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# NSSC This Week



Natick Soldier Systems Center Public Affairs Office

## Step lively

**Knee brace puts  
a spring in your stride**

Also inside

- 'Rock or Something'
- Pacific Pivot
- Band of Brothers
- Celebrating Heritage
- Summer Safety Day

**AMTI**  
FORCE AND MOTION

# Step lively

## Knee brace puts a spring in your stride

By Alexandra Foran, NSRDEC Public Affairs / NATICK, Mass. (May 23, 2013)

**W**eight, hinge design, and assistive power of a quasi-passive exoskeleton were studied at the U.S. Army Research, Development and Engineering Command's Natick Soldier Research, Development and Engineering Center here to see how these factors affect the way an individual walks.

The study, done in conjunction with Yale University, also measured how much energy a person used walking with the knee brace.

"The Yale engineers, under direction of Dr. Aaron Dollar, have built what can be simply defined as a pair of knee braces with springs built into them," said Al Adams, NSRDEC biomechanics research engineer.

The foundation of the Yale design is a pair of commercial off-the-shelf knee braces, comparable to the knee orthotics people use post-surgery or if they are suffering from knee pain. The major difference of the Yale design is the quasi-passive robotics — meaning the actual mechanical work of the device is done by springs, but the springs are controlled by electric motors and computer.

Testing involved 13 Soldiers from NSRDEC's Human Research Volunteer program. The participants wore a brace on each knee, which weighed at total of 11 pounds. Each brace contained a spring, an electric motor to engage/disengage the spring, and an electronic controller.

The device loads the spring at the beginning of each step, "slightly helping to extend your knee and removing some of the force usually applied by your quad muscles," Adams said. Disengagement of

the spring occurs right before the leg is swung forward for the next step, "so that you do not have to fight against the spring when flexing your knee closed during the swing phase of your step."

After orientation sessions using the brace to walk normally on the ground and to walk on a treadmill, data was collected during a testing session that involved six different 10-minute walking trials. The trials included knee braces with three different springs of varying stiffness, no springs, hinges of the knee brace detached, and a trial without the braces as a control condition.

**"Understanding the effects of each of these design aspects will help current and future exoskeleton engineers to optimize their system and reduce its negative effects on the user."**

— Al Adams, NSRDEC

Heart rate, rate of oxygen consumption and muscle activity were measured during data collection sessions. Motion capture cameras were also used during the testing to record the volunteers' movements.

"Understanding the effects of each of these design aspects will help current and future exoskeleton engineers to optimize their system and reduce its negative effects on the user," Adams said.

Previous exoskeletons tested at Natick were evaluated as advanced technology prototype products, not necessarily to answer funda-

mental scientific questions on the effects of exoskeletons on Soldier performance. Prior testing of robotic prototypes designed to assist Soldiers with heavy combat loads resulted in Soldiers using more metabolic energy walking with a personal augmentation system than they did when they walked without an exoskeleton.

This research-specific exoskeleton designed by Yale had "built-in adjustability" for engineers to test their hypotheses. In addition to looking at how the weight of the device affects the user, NSRDEC wants to examine how the hinge design alone affects the user. One of their hypotheses is that the hinge design may be limiting motion.

According to Adams, previously tested exoskeletons assume the knee is "operating like a pin joint. Think of a hinge on a door where it just rotates in one direction. But really the knee is sort of doing that but also rotating a little bit in another direction, as well. So the multiple degrees of freedom is something that most wearable devices assume doesn't exist or isn't necessary."

For the last decade, in particular, exoskeletons have been considered as a solution for unburdening Soldiers on the battlefield and assisting with Soldier load.

Adams said he hopes that working alongside exoskeleton engineers in a series of basic research programs will help answer the question of why previous exoskeletons did not aid in Soldier load carriage.

"This knowledge will aid current and future exoskeleton developers," said Adams, "as well as inform biomechanists at NSRDEC with regard to the unique challenges of devices like these to ensure the success of future, related efforts."



Photographer

# 'Rock or something'

By Bob Reinert, USAG-Natick Public Affairs / NATICK, Mass. (May 30, 2013)

**If** you're familiar with the phrase "rock or something," then you've probably used a Flameless Ration Heater to warm up a Meal, Ready-to-Eat.

To this day, the phrase remains part of a pictogram on the package of the heater, known as the FRH, which was developed at Natick Soldier Research, Development and Engineering Center's Department of Defense Combat Feeding Directorate and is celebrating its 20th anniversary in 2013. It refers to directions that advise warfighters to place the FRH at an angle when heating up a Meal, Ready-to-Eat, commonly known as an MRE.

"The term 'rock or something' has now reached cult status," said Lauren Oleksyk, team leader of the Food Processing, Engineering and Technology Team at Combat Feeding. "It's just taken on a life of its own."

Oleksyk was there at the beginning with colleagues Bob Trottier and now-retired Don Pickard when the FRH and that memorable phrase were born in 1993.

"We were designing the FRH directions and wanted to show an object to rest the heater on," Oleksyk recalled. "(Don) said, 'I don't know. Let's make it a rock or something. So we wrote 'rock or something' on the object, kind of as a joke."

The joke has legs. As Oleksyk pointed out, there now are T-shirts and other items for sale that bear those words. "Rock or something" even has its own Facebook page.

Introduced to the heater years ago, famed chef Julia Child insisted on following the package directions and activating it by herself. With no rock handy, she decided to employ a wine glass stem.

"Which is so classic Julia," Oleksyk said, laughing. "So there have been many things other than the rock or something that have been used. There are many, many Soldiers over the years that have their own personal joke about what they might use in place of a rock."

The FRH is no joke, however. Adding an ounce and a half of water to the magnesium-iron alloy and sodium in the heater will raise the temperature of an eight-ounce MRE entrée by 100 degrees in about 10 minutes.

"Some of the challenges were keeping it lightweight and low volume, and not requiring a lot to activate it," Oleksyk said.

**"There are many, many Soldiers over the years that have their own personal joke about what they might use in place of a rock."**

— Lauren Oleksyk,  
Combat Feeding

The heater's arrival gave warfighters the option of a hot meal wherever they went and whenever they wanted.

"I've heard more feedback on this item than any other item I've ever worked on in my career here," said Oleksyk, who has been at Natick nearly 30 years. "They're so grateful to have this heater in the MRE. It's almost always used whenever they have 10 minutes to sit down for lunch."

Prior to the FRH, warfighters used Trioxane fuel bars with canteen cups and cup stands to

heat their MRE entrees. As Oleksyk pointed out, the fuel bars couldn't be packed alongside food in the MRE package.

"So if the fuel bar and the MRE didn't marry up in the field," said Oleksyk, "they really had no way to have a hot meal."

The FRH has remained essentially the same over the past two decades because, as Oleksyk put it, "it's tough to find a better chemistry that's lighter in weight, lower in volume and that heats as well." A larger version has been developed, however.

"We've expanded it to a group ration," Oleksyk said. "So now we have a larger heater that is used to heat the Unitized Group Ration-Express. We call that ration a 'kitchen in a carton.' It serves 18 Soldiers."

The next-generation MRE heater is being tested now, and it will eliminate the need to use one of the most precious commodities in the field.

"The next version of this is a waterless version," Oleksyk said. "It's an air-activated heater, so you wouldn't have to add any water to activate it at all, but that's still in development and will have to perform better than the FRH overall if it's ever to replace it."

Oleksyk remembered sitting on a mountain summit one time during a weekend hike with friends. Suddenly, she heard laughter behind her.

"I hear a guy — sure enough, he says, 'Yeah, I need a rock or something,'" said Oleksyk, who turned to see him wearing fatigues, holding a Flameless Ration Heater, and telling his buddies how great it was.

"So it's far reaching," Oleksyk said. "It really had an impact on the warfighter."



Photo credit: David Kann, NSRDEC Photographer



Photo credit: David Kamm, NSRD/EC Photographer

By Bob Reinert, USAG-Natick Public Affairs / NATICK, Mass. (May 22, 2013)

# Pacific pivot

PM Force Sustainment Systems looks ahead, supports Pacific strategy

**What** covers half the world's surface, contains 50 percent of its population, and spans 9,000 miles and 16 time zones?

Give up? It's the U.S. Pacific Command, known as USPACOM, area of operation, where the experts at Product Manager Force Sustainment Systems, or PM FSS, at the Natick Soldier Systems Center, Mass., stand ready to support the joint force's future needs. The PM FSS emphasis reflects the renewed U.S. commitment to the Pacific region, where much has been learned since World War II about the environmental and geographic challenges of conducting military operations there.

"As we pivot to the Pacific, what do we know about the theater, what don't we know about the theater?" said John Viggato, systems acquisition manager for PM FSS. "Everything changes a little bit in that AOR (area of responsibility). The size is enormous, from the western shores of the U.S. all the way over to India — the entire Pacific Rim. It's a huge area to cover."

"(It goes) from tropical environment in places like Hawaii and Guam to the frigid Alaskan and even Antarctic environments. And there (are) a lot of perceived threats out in that AOR right now that we have to be aware of and be capable of engaging with in those specific environments."

The main idea, said Viggato, is to look forward, not backward, in dealing with the Pacific.

"The acquisition process is traditionally a reactive process," Viggato said. "We always try and equip for the last battle we fought. The

lessons learned from our most immediate engagements go forward into procurement for future engagements. But that method doesn't always produce the right tool for the new fight. With our efforts with PACOM, we're trying to lean forward to make sure the warfighter has the right systems from PM FSS that work well and reliably in the Pacific environment."

PM FSS, working with the USPACOM science advisor and Transformative Reductions in Operational Energy Consumption, or TROPEC, is seeking to bring its energy-efficient systems to USPACOM exercises and develop a long-term priority plan for the area.

"If we can let (warfighters) train on what they're actually going to be falling in on in theater, I mean, that's a win for the PM, that's a win for the unit, good across the board," Viggato said. "It's supposed to work in all these environments, but is that true for our latest iteration? Yeah, it might work in the environmental chamber, but let's get it in a quick-look-type scenario through these exercises in the Pacific."

PM FSS will support the 1st Special Forces Group from Joint Base Lewis-McChord, Wash., in September for the "Tempest Wind" exercise on Guam by setting up a 150-person rigid-wall camp to test various systems.

"Tempest Wind is the number one priority for (Special Operations Command, Pacific) and supposedly the number one priority for USPACOM, in terms of exercises," Viggato said. "They'll cycle the units in, like 1st Special Forces Group, and that's how they get their annual training. That's how they maintain their mission readiness, by going through these types of exercises."

PM FSS energy-efficient technologies are among the most popular with USPACOM, Viggato said. They include those well-insulated rigid-wall camps, micro-grid systems with load demand start-stop, shower water reuse systems, and emerging hybrid power supplies and energy-storage systems.

"Energy's very big in PACOM as an AOR right now," Viggato said. "The cost to produce power on Hawaii is exponentially higher than what it is in [the continental United States]."

"As (renewable energy sources) become more prevalent on the battlefield, the trick is getting that energy gain from the renewables applied in the right time in the right area. And part of what enables that is that battery storage, that energy-storage-type module."

Just getting PM FSS equipment to the USPACOM AOR imposes a logistical burden.

"If you fly in all your fuel for these island-type battles, or even to support a forward base on Hawaii, the cost per gallon of fuel goes through the roof," Viggato said. "That's when a lot of these emerging technologies become a lot more economically tenable as we get a higher return on investment."

Viggato said he expects new technologies to flourish as PM FSS and other science and technology organizations become better acquainted with USPACOM's unique needs and mission.

"As they get a better feel for what we know and what we don't know in the USPACOM AOR, they're able to do that gap analysis," Viggato said. "As they identify those gaps and needs, they're looking to do these technology-development ideas to fill those gaps."

# Band of brothers

## Soldiers, veterans celebrate Armed Forces Week together at Natick

In conjunction with Armed Forces Week, Natick Soldier Systems Center held a series of gatherings for current Soldiers and veterans May 15-17.

Veterans from the Town of Marlborough were invited May 15 to speak with some of the younger Soldiers and share their experiences. Pvt. Maryanne Fair, a human research volunteer, or HRV, at NSSC, participated in and appreciated the event.

"It's definitely an amazing opportunity for us, because in many units or places we will go, we won't have that opportunity," Fair said.

Fair said she is uncertain of where her career will take her, but speaking with other veterans has put her possible future into perspective.

"I do want to become an officer, so whether it is Green to Gold or West Point, I do plan to take full advantage of that," Fair said.

Pvt. Jacob Hergatt, another HRV, wants to become a warrant officer and said this experience helped him put one "boot" in front of another.

"It's always good to talk to the sergeant major, someone that has been in a lot longer than I have," Hergatt said. "Most of the time, we just talk to our sergeants, who more

than likely have just a couple more years experience (than us), so talking to someone that's been in for 20 years, it's a huge difference to get ahead and get planning set up."

Medal of Honor recipient Capt. (Ret.) Thomas Hudner shared his story with a group of NSSC veterans May 16.

Hudner graduated from the U.S. Naval Academy in 1946 and served as a communications officer. Initially, he had no desire

to fly, but soon found himself to be first in a group of about five who got orders for flight training. Hudner said he had no regrets and really enjoyed it.

In 1950 Hudner crash-landed his aircraft in an attempt to rescue his downed wingman, Ensign Jesse Brown. Brown died, but Hudner received the Medal of Honor for his courageous actions.

After 27 years of dedicated service to the Navy, Hudner, who also served in Vietnam, retired.

"I have been very proud of my service in the Navy and very proud of being part of the veterans' community all throughout the world," Hudner said. "It's great to be able to come out and see all of you and just talk a little bit."

Spc. Reginald Farrie, another HRV, was

**"I think it's so important. Look around at the older veterans telling their stories. That is so good for them. I know as a licensed counselor that you have to tell your story to heal, and for these guys ... they are having such a great time."**

— Paul Carew, Natick Veterans Services



Photo credit: David Kamm, NSRDEC Photographer

surprised by the Hudner's recollection of that fateful evening.

"He got the highest award that he could possibly get, and he wasn't talking about himself, he was talking about the other officer," Farrie said. "It's just good to come here and be here for only a month and be a part of something that great."

Veterans from the Town of Natick were invited to share their stories May 17.

Paul Carew, director of veteran's services for the town, had a hand in coordinating this year's event.

"I think it's so important," Carew said. "Look around at the older veterans telling their stories. That is so good for them. I know as a licensed counselor that you have to tell your

story to heal, and for these guys ... they are having such a great time."

While the older veterans had a chance to heal, the younger Soldiers had a chance to gain insight about military history.

Pvt. Gabrielle Hancsak, HRV, wanted the event to continue. "They have so much more to teach us" she said.

When describing the day's events, one word came to her mind.

"Exquisite," Hancsak said. "It's like a delicacy that you won't be able to have; just to savor it and enjoy the moment that you have."

Flying Tigers veteran Joseph Poshefko, a Natick resident, was among those who visited NSSC.

"We need what (NSSC scientists and researchers) offer," Poshefko said. "The clothes, food, medical training, the dedication, the faithfulness of our young group; I think we have the finest group of members in service that I have ever seen."

Lt. Col. Frank Sobchak, Natick garrison commander, said that these gatherings give the younger generation a chance to learn from the older generation.

"Events like these are what Armed Forces Day is supposed to be all about," Sobchak said, "because the Armed Forces, ultimately, we're a family."

"People talk about the one percent and about the special few (who serve). Well guess what?

We are the one percent. We are the ones who all put our lives on the line all so we can serve our country, serve in times of war and in times of peace."

Medal of Honor recipient Thomas J. Hudner Jr. (left) speaks with Command Sgt. Maj. Robert Beausoleil during a veterans' luncheon, May 16, 2013, at Natick Soldier Systems Center, Mass.



Lt. Col. (P) Frank Sobchak offers a token of appreciation to Dr. Susumu Ito for his participation in the Asian American and Pacific Islander Heritage Month observance program.

In October 1944 Ito was attached to I Company during the battle for the “lost battalion” of the 36th Division in Eastern France. I Company had the highest casualties and lost 132 out of 143 riflemen during the short battle.

**“I was totally accepted in my field, so in that respect, I didn’t feel any discrimination whatsoever.”**

— Dr. Susumo Ito

Just prior to the “lost battalion” rescue mission, Ito had received a battlefield commission to second lieutenant with the 442nd, the most decorated unit of its size and length of service in American military history.

During the NSSC program, Ito shared his experiences as a Japanese American in the Army.

“One thing that I never really experienced was any prejudice against my ethnic background,” he said. “I was totally accepted in my field, so in that respect, I didn’t feel any discrimination whatsoever.”

Ito said he felt that at times he was discriminated for, but never discriminated against. Even after his time in the Army, Ito said he believed that he had the latitude to explore any field he desired.

After the war, Ito used the Montgomery G.I. Bill to receive a Ph. D. in cell biology from Case Western Reserve University in Cleveland.

“Not only socially, but my chairman would let me work on projects (about) anything I wanted to do, and any way I wanted to do it,” Ito said. “He never told me, ‘You must work in this area or restrict (yourself) to a certain field.’”

Ito also offered advice for those seeking a better understanding of how to build leadership.

“Try to pick a field that you really have your heart into and can exert all your energy and efforts,” he said. “Geography doesn’t matter; my assessment is that you can be unhappy anywhere, but the opposite is also true.”

sioned officers in the 442nd were Caucasians, and Japanese American officers were very rare during World War II, Ito was a second lieutenant in the unit.

Ito was born in 1919 in Stockton, Calif., to sharecropper parents. He was drafted into the Army in 1940, less than two years before the Japanese attack on Pearl Harbor.

# Celebrating Heritage

## Natick recognizes Asian Americans and Pacific Islanders

By Tazanyia Mouton, USAG-Natick Public Affairs / NATICK, Mass. (May 22, 2013)

Soldiers and civilians gathered at the Natick Soldier Systems Center to observe Asian American and Pacific Islander Heritage Month May 15.

This year’s guest speaker was Dr. Susumu Ito, a veteran of the 442nd Regimental Combat Team, a segregated unit comprised almost entirely of second-generation Japanese Americans. Although most of the commis-

**The** Natick Soldier Systems Center conducted its Summer Safety Day May 30.

“The main reason we have the safety day is to raise awareness of some of the hazards normally associated with seasonal activities that we do,” said Installation Safety Manager Scott McPherson. “We look at our employees as assets to the Army, and each one has a small role in making our mission successful.”

Prior to the safety presentation, Lt. Col. Frank Sobchak and Command Sgt. Maj. Robert Beausoleil placed the Army Safety Excellence streamer on the garrison guidon. The streamer recognizes organizations and individuals for their achievements in the safety arena.

**“They’re applying common sense, they are thinking ahead, and they’re looking out for each other.”**

— Lt. Col. Frank Sobchak, USAG-Natick garrison commander

“The safety streamer is really the embodiment of all of the hard work from everyone throughout the garrison,” Sobchak said. “It means people are doing three things consistently: They’re applying common sense, they are thinking ahead, and they’re looking out for each other.”

During his presentation to Natick employees, Marc Nerino, president and senior technical trainer at Tiger Training Company, stressed the importance of boat and water safety.

Inexperienced swimmers should take precautions such as “wearing a U.S. Coast Guard-approved personal flotation device number 160 when around water,” Nerino said.

It is also important to remember that boating and drinking never mix. Receiving an infraction on the water weighs just the same as receiving an infraction in your vehicle.

“Be knowledgeable of the water environment you are in,” Nerino added. If unsure of your surroundings, Nerino suggested speaking with locals to make certain you know which places are “no-swim” areas.

You should also be on the lookout for aquatic life, as water plants and animals may be dangerous.

Switching gears from water to land, heavy emphasis was also placed on using grills and food safety.



During the Natick Soldier Systems Center ‘Summer Safety Day’ May 30, representatives from the Coast Guard explain which personal flotation device should be used while boating.

# Natick holds ‘Summer Safety Day’

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

“Approximately 30 people are injured every year as a direct result of gas grill fires,” Nerino said.

Before using your grill, make sure to check all tubes leading into the grill burner for any blockage.

Each year 325,000 hospitalizations and 5,000 deaths occur because of food-borne disease.

If using an ice cooler, it is imperative to always make sure you have plenty of ice, and foods that need to be kept cold, are cold enough prior to cooking.

The event also informed Soldiers and civilians

about heat-stress injuries and prevention, aquatic safety, and home preparedness.

For more information on summer safety, you can go to the Army’s safety homepage at <https://safety.army.mil>.

After the safety day presentation, booths and displays by vendors as well as outside agencies offered more information about eyewear and life jacket safety.

Participants also received information about different activities at the Gibson Outdoor Pool, and courtesy motorcycle inspections were performed.



# NSSC This Week

## **NSSC**

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