

Will It Work Anytime, Anyplace, Under Any Conditions?

Army Test and Evaluation Command Sponsors Workshop to Exchange Ideas on Testing in Natural Environments

MIKE CAST

How do the grit and dust, extreme heat and intense sunlight of a desert climate affect each part of a weapon system that contains new plastics, metals, or other materials? Will missiles or artillery shells still unfailingly fire and hit their targets if they have been stored for a long time in an extremely cold, hot, or humid place?

About 130 Army testers, evaluators, acquisition program managers, and others concerned with how the Army tests and acquires new weapons and equipment met near Baltimore/Washington International Airport in November to grapple with these and similar questions. The Army Test and Evaluation Command (ATEC) and its subordinate Developmental Test Command (DTC) jointly sponsored the Natural Environment Testing Workshop Nov. 29-30, 2000.

Finding the Right Mix

In keynote remarks, Army Lt. Gen. Paul Kern, Military Deputy to the Assistant Secretary of the Army for Acquisition, Logistics, and Technology, emphasized the importance of "finding the right mix" of modeling, simulation, and natural environment testing to provide soldiers with weapon systems and equipment they can use in all climates and conditions.

Cast is a public affairs specialist with the U.S. Army Developmental Test Command Public Affairs Office, Aberdeen Proving Ground, Md.



Consistently sub-zero temperatures at the Cold Regions Test Center in Fort Greely, Alaska, allow for extreme-weather testing of Army weapon systems.

"We rely very much on the test community to ensure we have the right test tools and measure the right things," Kern said. "No matter how good we get in simulation, we're going to have to come back to testing to verify those simulations."

Noting that acquisition of the interim armored vehicle (IAV) is the Army's first major equipment procurement since the 1980s, he said extremely tight timelines for acquiring the IAV and future systems

will pose real challenges for testers and evaluators as well as program managers.

"As we really take a look at what we're doing for the Army in the next 10 years for the Objective Force, is it adequate to do the job?" he asked the audience. "Sensors are going to be at almost every point of the spectrum you can dream of. We will have systems of systems involving networks of sensors, logistics systems, and command and control systems ... and as we move into the world of digits,



The Javelin shoulder-fired missile is one of numerous Army weapon systems tested under extremely cold conditions at the Cold Regions Test Center.

Test programs must help the Army procure weapons and equipment that will not fail soldiers under any conditions.

Chambers Aren't the Real Thing

Although modeling and simulation and tests in special chambers can to some degree provide data that help evaluators assess equipment reliability and performance, the “synergistic” complexities of the natural environment under extreme conditions reveal problems not seen in labs and chambers, Kern said.

Other speakers who briefed conference attendees also stressed the point that testing military systems in natural environments is both critical and complex.

Dr. James Streilein, director of the U.S. Army Evaluation Center (AEC), an ATEC subordinate command head-

quartered at Aberdeen Proving Ground, Md., said tight budgets and acquisition schedules cause program managers to opt out of some tests they might otherwise schedule. But manufacturers’ performance specifications often fail to meet the rigorous requirements designed to ensure equipment is suitable for military use in all possible weather conditions, he added.

“We don’t evaluate equipment so that it works at Aberdeen Proving Ground, but to ensure it works across the full spectrum of missions and environments,” Streilein said. “We frequently find that specs and standards from industry don’t have some essential considerations. Almost everything seems to leak when we put it in severe, blowing rain. We seem to keep learning the lesson that some of these extreme environments will damage the electronics.”

Streilein said the Army needs modeling and simulation, testing in special chambers, and testing in the natural envi-



A Javelin missile is fired at an armored target in the dead of winter at the Army's Cold Regions Test Center.

ronment, and that finding the right mix of all three is a challenge. He noted that not as much testing now takes place at the Army's Cold Regions Test Center (CRTC) in Alaska as in the past, largely due to time and budget constraints. But testing in a naturally harsh environment such as Alaska has often revealed otherwise undiscovered problems with equipment and operator procedures, he added.

From Bitter Cold

The CRTC's Robert Torp said the Army must understand "human factors" as well as material performance when operators and equipment are subjected to extremely cold weather. Climate extremes can very seriously affect how well soldiers perform or operate equipment, he said, adding that many operating manuals provided with Army systems do not adequately address operational problems in extreme sub-zero temperatures.

Established because thousands of U.S. servicemembers suffered cold-weather injuries during World War II, the CRTC has a group of experts trained to test and analyze equipment and procedures under frigid conditions, and prepared to recommend fixes to problems, Torp said. Though CRTC is a developmental testing facility, it emphasizes support for operational tests, he said.

The test center is located at Fort Greely in what Torp described as a "cold triangle" of dense arctic air that settles over that region of Alaska in the winter, lowering temperatures to as much as -70 degrees Fahrenheit and providing longer periods of consistently frigid temperatures than locations in the lower 48 states. The CRTC not only has a 670,000-acre range available for tests, he added, but also can conduct tests in other locations such as Valdez or Prudhoe Bay.

Visibility at Fort Greely is "excellent" and ideal for firing long-range weapons, he said, noting that clearances from the Federal Aviation Administration and use of nearby Army and Air Force lands enable CRTC users to fire shots as long as 100 miles.

... to Burning Heat

Lt. Col. Michelle Stoleson, commander of the Materiel Test Center at Yuma Proving Ground in southwestern Arizona, described testing at the high end of the natural temperature spectrum. The proving ground's 800,000 acres of test ranges, diverse test facilities, and rugged desert terrain are in a region as rugged and harsh as Southwest Asia. Yuma had a crucial role in testing weapons and equipment used in Desert Storm, Stoleson said.

Yuma Proving Ground not only has ranges for testing artillery, munitions, and aviation systems, Stoleson said, but also has a variety of mobility, durability, and cross-country vehicle test courses. These courses provide driving conditions that include extreme heat, rough road surfaces, and blowing dust. Stoleson said vibration and dust tests at Yuma revealed a few vehicle performance problems that required "quick fixes" before the onset of Operation Desert Storm.

The proving ground also offers good training opportunities for Army units, she added. The 1st Battalion, 17th Field Artillery Brigade from Fort Sill, Okla., trained at Yuma this past spring, gaining proficiency on the Paladin artillery system by firing the Sense-and-Destroy Armor projectile while conducting an operational test of this weapon, according to the battalion commander, Army Maj. John Gillette.

... to Sweltering Humidity

About three-fourths of all regional conflicts have taken place in tropical regions, so the military has a critical need to test systems in tropical environments, said Yuma Proving Ground's Lance Vander Zyl. The Army began conducting tropic testing at Schofield Barracks in Hawaii after the United States transferred control of its military installations in Panama to the host nation, Vander Zyl said, adding that the Army is striving to improve its test capabilities in Hawaii, negotiate with Puerto Rican officials to conduct testing there, and find other suitable test locations. Though Hawaii is humid enough to make it suitable for some types of tropic testing, it does not have

Panama's combination of high temperatures and humidity, and the proximity of populated areas makes it unsuitable for some types of weapons testing, Vander Zyl explained.

He emphasized that it is extremely important to test in a tropical environment because the combined effects of heat, humidity, and microscopic biological organisms degrade many types of materials and create an environment that is hostile to soldiers and equipment. Tropical insects, rodents, and birds can also cause damage to equipment, he added, and the thick, damp canopy of trees and plants in the tropics can interfere with communications signals. Vapors from tropical vegetation have affected chemical sensors on some military systems, he said.

Life Cycle Environmental Profiles

The second day of the workshop centered on the efforts of diverse work groups to develop "life cycle environmental profiles" for weapon systems. Group leaders highlighted their groups' efforts to identify potential environmental impacts to these systems, the types of testing needed to discover and fix problems, and the challenges that commonly confront decision-makers involved in military acquisition.

A few common themes emerged from workshop leaders' presentations: Army test and evaluation organizations generally lack the staff or resources to fully participate in the work groups and integrated process teams that plan and oversee acquisition programs. Their participation in these groups early in the acquisition process would help the Army improve that process. Testers and evaluators need to define test programs as soon as possible. Optimally, they should get involved early in the development of user requirements and identify the testing needed to meet those requirements.

Responding to workshop issues in his closing remarks, DTC commander Army Brig. Gen. Dean Ertwine said ATEC and its subordinate commands are committed to forming closer working relationships with program managers and ac-

quisition decision makers, and to finding various means to meet military test and evaluation challenges in the face of resource and time constraints.

ATEC is placing increasing emphasis on its Virtual Proving Ground and other technical innovations to streamline testing and make it cost effective, Ertwine said, adding that about half the command's current technology investments are now going into modeling and simulation initiatives. His bottom line, however, is that test programs must help the Army procure weapons and equipment that will not fail soldiers under any conditions.

"When the balloon goes up and soldiers are sent to some Godforsaken place, we've got to be able to look their parents in the eyes and say we've done all we could to make sure their equipment works," he said.

Editor's Note: The author welcomes questions or comments on this article. Contact him at castm@dtc.army.mil.

IMPORTANT NOTICE!

The 2001 Acquisition Research Symposium (ARS), originally scheduled for June 18-20, 2001, in Rockville, Md., has been postponed so that major policy changes in the new administration can be addressed. We will be updating the DAU Home Page (www.dau.mil) as information becomes available.

KEEP UP WITH CURRENT AT&L POLICY

Numerous policy guidance memoranda have been signed since the beginning of the new year! Read the latest at http://www.acq.osd.mil/ar/*whatsnew.htm.

Acquisition of Services

Acting Under Secretary of Defense (Acquisition, Technology and Logistics) Dave Oliver establishes an Integrated Product Team to focus on the area of Performance-Based Services Acquisition (PBSA), Jan. 5, 2001.

Commercial Acquisitions

Former Under Secretary of Defense (Acquisition, Technology and Logistics) Jacques Gansler provides guidance on overcoming barriers in accessing commercial items, Jan. 5, 2001.

Reform of Intellectual Property Rights of Contractors

Acting Under Secretary of Defense (Acquisition, Technology and Logistics) Dave Oliver highlights immediate policy areas for the treatment of intellectual property, Jan. 5, 2001.

Incentive Strategies for Defense Acquisitions

Former Under Secretary of Defense (Acquisition, Technology and Logistics) Jacques Gansler provides guidance regarding the use of incentives in defense acquisitions, Jan. 5, 2001.

JOHN P. "JACK" MCGOVERN

The Defense Acquisition University has received word of the death of John P. "Jack" McGovern of an apparent heart attack, on Thursday, March 8, 2001. Jack was a Professor of Manufacturing Management in the Faculty Division at the Defense Systems Management College (DSMC), and had recently retired from federal service on Dec. 31, 2000.

A resident of Fairfax Station, Va., Jack joined the DSMC faculty in April 1988. He came to the College from the Federal Systems Division, IBM Corporation, Manassas, Va., where he was an Advanced Signal Processor Program Manager. He is survived by his wife, Geneva, and four children: Kathleen McGovern, Gina McGovern, Michael McGovern, and Joseph McGovern. In addition, Jack is survived by two grandsons.

