



# THE WARRIOR

Natick, Massachusetts

Winter 2006



*Future Force  
Warrior  
moves out*

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## **Warrior Magazine to go electronic, PAO seeking e-mail addresses**

Starting in 2007, the U.S. Army Soldier Systems Center's (SSC) publication, The Warrior, will be published electronically.

If you would like to continue to receive the Warrior, please send your email address to: [IMNE-SSC-PA@natick.army.mil](mailto:IMNE-SSC-PA@natick.army.mil) and put Warrior Mailing as the subject.

Please include your regular (snail-mail) mailing address as well, so we can cross-check our printed mailing list.

The Warrior will be available online at: <http://www.natick.army.mil/about/pao/pubs/warrior/index.htm>. It will also be available in a .pdf format for those of you interested in printing a copy.

We hope you will continue to find The Warrior a good source of information about the SSC.



**Cover photo:**  
Soldiers evaluate the Future Force Warrior program equipment at Fort Benning, Ga.

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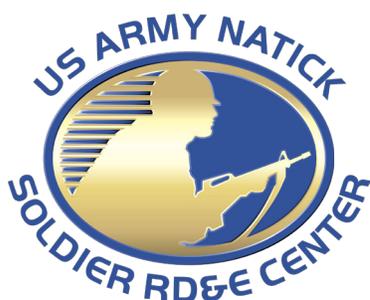
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# Natick Soldier RD&E Center, U.S. Army Research Institute of Environmental Medicine join forces to win big awards



Soldier sample First Strike Ration (FSR).



For the second year in a row, two tenant partners from the U.S. Army Soldier Systems Center (SSC), the U.S. Army Research Institute of Environmental Medicine (USARIEM) and the Natick Soldier Research, Development and Engineering Center (NSRDEC), won a Department of the Army Research and Development Laboratory of the Year Collaboration Team Award at the 2006 U.S. Army Acquisition Corps Award Ceremony.

Also, for the fifth time in the past six years, the NSRDEC won the Department of the Army Research and Development Laboratory of the Year Award for the Small Development Lab Category.

Claude M. Bolton Jr., assistant secretary of the Army for Acquisition, Logistics and Technology and Army acquisition executive, presented the awards at the ceremony on Oct. 8 in Crystal City, Va.

“It is clear that we have the world’s best acquisition and logistics workforce to keep our Army the most capable land force on earth,” said Bolton during the ceremony.

The Collaboration Team Award was won for the joint efforts of NSRDEC and USARIEM in developing the nutritionally-optimized First Strike Ration (FSR). The FSR is a compact, eat-on-the-move assault ration designed to be consumed during the first 72 hours of intense conflict by forward deployed Warfighters. The FSR is substantially reduced in weight and cube and enhances Warfighter consumption, nutritional intake, and mobility.

“These collaborative efforts and early accomplishments from the FSR Program are a perfect example of how a diverse group of talented individuals and a shared vision can make an immediate and lasting impact on a Warfighter’s health and performance in operational environments,” said Col. Beau Freund, commander, USARIEM. “USARIEM is absolutely delighted to be a part of the FSR team and this important ration development.”

In both categories, a group of science and technology experts assembled by the Army from industry and academia judged the competition, ranking the results based on a written report and oral presentation.

Selection for the Research and Development Laboratory of the Year Award is based on extensive evaluation of the organization’s vision, strategy and business plans; strategic management of human capital; competitive sourcing; improved financial performance; use of expanded electronic government; budget and performance integration; major management achievements; and major technical achievements.

“Working as a team, NSRDEC has achieved unmatched success which is without question the hallmark of a dedicated, highly skilled and enthusiastic workforce - something the Army clearly values,” said Philip Brandler, director of NSRDEC.

NSRDEC, in their nomination package, presented a portable chemical sterilizer for surgical instruments and biofunctional nanoporous electrospun polymeric membranes as their most significant technical accomplishments.

The sterilizer allows for the sterilization of medical equipment in austere environments without the need for electricity. Not only will this assist the military, but its usage will benefit emergency first-responders and disaster relief workers.

The membrane technology, while still being developed, will be instrumental in protecting the safety of food supplies. The primary benefit is its ability to concentrate food pathogens within the high surface area sensor material and luminescing to indicate their presence, accomplishing concentration and detection in the same disposable, cost-effective, pathogen sensor element.

“I extend my thanks to everyone at the Natick Soldier Research, Development and Engineering Center who has contributed so much in making the NSRDEC the outstanding organization it is. Over the years, all of our mission areas have been highlighted in the RDL competition,” Brandler added.

“We serve a Nation at war and a military force that is transforming while fighting and winning the global war on terrorism,” Bolton said. “It is clear that we have charted the right course - increasing capability, flexibility and sustainability - and that we must maintain the tremendous momentum we have built.”

# ***Future Force Warrior leaps ahead***

*By Carol Fitzgerald*

*Natick Soldier RD&E Center*

*Future Force Warrior Technology Program Office*

As the Future Force Warrior Advanced Technology Demonstration (FFW ATD) enters its final year our team has made major strides towards our objectives, proven through successful field experimentation with Soldiers.

We are progressing towards accomplishing our primary ATD goal: integrating and demonstrating advanced technologies into a Soldier/Small Combat Unit (SCU) system of systems that will significantly enhance the combat effectiveness of the SCU and will be interoperable with the Future Combat Systems (FCS) and the future force.



*Warrior/Underhill*

Recently, we participated in some Army-sponsored programs and experimentation venues that for a few years have been developing the future force network, to conduct our own FFW experimentation and demonstrations. This opportunity has allowed us to have Soldiers look at our many technologies, and answer the questions “Do these technologies work?” and “How will the capabilities help me do my job better?” We were also able to start evaluating how to distribute the capabilities across the SCU.

This summer we participated in the U.S. Army Communications Electronics Research, Development and Engineering Center’s (CERDEC) Command, Control, Communications, Computers, Intelligence, Surveillance, and Reconnaissance (C4ISR) On the Move (OTM) at Fort Dix, N.J.

OTM is focused on the technical and engineering aspects of establishing the future force network and making it work in a field environment.

OTM provided us the ability to meet our Increment 1 top level goal -- initial network interoperability, and integrating the Soldier/SCU into the future force network for the first time -- three months early.

In November, we participated in the U.S. Army Training and Doctrine Command’s (TRADOC) Air Assault Expeditionary Force (AAEF) Spiral C at Fort Benning, Ga.

AAEF is about exploring how the network enhances operational effectiveness.

AAEF/C provided a fantastic opportunity to experiment with Soldiers in the field to get feedback on Soldier acceptability of the equipment and to gain insights on the tactical utility of the FFW capabilities. It also provided a venue to determine what system refinements are necessary (and desired) for OTM 07 and AAEF/D—the events that will culminate the FFW ATD next summer and fall.

## ***Air Assault Expeditionary Force/Spiral C (AAEF/C)***

We participated in AAEF/C with a squad of FFW-equipped Soldiers within the experimental force (EXFOR) platoon, with Leaders and Soldiers Command and Control (C2)-enabled. Combat veteran non-commissioned officers (NCOs), who are members of the FFW team, conducted training of the FFW EXFOR squad. They conducted both operator training and individual and collective tactical training using the Tactics, Techniques and Procedures (TTPs) our team developed to employ the myriad FFW capabilities.

The prototypes we took to AAEF/C were based on all our previous FFW work, coupled with key leveraged technologies, and included an ergonomically designed advanced combat ensemble with stand-off, integrated body armor/load bearing (the “chassis”), passive cooling from the chassis stand-off coupled with a wicking combat shirt and integrated electronics (e.g., the computer, navigation, power and Personal Area Network (PAN).

The communications and networking integration was via a Wearable Soldier Radio Terminal hosting the Soldier Radio Waveform version 2.1 (from CERDEC), which is one of the primary waveforms used in the future force network.

The FFW Leader system also included mapping and situational awareness software called FalconView (being used in theatre today) and targeting software called BareBones (a spin-off of Air Force software), viewed in a goggle-mounted “look down” display and manipulated by the Soldier using system voice control.

A Battlefield Renewable Integrated Tactical Energy System (BRITES) power manager allowed any power source to be used as input power to the system. Some Soldiers had an FFW-modified XM-104 fire control target engagement system and some had a Multi-Function Laser.

Soldier level situational awareness was via CERDEC’s C2 Mobile Intelligent Net-Centric Computing System (C2MINCS) and provided basic position/location and mapping functions appropriate to a rifleman’s needs.

We also had memory joggers integrated in the Leader and Soldier software systems for quick recall of complex and/or infrequently used tasks.

Our FFW engineers on sight at Fort Benning also integrated the iRobot PackBot with our system for use by a Robotics NCO.

The benefits of our participation in OTM and AAEF/C have been significant.

Our three combat veteran NCOs, Sgt. 1<sup>st</sup> Class Rick Haddad, Staff Sgt. Stephan Simmins and Sgt. Josh Deveraux, captured the capability benefits of FFW as follows:

- *Soldiers at OTM and AAEF were able to operate tactically with the FFW systems, FalconView and C2MINCS in a matter of hours. The user friendly applications in the areas of navigation and fires planning allowed for quick route and target planning.*
- *Soldiers responded quickly to the Windows-based software that made the training much quicker than expected. Young Soldiers already having a foundation of basic computer skills made the learning curve small.*
- *The Soldier system (C2MINCS) was learned by most Soldiers in half an hour.*
- *FFW could assist Soldiers in the prevention of potential fratricide situations in combat; the Support by Fire leader can track all movement of the assault element by icon in the event of normal fire control standard operating procedures failing. Icon tracking by all allows Soldiers to know the location of squad members.*
- *Multi-Function Laser (MFL) with use of FalconView or C2MINCS software provides the Soldier the ability to transmit locations of hostile targets by lasing, eliminating the need to estimate distance, elevation and direction to the target. This method allows the Soldier to transmit the enemy location immediately without unnecessary movement or the use of voice that may compromise the Soldier's position, thus maintaining the initiative on making first contact when fires are authorized.*
- *The FFW system allows all Soldiers to participate in the command and control of all missions by having the ability to listen to all traffic and view icons of sub-tasks being conducted within the squad. This allows less dissemination by team leaders which equals less unnecessary movement and quick, more fluid patrols.*
- *Ease of route planning by use of FalconView allows for more rehearsal and time for mission prep. All Soldiers have the ability to navigate using either the Leader or Soldier system; this results in reduction of breaks in contact during movement and allows for any Soldier to lead the movement if needed.*
- *Normal movements to the objective were almost cut in half because the Soldiers did not have to stop for map checks. Team leaders did not have to continuously look for others in their team because they had their icon present and could talk to all of them.*
- *Use of the Goggle-Mounted Display and FalconView mapping software makes long map checks a thing of the past.*
- *The durability of the Soldier Protective Integrated Ensemble System (SPIES) trousers provided much more protection while negotiating thick foliage and wire obstacles. The integrated knee pads allowed for the Soldiers to take a knee, regardless of the terrain below.*
- *The SPIES chassis provided ease of movement during operations and distributed the fighting load evenly; Soldiers liked the fit and ventilation capabilities.*
- *The Boneknockers allowed for easy listening while being able to wear hearing protection.*
- *BareBones application allows for Soldiers to pre-plan targets that can be shared by all prior to movement to the objective.*
- *Cooperative engagement with the use of MFL and XM-104 allowed the Squad Leader to use his M203 (grenade launcher) in engagement of targets without line of sight. Target data received from the MFL was sent immediately to the M203 with the XM104 and the target could be engaged.*
- *The Soldiers said they were less likely to "drone" during defensive operations because they could all listen to what was going on. They could also watch the movement of supporting tasks being conducted either with the leader goggle or Soldier PDA.*

### **Linking FFW to Air Power, Future Combat System**

Our other major technical advancement this year was the move from closed, proprietary architectures to truly open hardware and software architectures. This move started early in 2006 with our fruitful partnership with the U.S. Air Force Research Lab and leverage of their Batefield Air Operations Kit, which is used primarily by ground personnel who control the Air Force's "fast movers."

This year, our engineers successfully demonstrated linkage of an FFW Soldier to an FFW leader to USAF Tactical Air Control Personnel to fast movers (A-10 and F-16), accurately and rapidly moving targeting data digitally, machine-to-machine, from Soldier to joint platforms.

This innovative hardware and software integration approach and use of open architectures will allow the Soldier and SCU to link to any platform, with potential for Soldiers in the network to significantly contribute to higher level force effectiveness.

Next year our plan is to integrate to Army rotary aircraft (Apache) to demonstrate this Soldier-to-platform linkage.

Also next year, we will participate in the Future Combat Systems Experiment 1.1, their first significant field experiment. Their goal is to be able to pass data via the network all the way down to the Soldier/SCU level.

"One of the biggest benefits to FFW will be demonstrating the FFW architecture is interoperable in any network environment. Based on our work to date, the integration with FCS will be more straightforward than we originally thought," said Andy Taylor, FFW chief engineer.

***Future Force Warrior leaps ahead***

*Continued on p.10*

# Feeding the individual warfighter

By Gerald Darsch, Director, CFD, NSRDEC  
& Kathy Evangelos, Program Integrator, CFD, NSRDEC

The human need for food, clothing, and shelter has been understood throughout the history of civilization. Providing for these very basic yet essential needs for the Warfighter brings with it challenges and constraints that many take for granted.

Within the U.S. Army Materiel Command (AMC), the science and technology required to provide combat feeding systems, cutting edge clothing and individual equipment, personnel and cargo airdrop, and shelter on the battlefield for today's 1.2 million Warfighters is the mission of the U.S. Army Natick Soldier Research, Development and Engineering Center (NSRDEC) in Natick, Mass.

As long as there are wars, there will be boots on the ground; and where there are boots on the ground, there must be combat rations. Make no mistake; the U.S. has the most lethal weapons platforms in the global arsenal. The most flexible and adaptive member of that arsenal has been and continues to be the American Warfighter. Without the effort to bring fuel to that individual Warfighter, the military machine would come to a grinding halt.

The research, development, testing and engineering of combat feeding systems is the mission of the NSRDEC's DoD Combat Feeding Program (CFP). The NSRDEC is committed to providing revolutionary, state-of-the-art science and engineering in the development of combat rations, field food service equipment and total combat feeding systems.

That task is accomplished by more than 100 dedicated professionals who specialize in the fields of food science, food engineering, chemistry, microbiology, nutrition, nutritional biochemistry, behavioral science, food packaging and materials science, electrical, chemical and mechanical engineering.

All joint service combat rations and Marine Corps, Navy, and Air Force food service equipment and systems are managed by the NSRDEC, while science and technology for Army managed food service equipment and systems is successfully transitioned to the Product Manager Force Sustainment Systems. Numerous pieces of equipment and systems have transitioned to the Navy, Air Force and Marine Corps over the last three years dramatically enhancing food service capability and exceeding customer expectations.

The NSRDEC is responsible for the family of combat rations to include individual, group, assault and special purpose rations. For the purpose of this article, we will focus on the MRE or Meal, Ready-to-Eat. Imagine for a moment, if you cooked a meal, stored it in a hot,



A Soldier adds water to his Meal, Ready-to-Eat (MRE). More than 6,000 Warfighters, Soldiers and Marines both, have contributed to the MRE improvement program since 1992.

Warrior/Underhill

stifling warehouse, dropped it out of an airplane, dragged it through the mud, left it out with bugs and vermin, and ate it – three years later. What would happen? Nothing – if it were an MRE or “Meal, Ready-to-Eat.”

## A bit of MRE history

The MRE replaced the Meal, Combat Individual, which some still refer to as the old “C-Ration,” beginning in 1980.

From its year of introduction to 1987, the MRE contained such memorable items as: Ham and Chicken Loaf, Smoky Franks (aka “the Five Fingers of Death”), Chicken a la King (or Chicken “a la Death”) and the ever popular freeze dried pork, beef and potato patties. In 1988, eight of the original 12 entrees were replaced with entrees that were slightly more identifiable, to include spaghetti and meat sauce.

The MRE had the opportunity to go to war in Operation Desert Shield and Desert Storm.

Unfortunately, the initial feedback on the acceptance of the MRE wasn't pretty. It wasn't the four letter words we heard, but the combination of 4-letter words! Gerry Darsch, then chief of the Ration Systems Division, was called to the Pentagon. It was “suggested” by the former Chairman of the Joint Chiefs of Staff, Gen. Colin Powell, that we explore how to “FIX IT!”

A Joint Services Operational Rations Forum (JSORF) was conceived and its first meeting was held in 1991 with the objective of redesigning the MRE. JSORF membership included a voting member from each of the Services and the Defense Logistics Agency. The path forward was clear; we needed to refocus our business philosophy from the “Father Knows Best” mentality to one based on “Warfighter Recommended, Warfighter Tested, Warfighter Approved.”



Warrior/Underhill

The Meal, Combat Individual, also known as ‘C-Rations.’ The Meal, Ready-to-Eat (MRE) replaced the Meal, Combat Individual in 1980.

The commitment by Philip Brandler, then director of Food Engineering, and now director, NSRDEC, Darsch and the professional staff at NSRDEC to the Warfighter was to dramatically improve the quality and variety of the MRE by insuring this standard individual combat ration would not remain stagnant but would reflect changes through component enhancements every year.

In order to execute this plan, industry was brought on board immediately by involving the Research and Development Associates, an organization comprised of commercial vendors who contribute to the family of combat rations.

The plan was clear; the NSRDEC would lead the charge, survey Warfighters in the field and identify what food items should go into the MRE. From this data, MRE components would be obtained from the commercial sector or developed at the NSRDEC by Judy Aylward, senior food technologist and MRE Project Team Leader.

Prototype MRE's would be assembled by the industry and include those new items. Field test sites and Warfighter test units would be locked in by the NSRDEC's Operational Forces Interface Team under the leadership of Max Biela. Two groups of Warfighters would contribute to the field test. One group would consume the current MRE as the control and the other would evaluate the new prototype menus and components.

Surveys for the groups would be developed, collected and analyzed under the watchful eye of one of the NSRDEC's senior behavioral scientists, Dr. Matt Kramer, of the Product Optimization and Evaluation Team, and the data collected from the troops in the field by a team of behavioral scientists, food technologists, and NSRDEC volunteers. This entailed living with the Warfighter in the field for up to ten days.

The results of the field test would be presented to the JSORF and the most highly rated prototype entrees, starches, desserts, beverages, candies and snacks would replace the least acceptable items in the current MRE. These decisions would then be presented to the combat ration industry to alert them of changes that will be made to the MRE. Finally, the NSC, under the leadership of Ray Valvano, would prepare and coordinate the necessary procurement documents and forward them to the Defense Supply Center Philadelphia (DSCP) to initiate procurement. From the moment a Warfighter recommends a new MRE component to the time DSCP receives the documents from the NSRDEC is less than 12 months!

This process began in 1991 with the first new components appearing in the MRE in 1992 and continues today. From 1993 to 2006, over 165 new items have been included in the MRE.



Warrior/Underhill

*Jeffrey Dunn of the Natick Soldier Research, Development and Engineering Center (NSRDEC) questions Soldiers regarding their food preferences during a field evaluation in Yakima, Wash.*

***Memorable moments in the MRE improvement program include:***

- 1992**.....Hot sauce in every menu;
- 1993**.....The Flameless Ration Heater;
- 1994**.....Last year for freeze-dried fruit (too expensive);
- 1996**.....From 12 to 16 menus and nutritional labeling;
- 1997**.....From 16 to 20 menus and beef jerky;
- 1998**.....From 20 to 24 menus, to include 4 vegetarian;
- 1999-2006** .....A wide variety of new entrees, starches, candies, desserts, snacks, beverages;
- 2005**.....The hot beverage bag;
- 2006**.....The ergonomically designed drink pouch for dairy shakes

In the past two years, 29 new items have been approved for the MRE for 2007 and 2008. The field test with Warfighters to evaluate new components and menus for the 2009 MRE took place in Yakima, Wash., during October 2006. 23 new items have been assembled in prototype menus. The feedback from these Warfighters will determine what new items will go into the MRE in 2009.

Did you know that of the 12 original MRE entrees, the last one removed was the Ham Slice – finally replaced by Chicken Tetrastini in 2000? And spaghetti and meat sauce still remains one of the favorites through the years because it has been reformulated and improved based on Warfighter expectations.

***Feeding the individual warfighter***

*Continued on p.11*

# Joint precision airdrop takes flight

By Patty Welsh, Public Affairs Office

Delivering supplies to American troops is a lot easier now and much more precise thanks in part to the airdrop team at the U.S. Army Natick Soldier Research, Development and Engineering Center (NSRDEC).

The Joint Precision Airdrop System (JPADS) allows aircrews to drop loads from higher altitudes and farther away from the intended ground impact point, and troops on the ground are now able to receive and retrieve supplies more accurately. JPADS allows for aircraft and aircrew to fly above most threat areas with a variety of offset options yet still deploy a range of autonomous decelerators to pre-planned ground impact points.

The JPADS is a family of systems that includes self-guided cargo parachute systems, mission planning and weather systems, and military free-fall parachute systems. The primary navigation sensor is a global positioning system (GPS).

JPADS is also taking on an important role with regard to logistics distribution. With JPADS, aircrew can deliver supplies to troops in very remote areas, including those not accessible by roads. This reduces the need for Warfighters to leave a protected area to retrieve supplies and reduces the number of ground vehicle convoys that need to enter possibly dangerous areas. By limiting these two areas, it also assists with avoidance of Improvised Explosive Devices (IEDs).

Recently, JPADS systems have been used in Afghanistan with tremendous success. NSRDEC sent two riggers to Afghanistan

as part of a Mobile Training Team (MTT) to train personnel to use and rig two types of JPADS systems. This training was very successful and riggers in theater are now rigging JPADS solo and both the MTT and theater-located riggers are providing valuable lessons learned and suggested improvements to NSRDEC for future consideration and implementation.

“The recent success of JPADS is due to the dedication and commitment to the program with excellent communication and trust between the many different players,” said Richard Benney, aerospace engineer and technical manager for JPADS.

The JPADS programs are an exceptional example of how numerous services and organizations can team together to support an immediate Warfighter need with numerous requirements and many users’ requests for support and participation.

The JPADS team consists of players throughout the Department of Defense (DoD), led primarily by the U.S. Army NSRDEC, U.S. Army Product Manager Force Sustainment Systems (PM FSS), Deputy Under Secretary of Defense Advanced Systems and Concepts Office, U.S. Air Force (Air Mobility Command, Air Mobility Warfare Center, Electronic Systems Center and Global Mobility Wing), U.S. Joint Forces Command, U.S. Transportation Command, U.S. Marine Corps, U.S. Special Operations Command, and U.S. Army Combined Arms Support Command.

The program also relies heavily on many other participants, including industrial partners, users (weapons officers, loadmasters, riggers, and maintenance personnel), military and civilian mobile training teams and the test community from all military services.

“This balance takes considerable time and effort to maintain but the benefits of working as a joint community have and continue to be showing a significant return on investment for the Warfighter in theater now and much more capability is anticipated to be provided to theater in the near future,” continued Benney.

The cargo system of JPADS can deliver supplies, such as ammunition, water and fuel, and falls into different weight classes. JPADS-Extra Light has a 700 to 2,200 pound capacity, while JPADS-Light has a 5,001-10,000 pound capacity and is the primary system within the JPADS Advanced Concept Technology Demonstration (ACTD) program. JPADS-Medium has up to a 30,000 pound capacity.

Each weight class of the cargo system must be able to hit a pre-planned GPS ground target within 50 meters (objective), be able to be deployed from altitudes as high as 24,500 feet mean sea level (threshold), and be able to be deployed from at least eight kilometers horizontal offset from the ground target.



U.S. Air Force photo/Senior Airman Brian Ferguson

A new Global Positioning System-guided Joint Precision Air Drop System bundle, known as Screamer 2K, floats to the ground after being dropped from the back of a C-130 Hercules over Afghanistan Aug. 31.

JPADS-XL is in the works to meet requirements that still exist. The U.S. Army PM FSS released a request for proposals for JPADS-XL in November 2006.

The JPADS Mission Planner (MP), which is used to determine the best estimate of wind throughout the volume of space that the airdrop systems will be traveling, is now and will be compatible with all JPADS systems. The JPADS-MP uses the wind estimate with decelerator system performance characteristics to determine an optimum Computed Aerial Release Point (CARP) for ballistic loads or a Launch Acceptability Region (LAR) for JPADS systems. The MP can update any number of JPADS systems with new weather information and/or impact coordinates wirelessly from the cockpit.



U.S. Air Force photo/Senior Airman Brian Ferguson

*Joint Precision Air Drop System bundles fall out of the back of a C-130 Hercules Aug. 25. The drop was made from almost 10,000 feet above sea level and was calculated using up-to-the-minute wind data relayed from two small dropsondes deployed 20 minutes earlier. The dropsondes calculate wind speed and relay the information back to the aircraft, helping to calculate the correct drop point.*

Once deployed from the aircraft, supplies are guided by GPS (actuators controlling parachute steering lines/risers) that direct them to the desired landing point. The MP has also demonstrated significant increased accuracy of high altitude ballistic fielded airdrop systems such as the Container Delivery System (CDS), known as Improved CDS (ICDS) when dropped with the JPADS-MP. The JPADS-MP is also compatible with and being used to compute CARPs for Military Free Fall (MFF) users. The system is also being tested with a wireless linkage to helmet mounted MFF Navigation Aids (NAVIADS) which provide steering cues to MFF paratroopers.

The U.S. Air Force (USAF) first used the JPADS-MP over Afghanistan on July 29, 2006. Since then, numerous successful high altitude ICDS airdrop operations have taken place. In addition, with significant support from the Commander of the USAF Air Mobility Command, JPADS-XL candidate systems have been provided to Warfighters in Afghanistan and the first JPADS-XL combat airdrops took place on Aug. 31, 2006.

The need for precision airdrop capabilities is growing around the world due to the IED threat to ground troops and surface-to-air threats to aircraft and aircrews. Precision Airdrop for Special Operations has been chosen as one of 10 areas prioritized as a NATO Defense Against Terrorism (DAT) effort. The purpose of the DAT program is to develop new, cutting-edge technology to protect troops and civilians from terrorist attacks. Precision airdrop is the only DAT for which the United States is the lead nation and the NSRDEC leads this NATO effort for the DoD. It is desired in order to support the increasing deployments of NATO troops at greater distances from their individual Nations.

“I’m very proud to be a part of the joint and ever-growing JPADS team and want to thank everyone involved for their contributions to date. Many of the systems being used in theater began and/or matured through Natick Soldier Research, Development and Engineering Center initiatives in the late 1990s. The program has accelerated rapidly through joint teaming and exceptional dedication and hard work from many players all committed to supporting the Warfighter every day. Nothing feels better than to see paper concepts pushed and matured into systems/reality and demonstrated to a level where they can and are now making a difference to our ultimate customer, the joint Warfighter,” Benney said.

As the Army transforms to the Future Combat System, JPADS will provide the ‘just-in-time’ logistics needed. The intention is to resupply troops anywhere in the world within 24 hours with supplies from the United States.

The JPADS team is provided feedback directly from Warfighters who have trained, rigged, flown JPADS missions, and recovered JPADS loads in theater, said Benney. This feedback and data is invaluable and our joint team is working together to ensure that JPADS capabilities are available and continuously improving to meet the Warfighters immediate and long-term aerial logistics needs.

## Future Force Warrior leaps ahead

Continued from p. 5

### The Next Steps

A major program execution change was also recently implemented because of the need for greater flexibility and return on the investment of FFW program funds and to achieve greater innovation through leverage of “best in class” technologies that are being developed across DoD. The FFW Technology Program Office is leading all technical development and integration for the remainder of the program, with support from numerous contractors to bring the FFW Increment 2 vision to fruition.

We are working on further capability enhancements beyond the systems at AAEP/C and Experiment 1.1 including: precise positioning system, low power flex display, headgear sensor fusion, wireless Personal Area Network, wireless weapons interface, unmanned ground vehicles and unattended ground sensors (UGS) integration, enhanced computer and software upgrades and rotary wing connectivity.

In addition, we are making progress in reducing size and weight of key components: most notably the Panasonic Toughbook

surrogate we used this year for the Leader computer will be replaced with a “hand-top” class computer, which is about one quarter of the volume and weight of the Toughbook and at least as capable.

To conclude the ATD in 2007, we will equip a light infantry



Warrior/Underhill



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platoon, approximately 35 Soldiers, with Increment 2 systems at OTM 07 and AAEP/D to determine if we have met our ATD exit criteria and to answer our essential elements of analysis—the real input for Army decision makers about the value of FFW capabilities.

As the early design phase of the Ground Soldier System (GSS), FFW will transition to Program Executive Office (PEO) Soldier/Project Manager (PM) Soldier Warrior in the first quarter of fiscal year 2008 for them to conduct the System Development and Demonstration program and field GSS.

Upon conclusion of the ATD, we will undertake follow-on science and technology efforts on capability enhancements at the component level that can be inserted later into GSS and the other Soldier as a System warrior programs such as Mounted Soldier and Air Soldier.

“The reason FFW was so well received by the AAEP/C EXFOR was because Soldiers recognized that we are trying to focus the system’s battle management and situational awareness to meet the needs of the members of the SCU by skill level, rather than forcing on them something designed for Battalion and Company level,” said Command Sgt. Maj. (retired) Sam Spears, FFW’s senior operational advisor.

We are making outstanding technical progress, and in concert with our team’s guiding principles, we are making great strides in achieving high levels of Soldier acceptance and meaningful SCU capabilities. We are poised to bring the FFW ATD to a stellar conclusion.

## Feeding the individual warfighter

Continued from p. 7



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All in all, more than 6,000 Warfighters, Soldiers and Marines both, have contributed to the MRE improvement program since 1992. As many of our Warfighters have stated, “you may never please all of us, but you sure are

pleasing most of us.” NOTHING goes in or out of an MRE without critical Warfighter input. Working closely as a team, we have now produced the most customer driven, customer focused ration in the history of DoD.

Darsch, now director of Combat Feeding, and Kathy Evangelos, combat feeding program integrator, had the opportunity to travel to the U.S. Army Central Command area of responsibility (AOR) in 2005 to obtain direct feedback from our boots on the ground relative to MRE improvements as well as feedback on two new ration concepts that were being field tested in Iraq and Afghanistan. Information obtained from Warfighters indicated that both the MRE improvements and two new ration concepts were “on the mark.”

In addition, Sgt. 1st Class (retired) Mike Acheson, now a food technologist on the Combat Feeding Team, volunteered for two 180 day deployments to Iraq. The first with the 101<sup>st</sup> Airborne Division as they moved north into Iraq in 2003, and the second which ended in May 2006. Acheson not only performed his expected duties but served as a valuable conduit for Warfighter feedback on continuing to enhance our family of combat rations.

Other members of the Combat Feeding Team who deployed in support of Operation Iraqi Freedom included Chief Warrant Officer Steve Moody and Sgt. 1st Class Celestine Burnette, both representing the NSRDEC in an admirable fashion, as well as providing valuable insight on advancing total asset visibility for tracking and monitoring Class 1 and fine tuning the two new ration concepts, the First Strike Ration (FSR) and Unitized Group Ration-Express (UGR-E).

The FSR is designed for the first on the ground, first to fight, highly mobile warfighter, and the UGR-E is designed for remote locations and small groups on the asymmetric battlefield. Both were undergoing field testing in country. As a result of feedback obtained from Warfighters, these two rations have now been approved and are on an accelerated path to procurement in the first quarter of fiscal year 2007 and will be “Coming to a Theater Near You™.”

Besides the MRE, the entire family of combat rations, and in particular, the UGR “A” version and “Heat and Serve” undergoes continuous improvement every year based on Warfighter feedback. The FSR and UGR-E, after fielding, will also enter the improvement programs to insure variety and the inclusion of science and technology drop-ins to further enhance both rations.

Warfighters also contribute during the design and testing of developmental items. New components and packaging as well as individual equipment are evaluated by Warfighters to insure functional and operational capability and true value on the battlefield. Some science and technology advancements will be transparent to the Warfighter while others will be more obvious as a result of improved quality, increased variety, or the inclusion of new components in rations.

In the not too distant future, rations will contain naturally occurring constituents such as probiotics, which are beneficial bacteria such as those found in yogurt, and, nutraceuticals, which are small nutritional organic molecules. It is anticipated that these constituents will provide improved nutrition, cognitive and physical performance enhancement using novel nutrient delivery systems, e.g. buccal (between the cheek and gum) delivery of nutrients based on scientifically proven studies.

Rations will be packaged using polymeric films relying on nanotechnology and contain enticing aroma emitting films. These will enhance consumption as well as protect and maintain extended shelf life to insure wholesomeness and safety. New food processing methods such as high pressure processing, pulsed electric field, and microwave sterilization will bring more variety and components with higher quality than those processed today via thermostabilization.

Self heating packages, new package designs, as well as heating and cooling technologies for rations and beverages will further enhance combat feeding systems for the Warfighter.

Woven through all these improvements and new technologies is a single and very simple common thread: feedback that constantly seeks to increase the satisfaction of the Warfighter. Rest assured the advancement of combat rations and combat feeding systems will continue to be driven by revolutionary advances in science and technology, many of which will be pioneered by the NSRDEC. The NSRDEC’s Combat Feeding Team remains committed to insure our world class Warfighters continue to be provided with world class rations - from deep sea to deep space - to outlast and outperform any adversary anywhere.



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