



SUCCESS

COOPERATIVE RESEARCH AND DEVELOPMENT AGREEMENT

USAFSAM WORKING TO HELP Battlefield Airmen Beat the Heat

CONTRACT

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NAME:

Gawi
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Air Force
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REQUIREMENT

Of all the threats facing Battlefield Airmen and other special operations forces, heat doesn't typically come to mind. However, heat-related illness is a critical factor for personnel operating in extreme temperatures.

Dr. Reginald O'Hara and his Exercise Physiology Research Team at the

United States Air Force School of Aerospace Medicine, part of the Air Force Research Laboratory's 711th Human Performance Wing, are working to reduce that heat stress.

"Military personnel exposed to excessive heat for an extended period of time may experience reductions in both physical and cognitive performance,"



An Air Force-invented cooling sleeve for a water bladder and cooling inserts for a specially-designed undershirt are two ways that Dr. Reginald O'Hara and his research team at the United States Air Force School of Aerospace Medicine hope to help Battlefield Airmen and other special operations forces avoid heat-related illness while in hot, humid conditions. (Courtesy photo)

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O'Hara said. "Those reductions could severely limit their ability to carry out their duties during intense ground and flight operations."

Essentially, if Battlefield Airmen are working at decreased capacity, the risk of mission failure increases.

Though there are many effective ways to mitigate high temperatures, most are not realistic solutions for the battlefield. For example, most devices are heavy and bulky, adding too much weight for troops to practically carry. What's more, many require a power source or a means of "re-cooling," which might not always be available, and they are often too noisy to safely use in the field.

TECHNOLOGY TRANSFER

Working under a Cooperative Research and Development Agreement with Gawi Healthcare, LLC, the USAFSAM team has developed an alternative – a small, lightweight, passive cooling technology. Under the three-year Technology Transfer collaboration with Gawi, which had acquired the assets of Arctic Ease, USAFSAM hopes to develop and commercialize a variety of hydrogel cooling technologies.

USAFSAM's partnership with Gawi Healthcare, LLC is one of the 711 HPW's many Cooperative Research and Development Agreements. A CRADA is a legal agreement between a federal laboratory and one or more nonfederal

parties, such as private industry or academia. The end objective of a CRADA is to advance science and technology that not only meets Air Force mission requirements but also has viability in other potential commercial applications. In fiscal 2015, the 711 HPW had 76 active CRADAs.

TECHNOLOGY INNOVATION

O'Hara and his fellow researchers have started testing two variations of the technology to date. One is an Air Force-invented cooling sleeve or wrap for the water bladder that Battlefield Airmen and other special ops forces carry, and one is cooling inserts for a specially-designed undershirt.

"The devices act through a form of conduction," O'Hara said, "transferring heat from the water in the hydration pack bladder or the Airman to the hydrogel.

The team conducted field-based testing of the sleeve to see if it would maintain or even reduce the temperature of the water during extended exposure to high heat and humidity, making it more palatable and thereby encouraging Airmen to drink more and stay hydrated.

"The sleeve was tested during 60-minute marches in 90 degree F temperatures and 40 percent humidity,

and it successfully demonstrated a 20 degree drop in drinking water temperature," O'Hara said. "Subjects drank up to two liters more cooled water when compared to non-cooled water."

Additional test plans include incorporation of quick-dissolve amino acid supplements to enhance hydration, energy and performance during training.

PAYOFF

Testing of the shirt inserts had similarly positive results, according to O'Hara. Subjects wearing the special undershirt with cooling inserts experienced lower core body temperature and significantly lower peak body temperature after a 70-minute weighted vest treadmill walking test than subjects in the standard undershirt with no inserts.

"During sustained operations, even a few degrees can make a tremendous difference," O'Hara said. "If these cooling devices can lead Battlefield Airmen and other special ops forces to drink more or help keep them from over-heating, the risk of heat stress and other heat-related illnesses goes down. And that means their focus can be on accomplishing the mission."

Linking technology with the mission and marketplace.

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