

July 3, 2014

NTSSC This



U.S. Army Garrison National Affairs Office



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Publisher's Note

John Harlow
USAG-Natick and NSSC Chief of Public Affairs



Take a Moment ...



Hello everyone, and thanks for reading *NSSC This Week*.

In our last issue, we had the Commanding General's safety message for Independence Day. Please follow his advice. Enjoy the holiday, but enjoy it safely.

NSSC Organization Day is July 11. The Civilian Welfare Fund group has put together a fun day for the NSSC workforce to enjoy together. The Soldiers from BOSS have the dunk tank down by the Lord Community Center. The money raised at the dunk tank benefits the single Soldiers on our installation.

There will be a great lunch, music and at around 2 p.m., the one-pitch softball tournament championship.

Let's have a great day of fellowship, and when you see CWF members, take a moment to thank them for all that they have done to put this day together for us.

On Friday, our nation turns 238. Please take a moment while you are celebrating to think of the Soldiers, Sailors, Airmen, Marines and Coast Guardsmen who are serving in harm's way and also take a moment to think of the families who are missing loved ones and praying for their safe return.

We have enjoyed 238 years of freedom because of brave men and women who have served in our uniformed services.

To our Soldiers at NSSC, thank you for your service. To our veterans at NSSC, thank you for your service. To our civilians who work at NSSC and haven't served, your contribution is very important to the safety and comfort of our Soldiers. Thank you for what you do on behalf of our Soldiers.

Have a great 4th of July, and we'll talk again soon.

John Harlow
USAG-Natick and NSSC Chief of Public Affairs

NSSC This Week

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About this newsletter

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On the Web: www.army.mil/natick

Cover photo: Mike Stepien, NSRDEC

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Upcoming Events

SHARP Training

Satisfy part II of your mandatory annual SHARP training by attending "Got Your Back" July 9 or July 10 at 9 a.m., 12:30 p.m. or 2:30 p.m. in Hunter Auditorium.

The two-hour session has been adopted and adapted for SHARP training across the Army, and is attended by Soldiers and civilians across the globe. By the end of this training, the audience will have created a list of realistic ways to intervene in a harassment or assault situation, such as directly confronting the perpetrator or providing a distraction so the victim has a chance to get away from the situation.

The training is designed to raise awareness, educate, promote intervention, and foster a climate of dignity and respect, emphasizing the five pillars of SHARP: prevention, investigation, accountability, advocacy and assessment.

For more information, contact [Laura Capehart-Hall](#) at ext. 6922.

Within the Gates

Organization Day

"NSSC Organization Day" will take place Friday, July 11.

This year's event will be combined with "Bring Your Sons and Daughters to Work Day."

Outback Steakhouse of Framingham will cater the meal, which will include macaroni and cheese for children. Tickets are \$12 for adults, \$6 for children 12 and younger.

The opening ceremony will take place at the flagpole at 9 a.m., followed by a 5-kilometer run/walk. The 5K awards ceremony will be at 1 p.m. near the pool.

For more information, contact [Duane Young](#), ext. 5609, or [Janice Kopacz](#), ext. 4205.

You eat them when you're deployed or in training, and some people even claim to pick them up at the commissary for date night. They're your [Meals, Ready-to-Eat](#) (MRE) ration, and deployed service members have been relying on them for more than 30 years. MREs have come a long way since they first made their debut. Since research and development of the MRE began in 1959, the MRE has improved significantly, mainly due to feedback on satisfaction from warfighters, but also because of technological innovation, and improved understanding of performance-oriented nutrition and operational mission performance demands.

MRE's Nutritional Standards Today

MREs today are designed to meet nutritional needs and satisfy our deployed warfighters' food preferences. The main goal of the food technologists at the [Combat Feeding Directorate](#) (CFD), tasked with developing and continuously improving MREs, is to maximize warfighter performance. New MREs are chosen based on three primary factors. First is warfighter feedback and acceptance. If an MRE doesn't get good feedback from service members, it gets cut. The CFD also uses feedback from service members to develop concepts for new flavors and food items.

The second factor is the nutritional content of those meals. All MREs need to meet the nutritional standards for operational rations, as determined by scientific evidence, and set forth by the [Surgeon General](#) (TSG), Department of the Army (DA). The Nutrition Standards for Operational Rations (NSORs) include requirements for numerous macronutrients, vitamins, and minerals, which act together to maintain health and achieve optimal performance. Those standards are designed to meet the increased nutritional needs and sustain optimal performance of service members in operational environments, be it combat or combat training (read: this means they are not ideal for date night). Each MRE provides approximately 1300 calories, composed of approximately 170 g of carbohydrates, 45 g of protein, and 50 g of fat for the energy needed to accomplish any mission. This balance of nutrients is necessary to ensure all the complex systems of the body are functioning properly.

The third factor is the shelf stability. The CFD tests MRE production items to ensure the nutritional content and sensory quality don't degrade too quickly, and continue to meet the performance-oriented nutrition needs of service members in the field over the entire shelf-life of the MRE. The minimum shelf-life of an MRE is a whopping 3 years at 80 degrees Fahrenheit, and 6 months at 100 degrees Fahrenheit. This shelf-life ensures that service members serving in remote areas can not only feed their hunger, but also get the nutrition they need to sustain peak performance, even if logistics prevent regular delivery of rations. If an MRE prototype passes all three criteria, CFD then presents its recommendations to the Joint Services Operational Ration Forum, for their decision on whether to give the approval for the new items.

Leading-edge Technology

Meeting the three criteria of an MRE is no easy task and requires leading-edge technology. For example, in order to meet the required shelf-life the food and its nutrients are preserved through leading-edge food science processing and packaging methods. The keys to maintaining nutritionally optimal rations and food safety over extended periods of time are to limit the food's exposure to light, oxygen, and moisture, all of which may deteriorate the food and its nutritional content. An example of these methods could be as simple as foil that creates a barrier to light and moisture. On the other hand, it could be as complex as a bakery item that includes an oxygen scavenger to minimize the impact oxygen might have on that bakery item, or

a humectant which binds available water and keeps bakery products moist. Invariably, some degradation of the foods does occur over the shelf-life, but those degradations are taken into account to avoid nutritional deficiencies, maintain taste, and of course, maximize warfighter performance.

Improving the shelf-life of MREs is just one way food scientists at the CFD are using leading-edge technologies. CFD food scientists have been studying whether they can add performance-enhancing nutrition elements, like omega 3 fatty acids (a nutrient important for metabolism typically found in fish and some seed oils) into new MREs. The challenge with adding something like omega 3 fatty acids, is that over time you can get a fishy taste as the fatty acids in omega 3s break down. And no one wants to eat fishy chicken. However, the CFD scientists have figured out how to add it without that fishy taste! While this technology isn't being used yet (pending review of NSOR requirements), it could be the future of MREs and performance-oriented nutrition in the Services.

Taking Performance-Oriented Nutrition into Your Own Hands

The CFD is also looking at ways to empower service members to take control of their nutritional needs, both at home and while deployed. They believe education is a key component of performance nutrition, and are currently striving to increase service members' awareness of the nutritional content of rations, and what service members actually need to consume to sustain peak-performance. One such way they are doing this is by collaborating with the DoD Nutrition Community and the [U.S. Army Research Institute of Environmental Medicine](#) (US-ARIEM), to update the nutrition education messages that accompany the MREs, and improve access to this information. In addition, CFD is collaborating with the Human Performance Resource Center (HPRC) to develop a website that will provide nutritional information at the component and menu level. The objective of the updates is to empower the warfighter to make appropriate performance-oriented nutrition choices. The nutrition education panels will soon focus on the role of nutrition to promote peak-performance and will also include nutritional needs information for when service members may be in extreme environments. These updated messages will be tested as early as the fall of this year.

MRE

A Lesson in Performance Nutrition

By Jeannette Kennedy, Combat Feeding Directorate (NSRDEC), and Cmdr. Connie Scott, Navy and Marine Corps Public Health Center



Photo: Mike Seppin, NSRDEC, DOD Combat Feeding Directorate

Life Line

Arctic warriors summit North America's highest point, put Army gear to the test



By Staff Sgt. Jeffrey Smith / JOINT BASE ELMENDORF-RICHARDSON, Alaska (June 24, 2014)

Driven by determination and trained in arctic survival, five paratroopers from the [4th Infantry Brigade Combat Team](#) (Airborne), 25th Infantry Division, along with one Soldier from the Army's [Northern Warfare Training Center](#), and two Soldiers from the [Vermont Army National Guard](#), scaled the highest point in North America by reaching the summit of [Mount McKinley](#), June 15.

The mountain, located in the Denali National Park and Preserve in the state of Alaska, ascends to an elevation of 20,237 feet above sea level. It has an 18,000-foot base-to-peak rise in elevation, which is the highest in the world in that category.

The Alaskan Native Athabaskan name for the mountain itself is Denali, which, when translated means "The High One."

Weather conditions on the mountain are often extreme. Bitter cold temperatures, blistering sun, and high winds create very difficult climbing conditions. Dangerous crevasses concealed by snow bridges scatter the surface of glaciers, presenting treacherous obstacles for climbers.

This climbing season has been particularly difficult, which according to the 4/25's climb team leader, Capt. Matthew Hickey, has seen less than 30 percent of climbers reaching the summit so far.

Hickey credits the discipline, training, and equipment he and his team employed on their way up as key factors to their successful attempt. He said the team's mountaineering skills, cold weather operations training, teamwork, and conditioning allowed them to keep their momentum as they pressed forward.

Spartan Brigade teammates who made up the team in addition to Hickey were, Staff Sgt. John Harris, Sgt. Lucanus Fechter, Spc. Matthew Tucker, and Spc. Tyler Campbell. They joined forces with 1st Sgt. Nathan Chipman and Staff Sgt. Taylor Ward, from the

Army's [Mountain Warfare School](#) in Jericho, Vermont, and Staff Sgt. Stephon Flynn from the Northern Warfare Training Center in Black Rapids, Alaska, to make up the entire eight-member team.

The team followed the West Buttress Route to the summit of Mount McKinley, with each Soldier hauling 140 pounds of gear. They ate Army-issued dehydrated meals twice each day, boiling the water they needed to prepare the meals from snow they collected from the mountainside, while snacking between their meals for added energy and nourishment.

Key mission objectives were to test and strengthen tactics, techniques, and procedures, while operating in a mountainous, high altitude, cold weather environment.

The [U.S. Army Alaska](#)-sponsored team took 13 days to reach Denali's summit. The mountain's oxygen-depleted air left team members with headaches and fatigue, to which they countered by stopping at intermediate camps along the way to acclimate to the high altitudes and weather conditions.

The team reached the top of Denali using primarily Army-issued equipment.

Harris, the assistant team leader, said the Army's pull-behind sled system is heavier than a lot of similar sleds, but because of its rigid poles, which are used to pull the sled, navigating downhill and along the sides of slopes was made easier.

"We brought it along, despite the weight," said Hickey. "That was one of the reasons why we were on the mountain, was to test some of this new equipment, or equipment that has been in the inventory for a while that hasn't been used in an environment such as Mount McKinley."

The team's safety equipment was tested when Campbell suddenly fell into a snow-bridged

crevasse. The safety harness and tethered line they wore every day saved him from plummeting to the bottom of the 80-foot deep crevasse.

"Personally, I love this piece of equipment," said Campbell. "It's part of the reason why I'm still here today."

"I think it was our fourth day on the mountain, not too far in," Campbell explained. "It was gray out, you know, [there] was a little drizzle, a little snow, and it just looked like a normal slope to me."

"We knew there were crevasses around, but we didn't see them. There was a snow bridge that I walked on, and it was just too weak to hold me up, and I just started falling," Campbell added.

His fall was stopped at about 15 feet down when the safety line rope went tight. He used his training in crevasse rescue to climb nearly to the top where he was then assisted the rest of the way.

"[It was] probably one of the scariest experiences of my life," said Campbell. "We were doing everything as safely as we could, and I'm still here today because of the equipment we used."

The team agreed that safety training and risk mitigation planning were key factors to their successful and safe journey. They also said that even though they were in a bitterly cold, unforgiving environment, turning back before reaching the summit never crossed their mind.

In all, the team spent 16 days on Mount McKinley. On summit day, they reached the top of the mountain inside of a cloud. With limited visibility, nausea, fatigue, and heads pounding, they celebrated, snapped some pictures, and with that, began their rapid descent home for a hot shower and a warm meal.

Seamless Transition

A pattern for excellence in 2D, looking forward to 3D

By Jane Benson, NSRDEC Public Affairs / NATICK, Mass. (July 3, 2014)

Natick Soldier Research, Development and Engineering Center's Design, Pattern and Prototype Team wears many hats and creates many products.

"We cover a range of items here—field clothing, combat clothing, dress clothing, chem-bio protection, body armor systems, gloves, hats, helmet covers, and experimental garments using new textiles," said Annette LaFleur, team leader for the [Design, Pattern and Prototype Team](#).

The nine-member team's primary function is designing concepts and patterns for clothing items and prototypes, and the team relies heavily on [computer-aided design](#), or CAD, to help with the design process.

"CAD is fundamental," LaFleur said.

Designers can start from scratch, or they can go into NSRDEC's extensive CAD archives of fielded items, historical items, or experimental items.

"We can go into the CAD system and pull up a flat pattern. Say we are designing a new coverall. We already have an existing one that fits really well and that Soldiers like," LaFleur said. "We can go in and take off the design features like the collar or the cuffs—so you have a basic silhouette in a certain size—and start from there to design a new garment so you don't have to start from scratch."

The CAD system also contains more than 300 different tools to alter patterns, helping designers to achieve the results they need.

"We use the system to size out all the patterns to the different sizes and lengths that are needed," LaFleur said. "We work really closely with the anthropometric group here to help determine what sizes are needed for different items."

"I see 3D printing as a tool. Work processes have always evolved and changed. But you still need a designer to understand what's possible, what's comfortable."

Annette LaFleur, NSRDEC Design, Pattern and Prototype Team

The team currently uses a 2D design program, and LaFleur is excited about the possibilities that 3D printing capabilities hold for her industry in general and possibly for the Soldier.

"It could improve flexibility. You could incorporate hard and soft materials together into one design. So, maybe you have some sort of clothing or protective item that has rigid areas that move into soft areas, where your body needs to flex. That could be really exciting, because that is hard to accomplish with a regular textile," LaFleur said.

3D printing would also eliminate or reduce the number of seams necessary to make a garment.

"The fewer seams you have, the more comfort you can achieve. Seams can cause a hot spot with rubbing," LaFleur said. "Seams can cause discomfort in high heat and humidity, especially when you layer with body armor. Reducing seams on chem-bio gear would be huge."

Ballistic materials could one day be incorporated into 3D printing, allowing designers to produce shapes for armor and perhaps making it less expensive. The technology could also be used to make custom-fitted clothing or equipment.

"So, we could create something that is a totally perfect fit and reduce weight, maybe reduce bulk. A lot of the neat textiles that are being 3D printed, even out of these synthetics, have a 3D structure to them," LaFleur noted. "So that makes you think about spacer-type materials where you have air flow, which is so important if our Soldiers are going to be somewhere hot again, whether it is jungle or desert."

Although LaFleur is enthusiastic about the possibilities 3D-printing technology could bring to her field, she noted that human insight will always play an important role in the design process.

"I see 3D printing as a tool. Work processes have always evolved and changed. But you still need a designer to understand what's possible, what's comfortable," LaFleur noted.



Annette LaFleur leads the Design, Pattern and Prototype Team at Natick Soldier Research, Development and Engineering Center.

Photo: David Korman, NSRDEC

Natick investigates the effect of shelter lighting on Soldier thinking and mood

By Jane Benson, NSRDEC Public Affairs / NATICK, Mass. (July 3, 2014)

Seeing the Light

A light bulb drawn over someone's head usually symbolizes an idea — but could the type of light bulb, or type of lighting, actually affect how well someone is able to think?

Researchers at the [Natick Soldier Research, Development and Engineering Center](#), or NSRDEC, are investigating the effects of different types of lighting in military shelters on Soldiers. Specifically, members of NSRDEC's [Cognitive Science Team](#) are examining the effect of lighting on mood, or affective state, as well as visual acuity, cognitive alertness/awareness and the ability to perform tasks.

The team is investigating two types of lighting — traditional fluorescent lighting and newer [light-emitting diodes](#), or LED, technologies. The lighting is being studied at varying color temperatures ranging from low color temperatures of yellow/red to high color temperatures of blue/white. Twenty-four human research volunteers, Soldiers between the ages of 18 to 31, participated in the study, which took place at NSRDEC over five consecutive days.

“The ultimate aim of the project is to develop efficient spaces that promote well being,” said Breanne Hawes, member of the Cognitive Science Team and lead researcher on this particular project. “We were thinking of Soldiers in tents doing mission planning. This is where they set up their maps and have their meetings in shelters, and we wanted to see how the lighting would affect that especially, among other things.”

Dr. Caroline Mahoney, leader of the Cognitive Science Team, explained that one of the goals of the team — which does basic and applied research to monitor, predict and enhance cognitive performance — is to help shape technology and material development. On this study, the Cognitive Science Team worked with the Shelters Team and the Special Projects Team.

“This (study) was about helping material/product developers and designers make deci-

sions about the technology,” said Hawes. “We were trying to analyze different lighting systems. Currently, all the tents use fluorescent lighting, and (the Shelters Team and the Special Projects Team members) were trying to analyze three LED systems, which are newer lighting technologies. They were analyzing them based on technological differences, such as how long they last and how easy they are to set up. So the goal for our project was to tie in how (the lighting choice) is actually affecting the people sitting under the lighting, how is it affecting the Soldiers.”

“There is a ton of past research on what lighting can do to humans. It can affect how sleepy you are, your sleeping patterns, or how productive you are. But this has rarely been studied as a military application.”

Breanne Hawes, Cognitive Science Team

“The goal of the Cognitive Science Team is to enhance the Soldier's capability and survivability within the context that they operate,” said Mahoney. “So we strive to have a really good understanding of their context — whether it is stress, physical fatigue, or a new technology that they need to use and manipulate. How do those things affect their ability to maintain awareness of their situation and their ability to make timely and correct decisions? Ultimately, we want to provide information to predict a Soldier's abilities in a given context, keep them safe, and optimize performance.”

“There is a ton of past research on what lighting can do to humans,” Hawes said. “It can affect how sleepy you are, your sleeping patterns, or how productive you are. But this has rarely been studied as a military application.”

LED lighting uses less energy than fluorescent lighting and has a longer lifetime, but its use in room lighting is still relatively more expensive than traditional lighting.

“This study is important because it is the first study that has considered the tradeoff between the differences in cost between the lighting technologies and the impact of the lighting on Soldier mood and performance,” Mahoney said.

Compared with fluorescent lighting, the NSRDEC researchers concluded that LED lighting in a work environment seems to foster positive mood, increased alertness, and faster performance on visual perceptual and cognitive tasks. Soldiers working in fluorescent lighting tended to feel less alert, more fatigued and more depressed over time. Under fluorescent lighting, Soldiers showed slower response times on cognitive tasks measuring spatial and verbal memory.

This data has both military and industrial applications and could help designers to create workspaces where lighting improves concentration and mood.

“The results from this study impact the bigger picture because these LED lights are a very new technology,” Hawes said. “There hasn't been a lot of human-centered research on them yet. There have been many previous studies on how lighting affects sleepiness and other measures but those studies have focused on fluorescent lighting. This study adds to the research on LED lights.”

“This approach to research is something I'm really interested in — really keeping the human element in mind,” Hawes said. “Really thinking it through and keeping in mind how it is going to affect the end user: the Soldier. It's important to consider how we can make things so they can perform their best and help ensure their well-being.”

NSRDEC Holds Textile Industry Day

By Jeff Sisto, NSRDEC Public Affairs / NATICK, Mass. (June 27, 2014)

The [Natick Soldier Research, Development and Engineering Center](#) held its first Textile Science and Technology Industry Day here June 24-25 in an effort to promote collaboration with its industry and academic partners in the textile field.

The idea for a textile industry day came in response to the lack of interaction with industry due to travel restrictions placed on Department of Defense employees by sequestration. Prior to sequestration, U.S. government scientists and engineers attended conferences all over the world to stay informed of the latest developments in their fields.

The two-day event afforded government and industry experts the opportunity to meet face-to-face, exchange ideas on textile technology, and establish contacts for future collaboration.

"Industry and academic partners have a long history of collaborating to advance textile science and technologies," said Dr. Laurel Allender, acting technical director of NSRDEC, in a welcome letter to participants. "Together, we have succeeded in creating advances unimaginable a generation ago, and in doing so, we have improved the protection, capability and comfort of our nation's warfighters."

Some of those advances were on display at the event, which featured 25 novel textile technologies that NSRDEC scientists are developing to improve Soldier performance.

The venue showcased how Army scientists and engineers are using various forms of textiles to address everything from vector-borne disease protection to flame-resistant uniforms, chemical/biological defense, shelter insulation, cold-weather threats, and the incorporation of smart textiles into cargo and personnel parachutes, among other cutting-edge textile technologies.

Andy Margules, a mechanical engineer with the airdrop technology team and aerial delivery directorate, is working on a thermal protection, extreme cold weather kit for high-altitude parachutes.

"We're looking at ways we can maintain good thermal protection for the extremities without sacrificing dexterity to control the parachute," said Margules.

Currently, fielded equipment does not adequately provide thermal protection during the extreme temperature swings experienced by free-fall paratroopers exiting aircraft at 30,000 feet, where it can be as low as minus 60 F, and landing at a location that may be as high as 120 F, where they may have to engage an enemy.

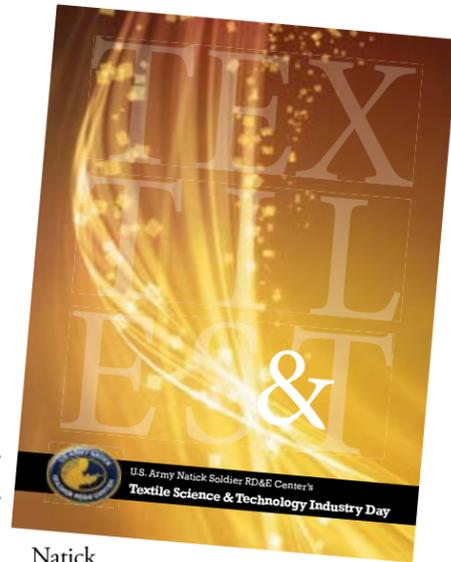
"A lot of industry people have said they are looking at new, innovative fibers and different ways of weaving things together that are good at managing temperatures and adaptive cooling," said Margules.

The event was also a chance for industry representatives to hear the challenges NSRDEC textile technologists are facing with Soldier-focused projects.

"We needed to reach down into the individual directorates and pull out the textile-related technologies that have challenges and hear from industry what kind of solutions they may have," said Henry Girolamo, the emerging concepts and technology lead for the [Warfighter Directorate](#).

"The SMEs laid out the technologies they are interested in, so that gives us a direction to go from," said Anthony Petrone, a retired Army sergeant major and current employee of Western Shelter Systems out of Eugene, Ore.

"It was important for our members to be able to network and build relationships with



Natick scientists," said Donald Vavala, director of government affairs at Gore Technologies Worldwide and chairman of the [National Council of Textile Organizations](#), or NCTO, an association that addresses issues faced by textile companies.

Industry participants also were given tours of NSRDEC's world-class research facilities, including the High Performance Fiber Facility, which features a research-scale bi-/tri-component fiber extruder; the Load Carriage Lab, where Soldier rucksacks and individual equipment are designed; and the Textile Performance Testing Lab, where uniform and protective gear materials are put through a battery of industry standard tests.

"We definitely benefited from learning more about the standards, how they are tested, and the people who are testing them," said Helene Krauss, director of development at American Cord and Webbing Co. "Making those contacts was important in the next steps moving forward."

"It has been a great event," said Ramaswamy Nagarajan, faculty director for the [Harnessing Emerging Research Opportunities to Empower Soldiers](#), or HEROES, program and associate professor in the plastics engineering department at the University of Massachusetts Lowell.

"To understand what the actual challenges are, and be able to go back to our colleagues and say, 'This is the problem they have; is there any way to solve it?' is a good thing."

For potential industry assistance, NSRDEC also had business operations representatives on hand to explain the various partnering mechanisms available.

Dining at Bagram

Natick co-workers recall fast-food lunch

By Bob Reinert, USAG Natick Public Affairs / NATICK, Mass. (June 27, 2014)

Mike Stepien and Brian Scott usually go to lunch a lot closer to their office at [Natick Soldier Research, Development and Engineering Center](#).

A while ago, however, the two co-workers shared a fast-food meal 6,500 miles away from Natick at Bagram Air Base, Afghanistan.

That's because Scott and Stepien were both deployed at the time: Scott as an Army Reserve staff sergeant with a military police unit; Stepien as a Department of Defense civilian public affairs officer.

These days, they're back to the familiar confines of NSRDEC's [Department of Defense Combat Feeding Directorate](#), or CFD, where the two men have occupied adjoining cubicles for about three years. Sitting in that space recently, they shared memories of that lunch and other moments in their Afghanistan deployments.

For starters, the meal at Bagram got two thumbs down from a couple guys who know something about food.

"It turned out to be terrible," said Stepien, a program marketing analyst at CFD. "It was awful."

"I actually like the local food much better," added Scott, an equipment specialist at CFD.

The chow hall food in Afghanistan didn't fare much better with them. When they tired of it, Stepien and Scott found a reliable antidote.

"I had some MREs shipped out, and I was eating those instead of going to the chow hall," Stepien said. "I think that's a nice

testament to the work that we do at Combat Feeding."

"Actually, I did that, as well," Scott said. "A couple times during the deployment, I ate a couple MREs instead of going to the chow hall."

Both men said they got great feedback on Combat Feeding products while in Afghanistan. Stepien told of Soldiers' reactions to sampling [First Strike Rations](#), eat-on-the-move assault rations.

"Some of them had never had it before," Stepien said. "They were very impressed with the quality of the ration. And the same with the MREs."

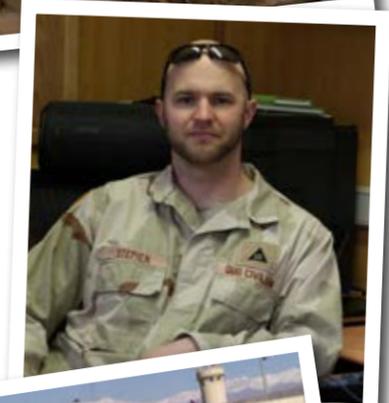
"The menus that I had were relatively new, so they had never tried them before. And again, they were very happy that the MRE had improved so much since the last time they'd had it."

Scott recalled a conversation that he had with a dining facility manager.

"He had talked to me about how impressed he was with the improvements (in) group rations that he'd seen, specifically the UGR-A and the UGR-Heat and Serve," said Scott, "and the improvements that he's seen since he joined the Army 18 years ago."

Back at CFD, Scott and Stepien continue to support ongoing efforts to keep America's warfighters well fed.

"It's an interesting place," said Stepien of his travels in eastern Afghanistan. "It makes you appreciate the opportunities we have in America."



Courtesy photos



Natick Researchers Mentor High School Robotics Team

By Jeffrey Sisto, NSRDEC Public Affairs / NATICK, Mass. (June 11, 2014)

When the [Natick High School](#) robotics team was approached by the town's fire department in March 2012 to develop a remotely operated vehicle, or ROV, that could assist in search and rescue dives, they first turned to the [Natick Soldier Research, Development and Engineering Center](#) for technical expertise and guidance on their project.

Two years later, Natick InvenTeam leaders Katelyn Sweeney, 17, and Olivia Van Amsterdam, 16, found themselves presenting their team's work to President Obama at the fourth annual [White House Science Fair](#).

InvenTeams are comprised of high school students, teachers and mentors that seek to invent technological solutions to real-world problems in their communities.

"In our meetings with firefighters, we kept hearing about how dangerous ice-diving was," said Sweeney, a senior who will attend MIT this fall. "So we decided we wanted to try to tackle that."

Armed with a \$10,000 grant from the [Lemelson-MIT Program](#), to which they were selected as one of 16 teams nationwide, students set to work on an underwater vehicle

that can assist firefighters searching for people or objects trapped under the ice.

With an initial scale model made from Legos, the team continued to refine their prototype with technical guidance from NSRDEC scientists and engineers.

"They made that small prototype turn into a reality," said Van Amsterdam of the NSRDEC mentors. "They asked a lot of questions and if we didn't have their input during the brainstorming phase, we would've gone through prototype after prototype after prototype."

"It was actually excellent that we failed so many times," said Van Amsterdam, a junior, who also serves as the technical lead for the team. "Fail early and fail often is what (Natick High School robotics teacher) Mr. (Douglas) Scott always says, and that was an important part of the process."

"With a team, it is easy to get either completely polarized or stuck on a single idea," said Sweeney. "Everybody had a different perspective on how to make the machine work, so we had to learn how to combine them to make something that was better than any singular idea."

Olivia Van Amsterdam, 16, and Katelyn Sweeney, 17, from the Natick High School InvenTeam, display poster boards of the remotely operated vehicle they developed to assist local firefighters in search and rescue ice dives at their school's robotics lab.

In addition to providing technical assessments during the mentoring sessions, NSRDEC researchers also emphasized the need for students to work collaboratively.

"It is important to respect each other's thoughts and ideas," said Gary Proulx, an engineer with NSRDEC's Prototype Shop who was one of the mentors. "Often the end result is a hybrid of different ideas."

The end result is a two-part design that uses a tread-wheeled ROV to traverse the ice to the point-of-entry hole, where an embedded crane then lowers a smaller, amphibious ROV equipped with an underwater camera system into the water. The submersible vehicle then searches beneath the water for the victim, ideally locating and latching on to its target for the rescue diver to retrieve.

The ROV, currently under patent review with the U.S. Patent and Trademark Office, weighs approximately 109 pounds - significantly lighter than a firefighter who would have to cross the ice to the point-of-entry hole.

"First and foremost, this is a device that is intended to scan an environment before a human has to go into it," said Sweeney. "So it could potentially be used in any application where that is necessary."

The goal is to not only assist firefighters in their search efforts, but to keep them as safe as possible while doing it — a familiar end state for NSRDEC scientists and engineers who work daily to ensure the protection and survivability of Soldiers in harm's way.

Nonthermal processing comprises a number of innovative technologies that provide alternatives for traditional heat for food preservation.

The inspiration for these and other innovations in Science and Technology are often difficult to pinpoint, coming from thinking outside the box, applying expertise to new areas, and persisting even when opposed by conventional wisdom.

These lessons ring true for many dedicated scientists and inventors, who know that their rigorous hard work will lead to research breakthroughs, major publications, books, and patents that advance the state-of-the-art.

Senior research chemist Dr. Christopher Doona and research microbiologist Florence Feeherry of the Natick Soldier Research, Development and Engineering Center's [Warfighter Directorate](#) take their research one step further — technology transfer to industry.

"D-FEND ALL" or Disinfectant For ENvironmentally-friendly Decontamination, All-purpose, is a novel "clean and green" technology for the on-site, point-of-use, at-will generation of chlorine dioxide.

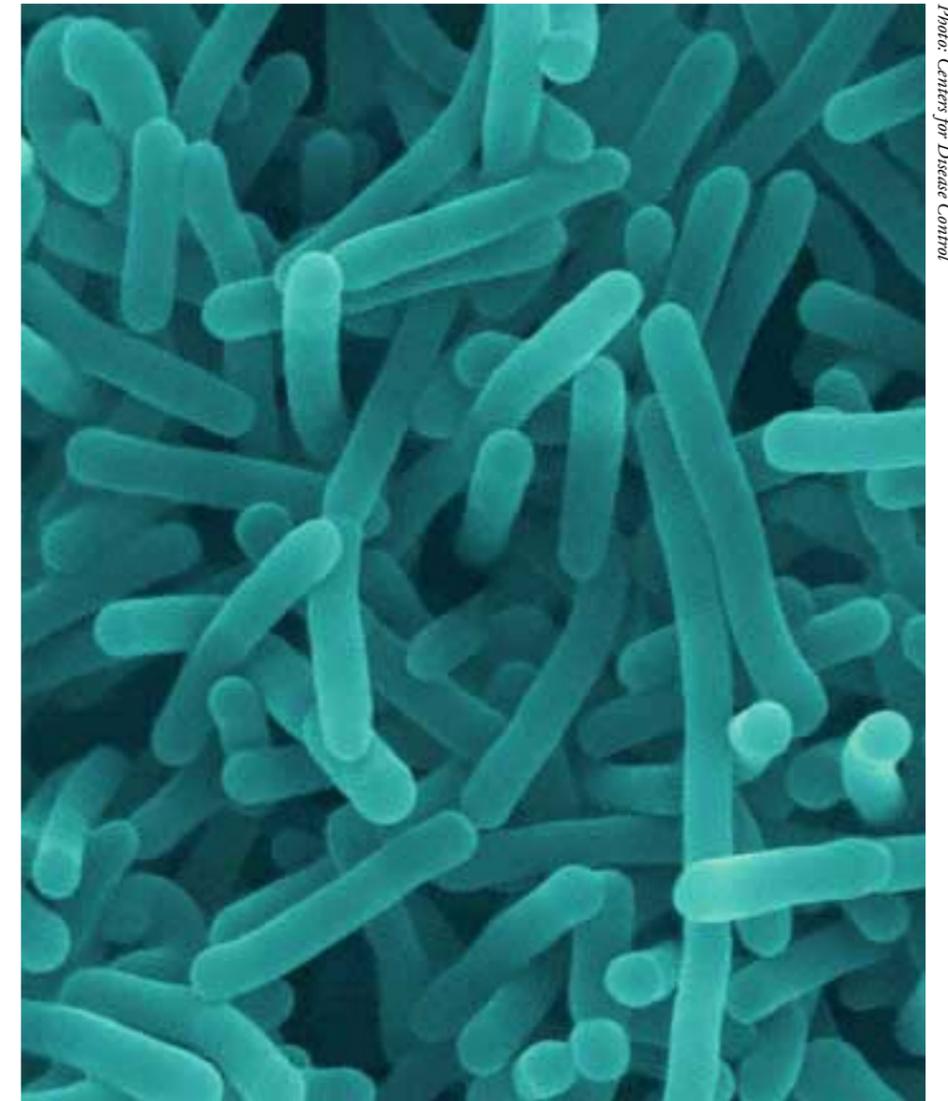
"D-FEND ALL decontaminates bacterial spores, promotes sanitation and hygiene, and improves water quality and safety with unique advantages over existing systems, including our previous patents for the PCS and D-FENS," Doona said.

The PCS, or Portable Chemical Sterilizer, is a modern field autoclave that sterilizes without electricity or water, and D-FENS, or Disinfectant For Environmentally friendly Sanitation, is a collapsible sprayer for sanitizing such surfaces as bathrooms, showers and laundries. In 2012, Thomson Reuters named the U.S. Army among the [Top 100 Global Innovators](#) for innovative patents such as these.

Technology transfer is often a first step toward commercialization. The [Federal Technology Transfer Act](#) encourages the transfer of federal technologies to nonfederal entities for commercialization for the nation's material benefit.

"It's exciting to see our laboratory research advance to the commercial marketplace," Feeherry said. "That's something not all scientists have the good fortune to experience."

Because of its convenience, D-FEND ALL has unmatched versatility in myriad dual-use applications for military and civilian consumers.



Transferring 'D-FEND ALL' Technology

By NSRDEC Warfighter Directorate / NATICK, Mass. (June 26, 2014)

"D-FEND ALL was intended for textile decontamination and for disinfecting in a novel gray water recycling system to generate potable water in base camps," said Doona, "and it can also be used to rinse fresh produce or anywhere in the home or office where microbial contamination is an issue."

As Executive Committee members of the Institute of Food Technologists [Nonthermal Processing Division](#), Doona, the past chair, and Feeherry have been Natick's leading researchers in nonthermal processing for more than a decade. Their scientific results in high

pressure processing, chemical sanitizers, cool plasma, and other nonthermal technologies are found in such premier journals as Journal of Food Science, International Journal of Food Microbiology, International Journal of Chemical Kinetics, Journal of Agricultural and Food Chemistry, and Natick's first-ever video publication for the Journal of Visualized Experiments.

"It's a privilege to be scientists for the Army," Doona said. "We look forward to seeing the Warfighter use our inventions to improve their quality of life in the field."



‘Birdies for the Brave’

Command Sgt. Maj. Robert Beausoleil of U.S. Army Garrison-Natick spoke and four Soldiers from the U.S. Army Research Institute of Environmental Medicine presented the colors June 25 at the “Birdies for the Brave” event at TPC Boston in Norton, Mass. Birdies for the Brave has raised more than \$11 million nationwide for military home front groups.

Photos by John Harlow, USAG-Natick Public Affairs