

June 2016

NSSC This Month

U.S. Army Garrison Natick Public Affairs Office



On Ice

Natick provides shelter for Navy at Arctic Circle



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



Commander's Corner

Lt. Col. Ryan Raymond
USAG Natick Garrison Commander



Table of Contents

June 2016

NSSC This Month

Defining Teamwork



Teamwork is defined as *the combined action of a group of people, especially when effective and efficient* – something I am seeing more of every day with Team Natick. You can see it in the way our products complement one another to maximize the collective advantage to the deployed Soldier. It is imperative that we recognize both that the whole is greater than the sum of its parts, and that the whole is incomplete without any of the individual parts.

We work hard at Natick to take care of our Soldiers. We also have the opportunity to play hard. We surveyed our workforce about recreational opportunities on the installation, and we listened to your comments. We have opened up access to Lake Cochituate on Wednesdays and Fridays through August. Swimming lessons start July 11 at the Gibson Pool and – as always – the Nino Dome hosts the NSSC Intramural Softball League. For more information about what FMWR is offering, please contact them at ext. 4791.

It seems like just yesterday that my daughter started school for this year, and now she is on summer vacation. That means vacations, trips, golf outings, grilling and more. Please be careful. Check for ticks, use bug spray and sunscreen and enjoy the great times that summer brings.

Thank you for what you do every day to make sure that our Soldiers, Sailors, Airmen, Marines and Coast Guardsmen have the advantage against all enemies. Please keep those serving in harm's way in your prayers. Be safe during the 4th of July holiday. We are One Team committed to the Soldier's success. Keep bringing that spirit of teamwork every day. We count on you.

Lt. Col. Ryan Raymond
USAG Natick Garrison Commander

NSSC This Month

NSSC
Senior Mission Commander
[Brig. Gen. Thomas H. Todd III](#)

Garrison Commander
[Lt. Col. Ryan Raymond](#)

Command Sergeant Major
[Command Sgt. Maj. Erika M. Gholar](#)

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[John Harlow](#)

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About this newsletter
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To subscribe to *NSSC This Month*, please contact Bob Reinert at robert.j.reinert.civ@mail.mil.

On the Web: www.army.mil/natick

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On Ice - p. 8

NSSC News Briefs.....4

Focal Point.....5

New USARIEM commander...6
Phua takes over for Eccles in June 13 ceremony

New Horizon.....7
USARIEM Soldier receives research award

On Ice.....8
Natick provides shelter for Navy at Arctic Circle

Sipping Fuel and Water, Cutting Waste.....12
More efficient base camps of the future

Jumpin' Jennifer.....14
Natick civilian attends Airborne School

Working with West Point.....16
NSRDEC collaborates with USMA

Speaking Their Language.....18
Working on food safety for Soldiers

Predicting the Future.....20
Matching recruits to MOSs

Fighting Zika.....22
DoD adds funding to enhance surveillance

NSSC News Briefs ...

Barber shop reopened



The Barber Shop, located in the basement of Carney Hall (Bldg. 1), has been reopened for business. Normal business hours are: Tuesday, Wednesday and Thursday, 10:30 a.m. to 4 p.m.

ACS Financial Readiness

Free and confidential one-on-one counseling sessions are available for active-duty service members and their families through an agreement with the Financial Planning Association of Massachusetts. They can assist with planning for retirement, paying for college, buying a home, managing debt and credit, managing a spending plan, and more. To schedule a session with a certified FPA financial planner, contact Diane Magrane, ACS Financial Readiness Program manager, at diane.k.magrane.civ@mail.mil.

Mobile library on-site

The [Morse Institute Library's Bookmobile](#) visits

the installation every first and third Wednesday of the month.

The Bookmobile is always located in Parking Lot B from 11:30 a.m. to

1:30 p.m. There is a selection of

popular fiction books, non-fiction books, DVDs and audio-books. They will also do their best to fulfill special requests, such as a

particular title, author, subject area or genre type.



Hunter Auditorium

Construction will begin July 1 and will continue through the end of September. During this time period, Hunter will not be available for use. If you have an upcoming event that requires a large seating capacity, contact Russ Stokes, DPW director, at ext. 4409, or russell.e.stokes.civ@mail.mil, to see what space is available for use at that time.

Flag status

If you are looking for information about the flag status on the installation, go to the NSSC Portal home page at <https://natiportal/default.aspx> and click on the small waving flag next to "Today's Date." Or you may go directly to the NSSC Flag Status Page at https://natiportal/garrison/DPTMS/Lists/Flag_Status/AllItems.aspx, to see why and when it is being displayed at half-staff, along with the proclamation authorizing it.



Photo: David Kamm, NSRDEC Strategic Communications

Cutting the cake to commemorate the Army's 241st birthday in a June 14 celebration are, from left, Lt. Col. Michael Boye, Natick Soldier Systems Center's oldest Soldier; Lt. Col. Ryan Raymond, United States Army Garrison Natick garrison commander; Leah Wilson, NSSC's youngest civilian; and Command Sgt. Maj. Erika Gholar, USAG Natick command sergeant major.

GEMS Summer Program

USARIEM and NSRDEC will be sponsoring the GEMS program once again this summer at Natick Soldier Systems Center.

The one-week, paid extracurricular science education program enables students to experience science in a real laboratory setting. Participants will conduct interesting biology and chemistry experiments, receive interactive lectures on engineering, mathematics and new technology, and tour NSSC facilities to learn about exciting, ongoing research efforts.

GEMS I: Session 1, July 5-8; Session 2, July 11-14

GEMS II: Session 1, July 18-21; Session 2, July 25-28

GEMS III: Session 1, Aug. 1-4; Session 2, Aug. 8-11

If you have a student who qualifies and is interested in participating, please email usarmy.natick.medcom-usariem.mbx.usariem-gems@mail.mil for more information.

Main Gate closure

Continuing through Sept. 30, the Main Gate entrance will be closed for construction. During this time: All traffic will enter the installation using the Service Gate located at the end of General Greene Avenue; between the hours of 6 a.m. and 6 p.m., all traffic will exit the installation using the Main Gate; between the hours of 6 p.m. and 6 a.m., all traffic will exit the installation using the Service Gate; weekend entrance and exit will be through the Service Gate. Please direct all questions regarding the entrance/exit plan to the Law Enforcement Desk at ext. 4201.



Photo: John Harlow, USAG Natick Public Affairs



Photo: John Harlow, USAG Natick Public Affairs

June saw plenty of physical activity at Natick Soldier Systems Center. Below, Soldiers and civilians take part in a morning run June 14 as part of the Army Birthday celebration. Above, a group of Soldiers prepares for the June 19 Tour de Natick bike ride. From left are Pvt. 2 Collin Mackay, Pvt. 2 Dylan Chitty, Staff Sgt. Eric Murray, Pvt. 2 Khalid Rhoden and Pvt. 2 Derek Ficken. Pvt. 2 Ulises Pacheco also did the ride. At left, Command Sgt. Major Erika Gholar throws out the first pitch June 7 to begin the NSSC Intramural Softball League's 2016 season.



Photo: Bob Reiner, USAG Natick Public Affairs

USARIEM welcomes new commander

Phua takes over for Eccles in June 13 ceremony at Natick

By Mallory Roussel, USARIEM Public Affairs/NATICK, Mass. (June 16, 2016)

Col. Raymond L. Phua became the 21st commander of the [U.S. Army Research Institute of Environmental Medicine](#) in a June 13 change of command ceremony.

Phua took over from Col. Thomas G. Eccles III, M.D., as [Maj. Gen. Brian C. Lein](#), commanding general, [U.S. Army Medical and Materiel Command](#), presided. Phua previously served as director of the [Performance Triad](#), Office of the Surgeon General. Eccles moves on to [Joint Base Lewis-McChord](#), in Tacoma, Washington, where he will become the I Corps surgeon.

Lein pointed out that in Phua, USARIEM was getting a commander with "an impeccable resume."

"Col. Phua's career started as an enlisted Soldier," Lein said. "After receiving his degrees in physical therapy, he has not looked back. Multiple previous commands in combat support hospitals, combat operational stress control units and other tactical and fixed medical units have prepped him well to assume this leadership position. His most recent assignment as the lead for the Performance Triad for the OTSG clearly sets up his research priorities for this command."

Phua said he was excited to be a partner of USARIEM and "perpetuate its history of distinguished service and accomplishments."

"I'm honored this day to serve our country, the United States Army, the Medical Research and Materiel Command and the professionals and families of USARIEM," said Phua. "And I will use every bit of my energy, effort and authority as commander to fulfill my responsibility for the well-being of this Army family, the stewardship of our assigned resources and accomplishments of this institute's assigned missions."

"Maj. Gen. Lein, I appreciate this opportunity to lead, motivate and inspire the future of Army research. I am proud to join the Natick Soldier Systems Center community, the MRMC family, and your command team."

Lein recognized Eccles' efforts at USARIEM during a busy period in its history.



Col. Raymond Phua, center, accepts the unit colors from Maj. Gen. Brian Lein to assume command of the U.S. Army Research Institute of Environmental Medicine.

Photo: David Kann, NSRDEC Strategic Communications

"Under Col. Eccles' leadership, this command has accomplished a tremendous amount of research for the Soldier," Lein said. "As our Army has finally moved toward gender integration into all specialties, the critical research into the Physical Demands Study was instrumental for the [U.S. Army Training and Doctrine Command](#) and our Army's validation of physical skills necessary for Combat Military Occupational Specialties. This [Occupational Physical Assessment Test](#) is being validated across the Army today as the baseline requirements for our Soldiers."

Phua also saluted Eccles' service at USARIEM.

"You established and nurtured partnerships that span across the enterprise and throughout the Department of Defense," Phua said. "You've set a high standard as a command family team, and I know you'll do great things at Joint Base Lewis-McChord. I look forward to building upon the strong foundation you've established."

Eccles noted that USARIEM made strides over what he called the "busiest and most productive two years in USARIEM's history." He mentioned the research on Combat MOSs

and the Chief of Staff of the Army's first priority: readiness.

"In the AMEDD, we've always known that health is a force multiplier," Eccles said. "Healthy Soldiers are ready Soldiers. The work you do takes that one step further. Your research in nutrition, injury prevention and recovery, environmental health and protection and real-time physiologic status monitoring not only protects and improves Soldiers' health; it makes Soldiers better prepared for every phase of any fight. The work you've done to understand the physical demands of Combat MOSs has been central to the Army's efforts to get the right people in the right jobs regardless of gender, further improving the readiness of the force."

In closing his remarks, Lein praised the people who work at USARIEM.

"Our Chief of Staff of the U.S. Army has stated clearly that readiness is our number one priority," Lein said. "Our research must be wholly focused on military relevance and advancing our Soldiers' readiness for the uncertainties of the future. I am confident this command has the right leadership, Soldiers and civilians to meet our chief's requirement."

Maj. Joseph Kardouni, director of the [U.S. Army Research Institute of Environmental Medicine's](#) Total Army Injury and Health Outcomes Database team, received the [Army Medical Specialist Corps](#) New Horizon Research Award on May 6 at [Fort Sam Houston](#) in San Antonio, Texas.

The New Horizon Research Award recognizes researchers in the early stages of their careers who have been in the research field for less than five years.

"I do not necessarily talk about myself very much," Kardouni said with a laugh. "But it felt great to receive recognition from my peers and seniors who have been in the research field longer than I have."

Kardouni began his work as director of the TAIHOD in 2013. The TAIHOD is a research database that joins multiple types of personnel and health datasets from various [Defense Department](#) agencies in order to analyze the impact of injuries on missions. The database can evaluate relationships between the risk factors Soldiers are exposed to and the long term health and injury effects they experience.

"What we are trying to do with the TAIHOD is to quantify or at least understand the magnitude of injuries that pertain to Soldiers," Kardouni said. "We are defining how types of injuries may affect Soldiers in the long term, the disability rates and outcomes over time. We are trying to find out how these injuries impact readiness, find factors that may be modifiable and learn how to address these injuries before they become chronic."

He received the award for his overall accomplishments and contributions to research and clinical investigation. His research has included studies on chronic low back pain, shoulder injuries, the relationships between musculoskeletal injuries and concussions, mild traumatic injuries and mental illness, and stress fractures.

Kardouni was nominated for the award by Maj. Richard Westrick, the deputy chief of USARIEM's [Military Performance Division](#). He highlighted that Kardouni was "emerging as a leader in medical research and a great representative for Army Medical Specialist Corps research efforts."



Photo: Maj. Amelia Duran-Stanton, USARIEM

On May 6 at Fort Sam Houston in San Antonio, Texas, Col. John Stang presented Maj. Joseph Kardouni, director of the U.S. Army Research Institute of Environmental Medicine's Total Army Injury and Health Outcomes Database team, the Army Medical Specialist Corps New Horizon Research Award for Kardouni's overall contributions to research and clinical investigation.

New Horizon

USARIEM Soldier receives research award

By Mallory Roussel, USARIEM Public Affairs/NATICK, Mass. (June 1, 2016)

"Musculoskeletal injury is well recognized as one of the major threats to military readiness and Maj. Kardouni's research efforts are aimed at better understanding and reducing that threat," Westrick said. "Maj. Kardouni's research efforts will provide data that military commanders and healthcare providers can use when making informed decisions regarding the management of Soldiers with musculoskeletal pathology."

Kardouni, who has been in the Army for about 17 years, was a physical therapist before he began his research career. He worked for four years as a medical officer in [3rd Special Forces Group](#) before he went back to school for long-term health education training from 2010 to 2013 for a doctorate in biomechanics.

"I got more into research when I started working with the guys in Special Forces," Kardouni said. "We were really focused on a lot of the lower extremity injuries. Soldiers go everywhere on their feet, so we pay a lot of attention to that. But I was noticing that a lot of the Soldiers had upper extremity issues, and I wanted to expand some of the research and tools we use to help address those injuries. That is why I went back to get my doctorate."

"I think the New Horizon Research Award shows that USARIEM is dedicated to research. We are a small installation, and a lot of the people in the Army may not know that we exist. However, a lot of the work we do shapes the way medicine is approached in the Army. It is great to get some recognition for the work that comes out of here."



On Ice

Natick provides shelters for Navy at Arctic Circle

By Jane Benson, NSRDEC Public Affairs/NATICK, Mass. (June 6, 2016)

U.S. Army shelters perform well on land, but that just may be the tip of the iceberg, or rather the tip of the floating ice sheet.

The Army Natick Soldier Research, Development and Engineering Center provided shelter support to the Navy during its biannual Ice Exercise in the Arctic Ocean. NSRDEC shelters were used as part of a temporary station on a floating ice sheet during the exercise called ICEX. The Navy used the NSRDEC shelters for billeting, diver exercises and emergency shelter.

The U.S. Navy's Arctic Submarine Laboratory is the lead organizer for the arctic exercise, which is held by the Navy as a way to research, test and evaluate operational capabilities. During the exercise, Ice Camp SARGO serves as a temporary command center, including shelters and other infrastructure to support the exercise.

"ICEX is the U.S. Navy's RDT&E exercise used to validate and assess operational readiness of the submarine force in the Arctic, while continuing academic research and military training in extreme cold conditions and the undersea environment of the region," said Theodore Goda, the Navy's ICEX Program Manager, at the Undersea Warfare Development Center detachment Arctic Submarine Lab.

"Every two years the Navy holds an event to basically look at their Arctic readiness and to do some evaluations of the projects and equipment," said Clinton McAdams, Science and Technology Strategic Integration lead at NSRDEC. "The shelters they've used in the past typically took a week or two to set up, so the Navy reached out to us and asked if we had something they could set up more quickly. We were able to get them our TEMPER air-supported shelters."

NSRDEC provided the Navy with shelters featuring airbeam technology. Natick was one of the pioneers of airbeam technology, which consists of inflatable, high-pressure arches. The arches replace metal frames in tents and can be deployed rapidly. The airbeams come in small, lightweight packages. Large shelters and shelter complexes can be set up quickly and with fewer personnel than metal frames.

Also, in the case of a storm, airbeam shelters may be safer than metal or wooden frame shelters, because the airbeams tend to bend and pop back up rather than break apart or collapse.

"I saw this as a great opportunity for our shelters to be utilized and evaluated in an extreme environment by the Navy," McAdams said. "This opportunity also allowed us to showcase some of our products to a whole new audience while we gained valuable information on new ways our shelters can and will be utilized in the Arctic."

"NSRDEC provided multiple airbeam shelters and forced air heaters that were tested to operate in Arctic conditions," Goda said. "At ICEX 2016, the Arctic Submarine Laboratory was able to conduct an operational assessment of the form, fit and function of the shelters and heaters. The shelters were used for berthing, watch standing, and to support training and RDT&E projects on a shifting ice floe approximately 200 (nautical miles) north of Prudhoe Bay, Alaska. Of particular interest to ASL was the capability to deploy the airbeam shelter rapidly with minimum manpower and equipment requirements."

Continued, next page



Photo: MC2 Tyler N. Thompson, U.S. Navy

John Viggato, Assistant Product Manager for Shelter Systems, [Product Manager Force Sustainment Systems](#), or PM FSS; Ariana Costa, Program Integrator, NSRDEC's Expeditionary Basing & Collective Protection Directorate, or EB&CPD; and NSRDEC's Primo Borelli traveled to the Arctic to help with the setup of the shelters.

The Navy was pleased with the ease of setting up and using the shelters as well as their performance, particularly given the extreme cold and wind.

“The U.S. Navy's Arctic Submarine Laboratory is grateful for the collaboration with the U.S. Army's Natick Soldier Research, Development and Engineering Center on shelter and heating capabilities for the austere arctic environment of Ice Exercise 2016,”

In addition to providing shelter support for the Navy, NSRDEC and PM FSS evaluated new camouflage netting.

“We evaluated a number of camouflage prototypes in support of the Ultra-Lightweight Camouflage Net System modernization effort,” said Viggato. “PM FSS has a new requirement to upgrade this legacy camouflage system, and we used Ice Camp SARGO as an opportunity for an initial look at snow pattern camouflage. We observed these prototype nets with visual cameras, as well as near-Infrared, Short-Wave Infrared, and Long-Wave Infrared sensors. The results were promising, and the team learned quite a lot about full-spectrum performance in this unique environment.”

NSRDEC's support of ICEX helped ASL carry out the exercise as well as build the foundation for future collaboration.



Photo: MCG Tyler N. Thompson, U.S. Navy

“The members from NSRDEC and PM FSS who went up to Ice Camp SARGO were able to gain firsthand knowledge of some of the difficulties an ice camp presents in terms of basing,” said McAdams. “By us sending TEMPER air-supported shelters, we were able to allow the Navy to set up the camp quicker and be able to start mission tasks more rapidly than they have been able to in the past. I see this as a great opportunity for EB&CPD and the U.S. Navy ASL to collaborate and for us to evaluate shelter technologies in an extreme arctic environment in the future.”

“We learned a lot and were also able to make some recommendations to them for future ICEX events,” said Costa. “We are planning for them to visit us soon to learn more about the technologies NSRDEC has that would assist them, including options from [Combat Feeding](#) and [Airdrop](#).”

Goda said. “The airbeam tents and forced air heaters performed well in conditions exceeding minus 20 degrees Fahrenheit, minus 45 degrees Fahrenheit wind chill, and 25 knots wind gusts.”

“The structures were used for billeting as well as a base of operations for the four dive teams that were on site,” said Viggato. “A hole was melted in the ice for the divers to enter, and the shelter was placed on top with the floor removed. This provided the dive teams with a warm, safe environment in which to surface and prepare for their dives.”

“For us, it is the first time that I know of where we have had anything like this where we are on sea ice and where we had search and rescue divers using it (the shelter) to go in and out of the water,” McAdams said. “The divers were practicing search and rescue underneath the ice. They basically used one of the shelters as a warm bay and one for an unmanned underwater vehicle and then they had one for billeting and emergency overflow.”

“The airbeam shelter was paramount to the Arctic Submarine Laboratory meeting its objective of overnighting on the ice starting on the first day of ice camp build-up, a first for the ICEX Program,” said Goda. “The airbeam tent performed well in all aspects of the operational test.”

“This event was a great opportunity for us to experience the unique environment the Navy operates in during this exercise,” said Costa. “We were happy to see that the airbeam shelters performed well in such extreme conditions.”

“While this was an excursion into an entirely tent-based camp, it was extremely successful and we look forward to additional collaboration with the Navy in future years,” said Viggato.

“It was a once in a lifetime opportunity that was truly eye opening to conditions of the Arctic,” said Borelli. “I would go back again in a heartbeat.”

“This event was a great opportunity for us to experience the unique environment the Navy operates in during this exercise. We were happy to see that the airbeam shelters performed well in such extreme conditions.”

Ariana Costa, NSRDEC

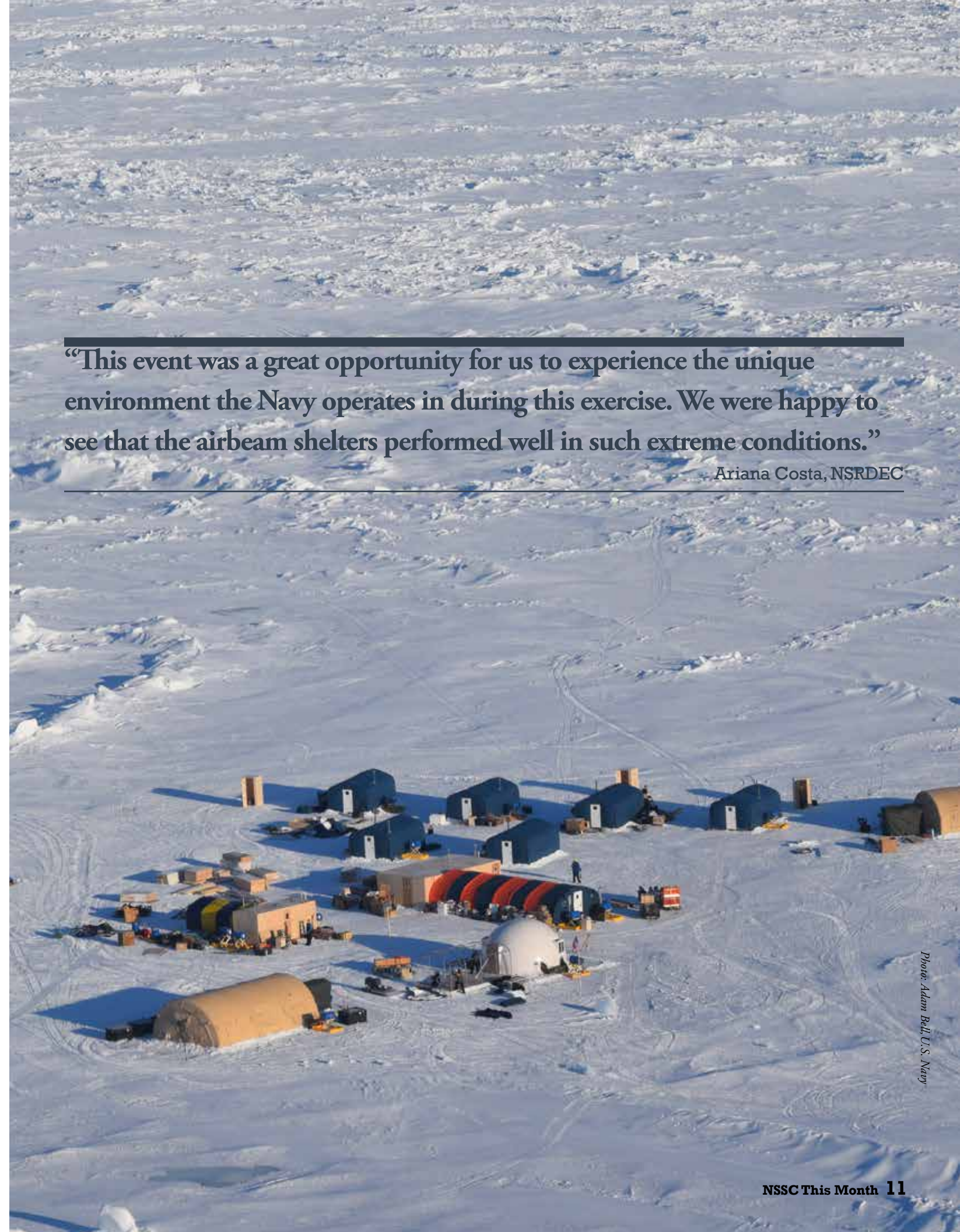
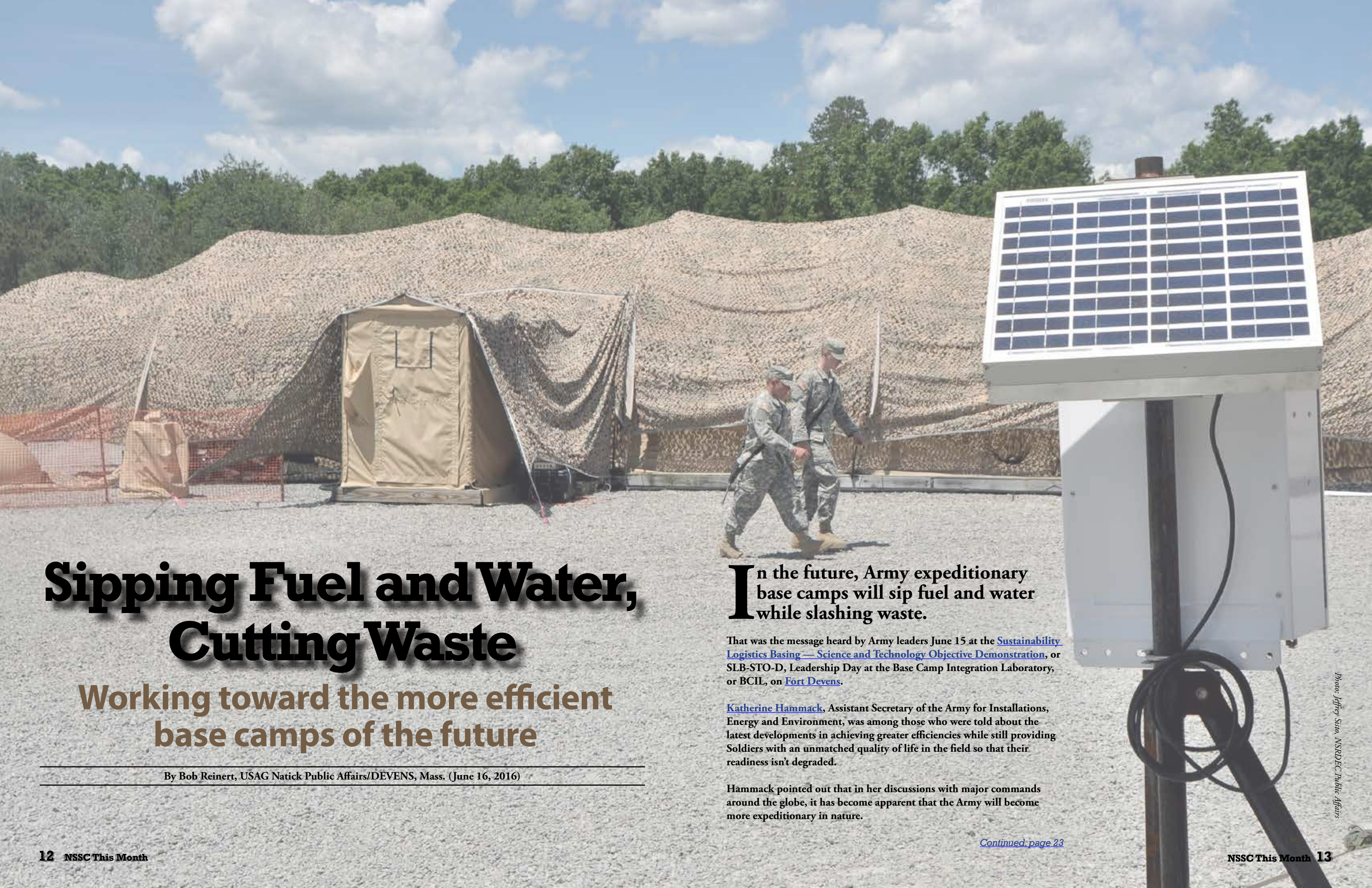


Photo: Adam Bell, U.S. Navy



Sipping Fuel and Water, Cutting Waste

Working toward the more efficient base camps of the future

By Bob Reinert, USAG Natick Public Affairs/DEVENS, Mass. (June 16, 2016)

In the future, Army expeditionary base camps will sip fuel and water while slashing waste.

That was the message heard by Army leaders June 15 at the [Sustainability Logistics Basing — Science and Technology Objective Demonstration](#), or SLB-STO-D, Leadership Day at the Base Camp Integration Laboratory, or BCIL, on [Fort Devens](#).

[Katherine Hammack](#), Assistant Secretary of the Army for Installations, Energy and Environment, was among those who were told about the latest developments in achieving greater efficiencies while still providing Soldiers with an unmatched quality of life in the field so that their readiness isn't degraded.

Hammack pointed out that in her discussions with major commands around the globe, it has become apparent that the Army will become more expeditionary in nature.

Continued page 23

Photo: Jeffrey Sina, NSRDEC Public Affairs

Jumpin' Jennifer

Natick civilian attends Airborne School

By Jane Benson, NSRDEC Public Affairs/NATICK, Mass. (June 21, 2016)

Why would an Army civilian jump out of a perfectly good airplane?

Jennifer Hunt did it to find out more about Soldier equipment and the Soldiers who use it.

Hunt is a textile technologist/materials engineer on the [Aerial Delivery Engineering Support Team](#), or ADEST, at the Army [Natick Soldier Research, Development and Engineering Center](#).

At just under 5 feet tall, Hunt is a powerhouse of dedication. To garner greater insight into her job, Hunt attended and graduated from the [U.S. Army Basic Airborne Course](#), also known as Jump School, which provides paratrooper training for the armed forces.

"I wanted to go and have the experience of using and jumping the parachute equipment I work with and inspect every day," said Hunt. "The opportunity has given me a different and fuller perspective of the work I do for ADEST and has made me better qualified to do my job."

"Jen works closely with personnel parachute systems, system parts/components and often goes TDY (government travel) for first article tests and lot inspections," said Richard Benney, director of the [Aerial Delivery Directorate](#) at NSRDEC. "Jen has rapidly become an aerial delivery subject matter expert and is well respected across the community for her knowledge, skills, abilities and total dedication to the airborne Soldier."

Hunt had wanted to go to jump school for a long time and was prepared to do the intense physical training necessary in order to be able to participate.

"Before this, I never went to the gym," said Hunt. "I never ran. To prepare for the challenges, I had to physically train for seven months, working out

five to six days a week – running, cardio and weightlifting. You have to be able to meet certain physical requirements to get in and stay in."



"I wanted to go and have the experience of jumping and using the equipment I work with every day."

Jennifer Hunt, NSRDEC

"Tower week included jumping from 34-foot towers with mock aircraft doors," said Hunt. "In full harness and equipment, we practiced how to properly exit an aircraft. We completed more PLF training using swing landing hangers. We learned techniques for handling emergency situations, parachute collisions, tree and water landings, and malfunctions."

In addition to the intensive training and preparation, you also, of course, have to jump out of an airplane.

"Jen expressed interest in attending the Basic Airborne School approximately one year ago and continued interest after getting smarter on the physical and mental challenges of the BAS – especially with no prior military experience and the knowledge that she will stick out as the only U.S. Army civilian," said Benney. "With support from the NSRDEC riggers and other military personnel at NSRDEC, Jen worked out on her own time for many months in preparation and to ensure she could pass the 18- to 21-year-old physical test easily."

"BAC was three weeks comprised of ground week, tower week and jump week," said Hunt.

"Ground week focused on proper landing – parachute landing falls (PLFs). We did PLFs from platforms of different heights and from lateral drift assemblies, which used a zip line."

Practicing PLFs and learning how to fall correctly in any direction is an important part of the training because it is key to avoiding injury.

During the course, Hunt also learned how to properly wear the parachute equipment, including the harness, the main and reserve parachute, and combat equipment. She also learned how to recover the equipment off the drop zone after the jump.

"Jump week involved completing five jumps from a C-130 aircraft using the knowledge learned over the course," said Hunt. "After completion of the jumps, we inspected all the equipment for damage and prepared the systems for repacking."

Hunt said that the young Soldiers she trained with were incredibly supportive.

"The Soldiers wanted to know why I was there," said Hunt. "When I explained my job and how I wanted to learn more about the Soldier's perspective of using the parachute equipment, they were amazing and so supportive. They appreciated why I was there. Not being familiar with military culture, they taught me a lot – like how to run in formation and properly wear the uniform, how to follow and respond to commands and address Soldiers, and many other things part of military life that, being a civilian, I was not aware of. They spent a lot of time helping me fit in."

Being a civilian and a woman made Hunt unique. Only about 10 percent of her class were women. And among the Army's women, Hunt's height and weight place her in the fifth percentile – making her one of the smallest in stature. She stands at just under 5 feet and was the minimum weight to qualify.

To do the pull-up test, or arm hang, Hunt actually had to jump to grab the bar.

"I was very nervous first going in. After passing some of the physical tests, Marines and Soldiers were fist-pumping and telling me, 'You're killing it,'" said Hunt. "Their support really helped me. It gave me encouragement."

The average age of the Soldiers with whom she attended Jump School was around 23 or 24 years. The cut-off age is 36, and Hunt, who is 41, had to get a waiver to attend.

"From all the feedback received, she nailed it and impressed the majority of her classmates," said Benney. "Many did not pass the course. I recall Jen checking in via phone after completing the first week and stating, 'Did you know I'm the oldest, the shortest and the lightest in my class of around 300?'"

Hunt was inspired by the dedication of the young Soldiers she encountered, and they were inspired by her.

"On the first jump, they had me jump out first," said Hunt. "Some Soldiers told me afterwards, 'We saw you do it, and we thought now we HAVE to do it.'"

She is also an inspiration to her colleagues at NSRDEC.

"We nicknamed her 'G.I. Jen.' She went so that she could do her job better," said Christine Charette, a textile technologist at NSRDEC. "She was doing something that people half her age do. I feel that I can learn from her experience. She is able to give us feedback now and share what she learned with the team. It just enhances what she is able to do. Her level of dedication is exceptional."

"Clearly a huge accomplishment, Jen now fully understands what it takes to be Airborne and has gained an even higher level of credibility

as part of the club," said Benney. "The knowledge of how the T-11 personnel airdrop equipment is used, the training soldiers experience, and airborne operations in the aircraft, during exit, and under canopy through landing will all be invaluable in assisting her for the rest of her career."

The importance of being able to incorporate what she learned into her daily work cannot be overstated.

"As the military liaison for NSRDEC's Aerial Delivery Directorate, I've had the opportunity to work with numerous scientists and engineers who are extremely talented and smart," said CW5 Cortez Frazier. "The theoretical knowledge that our engineers have is nothing short of amazing. However, theoretical knowledge can only take you so far when dealing with airborne paratroopers that want to know that you as an engineer can guarantee that the product or service that you have developed/tested will work as designed. What better way to earn the credibility of your customers than to actually gain the practical knowledge by jumping out of an airplane with the same products that we tell our Soldiers will work?"

"Ms. Hunt's expertise as a textile technologist directly contributes to our mission when conducting parachuting or airdrop-related mishap investigations," said John Mahon, a senior airdrop equipment specialist at NSRDEC. "The experience gained by attending Basic Airborne School and performing parachute jumps with the equipment she is subject to be analyzing will be beneficial by having firsthand knowledge of the associated environmental factors that the materials which the parachute is constructed of goes through. From ultraviolet rays through opening forces and the range of size, shape and weight of the jumpers are just some of the contributing factors that present themselves through each investigation."

"It has been the best training for me, very beneficial," said Hunt. "It was an amazing experience to get the Soldier perspective, to actually use all the equipment and see how it all interfaces and works together – things you usually don't get to see as an engineer. It really helped me to understand the equipment on a whole different level."

"Jennifer's dedication to her understanding of aerial delivery equipment by becoming an airborne paratrooper gives her that special practical knowledge required to articulate clearly a better understanding to her fellow 70,000-plus paratroopers," said Frazier.

"The airborne experience she has attained also provides Ms. Hunt a feeling of personal ownership when inspecting the components of personnel parachute systems and a more in-depth level of understanding of the whole process, which cannot be taught from any textbook," said Mahon.

Hunt saw firsthand the importance of the parachute work done by NSRDEC.

"Throughout the course, Soldiers are told by the instructors 'Trust your equipment. Trust your equipment,'" Hunt recalled. "That is what they are taught. And we, on the engineering side, our job is to make sure the equipment is safe and built correctly because that is what the Soldiers rely on. It validates what we do and the importance of the work that we do."

Inset photos: NSRDEC Aerial Delivery Directorate

Background photo: Staff Sgt. Adam C. Keith, 82nd Airborne Division Sustainment Brigade

Working with ...

West Point

NSRDEC collaborates with USMA on 'Senior Projects Day'

By Jeff Sisto, NSRDEC Public Affairs/NATICK, Mass. (May 19, 2016)

Collaboration between the [U.S. Army Natick Soldier Research, Development and Engineering Center](#) and the [U.S. Military Academy at West Point](#) yielded many innovative solutions to Soldier-performance challenges during the "Senior Projects Day" held in Natick on May 4.

The event marks the second year of collaborative research between the two organizations since formalizing a partnership in 2014 under a five-year memorandum of understanding, or MOU, established to cooperatively research topic areas that are of mutual interest and importance in the area of Human Augmentation.

The collaborative research conducted supports both NSRDEC's Soldier-focused research and the USMA cadets' senior capstone project, which culminates in a presentation to a joint USMA-NSRDEC audience in Natick at the end of the academic year.

"The capstone project development is a win-win for both organizations," said Henry Girolamo, lead, Emerging Concepts & Technologies, for NSRDEC's [Warfighter Directorate](#), who developed and manages the collaboration. "The research being conducted at USMA is viewed as complementary to NSRDEC's research, and it has the potential to provide beneficial and innovative improvements to Soldier products."

As the architect of the collaborative effort, Girolamo's original vision provided a vehicle to merge USMA academic competencies with NSRDEC's need for more Soldier-focused research, thus planting the seeds for mutual success.

"The USMA cadet teams are providing research details to NSRDEC subject matter experts, who in turn, provide constructive guidance to the cadet teams on optimal research approaches that will maximize beneficial technology solutions for Soldiers," said Girolamo.

"Prior to formalizing the collaboration in 2014, I had been working independently with USMA on various shelter projects, such as quickly erectable fighting positions and modular shelters," said

Melvin Jee, team leader, Tactical Shelters Team, [Expeditionary Basing and Collective Protection Directorate](#), NSRDEC.

Propelled by the program's successful launch in 2014, Girolamo expanded the program by adding additional research areas across multiple directorates that further align the cadets' academic competencies with more NSRDEC research initiatives, growing the total to eight capstone projects for the 2015-2016 academic year.

"The ability to make this an enterprise level program led to a greater awareness of what USMA had to offer the rest of NSRDEC and the warfighter," said Jee.

"The USMA-NSRDEC collaboration provides unparalleled opportunities for cadets to develop as engineers and leaders."

Lt. Col. Phillip Root, USMA

Research collaboration now extends across numerous topic areas, including: human augmentation, shelter technologies focused on design and development of a quickly erectable structural insulated panel (SIP) shelter, Soldier-microclimate conditioning, biomechanics-focused load carriage solutions,

anthropometric female helmet analysis, meteorological sensing in support of aerial delivery systems, rotor guards and landing chassis to improve durability in Soldier-borne micro unmanned aerial vehicles, or UAVs.

"The USMA-NSRDEC collaboration provides unparalleled opportunities for cadets to develop as engineers and leaders," said [Lt. Col. Phillip Root](#), director of the [Center for Innovation and Engineering](#), Department of Civil & Mechanical Engineering at USMA. "The relevant problems addressing Soldier-needs foster their cadet engineering education, and the engagement with the NSRDEC professionals matures their critical thinking and innovation."

Cadet John Billet, a mechanical engineering major from Nashville, Tennessee, centered his team's capstone project on improving human augmentation efforts by developing the "Hip Actuator," an exoskeleton technology designed to help dismounted Soldiers run faster.



Photo: USMA

"What's different about the Hip Actuator, compared to existing systems, is that it's so simple to use," explained Bellet. "Typically, with an exoskeleton, if you get something [in terms of power or capability], you lose something else, but our system has one purpose – to run faster.

"It's easy to put on and take off, easy to use and maintain in the field, because it only has one motor and not many moving parts."

"We are trying to prove that this works and could potentially be used as a piece of battlefield equipment in the future because of its simplicity," said Bellet, who will serve as an infantry officer after graduation. "I think we still have a way to go, but it could one day be out there."

Cadets John Culver from Louisville, Oklahoma, Mike Kerwin from Groton, Massachusetts, and Christopher Bascomb from Oradell, New Jersey, teamed up to address and reduce the problem of heat casualties, which sidelines approximately 2,000 Soldiers a day, according to their research.

With technical guidance from mechanical engineers Brad Laprise and Mike Zielinski from NSRDEC's Warfighter Directorate, the Soldier-cooling capstone team explored the use of evaporative cooling to help cool Soldiers who are operating in extremely hot and humid environments.

"Mr. Laprise has been working on this technology for almost 20 years, so he gave us a lot of background on all the different types of systems out there before we started," said Kerwin.

"Many of the systems out there are liquid based and designed for aviators, so we wanted to look at more of the air-based system for infantrymen," said Bascomb.

"Our system incorporates a shirt that provides separation between a Soldier's skin and the uniform they're wearing by using a blower to circulate air across the body, allowing the air to evaporate the sweat, which works hand-in-hand with the body's natural way of cooling itself," said Culver.

"Our testing proved that without the cooling device, the Soldiers' undershirts were soaked in sweat; but with the device, there was almost no sweat," said Culver. "There are a lot of improvements to be made, but we think this is definitely the path to continue down with this technology."

Whether or not their technologies make it to the field, the cadets have gained invaluable experience as students and future Army officers by collaborating with the organization focused on the individual Soldier.

"These cadets are far better prepared for the challenges facing them after graduation due to the efforts of the NSRDEC team," said Root.



Speaking Their Language

Working on food safety for Soldiers

By NSRDEC/NATICK, Mass. (June 9, 2016)

If mathematics is the language of science, then the Enhanced Quasi-chemical Kinetics (EQCK) model is a multi-lingual linguistics tool.

The EQCK model originated as a unique predictive model for food safety.

“We noticed that scientists typically monitored microbial growth curves through the stationary phase,” said co-inventor Florence “Chickie” Feeherry, research microbiologist at [Natick Soldier Research, Development and Engineering Center](#), “and a better model was needed to account for all of the microbial lifecycle, including death.”

And from there, the EQCK model was invented.

The EQCK model is unique, because it uses the mathematics of ordinary differential equations (ODEs) that confer on it flexibility and versatility.

“Such an approach is typical in chemistry and even describes the most complex chemical reactions showing periodic oscillations, period-doubling, bistability, hysteresis, Hopf bifurcations, intermittency, and deterministic chaos,” said co-inventor and [Brandeis University](#) Professor of Chemistry Emeritus Kenneth Kustin.

The theory is to treat microorganisms like a complex network of chemical reactions. The EQCK model has applications in textiles, bio-decontamination, chemical decontamination, sanitation and hygiene, and food processing and safety. In fact, the EQCK model has been used as a tool to control *Listeria monocytogenes*, *Escherichia coli*, and *Staphylococcus aureus* in foods such as bread, turkey, cheese, enrobed “pocket” sandwiches (meat loaf made with dried plum purée, maple-filled French toast) and in foods preserved with High Pressure Processing and other nonthermal technologies.

“We knew the EQCK model was special,” added lead inventor Dr. Christopher Doona, research chemist at NSRDEC, “so we published it in leading international journals to encourage other scientists to adapt it for their applications.”

18 NSSC This Month

Food technologists at Natick used these results to make further improvements to military pocket sandwiches and other bread-based products. Other scientists around the world also took notice and began using it for their own purposes, such as predicting the shelf-life of Spanish olives and other industry applications.

Doona, Feeherry, and Kustin were invited to contribute a chapter in *High Pressure Processing of Foods* (Balasubramaniam, Barbosa-

“The EQCK model has a lot of potential to be commercialized and used by Soldiers to improve their field quality of life, so we’re glad it continues moving forward in science, technology and for the benefit of the Soldiers.”

Dr. Christopher Doona, NSRDEC

Cánovas, Lelieveld, Eds. - 2016 Springer); a review paper in *Food Engineering Reviews* (Springer); and to present and publish a new variant of the model specific solely for spore germination by High Pressure Processing (presented at 2016 EFFoST-IFT NPD International Workshop in Athens, Greece – for more information, see <http://www.npdworkshop2015.org/>).

“Publishing our work in premier science journals that are peer-reviewed by other experts in the field provides a more exacting and challenging standard,” said Doona, “and codifies our work and its value to science, to Natick and to Soldiers.”

Researchers at federal laboratories advance their inventions through technology transfer to commercial industry for the material benefit of the Army and the nation. Federal labs do so through collaborative partnerships or licensing arrangements that help shorten the time to market and hasten the availability of commercial capabilities for the Soldier.

“Before publishing the EQCK model, we submitted a patent application to help encourage its technology transfer,” said Doona.

So far, that strategy has paid off. The rights to the EQCK patent application were assigned to Brandeis University, to continue prosecution of the patent application through attorneys specializing in IT-related patents. Doona was invited to present the model in May 2016 at the [New England Food Technology Forum](#) in Boston held by the [Massachusetts Technology Transfer Center](#).

Additionally, Applied Mathematics Inc. recently signed a Cooperative R&D Agreement with NSRDEC to use the EQCK



Dr. Christopher Doona and Florence “Chickie” Feeherry of the Natick Soldier Research, Development and Engineering Center hope to make life better for Soldiers in the field through the Enhanced Quasi-chemical Kinetics model.

model to predict the ability of experimental anti-microbial clothing to kill cutaneous microbes and other potential applications for Soldiers. AMI’s mathematical and statistical methods will strengthen the predictive capability of the model by applying Uncertainty Quantification algorithms.

“We’ve had a lot of success with technology transfer for our portable, power-free decontamination technologies, especially the ones used during [Operation United Assistance](#) in West Africa last year to fight Ebola,” said Doona.

Doona and Feeherry were in the news and won awards at Natick for their research contributions that produced a fielded technological capability to assist during this major international public health crisis.

“It’s one of Natick’s top technological transitions,” Doona said.

The EQCK model patent application was recognized when the Army won its first-ever [Thomson Reuters Award](#) as a “Top 100 Global Innovator” in 2012, and other inventors are already referencing the EQCK model.

“The EQCK model has a lot of potential to be commercialized and used by Soldiers to improve their field quality of life, so we’re glad it continues moving forward in science, technology and for the benefit of the Soldiers,” said Doona.

“We’re privileged to be recognized for our contributions to Natick’s mission, and to know our research is so highly valued scientifically and for its real-world applications.”

The Army currently uses the [Armed Services Vocational Aptitude Battery](#), or ASVAB, as a predictor of a future Soldier's ability to meet the academic requirements needed to do well in a particular military occupational specialty. This summer, the Army will add the [Occupational Physical Assessment Test](#), or OPAT, as a way to predict a recruit's physical fitness required to train for the high physical demand tasks for an [MOS](#).

The OPAT is currently being evaluated at a select number of recruiting stations around the Army. It involves four physical fitness tests that together measure a future Soldier's muscular strength, cardiorespiratory endurance, and lower body and upper body explosive power. The four tests include the standing long jump, the seated power throw, the strength deadlift and the interval aerobic run.

The new test isn't the first time the Army has used some sort of physical assessment for future Soldiers. In the late 1990s and early 2000s, the Army used the "1-1-1 test," which involved 1-minute of sit-ups, 1-minute of pushups, and a 1-mile run to evaluate the physical fitness of candidates. The [U.S. Military Academy at West Point](#), New York, currently does the Candidate Fitness Assessment, and the [Reserve Officer Training Corps](#) has in the past experimented with physical fitness performance as a requirement for entry into service.

It's expected that this summer, recruiters around the Army will begin administering the OPAT to all future Soldiers as a way to help place recruits into a best-fit MOS, based on their physical performance, in much the same way the ASVAB is used.

"A decision was made somewhere around 2012, relative to issues on placement on Soldiers into MOSs, especially high physically demanding MOSs, to come up with an assessment that would help better place Soldiers into those demanding MOSs," said Dr. Whitfield East, a research physiologist with the [U.S. Army Center for Initial Military Training](#). "In particular, the center of gravity was the seven congressionally-restricted combat MOSs. But there are obviously a significant number of other MOS that require high physical demands."

East said that a team, led by the [U.S. Army Research Institute of Environmental Medicine](#), developed an assessment to measure the physical abilities of Army applicants, so that the Army could better place them into MOSs with high physical demands.

The OPAT was developed following "two and a half years of extensive research on Soldiers performing a large number of events, physical capacity events, and then relating ... those against the high physical demand MOS tasks, like putting an 155mm (M109) round in a ammunition rack," East said.

In addition to guiding future Soldiers into the right MOS, one of the main drivers for that initiative, East said, was to reduce first-term attrition among new Soldiers, including attrition during basic training, advance initial training, and first units of assignment.

Soldiers, he said, are lost to attrition at "every point along the way," from the reception battalion, through BCT, AIT and at their first unit

Photo: U.S. Army



Soldiers administer the "strength deadlift" portion of the Occupational Physical Assessment Test to potential recruits during an OPAT pilot program.

Predicting the Future

Using OPAT to match recruits to Military Occupational Specialties

By C. Todd Lopez, Army News Service/WASHINGTON (May 31, 2016)

of assignment. There are many reasons for that loss, including lack of adjustment to the Army, behavioral issues and physical fitness.

"It's not just the ability to pass the APFT, but really the lack of a fundamental fitness foundation that allows them to train properly," East said. "I would argue it's always been more about looking at those foundation levels of fitness that are required to even start training, especially in the higher-demand MOSs."

The OPAT consists of four individual tests, each designed to meet a specific component of physical fitness that has been deemed important by the Army. Those tests include:

- the "Standing Long Jump," is designed to assess lower-body power. Recruits stand behind a take-off line with their feet parallel and shoulder-width apart. They will jump as far as possible with a

- two-foot take-off and landing. Results of the test are measured in centimeters.

- the "Seated Power Throw," is designed to assess upper-body power. Recruits sit on the floor with their lower back against a yoga block and upper back against a wall. They hold a 4.4 pound (2 kg) medicine ball with both hands, bring the medicine ball to their chest and then push or throw the medicine ball upwards and outwards at an approximate 45 degree angle. The throw is scored from the wall to the nearest 10 centimeters from where the ball first contacts the ground.

- the "Strength Deadlift," is designed to assess lower-body strength. Recruits stand inside a hex-bar and perform practice lifts to assure good technique. Then they begin a sequence of lifts starting with 120 pounds, and working up to 220 pounds. Recruits are scored by the largest amount of weight they can properly deadlift.

- the "Interval Aerobic Run," always performed last, is designed to assess aerobic capacity. The test is similar to what is commonly referred to as the "Beep Test." The evaluation involves running "shuttles" or laps between two designated points that are spaced 20 meters apart. The running pace is synchronized with "beeps," produced by a loud speaker, at specific intervals. As the test progresses, the time between beeps gets shorter, requiring recruits to run faster in order to complete the shuttle. Recruits are scored by the level they reach and the number of shuttles they complete.

East said the OPAT measures the "five primary domains of physical readiness," the Army has identified as important for performance. These include muscular strength, muscular endurance, cardiorespiratory endurance, explosive power, and speed.

Fighting Zika

DoD adds funding to enhance surveillance

By Cheryl Pellerin, DoD News, Defense Media Activity/WASHINGTON (May 16, 2016)

The [Defense Department](#) is providing \$1.76 million in extra funding to military laboratories to expand [Zika](#) virus surveillance worldwide and assess the virus's impact on deployed service members' health and readiness, Navy Cmdr. Franca Jones said in a recent interview.

Jones, who holds a doctorate, is chief of the [Global Emerging Infections Surveillance and Response](#), or GEIS, section of the [Armed Forces Health Surveillance Branch](#) in the Defense Health Agency's Public Health Division.

The enhanced Zika virus surveillance will involve 10 projects in 18 countries and territories by four lab partners based in the United States and five located overseas.

Jones said the labs receiving more Zika virus funds are part of the GEIS integrated worldwide emerging infectious disease surveillance network that includes core Army or Navy medical research labs in Egypt, Georgia, Kenya, Peru, Thailand, Cambodia and Singapore, and Army, Navy and Air Force labs in the United States, working in more than 60 countries around the world.

In the current fiscal year, she added, GEIS already has provided its network partners with more than \$51 million to support a range of emerging infectious disease surveillance programs.

Zika virus disease spread to people through the bites of *Aedes aegypti* mosquitoes, usually shows mild symptoms – fever, rash, joint pain and red eyes – that last several days or a week, according to the [Centers for Disease Control](#). But Zika virus infection during pregnancy can cause a serious birth defect called microcephaly and other severe fetal brain defects, the CDC says.



Photo: Centers for Disease Control

In May 2015, the [Pan American Health Organization](#) issued an alert about the first confirmed Zika virus infection in Brazil. Three months ago, the [World Health Organization](#) declared Zika virus a public health emergency of international concern. Local transmission has been reported in many other countries and territories.

Zika virus likely will continue to spread to new areas, CDC says. Some 4,905 confirmed and 194,633 suspected cases had been reported in 33 countries and territories in the Western Hemisphere, according to an April 6 Armed Forces Health Surveillance Branch summary.

Jones said the DoD labs will use the Zika money provided by the branch's GEIS section for three kinds of surveillance studies. One will look retrospectively for Zika virus exposure among DoD personnel through serum repository samples. A retrospective study looks backward in time, in this case using serum samples of patients who had been deployed in areas with high rates of Zika virus infection.

The other surveillance studies will leverage existing work in the GEIS lab network in different parts of the world to expand clinic-

based surveillance for Zika virus disease among DoD and civilian populations, and expand testing for Zika virus in mosquitoes.

The Defense Department collects a range of blood serum samples from all service members before, during and after their military service, and maintains the samples in the Armed Forces Health Surveillance Branch's Department of Defense Serum Repository. Serum is a clear fluid that's part of a person's blood. It's used in many medical diagnostic tests and in blood typing. The repository is the world's largest of its kind, with more than 60 million serial serum samples from more than 10 million service members.

For the retrospective Zika virus surveillance study, military virologists – scientists who study viruses – and public health officials will check the serum samples of service members stationed in the United States and in high-risk regions in the Caribbean and other places overseas. The scientists will be looking for prior exposure to Zika, dengue and chikungunya viruses, all of which are transmitted by [Aedes aegypti mosquitoes](#). In recent years, according to CDC, dengue and chikungunya cases have begun to appear in the United States, most of them brought in from tropical urban areas of the world.

[Base Camp, continued from pg. 13](#)

"We are going to smaller units, where it's more of advise and assist," said Hammack, "where they go in and come out."

Doug Tamilio, director of the [Natick Soldier Research, Development and Engineering Center](#), said that means battalions and companies will find themselves alone in remote locations.

"And we've got to be able to support them," Tamilio said. "This is a critical capability to enable those forces."

"We are the platform from which they operate," said Kurt Kinnevan of Engineering, Research and Development Center – Construction Engineering Research Laboratory, U.S. Army Corps of Engineers. "It doesn't matter if it's a 50-man outpost or a 40,000-man major supply point, they all have similar requirements for power, water and waste."

With that in mind, SLB-STO-D is focusing on reducing fuel demand by 25 percent, water demand by 75 percent and waste by 50 percent through a variety of efficient technologies. Such reductions would make base camps more self-sufficient while also saving lives by keeping resupply convoys off dangerous roads.

"Those convoys are typically not well-protected," Tamilio said. "There'll be less convoys on the road, less Soldiers in harm's way and ultimately, less casualties."

SLB-STO-D began in 2012 and will wind down in 2017. It is looking at 60-plus new and emerging technologies for potential solutions. The last of five demonstrations of those technologies

over the past two years took place on this day at the BCIL, currently occupied by some 240 Soldiers.

"It takes a team of teams," said Jyuji Hewitt, deputy director of [Research, Development and Engineering Command](#), referring to the SLB-STO-D effort. "It's really all focused on not only our Soldiers, but our joint force."

That team includes four major technology provider organizations: Natick Soldier, Research, Development and Engineering Center; Tank Automotive Research, Development and Engineering

Center; Communications-Electronics Research, Development and Engineering Center; and Engineering, Research and Development Center – Construction Engineering Research Laboratory, U.S. Army Corps of Engineers.

"I think that the theme of all of today is collaboration," said Magid Athnasios of TARDEC. "This is a capability that only comes together through

bringing together multiple stakeholders and technologies."

At the BCIL, Hammack saw many of those technologies, including the Force Provider rigid-wall shelters.

"The advantage of (the) rigid-wall shelter is it sets up so quickly and it takes down so quickly," Hammack said. "It doesn't take a whole lot of education."

Hammack came away from the BCIL with a favorable view of the SLB-STO-D efforts.

"I am just so amazed and impressed," Hammack said. "You're doing the right things for the right reasons. It's an inspired group of people here."



Photo: David Kamins, NSRDEC Strategic Communications

"I am just so amazed and impressed. You're doing the right things for the right reasons. It's an inspired group of people."

Katherine Hammack
Assistant Secretary of the Army
Installations, Energy and Environment



We hold these truths to be self-evident, that all men are created equal, that they are endowed by their Creator with certain unalienable Rights, that among these are Life, Liberty and the pursuit of Happiness.

**Declaration of Independence
July 4, 1776**