



Teamwork and high-tech

When the military needs something, they need it upgraded, heavy-duty, reliable, and right now. Several U.S. companies are pooling their HD experience and working together to meet the challenges.

by J. Michael Dawson, T/CCI Manufacturing LLC

Adaptation is the key to survival. This theory holds true as the world struggles through economic recessions, shifts in environmental conditions, and wars. Since the inception of the war in Afghanistan in March of 2003, the industries of technology, manufacturing, and healthcare have made advancements that help the world adapt and enhance the safety and welfare of our troops in the Middle East. The air conditioning industry is no exception.

When the front lines of international conflicts moved to the desert, the military moved quickly to adapt the design and functionality of certain vehicles. Summer temperatures in the plains can reach 115 degrees F. (46 deg. C) and the "Winds of 120 Days" which occur between June and September can exceed 100 mph. Combine the wind with the destructive potential of extremely fine sand—loaded with salts, carbonates, and other chemicals that can corrode metal parts—and the A/C systems have to be effective and reliable.

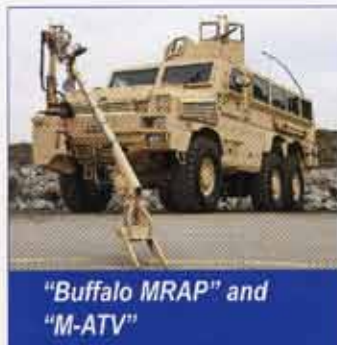
Over the last five years, the need has turned to properly equipping a new range of Mine Resistant Ambush Protected (MRAP) vehicles and new all-terrain versions called M-ATV's. The MRAP family of vehicles is a relatively new platform for the Department of Defense, and all of them are equipped with air conditioning to handle the extreme heat in both Operation Enduring Freedom (Afghanistan) and Operation Iraqi Freedom. These heavy-duty, armor plated machines need to be equipped with the

right components that fully protect the troops; reliable climate control increases the safety and health of personnel and protects the suites of electronic equipment found on board.

"Climate control is a matter of personal safety," said Gary Hansen, Vice President of Engineering for Red Dot, which

supplies A/C systems to companies like Oshkosh and BAE. "It used to be that only specialty vehicles and ambulances in the military were equipped with A/C systems. Today, it's a critical component in every armored field vehicle,"

The thick steel plating and bulletproof glass keeps the vehicles secure, but they don't breathe well and soldiers can't open a window or door in a war zone to get fresh air. In addition to working in the air-tight confines of the vehicle, in many cases occupants are suited in body armor which prevents normal body heat exchange. These A/C systems have to be able to reduce the inside vehicle temperatures by 50 degrees (from 130 down to 80) in less than an hour. The supply industry needed to increase cooling capac-



"Buffalo MRAP" and "M-ATV"

ity and upgrade all components to meet performance requirements.

The compressor is the heart of these systems and the key to bringing the entire cab temperature down quickly and efficiently. T/CCI, a manufacturer of heavy-duty A/C compressors, stepped up to meet the challenge.

"High capacity design and durability are critical to an effective compressor for these vehicles," said Richard Demirjian, Vice President of T/CCI Manufacturing. "Our company has a good track record in making reliable HD compressors, and this was a challenge we looked forward to."

The design

T/CCI was already using swash-plate compressor technology in their commercial products, and the engineers found that the dual-piston design was ideally suited for the rigorous demands of the upgrade. Durability was increased by adding a heavy-duty molycoating on the swash plate, and increasing the cylinder wall-to-piston surface area reduced surface stress and increased piston life.

"It's all about how you put it together – it's the engineering and the design that make a difference. Equally important is the commonality of components and having the needed support in place as well," Demirjian added. "If something needs to be fixed in the desert, these parts have to be easily sourced, simple to replace and easy to use."

One of the biggest differences between commercial and military vehicles is the frenetic pace of maintenance. With every troop rotation, a new group of soldiers or Marines has to learn how to operate and maintain the equipment. Everything needs to be simple, accessible and effective. If they're in the field and the A/C goes down, they may have to scrap the mission. To ensure every system is built with the highest level of efficiency and functionality, all industry parties work very closely with the vehicle manufacturers to make sure the parts and components are "in sync" before the finished product rolls out the door.

Armored and protected

Air conditioning was a rarity in military vehicles before 2004, but it's top-of-mind now. One reason is the additional protection on the vehicles. "Not every vehicle coming into service will require armor, but nearly all have the capability to add the armor if required," says Derek Kamemoto, lead engineer with Red Dot's Advanced Engineering Group. "And where there's armor, there's going to be air conditioning."

He also notes that TACOM and the Defense Department are interested in high-tech solutions if they mean a more reliable, more comfortable vehicle for the troops inside. Obviously the compressor – the heart of the A/C system – must be protected at all times. TACOM specs Red Dot's ProTech, a compact electronic control unit that monitors high-side system pressures, compressor clutch cycles, voltage, refrigerant charge, condenser fan operation,



PROFESSIONAL DiFM A/C STOP LEAK & SEALER REPAIR

Service Bays Not Busy Repairing A/C Leaks?



- ✓ A/C Stop Leak & Sealer Plus UV Dye.
- ✓ Available to Professionals for Professional Installation Only.
- ✓ Simple Installation Which Repairs Most Common A/C Leaks.
- ✓ Unlike Most DIY Off Shelf Products, A/C-1 Has No Additives That Will Harm or Clog Equipment.
- ✓ Compatible with ALL Types of Automotive Freon including R-12 (Dichlorodifluoromethane), R134a (1,1,1,2 Tetrafluoroethane) and Other Alternate Refrigerants.

www.BarsLeaksDiFM.com (800) 345-6572

© 2010 Bar's Products, Inc.

Teamwork and high-tech

and other performance indicators.

Blink codes on the ECU provide a simple visual indication of faults: a fast blink for low voltage, one blink for low charge, two blinks for lost charge, and so on. ProTecht also transmits A/C error and diagnostic codes to the vehicle's SAE J1708 data bus using SAE J1587 protocol. A technician



A variety of 8x8 and 10x10 "Heavy expanded mobility tactical trucks" (HEMTT) support military operations wherever needed.

can hook up a laptop running Windows-based A/C technician software and see details about active faults and the fault history.

"One of our priorities was to keep the air conditioning operating as long as possible without damaging the system," Kamemoto added. "We developed a feature for the military that allows the system to continue to operate in a limited capacity rather than completely shutting down. The blink codes will be displayed but the system is allowed to operate right up to the point of certain catastrophic damage before it disengages."

ProTecht is used on several military platforms as well as commercial vehicles. According to Kamemoto, "It offers the comfort, reliability and diagnostic tools the vehicle owner wants."

Moving Forward

Our industry has experienced tremendous growth in supplying the latest technology to the military over the last five years, and industry leaders are prepared to continue that growth. One company, Michigan-based Therma Tech, has specialized in engineering and manufacturing complete climate control systems for more than 60 years.

The company's president Denny Lowe offered some



2011 CONVENTION & TRADE SHOW

JANUARY 27 - 29, 2011 • DISNEY'S CORONADO SPRINGS RESORT • LAKE BUENA VISTA, FL.



MACS Thanks the Generous Sponsors of the Leading Forum for Mobile A/C & Heat Transfer
For More Information Phone: 215-631-7020 • Fax: 215-631-7017
E-mail: pam@macsw.org • Website: www.macsw.org

perspective: "Our view is that climate control for the military will continue to be an on-going requirement. We believe that there will be an increasing desire to make driving a military vehicle more automobile-like. Operator comfort may not be the primary reason, but increased comfort levels lead to improved performance and safety, and that will push vehicle manufacturers and climate control suppliers to continually improve in-vehicle system design."

"We all work as a team, and producing the next generation of best military equipment will be a team effort as well. I believe we're all equipped to keep up with future trends. Over the next 10 years, we may be moving to electronic compressors and new refrigerants. We're thinking about it now and we're ready to meet the future needs in the industry." ❁

Mike Dawson is Director of Sales for T/CCI Manufacturing based in Decatur Illinois. The company manufactures heavy duty compressors and clutches for the mobile air-conditioning and refrigeration industries.



OVER 200,000 EVAPORATORS IN STOCK...



EV-1250
Town Car



EV-1403
Caravan



EV-1804
Accord



EV-1276
Fusion



EV-1270
Explorer



EV-1731
Sequoia



EV-1711
4Runner



EV-6700
Golf/Jetta/Beetle

EXTENSIVE SELECTION OF EVAPORATORS AT:
WWW.GLOBALAIR.US

1098 NW 159th Drive - Miami Gardens, FL 33169 USA
Tel: 305-625-3454 Fax: 305-625-9935 *se habla español*