THE WARRIOR

U.S. Army Soldier Systems Center | Natick, Massachusetts | January-February 2001

Digital MPs

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Cover photo: Military Police soldiers from the 91st Military Police Detachment at Fort Polk, La., test the Digital MP System. (Courtesy photo)

THE WARRIOR
U.S. Army Soldier Systems Center

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People, products gain recognition

As we begin this new year, I realize that as I look around, everywhere I constantly see our products, projects and people being recognized and awarded.

I see our items being showcased in Army Times, in Popular Mechanics, in technical magazines, both national and international, and in local newspapers. I see our items being included on programs that air on the Discovery Channel and the History Channel. The Interceptor Body Armor was just included in the "Best of What's New" section of Popular Science. This issue recognizes 100 of the year's "hottest products and eye-opening discoveries."

I see our personnel being awarded for their excellence. In December, we had a number of personnel within the Research, Development and Engineering Center of the RDA Enterprise receive prestigious Army R&D Achievement Awards.

Dr. H. Dupont Durst received the award for his contributions on nanoreactor-based topical protectant creams. Dr. Richard Smardzewski, Mr. David Sickenberger, Mr. Felix Reyes, Mr. J. Michael Cress and Ms. Karen Vado received their award for work on the Biological Attack Warning System. Mr. Bruce Jezek and Mr. Patrick Berry were awarded for their work on Pre-planned Product Improvement-Biological Integrated Detection System.

Dr. Lynne Samuelsen got her award in recognition of her work in "developing a biocatalytic synthetic route to a broad range of advanced polymeric materials." Dr. Carolyn Bensel's award was for her work in "applying objective biomechanical methods and analyses to design more effective combat boots."

All of these R&D Achievement Awards are in recognition of our personnel's outstanding technical achievements, which have resulted in improved U.S. Army capabilities and have contributed to the nation's welfare.

We have yet more groups receiving Hammer Awards. The Aerial Delivery Support Team for Airdrop

Brig. Gen. Philip M. Mattox

Loads received the award for their outstanding efforts to provide justification and approval to initiate a repair/maintenance service at Natick. This service reduces the potential of critical shortages for airborne and Special Forces units because of defective manufactured parts.

The Domestic Preparedness Program Team was awarded for their achievements in providing a significant impact on the safety of America's population with the most efficient use of federal, state and local resources in training emergency responders to deal with terrorist incidents. One way they provided this was by structuring a "train-the-trainer" course for local responders in a number of cities.

We continue to host and impress a variety of visitors. At the Natick site, to name just a few, we recently hosted a group from the 548th Corps Support Battalion at Fort Drum; a group of students from the Massachusetts Institute of Technology's Security Studies Program and former Chief of Staff of the Army Gen. (Ret.) Dennis Reimer.

Our exhibits were displayed at a variety of events. Over the last few months, some of the places we had exhibits included the Johnson Space Center in Houston, Texas; the DoD Maintenance Symposium in Charleston, S.C., and the NATO Combat Clothing and Personal Equipment Display in Prague, Czech Republic.

The U.S. Army Materiel Command's (AMC) command sergeants major/sergeants major conference was held at Natick in December. Not only did the group get a chance to tour the Soldier Systems Center to see and learn about improvements to soldier food, clothing and equipment, but they also got a chance to enjoy a little local history with a historical staff ride to Boston and Concord. This group of sergeants major had nothing but praise for the work being done at Natick.

On Dec. 1, we held our annual Soldier Systems Review, "Soldier Systems in Transformation." The U.S. Army Training and Doctrine Command (TRADOC) Combat Developers and their AMC and Program Executive Office counterparts briefed on soldier system requirements, programs and challenges.

While definite progress was reported, the challenge remains to effectively integrate a multitude of agencies, technologies and programs, and to obtain the needed funding that will allow for the "Soldier Centric" Transformation. Gen. John Abrams, TRADOC commander, and Gen. John Coburn, AMC commander, will report their findings in a memorandum to the Chief of Staff of the Army.

As we host these important visits and events, our personnel also take time out of their schedules to help with lesser-known activities, which are not any less important. For instance, the Women in Science and Engineering Program hosted a group of junior-high school students in order to emphasize the importance of learning those subjects in school and their practical application.

The "Hall of Fame" ceremony was held to memorialize former employees who dedicated their lives to ensuring American servicemen were the best fed, clothed and equipped in the world. We also took time out to celebrate our diversity with a daylong event. The theme for this year's event was "Unity through Diversity."

As we move forward through this new year, I look forward to continued excellence, for I know the hard work we all do helps our soldiers stay comfortable and safe as they remain "on point" for our great nation.

Airborne

Advanced tactical parachute softens landing

By Curt Biberdorf
Editor

When they stand up, hook up and shuffle to the open door of the aircraft, the combat-ready airborne soldier faces the risk of injury with every landing.

Parachuting injuries have increased because the T-10 parachute system, reliably used since the 1950s for mass tactical assaults, can't cope as well with the weight today's soldiers are carrying during airborne operations. This led to the development of the Advanced Tactical Parachute System.

The new parachute will cut the rate of descent by 25 percent from 21 feet per second to 16 feet per second. The decline in rate of descent translates into 40 percent reduction in impact energy and could trim landing injuries significantly.

"The reduction of injuries is a combat multiplier," said Maj. Joel Rieman, assistant product manager at Product Manager-Soldier Support at the U.S. Army Soldier Systems Center (Natick). "If someone sprains their ankle, you're losing the two soldiers who are going to help the injured one and the injured soldier."

The T-10 parachute was designed to handle a gross weight of 250 pounds. It has served the military well, but now some soldiers are jumping with nearly 400 pounds because they are bigger and carry more equipment and supplies to sustain them through the initial fight, according to Rieman.

The parachute also must be able to handle the same combat mission as the T-10, in which troops drop from about 500 feet at aircraft speeds between 130-150 knots.

An early version of the new parachute system was scrapped in favor of a simpler parachute. In eight months, the Army shut down the previous program and awarded two competing contracts for initial-phase evaluation, which is an unprecedented speed of transition, according to Rieman.

Courtesy photo

The XT-11R reserve canopy uses an aeroconical design based on the current British reserve canopy.

Courtesy photo

The XT-11 main parachute uses a modified cross planform canopy. The parachute is one of two systems in competition for the final production contract.

"They're using proven materials and demonstrated technology to develop an advanced canopy," Rieman said, noting that no pyrotechnics, electronics or any other complicated tools will be used to slow the rate of descent to the new standard.

A total of 58 requirements are on the operational requirements document, including the requirement for a parachute system that is compatible with the military aircraft used for airborne missions and items such as the Interceptor body armor, MOLLE rucksack and Land Warrior system.

The new parachute operates as a system consisting of the main parachute, reserve parachute and harness. Rieman said the new systems are substantially larger than the T-10, which means the fabric needs to find a way to fill up faster. Both parachutes use a less porous material than the T-10, which could increase undesirable oscillation, but the designs compensate for that.

Two main parachute systems are in contention for the final production contract. The XT-11 developed by Para-Flite Inc., uses a modified cross canopy that removes sections of material around the edges to stabilize the descent. The current rate of descent for the main canopy is 16 feet per second, and it has improved stability, static line control and low opening shock.

The reserve canopy offers an aeroconical design based on the current British reserve canopy, can be deployed using either hand, uses a soft loop closure and has a rate of descent of 21 feet per second.

The XT-12, developed by Irvin Aerospace Inc., uses a high-drag quarter spherical and multi-slotted main canopy. Leading edge slots and sails enhance performance. Current rate of descent is 17.5 feet per second, and it will be resized to meet the 16 feet per second requirement. It also has improved stability and low opening shock, and the improved static line control is based on the proven British design.

The reserve canopy uses the main canopy's design with a soft loop closure, can be deployed with either hand and falls at a rate of 27 feet per second.

The harness for both the XT-11 and XT-12 models will be fully adjustable over the 5th to 95th percentile size range, bring improved comfort, and will be compatible with current and future equipment. The new harness will mount the reserve parachute at suspension points near the shoulders instead of the waist. This transfers opening loads along the axis of the body for improved safety.

Design validation is scheduled to take place at Yuma Proving Grounds, Ariz., in May. The better-performing system will progress into an extensive test program to demonstrate reliability. Fielding is expected to begin in 2005.

Courtesy photo

The XT-12 main parachute uses a high-drag quarter spherical, multi-slotted planform canopy. After a final parachute contract is awarded, fielding is scheduled to begin in 2005.

Courtesy photo

The XT-R12R reserve canopy uses the same basic design as its accompanying main parachute.

Screened

Suit selectively blocks contaminants, releases moisture

By Curt Biberdorf
Editor

Just 25 microns thick, the selectively-permeable membrane found in the Chemical Biological Protective Field Duty Uniform resembles plastic wrap, yet it's a potent barrier against weapons of mass destruction.

The new lightweight, one-piece uniform will be issued to the U.S. Special Operations Forces beginning next year for use during the threat of a chemical or biological agent attack on the battlefield, said Quoc Truong, project officer for the uniform at U.S. Army Soldier Systems Center (Natick).

Warrior/Biberdorf

The Chemical Biological Protective Field Duty Uniform eliminates the need for a protective overgarment.

The membrane replaces carbon. Variations of carbon-composed materials have been manufactured since chemical weapons were used in World War I. Carbon works, but it has several drawbacks.

"Carbon acts like a sponge," Truong said, a physical scientist at the Natick Soldier Center's Individual Protection Directorate. "When it reaches its holding capacity, it's no good. In heavy contamination, soldiers would have to carry extra suits to change into."

Heft is another setback. With the cellulose-based selectively-permeable membranes, the suit weighs nearly half as much as the Joint Service Lightweight Integrated Suit Technology (JSLIST) overgarment, the military's most modern protective suit. Instead of absorbing, the membranes block all known liquid, aerosol and vapor agents. At the same time, the polymer-based membrane allows moisture vapor from sweat to escape and evaporatively cool the body. A protective overgarment becomes unnecessary, although this suit would not become the regular duty uniform, said Truong. The regular Battle Dress Uniform is still more comfortable than any protective suit.

Truong compared the filtering and blocking process to shaking a woven basket filled with sand and marbles. The "marbles" represent chemical or biological molecules while the "sand" represents water molecules. The membrane is sandwiched between the inner liner and outer layer of either a nylon or heavier Nomex/Kevlar fabric. Because a tear in the fabric would render the suit ineffective, extra attention was focused on creating an abrasion and puncture-resistant material.

Extensive laboratory testing at

Warrior/Biberdorf

A heavy-duty zipper seals the front and back part of the hood. The mask opening's rubber rim provides a snug fit.

Natick, the Edgewood Chemical Biological Center at Aberdeen Proving Grounds, Md., and Dugway Proving Grounds, Utah, proved the reliability of the material.

In May 1999, soldiers at Fort Lewis, Wash., tested prototype membrane suits along with the JSLIST for comfort. In June, Marines tested the uniform for durability.

Truong said Hawaii was used as the test site because of the harsh environment with sharp surfaces. Marines successfully practiced amphibious assaults with the waterproof uniform.

"Soldiers like them very, very much," said Truong. "You do sweat, but it's much less than with a (Battle Dress Uniform) and JSLIST. Its light weight adds to the perception of comfort."

Besides being worn over the duty uniform, previous versions of chemical biological protective ensembles consisted of a jacket, pants, and rubber gloves and boots. The Chemical Biological Protective Field Duty Uniform covers everything from head to toe. The only piece missing is the protective mask.

A heavy-duty water and vaporproof zipper with thick, rubbery black plastic to form a tight seal opens at the front. Users step into the pant legs with "feet," slide their arms into the sleeves that have protective gloves attached to them, and close the zipper. The feet and gloves offer a seamless seal from the neck down. From the neck up, after the user dons the protective mask, the front flap with a rubberized brim slips snugly around the mask face. Then the back flap joins the front flap with a zipper closing across the head from ear to ear.

Overboots are unnecessary. Troops slip their covered feet directly into their combat boots. Selectively permeable gloves will replace the currently used butyl rubber gloves, which would ordinarily fill with sweat after a short wear time. Directly above each glove is another zipper opening to allow troops to take out their hands when dexterity is required.

Warrior/Biberdorf

Adjustable straps at each side of the waist can be fastened to provide a snugger fit.

Adjustable straps at each side of the waist can be fastened to provide a closer fit. A pocket on the left sleeve is slanted for easy reach. The front zipper conveniently opens from both ends with two sliders to allow users to don and doff the garment, and also take care of bodily functions. The thin, flexible material is easy to launder and uses less package volume.

Applications beyond the military include police and fire departments involved with domestic terrorism preparedness, medical employees who are exposed to bacteria and viruses, and industrial workers, who may be exposed to industrial chemicals, insecticides and pesticides. Truong said federal law enforcement agencies are preparing to test a modified-version of the suit to see how they might benefit from it.

Cellulose-based selectively-permeable membrane technology was developed with the help of Acordis Research GmbH, Obernburg, Germany. W.L. Gore and Associates, Inc. in Maryland developed its amine-based selectively permeable membrane with Natick's guidance.

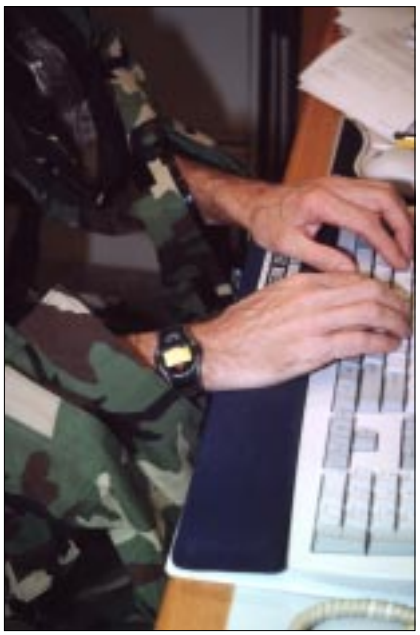
The final contract was awarded to Acordis Research to develop a selectively-permeable coating for seamless glove application, while Texplorer is working with Natick to convert cellulose-based selectively-permeable fabric laminate to garments for human testing and evaluation.

Warrior/Biberdorf

An angled sleeve pocket reduces the difficulty of reaching in.

Warrior/Biberdorf

Gloves are integrated into the suit and allow sweat to escape.



Warrior/Biberdorf

When gloves aren't needed, the user can slip out of them through a zipper in the sleeve.

Military Police have multiple responsibilities such as reconnaissance, checkpoint security, anti-terrorism operations as well as law enforcement. A new wearable personal computer may one day give them the edge in communications and information management. It's known as the ...

Digital MP System

By Trish Warrick

He can see around corners, through trees and in the dark. He maintains a file of known offenders on his head and checks faces against it at roadblocks and checkpoints. He communicates by hand signal with people who can't see him.

He's not a "universal soldier" — he's a military police soldier wearing the Digital MP System.

The Digital MP is a durable, lightweight, wearable communications and information management system designed to help carry out reconnaissance, checkpoint security, anti-terrorism operations and other MP missions, said Henry Girolamo, program manager at the U.S. Army Soldier Systems Center (Natick).

Funded by the Defense Advanced Research Projects Agency, the first versions of ViA's next generation wearable PC are currently being used by the U.S. Army Military Police in field tests at Fort Polk, La. and elsewhere.

"The new ViA PC with Transmeta processor has high performance, lower power and no noticeable heat," Girolamo said. "ViA's Crusoe-based computer has the potential to be a central component in a soldier's weapon system, providing communication and information management in critical combat situations."

Fort Polk's 91st Military Police Detachment soldiers became the first MPs to test the system when representatives of Soldier Systems Center, the Defense Advanced Research Projects Agency and contractor teams brought the system to Fort Polk in early November to see how it would work on real soldiers.

The backbone of the Digital MP is a wearable computer developed by ViA Inc., MicroOptical Corp and Honeywell Inc. and tailored to the mission requirements of the MP soldier. The Digital MP's support features include a hands-free, voice-operated interface and an easily recharged or exchanged battery that provides daylong power on a single charge. It features peripherals such as:

- An audiovisual system with built-in miniature camera for face recognition and image display plus a noise-canceling microphone and bone-conduction microphone/earphone for voice recognition, all incorporated in a pair of normal-size eyeglass frames.
- A BDU-pocket-sized "military e-book" readable even in strong sunlight or pale starlight (with night vision goggles) that emits no light to give away a soldier's position.
- An electronic glove that can function like a computer mouse with the e-book and translate hand signals into words on other soldiers' eyeglass-mounted viewers.

The Digital MP system can connect a military police team wirelessly and in ways never before possible.

The eyeglass-mounted camera provides streaming video. "It can transmit to me what another MP is looking at even though I can't see him," said Sgt. Michael Sauer, Special Reaction Team noncommissioned officer-in-charge, 91st MP Det.

An MP making a traffic stop or manning a checkpoint can take live videos that are checked against digital mug shots stored in the National Crime Interdiction Center database, so he's quickly alerted if the person stopped has a criminal record. On deployment, the system can warn him that he's dealing with a suspected

Courtesy photo

Military Police from Fort Polk's 91st Military Police Detachment test the new Digital MP System.

Courtesy photo

The Digital MP can be programmed to continuously translate speech from English to another language and vice versa.

Courtesy photo

The backbone of the Digital MP is a wearable computer.

Courtesy photo

The Digital MP's support features include a hands-free, voice-operated interface and an easily recharged or exchanged battery that provides daylong power on a single charge. The audiovisual system, microphone and earphone are incorporated onto eyeglass frames.

terrorist or war criminal. An MP on patrol can use the e-book to quickly help others locate what he sees.

"Say he's on recon, looking at the terrain," said Sauer. "He sees enemy tanks." Using traditional methods, the soldier plots coordinates on a paper map, calls the tactical operations center on the radio and another soldier plots the coordinates on another map. With Digital MP, "He puts the icon on the map and sends it to the operations center," Sauer said.

With the electronic glove, MPs separated by thick woods, buildings or darkness can still communicate silently with the familiar hand signals for "Suspect armed!" and other vital information.

The adapted Nomex flight glove, with bend sensors in each finger and in the wrist, pressure sensors in the index and middle fingertips and 2-degree tilt sensors, renders preprogrammed gestures as words in fellow MPs' eyeglass display monitors.

The glove works when the signaler doesn't have line of sight communication with the others and doesn't want to give away his position by speaking, said Sauer.

The glove also functions like a mouse with the e-book, guiding the cursor with the tilt sensor and using the pressure sensors as right and left clicks. When silence is necessary, as on patrol, the glove can override the voice-operated system.

The Digital MP can be programmed to continuously translate speech from English to another language and vice versa with only a five-second lag.

Presently it can handle Spanish, Korean, Arabic, German, French, Italian, Portuguese, Dutch, Thai and Turkish, and plans are to add "militarese" — translating the soldier's "clicks" into the civilian's "kilometers," for instance.

Editor's Note: Trish Warrick is editor of the Fort Polk Guardian.

Warrior/Biberdorf

The Chemically and Biologically Protected Shelter uses an expanded capacity Humvee and a hard-walled lightweight multipurpose shelter attached to the bed of the Humvee.

Shelter blocks contaminants

By Curt Biberdorf
Editor

Forward-deployed Army medical units will have extra capability to treat patients contaminated from nuclear, biological or chemical weapons with the Chemically and Biologically Protected Shelter (CBPS).

Developed at the U.S. Army Soldier Systems Center (Natick), the new shelter is used by a treatment squad, medical company and a forward surgical team.

The CBPS is a self-contained system with five major components: an expanded capacity Humvee; a hard-walled lightweight multipurpose shelter (LMS) attached to the bed of the Humvee; an airbeam-supported chemically and biologically-resistant soft tent shelter attached to the back of the LMS; and a high mobility trailer with a 10 kilowatt tactically-quiet generator.

After the trailer is positioned and detached, the unit is ready to set-up. A fabric cover over the Humvee tailgate is opened and a pulley system lowers the tailgate that allows the soft shelter to roll out into position. Then the four-soldier medic team unfolds the soft shelter and inflates the air beam assemblies forming six arches. A rib air inflation system fills the beams within minutes and needs only 3 pounds per square inch to erect the shelter.

Warrior/Biberdorf

The airbeam-supported chemically and biologically-resistant soft tent shelter is connected to the Humvee's hard-walled shelter.

"The low-pressure fabric airbeams are being used for the first time in a production item," said

Warrior/Biberdorf

Up to seven systems can be connected together by unzipping a door-sized portion of the tent from the right or left-side walls.

Warrior/Biberdorf

The CBPS provides 300 square feet of space and can process 10 patients per hour in a chemical and biological threat environment.

Warrior/Biberdorf

Separate entrances are used for ambulatory and litter patients. Each entrance is an airlock which forces out lingering contaminated air.

Andra Kirsteins, CBPS systems manager. "They improve the speed and ease of deployment over traditional tent frames with their low weight and simple operation."

From the time the CBPS stops, set-up time in a non-threat area must be performed in 20 minutes. Medics have been able to exceed this requirement by being fully mission-capable and able to receive their first patient within seven minutes of driving on site. The CBPS is highly mobile and can relocate up to three times per day.

The CBPS provides 300 square feet of space and can process 10 patients per hour in a chemical and biological threat environment. Unlike regular tents, the soft tent shelter is treated to resist chemical and biological agents. The fabric also can be decontaminated.

"A normal tent will absorb chemical agents. It would normally go right through the fabric," Kirsteins said.

The CBPS can operate in a chemically-contaminated environment of minus 25 to 120 degrees F while maintaining an internal temperature of 60 to 90 degrees F.

Up to seven systems can be connected together by unzipping a door-sized portion of the tent from the right or left-side walls. A passageway connector is attached, connecting one CBPS to another. Three CBPS's are connected to form a forward surgical team.

The CBPS has separate entrances for ambulatory and litter patients. Each entrance is an airlock which forces out any lingering contaminated air from soldiers entering the shelter. Patients and personnel are decontaminated before they get to the CBPS, and the tent remains pressurized when operating in a contaminated area.

CBPSs were sent to Aberdeen Proving Ground, Md., for reliability and limited user-testing in July and August.

They then went through testing for operational effectiveness at Fort Drum, N.Y., in October and November. Production models are scheduled for delivery beginning in June 2001.

Mask cuts breathing effort

By John G. Maruscak
Contributing Writer

The Joint Service General Purpose Mask (JSGPM) will be the military's next generation chemical and biological protective respirator, replacing the Air Force and Navy MCU-2A/P series mask and the Army and Marine Corps M-40 series mask.

An Army-led program, the project taps into the U.S. Army Soldier and Biological Chemical Command's more than 50 years of experience in mask and soldier equipment development. Project Manager for Nuclear Biological Chemical Defense Systems has partnered with Avon Rubber and Plastics, Inc. of Cadillac, Mich., Project Manager-Soldier Systems, Natick Soldier Center and Edgewood Chemical and Biological Center for the mask program.

Improved performance against chemical and biological agents, toxic industrial materials and nuclear fallout; improved field of vision and equipment compatibility; reduced weight and bulk, and significantly reduced breathing resistance are program goals.

Courtesy photo

The Joint Service General Purpose Mask is lightweight and uses a new filter design that may reduce breathing resistance by 50 percent.

"The joint-service management sought to make the mask more comfortable," said Col. Stephen Reeves, project manager for Nuclear Biological Chemical Defense Systems. "It's lighter than the current M-40 or MCU-2/P masks and easier to see through than previous masks."

Some previous masks had binocular eyepieces, but the joint service mask has a single eyepiece, according to Reeves. "This gives the servicemember much greater field of view," Reeves said. "We're testing this vision piece to ensure it will interface with night vision equipment, any weapon-sighting systems, as well as individual weapons."

He said the filter technology is perhaps the largest and most radical change. "One objective is to reduce breathing resistance by half," he said. "This means it won't be so tiring to use because it will take less work to breathe."

Filter designers, Avon and its subcontractor, Guild Associates, are looking at several different filter media, a radical departure from the traditional filter bed.

The ability to make a smaller canister and shape it in different configurations to fully integrate it into the mask helps with increasing the field of view and improving the equipment compatibility.

Extra features of the mask are color-coded repair parts for easy identification, a filter shelf-life indicator, the ability to safely and quickly change filters while in a contaminated environment, and an improved drinking system for easier use and greater flow of liquids.

The new mask is fully integrated into the warfighter's combat ensemble for the next generation. The mask was tested with the current Land Warrior system at the Human Engineering Research Laboratory at Aberdeen Proving Ground, Md.

A unique and innovative modeling and simulation test fixture was developed that allowed more realistic form, fit, and function of the mask during evaluations using live agents, ensuring maximum real-world protection.

Courtesy photo

The joint service mask has a single eyepiece for improved field of vision.

All maintenance will be taken care of at the operator and unit level with limited repair using replacement parts. The repair parts will be reduced from about 36 for the current mask to 12. Total ownership costs will be cut by at least 50 percent.

The development team is attempting to do whatever is necessary to ensure that the mask will satisfy servicemembers.

"Keeping the lines of communication open between product developers and those who will ultimately use the mask is paramount," said Capt. Matt Seipt, project officer for the Marine Corps. "The JSGPM team is exactly that-a team- and to that end I am confident the final result of this program will truly be a mask that satisfies, and even goes beyond, service expectations."

The mask is scheduled for fielding beginning in 2006.

Editor's Note: John G. Maruscak is with Project Manager-Nuclear Biological Chemical Defense Systems.

Better bread baked for troops

By Curt Biberdorf
Editor

Unlike hardtack soldiers ate during the Civil War or the crackers soldiers find in today's rations, shelf-stable pouch bread provides them extra nutrition and variety along with bread's appealing taste and texture.

First produced in 1988 and successfully fielded during Operation Desert Storm, pouch bread technology was patented in 1991 and led to an expanded variety of shelf-stable bakery items for individual and group rations. Now a better version of pouch bread is being developed and will be available in 2002.

"It's not meant to compete with fresh bread," said Barbara Daley, project officer for the improved pouch bread program at the Department of Defense Combat Feeding Program at the U.S. Army Soldier Systems Center (Natick). "It's a very good complement to the (Meal, Ready to Eat) when fresh bread isn't available."

The Office of the Surgeon General considers the bread to be a mandatory meal supplement for soldiers living entirely on MREs for the first 21 days of deployment.

Studies have shown that including bread with meals increases troop morale, and soldiers' acceptability and consumption of other ration foods.

Pouch bread is preserved by using ingredients and techniques to control water activity, which prevents mold and minimizes staling. Ingredients that stabilize and retain moisture along with oxygen-absorbing sachets placed in each foil container prolong shelf life. Issued separately from the MRE, pouch bread has a minimum shelf life of three years at 80 degrees F or six months at 100 degrees F.

Packaged in the same flexible and tough material as MRE foods, the current pouch bread is about the size and shape of a hamburger patty.

The bread provides 160 calories, about one-third of them fat calories from hydrogenated soybean or cottonseed oil. Available in white or wheat, both are enriched with vitamins and minerals.

Although it met the guidelines and soldiers liked having the item, pouch bread improvements were desired because quality deteriorates before reaching its three-year shelf life.

"The current MRE pouch bread in the system is not as well received as we would like," Daley said. "Two big problems we face are general staling and off-flavor development."

The goal, as with all combat rations, is to create a product that is highly acceptable so that soldiers eat the food and get the nutrition. Daley is in the second of a two-year program to remove the barriers to acceptance.

"I'm looking at other ingredients to control water activity and experimenting with flavor-masking ingredients," Daley said. "There's some discussion by the services of reducing the shelf life to 18 months, which would further assure a fresher product reaches our soldiers."

The manufacturer, Sterling Foods, Inc. in San Antonio, Texas, also plays a role in quality by ensuring the best possible processing at the plant, she said.

The improved pouch bread can be eaten alone or with other MRE foods, such as with the grilled chicken breast entrée to make a sandwich. She said the bread is a main component of the science and technology program for Mobility Enhancing Ration Components (MERCs). MERCs are prototype shelf-stable sandwiches, which would provide soldiers eat-on-the-move capability.

Daley is also working on a different name, new packaging that looks more commercial-like, and a rectangular-shaped split-top for the improved pouch bread. "We want soldiers to know this is different from MRE bread of the past," she said. White bread will be the only variety offered initially, but the technology may be applied to the wheat bread formulation.

Warrior/Biberdorf

The improved pouch bread will be a rectangular shaped split-top and use a different package. Better flavor and reduced staling are two goals of the program.

Courtesy photo

Phil Gibson, materials research engineer at the U.S. Army Soldier Systems Center (Natick), rappels down a rock wall at the Mountain Warfare School, Ethan Allen Firing Range in Jericho, Vt.

Frontline

Program gives civilians perspective on soldiering, equipment

By Curt Biberdorf
Editor

Although it was called the "summer phase," Phil Gibson shivered on many days of wind-driven snow and sleet at the Vermont Army Reserve and National Guard Mountain Warfare School, Ethan Allen Firing Range in Jericho, Vt., last October.

Gibson, a materials research engineer at the U.S. Army Soldier Systems Center (Natick), participated in the two-week course as part of Scientists and Engineers Field Experience With Soldiers (SEFEWS), which is coordinated by the Operational Forces Interface Group (OFIG) at the U.S. Army Soldier and Biological Chemical Command (SBCCOM).

SEFEWS is a voluntary program that gives U.S. Army Materiel Command engineers, scientists, technicians and other employees with a "foxhole-level" perspective by permitting them to live, eat and work alongside soldiers in an active Army unit engaged during a field training exercise.

"We want to give them a feeling for what the soldier does, his requirements and limitations," said John Lupien, SEFEWS coordinator at OFIG.

"Civilians I think are isolated from daily contact with soldiers," Gibson said, who researches ways to improve cold weather and chemical biological protective clothing. "These trips keep you motivated, they reenergize you. I think everybody should do something like this, particularly people like me in a lab doing basic research."

Civilians participate as part of the unit or class for a period of 10-14 days. They get the opportunity to discuss problems and ideas that the soldiers have with equipment they are currently issued.

SEFEWS is different from the Greening program. Greening allows the project officers and scientists who cannot participate in the SEFEWS program to gain field experience with soldiers. Greening reduces the amount of time the employees are away from their office.

Unlike SEFEWS, Greening is SBCCOM-controlled, requires no medical screening or physical fitness test, and allows the individual to work with and observe more than one unit

Courtesy photo

A soldier at the Mountain Warfare School negotiates a rock wall.

during their training time. An OFIG enlisted leader is on-site to escort Greening personnel, assist in training and answer questions.

"Greening is a walk in the park compared to (SEFEWS)," Lupien said.

Gibson has participated in SEFEWS with Fort Lewis, Wash., soldiers at the Yakima Training Center who were conducting mechanized infantry training, but said he liked his trip to Vermont much more because the activity was nonstop each day.

"A school is organized and programmed. It provided continuous activity and interaction with soldiers," he said. "You get a lot more out of it and still get to see and experience the equipment."

The course trains soldiers on mountaineering and consists of daily mountain walks up to the training sites, loaded with a full rucksack. Soldiers climb up and rappel down mountains, tie rope systems to make bridges, navigate the land by day and night, and learn how to care for and evacuate casualties.

During the two-week winter phase, students are introduced to ice climbing, snowshoeing and cross-country skiing in mountainous terrain.

"I was really impressed with the soldiers," he said, noting that most of them were infantrymen or Special Forces troops. "They're really glad to see civilians there and to have someone to talk to about their equipment."

Through the wind, cold temperatures and precipitation, Gibson said they didn't complain or lose their spirit, and they exhibited teamwork in all their tasks.

In his class, 33 out of 44 attendees graduated. Nearly half of the failures were from physical ailments; the remaining soldiers were academic failures.

Lauren Milch, a food technologist at the Department of Defense Combat Feeding Program, attended the summer phase in 1995.

"I found it extremely rewarding to finish the school," said Milch, who is part of the Equipment and Energy Team. "(The experience) helped me develop better packaging designed for the needs of the soldiers. (SEFEWS) forces you to use your items everyday, and you can't get that any other way than if you're in the military."

Participants dress like the soldiers, using the same helmets, rain gear, uniforms and sleeping bags. Gibson said field-savvy troops knew how to adjust the ALICE pack, which had rubbed a hole into his uniform. They also prepared meals from Meal Ready-to-Eat (MRE) recipes and were aware of new meals soon to be introduced.

Besides gaining an appreciation of soldiering, Gibson learned how various gear performed. He really liked the MREs and Gore-Tex parka. Overall, he said the soldiers liked the clothing, wet-weather gear, rucksacks and food.

However, the boots and gloves they used fell out of the comfort zone.

Despite the physical and mental rigors, and often lousy weather, he said it was an experience worth repeating, and he plans on participating in SEFEWS again.

Many possibilities available for employees who qualify

In 1992, the Design Engineers Field Experience With Soldiers (DEFEWS) was renamed Scientists and Engineers Field Experience With Soldiers (SEFEWS), but the emphasis stayed the same.

The Army Materiel Command Field Assistance in Science and Technology (AMC-FAST) manages a program beneficial for employees engaged in or responsible for materiel or weapons research and development. They acquire a first-hand knowledge of the soldier's environment and equipment.

"They'll be treated like a soldier," said John Lupien, the Operational Forces Interface Group representative for the SEFEWS program at the U.S. Army Soldier Systems Center (Natick).

AMC-FAST sends a list of volunteering units representing major Army installations to OFIG, and employees can participate in field training exercises or schools, such as the Mountain Warfare School or Airborne School.

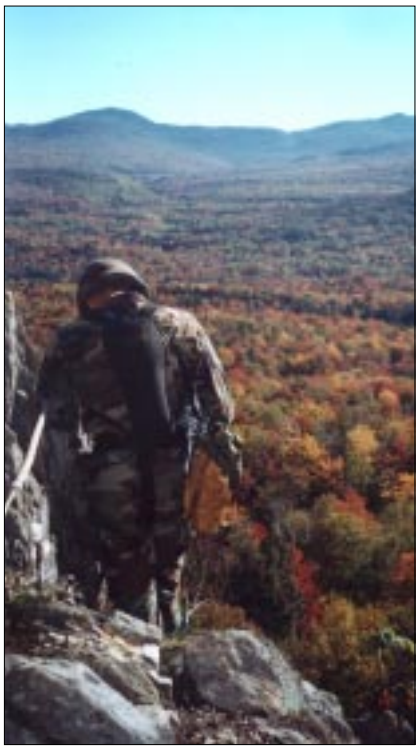
Lupien said participants could be exposed to almost anything the Army does.

Among the installations Natick employees have visited for SEFEWS are Fort Knox, Ky.; Fort Lewis, Wash.; the Mountain Warfare School on Jericho, Vt., and Camp LeJeune, N.C., with soldiers from Fort Bragg, N.C.

Participants must pass the Army Physical Fitness Test and a medical examination to qualify. OFIG handles all the coordination of what to bring and supplies the necessary field gear.

Dozens of employees have participated over the years, gaining some insight into what it's like to be a member of an Army unit, and taking that knowledge back to the office to design better gear.

—CB



Courtesy photo

On a clear day, the view at the Mountain Warfare School is expansive.