Helping Fort Benning Mitigate Heat-Related Risks

New software application improves Soldier safety during training

US Ignite's Heat Risk Management (HRM) application helps protect soldiers at Fort Benning Army Base from heat-related injuries while training. The HRM app, developed as an integral component of the Smart Installation and Community Dashboard (SICD), tracks heat category changes with IoT sensors and uses data analytics to improve safety officers' response in real time.

THE HEAT RISK CHALLENGE

The April 2023 Medical Surveillance Monthly Report (MSMR) found that between 2018 and 2022, **Fort Benning recorded the largest share (16.7%) of all heat injury events among 250+ U.S. military installations worldwide.**[1] Heat related illnesses are a well-known and persistent threat to soldiers during military training and operations and can be fatal even when recognized early.

Moreover, treatment for heat related injuries and illnesses, like heat exhaustion and heat stroke, contribute significantly to high Army medical costs. A 2020 report concluded that the **annual direct care cost to the Army for heat stroke and exhaustion encounters was $7.3 million in the years between 2016 and 2018.**[2]

Recognizing the challenge, Fort Benning leaders saw an opportunity to improve the health and safety of soldiers while also reducing operational costs.

What is Heat illness?

A group of problems that happen when the human body gets too hot and can't cool down enough. It usually happens during extreme hard work in a hot environment and can result in issues like cramps, rashes, and heat stroke.

[1] MSMR April 2023. Volume 30, No. 04. (Health.mil)
[2] Brief Report: Direct Care Cost of Heat Illness to the Army, 2016–2018 (Health.mil)

THE TRADITIONAL APPROACH

As a part of their daily routine, Fort Benning's safety officers conduct heat index checks using manual, time-consuming processes prone to human error. Safety officers are tasked with setting up, reading, and interpreting individual microclimate tracking devices to determine the local wet bulb globe temperature (WBGT), an important indicator for heat risk.

During strenuous drills and activities, like long marches, this cumbersome process proves especially challenging. The limitations of the traditional method highlight the critical need for a more efficient solution to ensure soldier safety and well-being.

US IGNITE'S IMPROVEMENTS

To address Fort Benning's heat challenge, US Ignite worked closely with the Fort Benning Garrison Command, S6, and U.S. Army Engineer Research and Development Center
(ERDC) researchers to identify critical components of the problem and compile a set of solution requirements. Next, US Ignite worked to source the sensors needed for a solution and tested some of the best products on the market. Finally, the team selected and deployed several devices and developed software to ingest the sensor data, analyze it, and communicate the result.

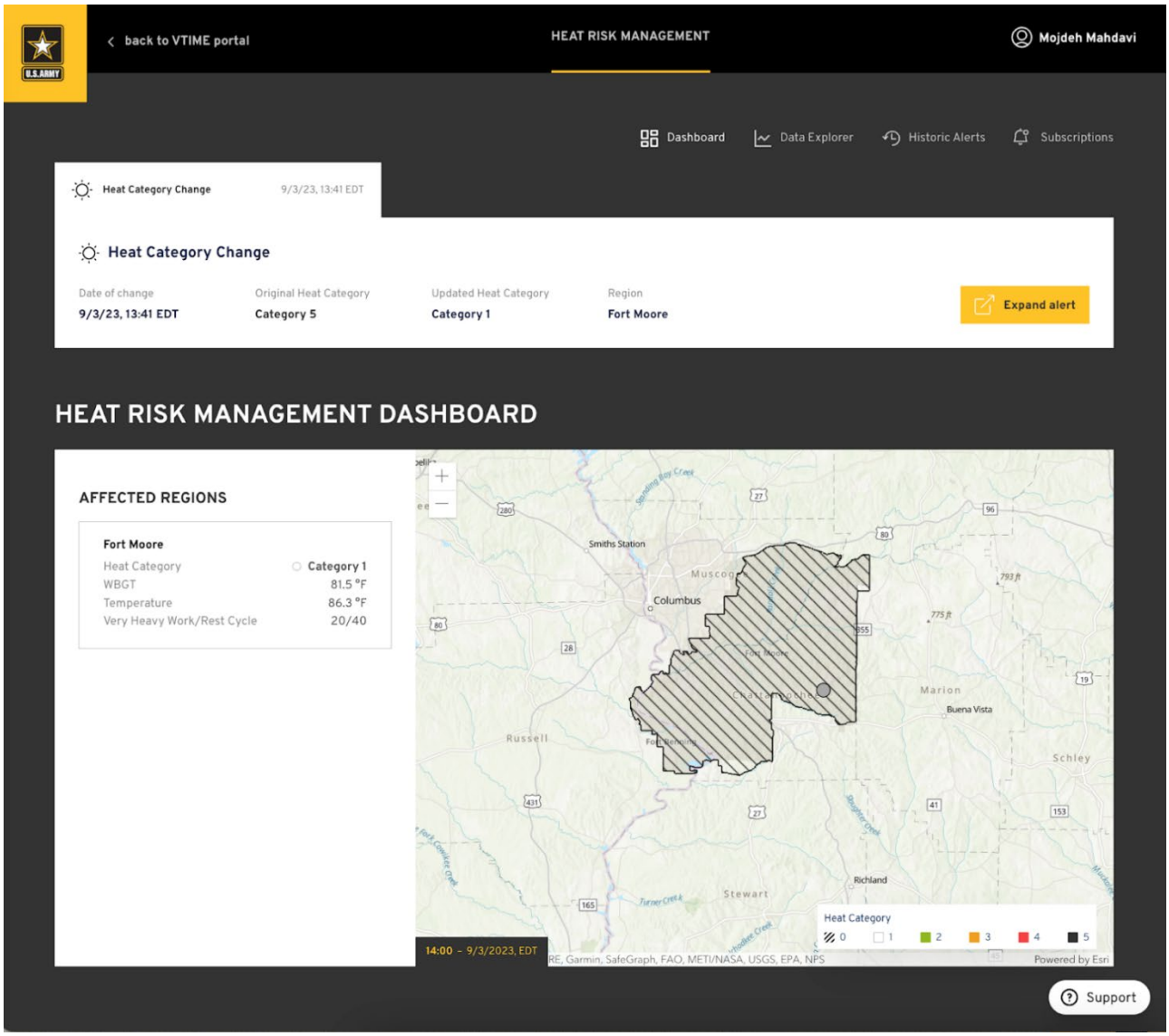
WBGT manual device.

Companies are always prepared to take care of heat injury instances.

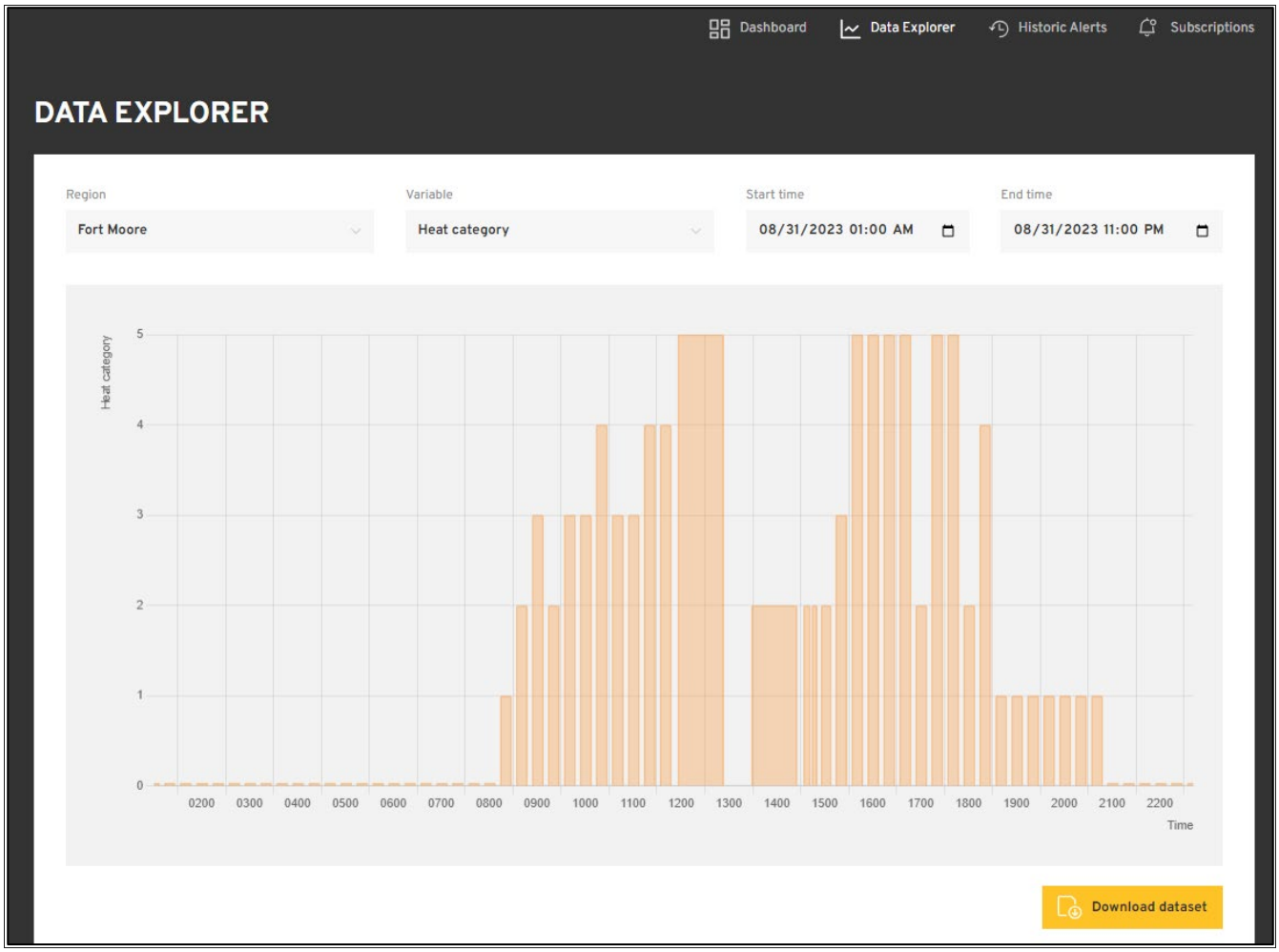
HOW THE HEAT RISK MANAGEMENT APP WORKS

Using an IoT sensor to monitor heat conditions eliminates the manual process of setting up a WBGT reader at each training site. US Ignite's HRM app also automates the process of collecting readings by proactively sending SMS notifications to officials every 20 minutes. These notifications improve safety officers' ability to rapidly detect and respond to heat category changes and mitigate the risks resulting from infrequent or missed WBGT checks.

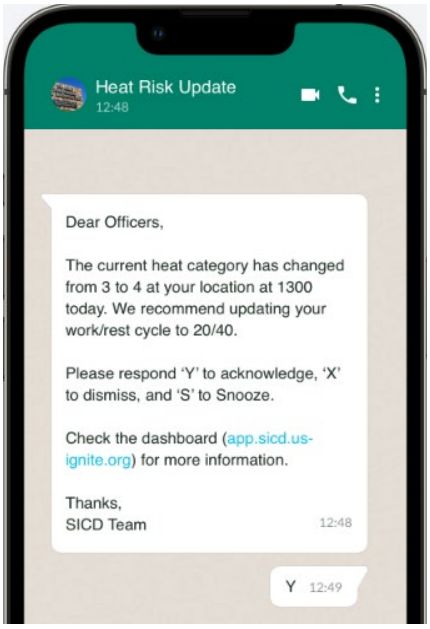
In addition to real-time data notifications, the HRM app also provides actionable recommendations for optimizing training times and durations. The custom-built HRM software offers Fort Benning leaders a communicative, interactive, and informative tool that can prevent injuries and save lives.



HRM web-version dashboard.
As the heat categories change, the Fort Benning Installation map changes color accordingly.



The HRM application has a data explorer function for research and analysis purposes. Report generation is also supported by the app.



Example of a warning text sent by the HRM application.

TESTING AND IMPROVEMENT

Currently, a select group of Fort Benning users have access to the first version of the HRM app. These users have already reported an improved understanding of the weather and microclimates and ease of access to information in the HRM app. The main draw so far has been the app's accuracy, ease of use, and data communication speed. Users are actively providing feedback to US Ignite that will help improve the HRM software in future iterations.

US Ignite partnered with Karthik Consulting for the back-end development and PixelPillow for the front-end development of the HRM application. For more information about the HRM app and other US Ignite projects at Fort Benning, please visit: www.us-ignite.org

US Ignite collecting feedback from users over demo period.

ABOUT US IGNITE

US Ignite collaborates with smart communities and research testbeds to drive high-impact solutions to their toughest challenges. Operating like a high-tech startup, our organization delivers timely results by applying technical expertise, stakeholder engagement, and targeted tools. US Ignite works tirelessly to ensure our programs are effective and reach the communities that need them the most. **LEARN MORE AT US-IGNITE.ORG.**