

November 12, 2013

# NSSC This Week



Natick Soldier Systems Center Public Affairs Office



# Soldier 2020

Army Science and  
Technology insight  
by Gen. Robert W. Cone

Photo: Pvt. Andrew Slovensky

Inside: Army Energy | Rucking for a Cause | In the Field | Space Food | Fall Family Day



# Publisher's Note

John Harlow  
USAG-Natick and NSSC Chief of Public Affairs

## A New Look

I hope you have noticed some of the changes to *NSSC This Week*.

This newsletter doesn't just come out of nowhere; there is a great group of people telling the Natick story.

I want to give a sincere thank you to Bob Reinert, Alexandra Foran, Tazanyia Mouton and Kelly Sullivan. It is because of their great storytelling abilities that the Natick Soldier Systems Center continually has more stories on the Army's homepage than any other installation.

We are very fortunate to have the total package. Great words tell stories, but great design and photography complete the package. The design of Phil Fujawa and the photography of Dave Kamm make this newsletter something special.

The hard work and effort by everyone mentioned turned a one-page newsletter with five links into a magazine-quality newsletter that is something to be proud of. Thanks so much to everyone who makes this a great piece of work.

One great thing about working here at Natick is the relationships that you build. Capt. Justin Fitch, company commander of Headquarters Research Development Detachment, has become a friend in his time here, but after reading the story from Tazanyia Mouton, he will inspire you.

On a personal note, I am honored every time I talk to the media about the great work that is done here on behalf of our Soldiers, Sailors, Airmen, Marines and Coast Guardsmen. It has been a tough year with the furlough and the government shutdown, but you have come in everyday looking to find that next innovation that will give our warfighters the advantage over any enemy. Thanks to all of you for what you do.

Monday was Veterans Day, one of my favorite days of the year, the day we honor those who raised their right hand and took the Oath to protect and defend the Constitution of the United States against all enemies. We are fortunate to have at NSSC more than 200 men and women who have served in uniform and who continue to serve as government civilians today. Thanks to all who have served.

If you have comments or stories that you would like to share with our team, please feel free to contact any of us.

Thanks for reading.

John Harlow



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## Within the Gates

### Tsongas Visit

To highlight the effects of federal budget cuts on research and development, U.S. Rep. Niki Tsongas made an Oct. 31 visit to Natick Soldier Research, Development and Engineering Center. Tsongas spoke favorably of the collaboration between NSRDEC and area businesses and schools.



## Upcoming Events

### Veterans Day

Participants with ties to NSSC were on hand at Veterans Day observances Nov. 11 in Natick and Wayland. Dave Sanborn, who recently returned from a deployment to Afghanistan as command sergeant major of U.S. Army Garrison Bagram, spoke at Natick's Morse Institute Library. USAG-Natick Commander Lt. Col. Brian Greata addressed the Natick Fire Department at its ceremony. At the Trinitarian Congregational Church in Wayland, the NSSC Color Guard opened and closed the indoor ceremony.

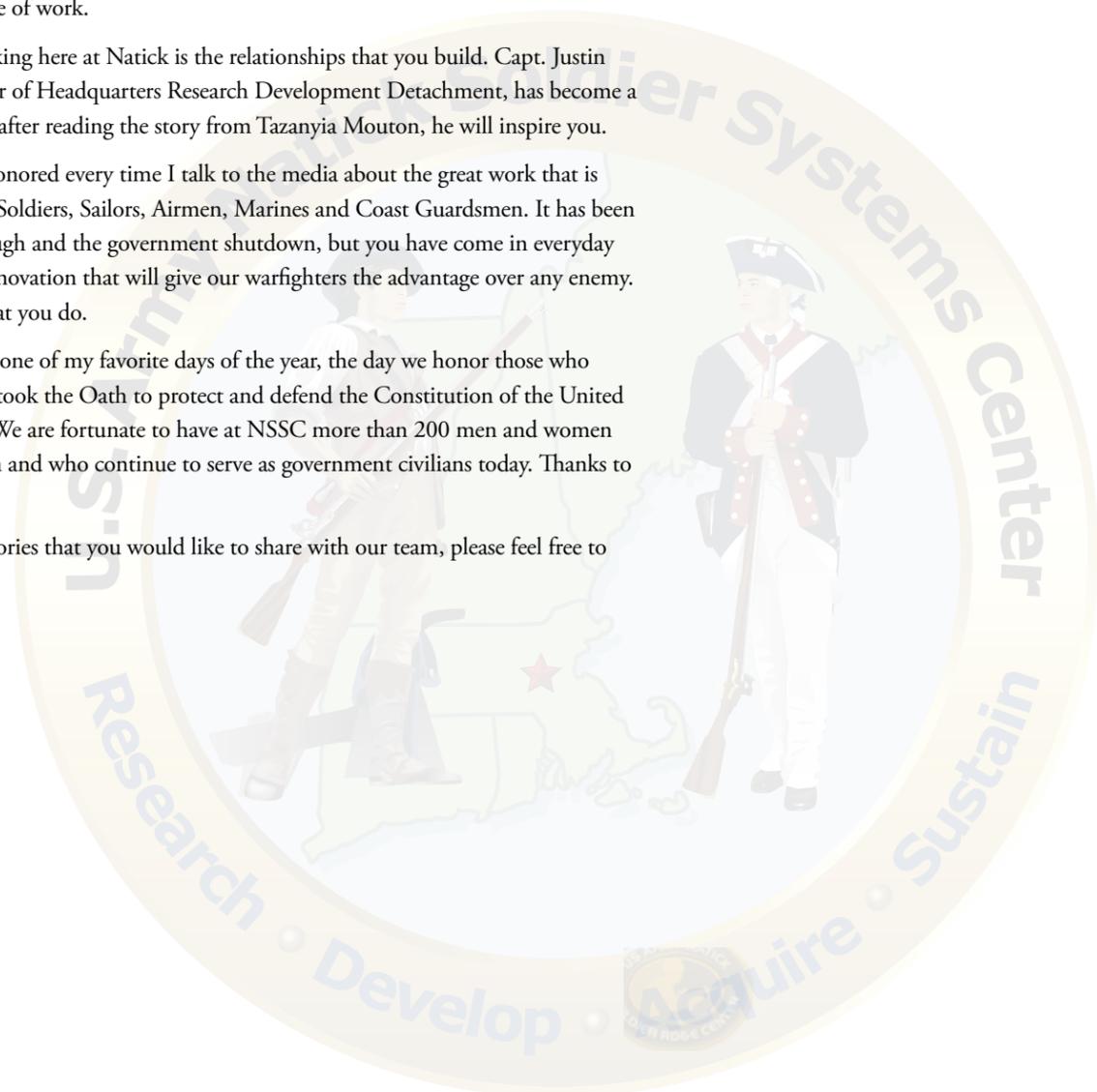


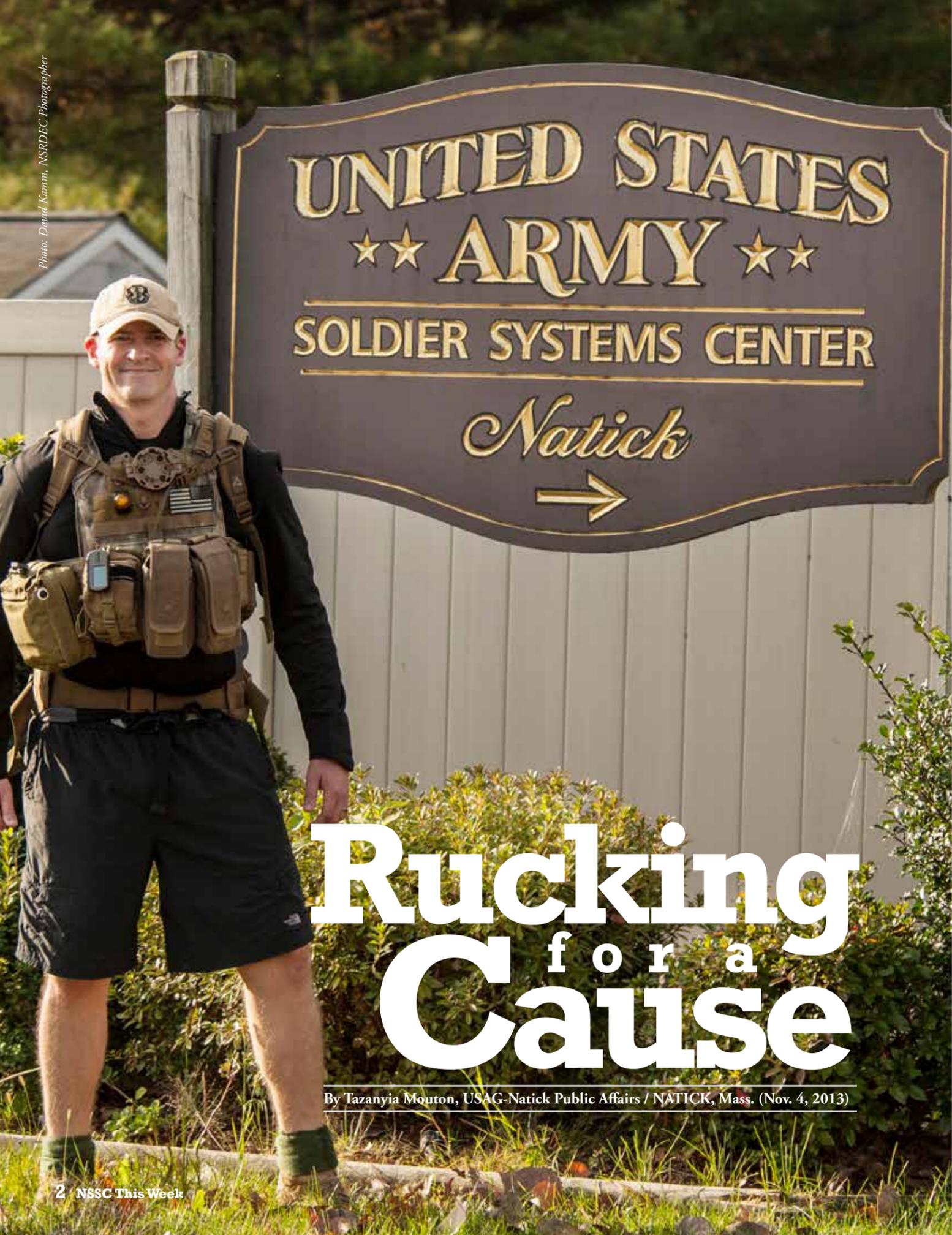
### Safety Day

The NSSC Fall/Winter Safety Day will be held Nov. 15 from 12:30 p.m. to 3:30 p.m. at Lord Community Center. There will be seasonal safety booths and a CWF cookie and cocoa social.

### National American Indian Heritage Month

In observance of National American Indian Heritage Month, NSSC will hold an ethnic lunch Nov. 15 at the dining facility. A slide show with the theme "Guiding Our Destiny with Heritage and Traditions" will be available on the kiosk in the Carney Hall lobby through Nov. 30.





# Rucking for a Cause

By Tazanyia Mouton, USAG-Natick Public Affairs / NATICK, Mass. (Nov. 4, 2013)

Every day, 22 veterans take their own lives. That's almost one veteran each hour.

Capt. Justin Fitch, the Headquarters Research and Development Detachment commander at the Natick Soldier Research, Development and Engineering Center, wants that number to be as close to zero as possible, because he understands what it's like to face great personal challenges.

Fitch grew up in the Midwest and decided to join ROTC while he was in college. For the first few years after his commission, Fitch was an infantry officer, and he deployed to Iraq with his platoon. After re-deploying, he transitioned into an adjutant position with a Special Forces group, and in February 2012, he took command of HRDD.

In May of that same year, after running an adventure race, Fitch said he didn't feel quite right.

"I felt ill for almost a year, and I ignored intense abdominal pain for about four months," said Fitch. "I came into work the next day and decided to go see a doctor."

Shortly after his visit to the doctor, Fitch was informed that he had a tumor, which caused his large intestine to rupture. It was then that Fitch was told that he had colon cancer.

On Oct. 18, Fitch finished his 23rd round of chemotherapy.

"I've got two more on this cycle, and then I get a small break before I start it up again," Fitch said. "But as of now, with stage four colon cancer, tumors have spread beyond the large intestines."

Fitch said he appreciates the support he has received from his Army counterparts through his treatment.

"I am fortunate that the command here at Natick has supported me and allowed me to still be in command," Fitch said, "which has been a big psychological boost for me to be able to still contribute to the Army."

Fitch went on to add that he is receiving world-class care at Brigham and Women's Hospital, Dana-Farber Cancer Institute and Tufts University.

While Fitch is trying to maintain good command, control and discipline in his unit, in his free time he enjoys competition shooting. Fitch placed first in his division at the 2013

New England Regional Championship for the International Defensive Pistol Association. Fitch also said his wife and two dogs keep him sane.

Fitch said he has been pushing himself to physically rehabilitate after his numerous surgeries. He added that working on Soldier basics such as push-ups, sit-ups and the run have proven to be challenges.

"One thing that I have been able to rely on through rehabilitation, in exercise therapy, almost like a meditative state, is ruck marching," Fitch said. "It's not requiring my core to twist in weird ways, and it's something that I've always been good at."

**"Since I have started this campaign, I have had Soldiers that I have worked with in the past, (and) people that I've never talked to in my life, become very open with me about how important it is to them because they lost their buddy or they lost their brother, or their father committed suicide."**

Capt. Justin Fitch, Headquarters Research and Development Detachment commander, NSRDEC

Fitch said that he has been trying to ruck to work at least twice a month. On a recent day, Fitch was recovering from a nine and a half mile ruck, which he completed in a little more than three hours, with 80 pounds of weight strapped to his back.

"The last time I came in was 72 pounds; I think 65 (pounds) was the time before that. Just about a week and half ago, I took 85 pounds on a five-mile ruck around my house to try to build up that kind of strength and endurance," Fitch said. "I'm also being careful not to wear myself into the ground because I have to balance recovery from chemotherapy, not over-train, and recovering from when I do train."

Fitch said his motivation to train hard comes from an organization he recently joined.

"The charity is 'Active Heroes' (and) the campaign is 'Carry the Fallen,' where we're doing everything that we can to raise money and awareness ... to intervene, mitigate and reduce the trigger points of post-traumatic stress disorder and suicidal tendencies in veterans," Fitch said.

The organization was started by Fitch's close

friend, Troy Yocum, a former Soldier who returned from his deployment and wanted to do something to help veterans.

"He walked with a whole bunch of gear, kind of like rucking, across the whole continental United States," said Fitch. "He got so much attention and (donations) from this that he started up this nonprofit."

On Nov. 10, Veterans Day weekend, about 200 people around the world, including Fitch, rucked to raise money and awareness for veterans and families who deal with PTSD and suicidal ideations and tendencies. Fitch said the campaign allows for the offering of financial support, counseling and retreats for veterans in need.

To date, Fitch and Team Minuteman have already raised thousands of dollars, and the totals rise daily.

Fitch said he is blown away by the amount of support from people across the nation.

The team rucked from Hopkinton to Boston, which included following the Boston Marathon route.

Fitch said the organization and the cause have kept him motivated.

"I think without having things like this to focus on, I probably wouldn't be as mentally resilient as I have been," Fitch said.

Fitch also said he is willing to do anything that he can to help.

"Since I have started this campaign, I have had Soldiers that I have worked with in the past, (and) people that I've never talked to in my life, become very open with me about how important it is to them," Fitch said, "because they lost their buddy or they lost their brother, or their father committed suicide."

"It's pretty dark to hear these things, but it's good that they're talking about it."

To learn more information about Fitch and the "Carry the Fallen" campaign, visit <http://bit.ly/1fGBxEQ>.

*Capt. Justin Fitch, the Headquarters Research and Development Detachment commander at the Natick Soldier Research, Development and Engineering Center, rucks to work Oct. 23 as part of his training for the campaign "Carry the Fallen," part of the charity "Active Heroes." On Nov. 10, Fitch, along with approximately 200 others around the world, rucked to raise money and awareness for veterans and families who deal with PTSD and suicidal ideations and tendencies.*



# Soldier 2020

**Army Science and  
Technology insight by  
Gen. Robert W. Cone**  
(from ARMY Magazine)

This year, the Army initiated a deliberate servicewide effort—Soldier 2020—to ensure that our units are filled with the best qualified Soldiers. This effort includes opening previously closed positions and occupational specialties to women while maintaining our combat effectiveness. For generations, women in uniform have served our nation with skill, courage and tenacity.

This year, the Army initiated a deliberate servicewide effort—Soldier 2020—to ensure that our units are filled with the best qualified Soldiers. This effort includes opening previously closed positions and occupational specialties to women

seeks to remove as many barriers as possible and allow talented people—regardless of gender—to serve in any position in which they are capable of performing to standard. Soldier 2020 is rooted in three principles:

- Maintain the dominance of our nation's warfighting forces by preserving unit readiness, cohesion and morale.
- Validate both physical and mental occupational performance standards for all MOSs, initially focusing on those currently closed to women.
- Set the conditions so all Soldiers, men and women, have an opportunity to succeed as their talents dictate.

while maintaining our combat effectiveness. For generations, women in uniform have served our nation with skill, courage and tenacity. In the last 12 years, more than a quarter of a million women served in Iraq and Afghanistan, of whom approximately 150 were killed in action and another 800 were wounded. Today, women fulfill crucial combat support roles in combat arms battalions around the world.

Our recent wartime experience indicates there are few practical limits to the vital contributions women can make in our Army formations. Therefore, the Soldier 2020 effort

#### **Including Women—The Time Has Come**

The Army began expanding roles for women 40 years ago. Since then, women have trained and fought alongside men as members of the profession of arms. Starting in the 1970s, they used the same curricula, learned the same tasks and did so under the same conditions as their male counterparts.

Throughout the 1980s and 1990s, we integrated women into most of the force, making them part of nearly every training

event. By the time we went into Iraq and Afghanistan, women were filling essential roles throughout the force. During the wars, commanders routinely attached women to small combat units when they possessed skills needed on the battlefield.

The contributions and sacrifices made by women have challenged many long-standing assumptions about their roles in battle as well as the efficacy of the rules meant to keep them from serving in combat units. This summer, when the Army allowed women into a number of combat battalions in MOSs that were already open to them, there was no need for fanfare. The vast majority of our force is already integrated.

We are approaching the gender integration of the combat arms MOSs in a clear-eyed manner. We must do this right, lest we put women and our institutional credibility at risk. The combat readiness of our well-seasoned Army must remain the first priority.

While this integration requires a well-thoughtout approach, I am confident we can do this right and improve the total force. Moreover, our current challenges cannot be an excuse to stop examining integration and, where warranted, executing it.

everyone—including our female Soldiers and leaders—insisted that we not lower the standards for service in combat MOSs. The one unmistakable message we received is that most Soldiers agree that women, based on their wartime performance, have earned the opportunity to stand in any one of our formations for which they qualify, if they wish to do so.

### Validate Standards

As part of Soldier 2020, TRADOC is implementing several essential initiatives to provide every American Soldier with the same opportunity to serve in any MOS while maintaining standards. Our fundamental goal is to place everyone on a path toward a meaningful career based on individual merit while ensuring combat effectiveness.

First, we must clearly define the standards for service in MOSs currently closed to women. A recent survey of infantry recruits shows our standards are antiquated. The truth is that the shortest infantryman we recruited last year stood under 5 feet tall; the lightest weighed less than 100 pounds. We are clearly accepting people into these positions who may be physically overmatched by the demands of modern combat.

Once the CSMs on the board approved the proposed standards, the standards were tested in combat arms units. Random populations of MOS-qualified Soldiers attempted to perform the tasks. By and large, we found that our proposals were accurate. Regarding a significant portion of the test population that was unable to meet the standards, we are looking to see if the cause is a training shortfall or if the proposal exceeds the actual standard needed within combat arms units. For those instances in which nearly everyone passed the physical test, we are examining if our proposed standard is too low or if the task is not really a discriminator.

As we speak with those in the field and continue our study, we may also determine the need to add tasks.

Throughout this endeavor, our partners at the U.S. Army Medical Command and U.S. Army Research Institute for Environmental Medicine (USARIEM) observed our processes and made sure our results remained scientifically valid.

Once we possess clearly established standards and gain broad consensus, USARIEM will lead the final phase, transforming the standards into physical tests an individual must meet to enter a combat MOS.

We will not only develop a gender-neutral standard, but we will also ensure that everyone in an MOS can perform the necessary tasks associated with his or her job. Soldier 2020 holds the promise of improving quality across our warfighting formations while providing a level field upon which all Soldiers can succeed based upon talent.

While this initiative is a promising step toward gender integration, we must harness past lessons learned and discern points of friction the Soldier 2020 program will encounter. Therefore, in the second major effort, I directed the TRADOC Analysis Center (TRAC) to conduct an extensive study to identify integration challenges and develop mitigation strategies for overcoming institutional, cultural and implementation barriers. TRAC began with a detailed study of historical references, medical studies and experiences of foreign armies.

This thorough review developed research questions on policies, programs and requisite leadership action. TRAC is now employing its unique analytical skills, coupled with a command sergeant major support team grounded in the rigors of war, to examine these questions. USARIEM and the U.S.

Army Institute of Public Health will complement TRAC's study with pertinent historical and analytical data as well as scientific review. These analytical centers are employing a variety of tools to answer the most important questions.

A distinguished collection of external scholars, writers and retired Army leaders is also providing advice [see box]. They offer a critical and comprehensive look at the viability of our planned methodology, study outcomes, and proposed recommendations throughout every step of the process. Together, these studies and reviews will help us see the history of the issue, understand the lessons of the past and identify where leaders need to focus their attention and resources.

### Set Conditions

The third element of Soldier 2020 revolves around setting the conditions in units as they integrate women into closed MOSs. During the course of these studies, researchers found that women are looking forward to being allowed to test themselves against the many physical and professional challenges they will face within combat units. So far, their biggest fear is not about their ability to perform, but instead the sense of isolation resulting from being the first to do something. Ensuring no one faces such a hostile or isolated environment is nonnegotiable for Army leaders.

Project Athena, the study of the U.S. Military Academy's integration of women into the Corps of Cadets, found that avoiding isolation requires a minimum population of women at the small-unit level. Furthermore, placing a cadre of female leaders into units during integration who provide mentorship and help the command smoothly transition is also essential. That infusion of leadership will come from two directions. First, the current policy of allowing women to serve in MOSs that are currently open within combat battalions will provide commanders with trusted senior leaders who can serve as mentors and role models. Furthermore, as we open MOSs, we will seek qualified female NCOs and officers who wish to transfer into them. They will provide the leadership required at the point of attack.

We know how to do this. TRADOC's long history of integrating women into demanding positions provides a proven point of departure. More than 500 highly qualified women serve as drill sergeants, and 14 serve as training battalion and brigade command sergeants major. In addition, women fill



Photo: David Kamm, NSRDEC Photographer

critical command positions, including one training brigade, two training battalions and 35 training companies. In short, they occupy significant positions of trust leading America's sons and daughters as they face the trials associated with entering our profession.

When a series of ordnance and artillery specialties was opened to women last year, we moved female NCOs into the training units and made practical infrastructure changes to maintain a safe and secure environment. We also added a number of female platoon sergeants who, though not responsible for the MOS instruction of new Soldiers, play a direct and close supervisory role. Now, the imperative is to help replicate these conditions across all our formations.

As commander of TRADOC, women's performance during combat operations certainly does not surprise me. We set the stage for success nearly four decades ago when we began integrating training throughout our Army. Well before the wars, women prepared for conflict right beside men. Our work, however, continues today. We have challenges, and every leader must remain vigilant to ensure we do not tolerate harassment or mistreatment of our teammates while upholding the highest standards of performance.

In the end, though, we will only get better. I am confident because all our Soldiers, men and women, continue proving themselves as highly capable warriors on a daily basis. By expanding opportunities and assignments for women, we will only strengthen the force.

### U.S. Army Education Advisory Committee Consultants

Michael A. Wartell, Ph.D., chairman

Kayla M. Williams

David R. Segal, Ph.D., Department of Sociology, University of Maryland

Mady W. Segal, Ph.D., Department of Sociology, University of Maryland

LTG Paul E. Funk, Ed.D., U.S. Army retired

MG Marcia M. Anderson, Deputy Chief of the Army Reserve (Individual Mobilization Augmentation)

BG Maureen LeBoeuf, U.S. Army retired

Jack L. Tilley, 12th Sergeant Major of the Army

CSM Jackie Moore, U.S. Army retired

*Gen. Robert W. Cone is the commander of U.S. Army Training and Doctrine Command, Joint Base Langley-Eustis, Va. A graduate of the U.S. Military Academy, he has master's degrees from the University of Texas at Austin and the Naval War College. He has served in command and staff positions in the continental United States, Iraq and Afghanistan.*

**As part of Soldier 2020, TRADOC is implementing several essential initiatives to provide every American Soldier with the same opportunity to serve in any MOS while maintaining standards. Our fundamental goal is to place everyone on a path toward a meaningful career based on individual merit while ensuring combat effectiveness.**

U.S. Army Training and Doctrine Command (TRADOC) initiated this effort by examining current attitudes about women in combat units. We conducted interviews and focus group discussions with more than 2,500 participants from a variety of organizations. We found that most men who had worked and fought beside women expected them to do well in combat roles. Some work remains to be done in order to convince men with little or no experience serving alongside women that they will perform well in new roles, but I am convinced that those with concerns will change their views. Across the force,

Resolving this mismatch begins by identifying the most demanding tasks an artilleryman, engineer, infantryman, scout or armored crewman must perform, and determining how to measure a Soldier's ability to perform them.

Branch commandants and their command sergeants major (CSM) led teams that initially identified 31 tasks across the closed MOSs. They established proposed performance standards for those tasks and forwarded their recommendations to the Sergeant Major of the Army Board of Directors—our most senior NCOs.



Photos: David Kamm, NSRDEC Photographer

By Bob Reinert, USAG-Natick Public Affairs / FORT DEVENS, Mass. (Nov. 6, 2013)

Innovations meant to improve Soldiers' quality of life during deployments – while saving lives, fuel, water and money – were on display Nov. 5 at the Army Base Camp Integration Laboratory.

The BCIL hosted its second annual "Base Camp Resource and Energy Efficiency Day." Situated on 10 acres at Fort Devens, the laboratory features two "Force Provider" 150-person base camps. One contains standard technologies; the other offers a glimpse into the Army's energy future.

Katherine Hammack, assistant secretary of the Army, Installations, Energy and Environment, and Lt. Gen. Raymond V. Mason, Army deputy chief of staff, Logistics, were among those attending the event. They were briefed about shelters, power management, energy storage, waste disposal and waste-to-energy systems, alternative energy, micro-grids, energy-efficient structures, rigid-wall camps, and fuel-fired kitchens.

"It's just great to see the strides that we're making, the systems that we're testing," Hammack said. "The team here is doing a fantastic job finding ... new technologies, testing them, getting modifications made, and determining the resiliency of the systems prior to deploying them with our Soldiers."

Mason said all the work toward resource and fuel efficiency was done to help Soldiers focus on their missions. He used the hypothetical example of a forward operating base in Afghanistan that has 20 fuel trucks pull up to its front gate.

"Soldiers are put at risk protecting that convoy," Mason said. "Then you've got to get those 20 fuel trucks through your front gate. Every one of those trucks could be a potential bomb."

"Then you've got to store all that fuel somewhere on your forward operating base, which means you've got to build a bigger

(FOB), and that fuel becomes a big target for either indirect or direct fire. Our purpose is to reduce down that risk by reducing down the amount of fuel that's needed to conduct combat operations."

And once it's stored, much of it goes to something other than fueling vehicles or aircraft, Mason noted.

**"It's just great to see the strides that we're making, the systems that we're testing. The team here is doing a fantastic job finding ... new technologies, testing them, getting modifications made, and determining the resiliency of the systems prior to deploying them with our Soldiers."**

Katherine Hammack, assistant secretary of the Army, Installations, Energy and Environment

"Nearly 50 percent of the fuel that's consumed in Afghanistan on Army operating bases is producing generator power," Mason said.

Hammack pointed out that 70 to 80 percent of all ground convoys in Afghanistan, as measured by weight, consist of fuel and water deliveries.

"And so through better power management, flexible power sources, lightening the energy load on our Soldiers – all combined – we're able to redirect our manpower and our equipment assets back to the mission," said Hammack, "and that increases our agility and it increases our effectiveness overall."

More than 12,000 service members training at Fort Devens rotate annually through the BCIL, providing invaluable user input about systems being developed here, with the ultimate goal of trimming fuel and water usage on base camps by 50 percent. Such innovations as micro-grids, solar shades, shelter

liners and shower water reuse systems have already brought that goal closer to reality.

"When you look at the reductions to date, in a few years, it's remarkable," said Kevin Fahey, Program Executive Officer, Combat Support & Combat Service Support. "And I think a lot of it is our ability to test things and get users on it and get feedback quickly,

and then (be) able to prove that this is the thing we want put in the Soldiers' and the Marines' hands in the field."

This progress has been made despite the budgetary headwinds faced by all Army programs.

"I think this BCIL will survive declining budgets because it's proved the return on investment and the capabilities, and shortened the acquisition process," said Hammack, "and all of those represent costs to the Army and costs to this nation."

Mason said it's critical to maintain funding for such programs as the BCIL.

"If we don't spend appropriately in science and technology, research and development, we're going to find ourselves on the battlefield in a situation where our enemies have a comparative advantage over us, as opposed to the other way around," said Mason, "and our Soldiers are going to be put at more risk."

# Energizing Army base camps

# In the Field

## Deploying tents for tests

By Alexandra Foran, NSRDEC Public Affairs / NATICK, Mass. (Oct. 29, 2013)

**“It’s not until you actually put it in an operational environment where you can really have a good assessment of what will work and what won’t work for the Army.”**

Amy Klopotoski, contingency basing science and technology lead at the Natick Soldier Research, Development and Engineering Center

Wherever Soldiers go, shelters must go, too. These shelter systems must not only protect and provide comfort; they must also be as energy efficient as possible. Every time a base camp needs fuel delivered, that camp and its warfighters are exposed to vulnerabilities.

That’s why a group of shelters were sent to the Southwest Asia Area of Responsibility to be tested by both the Army and Air Force recently as part of the “Advanced, Energy-Efficient Shelter Systems for Contingency Basing and Other Applications” program.

“It’s not until you actually put it in an operational environment where you can really have a good assessment of what will work and what won’t work for the Army,” said Amy Klopotoski, contingency basing science and technology lead at the Natick Soldier Research, Development and Engineering Center.

Most of the shelters being tested are 20 feet by 32 feet long and are equipped with various energy-saving technologies that must adapt to the environments warfighters face: median temperatures ranging from minus 25 to 120 degrees Fahrenheit in all sorts of weather.

Tent fabrics have to be durable, mildew resistant, flame resistant, and capable of blackout, which is why “you have multiple layers with multiple different functions in these textiles,” said Klopotoski.

Klopotoski explained that advanced materials such as additional reflective layers, “basically aluminized film,” were added onto pre-existing shelter fabrics. Low-emissivity

coatings are another product being tested in the AOR, specifically for durability. This coating will also reflect the sun’s energy away from the shelter.

All tents were outfitted with more advanced thermal insulation, also developed by NSRDEC, designed to reduce the power required to heat and cool the shelters without increasing weight and bulk. Every tent also had integrated solar shades that reduce solar load and the build-up of heat within the tents, without increasing the shelter’s footprint.

“The NSRDEC provided many technologies utilized in the tests,” said Klopotoski. “The reduction in energy demand will be achieved through a combination of technologies.”

The joint Army/Air Force team seeks to reduce that demand by at least 50 percent through the use of solar shades, photovoltaics, advanced materials and coatings.

Besides energy reduction, there will also be less weight and extra equipment warfighters would need to support sustainable living.

“Currently, we field each 640-foot-square shelter with one 5-ton, where with these shelters, we have two 640-foot-square shelters being cooled with one 5-ton ECU,” said Klopotoski.

This reduction eliminates a 2200 pound and 4160-foot-square of equipment as well as up to 40 kilowatts of energy consumption on a 150-man camp.

One shelter is even outfitted with photovoltaic modules, balance of systems electronics to make the power generated usable, and

battery backup for storage and future use that was developed through NSRDEC projects.

“The photovoltaics generate power for lights and subsidiary equipment, which reduces the need for diesel-fueled generators,” said Klopotoski.

Reducing the need for diesel fuel cuts down on energy consumption, cost and the need for refueling, which will mean fewer Soldiers transporting fuel on the roads.

Previous similar tests could only be run if NSRDEC personnel physically came to the site every 30 days to download data; now that data can be accessed remotely in real time.

“The data collection equipment measures the temperatures at all of the different layers of the shelters, including outside of the solar shade, in-between the solar shade and tent, the tent surface, and internal temperatures, as well as airflow inside the tent,” said Klopotoski. “We are also measuring the fuel being consumed and the power usage of all of the equipment.”

This intensive testing will be completed in November. Following this testing will be tests at a cold-weather location to collect the same type of data in a minus 25 degree Fahrenheit environment.

The results of this data collection will assist both the Army and Air Force as they seek to provide warfighters with the best technological advances possible.



# Space Food

By Alexandra Foran, NSRDEC Public Affairs / NATICK, Mass. (Nov. 1, 2013)

Getting enough vitamins in one's diet is tough enough on this planet. Consider the health of astronauts in extended spaceflight.

The depletion of vitamins in astronauts' food during lengthier missions in outer space is one of the reasons NASA requires a five-year shelf life at 70 degrees Fahrenheit for stabilized foods.

The Department of Defense Combat Feeding Directorate, or CFD, at the Natick Soldier Research, Development and Engineering Center is looking at compressed bars and dried drink mixes to study essential vitamins in nutrient-dense foods and develop packaging that will better preserve essential vitamins for NASA.

This study is based upon a three-year contract for a possible mission to Mars, titled, "Stabilized Foods for Use in Extended Spaceflight: Preservation of Shelf-Life, Nutrient Content and Acceptability."

Blueberry granola bars and chocolate drink

mixes have already been developed by CFD to be used in this study. Since vitamins naturally chemically degrade through time, CFD will encapsulate vitamins in these food products with a protective shell material and also adjust the chemistry of the food based on its chemical environment.

"You have two different chemical environments in food," said Ann Barrett, CFD principal investigator for this project, "water-loving, or hydrophilic, and fat-loving, or lipophilic. Sometimes a water-loving antioxidant will have better survival and shelf life, and conversely, a non-polar or fatty-type antioxidant would have worse retention in a non-polar environment."

After encapsulating the vitamins with either a lipid coating or carbohydrate coating, CFD will be provided with data showing the percentages of essential vitamins retained during accelerated storage.

CFD is also analyzing different packaging

*The Department of Defense Combat Feeding Directorate at the Natick Soldier Research, Development and Engineering Center, Mass., is looking at compressed bars and dried drink mixes to study essential vitamins in nutrient-dense foods and develop packaging that will better preserve essential vitamins for NASA astronauts on extended missions.*

prototypes to better preserve food's shelf life. The Advanced Materials Engineering Team has been developing advanced packaging materials for extended shelf-life during the past several years, both internally and externally.

"Packaging technologies similar to those developed in these past studies is required by NASA for deep-space missions," said Danielle Froio-Blumsack, CFD principal investigator for the project. "Meeting the shelf-life requirement is one of the biggest challenges involved in developing packaging for both space missions and military application."

Packaging for the NASA prototypes has to not only preserve vitamins, but also be compatible with advanced sterilization processes. These processes minimize the amount of time the food is exposed to high temperatures, which in turn reduces the degradation of vitamins during processing.

Thin nanocomposite and aluminum oxide barrier coatings are being used during this study to maximize durability and protection of food contents that will undergo more extensive testing. The packaging will undergo complete characterization and performance testing, both before and after the sterilization processes.

"This will allow us to pinpoint what material properties are most affected by the different sterilization techniques," said Froio-Blumsack.

The combined effort will provide data showing the ideal chemical environment and processing/packaging method to ensure food quality and, more specifically, nutrient retention.

"This study is important because it will help ensure the health of astronauts and it also has bearing on our Soldiers," said Barrett, "because if we learn techniques that preserve vitamins in these model systems, we can apply that to our own food for the troops."

This study will allow for better understanding of general food preservation, not only for retaining vitamins, but also for selecting the best packaging and sterilization processes to deliver quality food to Soldiers, astronauts and consumers.

**W**hat do you get when you mix arts and crafts, costumes, "trunk-or-treating" and drive-in movies?

The 2013 "Fall Family Day" at the Natick Soldier Systems Center.

Children and parents were able to enjoy all the festivities of the event Oct. 19.

The occasion was hosted by the Family and Morale, Welfare and Recreation team, and marked the first time an event like this has been held.

Sherita Baker, Family and MWR special events coordinator, said the goal of the family day was a simple one.

"Family and MWR has identified a need to increase the number of family-friendly programs offered year round," Baker said. "The fall family day and drive-in movies are a natural progression from what we have already done in the past."

Baker also added that they included community partners such as Operation Military Child and Operation Homefront, to provide a well-rounded day of family fun and activities.

Shirley Davis, a military spouse of a deployed Airman, said she didn't mind making the drive from Hanscom Air Force Base.

"What has made us get through these deployments a little better is keeping the kids active on the weekends, because during the week they're in school," Davis said. "It was just one of those things where I didn't have anything planned for this weekend."

Davis said she began asking around and came across a flyer advertising the event and thought, "OK, yeah, this is what we're going to do."

Davis added that after seeing the advertisement, she mentioned it to a few other Air Force spouses and recruited them to come along for the ride.

"My kids had a good time and they did different crafts," Davis said. "It was worth it for me."

Lt. Col. Brian Greata, USAG-Natick garrison commander, said he was pleased with the event.

"It's harder on an installation like Natick to create a feeling of community, when most employees and Soldiers live on the economy, or in housing areas that are outside the fence line and spread over a wide area," Greata said. "So it's important to provide safe, fun activities that our employees enjoy bringing their



# Fun Fall Family Day

By Tazanyia Mouton, USAG-Natick Public Affairs / NATICK, Mass. (Nov. 4, 2013)

children, grandchildren or friends to that help people feel connected to each other."

Greata went on to add, "I couldn't be happier with how the event turned out. This was the inaugural event of this kind at NSSC, and the next one will be even better."

He also noted that the occasion went better than anyone could have hoped for.

"We had twice the anticipated turnout, which is a phenomenal result, and everyone I talked to had a very fun time," Greata said. "It's hard nowadays to find a drive-in movie, and we brought one here."

Baker also said she needs everyone's help to make the family events and programs even better.

"Now is a great time for patrons to comment on events held over the past year and to voice what they would like to see for next year," Baker said. "We welcome all feedback, as it helps us to develop programming that is supported and well received."

Baker said her team will be working hard during the winter months to put out great programs for 2014 and beyond.



# NSSC This Week

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*Garrison Commander*

Lt. Col. Brian Greata

*Command Sergeant Major*

Command Sgt. Maj. Robert Beausoleil

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