help save lives, prevent human suffering, and mitigate great property damage.

Ten units are being formed nationwide, stationed at locations based on Department of Defense criteria and in concert with the ten Federal Emergency Management Agency (FEMA) regions. Factors considered in making the decision are demographics, threat assessment, location of high value targets, military airlift capability, and the availability of other federal response assets. RAID teams will be based in California, Colorado, Georgia, Illinois, Massachusetts, Missouri New York, Pennsylvania, Texas, and Washington.

POC: Ms Brenda C. Eckstein, Corporate Enhancement Team, Commercial (410)-436-2879, DSN 584-2879, or email brenda.eckstein@sbccom.apgea.army.mil

SUPPORT FOR "STATE OF THE UNION" ADDRESS

The State of the Union address by the President of the United States was declared a National Special Security Event. The Chemical Biological Rapid Response Team (CBRRT) was tasked to provide resources to counter a potential CB Threat in the National Capitol region during President Clinton's State of the Union address. This support included providing chemical and biological modeling and hazard assessment to the CBRRT on the evening of January 19th at the Edgewood Operations Center. Specific tasks included gathering local meteorology information for the DC region and simulating a chemical and biological release of material near the Capital.

These scenarios were updated on an hourly basis during the event. Specific scenarios requested by the CBRRT located in DC were also modeled.

All modeling results were relayed to CBRRT unit in the District of Columbia from the Edgewood Operations Center using the EIS software package. During the exercise, the Defense Threat Reduction Agency's Hazard Prediction Assessment Capability (HPAC) model was the model of choice. The D2PC model was also available.

POC: Mr. Raymond E. Jablonski, Commercial (410) 436-3566, DSN 584-3566, or email ray.jablonski@sbccom.apgea.army.mil

IMPORTANT

<i>Upcoming Conferences</i>		
<i>Date and Place</i>	<i>Title</i>	<i>POC</i>
<i>14-18 June 1999 Edgewood Area Conference Center</i>	<i>Scientific Conference on Aerosol Research</i>	<i>Ms. Amy Coverstone (410) 569-0200 email: coverstonea@battelle.org</i>
<i>21-25 June 1999 Edgewood Area Conference Center</i>	<i>NBC Symposium DOD CB APBI IR&D Conference on CB S&T</i>	<i>Mr. David P. Labar (410) 436-5272 email: dplabar@apgea.army.mil Mr. Ronald P. Hinkle (410) 436-2031</i>

GENERAL JOHNNIE E. WILSON VISITS SBCCOM

On March 11th, GEN Wilson, retiring Commander of the U.S. Army Materiel Command, visited SBCCOM for the last time. GEN Wilson was succeeded on March 23rd by Lieutenant General John G. Coburn, who served as the Deputy Chief of Staff for Logistics, United States Army, Washington, DC.



GEN Wilson started his visit with a Smoke demonstration and a ride in the Fox vehicle. He received an equipment display inside a Simplified Collective Protection Ensemble. He toured the Process Engineering Facility and addressed several SBCCOM Senior Leadership Alignment workshops.

GEN Wilson also presented an award to Dr. Harry Salem on being unanimously elected as a Toxicology Fellow of the American College of Toxicology. Dr Salem, who is the Chief Scientist for Toxicology, was internationally recognized for his contributions to the significant advancement in the science of toxicology.



During his visit, GEN Johnnie Wilson (center) visited the CBRRT to get the latest information on this SBCCOM mission. Dr. Clarence "Wes" Kitchens (at left), AMC's Principle Deputy for Technology, accompanied the AMC commander for the demonstration led by Mr. William Drumgoole (second from left), team leader, and COL Larry Sparks, SBCCOM Operational Enterprise Director (second from right).

POC: Ms. Joann J. Brucksch, Corporate Enhancement Team (410) 436-5383, DSN 5 8 4 5 3 8 3, o r e m a i l joann.brucksch@SBCCOM.apgea.army.mil

**ANNUAL MEETING OF THE
ASSOCIATION OF THE UNITED STATES ARMY
October 13, 1998**



DEPARTMENT OF THE ARMY
HEADQUARTERS UNITED STATES ARMY MATERIEL COMMAND
5001 EISENHOWER AVENUE, ALEXANDRIA, VIRGINIA 22333-0001

December 18, 1998

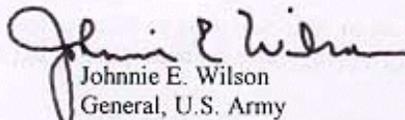
Dear Dr. Smardzewski:

Our presentation, "What Are We Doing for the Soldier of 2020? Critters, Spikers and Tortellini," at the Annual Meeting of the Association of the United States Army, October 13, 1998, was a resounding success. The feedback from soldiers, civilians, industry representatives, and senior leaders in government and the commercial sector, has been highly complimentary.

Your assistance with the Biological Aerosol Warning System segment contributed to the success and we appreciate very much your time and effort.

Thank you for the role you played and for helping us demonstrate that the Army Materiel Command is truly relevant, responsive and ready to support the soldier of today and of 2020.

Sincerely,


Johnnie E. Wilson
General, U.S. Army
Commanding

Dr. Dick Smardzewski
Office of the Program Director, Biological Defense Systems
U.S. Army Soldier and Biological Chemical Command
Edgewood Area
Aberdeen Proving Ground, Maryland 21010-5423

POC: Dr Richard R. Smardzewski, Commercial (410) 436-1832,
DSN 584-1832, or email rrsmarz@apea.army.mil



*Left to right: R. Smardzewski,
J. Christian, K. Vado, and
D. Sickenberger.*

The Edgewood CB Center enacted the Integrated Biodetection (Bio) Advanced Technology Demonstration Program (ATD) to demonstrate two technologies: one that provides a pre-exposure warning for a biological attack, and another that provides an order-of-magnitude increased sensitivity to agents while adding a first time virus identification capability with significantly reduced logistics. The BAWS technology is vital to the development of a real-time detection and early warning alert to an immediate aerosol bio-hazard on the battlefield. The BAWS sensors provide rapid real-time biological aerosol warning using small laser based particle counters. Final development shall provide identification of unique DNA sequences, virulence factors in current and emerging pathogens as well as an automated virus detection and identification capability. The device will have an estimated response time of 30 minutes and be capable of providing for a 12 hour mission with reduced consumable, and storage requirements.

PEOPLE

SBCCOM's **Dr. Mohamed Mughal** successfully *completed his Ph.D. in Public Policy* from the University of Maryland. Dr. Mughal is currently assigned to the command's Domestic Preparedness Program, and the interagency and intergovernmental nature of the program's mission will provide Dr. Mughal with challenging and exciting opportunities to practice and apply his new academic skills. Congratulations to Dr. Mughal!

At the 19th Annual Meeting of the *American College of Toxicology*, it was announced that the Council had recommended and *unanimously elected Dr. Harry Salem a Fellow*. This honor was bestowed upon Dr. Salem because of the international recognition of his many contributions to toxicological research and to the advancement of the science of toxicology.

Mr. James Blackiston of the Detection and Decontamination Core Team received an *Army Ideas for Excellence Award* for the implementation of his recommendation on the installation of a turn-off valve when operating a siphon system as a means of water conservation. As a result, the conservation of water for drinking, as well as for decontamination purposes, is now in place.

Our Technical Director recently announced that the following Edgewood CB Center employees were selected to receive a *1999 Excellence in Federal Career Award* from the Baltimore Federal Executive Board (FEB):

GOLD/SILVER AWARD FINALISTS:

Dr. Tu-Chen Cheng, Category IIA, Outstanding Professional (Technical, Scientific and Program Support)

Mr. Raymond R. Lins, Category IIA, Outstanding Para-Professional (Technical, Scientific & Program Support)

BRONZE WINNERS:

Ms. Sabrina V. Edwards, Category I, Outstanding Supervisor (Grades 13 & Above)

Ms. Hilda M. Bartley, Category IV, Outstanding Clerical

Ms. Roberta C. Walker, Category VI, Equal Employment Opportunity Service

Ms. Patricia J. Reeves, Category VIII, Community Service

The FEB Awards Ceremony and Luncheon will be held May 7th.

ENGINEER-FOR-A-DAY PROGRAM

Edgewood Chemical Biological Center's Engineering Directorate hosted ten students during the Engineer-For-A Day Program. The students shadowed their mentors through part of a typical engineering workday and toured specialized engineering laboratories. The laboratory tours included Computer-Aided Engineering, the wind tunnels, microwave/laser lab, biological detection system production area, Experimental Fabrication, Process Engineering Facility, and a MICAD integration on an M1 Tank. The agenda also included a valuable discussion on college experiences and what to expect as an engineering student, the pros and cons of different majors, a review of various colleges, and potential student work experience.

HAMMER AWARDS

The Hammer Award is presented to teams of federal employees who have made significant contributions in support of reinventing government principles.

Recently, the Chief of Staff to the Secretary of Defense and the Commanding General of the U.S. Army Materiel Command participated in the presentation of two Hammer Awards at Natick. The awards were presented to the “Partnering with a Field Unit Team” and the “Technology Transition Team.”

In January, several employees at Edgewood, who are part of the “In-House Report Functional Improvement Team,” were notified that their team had been awarded Vice President Gore’s Hammer Award for developing and implementing the improved process for preparation and publication of the annual Department of Defense In-House Research, Development, Test, and Evaluation Activities Report. The first publication was the FY96 In-House report; and the new web-based system dramatically streamlined the report publication cycle by reducing the time to publication by over 75 percent, lowering the cost of producing the report by over 50 percent, and decreasing work hours spent by those involved in report preparation by almost 60 percent.

VOLUNTEERS FOR MEDICAL ENGINEERING (VME)

VME is a Maryland tax-exempt charitable organization, which provides an opportunity for skilled professionals to “give back” to those with disabilities or to the elderly. Participants design and manufacture innovative medical devices through the donation of their time and talents to the VME program.

VME was founded by Mr. John Staehlin, P.E., an engineer working for Westinghouse Defense Electronics in Linthicum, MD, around 1978. By 1982, volunteers from Westinghouse and other defense contractors were performing research, inventing solutions to individual challenges, and serving the needs of individuals with disabilities throughout Maryland. VME is headquartered in the Maryland Rehabilitation Center on Argonne Drive in Baltimore.

VME’s mission is “*to improve the independence of individuals with disabilities through the use of innovative engineering.*” VME is not intended to

compete with private industries that make medical assistive devices in the commercial market place. VME focuses on “one of a kind” devices that can be designed and built for a client who, for whatever reason (cost, uniqueness, etc.), cannot obtain the device through commercial sources.

Currently, VME clients come from “word of mouth” referrals, professional referrals, and community outreach. They could be a friend, relative, a loved one, or anyone in the Harford/Cecil County areas. Efforts are being initiated to publicize our efforts in local newspapers.

Potential clients (or concerned acquaintances or family members) may contact anyone on the VME team. Initially, a Client Service Team visits the potential client. The Client Service Team will include the primary point of contact from the VME team, the team technical leader, usually a representative of the medical community who works with VME, and an engineer familiar with

the area of concern. Once the initial contact has been made by the Customer Service Team, the project is presented to the Project Review and Approval Committee (PRAC) for approval. If the PRAC approves the project, the project is turned over to the VME team where design and manufacture occur.

After the project is completed, it is once again presented to the PRAC. Once the PRAC approves the work to ensure it fulfills the client's needs and is safe to operate or use, the item is turned over to the client. The various review by the PRAC are required to meet the VME liability insurance requirements.

VME assessment, engineering, and manufacturing time is donated. Materials costing up to \$200 for VME programs are paid for by VME. VME corporate sponsors, individual contributions, or donations of materials and services from local businesses and industry usually cover costs above \$200.

Past VME projects have ranged from a modified walker for a student learning to walk after a brain injury to computer programs that teach eye movement control and communications skill to a battery pack to control body temperature for a toddler.

In November 1998, a permit was approved for a VME Team to operate at SBCCOM. We initiated operation on December 3, 1998, when nearly 30 employees and community members attended an orientation by Ms. Jan Hoffberger, the executive director of VME. This initial training was a requirement of VME so that volunteers are covered under VME's liability insurance policy.

Our kickoff meeting was held on February 1st; team officers were elected and volunteers had a chance to get their "hands dirty" and accepted the challenge of working for newly assigned clients.

Currently, VME has 6 projects. Several of these are on-going VME projects where the assistance of the SBCCOM VME team was requested. A follow-up training session was conducted on February 23rd for those who were unable to attend the kickoff meeting and wished to participate in VME.

The SBCCOM VME team currently has about 35 members from all facets of the workforce. In addition to SBCCOM employees, members of the Edgewood Area community are strongly encouraged to participate. You do not need to be a member of SBCCOM to participate in our VME activities. The only requirement is a desire to help those among us with disabilities.

At the VME PRAC meeting in February, the SBCCOM VME team received approval to begin its first project. Two members of our VME team attended the PRAC meeting to answer any questions the committee had concerning the project.

Officers at SBCCOM are Leader, Ms. Sue Chester; Technical Leader, Mr. Mark Schlein; Installation Representative; Ms. Laurie Kwiedorowicz; Project, Property and Financial Manager, Ms. Connie Riley; and Client Advocate, Mr. Bob Coen.

POC: Mr. Robert L. Coen, Client Advocate, Commercial (410) 436-8213, DSN 584-8213, or email robert.coen@sbccom.apgea.army.mil



SBCCOM EXHIBITS AT THE ASSOCIATION OF THE UNITED STATES ARMY'S WINTER SYMPOSIUM

The U.S. Army Soldier and Biological Chemical Command was well represented at the AUSA Winter Symposium in February at the Radisson Twin Towers Convention Center, Orlando, FL. The theme for this event was "Meeting the Challenge: Preparing Industry and the U.S. Army for the Millenium" and featured speakers that included the Honorable Louis Caldera, Secretary of the Army; Chief of Staff of the Army, GEN Dennis J. Reimer; and GEN John N. Abrams, Commanding General of the U.S. Army Training and Doctrine Command.



COL (P) "Yogi" Mangual (center), Deputy for Acquisition and Readiness, SBCCOM, thanked the troops from Fort Polk for bringing their newly-fielded BIDS to the symposium. From left, SGT Jimmy Bouffard and PFC Sheronda Tucker, both of Fort Polk, AL; COL Mangual, CPT Russ Spengler, who is assigned to the Program Director, Biological Detection Systems at SBCCOM, and Mr. Bruce Jezek, Program Director.

Within the AMC Corporate Exhibit, SBCCOM joined the Army Research Laboratory and the Tank-Automotive Command in the module titled, "Soldier Support", one of five different areas of the exhibit. The three R&D organizations demonstrated technological breakthroughs being pursued jointly with industry that will help soldiers fight and survive on the battlefield into the 21st Century.

SBCCOM demonstrated a hand-held device, an ALERT Ticket, featuring a nanomaterial, called a dendrimer, that can reliably detect the presence of biological warfare agents at extremely low concentrations. Using a simulated bio-agent detection test to show how simple it was to operate the ALERT Ticket in a threat environment, visitors were advised that this new technology could provide soldiers with an early warning of anthrax, plague, VEE, botulinum, and other threat agents.

In addition, SBCCOM provided two mannequins with individual equipment for today's soldier and the future "land warrior." The current soldier was equipped with components based on modern technologies in clothing, camouflage, chem/bio protection, and ballistic protection. The future soldier was shown equipped with a chemical/biological dosimeter that could be part of the "sensor-to-warrior" warning network being developed by SBCCOM for the Joint Services. The mannequin was also wearing the Advanced Tactical Parachute System, a new lightweight parachute featuring a landing-velocity attenuator that reduces the rate of descent prior to ground impact and lowers the probability of parachute landing injuries.



Yes, the Black Ninja was in Orlando as part of AMC's Corporate Exhibit.

The future soldier, nicknamed the "Black Ninja" by MG Doesburg, modeled many n o t i o n a l technologies that could provide the "leap-aheads" warfighters will need in the Army After Next. Wearing a lightweight multifunctional material uniform

with embedded electronics and power management systems, the uniform incorporated a chameleon-like outer layer, a ballistically resistant layer, and an underlying layer that protects against cold, heat, and chemical and biological agents. Computing, communication, and power management electronics were simulated in the layers of the fabric and the helmet portrayed future lightweight material that would protect against ballistic, acoustic, and directed-energy threats. The future helmet could incorporate a 360-degree combat ID system, individual GPS antenna, and hands-off communications and computing interfaces.

The separate, SBCCOM exhibit (20 feet), featured a photographic display of the diverse missions, Joint Service Materiel Group activities, a mannequin in Joint Service Lightweight Integrated Suit Technology and the Joint Service General Purpose Mask, and an interactive, browser-based demonstration of the Joint Warning and Reporting Network (JWARN).

In an outside exhibit, the Biological Integrated Detection System was on display as well as the Counterproliferation Long-Range Biological Standoff Detection System and the Airborne Precision Delivery System.



BIDS TEAM: (From left) SGT Jimmy Bouffard and PFC Sheronda Tucker, Fort Polk, AL; MG Ralph Wooten, Commandant of the U.S. Army Chemical School, Fort McClellan, AL; and CPT Russ Spengler, who is assigned to the Program Director, Biological Detection Systems at SBCCOM.

CPT Russ Spengler, Mr. Bruce Jezek (Program Director for Biological Detection Systems), and the two soldiers from Fort Polk provided information to our visitors. SGT Jimmy Bouffard and PFC Sheronda Tucker of the 7th Chemical Company, 142nd CSB, provided excellent support in briefing the BIDS to visitors and flag officers.



Under the warm Florida sun: the Biological Integrated Detection System, parked at the entrance to the outside displays, drew as much attention as did Universal Studios, across the street.

Mr. Mike Bucci (Project Manager for NBC Defense Systems) was the briefer for the JWARN system that was demonstrated on a browser-based, touch-screen monitor.

We were also lauded by many for our role in meeting requirements for the Joint Services in CB defense systems development. Mr. William Fox, Joint Service Materiel Group, was an excellent spokesman and highlighted our leadership in this area. He was a real asset in talking to our military counterparts in other countries who found our display informative.

As an aside, at our exhibits, the military SBCCOM systems received much attention and interest; we were on local Orlando Channel 9, WFTV (ABC), with the laser biodetection system and BIDS in the background. Also, we had extremely high interest in our role in Domestic Preparedness and Homeland Defense. In the past, AUSA events have been primarily military; but this year, many were national guard, law enforcement, fire departments, and medics.



Counterproliferation Long-Range Biological Standoff Detection System: SBCCOM's industry partner, Schwartz Electro-Optics, Inc., of Orlando, was represented at the display by Jeffrey A. Saunders, Director of Corporate Business Development.



*From the Natick Soldier Center, the **Airborne Precision Delivery System** on display in the SBCCOM tent, is part of the SBCCOM Airdrop Program, which encompasses the design and development of airdrop equipment for personnel, supplies, and equipment in support of mass airborne assaults, resupply, special operations, deep strike concepts, and humanitarian relief. The focus is on improved accuracy and reliability of parachutes, increased payloads, improved safety, and increased operational flexibility.*



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584-2879, or email
@sbccom.apgea.army.mil



Edgewood Enterprise employees participate in many workshops, symposiums, and conferences; and many are recognized by outside organizations for their exemplary performance. It is our pleasure to share this information.

In December:

Members of the SBCCOM Disability Awareness Team attended the **Perspectives on Employment of Persons With Disabilities** conference. This annual conference brings together all of the elements of the federal government which deal with disability issues. The guest speakers represented those offices which deal with disability issues at the highest levels of federal government. In addition, a number of workshops were presented on various topics, such as Providing Reasonable Accommodations, Office Ergonomics, and Emergency Evacuation Of Disabled Persons. The information we gathered will assist the Disability Awareness Team in developing a beneficial disability program for SBCCOM.

A **Joint Warning and Reporting Network (JWARN) Demo/Exhibit** was installed in the Office of the Assistant Secretary of the Army for Research, Development and Acquisition. JWARN was one of only five systems selected for display during the month of December. This demonstration is comprised of a browser-based, interactive, touch-screen monitor that provides information on the Joint Vision 2010 concept, sponsoring agency information, and entrance into the JWARN demo. Portraying local area battlespace, visitors to Mr. Hoepfer's and LTG Kern's offices can learn more

about JWARN's combination of systems linking NBC detectors to tactical communications and how it provides NBC warning, reporting, and battlefield management. The team effort that went into this display was tremendous, and ASCD appreciates their support: COL Reeves, for his firm support and encouragement; Ed Conley and Nick Marasco, for the computer design, concept, and program-writing; Ralph Falcone and his team for the exhibit design & construction and outstanding graphics; and the "fielding team" who went assisted at the Pentagon, Nick Marasco and Ron Eckstein.

Dr. George Famini attended the **1st Singapore International Symposium on the Protection Against Toxic Chemicals**, sponsored by the Singapore Defense Science Organization. The meeting brought together 180 scientists, including 100 from other countries, who are involved in research and development of chemical and biological warfare defense equipment. Key topics included the qualification and proficiency testing for treaty labs, simulant research, detection of chemical agents, medical countermeasures, and physical protection. In addition to being invited to chair the session of physical protection, Dr. Famini was also invited to present a paper on the use of computational chemistry for the prediction of physicochemical properties for use in selection of agent simulants.

Drs. Harry Salem and Eugene Olajos co-chaired the successful **5th Biennial Alternative Symposium** entitled "Alternative Toxicological Methods for the 21st Century." This symposium was held at the National Library of Medicine, Bethesda, MD. The partners and co-sponsors were the U.S. Army Soldier and Biological Chemical Command, National Institute of Environmental Health Sciences, U.S. Army Center for Health Promotion and Preventive Medicine and the U.S. Army Medical Research Institute of Chemical Defense. The

symposium was held in association with the Associate of Government Toxicologists, Chesapeake Chapter of Sigma Xi and the National Capital Area Chapter of the Society of Toxicology. The keynote address by Dr. Anne Sassaman of the National Institute of Environmental Health Sciences discussed Environmental Health Sciences Research: Opportunities for Improving Human Health. The guest speaker at the Dinner Banquet was Dr. Michael Balls, Head of the European Center for the Validation of Alternative Methods. Highlights of the breakthrough alternative technologies included the following: Dr. John Gordon of M. Sinai School of Medicine discussed transgenic technology as uniquely situated as a novel and effective system for toxicological testing. Dr. Gordon helped develop the first transgenic model while at Yale University in the 1980s. Transgenic models are animals with different gene inserts. Additional novel techniques included the use of differential gene display methods of gene expression to develop databases and screening assays for predictive toxicology applications and real time in vivo imaging on monitoring technology based on detection and quantification of light transmitted through living mammalian tissue and the production of biochemical light from genes that can be cloned and mixed from site to site. There were 100 attendees at this Symposium.

In January:

Members of the Natick Soldier Center participated in the Army Science Board's Advisory Panel **Workshop on Strategies to Protect the Health of Deployed Forces**. The goals were to gain an understanding of several issues in physical protection and decontamination, including requirements for protection, textile and garment technology, barrier creams, toxicity, the percutaneous threat, and human performance under stress. Members of the Army Science Board briefed their respective areas of expertise with open discussions following the briefings until the goals of the workshop were achieved.

The Edgewood CB Center Computer Aided Engineering (CAE) Team hosted the Baltimore

Chapter of the **Society of Manufacturing Engineers (SME)** for their February meeting. A dozen members of the CAE team remained after hours to present their capabilities and facilities to visiting engineers from around Maryland. The interest level within SME was very high, with 150% of the normal monthly attendance and the presentation was very well received. SME members were impressed with the technology integration and the team's capabilities. They commented on the enthusiasm of the team and their willingness to voluntarily stay late to demonstrate their work.

Messrs. Robert Gross, Dick Dewey, and Mike Lee participated in a war game at U.S. Central Command. SBCCOM was tasked by OSD/Policy CP and funded by DTRA to support the CENTCOM war game series. SBCCOM will also support a trip to SWA to initiate discussions on a Cooperative Defense Initiative against WMD. SBCCOM sent a CB expert on the OSD trip to Bahrain, Kuwait, and Jordan at the end of February.

In February:

SBCCOM was represented within the AMC Corporate Exhibit at the **Association of the U.S. Army (AUSA) Winter Symposium** in the Soldier Support portion of the exhibit with our Joint Service mask and CB dosimeter. Additionally, we fielded a separate Command exhibit and showcased a P³I Biological Detection System (BIDS) and Natick's Advanced Precision Airborne Delivery System (5-ft wing span). See article on page 45.

Mr. James Warrington and Dr. Mohamed Mughal attended the **National Symposium on Medical and Public Health Response to Bio Terrorism**, held in Washington, D.C. The symposium presented by the Johns Hopkins Center for Civilian Bio-defense

studies included interagency briefings and discussions of the bio-terrorism threat and the expected clinical and epidemiological features a bio-terrorist event. Interagency panels also discussed the medical response requirements associated with both contagious and non-contagious bio-terrorist attack scenarios. In addition to providing a good background on the threat of bio-terrorism, the symposium proceedings have provided our team valuable concepts to help plan the medical response portion of this year's bio-oriented Federal, State and Local exercise.

SBCCOM hosted 20 students of the **Air Force's Air War College**. This was their final "field trip" in the Chem-Bio Warfare class. Col Jim Davis, their instructor at the College, felt that it was beneficial for them to come to SBCCOM as part of the curriculum. They visited the Chemical School late last month and came here after visiting Fort Detrick

In March —

Ms. Monica Heyl attended the **Advanced Research Workshop** in Switzerland, the host nation for this NATO-sponsored workshop that is part of the NATO Partnership for Peace. Ms. Heyl received funds from a NATO grant earlier this fiscal year to organize this workshop. She presented the keynote address at the conference site, north of Zurich (in place of Mr. Mike Parker who had to cancel on short notice).

A Joint Agency NIOSH, DOD, OSHA **Chemical and Biological Respiratory Protection Workshop** was held at Lakeview Resort and Conference Center, Morgantown, WV.

The DoD CB Defense Technology Area Review and Assessment (TARA) was held in Washington, DC. This was the first joint medical/non-medical CB TARA. The TARA panel (Industry, Academia, and Government) is tasked by DDR&E to provide independent input regarding Science and Technology program adherence to principles of highest quality science, affective management, and

customer orientation. Dr. John Ferriter (SBCCOM), the current Defense Technology Area Plan Panel Chair and the Joint Service Technology Panel for CB Defense Chair, transitioned these positions to Mr. Carmen Spencer, DTRA, at the conclusion of the TARA.

Upcoming Symposium

The Edgewood CB Center has purchased exhibit space for the **FEMA Conference** in Gatlinburg, TN, in May. We will exhibit with Natick and the IMMC at Rock Island. The theme of the conference is "Moving Preparedness, Mitigation, and Response Into the Next Millennium."

An **NBC Symposium** is scheduled for June 1999 and will be the first of its kind at Edgewood. It will encompass parts of the Joint Service Chemical Biological Advance Planning Briefing for Industry (APBI), Worldwide Chemical Conference, and Independent R&D Conference on CB Science and Technology. A call for agenda topics for the APBI portion of the symposium is being circulated throughout the DOD CB Defense Community.

The NDIA will be sending out a brochure announcing the Symposium and providing information on how to register, etc. This office is compiling the information for that brochure, to include the agenda, maps, information about on-post housing, and instructions for participating in the IR&D Conference portion of the Symposium. One major change in this Symposium (from previous such conferences) is that a hard copy of the presentations will not be given out to attendees the day of the meeting. Rather, all of the presentations will be available on SBCCOM's Web Site for downloading a week or two before the Symposium. The brochure will also include information on where to go to get the presentations.



Books, Journals, and Magazine Articles

“Kinetic and Toxicological Parameters of ‘Mustard’ (HD) Hydrolysis and Biodegradation,” by Harvey, S.P.; Blades, T.A.; Szafraniec, L.L.; Beaudry, W.T.; Haley, M.V.; Rosso, T.E.; Young, G.P.; Earley, J.P.; and Irvine, R.L., in *Arsenic and Old Mustard: Chemical Problems in the Destruction of Old Arsenical and “Mustard” Munitions*, J.F. Bunnett and M. Mikolajczyk, eds. Kluwer Academic Publishers, Netherlands, 1998. The manuscript includes selected HD hydrolysis, biodegradation, and aquatic toxicology data gathered in support of the Alternative Technologies program funded by the Program Manager for Chemical Demilitarization. Other papers included in the book cover various chemical munition disposal issues from concepts to practical experience. Papers were presented at the NATO Advanced Research Workshop on Chemical Problems Associated with Old Arsenical and ‘Mustard’ Munitions, Lodz, Poland, in March 1996.

“Acute Inhalation Toxicity of Neutralized Chemical Agent Identification Sets (CAIS) Containing Agent in Chloroform,” by E.J. Olajos and H. Salem (Edgewood Chemical Biological Center) and E.W. Morgan, R.A. Renne, B. McVeety, R. Johnson, R.L. Phelps (Battelle Memorial Institute, Pacific Northwest National Laboratory), was published in *J. Appl. Toxicol.*, **Vol. No. 18**, pp 363-371 (1998).

“Evaluation of Neutralized Chemical Agent Identification Sets (CAIS) for Skin Injury with an Overview of the Vesicant Potential of Agent Degradation Products,” by E.J. Olajos, H. Salem, B. MacIver (Edgewood CB Center), and C.T. Olson, A.W. Singer, T.L. Hayes, R.G. Menton, T.L. Miller, T. Rosso (Medical Research and Evaluation Facility, Battelle), was published in *J. Appl. Toxicol.*, **Vol. No. 18**, pp 409-420 (1998).

“Neural Network Pattern Recognition Via Differential Absorption Mueller Matrix Spectroscopy,” by Arthur H. Carrieri, was accepted for publication in the Lasers, Photonics and Environmental Optics division of the *J. Applied Optics*. Artificial neural network systems were built and tested for detecting amino acids, sugars, and other solid organic matter by pattern recognition of their infrared polarized light scattering signatures in the form of a Mueller matrix. A backward-error propagation algorithm with adaptive gradient descent paradigm performs network training. The product of training is a weight matrix that, when applied as a filter, discerns presence of the analytes based upon their cued susceptible Mueller matrix difference elements. This filter function can be implemented as a software or hardware module to a future remote sensor Differential Absorption Mueller Matrix Spectrometer (DIAMMS). Referees reviewing the manuscript gave strong positive evaluations regarding originality of work, power of technique as applied to the C/B remote detection problem, and applicability of the neural network models to nonmilitary photopolarimeter-based research.

“Reactions of VX, GD and HD with Nano-Size MgO,” by George W. Wagner (Geo-Centers, Inc.), Philip W. Bartram (Edgewood Chemical Biological Center) and Kenneth J. Klabunde (Kansas State University and Nantek, Inc.), has been accepted for publication in *J. Phys. Chem. B*. The work examines the room temperature decomposition of liquid VX, GD and HD on MgO nano-particles. All three agents hydrolyze to yield non-toxic products, but HD also undergoes about 50% elimination. The observed kinetics are

characterized by a fast initial reaction, followed by a much slower steady-state, first-order reaction. The fast reaction is consistent with liquid spreading through the porous nano-particle aggregates. The steady-state reaction is identified as a gas-phase reaction, mediated by evaporation, once the liquid achieves its volume in the smallest available pores.

“Thermal Degradation of Bis(2-Chloroethyl) Sulfide (Mustard Gas),” by George W. Wagner (Geo-Centers, Inc), Brian K. MacIver (Edgewood Chemical Biological Center), Dennis K. Rohrbaugh (Edgewood Chemical Biological Center) and Yu-Chu Yang (U.S. Army ERO) was accepted for publication in *Phosphorus, Sulfur, and Silicon and the Related Elements*. The paper describes the decomposition of HD at 90 and 140C. Major products include Q, 1,2-dichloroethane, polysulfides and 1,4-dithiane. With 5% added water, oxygenates such as 1,4-thioxane and 2-chloroethanol are produced as are numerous sulfonium ions. The decomposition does not go to completion due to the equilibrium nature of the reaction at these temperatures.

Special Operations Forces and the Army's Technology Program by Mr. Michael R. Miller, SBCCOM, was published in **Army RD&A Magazine**, March-April 1999.

TECHNICAL REPORTS

Published technical reports, when available, should be requested from the Administrator, Defense Technical Information Center, ATTN: DTIC-FDRB, 8725 John J. Kingman Road, Ste 0944, FT Belvoir, VA 22060-6218.

<i>Report No.</i>	<i>Title</i>	<i>Author(s)</i>
ERDEC-CR-271	Final Report for Phase II LSCAD Scanner (Gen 2) and Retrofit of Phase I LSCAD Scanner (Gen 1) December 1998, UNCLASSIFIED - limited.	P. Cucchairo P. Beard
ERDEC-SP-050	Literature Review: Effects of Cryogenic Temperatures on Munitions and Munition Components, October 1998, UNCLASSIFIED - limited.	V.M. McHugh
ERDEC-TR-345a	Pressure Swing Adsorption Filtration Prototype-Scale: Study I - Chlorodifluoromethane (R-22) Constant Feed, August 1996, UNCLASSIFIED - limited.	M.T. Causey L.C. Buettner
ERDEC-TR-345b	Pressure Swing Adsorption Filtration Prototype-Scale: Study II - Trichlorofluoromethane (11) and Cyanogen Chloride (CK) Constant Feed, August 1996, UNCLASSIFIED - limited.	M.T. Causey L.C. Buettner
ERDEC-TR-345c	Pressure Swing Adsorption Filtration Prototype-Scale: Study III: Trichlorofluoromethane (R11) and Cyanogen Chloride (CK) Pulsed Feed, August 1996, UNCLASSIFIED - limited.	M.T. Causey L.C. Buettner

ERDEC-TR-345d	Pressure Swing Adsorption Filtration Prototype-Scale: Study IV: 2-Hexanol and Isopropyl Methyl Phosphonofluridate GB Pulsed Feed, August 1966, UNCLASSIFIED - limited.	M.T. Causey L.C. Buettner
ERDEC-TR-500	Acute Inhalation Toxicity of Neutralized GB in Rats by the Munitions Management Device, Version I (MMD-1) Wastestream Process, October 1998, UNCLASSIFIED - public release.	W.T. Muse S.J. Anthony E.J. Olajos S.A. Thomson C.L. Crouse L.C. Crouse
ERDEC-TR-530	Toxicological Evaluation of VX/Sodium Hydroxide (VX/NaOH) By-Products, Super Critical Water Oxidation (SCWO) Effluent Samples, and VX/NaOH Neutralized Samples by the Intravenous Route in Mice, December 1998, UNCLASSIFIED - public release.	J.H. Manthei R.A. Way K.P. Cameron B.I. Gaviola D.M. Bona
ERDEC-TR-547	Aquatic Toxicity of Evaporator Condensate Produced From the VX Super Critical Water Oxidation Process December 1998, UNCLASSIFIED - public release.	M.V. Haley C.W. Kurnas S.D. Turley D.T. Burton
ERDEC-TR-549	Dissolved Solids as HD Bioeffluent Toxicants December 1998, UNCLASSIFIED - public release.	M.V. Haley C.W. Kurnas
ERDEC-TR-552	Test Report for the Joint American/Israeli Improved Lightweight Standoff Chemical Agent Detector (ILSCAD), Operational Test: Test 2, September 1997, December 1998, UNCLASSIFIED - limited.	C.C. Keiser M.A. Myers M. Althouse
ERDEC-TR-553	Federally Owned Treatment Works (FOTW) Demonstration Test, Chronic Aquatic Toxicity of HD Bioeffluents, December 1998, UNCLASSIFIED - public release.	M.V. Haley C.W. Kurnas S.D. Turley D.T. Burton
ERDEC-TR-558	Inhibition of PCR by Contaminants in Field Samples December 1998, UNCLASSIFIED - public release.	D.E. Menking D.R. Eihinhaus P.A. Emanuel J.J. Valdes S.K. Kracke
ERDEC-TR-559	OPAA Enzyme Kinetics with the Substrates EA3534, GD and TGD, December 1998, UNCLASSIFIED - limited.	S.P. Harvey T-C. Cheng F.J. Berg

ECBC-TR-004	Domestic Preparedness Program: Liquid Sulfur Mustard and Sarin Challenge/Vapor Penetration Swatch Testing of ILC Chemturion Suit, Model 13, January 1999, UNCLASSIFIED - public release.	R.S. Lindsay J.M. Baranoski J.B. Hannigan
ECBC-TR-005	Domestic Preparedness Program: Liquid Sulfur Mustard and Sarin Challenge/Vapor Penetration Swatch Testing of Chempruf II Betex Suit, January 1999, UNCLASSIFIED - public release.	R.S. Lindsay T.L. Longworth M.A. Johnson
ECBC-TR-006	Domestic Preparedness Program: Liquid Sulfur Mustard and Sarin Challenge/Vapor Penetration Swatch Testing of Responder CSM Level A Gastight Protective Suit, Model 50660, January 1999, UNCLASSIFIED - public release.	R.S. Lindsay J.M. Baranoski J.B. Hannigan
ECBC-TR-007	Domestic Preparedness Program: Liquid Sulfur Mustard and Sarin Challenge/Vapor Penetration Swatch Testing of Tychem 10000 Vapor Protective Suit, Model 11645, January 1999, UNCLASSIFIED - public release.	R.S. Lindsay J.M. Baranoski J.B. Hannigan
ECBC-TR-008	Domestic Preparedness Program: Liquid Sulfur Mustard and Sarin Challenge/Vapor Penetration Swatch Testing of MARMAC Commander Brigade Ensemble, Style 10000F91, January 1999, UNCLASSIFIED - public release.	R.S. Lindsay T.L. Longworth M.A. Johnson
ECBC-TR-009	Quantitative Analysis of Residual VX in Caustic Neutralization Solutions by Solid Phase Extraction and GC/MSD: Analysis of Hydrolysate as Separated Organic and Aqueous Phases, February 1999, UNCLASSIFIED - public release.	K.M. Morrissey T.R. Connell W.R. Creasy J.R. Stuff H.D. Durst R.J. O'Connor
ECBC-TR-014	Domestic Preparedness Program: Liquid Sulfur Mustard and Sarin Challenge/Vapor Penetration Swatch Testing of Tychem 9400 Coverall Model 94150, February 1999, UNCLASSIFIED - public release.	R.S. Lindsay T.L. Longworth M.A. Johnson
ECBC-TR-015	Photographic Study of the Fate of VX Droplets on Various Surfaces, February 1999, UNCLASSIFIED - public release.	S.P. Harvey M.A. Guelta
ECBC-TR-017	Methanol Chemical Ionization Ion Trap Mass Spectrometry of VX Degradation Products, March 1999, UNCLASSIFIED - public release.	D.K. Rohrbaugh

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