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Q3 2018

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LTG Jeffrey S. Buchanan
Commanding General
U.S. Army North/Fifth Army
Senior Army Commander
Joint Base San Antonio, TX



**BG Antonio
Munera**

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U.S. Army Chemical,
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MULTI-LEVEL COORDINATION FOR MULTI-THREAT PREPAREDNESS

The 7th Weapons of Mass Destruction-Civil Support Team (WMD-CST), Missouri National Guard, supports IED and WMD threat detection and defeat in coordination at national, state, and local response levels.

By MAJ Lindsey Decker

Features



COMMANDER'S CORNER

Facilitating Land Force and Cross-Agency National Security

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LEADERSHIP PERSPECTIVE

A Century of Chemical Management and Defense

BG Antonio Munera

30th Chief of Chemical
Commandant, U.S. Army Chemical
Biological, Radiological and Nuclear School

Cover: A group of Michigan Army National Guard Soldiers from the 460th Chemical Company, 210th Military Police Battalion, practice chemical decontamination procedures during a training lane at Camp Grayling, MI. Participants received hands-on training and experience with CBRN equipment and procedures as Soldiers from all three U.S. Army components joined forces to train, assist and supervise Mexican Army counterparts. (Official U.S. Army Reserve photo by SFC Brent C. Powell)



PG 6

Increasing Predictability for Enhanced Incident Preparedness

JPEO CBRND's Experimentation Directorate is improving the capabilities acquisition cycle to help free first responders to counter threats more quickly.

By Richard Newton



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Promoting Information Evaluation and Diffusion

CST & CBRNE spoke recently with the Joint Program Manager for Information Systems (JPM-IS), JPEO-CBRND, regarding the criticality of measured, timely data in field operations.

Interview by Christian Sheehy



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Targeting an Ever Shifting Nuclear Threat

The U.S. Army's 20th CBRNE Command National Technical Nuclear Forensics mission is led by Nuclear Disablement Teams responsible for neutralizing post-initial incident hazards.

By CPT Ivan Cho



PG 26 UNIT FOCUS

Supporting Readiness through Expertise

The U.S. Army Chemical Materials Activity (CMA), Aberdeen Proving Ground, MD, safely stores and disposes of chemical warfare materiel.

By Karen Jolley Nikol



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Connectivity Driving Effective Incident Response

The Joint Task Force Civil Support (JTF-CS), U.S. Northern Command (USNORTHCOM), performs the vital task of revitalizing existing communications technology to sustain response readiness for a complex catastrophic crisis.

By MG William A. Hall

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INSIGHTS

As challenges surrounding national, state, and local incident and disaster persist, the preparation of men and women tasked with ensuring clear communication is paramount. From the halls of higher command, such as the North American Aerospace Defense Command (NORAD) and U.S. Northern Command (USNORTHCOM), to critical connectivity linking state civil support teams to emergency first responders, the need for clarity in integrated communications remains a top response priority.

The Q3 2018 issue of Security & Border and CST/CBRNE sheds light on relationships necessary to national security. S&B spoke with LTG Jeffrey S. Buchanan, Commander, U.S. Army North (ARNORTH) and MG William A. Hall, newly assigned Commanding General, Joint Task Force-Civil Support, USNORTHCOM, regarding today's challenges in sustaining high-level homeland defense readiness through joint and interagency cooperation. The implementation of cutting-edge, high-frequency (HF) radio communications to enhance communications redundancy for increased interoperability is happening now.

This issue profiles the 7th Weapons of Mass Destruction-Civil Support Team (WMD-CST), Missouri National Guard. This central U.S. first responder unit specializes in operations such as improvised explosive device (IED) neutralization, explosive ordnance disposal (EOD), national-level sporting event protection, and targeted hazardous material (HAZMAT) detection and removal. With the continuing need for understanding changing threats to the nation and its communities at all levels, the Army's JPEO for CBRN Defense, Aberdeen Proving Ground, MD, is in the first year of an Experimentation Directorate designed to give field commanders at home and deployed a larger integrated chemical and biological early warning capability.

As the U.S. Army Chemical Corps celebrates 100 years of service, we get a look at some priorities and challenges that the installation is working on from the words of BG Andy Munera, 30th Chief of Chemical and CBRN School Commandant. On the chemical materials side, the Army's Chemical Materials Activity, in coordination with the PEO for Assembled Chemical Weapons Alternatives (ACWA), is actively involved with the safe storage and disposal of various types of chemical warfare agents still in existence at Army Depots Pueblo and Bluegrass.

From a radiological and nuclear perspective, the issue offers a look at critical efforts in nuclear waste disposal being undertaken by the Army 20th CBRNE Command's Nuclear Detection Teams (NDTs) as they support the DoD's National Technical Nuclear Forensics (NTNF) mission, a first line of national defense in case of a potential nuclear conflict.

Your comments and suggestions are welcome. Thank you for your continued readership!

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¹Lurie KG, et al. *J Med Soc Toho*. 2012;59(6):304-315.

²Convertino VA, et al. *Resp Care*. 2011;56(6):846-857.

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MULTI-LEVEL COORDINATION FOR MULTI-THREAT PREPAREDNESS

By MAJ Lindsey Decker, Commander, 7th WMD-CST



7th CST Survey Team training on site characterization and evidence collection. (MOARNG)



7th CST trains on a joint entry with the Springfield Fire Department at their new training site. (MOARNG)

The 7th Weapons of Mass Destruction-Civil Support Team (WMD-CST), Missouri National Guard, one of the first 10 teams created under the Clinton Administration in 1999, has a history of supporting various high-profile events, supporting local and federal agencies during real-world incidents, and training hard to maintain preparedness for any threat. I joined the team nearly two years ago, and everyone I spoke to with any knowledge about the 7th CST told me the same two things: I was joining one of the most professional and proficient CSTs in the nation, and I was going to be incredibly busy and away from home for the foreseeable future. Both of those statements are spot on, and here is why: We work hard. We care about our mission and work every single day to ensure we are ready when called.

Over the past training year, members of the 7th CST drove hard to train to a higher level and build stronger relationships with civil authorities across the state and region. We trained collectively as a team at 12 different training events with as many different agencies including multiple large and small fire departments, local law enforcement agencies, DNR, EPA and the FBI. Individuals on the team attended over 25 different training courses to improve their proficiency in their specialties. We trained in and supported real-world events in over 15 different states spanning from Massachusetts to California, gaining confidence in our skills, learning the most current techniques and procedures, and building strong relationships with adjacent

CSTs. We were called upon for multiple immediate response missions in Missouri ranging from identifying unknown substances in suspicious packages to providing support to civil authorities during the riots and unrest in St. Louis.

We endeavor to share the knowledge we have with other agencies and to continually learn from other experts in the community. In that vein, I would like to share some highlights from the past year's training, new equipment gains and mission accomplishments, from those on the team that work so hard.

Meeting IED and WMD Threats

The history of U.S. Explosive Ordnance Disposal (EOD) teams dates back to World War II. The initial mission at that time centered on rendering safe the host of unexploded bombs, mines and other ordnance left behind by conventional armies on battlefields and cities across Europe. Today's mission has shifted to a focus on detecting and defeating improvised explosive devices (IEDs) and WMDs. "The challenge of today's mission is multifold," said SGT Brett Redel, Admin/Decon NCO, former Survey team member. "The threat environment is continually changing. The threat is more clandestine. The enemy is more adaptive and requires an adaptive response. The risk of failure is more catastrophic. Chemical, biological, radiological and nuclear devices expand the risk from a localized area to an entire region," he emphasized.

Asynchrony Labs has been supporting the EOD mission since 2003, when it worked on a government research project developing a system to connect EOD personnel in the field with an online knowledge base. After leading the project to a successful final Military Utility Assessment in 2005, Asynchrony entered into a Cooperative Research and Development Agreement (CRADA) to extend the technology to other military, public sector and commercial organizations.

Today, the Mobile Field Kit (MFK) puts state-of-the-art collaboration tools and real-time sensor data in the hands of tactical teams such as first responders; chemical, biological, radiological, nuclear and explosives teams; and physical security teams. The MFK is typically configured in a package that includes the software, hardened tablets and/or laptop computers, secure wireless mesh networking, and hardware facilitating wide area network connectivity via cellular, satellite or other networks. "There is growing support for integration of capabilities onto mobile systems," Redel indicated. "The kit is housed in a portable, hardened case that includes everything needed for deployment across the city or halfway around the globe. It's built to easily integrate a wide array of communication and sensor suites within a field-tested, standards-based platform," he added.

Whether working in the wake of a disaster or mobilizing to secure a base or large facility, teams in the field require effective tools for communication, collaboration, situational awareness, and management. "The MFK allows



Members of the 7th CST. (MOARNG)

team members to acquire, store, evaluate and share information, both within the team and across organizational boundaries," Redel noted.

Securing National Events

With the primary mission of a WMD-CST to provide expertise to civil authorities on all matters relating to WMD hazards, a unique mission CST personnel must be prepared for is to integrate and operate with their civilian counterparts at the local, state, tribal and federal level. One manner in which the 7th fulfills this mission is through security support to football games for the University of Missouri and to the NFL's Kansas City Chiefs.

"Our team members work with civilian EOD, K-9 and firefighter professionals for the safety of the event," said SSG Daniel Ponder, Survey team member. A typical configuration for this mission is three CST members: two from Survey and one senior member from Operations or another section. The two Survey members will conduct sweeps and inspections with their civilian counterparts and provide expertise in their field as needed. The Operations member present will coordinate documentation, reporting and requesting additional forces if necessary.

"In this capacity, CST members gain valuable experience," Ponder noted. "Not only do they provide a valued service to their civilian counterparts; they gain the opportunity to work with and build professional relationships with them as well."

Prepping for HAZMAT Coordination

For the past 21 years, hazardous material (HAZMAT) teams from the Missouri National

Guard have participated in an organized challenge for a chance to network with one another, practice technical skills, and learn new HAZMAT techniques under realistic conditions in a safe environment. "The annual HAZMAT Challenge involves vehicles, trucks, tankers, and rail cars used in some of the props to mimic real-life hazardous material situations," said SSG John Trower, Survey team chief. "Past Challenge scenarios have included drug laboratory or chemical hazard identification, a complex valve tree, confined space rescue, compressed gas leaks, a leaking rail car dome, pressurized drum opening, a stinger operation, and a damming/diking exercise from an overturned tanker."

This year, to even the playing field and to seed apples to apples, the HAZMAT Challenge became the All-CST Challenge. Held at the same venue as the original event, four CSTs showed for the inaugural event. New Mexico, Utah, and Southern California teams met up with our Missouri team on May 21 at Training Area 49 in the Los Alamos National Laboratory. Eight evolutions made up the course, each one a four-hour block. "Evolutions were mainly scenario-based, consisting of chemical, biological, radiological and toxic industrial materials," Trower noted. "The sites included an airfield, village, rail yard, rural road, medical clinic, and a confined space hidden in a home. Scoring was conducted on a 100-point system per event with an opportunity for bonus points for best practices and point deductions for unsafe acts."

The competition was tight, and all four teams performed very well. It came down to the wire with Utah beating Missouri by one point and only 30 points separating all four teams. ■



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INCREASING PREDICTABILITY FOR ENHANCED INCIDENT PREPAREDNESS

A chemical, biological, radiological or nuclear event could mean devastating losses for U.S. forces without warning or protection from weapons of mass destruction. With this potentiality, the Joint Program Executive Office for Chemical, Biological, Radiological and Nuclear Defense established an Experimentation Directorate in 2017 to improve the acquisition cycle and free DoD to counter threats more quickly.

By Richard Newton, Experimentation Directorate



An important part of training for chemical, biological, radiological and nuclear readiness involves the Joint Service General Purpose Mask. Experimentation tests solutions aimed to provide the early warning that Soldiers need to put on protective equipment. (U.S. Army Reserve photo by SPC Torrance Saunders, 982nd Combat Camera Company Airborne)

A new directorate is currently managing an enhanced capability demonstration as part of the Joint Program Executive Office's (JPEO) larger integrated situational-understanding campaign to develop an integrated chemical and biological early warning capability using mostly non-materiel and a few materiel solutions. These solutions combine existing sensor technologies, information threads and advanced algorithms from multiple battlefield domains into a novel decision management framework for operational use. The integrated situational-understanding campaign will collect chemical, biological, radiological and nuclear (CBRN)-related information threads, distribute them in a common operating environment among the joint forces and develop an analytical engine to weave them into an informative fabric, offering commanders choices of action and informing logistical considerations. The actions could include changing the joint forces' Mission Oriented Protective Posture levels, altering battlefield routes of ingress and egress, and suggesting decontamination options.

This campaign's primary purpose is to provide joint forces more warning time and more options in the event of a chemical or biological attack. Increased warning time allows them to don their protective masks and consider options such as moving upwind or around the attack, thus maintaining their freedom to act, move and maneuver while accomplishing the mission. A successful integrated situational-understanding campaign requires three improvements to the existing decision-making infrastructure for more timely delivery of CBRN information to the joint forces:

- A more robust information network drawing from a wider variety of sources, such as non-CBRN counterbattery radar sensors, to warn commanders of incoming rounds before they explode and disseminate chemical agents.
- A more robust way to disseminate information to and from commanders.

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The AN/TPQ-50 counterbattery radar is evaluated for its ability to detect chemical or biological ordnance, whether detonated or in-flight, at a JPEO-CBRND experiment at Yuma Proving Ground, Arizona. (U.S. Army photo)

- Development of an automated decision tree that provides actionable outputs for commanders.

Objective: Earlier Detection

The enhanced capability demonstration includes two experiments in fiscal year 2018, with the objective to reduce risk and enable commanders to survive an event involving weapons of mass destruction. One experiment, which is exclusive to the demonstration, will analyze the value of real-time, radar-based information threads. In the other, the demonstration enlists the U.S. Defense Threat Reduction Agency (DTRA), Ft. Belvoir, VA, to study the connectivity and continuity of the common operating environment and its interfaces.

A first experiment examines real-time information threads that will look for CBRN information of value in existing radar-based data, such as that gathered using the fielded AN/TPQ-50 and AN/TPQ-53 counterbattery radar systems. This experiment is designed to determine if the systems can detect ordnance filled with chemical or biological weapons or material in flight or upon detonation. For joint forces, this capability could mean more warning time. Additionally, chemical sensors deployed right of boom – just after detonation of the chemical-biological round – could be directed by radar data to stare at the point of impact to detect chemical-biological threats, rather than scanning the entire battlefield. This could also yield additional warning time.

Another part of this experiment, performed at U.S. Army Dugway Proving Ground, UT, uses 155 mm rounds, some with conventional solid fills and some with liquid fills. Liquid fills are characteristic of chemical-biological munitions and include triethyl phosphate (liquid), polyethylene glycol (liquid), conventional high explosives (solid), and blanks. The 155 mm rounds are detonated in ground and air bursts to replicate possible scenarios. Among the differences captured from the variously filled rounds are their trajectory, wobble, and post-detonation fragmentation patterns. Contrasting the rounds' radar signatures could identify the fill as chemical-biological (liquid) or non-chemical-biological (solid). An analysis of differences in the data should illuminate the possibilities of using radar-based information threads for early warning of a chemical-biological attack.

In a second experiment, the JPEO joins DTRA in Perceptive Dragon II. The experiment takes place at Marine Corps Base Quantico, Virginia, and examines the connectivity and continuity of interfaces in the common operating environments of the Army and Marine Corps. The

field demonstration, using Army and Marine personnel and equipment, assesses the feasibility and utility of passing CBRN tactical voice and data communications between the two services for common battlefield awareness and understanding. The connectivity and continuity of existing interfaces control the flow of data between the Army and Marine Corps. The two services exchange simulated radar data such as point of origin, point of impact and in-flight characteristics of suspected CBRN rounds. Knowing the point of impact allows CBRN detectors to stop scanning a wide area and focus on a single point, thus reducing the time it takes to identify a CBRN threat. Successful interservice exchange of CBRN data will demonstrate the capability to enhance awareness and understanding, thus shortening a commander's decision cycle – the time from awareness to understanding to decision to action.

Perceptive Dragon II also examines a radiological and nuclear sensor interface in the legacy integrated sensor architecture to gauge the feasibility of harvesting and distributing radiological and nuclear data between services. This will increase awareness, understanding, and options for commanders' actions. Additional experimentation will ultimately involve the Navy and Air Force as well.

Managing Critical Logistics

Another element of the JPEO effort is to determine the feasibility of incorporating a CBRN logistics management system into the integrated situational-understanding campaign. There is no current system to record and track the amounts of contaminated classes of supply that need to be reconstituted beyond local standard operating procedures. Improved management of CBRN logistics information could improve the management of equipment by quickly answering the question: Do we have the CBRN equipment that joint forces need when they need it? The benefit to the joint forces would be to more reliably identify areas needing resupply and better understand mission impacts.

More Analysis and Experimentation Ahead

This fall, the Experimentation Directorate will analyze the data inputs, outputs, and joint force evaluations. If the experiments prove successful in harvesting real-time, CBRN-related information threads and distributing them among the joint forces' common operating environment, then the enhanced capability demonstration will have contributed substantially toward early warning. A successful demonstration will bring about the combination of awareness, understanding and confidence that facilitates effective, timely decision-making so the joint force can continue military operations in a CBRN environment.

Additional experiments are planned for each year in fiscal years 2019 to 2021 on the decision-support tool that produces courses of action for joint forces commanders. Once the experiments have established the utility of data from counterbattery radar and radiological detectors, along with connectivity among commanders, those information threads can feed into the decision-support tool. Future experiments will incorporate additional threads, and the decision-support tool will continue weaving the threads into an informative fabric to increase awareness and understanding and provide commanders with courses of action. ■

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A CENTURY OF CHEMICAL MANAGEMENT AND DEFENSE

Brigadier General Antonio (Andy) Munera is the 30th Chief of Chemical and Commandant of the U.S. Army Chemical, Biological, Radiological and Nuclear School.

BG Munera received a Regular Army commission in May of 1991 as a Distinguished Military Graduate from Shippensburg University in Pennsylvania. His military education includes the Chemical Officer Basic and Advanced Courses, the Command and General Staff College, the School for Advanced Military Studies and the U.S. Army War College. He holds a Bachelor of Science degree in history and masters degrees in theater operations and strategic studies.

In his 26 years of service to our nation, BG Munera has served in a variety of command and staff positions.



CST & CBRNE had the opportunity to speak with BG Antonio (Andy) Munera, 30th Chief of Chemical Corps, Commandant of the U.S. Army Chemical, Biological, Radiological and Nuclear School, on the occasion of the U.S. Army Chemical Corps' 100th anniversary and some current priorities and challenges.

CST & CBRNE: Give us a look into some key evolutionary aspects of the U.S. Army Chemical Corps to the present time (i.e., when it was first stood up and the reason, some brief history, and focal aspects of the mission to the current day).

BG Munera: The Chemical Warfare Service was formed on June 28, 1918, during World War I. As Germans began to use chemical agents, the first weapons of mass destruction that were introduced on the modern battlefield, the Chemical Warfare Service was established to help protect our Soldiers and to deliver chemical munitions later in the war. The Chemical Warfare Service reached peak strength during World War II, with chemical Soldiers among the first waves to land on Omaha and Utah beaches on D-Day, the invasion of Europe. The Chemical Corps as we know it today was born out of that service, and since then we've remade ourselves to be whatever the Warfighter needed to support their efforts in every major conflict.

As we reflect on our past and move toward our next 100 years of service, one thing has not changed: the fierce resolve of the Dragon Soldier, which serves as the bedrock of deterrence to ensure that our adversaries don't employ WMD [weapons of mass destruction] and, if they do, ensures the Army is ready to fight and win in a contaminated environment.

Our objective must remain ensuring unit proficiency in chemical, biological, radiological and nuclear (CBRN) defense tasks and conducting mission-essential tasks in a CBRN environment. We will accomplish these tasks by seeking to increase CBRN defense proficiency at the unit level, evolving CBRN as part of a complex operating environment, and modernizing CBRN defense capabilities. Our end goal is to retain freedom of action in a CBRN environment.

BG Antonio Munera

30th Chief of Chemical and Commandant
U.S. Army Chemical,
Biological, Radiological and Nuclear School

CST & CBRNE: As the Chemical Corps celebrates its 10 decades of existence, what are some current challenges and program priorities the Corps is focusing on to address present-day global threats to U.S. security?

BG Munera: To meet the future challenges of large-scale combat operations, the priority of the Chemical Corps is to assess, protect the force, and mitigate CBRN hazards in stride with no degradation to combat operations. Near-peer adversaries are projected to have the access and capability to employ [WMD], intermittent air superiority, and cyber-electromagnetic threats, as well as cause challenges for resupply. Based on these projected threats, the Chemical Corps is focusing its near-term and modernization efforts to improve remote, real-time integrated assessment, individual and collective protection, and mitigation of CBRN hazards. The experience and expertise of members of the Corps will be leveraged to help drive future materiel solutions, such as furthering our capabilities for contamination avoidance and terrain decontamination.

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Members of the Chemical Corps Regiment form up on Fort Leonard Wood's Gammon Field June 28 for an early morning run commemorating the centennial anniversary of the Corps. (Photo by Michael Curtis, Fort Leonard Wood Visual Information Center)

CST & CBRNE: From an individual Soldier readiness perspective, how have lessons learned over recent years of real-world missions helped redefine training regimen for preparing new, threat-ready CBRN professionals to address real-time challenges?

BG Munera: As we honor the past and prepare for the future, we must pivot from a counterinsurgency mindset to large-scale combat operations. LSCO require that our Soldiers are ready to excel and survive in austere environments. We must ensure that our Soldiers are prepared for the harsh realities of the potential mass casualties of LSCO and increased vulnerabilities to the effects of CBRN hazards. Therefore, it is paramount that we continue to improve Soldiers' lethality, individual and collective training, and knowledge gaps as they pertain to operating on a contested battlefield. LSCO will create high demands for CBRN personnel and health service professionals. Leaders at all echelons must make every effort to ensure that our force remains deployable to fight and win our nation's wars. Our Soldiers must be equipped, trained, and prepared to execute reconnaissance and surveillance tasks to provide commanders with detailed, timely, and accurate CBRN intelligence, and to gain situational understanding of CBRN threats and hazards. Area support companies must be prepared to conduct decontamination of targeted areas, and they must possess a level of familiarization to fill in gaps within other specialized areas of our career management field.

CST & CBRNE: As this year's CBRN Exhibition and Best CBRN Warrior Competition occur, speak to some of the goals you have for each and how the CBRN School is promoting greater partnering with industry to bring solutions for raising the CBRN training bar.

BG Munera: We are always learning. The Chemical Corps is working with the science and technology community and looking at what our adversaries or potential adversaries could be capable of doing. We continue to develop the tools and skills we need to keep up with or get ahead of our adversaries. Annually, the Chemical Corps holds a gathering of CBRN/WMD joint, interagency, intergovernmental, multinational, industry, academia and CBRN professionals. The goal of the gathering is to leverage the CBRN community to provide the best support possible to current operations and Soldiers, along with engaging our CBRN strategic thinkers of today and discussing preparations for our next set of challenges.

CST & CBRNE: Feel free to speak to other challenges/goals moving forward.

BG Munera: In this information age that we live in, proliferation of ideas and information that enable bad actors to possess weapons of mass destruction is something we have to keep up with, and [we must] constantly evolve our methods for defending against those kinds of attacks.

There is a lot of pride right now in our Corps as we commemorate our centennial anniversary. The state of the Chemical Corps is strong. I've seen a constant evolution of technological capability and an evolution in what we're training in our classrooms and right here at Fort Leonard Wood, the home to the U.S. Army CBRN School. Our progress is in response to the real threats we face around the world, and I assess we're heading in the right direction. We've made many strides, but there are also bad actors who continue to develop new capabilities. We always have to be at the cutting edge; we always have to be at our best to make sure we can defend all Servicemembers and the homeland.

WORTH NOTING

Next-Gen Chem Bio Suit

W.L. Gore & Associates' Protective Fabrics Division has expanded its line of certified products for emergency responders with the addition of the Ruggedized Class 3 suit made of GORE® CHEMPAK® selectively permeable fabric. Manufactured and distributed by Blauer® Manufacturing Company, Inc., the Ruggedized Class 3 suit is certified to NFPA 1994, Class 3R and NFPA 1992 Standards (2018 Edition). The suit's ruggedized construction makes it ideal for extended CBRN responses that include tactical entry or search and rescue missions for several reasons.

First, the GORE® CHEMPAK® selectively permeable fabric is engineered to deliver extremely durable protection against potential exposure to liquid and vapor chemicals, biological and radiological particulates, blood and body fluids, and emerging pharmaceuticals such as fentanyl – even after exposure to field contaminants such as seawater, sweat and hydraulic fluid.

Second, the form-fitting garment, with reinforced padding at critical stress points for a greater level of cut and puncture resistance, is designed to enable the responder to move more easily and effectively throughout hazardous surroundings, confined spaces and rubble piles.

Third, the highly breathable GORE® CHEMPAK® selectively permeable fabric enables the responder to stay actively involved in the mission significantly longer than an impermeable suit does. While maintaining a minimum of four hours of permeation protection, Gore's barrier enables sweat vapor to escape through the suit, helping reduce heat stress.

NFPA certifications and AEL/SEL qualifications of the Ruggedized Class 3 suit make it eligible for grant funding.

More info: [GoreChempak.com](https://www.gorechempak.com)

TARGETING AN EVER SHIFTING NUCLEAR THREAT

The U.S. Army 20th CBRNE Command provides trained and ready Ground Collection Teams prepared to deploy immediately and execute debris collection in support of the National Technical Nuclear Forensics mission.

By CPT Ivan Cho, EOD Officer, Nuclear Disablement Team 1, 20th CBRNE Command



U.S. Army PFC Maxwell Price, a ground collection team member assigned to the 51st CBRN Company, collects ground samples during Exercise Prominent Hunt 18-1, Burbank, CA. (U.S. Army photo by SPC Joseph Friend)

The 20th Chemical, Biological, Radiological, Nuclear and Explosives (CBRNE) Command, based in Aberdeen Proving Ground (APG), MD, has multiple mission sets, both in the homeland and overseas, as well as several distinct capabilities. The command's Nuclear Disablement Teams (NDTs) are a unique capability within the Army charged with the primary mission of identification, characterization and, when necessary, the targeted disablement of an adversary's nuclear infrastructure and facilities.

The NDTs rotate support as part of the National Technical Nuclear Forensics (NTNF) Ground Collection Task Force (GCTF). The NTNF-GCTF is not a conventional Army mission. If the NDTs deploy as part of the GCTF, then a catastrophic nuclear event has just occurred in the United States or other friendly nation requesting support. The area surrounding the point of detonation will be in chaos, and basic



CAPT Ivan Cho

civil infrastructure may be destroyed. Cellphone towers and electricity in the surrounding vicinity may be down.

Upon detonation, the explosive fireball rises into a mushroom cloud, pushing dust, dirt and debris — nuclear or otherwise — into the air in a plume. This plume is subjected to various atmospheric conditions and shifts and moves with the winds. Over time, the debris in the plume falls and deposits on the ground. The larger and heavier particles fall more quickly, while the lighter particles may ride the winds for very long distances before depositing on the ground.

Managing Specific Incident Need

As part of a consequence management response, the GCTF needs the capability to understand the terrain, plan routes and traverse the

destruction to execute sample collection operations quickly and effectively at different locations and distances relative to the plume.

The Army's 20th CBRNE Command provides the GCTF with this capability. Led by a supervisory special agent from the FBI and comprised of representatives from the FBI, the Department of Energy (DoE) and the DoD, the NTF-GCTF stands ready to deploy on order, seamlessly integrate with the other responding agencies and conduct ground sample collection operations to answer technical requirements.

The DoD provides approximately 26 personnel to the GCTF, including 14 Soldiers from the 48th Chemical Brigade, a subordinate command of the 20th CBRNE Command; two Signal Soldiers and one maintenance Soldier from Headquarters and Headquarters Company, 20th CBRNE Command; seven Soldiers and officers from the NDTs; and two Airmen from the Air Force Technical Applications Center (AFTAC), who serve as the task force technical event field lead (TEFL). The TEFLs determine the technical requirements to plan each of the collection missions, incorporating the results of sample analysis into future plans and managing the sample from collection through the laboratory process.

The GCTF is responsible for the collection of nuclear debris from the detonation of a nuclear device of unknown origin in support of forensic analysis and subsequent attribution. Following detonation, nuclear debris contains unburned fuel and fission products from the device. These particles decay at varying rates, some with a very short half-life. Therefore, samples collected as soon as possible after detonation offer the greatest potential for analysis.

Distributing Response Support

Led by the NDTs, the DoD component of the GCTF stands ready to execute on a prepare to deploy order (PTDO) standby status with a short notification to launch response timeline. Upon assembly of the GCTF, a forward operating base is selected, surveyed and occupied, and each section begins working toward establishing initial operating capability.

The GCTF plans the initial collection mission based on initial reports and computer-generated models of the plume. The information gained from this initial collection provides key updates to the plume model necessary for follow-on mission planning. The overall collection goal is evidence of fission in the form of fission products, with minimal mass and a range of volatility.

The DoD ground collection teams (GCTs) execute a rigorous training schedule to establish and maintain readiness for this important mission. DoD components of the GCT cycle through the NTF mission PTDO standby every six months, despite personnel moves. The overall NTF training evolution requires a minimum of five weeks and includes NTF academics, nuclear debris phenomenology, Airborne Radiological Detection, Identification and Measurement System (ARDIMS) training, and the culminating Prominent Hunt validation exercise. The training cycle begins with two weeks of NTF academics hosted by the NDTs at APG. The NTF academics consist of a combination of classroom instruction and a field-training exercise designed to provide the opportunity for newly assigned personnel to get an idea of the size and scope of the entire task force and meet representatives from each of the constituent agencies while learning their role in the NTF-GCTF mission.

Detection and Removal

The next event in the ground collection team training calendar is nuclear debris phenomenology, or more commonly referred to as Crater Crawl. Held at the Nevada National Security Site in Mercury, Nevada,



SGT Ivan Franco (right), a decontamination team leader for a chemical response team and member of the current ground collection task force, teaches the incoming GCTF team on following proper procedures, collection techniques, maintaining their PPE (personal protective equipment), and ensuring they get sufficient sample evidence during the NTF GCTF Academics at Aberdeen Proving Ground, MD. (U.S. Army photo by Angel D. Martinez-Navedo)

Crater Crawl is a one-week training event at which DoD and other invited personnel learn about nuclear debris formation and fallout and debris identification. Personnel are taken out to a number of different test sites and tour the craters resulting from actual nuclear tests after a classroom introduction to debris. Although these tests occurred decades ago, the nuclear debris remains and the students are provided the unique opportunity to train for their mission with the actual subject of their collection.

The ARDIMS pod is a UH-60-mounted detection and identification system that enables the user to map and identify hazardous and radiological areas of interest from a safe distance in the air. The information and data received by the detection pods provide the DoE modelers actual data from the nuclear plume to adjust the model and better inform collection mission planning. The ARDIMS pods are a unique asset specifically designed and created for the NTF mission. The ARDIMS operators learn system installation and operation and conduct several practical exercises, both in the classroom and in flight over the course of one week at designated locations in Edgewood, Maryland, or Fort Bragg, North Carolina.

Perpetual Preparedness

The NTF training cycle culminates with the Prominent Hunt exercise. Prominent Hunt is a bi-annual exercise that takes place in a large populated area. The last iteration was held in Burbank, California, and the next exercise is scheduled to be held in Colorado Springs, Colorado. Prominent Hunt validates the entire GCTF mission from detonation to notification, deployment, collections, analysis and reporting, and it includes participation from all partner agencies. The exercise does not end until the FBI task force leader determines the samples collected provide enough information for attribution. ■

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FACILITATING LAND FORCE AND CROSS-AGENCY NATIONAL SECURITY

Lieutenant General Jeffrey S. Buchanan assumed command of United States Army North (Fifth Army) on 26 August 2016.

LTG Buchanan's duty assignments include command and staff positions within the 82nd Airborne Division, 25th Infantry Division, 101st Airborne Division, and 10th Mountain Division. He also served as a Company and Battalion Tactical Officer at the U.S. Military Academy, the Director for Operations (J3) of Joint Task Force Full Accounting, and the Senior Light Infantry Task Force Trainer at the National Training Center.

LTG Buchanan served four tours in Iraq and one tour in Afghanistan. In 2003-2004 he was the Director of Operations (C3), Coalition Military Assistance Training Team. Between 2004 and 2006, he commanded the 2nd Brigade, 75th Division (TSB) and deployed a second time to Iraq to serve as an advisor to the Iraqi Special Police Commando Division. Upon his return, he served as the Director of Operations for U.S. Army North (Fifth Army) at Fort Sam Houston, TX until November of 2007. From 2007 through 2009, he served as Deputy Commanding General for the 10th Mountain Division including a deployment to Iraq as the Multi-National Division-South. Following an assignment as the G-3/5/7 for the United States Army Reserve Command, he returned to Iraq for his fourth tour there as the Director of Strategic Effects (J9), U.S. Forces Iraq, from July 2010 to December 2011.

LTG Buchanan served as the Deputy Commanding General, I Corps from 2012-2013, and then commanded the US Army Military District of Washington/Joint Force Headquarters-National Capitol Region from 2013-2015. He most recently served as the Resolute Support DCOS-Operations/Deputy Commander (Operations) for US Forces-Afghanistan in 2015-2016.



LTG Jeffrey S. Buchanan

Commanding General
U.S. Army North/Fifth Army
Senior Army Commander
Joint Base San Antonio, TX

Security & Border had the opportunity to speak with LTG Jeffrey S. Buchanan, Commanding General, U.S. Army North/Fifth Army, and Senior Army Commander, Joint Base San Antonio, TX, regarding ARNORTH's role in sustaining high-level homeland ground defense readiness through Joint and interagency cooperation.

S&B: Explain U.S. Army North's mission with regard to the security of the nation's Southern border.

LTG Buchanan: U.S. Army North (ARNORTH) serves as the land component of U.S. Northern Command (USNORTHCOM) and performs a diverse mission set in homeland defense, defense support of civil authorities, and theater security cooperation with Canada and Mexico. This command prepares, plans and coordinates land operations in defense of the United States as well as facilitating the use of military capabilities in support of federal law enforcement agencies. We are the Army's point of contact when it comes to military-to-military communication and cooperation with the nations of North America. ARNORTH is uniquely postured to enhance

the security of the nation's Southern border given its authorities to build strong relations with Mexico's Army and our operational authorities to work on our side of the border with our interagency partners, specifically the Department of Homeland Security. We are the land component to USNORTHCOM tasked with synchronizing these activities on both sides of the border.

With Mexico specifically, ARNORTH hosts multiple programs with the intent of building mutual understanding and cooperation between the armies of both countries. Through these programs, the Mexican and U.S. militaries collaborate on a range of topics from improving disaster response to addressing security issues that impact both countries, including ways to better secure our shared border. ARNORTH facilitates regular contact meetings on the border between Mexican Army units conducting border security and the U.S. Border Patrol to share real-time actionable information. One such program is the Border Commanders Program (BCP). The BCP is an ARNORTH initiative designed to support U.S. law enforcement agencies and USNORTHCOM efforts to engage with the Mexican Secretariat of National Defense (SEDENA). The Program consists

of an annual, national-level Border Commanders Conference (BCC); quarterly Regional Border Commanders Conferences (RBCC); and 16 separate Military Zone Border Contact Meetings (BCM). The BCC serves as a cross-border venue for regional commanders – military and civilian – from both the United States and Mexico to engage in candid discussions on issues that pertain to our common border. The program sets a predictable 18-month schedule for the BCP of the coming year, gives a joint assessment of the BCM program for the ending cycle, disseminates insights gained from the RBCCs, and determines an overarching theme for the upcoming year.

In addition to these contact meetings between our nations' militaries, we host an annual natural-disaster response exercise on the Southwest border. All of these engagements take into account several key principles, including respect for the sovereignty, laws, regulations, customs and traditions of our partners; cooperation in areas requested by SEDENA; operating on the basis of shared responsibility; cooperating against shared threats in pursuit of our shared interests; and working toward a long-term goal of interoperability and a cooperative defense. As a result, the United States and Mexico achieve interoperability at the individual and unit levels, enabling both countries to share real-time actionable information. In the end, improving our enduring partnership improves readiness for both the United States and Mexico to face any threat affecting our countries, and within today's constantly changing environment, our army-to-army relationship with Mexico in disaster response and homeland defense has never been stronger.

S&B: How does the Department of Defense support U.S. government, Border Patrol and other agencies in counterdrug and counternarcoterrorism operations on the U.S. border? What role does Joint Task Force-North (JTF-N) play in supporting these operations?

LTG Buchanan: Transnational criminal organizations (TCOs) are complex networks that have risen in power and influence and continue to threaten North America. Our military-to-military activities with SEDENA complement the Mexican military's internal efforts to build capability and capacity for a broad array of missions, including counter-TCO operations. Additionally, at the operational level, ARNORTH partners with the Department of Homeland Security's recently formed Joint Task Force-West to strive to integrate numerous interagency efforts along the Southwest border to maximize overall effectiveness in reducing the operations of these TCOs. All of these constructs help us identify and translate requirements to tactical operations, which JTF-N then supports.

JTF-N is a subordinate command to ARNORTH. Based at Fort Bliss in El Paso, Texas, its primary mission is to support counterdrug law enforcement agencies while providing significant operational experience for DoD units. JTF-N provides military capabilities – both Title 10 active duty and reserve military forces – to assist with identification and interdiction of TCO activities along the nation's borders. It works closely with the National Guard Bureau and states' National Guard counterdrug support programs to synchronize and maximize DoD's contribution in countering TCO activity. By disrupting TCOs and deterring their freedom of action, ARNORTH and JTF-N protect the homeland while contributing to military readiness.

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S&B: What do you see as the priorities of work to maintain security at the border from the ARNORTH perspective?

LTG Buchanan: From an ARNORTH perspective, it's continuing to develop working relationships with DHS JTF-W and other federal agencies but also continuing to develop our military-to-military relationship with Mexico to synchronize activities on both sides of the border. Our military-to-military relationship with Mexico is as strong as it's ever been. Without the facilitation of programs promoting cross-talk and information-sharing between our nations' militaries, both countries would be at a severe disadvantage in countering TCO operations and deterring criminal activity on the Southwest border. These activities are important to the nation because Mexico is an important strategic partner and because the U.S. and Mexican economy, peoples and security are so closely linked. Strengthening the cooperative defense of North America helps both countries better safeguard these mutual interests.

S&B: Who are your law enforcement partners on the Southwest border and how do you support them?

LTG Buchanan: The Army can provide a variety of capabilities to support federal law enforcement agencies. When military support is requested, JTF-N will facilitate mission planning and execution with federal law enforcement agencies including the Department of Homeland Security, Department of Justice and High Intensity Drug Trafficking Areas programs. Essentially, ARNORTH and JTF-N are effects multipliers, assisting law enforcement agencies to secure the homeland by providing supplemental and unique capabilities while ensuring the mission supports readiness for all DoD personnel involved. Federal law enforcement agencies might lack some of the capabilities the United States military has access to. We fill that gap with operational, engineering and intelligence support and through interagency synchronization. JTF-N has accomplished more than 6,400 missions assisting law enforcement agencies throughout the past 29 years in service.

S&B: When the National Guard was activated to send troops to the border this past spring, what went on at ARNORTH and what elements of the mission did you think might land on your doorstep?

LTG Buchanan: Initially, we thought we would have a command and control responsibility; however, as this operation came down to us through U.S. Northern Command, it became clear that this would be a National Guard-only effort. The intent of the operation was to provide infrastructure, maintenance and other operational support with National Guard forces in order to free up border patrol agents to conduct law enforcement operations. This type of mission is best performed by the National Guard because of their proximity to the border and the relationship National Guard units and commanders have with state governors. There are currently about 2,000 National Guard personnel supporting the Department of Homeland Security and U.S. Customs and Border Protection along the Southwest border. We don't expect any elements of this operation to migrate to federal forces. That said, we continue monitoring the National Guard's efforts and are prepared to assist if directed. This is just one more aspect of the Department of Defense's mission to defend our nation, and the National Guard plays an important role in enhancing border security.

S&B: How does DoD's unmanned aerial system border surveillance program enhance border security in the Southwest? What unique capabilities does DoD provide to law enforcement agencies on the Southwest border?

LTG Buchanan: When requested by a federal law enforcement agency and approved by the Secretary of Defense, unmanned aerial systems provide airborne detection and monitoring. These platforms are ideal due to their ability to remain airborne for long periods of time and their ability to operate without being detected by TCOs. All support is provided to law enforcement agencies in accordance with applicable U.S. laws. Other types of capabilities that law enforcement agencies also request include operational support such as ground transportation, ground-based detection and monitoring, sensor operations, and mobility and ground reconnaissance; intelligence support such as intelligence analysis and information sharing; engineering support such as road and bridge construction; and general support such as training and tunnel detection. All of these missions enhance the readiness of the total force by providing significant real-world operational experience for active and reserve forces in missions that contribute to border security.



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CONNECTIVITY DRIVING EFFECTIVE INCIDENT RESPONSE

During a response to a complex catastrophic crisis, it goes without saying that communication is vital to efforts to cut through the fog, friction and mass confusion that are anticipated to unfold if a major nuclear detonation were to occur in the United States.

MG William A. Hall, Joint Task Force-Civil Support, U.S. Northern Command



Petty Officer First Class Angelica Mathis, a communications specialist at JTF-CS conducts a radio check with the PRC-150 during a recent command post exercise at Fort Eustis to prepare for Defense Support to Civil Authorities. (Photo By Michael Redd, Mass Communication Specialist 3rd Class)

We hope it never happens, but if it does, Joint Task Force Civil Support (JTF-CS), U.S. Northern Command (USNORTHCOM), is a federal military unit standing ever vigilant and always ready to help Americans during a time of great need with assistance to civil authorities and the nation's first responders.

To improve communication efforts, JTF-CS, in lock-step with our higher headquarters, North American Aerospace Defense Command (NORAD), USNORTHCOM, is taking the approach of "what's old is new again" and revitalizing high-frequency (HF) radio communications so there is redundancy in communication capabilities to increase our interoperability capabilities.

Going Beyond Telephonic Comms

In general, our primary method of communication to coordinate during a whole-of-nation response is using the Internet, telephones and various hand-held radios, which have their limitations. We use the computer or pick up the phone; however, how does one coordinate grid restoration to bring back life-sustaining infrastructure without these? Our computers, telephones, cellular phones, satellite phones, and land mobile radio networks all depend on vulnerable infrastructure, which depends on power, water, fuel and people.



MG William A. Hall

Communications traffic that is transmitted over HF radio can travel great distances without the use of traditional communication infrastructures that are vulnerable even during a modest thunderstorm or minor earthquake, let alone a 10-kiloton nuclear detonation from a rogue threat.

Think of the apocalyptic movies where there is the lone survivor making the call and asking, "Anyone out there? Anyone out there?" That person is using HF radio and taking advantage of Mother Nature when man's infrastructure fails.

If a survivor has a HF radio transceiver, an antenna and a power source, then they can bounce a signal off the ionosphere, not being dependent on outside infrastructures to make communication links, to communicate with other HF stations. A power source can be as simple as a 12-volt battery from a car, an uninterruptible power supply or solar power cell.

In July, stories appeared in national news outlets detailing how Amelia Earhart may have been heard across the world during her infamous last flight, sending distress calls out on her two-way HF radio and allegedly heard by people who just happened to be listening to their radios at the time. While the aviator's radio was designed for only a 200-mile range, the stories go on to say that aside from primary frequencies, the radio transmitter also produced multiples of those wavelengths, or harmonics, which means skipping off the ionosphere.

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Is it true? I don't know, but it certainly intrigues the mind. As a commander, I take notice when my own team relays stories of their experiences when taking advantage of the power of HF radio.

JTF-CS is the leader in the DoD for a CBRN response. We take to heart the great responsibility of our mission and maintain a sense of urgency as we prepare for potential crises and incorporate more capability like HF radio into our response efforts.

Taking Comms to a Higher Frequency

Here's what we are doing to enhance communication into our response using HF radio.

First, we are taking our existing Harris PRC-150 military radios and the ICOM (commercial) HF radios that USNORTHCOM provided to us and integrating them into our existing communications architecture. This allows us to communicate on nonclassified network(s) with state authorities along with the 5,200 forces who would be assigned to us during a crisis and are the real hands-on federal capability to assist Americans. They are called the Defense CBRN Response Forces (DCRF).

As a command and control headquarters of 163 people, we don't normally interact directly with the civilian incident commander (IC) for a crisis since we operate from a relatively stand-off position away from the center of a would-be nuclear detonation. The hands-on response capability of technical search and rescue, mass decontamination, extraction and transport of medical patients, logistical and aviation support, and more comes from the DCRF (as mentioned), who operate closer to the crisis and need the capability to speak with civilian authorities using standard HF radio emergency frequencies.

Still, this doesn't come easily. The DCRF are sourced from traditional federal military forces, who primarily train and operate on military communication platforms that normally will not interoperate with civilian communication systems. This brings unique challenges for military forces to communicate alongside civilian authorities during an event. To overcome these communication gaps, we deploy across the DCRF radio bridging systems (e.g., ACU-2000) to allow unlike radio systems or frequencies to communicate on a common platform. The advantage to HF radios (being military or commercial) is that they can communicate when operating on the same frequency in unclassified modes.

So supporting a local governor – a typical National Guard function – means the DCRF, and JTF-CS as an extension of the DCRF, are learning how to become more interoperable with our civilian partners. That also means increasing communication ranges beyond the incident site to pool resources from across the nation. To do so, our Defense CBRN Response Forces could bridge line-of-sight radios to HF radio nets using an ACU-2000 to communicate on a common platform. However, as a military organization, we still maintain and operate military tactical satellite (TACSAT) communications radios to support secure communications between higher and subordinate military commands.

Bridging the Cross-Network Gap

Hence HF radio provides the solution for long-range as well as short-range open communication on civilian responder frequencies the emergency responder military would need to utilize during life-saving efforts. Where HF radios can be bridged, using an ACU-2000 device provides more capability and flexibility to the DCRF commanders to communicate and coordinate with local civilian hospitals, police and fire units. By making a phone patch to phones not in the affected area, we

can take the DCRF's line-of-sight radios and extend their networks to 200 miles or around the globe depending on the propagation of the signal, which depends on the power of the equipment, atmospheric conditions, the ground terrain and a user's expertise as major factors.

Bridging is not a new idea, and those who rehearse that expertise on a daily basis are volunteers located across the nation who are part of the Military Auxiliary Radio System (MARS), which has been in operation since 1925. The U.S. Army and U.S. Air Force MARS is the largest HF service across the United States, and their main mission is to provide contingency HF radio communications to the DoD and U.S. military. In this manner, MARS can be used for Defense Support to Civil Authorities (DSCA) such as the Federal Emergency Management Agency (FEMA) and the Department of Homeland Security, which JTF-CS supports as a typical lead federal agency. So under DSCA, MARS can be used to assist state and local emergency response agencies.

This is key, because if a catastrophic nuclear event were to happen in the U.S., it would take a whole-of-nation response. The more than 3,000 volunteers who operate MARS stations would become vital to connecting DSCA communications. It would be something in the spirit of the "Cajun Navy" comprised of regular citizens who assisted during Hurricane Harvey, only with MARS being an already established, highly defined radio network of volunteers. To stay sharp for that DSCA mission, the MARS volunteers participate in joint military and civilian training exercises, such as Vigilant Guard.

Engaging Through Exercise, Resource and Planning

Along with DCRF members, JTF-CS can also rehearse bridging and overall HF radio skills at a yearly exercise called Vital Connection. Exercising is a third effort we are taking in regards to improving HF radio skills. Held in August, Vital Connection promotes communications interoperability among the DoD, federal, state, tribal and local emergency responders. Participants attend for a realistic environment, which includes the opportunity to exercise with nongovernmental organizations as well as civilian local first responders, among others.

A fourth JTF-CS effort to improve HF radio efforts is learning how and practicing tapping into the Shared Resources (SHARES) High Frequency Radio Program. Administered by the Department of Homeland Security's National Coordinating Center for Communications, it provides an additional means for users with a national security and emergency preparedness mission to communicate when landline and cellular communications are unavailable. Participants in SHARES voluntarily pass emergency messages when normal communications are unavailable from HF radio stations worldwide. Those contributing to the SHARES network include federal, state and industry organizations.

Lastly, JTF-CS is considering how to take all the recent efforts in HF radio activities and institutionalize them into our planning documents in a deliberate way, based on actual (instead of theoretical) experience. As we mature, our goal is to participate in communication exercises such as Vital Connection and MARS QPRS (a radio call sign), to include weekly communication checks on the SHARES HF radio network.

In summary, as we participate within the federally mandated National Incident Management System (NIMS) and subsequently the Incident Command System (ICS), which is an element within the Command and Management component of NIMS, we are training daily to improve our civilian and military interactions for a response so we can be relevant to our fellow Americans. Integral to that relevancy is bringing back the art of HF radio communications as a viable form of crisis communication.

"Can you hear me now?" The answer we're training for is: "Yes!" ■

Next-Gen Handheld Genomics

The MinION, a hand-held genomic sequencer, showed promise in a recent field demonstration as it continues testing at the U.S. Army Research, Development and Engineering Command Chemical & Biological (RDECOM C&B) Center.

Owned by Oxford Nanopore Technologies, the MinION is a DNA/RNA sequencer that the U.S. Army sees as a potential, all-purpose biothreat detector. Conducted at Aberdeen Proving Ground and coordinated by the Joint Program Executive Office for Chemical and Biological Defense, the field test put the MinION in the hands of operators from the 20th CBRNE Command and the 32nd Civil Support Team (CST). In the field test, there were two bacterial samples, one for the 20th CBRNE and one for the 32nd CST.

By identifying biothreats on the battlefield – known and unknown – warfighters can respond accordingly to prevent or treat exposure. Initially, its hand-held size proved to be both an advantage and a limitation; while portable, it lacked the ability to produce high-quality data in the field. However, ongoing breakthroughs have enabled the MinION to analyze a sample in an hour, without high-powered lab equipment, even in low resource environments.

More info: army.mil/rdecom

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PROMOTING INFORMATION EVALUATION AND DIFFUSION

Mr. Scott A. White is the Joint Project Manager for Information Systems for the Chemical, Biological, Radiological and Nuclear Defense Program. He was assigned to his current position in June 2006 and reports directly to the Joint Program Executive Officer for Chemical, Biological, Radiological, and Nuclear Defense (JPEO-CBRND). As the Joint Project Manager for Information Systems, Mr. White is responsible for developing, delivering, sustaining and modernizing the Joint Warning and Reporting Network, the Joint Effects Model and Global Biosurveillance Portal programs. He also presides over the Chemical and Biological Defense Software Support Activity created to assist the entire JPEO-CBRND enterprise with information management.

CST & CBRNE had the opportunity to speak with Mr. Scott White, Joint Project Manager for Information Systems (JPM-IS), Joint Program Executive Office for Chemical, Biological, Radiological and Nuclear Defense (JPEO-CBRND) regarding a portfolio of capabilities to project the Joint Force from weapons of mass destruction, enterprise warning and reporting, hazard prediction and decision support capabilities for the collection, analysis and dissemination of CBRN information.

CST & CBRNE: Give us an understanding of JPM-IS' capabilities portfolio in support of CBRN defense.

Mr. White: Working to address the complexity of the current threat landscape, JPM-IS capabilities help shape the battlespace by providing awareness of CBRN threats via integrated early warning, the DoD accredited hazard prediction models, consequence management, course-of-action analysis, and decision support tools. These tools will modernize the force and potentially exceed the abilities of enemies to deliver the threat.

The JPM-IS portfolio of capabilities includes CBRN Information System (CBRN-IS), Joint Effects Model (JEM), Joint Warning and Reporting Network (JWARN), the Joint Operational Effects Program (JOEF) and JPEO-CBRND Software Support Activity (SSA). Recently added as a result of prototypical work JPM-IS conducted in the Republic of Korea for U.S. Forces Korea (USFK), the Global Biosurveillance Portal (G-BSP) program is an unclassified, cloud-hosted toolkit provided to the Special Operations Command and others.

CST & CBRNE: Tell us about some of JPM-IS focus areas and priorities for maximizing information sharing.

Mr. White: Our primary focus areas currently pertain to enhancing our Warfighters' situational awareness, contributing to their situational preparation and understanding, and providing tools and algorithms for better and faster decision-making before an incident occurs or in response to an incident or multiple incidents. We are quickly evolving



Mr. Scott A. White

**Joint Project Manager for Information Systems
JPEO-Chemical, Biological Radiological
and Nuclear Defense**

beyond acquiring and deploying the "break glass in times of emergency" planning and response command and control systems tools to a more all-encompassing information environment that supports the Warfighter on a day-to-day basis as a part of his or her daily routine. Clearly an incident that has the potential consequences associated with weapons of mass destruction demands our full attention and response, but the absence of incidents can lessen our priority to be ready and prepared for such an unthinkable event. By making it easier and more routine for our Warfighters to remain prepared and proficient with regards to combatting weapons of mass destruction, we will gain a significant advantage when and if we are confronted with threats or incidents in this arena.

We continue to address two remaining challenges we have struggled with since our infancy: the movement of data, especially in the wireless tactical environment, as well as moving data to and from different classification domains. We must find solutions for wireless network communications that strike a balance between risk and cost to succeed in connecting information sources at the tactical level. Cross-classification domain solutions exist, but they continue to require a time-consuming and expensive process to accredit their use in the field. However, on both counts we are encouraged by recent developments in these areas.



Cyber-warfare specialists with the 175th Cyberspace Operations Group of the Maryland Air National Guard take part in training at Warfield Air National Guard Base, Middle River, MD. (U.S. Air Force photo by J.M. Eddins Jr.)

Cybersecurity, a common term in today's society due to our threat environment, requires the use of a Risk Management Framework (RMF) process. This multistep process, employed by all JPEO-CBRND JPMs, helps secure information systems (computers and networks).

CST & CBRNE: What challenges have you come across while integrating information systems, and how were you able to solve these challenges?

Mr. White: Two of our capabilities to provide early warning information and predictive analysis, JWARN and JEM, have requirements to tightly integrate into current joint service and joint command and control (C2) systems. This includes the operational C2 systems for all four services as well as Global Command and Control System-Joint (GCCS-J). Within our development schedules, this became a moving target to hit for integration into service and joint C2 systems. After a comprehensive RMF and test process, we successfully fielded both increments of JWARN and JEM to the field. Once in the field, with every protocol or security change, or some other type of software modification, we have had to remain agile, adjusting our software quickly to continue to operate our products within that C2 host environment.

During C2 systems operations, we often experienced service interruption during host system changes. We frequently had to execute what I call "just-in-time" engineering, which proves challenging for us to address worldwide. To address these persistent accessibility and availability issues, we prototyped CBRN-IS on the premise that we should put all of our tools in a universally accessible and ultrareliable, cloud-hosted environment. After researching available services, by 2010 our engineers discovered that Defense Information Systems Agency (DISA) had a cloud-hosted capability called milCloud, which was already accredited for use both in the

secret-level classified, or SIPR, environment, as well as the NIPR [Non-classified Internet Protocol Router] environment for official use unclassified information. We put JWARN and JEM in both of these environments very rapidly.

The Air Force, which had grappled with the decision as to which C2 system to use for implementation of our tools, quickly adopted the cloud-hosted environment as their primary C2 solution. Our products in milCloud have also been complementing the requirement for tight integration into C2 systems across the other services because one can still easily export and import products from the JPM-IS tools into the various C2 system of choice. As the cloud is always available, as long as one is logged onto NIPR or SIPR, he or she can use the system. CBRN-IS is especially effective for training and planning. This capability has become an absolute game changer for us in terms of how we provide critical information to the Warfighter as we continue to prototype new applications and tools in this environment.

There are always cybersecurity concerns and in many cases, especially in the Navy, bandwidth concerns. Therefore, we know the DISA cloud-hosted delivery system is not the be-all-end-all. Cloud-hosting is more about architecture than geographic location, as preferences range from universal to regional to local cloud-hosted environments. I believe that the services will continue to require us to integrate to some extent with their C2 systems; those requirements are not going to go away entirely. At the tactical edge, we must also provide capabilities to Warfighters that are not web-based. Quite often our Warfighters are disconnected from the net for various reasons, but they still need capabilities on their handhelds, laptops or whatever devices they are operating with at the time. Warfighters will continue to employ capabilities they can use locally as they collect information that can be transferred back to the cloud-hosted systems once they reconnect, similar to the apps we enjoy on our cellphones today.

CST & CBRNE: How much is automation being looked at right now by JPM-IS and CBRN-IS?

Mr. White: We have the ability to fully automate most of our systems. From an operations architecture perspective, we try to remain "doctrine agnostic" as the service, COCOM or individual decision-makers determine whether or not information gets passed up, down and across the chain of command.

Full automation requires the proper aggregation, fusion, and presentation of information to avoid data overload or perhaps data reaching someone where it is not timely or relevant. How the data and information get pared down is also important. For example, what a four-star general sees from an information systems standpoint should look dramatically different from what the sergeant sees at the tactical level.

With much work to do in this area, none of this is easy when you begin to address decision support, artificial intelligence and machine learning. In all of these concepts and executions, we must get it right for the safety of our Warfighter. If the commanders do not have confidence the information they receive is accurate, relevant and timely, they simply will not use it.

CST & CBRNE: What types of potential flexibility or modularity do you see being built into future CBRN-IS capability prototyping moving forward?

Mr. White: Regarding the implementation and development of our tools for various types of host environments, we realized significant modularity

through the change in architecture to the Joint Effects Model (JEM) that began several years ago. We obtain many new and updated models for JEM from the Defense Threat Reduction Agency, our science and technology partner. The JEM changed their architecture to include what we call CCMI, or the Common CBRN Model Interface. This strategy is similar to what we have done with the sensor connectivity, or CCSI, the Common CBRN Sensor Interface for JWARN. CCSI is more of a protocol for how we catch data coming off the sensors and detectors. The JEM CCMI modeling interface enables us to plug-and-play new and modified models without having to dismantle the entire application down to its components and put it back together again, saving time and expense. Furthermore, by hosting our products in the cloud, we will see smaller, more specific solutions that address the mission with the appropriate widget, rather than having a monolithic application cover multiple mission areas with significant complexity. We are working to simplify rather than complicate the Warfighters' tools as they address the vast variety of mission contingencies in CBRN defense.

CST & CBRNE: With great information distribution and coordinating complex potential national state, local CBRN event response, what are some ways JPM-IS is enhancing the accessibility of critical information?

Mr. White: We can easily provide the technical tools necessary to share information with our state and local first responders, but sharing information in this environment has its own unique set of challenges. Depending on the contingency and the situation, the process used to

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perform command and control and how that information makes its way to and from CBRN-IS is still in its infancy. I believe that the National Guard's Mobile Field Kit (MFK) and other systems are evolving and maturing to ultimately "connect" with CBRN-IS. Having the ability to share data with one another when DoD is asked to assist, participate in training exercises, or simply provide day-to-day situational awareness is our key to success.

JPM-IS and our connections with the 20th Support Command, the Civil Support Teams, the National Guard and NORTHCOM continue to push for a more comprehensive information-sharing approach. As we transition from a more reactionary-response type of toolkit, such as JWARN and JEM, to a more proactive stance, we continue to build tools, information, and collaboration, as seen in our Global Biosurveillance Portal.

CST & CBRNE: Working proactively to provide real-time intel and data through your information-sharing toolkits, how do these systems work in providing the right classification of information at the right time?

Mr. White: The Global Biosurveillance Portal, from its infancy, has been cloud-hosted on an unclassified off-GIG-wavered system. It provides situational awareness from a geographic standpoint, including a Pacific disaster center map tool with over 800 map layers of all different types of information from earthquakes to disease breakouts, as well as many other functional areas. We've included over 200 of our own CBRN-specific map layers along with collaboration tools, libraries, links, analytics, reporting and other capabilities in an effort to create a one-stop-shop for all things biosurveillance and, ultimately, all hazards. Already cloud-hosted, we have begun to incorporate appropriate unclassified capabilities for the entire CBRN defense spectrum.

Ultimately, all of these different toolkits and structures will look very similar in the various classification domains. For example, it is natural to assume that many of the in-the-clear sources of information, or things that might be more inclined to give us indications and warnings of naturally occurring disease outbreak, would be appropriate at the unclassified level, whereas combat types of situations and contingency information would fit more in the CBRN-IS toolkit at higher classification levels. However, CBRN-IS will have the same look and feel, and it will have many of the same infrastructure capabilities such as collaborative tools, map tools, links, libraries, and decision support tools everywhere it is employed.

CST & CBRNE: Can you speak to capabilities such as integrated early warning, or pre-integrated early warning, and other methods being developed to get more information out sooner?

Mr. White: Integrated early warning (IEW) is currently on the tip of everyone's tongue in the CBRN defense enterprise. This layered defense strategy strives to improve situational awareness, improve threat understanding, and provide tools and capabilities for rapid decision support. That sounds simple, but it is very difficult and includes some tremendously challenging algorithmic work with our vastly different contingencies. Historically we used only our CBRN sensors, detectors, and analytics to determine what we are confronting in this mission space. By supplementing those tools with intelligence and other types of information from non-CBRN sensors, detectors, cameras, analytics, and observations, the Warfighters may begin to see earlier indications and warnings of something that may pose a threat in a particular area.

In a recent IEW demonstration, a camera displayed a truck that was driving by an installation discharging vapor, and several moments later



Personnel play a vital role in the development of the Joint Effects Model software at a User Feedback Event at the Space and Naval Warfare Systems Center Pacific. (Photo by Alan Antczak/released)

it set off CBRN sensors, detectors and alarms. This was a simple yet effective way to show how disparate information sources may be used collectively to increase the effectiveness of our defense and increase our confidence that we know more precisely what we are dealing with. The challenge is how to aggregate that information, fuse it, and make it usable to everyone from the tactical to the operational command to strategic command. *Usable* and *intuitive* are the key words; we must avoid bombarding our users with too much disparate data and not enough truly relevant and actionable information.

To address this challenge, we will shape what integrated and early warning becomes. It's a huge concept to implement, but we have changed information technology (IT) acquisition. It is now based on the requirements process called the "IT Box." We start out with an all-encompassing requirement with many different aspects we can build piece by piece. From a program of record perspective, going through the rigor and formal process of acquisition, we can break down the requirements into smaller sets, called Requirements Definition Packages. This process enables us to develop and deploy smaller software capabilities much faster.

CST & CBRNE: Talk about the process for streamlining, gaining efficiencies and quickly working through the acquisition process.

Mr. White: We are leveraging more prototyping to meet today's acquisition streamlining direction to get capabilities to the Warfighter more quickly. We can adjust capabilities when priorities and technology change. Previously, we've struggled with adjusting quickly because of a confined and limited process. As a result, we developed and procured our software using an agile process long before agile became the norm. Now, our requirements process marries up to the agile development process, which is a huge step forward for us in acquisition. I envision a tremendous amount of software work that will come from prototyping and addressing the requirements currently in development as well as many necessary agreements for how we connect to and gather from myriad information sources.

The way in which this information gets worked into a decision support system falls in the software development arena, requiring us to provide these capabilities up and down and across the chain of command. As we continue to prototype these capabilities, IEW and CBRN defense will continue to evolve. Requirements flexibility and agility will be a key to success, and we look forward to overcoming the challenges ahead.

SUPPORTING READINESS THROUGH EXPERTISE

The U.S. Army Chemical Materials Activity safely stores and disposes of chemical warfare materiel, enabling a greater focus on the national security mission.

By Karen Jolley Nikol, U.S. Army Chemical Materials Activity Public Affairs



An operator documents destruction of two munitions at the Pueblo Chemical Agent-Destruction Pilot Plant Explosive Destruction System (PCAPP EDS). The transportable EDS was designed to destroy recovered chemical weapons, and also is supporting the stockpile destruction mission for PEO for Assembled Chemical Weapons Alternatives. (U.S. Army CMA)

In 1992, the U.S. Army combined elements from the U.S. Army Soldier and Biological Chemical Command and the Program Manager for Chemical Demilitarization to consolidate storage and demilitarization of chemical warfare materiel within a single organization headquartered at Aberdeen Proving Ground, MD.

The U.S. Army Chemical Materials Agency (CMA) – a major subordinate command of U.S. Army Materiel Command (AMC) – was established to store the nine U.S. chemical weapons stockpiles, destroy seven of those stockpiles, assess and destroy recovered chemical warfare materiel, and manage the program to protect communities around stockpile sites. CMA's director was delegated by the Department of Defense as implementing agent to ensure the Army adheres to the Chemical Weapons Convention (CWC), a treaty ratified by the United States in 1997 requiring destruction of all chemical weapons and former chemical weapons production facilities.

CMA was designated as an AMC Separate Reporting Activity and renamed the U.S. Army Chemical Materials Activity in July 2012, after the organization met U.S. treaty obligations to destroy seven chemical weapon stockpiles, former production facilities, binary chemical weapons, and other materiel.

Managing Process and Compliance

Today, CMA continues the mission of safe, secure storage of the Army's two remaining chemical stockpiles at Pueblo Chemical Depot, Colorado, and Blue Grass Army Depot, Kentucky, until those stockpiles

are destroyed by the Program Executive Office for Assembled Chemical Weapons Alternatives (PEO ACWA).

The organization teams with the Federal Emergency Management Agency and state and local governments to educate, prepare and protect communities surrounding those stockpiles, through the Chemical Stockpile Emergency Preparedness Program (CSEPP).

CMA continues to manage treaty implementation, which includes serving as part of the host team during inspections of chemical weapon storage and destruction sites; exercising readiness for treaty challenge inspections; preparing notifications for declaring recovered chemical warfare materiel (RCWM); providing notification of start and end of destruction operations; and preparing reports and briefings on treaty-mandated obligations.

Proactive Evaluation Before Destruction

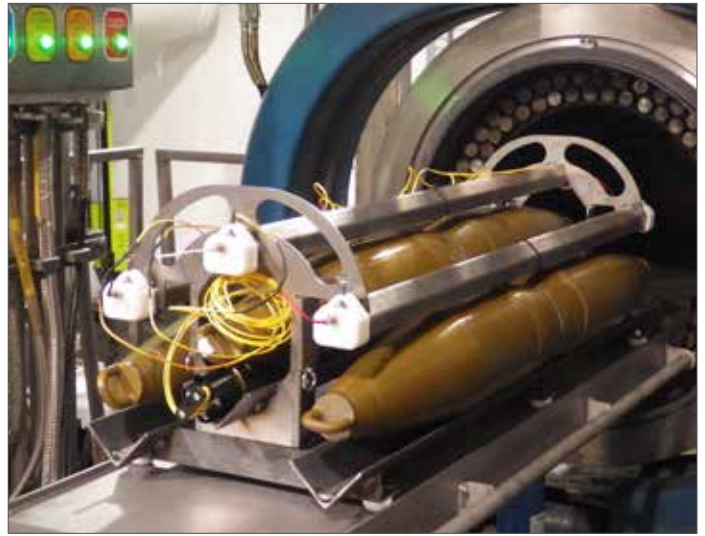
CMA also is responsible for assessment and destruction of RCWM using transportable technologies, managed by CMA's Recovered Chemical Materiel Directorate (RCMD). CMA RCMD maintains mission technology and expertise through a Research, Development, Test and Evaluation (RDT&E) team, which seeks increased safety and efficiency. This proactive approach supports Army readiness by anticipating and addressing issues that could delay mission response by Combatant Commanders requiring our capabilities. For example, research to improve assessment technology can increase the capability to detect agents that currently are difficult to detect.

The centerpiece of CMA RCMD destruction technology is the Explosive Destruction System (EDS), which provides on-site treatment of chemical warfare materiel in a safe, environmentally responsible manner. Cutting charges access chemical munitions, eliminating their explosive capacity before the chemical agent is neutralized, with all blast, vapor and fragments from the process contained in a stainless-steel vessel of the EDS. Modifications have nearly doubled the system's net explosive weight rating, and reduced operation time from two days to one.

With 17 years of successful operations, destroying more than 2,600 items at 15 locations, the EDS serves as the premier Army technology to destroy RCWM. Its proven success led to the Department of Defense selecting the EDS to destroy problematic munitions that could not be processed at PEO ACWA's Pueblo Chemical Agent-Destruction Pilot Plant (PCAPP), which is destroying the stockpile stored at Pueblo Chemical Depot, Colorado. The partnership between CMA and PEO ACWA demonstrates what can be accomplished through perseverance and teamwork.

Reducing Risk, Strengthening Force

CMA continues to pursue its goal of operationalizing capabilities to support Combatant Commanders. For decades, CMA has demonstrated that the Army's capability to safely assess and destroy RCWM onsite greatly reduces risk of injury while protecting the workforce, community and environment. CMA serves as the National Inventory



Explosive Destruction System testing continues to seek ways to improve efficiency, increase throughput and reduce operating time. The EDS uses cutting charges to slice through munitions, then neutralizes the chemical agent. This process takes place in the system's sealed stainless steel vessel, which contains all blast, vapor and fragments from the process. (U.S. Army CMA)

Control Point for the chemical weapons stockpile, and maintains the expertise to safely store CWM. CMA will continue to support readiness by leveraging science and technology, continuing research and development, continuing to build partnerships, and shaping our organization to meet the Army's future needs. ■



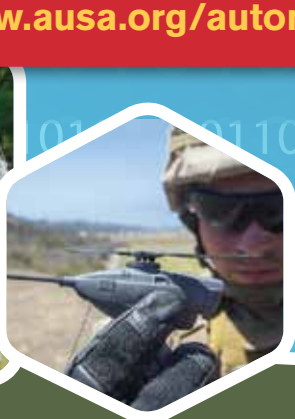
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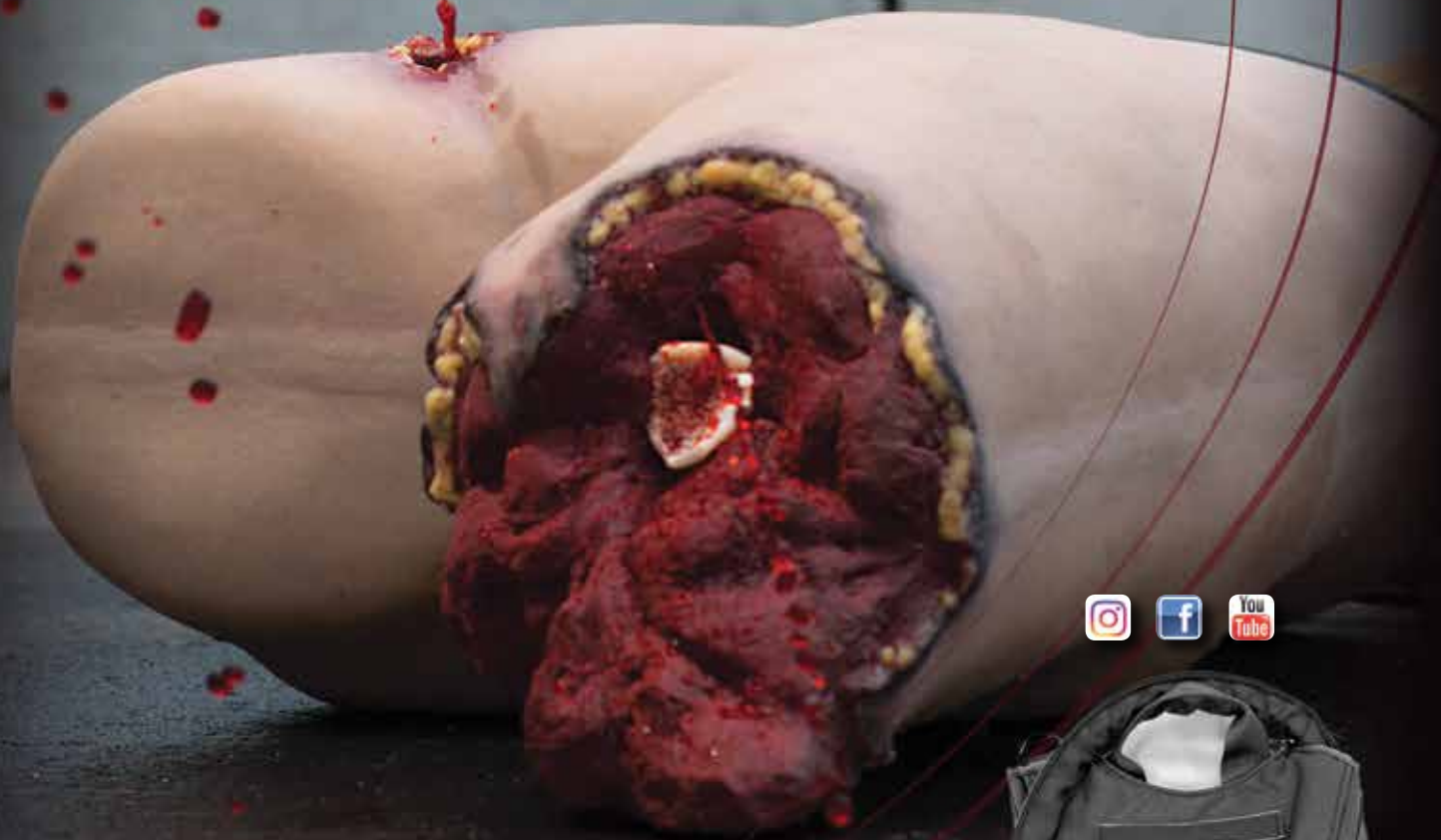
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