

October 2016

# NSSC This Month



U.S. Army Garrison Natick Public Affairs Office

## Soldier Power

Self-generation will reduce loads



2013 and 2015 U.S. Army  
Maj. Gen. Keith L. Ware Awards  
First Place, Digital Publication



2016 National Association of  
Government Communicators  
First Place, External Newsletter



# Commander's Corner

Lt. Col. Ryan Raymond  
USAG Natick Garrison Commander



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## Projects nearing completion

Two major projects are winding down just in time for the cold(er) weather. The main gate and the Hunter Auditorium are open for business again starting November 1; some touch up work will continue, but that work will not impact operations. I appreciate your patience. These projects, and several others, have been completed this year by leveraging the resources of several organizations on the installation.



This issue of the newsletter contains an interesting article by Capt. Briana Tellado regarding the Hatch Act and election season. In addition to the requirements of the law, I encourage everyone to remember that the Army remains a non-partisan, apolitical organization. It is imperative that the American people remain confident that the Army is largely immune to political rhetoric and changes in civilian leadership positions.

On November 7, we will conduct an installation expo that highlights recent accomplishments and future initiatives. Please join us at the entrance to Building 1 at 11 a.m. (there will be food). Also, please join us for Thanksgiving lunch at the DFAC on November 18; sign-up information will be out soon.

As the holidays approach, please remain safe in all of your endeavors; seek outlets for the stress that naturally comes at this time of year. The future Army depends on you, and I thank you for all you continue to do for our Soldiers

Lt. Col. Ryan Raymond  
USAG Natick Garrison Commander

# NSSC This Month

NSSC  
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About this newsletter  
NSSC This Month is a monthly newsletter covering NSSC news within the Army and commercial media.

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To subscribe to NSSC This Month, please contact Bob Reinert at [robert.j.reinert.civ@mail.mil](mailto:robert.j.reinert.civ@mail.mil).

On the Web: [www.army.mil/natick](http://www.army.mil/natick)

Cover photo: Bionic Power Inc.

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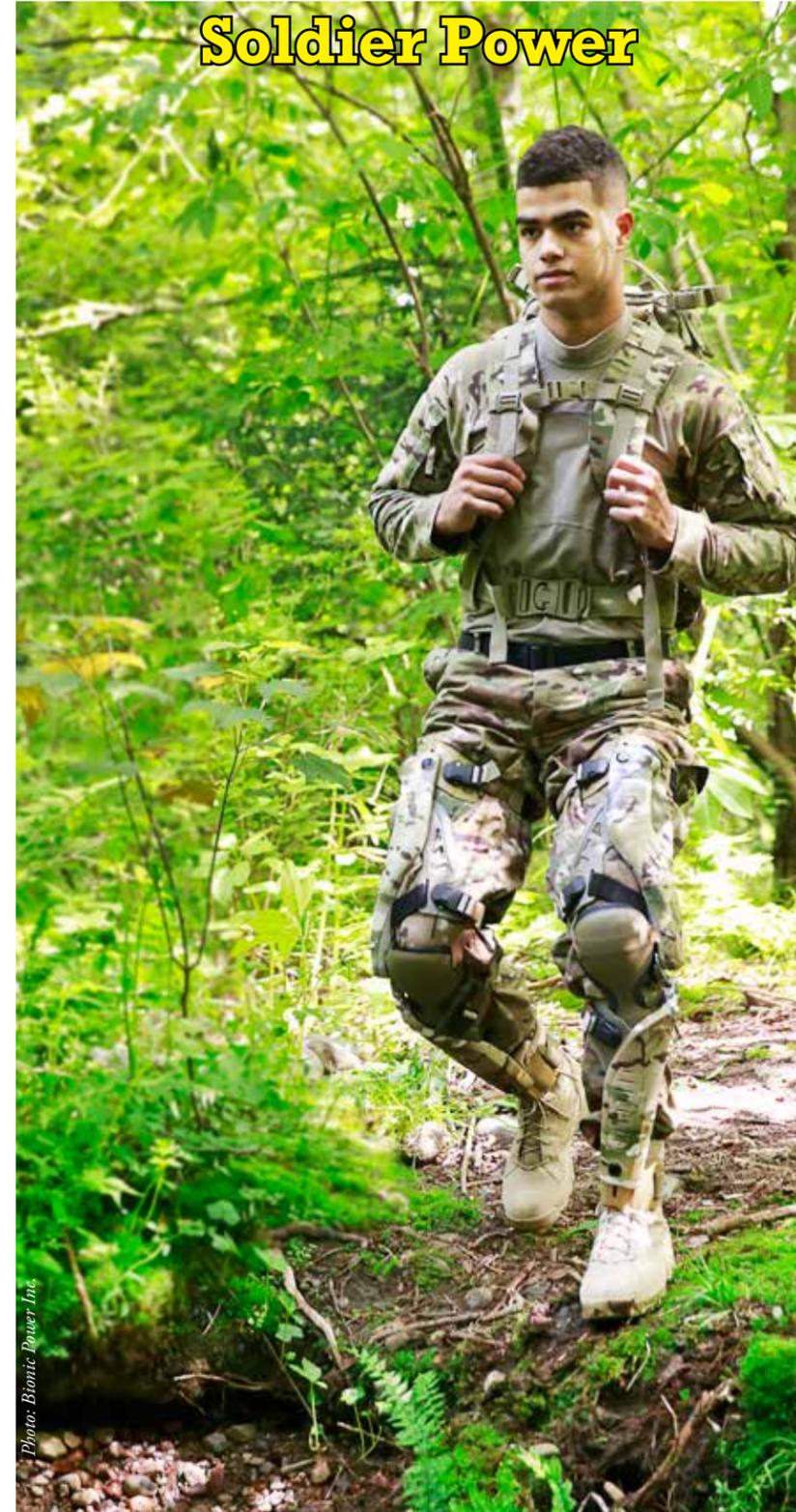


Photo: Bionic Power Inc

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## Fall Veterans Clothing Drive

Collection boxes will be placed in the lobbies of Carney Hall (Bldg. 1), MacGillvary Hall (Bldg. 3), MacArthur Hall (Bldg. 4), and the Wood Building (Bldg. 42), to accept clothing items in anticipation of a cold winter here in New England. All donated items will be delivered to Veterans, Inc. in Worcester. Some suggested items include winter jackets, sweatshirts, warm pants and sneakers. This clothing drive will also accept new T-shirts, undergarments, socks and personal hygiene products. For more information, contact Sarah Ross at [sarah.e.ross26.civ@mail.mil](mailto:sarah.e.ross26.civ@mail.mil).

## Chaplain's Office Counseling

If you are in need of a counseling appointment, chaplain coverage or religious support, please call the Chaplain's Office at ext. 4506, or the mobile line at (508) 202-2638. All communication during a counseling session with an Army chaplain and/or chaplain assistant is strictly confidential.



## Civilian Wellness Program



Did you know that DA Civilians can take part in a six-month exercise program? While every organization has specific guidelines for employee participation, the Army Civilian Wellness Program allows civilian employees to exercise up to three hours per week during the duty day to help promote a healthier and more productive workplace. For more information, contact MWR at ext. 4791.

## ACS Overseas/PCS Assistance

ACS offers one-on-one briefing appointments for overseas relocation or other Permanent Change of Station (PCS) moves. Gain information on what you need to know about living overseas, or let us help you link up with your next duty station with welcome packets and other online resources. Briefings are available for both military and DoD civilians anticipating a PCS move. For an appointment, please contact Diane Magrane at [diane.k.magrane.civ@mail.mil](mailto:diane.k.magrane.civ@mail.mil).



## Garrison Spotlight

### Walter Ulrich

#### What Walter does:

"I am a management analyst working in the Plans, Analysis and Integration Office of the garrison's Directorate of Plans, Training, Mobilization and Security."



#### PAIO Chief Lynn Valcourt on Walter:

"Walter goes out of his way to sit with each directorate to gather and review the quarterly data, input this data into the system, and diligently reviews all submissions to ensure the comments and input are in line with the command message. He also manages the Installation Status Report, Common Levels

of Support, and Performance Assessment Review programs. The impact of his efforts is far-reaching as the ISR data influences the Program Objective Memorandum funding for installations. In May, Walter was recognized by the IMCOM commander, Lt. Gen. Kenneth Dahl, with a commander's coin for his hard work within the garrison. With his attention to detail and his unwavering professionalism, Walter is an asset to the garrison and to the Natick Soldier System Center community at large."

## Hanscom Patient Handbook

A limited number of patient handbooks are available for active or retired service members and their families who receive medical treatment at the Hanscom AFB Medical Clinic. Please stop by ACS in Building 1, Room A-122, for a copy courtesy of the Natick ACS Information and Referral Program.



## Federal Employee Benefits

The annual Federal Employee Benefits "Open Season" will run Nov. 14 through Dec. 12. Federal employees, retirees and their families can learn about their benefits plans and make changes, as needed. The Natick CPAC will also be hosting an on-site Open Season Health Fair on Thursday, Nov. 10, from 9 a.m. to 3 p.m.

# Explaining the Hatch Act

By Capt. Briana S. Tellado, Command Judge Advocate

November 2016 brings colder weather, football, Thanksgiving, and effortless opportunities to break the law.

Specifically, the Hatch Act restricts federal government employees from participating in partisan political activity while on duty or



Sen. Carl Hatch

in the federal workplace. Because DoD civilian employees are subject to the Hatch Act, it's important to know what types of activities could violate it. Military service members are similarly restricted from engaging in political activity, but they are subject to the parameters of DoD Directive 1344.10, Political Activities by Members of the Armed Forces, and not the Hatch Act. There are two categories of civilian employees under the Hatch Act: further restricted (which includes employees who are members of the Senior Executive Service and those who are appointed by the president and confirmed by the Senate) and less restricted (nearly all other DoD civilian employees). Because of their prominent positions, further-restricted employees are more limited in how they may participate in political activities. Less-restricted employees, however, may generally participate in partisan political management and campaigns, as long as it is not on duty or in the federal workplace. On the other hand, any political activity, if directed toward the success or failure of a political party, candidate for partisan political office, or a partisan political group, if facilitated by government resources, would constitute a violation of the Hatch Act. This means you can't drive the government vehicle to a political rally or fundraiser, you can't use the government printer to copy campaign flyers, and you can't use government email to advocate for or against a candidate for political office.

Most violations of the Hatch Act are unintentional. Still, ignorance of the law is no excuse. Transgressions of the Hatch Act, even if unwitting, can result in termination, demotion, debarment from federal service for five years, suspension, a letter of reprimand, or a fine of up to \$1,000.

Recent examples of federal employees violating the Hatch Act are not difficult to find. The U.S. Office of Special Counsel (OSC), which is responsible for investigating and prosecuting violations, investigated a U.S. Postal Service employee for having a "Make America Great Again" sign behind his desk at the post office.

The OSC determined the display of Donald Trump's presidential campaign slogan was a Hatch Act violation. A different U.S. Postal Service employee violated the Act when he displayed a congressional candidate's campaign sign in his mail truck while delivering mail in the candidate's prospective district.

The OSC has identified a number of other Hatch Act violations, to include: displaying a Hillary Clinton bobblehead doll at work, collecting signatures for a mayoral candidate from co-workers (even though the employee collecting the signatures was on leave, she was still in a federal building), and retweeting a candidate's request for political contributions. Answering a federal hotline in 2012 with a chant to re-elect President Obama was a violation, as was participating in a live webcast from a federal building while criticizing the Republican Party and their presidential candidate, Mitt Romney.

Federal employees are permitted to advocate for particular causes, issues or legislation, as long as they are not linked to a political party or candidate. For instance, speaking for or against the Affordable Care Act, gun control, term limits, constitutional amendments, tax reform, pro-choice or pro-life, are all permitted, if not associated with a political party or candidate for office. As crazy as it sounds, wearing an anti-war button in a federal workplace would not violate the Hatch Act, because war is not tied to a political party or candidate. However, wearing an anti-war button in a federal building could be at odds with the philosophy of the employee's federal organization, and the employee could be punished for violating a different policy, rule or regulation of the organization.

Making personal donations to a candidate or campaign is permitted, as long as the federal employee does not make online donations on a work computer or in the federal workplace, even if using a personal computer or device. Despite their freedom to make personal donations, federal employees are prohibited from fundraising, which encompasses soliciting, accepting or receiving political contributions for a candidate or political party.

Being a public servant does not prevent you from participating in the democratic process entirely. You can still vote, attend political rallies, and distribute campaign literature (when off duty, away from the workplace, and out of uniform). Just remember that federal employees may not use their official authority or position to interfere with an election, or to invite subordinates to political events or activities. Use of an official title or official agency social media account while participating in political activity is also prohibited. So this election season, leave your campaign signs at home, keep your bumper stickers on your personal vehicle, and remember that even though it's getting colder out, participating in political activities in the federal workplace could get you into hot water.

Photo: Steve Bauer/Shutterstock.com



# Field of Her Dreams

Natick employee, lifelong Cubs fan, misses World Series to serve country

By Bob Reinert, USAG Natick Public Affairs/NATICK, Mass. (Oct. 27, 2016)

Marissa Spitz has been a lifelong [Chicago Cubs](#) fan, but the only way she can visit her beloved [Wrigley Field](#) during their first trip to the World Series since 1945 is in her dreams.

Instead of feasting her eyes on the lush, Ivy-covered confines of Wrigley – where she has been a season ticket holder since 2011 – Spitz will spend the series in the more barren environs of Kuwait, where she is deployed as an [Army Reserve](#) first lieutenant serving as executive officer for the 456th Area Support Medical Company out of Somersworth, N.H.

“We are currently deployed in support of Operation Inherent Resolve,” said Spitz, who in civilian life is a research physiologist and project manager with the Biological Science and Technology Team, Warfighter Directorate, [Natick Soldier Research, Development and Engineering Center](#). “The unit’s mission is to be a part of the medical assets throughout the area of responsibility, and we currently have teams of Soldiers in different locations, augmenting other medical units.”

The 32-year-old Spitz, who grew up in [Skokie, Illinois](#), just north of Chicago, joined a group including her brother David that acquired four season tickets five years ago.

“His wait list number was called up in 2010,” Spitz recalled. “We decided to go in (on) them together with a few friends, in the hopes that within a decent time period, we could see our Cubbies play in the playoffs and World Series.”

That time has come, but it finds Spitz nearly 7,000 miles away, watching the games on television at Morale, Welfare and Recreation in the middle of the night. She has yet to find any other fellow Cubs fans there.

“So the atmosphere was quiet, which is hard for me because of all of the emotions I have during these games,” Spitz said. “I’m hoping with each game, there is more interest and maybe I’ll find those other fans somewhere. It’s tough at that time because Soldiers in other units typically have PT in the morning, or work night shifts, so if they are watching, it might be in their office or hooch.”

Meanwhile, taking her place back at Wrigley in Aisle 233, Row 10 along the right-field line for the first game in Chicago Friday night will be Spitz’s other brother, Danny.

“He is just as big of a Cubs fan,” said Spitz of Danny, “and I’m really excited that (he and David) will both be there together.”

She and her siblings grew up as Cubs fans, of course.

“As a child I remember my entire family loving the Cubs among the other Chicago sports teams, except the White Sox, of course,” Spitz

said. “The first game I remember going to at Wrigley was opening day in 1994. That day was special because it was my dad’s birthday, and a Cub at the time, Tuffy Rhodes, hit three home runs that game.”

Spitz’s fondness for the Cubs grew when she left for Ithaca College in 2002 and the Cubs made a playoff run the following year.

“I remember watching the games at school in upstate New York with a girlfriend who was also from my hometown,” Spitz said. “We cried together when the Cubs lost in the (National League Championship Series). I got more into baseball as the years went on, and especially when I moved to Texas for graduate school.”

While she was attending graduate school at Texas Christian University, she and her boyfriend traveled to see three Cubs’ games in St. Louis.



**“My outlook definitely hasn’t changed. The Cubs are surely the better team in all aspects. They have more depth in each component of the team, based on my not-so-expert analysis.”**

Marissa Spitz, diehard Cubs fan

“One of his friends worked for the Cardinals at the time, and she was able to get us on the field for Cubs’ batting practice,” Spitz said. “To see the players that close up and to say ‘Hi’ to them was an amazing feeling.”

It would not be her only chance to walk on a Major League diamond. In Game 1 of the 2013 World Series, when she was an enlisted Soldier assigned to the [U.S. Army Research Institute of Environmental Medicine](#), she served as part of color guard at Fenway Park in Boston for the 8-1 Red Sox win over those same Cardinals.

When she’s not deployed, Spitz attends as many as a half-dozen Cubs games each year at Wrigley.

“Last season, I was at a game with both of my brothers and another friend,” said Spitz, “and we saw Kris Bryant’s first ever walk-off home run.”

Spitz didn’t waver in her support after the Cubs’ first-game loss to [Cleveland](#) in this year’s World Series.

“My outlook definitely hasn’t changed. The Cubs are surely the better team in all aspects,” Spitz said. “They have more depth in

each component of the team, based on my not-so-expert analysis.”

Indeed, the Cubs rebounded to win Game 2, 5-1, Wednesday to send the series to Chicago tied 1-1. Spitz won’t be there, but she has no doubt that she will someday settle into her seat at Wrigley for a World Series game.

“This team is set up for success for several more years,” Spitz said. “I definitely have high hopes for next year and in the years to come. I don’t think it will take another lifetime, unless some other curse is bestowed upon the team.”

# Soldier Power

## Self-generation will reduce loads

By Jane Benson, NSRDEC Public Affairs/NATICK, Mass. (Oct. 24, 2016)

Today's warfighters may one day find themselves knee-deep in power.

The bionic power knee harvester, also known as the [Power-Walk](#), is an energy-harvesting device that is attached to both the upper and lower areas of both legs and generates power from movement. The device is still in development. Field trials will begin in 2017.

The device is designed to extract the energy when the knee is flexed and negative work is being performed. The system adjusts to a person's gait, so Soldiers don't feel like they are wearing a device and can even forget that they have it on.

"Just by walking, Soldiers could generate power," said Noel Soto, a project engineer at the [U.S. Army Natick Soldier Research, Development and Engineering Center](#), or NSRDEC. "We are converting the movement of the knees when you walk into useful power."

Soldiers now carry multiple electronics that aid in strategy, communication and navigation, including computers, radios, mobile phones, battlefield situational displays and navigation tools – to name just a few devices. Being without power to run these devices could impact Soldier safety, performance and efficiency.

"The power generated by the device charges the main battery," Soto said. "The goal is to reduce the amount of batteries used by Soldiers or to be able to extend the mission with the same load. We have found out through studies that Soldiers are carrying a heavy load and a lot of that weight, 16 to 20 pounds for a 72-hour mission, is due to batteries."

Heavy loads can increase injuries as well as impact mobility. In addition to potentially lightening the load by reducing the number of batteries needed, the energy-harvesting technology could also free up space in backpacks for other supplies, including food and water.

By wearing the device, Soldiers can generate power to recharge batteries for themselves or for others.

"The objective is to have the device weigh one pound and be capable of generating 3.5 watts and to have a device weighing two pounds able to generate 10 watts," Soto said.

NSRDEC is working with [Bionic Power Inc.](#) of Canada on the joint-service project, which will benefit the Army and the Marine Corps infantry. [Project Manager Soldier Warrior](#), with the

addition of the Office of the Secretary of Defense and USMC, lead the contract.

The project comes under the Joint Infantry Company Prototype Program, which came out of the Soldier Power Generation program. NSRDEC led the original concept for energy harvesting in 2012 through a congressional effort, and PM SWAR funded the next phase, SPG, in 2014.

The device would also serve to reduce the logistical burden.

"In remote places, it could potentially increase self-sustainability and independence by reducing the need for resupply," Soto said.

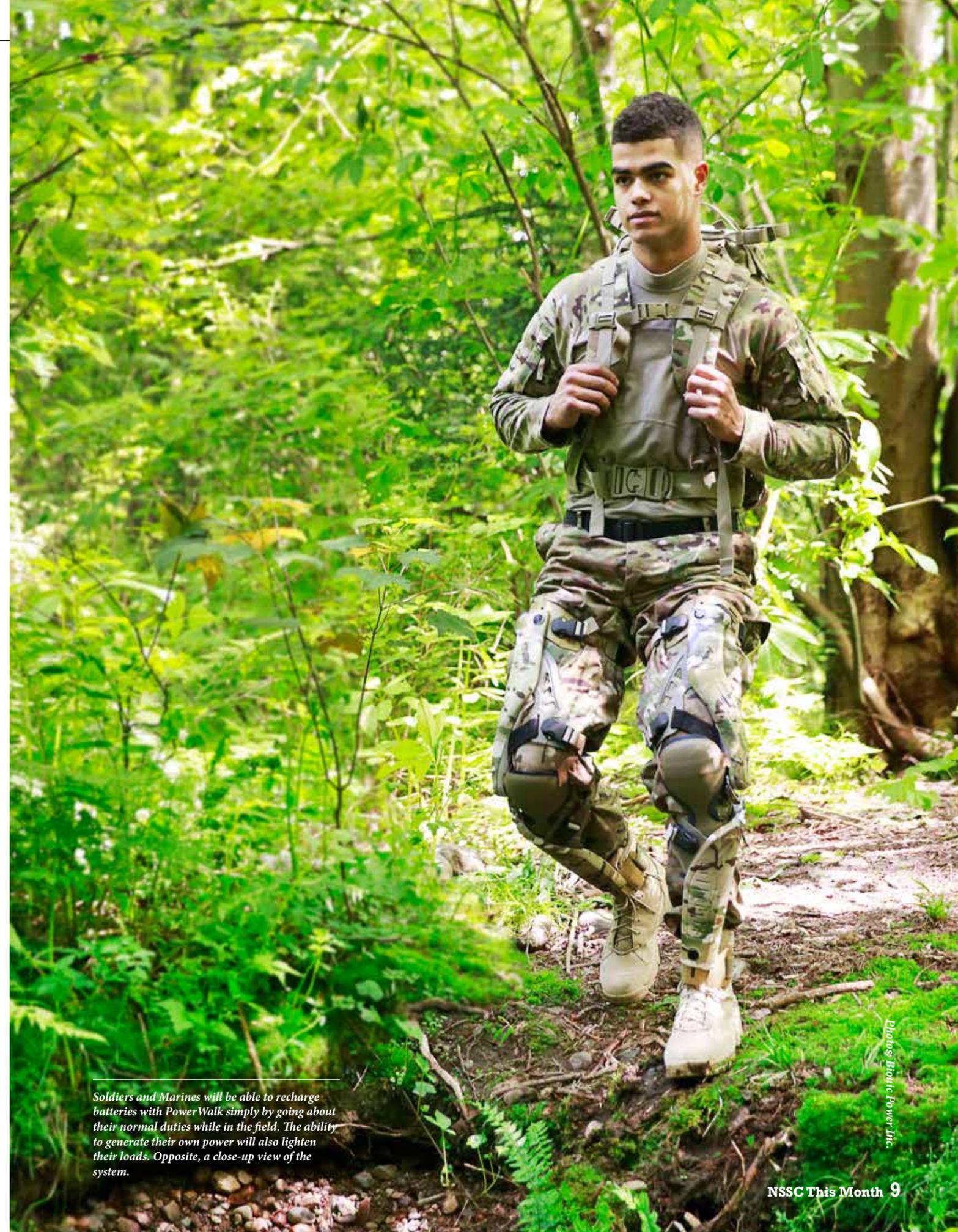
The knee energy-harvesting device also reduces muscle fatigue during downhill walking.

"As a generator, it creates power," said Soto. "As a motor, it could potentially be used in the future for

human augmentation. It acts as a brake when you are walking downhill. It actually helps Soldiers by preventing sudden movement on the slope."

For Soto, improving life for the Soldier and lightening the Soldier's load are professional goals that also have personal meaning.

"I am a disabled veteran," Soto said. "I know what it's like to carry a lot of weight on my back. I served with the 82nd Airborne. Everywhere we went was uphill, both ways. Now, I'm in the driver's seat and able to help. I know it's worthwhile because I've been there. I know I'm doing something valuable for the Soldier."



*Soldiers and Marines will be able to recharge batteries with PowerWalk simply by going about their normal duties while in the field. The ability to generate their own power will also lighten their loads. Opposite, a close-up view of the system.*

Photos: Bionic Power Inc.

# High Time

## USARIEM developing algorithm to predict Acute Mountain Sickness in Soldiers

Mallory Roussel, USARIEM Public Affairs/  
NATICK, Mass. (Oct. 18, 2016)

Every Soldier is different, and this cannot be more evident when troops deployed to the same mountainous terrain experience symptoms of [Acute Mountain Sickness](#).

For some Soldiers, the headaches, vomiting, fatigue, exhaustion and trouble sleeping are so severe they need to be put on supplemental oxygen. Other Soldiers might experience less-severe symptoms or even feel completely fine.

Now, researchers from the [U.S. Army Research Institute of Environmental Medicine](#), USARIEM, are beginning to solve this puzzle after concluding their field study in the Maher Memorial Altitude Laboratory on the 14,115-foot summit of [Pikes Peak](#) in Colorado.

“We are striving to create a look-ahead model that has been tailored to an individual based on their physiology,” said Dr. Mark Buller, a research psychologist with USARIEM’s [Biophysics and Biomedical Modeling Division](#), or BBMD. “The system will measure parameters like heart rate and oxygen saturation to provide some prediction of when and how severe Soldiers could suffer from AMS.”

In July 2016, researchers from BBMD along with Dr. Beth Beidleman, the principal investigator of the study conducted on Pikes Peak, used wearable physiological status monitors to collect real-time, minute-by-minute heart rate, blood-oxygen saturation levels, respiration rate, skin temperature, core body temperature and body position.

Researchers collected these real-time physiological data at sea level, during the first two days on the peak (when AMS symptoms are usually the most severe) and then again during a 24-hour exposure in the USARIEM hypobaric chamber after a 12-day period of de-acclimatization. The data will be used to develop an algorithm that can predict the likelihood of health and performance decrements in individuals exposed to a hypoxic environment.

“BBMD likes to use the analogy of a car,” Buller said. “A car has gauges that provide information on how it is working, such as how hot it is getting or how hard the engine is working. With a person,

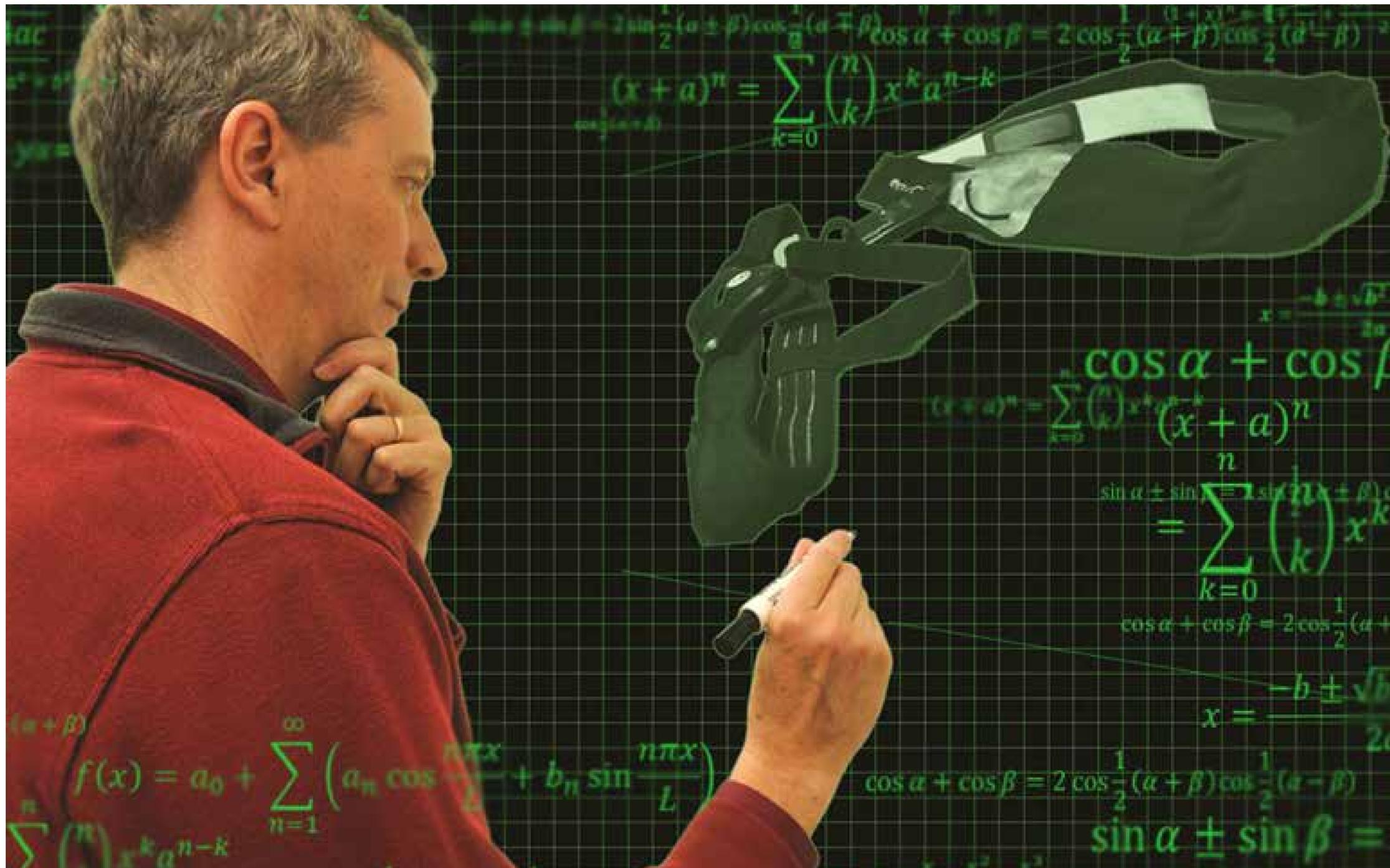


Photo illustration: Mallory Roussel, USARIEM Public Affairs

you do not really have those gauges or know where they are in terms of their health and performance. Physiological status monitors are being developed to provide that information.

“If a Soldier goes to altitude, a physiological status monitor can provide that situational awareness of their health and performance and their predicted likelihood of AMS, so commanders can take action based upon that information. Mission planners will not be caught off guard by having half of their troops suffering from AMS.” Back at USARIEM, BBMD researchers are now processing the data and getting into the mathematical development of the model. According to Buller, BBMD plans to apply their modeling skills to other extreme environments in future studies.

“As we combine all of these different aspects, we now begin to have a much more comprehensive view of the warfighter,” Buller said. “Rather than just applying physiological status monitors to thermal environments, we are dealing with how nutrition, hydration and physiological status relate to Soldier readiness in a host of extreme environments. If mission planners are given a particular mission and know the Soldier’s state, they can use the models to optimize the mission and complete it in the least-stressful way for the Soldier.”

“USARIEM is moving toward more individualized health modeling, which not only takes into account the individual responses, but also how those responses change over time and in response to external

*Dr. Mark Buller is one of the U.S. Army Research Institute of Environmental Medicine scientists who are developing an algorithm to help predict beforehand which individual Soldiers could experience Acute Mountain Sickness during a mountain expedition.*

stimulation. When you have a biomedical model that works for a group, it might work for 80 to 90 percent of the Soldiers. However, you are going to miss the Soldiers who respond outside of the normal range. We want to adapt our models to accurately capture individual Soldiers’ differences and responses. These types of models will allow the possibility of adapting treatments so they become as unique as the individual.”

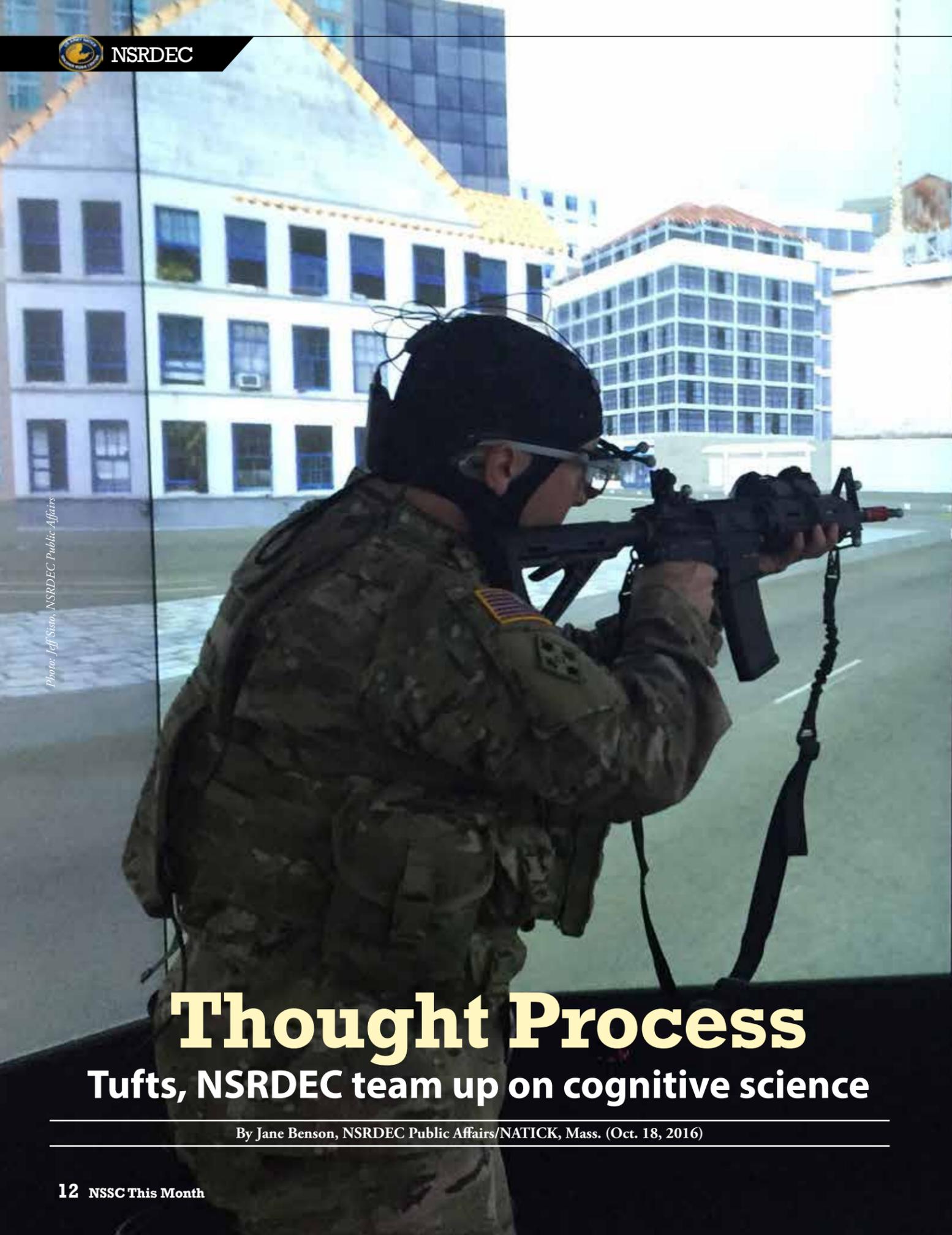


Photo: Jeff Sisto, NSRDEC Public Affairs

# Thought Process

## Tufts, NSRDEC team up on cognitive science

By Jane Benson, NSRDEC Public Affairs/NATICK, Mass. (Oct. 18, 2016)

The [Natick Soldier Research, Development and Engineering Center](#), or NSRDEC, and [Tufts University School of Engineering](#) held a grand opening for the Center for Applied Brain and Cognitive Sciences, or CABCS, on October 18.

CABCS brings together the resources of both partners, and research will focus on optimizing Soldier performance and readiness. The nation's warfighters, as well as first responders, will benefit from the partnership's multidisciplinary, cutting-edge research and facilities, including advanced virtual reality capabilities. The center is also part of a larger effort to create a bridge between Soldiers in the field and scientists and engineers in the lab.

The center is co-directed by Caroline Mahoney, Ph.D., team leader for NSRDEC's Cognitive Science and Applications Team, and Holly A. Taylor, Ph.D., a professor of psychology in Tufts' School of Arts and Sciences who also has an appointment in mechanical engineering at Tufts.

"CABCS operates on a unique model that includes joint leadership of the center, with both institutions contributing personnel and resources to push the state-of-the-art in the brain and cognitive sciences," said Mahoney.

"The center formalizes a longstanding successful collaboration between Tufts University scientists and NSRDEC scientists," said Taylor. "And what it brings, then, is the facilities and the capabilities that can expand those successful collaborations even more. And that really was the basis of starting and building up the center at Tufts."

"The Center for Applied Brain and Cognitive Sciences is a tremendous opportunity for NSRDEC and Tufts University School of Engineering to pioneer a truly innovative partnership," said Mahoney. "By bringing together a multidisciplinary group of scientists in the fields of psychology, neuroscience, computer science, robotics, and engineering, we can view problems from different perspectives and solve complex problems for Soldiers in future operating environments."

The collaboration aims to advance researchers' understanding of how people think, respond and perform in ever more complicated, demanding, stressful and challenging real-world situations and environments.

"This partnership will also extend the expertise available for innovative, collaborative projects for Tufts researchers and graduate students by involving the NSRDEC researchers," Taylor said. "Interdisciplinarity is highly valued at Tufts already, and this center fits that emphasis."

"The partnership between Tufts and NSRDEC will allow NSRDEC scientists opportunities to partner with Tufts faculty and students and utilize unique center resources," Mahoney said. "It will also afford the opportunity for Tufts faculty, undergrad and grad students to gain further real-world experience working collaboratively with NSRDEC scientists to solve Soldier problems in specialized NSR-

*NSRDEC and Tufts University have jointly opened the Center for Applied Brain and Cognitive Sciences. The nation's warfighters, as well as first responders, will benefit from the partnership's multidisciplinary, cutting-edge research and facilities, including the virtual reality capabilities seen at left.*

DEC facilities, such as the climatic chambers, that are not available to them at the university."

"Our objective at the cooperative center is to identify innovative, interdisciplinary approaches to monitoring Soldier physiological and mental states, predicting how those mental states influence operational behavior, and optimizing behavior via adaptive, multimodal interfaces, neuromodulation, nutritional intervention, and robotic platforms," said Dr. Tad Brunyé, the center's Scientific Manager and senior cognitive scientist on NSRDEC's Cognitive Science and Applications Team. "This objective is accomplished through fundamental and applied interdisciplinary research to inform the design and development of next-generation support and augmentation systems, enhancing future Soldier capabilities and performance during kinetic operations."

"A core objective of the center is to enhance situational understanding and decision-making by characterizing Soldier cognitive capabilities and limitations in complex future environments," said Mahoney. "We do this by building strong foundational science and then translating this to more relevant environments, operational tasks and stressors in our virtual environment laboratories. This helps to ensure that by the time we get to testing in field environments we have identified the most promising methods, metrics, and strategies to measure, predict and optimize performance."

CABCS also aims to enhance Soldier performance through science-based guidelines for the development of technology and Soldier interaction with technology.

"The idea here is that we design future technology to work for the human, rather than fitting the human to a new technology," said Mahoney.

NSRDEC and Tufts will also investigate individual and team interaction and performance.

"The ability to quantify individual Soldier or small team situational understanding, decision-making and readiness across a range of complex future operating environments, mission scenarios, and physical and emotional stressors allows us to develop valuable predictions of performance in future situations," said Mahoney.

Both Taylor and Mahoney are excited about the center's possibilities.

"The center brings together a multidisciplinary group of world-renowned experts in the fields of cognitive science, psychology, neuroscience, computer science, robotics, engineering, linguistics, and nutrition to push the state of the science on measuring, predicting and enhancing cognitive capabilities and human-system interactions for individuals and teams working in naturalistic high-stakes environments," said Mahoney. "The research focus for the center is the dismounted Soldier, but certainly data and knowledge products developed will have the potential to make a significant impact on law enforcement, emergency first responders, and the medical community, as well."

"What the center has done is made opportunities available to bring together scientists from different disciplines and begin conversation, which will, I believe, lead to even more exciting research," said Taylor.

# Outside the Box

## Thinking differently to keep Soldiers protected

By Susan L. Follett, Army AL&T Magazine

In his 13 years in acquisition, Robert DiLalla has played a big role in keeping Soldiers safe: as an engineer matrixed to the product manager for Soldier protective equipment (PM SPE) in the [Program Executive Office \(PEO\) for Soldier](#), he supported the procurement of 30,000 Interceptor body armor vests in one month, and helped the program manager with the procurement of more than a million sets of Improved Outer Tactical Vests and 150 explosive ordnance disposal suits. He also had a hand in introducing female body armor and facilitating the transition of all body armor from the universal camouflage pattern to the operational camouflage pattern.

More recently, he and his team at the [U.S. Army Natick Soldier Research, Development and Engineering Center \(NSRDEC\)](#) developed the Ballistic Combat Shirt (BCS), an integrated armored shirt that offers ballistic protection to the chest, upper arm and neck areas. Unlike tactical or concealable flexible armors fielded to date, the BCS is a comfortable, sized-to-fit athletic-style outer garment that could be worn in place of the current Army Combat Shirt (ACS). It's cooler and lighter than the current Interceptor Body Armor components and the ACS, and it improves range of motion, enhances marksmanship and reduces bulk while maintaining a high level of ballistic protection.

"The greatest satisfaction in being a part of the Army Acquisition Workforce is seeing how the work that we do impacts the Soldier," said DiLalla, supervisory general engineer and team leader for the Infantry Combat Equipment Team (ICET). "Whether it's a knowledge product that influences new requirements, a new test method to better characterize performance or a novel product, it all helps shape the end items that the Soldier uses. Seeing Soldiers wear and use the items we work on is an extremely rewarding feeling."

As the leader for ICET, he manages two groups of scientists and engineers. One group executes Army science and technology projects in ballistic and blast protection, and the other provides matrix support to the [Marine Corps Systems Command](#) in procuring protective products, individual clothing and equipment. "ICET plays a critical role in supporting Soldiers and Marines from a science and technology and development and engineering standpoint," DiLalla said. "We have the ability to influence products and systems currently fielded and planned for the next generation."

The BCS was developed through a technology enabled capability demonstration (TECD) focused on force protection for Soldiers and small units, one of five TECDs managed by the [U.S. Army Research, Development and Engineering Command](#), NSRDEC's parent command. For his efforts, DiLalla earned the FY15 Maj. Gen. Harold "Harry" J. Greene Award for Innovation in the individual civilian category.

### PROGRESS IN PROTECTIVE GEAR

In developing the BCS, researchers thought of the Soldier as a mobile weapon system and collaborated with nontraditional sources of armor,

including the athletic apparel industry. The result was a design that resembles something a hockey or football player might wear.

DiLalla wants to see that kind of unconventional thinking take root. "As team leader, I want to encourage the great minds on my team to think outside the box. I want them to know that they are capable of doing something novel and revolutionary," he said.

He has his dad to thank for getting him started in a military career. "While I was an engineering student [in college], my father—who is an Army veteran—told me about an Army laboratory in Natick, Massachusetts, that developed all sorts of cutting-edge technology. Intrigued by what he told me, I found a website, called the base number and found out that there were job opportunities for students." One month later, he was working at NSRDEC.

"I got to experience what the Army Acquisition Workforce was all about, and I thought it was cool that all of these engineers and scientists were working on new technologies that one day could benefit Soldiers," he said. "I knew from that point on I wanted to work for the Army upon graduation." He spent one more summer at NSRDEC before being hired full time in 2003.

He noted that his work for PM SPE, from 2008 to 2012, "was one of the most profound experiences in my career. I was working on items that were literally being developed, procured and immediately fielded to Soldiers deploying to Operation Enduring Freedom and Operation Iraqi Freedom." He was involved with all technical aspects of the acquisition development life cycle for both the Interceptor Body Armor and the Soldier Protection System programs. "I got to experience firsthand what I had learned through my acquisition training."

He also noted the contribution of two mentors. "Ken Ryan, chief of the Warfighter Protection Branch, is my current supervisor and was also the first engineer I worked for fresh out of school. He has taught me over the years how to become a better engineer and civil servant. Without a doubt, I wouldn't be the engineer or manager I am today without the support he has provided to me over my career."

He added, "I also have to mention Lt. Col. Craig Fournier, who empowered me to think out of the box and allowed me the flexibility to pursue new, innovative ideas. He also taught me a lot about the uniformed side of the Army." Fournier is currently the product manager for petroleum and water systems in the [PEO for Combat Support and Combat Service Support](#). "During the first five years that I worked for the Army, I didn't really work directly with anyone in uniform," DiLalla said. Fournier "took the time to teach me a lot about Army command structure, staff functions, etc. In addition, he was a scientist who previously had worked at NASA as a contractor. He was a problem-solver and a good manager."

*This article was originally published in the October – December 2016 issue of Army AL&T magazine.*

Robert DiLalla shows how a Soldier would wear the Ballistic Combat Shirt for lightweight ballistic protection to the chest, upper arm and neck areas. The armored garment is designed as an alternative to the current Army Combat Shirt.



Photo: David Kamm, NSRDEC Strategic Communications



During a ceremony at the Orangeburg, New York, Reserve Center, on Sept. 10, 2016, Col. Dean Hoffman, right, presents Staff Sgt. Frankie Hernandez with the Advanced Combat Helmet that saved his life while he served in Afghanistan.

Photo: U.S. Army

# Life-saving Technology

## Helmet that kept him alive returned to Soldier

By C. Todd Lopez, Army News Service/WASHINGTON (Sept. 13, 2016)

Staff Sgt. Frankie Hernandez might not be around today were it not for his Army-issued advanced combat helmet.

On Saturday, Sept. 10, Hernandez was reunited with the helmet that saved his life as part of [Program Executive Office - Soldier's](#) "Personal Protective Equipment Returns" program. Hernandez, an Army Reservist, is a platoon sergeant with the [668th Engineer Company](#) out of Orangeburg, New York.

Four years ago, on May 18, 2012, while on deployment to Afghanistan, Hernandez was driving an up-armored [D7 bulldozer](#) in Afghanistan during an operation to build a road that would serve a U.S. Army infantry unit.

"It was in the afternoon, closer to the end of the evening," Hernandez remembered. "It was towards the end of the mission

when we came to a point where we needed to adjust the direction we were going."

Hernandez stepped out of his up-armored bulldozer to consult with two Army infantry officers who were leading the way on how to proceed with the construction mission. They had come to a swampy area and were trying to determine the best route of approach to continue building the road.

While he was consulting the map with the infantry captains, they heard a loud noise coming from the engine compartment of the bulldozer. All three turned to look.

"The captain that was on my right asked me what it was," Hernandez said. "As I turned to answer – I don't remember what I was going to say to him – I felt the impact on my helmet, and on my head."

Hernandez had been fired upon, but his advanced combat helmet had stopped the bullet from hitting his head.

"I was kind of numb. I didn't know what had happened," Hernandez said. "So I told the captain to my right, I told him, 'I think I got hit.'"

The captain confirmed for Hernandez that he'd been hit on the helmet. At that point, the men dropped to the ground and sought cover on the other side of the bulldozer. Hernandez called for the other bulldozer to pull up to provide additional cover. An infantry captain called for gun support.

Today, Hernandez finds it hard to describe exactly what was going through his mind after being hit by gunfire.

"One second you're normal talking he said. And then the next your whole body goes numb. You get like a ringing sensation in your ear. ... I thought about a lot of things: family, friends, my Soldiers. Everything was going through my head at the same time."

One thing Hernandez knows for sure about the moments immediately after being fired upon is that his battle buddies were there for him when he needed them most.

"It felt like I was alone," he said. "Then all of a sudden, out of everywhere, I had back up," he said. "They came and they had my back and they helped me. That was such a relief."

He remembers feeling angry at being shot, but concerned for the other troops and concerned for his own welfare, because he had no idea of the degree of seriousness of his injury.

"I didn't know whether or not we were going to get back up, or get cover fire, or get support," he said. "Everything goes through your head really fast."

Hernandez received the [Purple Heart](#) in July of 2012 for the wounds he received that day.

Back home in the United States, Hernandez said, he had a fiancée, Deborah Galdames. He knew she was worried for his safety. Since Hernandez and Galdames had become a couple, Hernandez had already served two deployments. This was the third. It was the first time he had been seriously injured.

She was the first person he told that he had been shot. She wasn't pleased.

"I started picturing different things in my head, like how serious is it? Is he coming home?" she said. "Is this it? Is it ending his military career? Luckily, it's not so serious. He's okay. And he's able to continue to do what he has to do."

Galdames said that the best advice she can offer to other fiancées of service members and for military spouses is just to be there for their Soldiers to provide support and understanding.

"Even though we're together and building a life together, the military is his life too," she said. "I try to stand by his side and be there for him and be understanding."

**Hernandez is alive today because of the work of the PEO Soldier team, industry, Army scientists and engineers, and places like Army Natick Soldier Research, Development and Engineering Center, Army Research Laboratories and the Defense Logistics Agency.**

During his Afghanistan tour, Hernandez was able to return home on leave to visit his friends and family, knowing full well he would eventually have to go back, even though he had been shot. He said that was difficult for his friends and family to accept, especially his mother.

"They weren't too happy about that," Hernandez said. "But they have been with me through thick and thin since I joined the military. If it wasn't for the love and support and encouragement, I probably wouldn't have been able to come back."

For his mother's part, Hernandez said, she wanted to know why he had to return. She asked if he could get out of it somehow. He told her that he couldn't, that he had to go back.

For Hernandez, serving in the Army was about more than a fulfilling a contract, or earning a paycheck – it had to do with his brothers in arms.

"It has to do with the guys I go back to," he said. "That's it."

When protective equipment like an advanced combat helmet or an enhanced small arms protective insert fulfills its role in combat – by taking fire – Program Executive Office (PEO) Soldier brings it back to the U.S. to evaluate how well the gear performed.

During the Sept. 10 presentation ceremony at the [Orangeburg Reserve Center](#), the Army returned the helmet to Hernandez. His fiancée and several members of his unit attended the event. Members of the 668th chain of command were also part of the ceremony.

Col. Dean Hoffman, the program manager for [Soldier Protection and Individual Equipment](#), part of PEO Soldier at Fort Belvoir, Virginia, said that such events remind Soldiers of the value of their personal protective equipment.

"When we do a ceremony like this, what it does is it says, one, you're going to get the best equipment the Army can provide, and two, that it works," Hoffman said.

"And that's the big takeaway. But you've got to wear it and use it to your advantage, with that same heart and dedication we saw with Sergeant Hernandez. He's been shot, been through two improvised explosive devices, but he still continues to be in the fight. He does what he loves."

Hoffman said that Hernandez is alive today because of the work of the PEO Soldier team, industry, Army scientists and engineers, and places like [Army Natick Soldier Research, Development and Engineering Center](#), Army Research Laboratories and the Defense Logistics Agency.

"Everybody in the lifecycle plays a key role," Hoffman said. "We can't do it alone. We need that total team working together to provide the best equipment."

# Harnessing Excellence

## Army patents blast debris protective device

By Jane Benson, NSRDEC Public Affairs/NATICK, Mass. (Oct. 7, 2016)

Engineers and designers at the [U.S. Army Natick Soldier Research, Development and Engineering Center](#) have patented a blast debris protective harness.

The harness is worn outside the pants. It was designed to protect the groin and femoral artery from blast debris and to prevent debris from embedding in and around the groin. The problem was so severe that repeated surgeries were often needed to remove the debris, which lead to extreme discomfort, as well as health and hygiene issues. The harness has since been adapted to also provide fragmentation protection.

Kristine Isherwood, an NSRDEC mechanical engineer, was the overall project lead and Cara Tuttle, an NSRDEC clothing designer, was the design lead. NSRDEC's Blake Mitchell, Annette LaFleur, David Brantley and Magdalena Mulherin also worked on the project/patent.

Isherwood explained that a joint urgent operational needs statement was issued for blast debris protection. As the [Product Manager Soldier Protective Equipment](#) evaluated commercial-off-the-shelf solutions to meet the need, NSRDEC went to work developing something from scratch. NSRDEC evaluated different under-trouser, within-the-trouser and over-trouser designs before choosing the harness.

"The protection that existed before was letting debris in because it wasn't fitted close enough to the body," Tuttle said. "Soldiers weren't wearing it often enough, and it didn't come down inside of the leg to protect the femoral artery."

"The harness-type design, which was patented earlier this year, turned out to be the most effective," said Isherwood.

"Within the outer shell, the multiple layers of Kevlar have seam allowances that alternate as they overlap," said Tuttle. "A layer overlaps in one direction, then the next layer overlaps in the opposite direction, and it keeps alternating. This creates a better barrier for small frags – which would have to zigzag through all these layers to get through. That's not going to happen."

"By not stacking the seams, it creates a convoluted path," said Isherwood.

The resulting design hugs the body without hindering movement or range of motion.

"Fit, material and acceptability to the Soldiers are key," said Tuttle. "We partnered with the Human Factors Team and the Anthropology Team to get the best fit."



Photo: David Kann, NSRDEC Strategic Communications

"It was challenging to add layers and area of coverage without impacting movement," said Isherwood. "Whether you had to climb in a window or kneel, it needed to stay in place, but allow full range of motion. The uniqueness of this design is that it's stable but moves with you."

"There are other design features, as well, such as easy access to the pockets," said Tuttle. "There are buckles that allow for easy doffing and donning. You can just snap it on and off. There's adjustability on the straps and the buckles, which gives you a nice, snug fit."

Isherwood and Tuttle are dedicated to improving quality of life and safety of the warfighter.

"I worked in the apparel industry for a number of years before coming to Natick," said Tuttle. "There is nothing in the industry quite like what we do here at Natick. We are helping to protect the men and women who are protecting our country. Our work can improve their quality of life and has the potential to save lives. It's an amazing experience."

"Protecting our Soldiers is what motivates me every morning," said Isherwood. "They are volunteering to be put in harm's way, so anything I can do to protect them without compromising their effectiveness is the goal. That's what we are trying to do every day."

As with many protective items developed by NSRDEC, the innovation will not only benefit the warfighter as a component of the new Soldier Protection System but in the future may be licensed for use by first responders.

# Aging Shelters?

## Carbon composites may be the answer

By Barbara Romiti, USAMMDA/FORT DETRICK, Md. (Oct. 17, 2016)

After more than 20 years in the field, rigid wall shelters, an integral part of Army field hospitals, are starting to show their age. There are problems with stability, transportation issues and the need for more energy efficiency. The [Army Medical Materiel Development Activity](#)'s Medical Support Systems Project Management Office has found a solution.

A rigid wall shelter starts out as a container that is 20 feet long, 8 feet high, and 8 feet wide and unfolds to shelter that is triple that size, providing a floor, a ceiling and four walls. It is a very efficient design, which maximizes available floor space, and it can be set up by four to six people in less than an hour. However, because the rigid wall shelter is made of aluminum, which enables the shelter to be lightweight, it has its downsides.

Working in coordination with Melvin Jee and Roger Masadi of the Tactical Shelters Team, [Army Natick Soldier Research, Development & Engineering Center](#) and also Core Composites, a division of ROM Development Corporation in Bristol, Rhode Island, the MSS PMO will use a carbon composite retrofit kit to refurbish the current shelters and address the deficiencies.

"Carbon composite [carbon fibers coated in resin] is two times stiffer and, overall, the shelter will be 20 percent lighter than the current aluminum design," said Richard O'Meara of Core Composites, a division of ROM Development Corporation.

The rigid wall shelters are used for the core parts of Army field hospitals, housing the operating room, the C-arm (portable radiology), and the laboratory, where the floor must be stable and free of vibration.

According to Jaime Lee, MSS PMO product manager, the kit will address a constant problem for rigid wall shelters: instability. "We kind of fixed it by placing scissor-jacks underneath the middle section of the shelter," Lee said. "This works for a while until the ground settles."

The kit provides a single fixed floor with two expandable floors. Constructed with carbon composite, they are double the stiffness of the previous floors, which makes them less susceptible to unwanted vibration.

Also included are four vertical corner posts fabricated out of carbon composite. Each post only weighs 50 pounds, as opposed to the current aluminum post, which weighs 71 pounds. These posts bear the load of additional containers stacked on top of the shelter.

Currently, each aluminum corner post is designed to support 100,800 pounds, which allows for the shipping containers to be transported in a six-high stack. The carbon composite corner posts are designed to meet the current transportation standards, which require each corner post to support 211,675 pounds in order to withstand the weight of eight shipping containers resulting in a nine-high stack. This increased capability improves transportation efficiency and will reduce the cost of shipping.

Additionally, when taken as a whole, the reduced panel and corner post weights serve to lower the overall empty shelter weight by several hundred pounds. This allows for an increase in the amount of cargo the shelter can carry.

According to O'Meara, the posts are also much more corrosion-resistant than the current aluminum posts, which corrode when in contact with the steel corner fittings.

**"Carbon composite [carbon fibers coated in resin] is two times stiffer and, overall, the shelter will be 20 percent lighter than the current aluminum design."**

Richard O'Meara, Core Composites

In the past, shelter refurbishment has involved more of a facelift approach: the floors are redone, and the shelter is painted and resealed. Now, Core Composites, a division of ROM Development Corporation, will make the retrofit kits and send them to Defense Depot Hill Utah. There, the original shelter will be disassembled and more than half of the major components will be replaced using the new kit.

Also, since current shelters are not energy efficient, Tnemec's Aerolon 945 will be applied to the ceiling as either a sprayed-on coating or a peel-and-stick "wallpaper," which will provide better insulation, thereby reducing heat and cold loss through the top of the shelter. This will double the insulation efficiency of the shelter.

According to Lee, the retrofitting of 24 shelters using FY16 funding will begin in fiscal year 2017 and continue with 24 shelter retrofits per year, subject to the availability of funding.

"We are procuring the kits now as an engineering change proposal to the original shelter," said Lee. "In two years, we will reassess and do a cost-benefit analysis to see if we should just replace the entire shelter with a carbon composite shelter. It might be just as cost-effective to stay with the kit."

Either way, carbon composites are the future. Whereas aluminum is a limited resource with inadequate capabilities, carbon composite is a more abundant, stronger and lighter building material. Carbon composite also has more potential applications and producing it leaves a smaller carbon dioxide footprint.

A silhouette of a soldier in profile, facing right, holding a rifle with a scope. The soldier is positioned in the lower-left foreground. The background is a large, waving American flag with stars and stripes. The text 'Veterans Day' is overlaid on the right side of the flag.

# Veterans Day

November 11, 2016