



## PRESS RELEASE

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## FOR IMMEDIATE RELEASE

### *Diversified Technology, Inc. and Mississippi State University Announce Patent License Agreement to Promote Tactical Mobile Power Technology*

RIDGELAND, MS – March 7, 2005 – Diversified Technology, Inc. (DTI) and Mississippi State University (MSU) today announced that a definitive Patent License Agreement had been executed. DTI worked initially to assist MSU in packaging of this prototype hardware into solutions that could meet military environmental and operating specifications. MSU has demonstrated applications of prototype hardware that could reduce the size and mass of current hardware by about 50%. Acquisition of the Technology from MSU will allow DTI to finalize, ruggedize and commercialize the technology for electric power conversion, generation and attendant processes based on the research work done at MSU.

A. Patrick Busby, President of DTI stated “We cannot emphasize enough our appreciation for the Center for Advanced Vehicular Systems (CAVS) cooperation with the technology transfer phase of this program. Through this cooperation, DTI is taking MSU’s research and proof of concept configuration and redesigning, repackaging and molding it into hardened combat ready equipment. The royalty stream paid to MSU by DTI after successful commercialization will benefit MSU’s research efforts and should be a model for future endeavors.”

Barrie McArthur, Vice Chairman of DTI heads the On Board Vehicle Power (OVBP) Project at DTI. Mr. McArthur stated, “Unlike many systems that were originally developed for the commercial, recreational vehicle market and are currently attempting to adapt to military specifications, the VPS-10K was designed and built to meet the stringent military requirements in conjunction with the Army Space & Missile Defense Command, from the ground up. The VPS-10K is the only known system that has a peak power output of 10KW, both single and three phase 120 VAC and 208 VAC outputs, takes its input from the vehicle’s 28VDC source, and produces its voltage outputs at 50 Hz, for international applications, 60 Hz for domestic applications, and 400 Hz for aircraft and radar applications. It has an independent speed control system to vary the vehicle’s motor speed in accordance with the electrical load that is being generated.”

“The significance of this development is realized by the fact that this small 17” x 19” x 8.25” module replaces a 10KW diesel generator that must currently be towed by trailer. By eliminating the need to tow trailer power, the warfighter can now travel through off-road terrain which was previously prohibitive, is not subjected to trailer rollover accidents which saves lives and eliminates the cost of a diesel generator and accompanying trailer. Derivatives of this power conversion concept are currently being investigated to produce even higher power, as well as, being adapted to on-person application for the individual soldier.”

MSU President Charles Lee explains “This is a terrific example of the university's increasing focus on research that has the potential for commercialization within the state. We believe a strong partnership between MSU and private industry will reap positive economic benefits, create more jobs and result in a better quality of life for all Mississippians.” MSU Research Vice President Colin Scanes believes “Mississippi State has become a leading developer and manufacturer of silicon carbide electronics and electronic materials, which provide the basis of this research effort by CAVS scientists Mike Mazzola and Marshall Molen. The university has adopted a proactive approach in taking intellectual properties to the marketplace.”

### **About VPS-10K Power Electronics**

A single box containing the electronics required to convert the output of the alternator may be flexibly mounted in various locations in the HMMWV, including the well behind the front seat (the auxiliary storage compartment) or in the wheel well of the HMMWV.

The following data summarizes the features of the system.

- Input voltage to Power Electronics: 24-28 VDC (standard HMMWV power)
- Output voltage of Power Electronics: 120/208 VAC (single or three phase)
- Output frequency: 50, 60, or 400 Hz (selectable)
- Output Power: 5.6 kW continuous\*, 7 kW peak\* or 7 kW\*\* continuous, 10 kW peak\*\*
- Dimensions: 17"x19"x8.25"
- Weight: 55 lbs
- Efficiency: >85%
- THD: <5%

Also, the system includes a circuit breaker installed in the HMMWV for protection purposes; and a 28-V high-current connector to connect the battery to the input of the power electronics. At the output of the power electronics, there is a 3 phase 208-VAC connector with neutral and safety ground to connect loads to the system.

\*5.6 kW continuous, 7 kW peak achieved using compact IGBT's.

\*\*7 kW continuous, 10 kW peak achieved using standard IGBT's.

### **Speed Control System:**

The system features an advanced adaptive speed controller. To optimally use the system, especially from the perspective of fuel economy, a speed control is necessary to match the most efficient speed of the engine to the load supplied by the power electronics. The adaptive speed controller uses a dc/dc converter and a stepper motor to move the throttle when a current transducer monitored by the speed controller senses a change in the load. The stepper motor is a NEMA 23 unit with dimensions of 2.22" x 2.22" which fits easily under the hood of the HMMWV. The rest of the speed controller electronics are mounted in a small box under the driver seat. A speed controller interface and display box is placed next to the ignition. This interface allows the driver to turn the system on or off, monitor a digital tachometer display, and set the mode of the speed control system to automatic or manual. The manual mode is much like cruise control in a normal automobile. The driver sets the engine RPM and the speed control maintains that speed. The automatic mode provides for load sensing and adaptive control, so that the engine speed is continuously adjusted to optimally power the load. Because the alternator provides DC current, it is NOT necessary to run the engine at a fixed RPM determined by the AC frequency required by the load. Thus wet stacking under light load conditions, a perennial maintenance problem with conventional diesel motor/generator sets, is eliminated.

### **About Diversified Technology, Inc.**

Diversified Technology, Inc., an Ergon Company, has been a leading designer/manufacturer of single board computers, embedded platforms, and rackmount systems in the industrial computing market for over 33 years. As a member of the Intel® Communications Alliance and an ISO9001 certified company, DTI provides leading edge computer boards, systems, and products for the Communications, Government / Military and Commercial markets. ([www.dtims.com](http://www.dtims.com))

### **About CAVS**

The State of Mississippi committed to the establishment and continued operation of the Center for Advanced Vehicular Systems (CAVS) at Mississippi State University (MSU) with a branch of CAVS to be located near the Nissan plant in Canton, MS. CAVS' mission is to research and develop design and manufacturing means and methods for producing superior quality vehicles with advanced features and functions at reduced costs and shorter product development times and exploiting the underlying technologies for broader industrial use. The mission also includes engineering extension, education and workforce training outreach for industry. Reducing product development time involves both the development of the product and the manufacturing start-up. This first "compelling issue" presents an opportunity to exploit existing MSU computational engineering expertise. To address these needs, CAVS is organized into three major research areas: 1) Alternative Power Systems, 2) Computational Manufacturing and Design, and 3) Human and Systems Engineering. For more information visit: (<http://www.cavs.msstate.edu/>)