

# COMMERCIALIZATION

Brochure



**ARMY**  **SB&R**  
SMALL BUSINESS INNOVATION RESEARCH



## Electronics Case Cooler

U.S. Army Communications-Electronics Research, Development and Engineering Center



Overheating is the leading cause of electronics failure and effectively cooling vehicle mounted electronics operating in extreme temperature environments has proven especially difficult. To efficiently cool electronics, a refrigeration based environmental control unit for electronics enclosures needs to be developed with the capability to dissipate over 500 watts of heat while maintaining internal air temperatures at or below outside ambient levels. Additional objectives include a heating capability for cold start and the ability to seal the electronics from environmental contamination.

Command, Control, Communications and Computers, Intelligence, Surveillance and Reconnaissance (C4ISR) systems have been using Commercial-Off-the-Shelf (COTS) rack mounted electronics that were originally designed for operation in air conditioned office buildings. These rack mounted systems are now deployed in transit cases that are exposed to rain, sand, and dust typical of a military environment and ambient temperatures exceeding 120°F. The environmental control unit, "ECU-CHILL" developed with Communications-Electronics Research, Development and

Engineering Center SBIR funding is a mission enabler for the fielding of COTS and high-end C4ISR electronics systems, by providing a clean, cool, sealed environment that helps ensure reliable operation in severe environments. ECU-CHILL is a vapor compression refrigeration system that consists of Aspen's unique, miniature rotary compressor, condenser, evaporator, fans, control system, expansion valve, heater, and refrigeration lines. A temperature sensor in the ECU monitors enclosure temperature and provides feedback to the ECU control system. Using this, the internal controls can vary the compressor speed to maintain desired enclosure temperatures. It maintains a sealed electronics enclosure at or below ambient temperatures, enabling C4ISR electronics to be safely and effectively used for computing and communications in extremely hot or cold environments.

### Technology Transition

The SBIR program was combined with Phase III contracts to fully develop the ECU-CHILL system into a field-ready system. ECU-CHILL is now in production at Aspen's facility and is beginning to be used by a major Army program with ECU systems being procured for 2 different systems. The Special Operations Command is using the ECU-CHILL on



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its Mine Resistant Ambush Protected vehicles to cool command and control equipment. To date, Aspen has received over \$7.2M in production orders for ECU-CHILL.

