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USAMMDA Successfully Tests Arctic Shelter Systems in Extreme Conditions

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The U.S. Army Medical Materiel Development Activity (USAMMDA) has successfully completed rigorous environmental testing of its arctic shelter kit and support systems at the McKinley Climatic Laboratory (MCL) at Eglin Air Force Base. The five-day program, conducted from July 11-15, 2024, exposed the equipment to extreme cold temperatures as low as minus 60 degrees Fahrenheit and hurricane-force winds.

In collaboration with industry partners and MCL test engineers, USAMMDA advanced developers subjected multiple shelter kits and support systems to a range of simulated arctic conditions. The goal was to assess the equipment's ability to withstand the harsh realities of an arctic environment and identify areas for improvement.

"We are testing to make sure that the systems will even work under these extreme conditions. At such cold temperatures, screens and fabrics can crack, water will flash-freeze, oils and adhesives can dry and fail, and engines can potentially freeze and not function," said Jack Philpott, an assistant program manager with USAMMDA's Soldier Medical Devices Project Management Office. "We also captured temperature data on the shelters, determining how well the systems will keep personnel and casualties warm, looking for leaks, cold spots, and other potential weaknesses and limitations."

The MCL's unique capabilities, including its massive climate-controlled chambers, provided the ideal environment to evaluate the shelter systems under realistic conditions. By subjecting the equipment to such extreme temperatures and wind speeds, USAMMDA was able to gather valuable data on performance, durability, and potential vulnerabilities.

“[MCL offers] size and scale. It’s the only environmental chamber large enough to deploy several shelter systems [at the same time]. Some will hold a single shelter, but only MCL allowed us to deploy all four kits and systems and a legacy ‘control’ shelter at once under identical conditions,” said Philpott. “It is critical to know ahead of deployment whether a system is capable of operating in every environmental condition that it may be deployed to. The battlefield is not the place to discover that a system is not able to withstand the extreme cold. Finding any [system] limitations while still in development will avoid costly test-fix-test cycles later in the acquisition cycle and avoid having a system rendered inoperable in the field.

“We [also tested] to ensure that the shelters will not melt the permafrost under the tents, which could potentially create puddles that could leak into the shelters,” said Philpott. “Should a person step into a puddle at those temperatures, [it could] lead quickly to cold weather injury — frostbite can be instantaneous.

“The data received here will help identify limitations that can be addressed in future design turns and help inform training and doctrine for these systems should they eventually deploy.”

As the U.S. Army continues to focus on modernization for future operations, including those in arctic regions, the development of reliable and effective shelter systems is essential for the safety and well-being of soldiers. USAMMDA’s commitment to rigorous testing ensures that these critical systems will meet the demands of the battlefield.