Teaching an old water can new tricks

U.S. Army

NATICK, Mass. (March 1, 2013) -- A system developed by researchers at the Natick Soldier Research, Development and Engineering Center, Department of Defense Combat Feeding Directorate, would help bring water to Soldiers in the field, either cool or heat it, and then keep it that way for days at a time.

The system revolves around a high-stress collapsible water bag, a beverage cooling unit, and an insulated bag that holds the standard five-gallon water can or the collapsible water bag.

"Everything works together," said Ben Williams, with Combat Feeding's Systems Equipment and Engineering Team, or SEET. "You don't need to use everything together, but you can."

The system resulted from an effort to improve the standard five-gallon water can by giving it more capability.

"We didn't have a lot of money," said Shubham Chandra, who works with Williams at SEET. "We started working with what was out there."

As Williams pointed out, getting Soldiers to hydrate sufficiently in extreme temperatures, such as those encountered in Afghanistan, has always been a challenge.

"People aren't drinking enough because their water is 100 degrees," Williams said. "It's not pleasurable. But if it was 40-degree water, of course you'd drink more. Your stamina also increases."

The water bag was developed after a request from the theater to replace the standard water can.

"They said, 'Hey, we want bags that can be air dropped from at least 35 feet,'" Chandra said. "We knew the cans had a problem. The cans can't be dropped more than six feet."

The bag, made of 1050 denier nylon material and coated with silicone rubber, can be air dropped from up to 55 feet, allowing resupply without requiring helicopters to land on remote outposts.

"It won't explode," said Williams of the bag. "If you drop a jerry can ten feet, it will blow up. We saw an opportunity here for improvement. The standard five-gallon water can basically hasn't changed since it was created."

Storage of the collapsible water bag is also much easier.

"When it's empty, it rolls up, reducing its volume substantially," said Williams, "as opposed to the jerry can, which retains the same volume after it's been emptied. It is also substantially lighter than the water can. These features are especially important when used in a vehicle, where storage space is extremely limited."

According to Chandra, Combat Feeding has sent approximately 1,300 bags to service members in Afghanistan.

"They loved them," Williams said. "They wanted more, so we kept sending them. It's one of those little things that didn't require millions of dollars. It was developed on a minimal budget (and had) a big impact."

There was even an unforeseen use for the bags.

"They can put a cap on it and use it as a shower," Chandra said.

The bags can be connected to the beverage cooling unit, or BCU, which can cool a standard five-gallon container full of water at least 40 degrees Fahrenheit in 25 minutes. The stand-alone, 40-pound unit can be plugged into any tactical vehicle or a standard wall outlet.

"It's super fast, super efficient," Williams said. "Now you have flexibility. You can cool water on demand in a standard water can or the new collapsible bags and then transfer that water to a personal hydration system via the BCU without spilling a drop. Obviously, there was a need in Iraq and Afghanistan for cold water, because they're buying ice. Instead, you could just cool the water you have back down."

Keeping water cool can be difficult in temperatures above 100 degrees Fahrenheit as troops move around in tactical vehicles or on dismounted patrols. Heat exhaustion, heat stroke and dehydration become formidable foes in these environments.

Williams' solution was a new insulated bag, which is 50 percent lighter than the currently fielded version and provides twice the performance. The new insulated bag can keep a can of frozen water below 70 degrees for more than four days and hot water (180 degrees) unfrozen for five days in the most extreme ambient conditions.

"It's basically a backpack that you can put the standard five-gallon water can, the water bag, or a case of bottled water into, and you can carry it on your back," Williams said. "So, once you've cooled your water with the BCU, you can take that water away and it will remain cold until you need it.

"This new design reduces the weight by over four pounds, keeps the cost the same, and increases the performance twofold."

Together, the air-droppable bag, the beverage cooling unit, and the insulted bag provide a low-cost, effective system for delivering water to the most remote areas

of the field and keeping that water cold or hot.

"People don't know about this," Williams said. "If people in the field saw how it all works together, I think they would want it."

Williams and Chandra did it all with one person in mind.

"The bottom line is it really helps the war fighter," Chandra said. "That's what we're here for."