

September 6, 2013

NSSC This Week



Natick Soldier Systems Center Public Affairs Office

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HEaDS-UP

NSRDEC for better helmets

Photo Credit: David Kamm, NSRDEC Photographer

HEaDS-UP

NSRDEC for better helmets

By Bob Reinert, USAG-Natick Public Affairs / NATICK, Mass. (Sept. 6, 2013)

In their quest for better helmet technologies to keep Soldiers and Marines safe on the battlefield, researchers at Natick Soldier Research, Development and Engineering Center are making a “HEaDS-UP” play.

Helmet Electronics and Display System-Upgradeable Protection, or HEaDS-UP, has been a four-year effort at Natick to provide mounted and dismounted troops with more fully integrated headgear system. HEaDS-UP has focused on developing a Technical Data Package of design options and tradeoffs to build a modular, integrated headgear system. Some of these technologies include: improved ballistic materials; non-ballistic impact liner materials and designs; see-through and projected heads-up display technologies; better eye, face and hearing protection; and communications.

Two modular headgear concept designs emerged from the process. They will be officially unveiled in October during a demonstration at Fort Benning’s Maneuver Battle Lab, said Don Lee, project engineer in the Headgear Thrust Area of NSRDEC.

“We’ll have mounted and dismounted Soldiers wear the two different concepts, performing a variety of tasks,” Lee said. “The event will be a VIP demo of Soldiers con-

“Going by a recent (Joint Trauma Analysis and Prevention of Injury in Combat) report, ... of all the injuries to the head, 72 percent are to the face. So that shows a technology gap there.”

Don Lee, project engineer in the Headgear Thrust Area of NSRDEC

ducting training operations at mission speed using the helmet concepts.”

According to Lee, the advances resulted from the collaboration between NSRDEC and the Army Research Laboratory. Quarterly meetings kept dozens of involved personnel on the same page.

“The program was very successful due to the collaborative support from the different agencies,” Lee said. “Without that collaboration and support, it would have made the program more challenging.”

Lee said that the program looked at a variety of technologies.

“It was mostly like an 80-20 split – 80 percent material solution, 20 percent impact on the Soldier,” said Lee, “kind of setting the stage for the next evolution of headgear protection, which will look to swap that, doing more 80 percent impact on the Soldier and 20 percent material solution.”

The modular prototypes were designed to allow warfighters to adapt the headgear to the mission and to work harmoniously “with other existing, fielded technologies – your body armor, your (hydration pack), ... your protective eyewear, and then being able to accomplish common skills and tasks – getting up, getting in a prone positions, entering a vehicle, exiting the vehicle, sighting a weapon, and stuff like that,” Lee said. “We’ve done some cognitive studies, as well, looking at head-mounted displays, see-through displays, the integration factor of the display.”

Mounted and dismounted Soldiers have already worn the prototypes in “human factors evaluations,” from which data were collected, analyzed and applied.

“We were able to integrate the concepts during their normal training scenarios, ...



Photos: David Kamm, NSRDEC Photographer

and then following their training event, get feedback from them,” Lee said. “It was quite overwhelming, the response (we) received that every Soldier that used these systems liked the prototype systems over their currently fielded system. So whether it was an (Army Combat Helmet) or a (Combat Vehicle Crewman helmet), they all like the prototypes over them.”

Lee predicted that Soldiers will embrace the modular platform, from which parts can be added or removed in seconds. “Being able to do that (mandible and visor) protection when needed or being able to remove it when not needed is the big ‘wow’ factor,” he added.

The mandible and visor provide fragmentation protection for the face, Lee said.

“Going by a recent (Joint Trauma Analysis and Prevention of Injury in Combat) report, ... of all the injuries to the head, 72 percent are to the face,” Lee said. “So that shows a technology gap there.”

“Soldiers wear the (ballistic) eyewear, but everything outside the eyewear is open. This will be the biggest advantage to the Soldier.”

Vehicle crew members, in particular, should appreciate the headgear.

“One of the things I hoped to do with this program was reduce the logistic footprint of combat helmets for ground Soldiers,” Lee said. “Right now, mounted Soldiers have two helmets. They have their Combat Vehicle Crewman helmet ... and they have their Advanced Combat Helmet. So, if they dismount from the vehicle, they’re supposed to swap helmets.”

“I think we’ve proven through our program that there can be one helmet for both mounted and dismounted Soldiers, which, I think, is a big deal. I think the program’s proven that a

one-helmet system for ground Soldiers, whether they’re mounted or dismounted, can exist.”

Crew members looking out hatches discovered an unexpected benefit during evaluations.

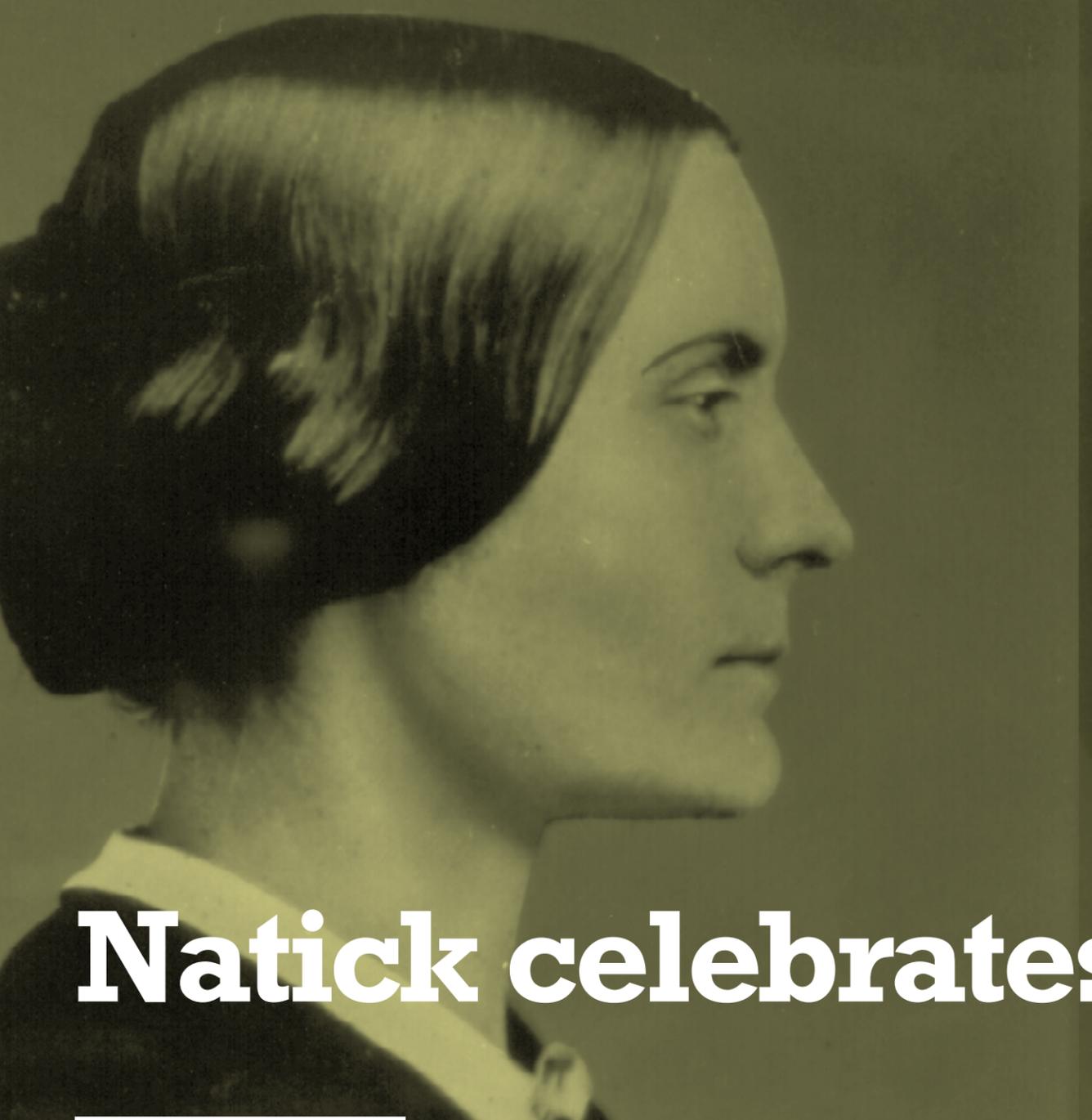
“When the Soldiers wore the prototype systems with the visor and mandible,” said

Lee, “it was the first time that they weren’t eating sand and dust and rocks going down the road.”

Ultimately, the program data will be transferred to Program Executive Office Soldier and the Marine Corps for decisions about

what technologies should be fielded.

“We’ve come up with tradeoffs, ideas, designs that the Soldier will benefit from in the end,” Lee said. “When these technologies impact the Soldier in a positive way, that’s really the reward at the end of the day.”



Natick celebrates women's right to vote

By Tazanyia Mouton, USAG-Natick Public Affairs / NATICK, Mass. (Aug. 28, 2013)

On Aug. 26, 1920, the 19th Amendment was certified extending the right to vote to women, and advancing our nation's long journey for full equality to all Americans.

The 19th Amendment made it possible for more women to participate in American politics as leaders, candidates, voters and volunteers. Today, women make up the majority of the electorate, and last year a record number of women were elected to the U.S. Congress.

On Women's Equality Day, we celebrate the progress that has been made and renew our commitment to securing equal rights, freedoms and opportunities for women everywhere.

As part of the celebration, Heather Leiby, the Natick Soldier Systems Center director of Army Community Service, spoke of the importance of women's right to vote and highlighted the significant milestones in women's equality.

"Today is not only about commemorating the passage of the 19th Amendment, but the day we call attention to women's continuing efforts to full equality," said Leiby. "In order to see where we are going, it is important from time to time to look backward, and then forward again."

Leiby said her goal for the presentation was to educate the audience about how our nation has moved from seeing women as the property of men, to seeing women as individuals in their own right.

By 1914, 10 states had laws permitting women the right to vote and in 1917, Montana sent the first woman to Congress.

Leiby also tied together the role of women in our armed forces.

"In the years following, a great number of milestones were reached," said Leiby, "flying combat missions, obtaining the rank of brigadier general and rear admiral, acceptance into military academies, serving on submarines and flight decks, becoming training officers, and driving in convoys, to name a few."

In 2011, more than 214,000 women were serving in the ranks of the armed services, making up almost 15 percent of the active duty military population.

"Today is not only about commemorating the passage of the 19th Amendment, but the day we call attention to women's continuing efforts to full equality," said Leiby. "In order to see where we are going, it is important from time to time to look backward, and then forward again."

"In 1948, President Harry Truman would sign the Women's Armed Services Integration Act, and women would become official members of all the armed services," Leiby said. "The roles that the 350,000 women had filled during World War II would never look the same."

The war in Vietnam also provided further opportunities for women in the armed forces.

"Today, we celebrate the road toward equality that has been paved by those who walked before us," Leiby said. "We have an obligation to each other and to the future to find the balance to support one another, to recognize our differences and celebrate our achievements."

Female flag detail honors Women's Equality Day

By Kelly Sullivan, USARIEM / NATICK, Mass. (Aug. 28, 2013)

Every day at 6:30 a.m. sharp, Soldiers stationed at Natick Soldier Systems Center raise the American flag over the installation during a ceremony called reveille. On Aug. 28, however, as the sun rose something special happened, making this daily routine memorable.

"An all-female flag honors team raised the installation flag during reveille," said Spc. Marissa Spitz, a biological research assistant with the U.S. Army Research Institute of Environmental Medicine, who took part in the detail. "I am excited to be a part of this to give tribute to female warfighters who served

before me and have paved the way for me to be where I am today."

Spitz said the seven female Soldiers were there to commemorate Natick Soldier Systems Center's Women's Equality Day, and to celebrate the privilege of serving their country.

Women's Equality Day, celebrated nationally Aug. 26, observes the ratification of the 19th Amendment, which gave women the right to vote. This year marked its 93rd anniversary.

In a presidential proclamation, President Obama noted that after decades of organizing, agitating and demonstrating, this country achieved a major victory for women's rights and American democracy. The 19th Amendment was certified, extending the vote to women and advancing our nation's long journey toward full equality for all Americans.

The ratification of the 19th Amendment paved the way for more women to participate in American politics -- as leaders, candidates, voters and volunteers.

Natick Soldier Systems Center planned other events to mark the day, including a speech about the women's rights movement and various Family and Morale, Welfare and Recreation events. For Soldiers like Spitz, it is important to honor such historic events to appreciate the benefits from them that are felt by many today.

"It's important to look back into our nation's great history of women who have given tremendous amounts of time and effort to pave the way for equal opportunity now," said Spitz, "especially in the military."



Soldier photos: Kelly Sullivan, USARIEM

Female Soldiers from the U.S. Army Research Institute of Environmental Medicine, Natick Soldier Systems Center, Natick, Mass., raise the American flag during reveille, Aug. 28, 2013. The all-female flag honor detail joined together to commemorate Women's Equality Day, the day when the 19th Amendment was ratified, giving women the right to vote.



Civilians learn about Soldier life

By Alexandra Foran, NSRDEC Public Affairs / NATICK, Mass. (Sept. 6, 2013)

It's not every day you arrive for work and line up in formation if you are a civilian, but that is the case during the one-week Basic Greening Program at the Natick Soldier Research, Development and Engineering Center this summer.

Show up late to Peter Niemeyer's course, and you risk the chance of being locked out. Niemeyer runs the course, which he created only a few years ago, like the senior drill sergeant he once was.

"This course all starts from the basics," said Niemeyer, who served in the Army for 20 years. "You'll get a feel for how privates feel in basic training."

Niemeyer is not as tough on the civilian attendees as he was on privates, but he does expect everyone to fully participate in each and every activity. That means the possibility of being randomly called on to answer a question or even being told to act as a squad or platoon leader during drill and ceremony formation.

The course offers a lot of new information for civilians with limited knowledge about the Army and military life. During the first day alone, participants learned about rank, insignia, branches, and drill and ceremony formation.

"From this day forward, we have to work together as a team," said Niemeyer during his overview of the Greening course. "This course will challenge you, but it's also meant to be fun."

During the week, attendees not only learned about what life is like for a Soldier, but they were also able to perform hands-on tasks Soldiers conduct regularly. Those included as-

sembling and disassembling an M4 Carbine, learning how to read maps, performing drills in formation, and Land Navigation and orienteering.

"We had to drill for half an hour or an hour," said Greg Pigeon, NSRDEC materials engineer, who started working at Natick as a student in 2010. "Soldiers have to drill until they get it right. It (gives one) a better appreciation for all the stuff Soldiers have to learn in Basic. To have to have all that down and memorized on the tip of your tongue is kind of a task."

"This is the single best class I've taken in the 10 years that I've been here ... I do think it should be mandatory for all incoming people."

Amy Johnson, NSRDEC textile technologist

Many people enjoyed the hands-on tasks, but for others, learning about the smaller things like rank and insignia was also useful and worthwhile.

"If you work for the Army, you should have an understanding of what the organization is as a whole," said Amy Johnson, NSRDEC textile technologist, "because to me it's ignorant not to know; essentially, you do not know your customer."

The course also allowed participants to network and learn more about what different teams do at Natick. Participants are able to tour facilities on base they may never have

visited and learn more about projects being worked on by other employees

A few years ago, the commanding general of Research, Development and Engineering Command requested a course that would teach civilians about the military and their place of work, and Niemeyer complied.

"I built the course from the ground up with very minimal funding," said Niemeyer, who makes additions to the course as he sees fit, such as basic hands-on first-aid training, which was added this summer.

Niemeyer received great feedback from not only RDECOM, but also participants in previous courses. In fact, he received NSRDEC's Employee of the Month award for July.

"This is the single best class I've taken in the 10 years that I've been here," said Johnson. "I would highly recommend it to anybody that wants or needs to take a class. I do think it should be mandatory for all incoming people."

Niemeyer has also run advanced greening trainings that are more intensive and take place at other military bases over a week or more.

"When you think about it, our scientists here might be able to help Soldiers, but we have to sit at our desks and try to imagine ourselves in their situation," said Pigeon. "As a scientist, the advanced greening course would give us a much bigger data pool to pull from when we're trying to think of ways to help Soldiers."

Many civilians do not receive an introduction when they begin working for the Army. This course provides not only practical information about the Army, but also team-building and life-saving skills that service members use every day.

Force Providers train at BCIL

By Spc. Sophia Klevemann / FORT DEVENS, Mass. (Sept. 4, 2013)

Soldiers of the 542nd Quartermaster Company, 301st Regional Support Group, headquartered in Fairview, Pa., participated in an annual training at the Base Camp Integration Lab, here, this summer.

This is the third two-week iteration of this training for the 542nd QM Co. This training tests the unit's Mission Essential Task List, including operating the new Force Provider system that supplies everything the Soldiers need; climate-controlled billeting, showers, latrines, laundry, dining facilities, an all electric kitchen, and a power distribution system. These modules support 150 personnel and the 542nd QM Co. is capable of supporting 24 modules for a total of 3,600 personnel.

"Force Provider equipment is very unique, and it's very limited on availability," said Staff Sgt. John K. Schwentner, of DuBois, Pa., the Shower/Bath and Laundry Non-commissioned Officer-in-Charge. "Here, we have everything, brand-new and the next generation. You're not going to get that anywhere else."

"The 542nd QM Co. is the only Force Provider company still within the Army's inventory," said Maj. Mitchell J. Wisniewski III, of Cleveland, commander of the 542nd QM Co. "The only current training sets are here at Fort Devens."

The Force Provider containerized modules weigh less than 10,000 pounds making them easily movable with a forklift. In addition, these readily deployable, pre-packaged base camps can be transported inside one C-17 Globemaster III aircraft and within a matter of hours setup and operational. These tents cut down on weight by using air-filled beams, not metal supports, and are easily replaceable without having to take the whole tent down. Soldiers from the 542nd QM Co. are using their annual training to learn the new systems and brush up on old skills.

"We have everything we need to be self-sufficient," said Schwentner.

These modules include nine air-beam tents with flooring, electrical, insulation and bunk beds.

"This one uses an air compressor to fill the beams," said Spc. Nicholas E. Pire, of Bradford, Pa., a Food Service Specialist who went through the training here. "It's much quicker and much more reliable than the old I-beam tents."

"You just deflate the beam, put it back in, no problem," said Pfc. Tasha A. Baranchak, of

"The 542nd QM Co. is the only Force Provider company still within the Army's inventory. The only current training sets are here at Fort Devens."

**Maj. Mitchell J. Wisniewski III,
commander of the 542nd QM Co.**

Clearfield, Pa., a Water Treatment Specialist. "It's cheaper also in the long run." Baranchak believes it's also easier to store and carry, has a better air conditioning system, and takes less effort and manpower to set up.

Each of the seven billeting tents house 22 Soldiers. Also included are an all-electric expeditionary kitchen that feeds 150 personnel, a tricon freezer/refrigerator, a laundry unit capable of handling the Army standard of 15 pounds of laundry per Soldier, a shower system divided into two containers with a total of eight showerheads, and two latrine units.

One technological advancement of the Force Provider equipment is the water system.

"We have what's called a shower-water reuse system," said Wisniewski. "It's a system based initially off a (Reverse Osmosis Purification Unit) theory, but it has a lot more filters in it, and it allows us to reuse up to 75 percent of

the shower water in order to save on resources, water deliveries and such. So, we don't have to have additional transportation assets always bringing water in."

Deployment is always inevitable when serving in the Army Reserve.

"This type of training here is essential for our Soldiers who never touched any of this to actually learn how to properly use this equipment," said Schwentner. "So, when they move downrange, they will know what they are doing." He stressed how this new equipment will help other Soldiers while deployed. Soldiers can get some rest, a hot meal and a shower, and get right back on the road to get to the next camp and get what is needed, he said.

Schwentner spent the first 14 years of his career as a truck driver and vividly remembers sleeping under his trailer while deployed.

"It was an absolute welcome to at least find some sort of shelter to stay in besides the cab of our truck or underneath the trailer," said Schwentner. "It is a really nice morale booster to have a bunk you can sleep on instead of the ground, have a hot meal, get a shower, and have a flushable toilet."

"It puts us in a state where we have to be always available as a unit," said Wisniewski. "At a moment's notice, we can be called to go anywhere to support any type of mission. So, having this training here is key in updating our Soldiers' skills on this equipment."

This exercise provides Soldiers with skills they can use in many situations.

"The bigger picture of the exercise is to enable the Soldiers to be able to take the skills they're learning here on the actual Force Provider equipment and apply that to deployment situations or exercises ... worldwide as well as assisting with disaster relief efforts at home," said Wisniewski.



Photos: David Kamm, NSRDEC Photographer

Army's manufacturing improvements yield lighter body armor

By Dan Lafontaine, U.S. Army Research, Development and Engineering Command
ABERDEEN PROVING GROUND, Md. (Aug. 28, 2013)

Soldiers facing rugged terrain and extreme temperatures are continually searching for ways to reduce the weight of their gear.

In a search for solutions to this persistent issue, U.S. Army scientists and engineers have preliminarily demonstrated body armor that is 10 percent lighter through new manufacturing processes.

The U.S. Army Research, Development and Engineering Command, known as RDECOM, along with its industry partners, has leveraged the Army's Manufacturing Technology Program to spur the Advanced Body Armor Project.

Shawn Walsh, Ph.D., leads the project at RDECOM's Army Research Laboratory, or ARL, where his team has reduced the weight of a size medium Enhanced Small Arms Protective Insert plate from 5.45 pounds to 4.9 pounds.

While the Army leads the research, the new armor will also benefit the Marine Corps, Air Force, Navy and U.S. Special Operations Command, with similar body-armor requirements. In addition, highly novel technology initially identified by the Army has since been supported by SOCOM, pervasively benefiting lightweight body-armor goals overall.

"The armor the Soldier is wearing right now is the best armor we can possibly give them," said Walsh, the Agile Manufacturing Technology team leader within the Weapons and Material Research Directorate. "The one concern that we hear about it -- can you make it lighter? That's the number one request. We don't want to compromise the protection, but want to reduce the weight. It's a challenging problem, and ARL should take on high-risk programs like that."

The current weight-reduction technologies in the laboratory were impractical for mass production and fielding, Walsh said. The project focused on developing manufacturing methods that resolve these issues.

To accomplish this weight reduction, researchers pushed advances in composites,

ceramics and component integration. All the materials must work in tandem to provide the necessary performance characteristics -- stopping the bullet, managing the bullet's momentum, and preventing trauma to the wearer.

Project Manager Soldier Protection and Individual Equipment, or PM SPIE, had requested lighter body armor several times but did not receive a satisfactory response from industry, Walsh said.

"That's an indicator that there's a technology gap," Walsh said. "We realized there is something that the [project manager] wants for the Soldier, but can't get from industry. Maybe it's inherently not achievable, or maybe people haven't tried an innovative approach. We assumed the latter. In our particular case, we used processing technology as a method for achieving these weight reductions."

ARL turned to the ManTech program and the Office of the Secretary of Defense's Defense-Wide Manufacturing Science and Technology, or DMS&T, programs for this challenge that was "beyond the normal risk of industry." The ManTech program provides funding for the Army's research and engineering organizations to partner with the defense industrial base to overcome manufacturing obstacles and deliver new capabilities into Soldiers' hands.

"The ManTech and DMS&T programs give us a unique opportunity," Walsh said. "We knew there were some untapped potential technologies, and manufacturing would be the integration step. ManTech offers industry a catalyst. This program allowed them to exercise some of their novel technologies they want to try. It's an incentive to take a little risk."

Because the Army does not manufacture equipment, it must ensure there are companies capable of meeting production demands, Walsh said. Researchers need a plan to transition novel technologies from the laboratory bench, to a manufacturer's shop floor, and then to Soldiers in the field.



Photo: Conrad Johnson, RDECOM

Scientist shares STEM lessons with students, teachers

By Alexandra Foran, NSRDEC Public Affairs / Natick, Mass. (Sept. 6, 2013)

Stephanie Marcott takes time out of her busy life, even on the weekend, to enrich others' lives through her passion for science.

Whether she's volunteering at the Massachusetts Institute of Technology on the weekends to assist kids with physics projects or collaborating with teachers through her place of work at the Natick Soldier Research, Development and Engineering Center, Marcott shares her enthusiasm for science, technology, engineering, and mathematics and learning.

"I am a career peer mentor, since high school; it's just a trend," said Marcott, a research chemist who also runs the Bill Porter STEM Laboratory at NSRDEC. "Before high school I helped my brother and sister ... When I joined the Army, I mentored other Soldiers with their training. I naturally fell into (working on STEM activities) here at Natick and helped out students."

The STEM lab has hosted a variety of groups, including students from local schools and teachers who come to NSRDEC for training. Marcott has created several fun hands-on activities for students to test in the lab, along with members of her team, and even brings some ideas outside of the lab for different local events.

During events such as the Girls' Robotics Day held at Natick High School, Marcott recognized the power of positive reinforcement and support for students learning new concepts. This interactive event focused on generating interest in science and technology in high schools by building basic robots for competition, a task many of the students were trying for the first time..

"You hear what (students) have to say," said Marcott, "and you can comment on the technical aspect in a way they can understand and suggest improvements or just encourage them, just say 'Keep going, keep up with what you're doing.'"



Photos: David Kamm, NSRDEC Photographer



Mentors such as Marcott know that they sometimes learn as much, if not more, as the students they teach.

"One thing that you have to do as a mentor is recognize if a lesson isn't going so well, and adjust," said Marcott.

During one lesson on Atomic Force Microscopy, Marcott realized the students had a tough time understanding the concept, and he allowed the students to look at their own hair under a microscope.

As a chemist, Marcott knows the importance of safety in her career and makes lab safety an important part of every lesson she creates. This is one of the reasons she received an Army Individual Award for Excellence in Safety in 2011.

"I have a rewarding career already working for the warfighter, but it's even more rewarding that I also get to help the community and the youth of the nation," said Marcott.

Marcott has frequently been nominated as a regional "virtual judge" for eCYBERMIS-

SION, an online STEM program sponsored by the Army for students in grades six through nine. The competition provides students the opportunity to solve a real problem in their community using STEM. eCYBERMISSION judges at the regional, state and national levels critique the web-based projects' scientific inquiry or the engineering design process, community benefit, and team collaboration.

Recently, Marcott has partnered with local schools to help teachers write proposals to send back to NSRDEC for activities. Various schools in the community received science kits to use in their laboratories. Kits such as Lego NXT Robotics can be loaned out to schools through NSRDEC.

Mentoring by engaging with students in a positive manner, as Marcott has done by volunteering her time for several years while working for the Army, provides STEM lessons for students outside of the classroom and gives them a real-world perspective into possible future careers in STEM.



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