



The U.S. Army Combat Capabilities Development Command (DEVCOM) leads in the discovery, development and delivery of technology-based capabilities to enable Soldiers to win our nation's wars and come home safely. DEVCOM is a major subordinate command of the U.S. Army Futures Command. The DEVCOM Chemical Biological Center is the Army's principal research and development center for chemical and biological defense technology, engineering and field operations. The DEVCOM Chemical Biological Center is headquartered at Aberdeen Proving Ground, Maryland.

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## Technology Provides Warfighters with Decisive Edge at Resolute Dragon 2

By Dr. Brian B. Feeney



**DEVCOM CBC team lead for Resolute Dragon 2, Fiona Narayanan, briefs leaders from Chemical Biological Defense Program organizations on the system of software systems used in the 12-day advanced technology demonstration held at Aberdeen Proving**

**Aberdeen Proving Ground, MD** -- Seventeen Marines, Airmen and Sailors gathered at Aberdeen Proving Ground for 12 days in June to show how advanced software working in concert with advanced Chemical, Biological, Radiological, and Nuclear (CBRN) technologies can create a next-generation threat warning and protection capability on the battlefield. The exercise culminated in a demonstration for senior leaders from the nation's leading Chemical Biological Defense Program organizations on June 23.

### New Technology From Table to Field

The Defense Threat Reduction Agency (DTRA) and the U.S. Army Combat Capabilities Development Command Chemical Biological Center (DEVCOM CBC) organized the Advanced Technology Demonstration (ATD), named Resolute Dragon 2, to demonstrate how the latest CBRN science and technology (S&T) under development at DTRA and integrated by DEVCOM CBC could be used to track and respond to threats on the battlefield in near real-time using a common operating picture, or COP.

The ATD had two components. First, the warfighters engaged in war gaming, a tabletop, digitally-enabled practice version of mission execution, in which they developed courses of action to respond to CBRN threat scenarios. The second was the mission execution itself, following an in-the-field threat scenario in which warfighters made risk-based decisions using new software capabilities.



## Customizing the View to the Command Echelon

The integrated software-based capabilities are so sophisticated that commanders at each echelon see what they need to see. The commander of the tactical unit on the ground, the company commander, battalion commander and the joint task force commander each see the COP on their own tablet in a form customized to the specific decision-making needs at their level.

“At each level, what is it that the decision maker needs? Not every decision maker needs the same set of data. If you’re at the tactical edge, you need a smaller set of data. You have to look at every echelon to make that correlation: what is it I need and at what level,” said Darryl Colvin, who leads the Joint Program Executive Office for CBRN Defense. “What I see here today is very simple applications, pulling data from data rich environments, especially when you start integrating these sensors.”

“We wanted to be able to show how CBRN data collected in the battlespace can generate information in a COP which lets the warfighter out front and the higher echelon decision makers know as much as possible about the threat. That way, the best possible decisions can be made on how to protect the warfighters in a CBRN hazardous environment,” said Chris High, the ATD Program Manager at DTRA. “This capability advances the Joint All-Domain Command and Control concept for commanding joint task forces at the speed of relevance.”



Senior leaders from several Chemical Biological Defense Program organizations attended an advanced technology demonstration, Resolute Dragon 2, in which warfighters used advanced chemical biological detection and reporting software to conduct war games.

## War Gaming a Deadly Scenario

The DEVCOM CBC team, led by Fiona Narayanan, an electrical engineer and Nuclear Biological Chemical Battlefield Integration Branch chief, served as the interface between the warfighters and the technology. The in-the-field scenario was a joint task force of U.S. Marines, Sailors, and Airmen transported on naval vessels to land on a fictional island in contested waters. Their mission was to seize key assets on the island, but it was complicated by opposing forces releasing chemical and biological agents into the battlespace.

The virtual threat was closely monitored and mitigated by a prototype of both hardware and software systems known as the Austere Environment Reconnaissance and Surveillance (AERS) platform. As the lead technology integrators for the ATD program, Narayanan and her team at DEVCOM CBC designed and built this prototype platform to provide chemical, biological and radiological force protection. They were able to do this by developing and integrating hardware and software plug-ins that directly input data sent in near real-time from the AERS prototype to higher echelons. Commanders at higher echelons are able to use this CBRN information, including where and what the hazard is, to be able to make risk-based decisions to protect their



warfighters on the ground.

### **The Technology Advantage**

Sensors that a warfighter wears can provide data for calculation of their level of heat strain too, using algorithms that run on the AERS platform. In addition, the plugins allow the warfighters to send or receive information on whether or not they have donned personal protective equipment (PPE), how much, and for how long.

Yet another feature of the plugins is that they allow warfighters to run hazard prediction models based on information generated on the AERS platform. These include using integrated sensors on drones and robotic unmanned vehicles to maintain close surveillance of the threat. This data is displayed in the form of color-coded alerts that create a model of the moving plume on the screen. The commander can then direct the warfighters to protect themselves against the threat by donning PPE, rerouting, or holding in place.

### **Demonstration Day for CBRN Organization Leaders**

Speaking to other CBDP senior leaders on demonstration day, Dr. Ronald Hann, Acting Director of Research and Development at DTRA, said, "I learned as a chemical officer in the 2nd Cavalry Regiment how to look for opportunities and threats, and get counter-measures ready. That is what we are doing with chemical biological threats here in this advanced technology demonstration." He added that another advantage of this demonstration is that, "We build a prototype then let our warfighters use it, get their feedback and take that back to the technology developers." Resolute Dragon 2 comes after a series of advanced technology demonstrations that first showcased integrated early warning technology, known as Perceptive Dragon I-IV, and the subsequent COP-based Resolute Dragon 1, which was held at Savannah River National Laboratory in 2021. Hann used the occasion of Resolute Dragon 2 to state that these ATDs will continue as an annual event within the CBDP community.

### **Hearing From the Warfighters**

The 17 warfighters who participated were taught how to use the CBRN defense technologies and were divided into three planning cells. Then they started war-gaming the joint task force's mission objectives. They developed courses of action using data provided by the software's decision support tools, selected the ones they liked best and virtually implemented them to see how they played out against the opposing force. It was a far cry from the old school method of using paper maps and magic markers, and the warfighters were impressed.

Marine Chief Warrant Officer 2 Kevin Huff, a CBRN defense officer at Camp Pendleton in San Diego County, California said, "This was a unique opportunity and from a planning perspective it's an excellent tool. The key take-away for me is that the systems we want to see in 2030 already exist."

Air Force Master Sgt. Matthew Woolery, installation emergency manager of the 319<sup>th</sup> Civil Engineer Squadron in Grand Forks, North Dakota, added, "I'm excited for the future. Being able to automate this way means I need fewer people to do chemical biological response missions. That frees Airmen up to do other things and I don't have to put them at risk."



# News Release

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The scientists and engineers at DTRA and DEVCOM CBC will use the lessons learned through the participating warfighters' experiences to further refine the S&T technologies, software and design of the COP. That combined with the continuing miniaturization and mobility of chemical biological sensors and their delivery platforms will make the next advanced technology demonstration in the summer of 2023 even more sophisticated.

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