

# Army Guide monthly



## # 8 (95) August 2012

- U.S. Marine Corps Uses Oshkosh TerraMax™ UGV Technology to Prepare for Future Missions
- LM to Integrate Fuel Cells, Solar Power for Military Applications
- Camouflage research blending in with future ADF needs
- Fidelity Wins \$176 M Manufacturing Contract from US Army
- LM Receives US Marine Corps Contract For Personnel Carrier Vehicle Study and Demonstration
- Iconic Armoured Mamba Hulls to be made by MTL Group
- KONGSBERG Wins next phase CROWS Contract
- Armoured SISU 8x8 Fire Truck brings extinguishing operations to new level
- Oshkosh Defense Delivers 10,000 FMTVs to the U.S. Army in Less Than Two Years
- Finland Orders Weapon Stations for RG32M Armoured Vehicles
- Oshkosh Receives EMD Contract to Develop JLTV - the Future of Light Tactical Vehicles
- UK Ministry of Defence has announced plans to procure 25 extra Foxhound vehicles to add to the Army`s existing fleet
- Lockheed Martin Wins \$65 Million JLTV Engineering and Manufacturing Development Phase
- AM General`s BRV-O Selected for Next Phase of Joint Light Tactical Vehicle Development
- COMBAT CRITICAL CARE CORPORATION Announces The O2PAK CHEMICAL OXYGEN GENERATOR
- AT FMCW Radar Solutions
- ManTech Awarded \$30 Million to Support U.S. Marine Corps' Cougar Family of Mine Resistant Ambush Protected Vehicles

## Future Technologies

### U.S. Marine Corps Uses Oshkosh TerraMax™ UGV Technology to Prepare for Future Missions



OSHKOSH, Wis. -- Unmanned tactical wheeled vehicles have the potential to serve as a force multiplier and reduce Warfighters' exposure to lethal attacks continue to come closer to reality. The U.S. Marine Corps Warfighting Lab (MCWL) and Oshkosh Defense, a division of Oshkosh Corporation, recently conducted the Marines' first-ever training of multiple unmanned ground vehicles (UGV) in a single convoy using the Oshkosh TerraMax™ UGV technology.

The Marines then evaluated the UGVs to determine how they can be utilized to support real-world “dull, dirty and dangerous” missions.

These most recent developments are a continuation of the MCWL's Cargo UGV initiative, which uses Oshkosh Medium Tactical Vehicle Replacements (MTVR) equipped with the TerraMax UGV technology, and took place during the MCWL's Enhanced MAGTF Operations (EMO) Limited Objective Experiment (LOE) 2.2, July 24 through Aug. 5 at Fort Pickett, Va. The EMO LOE 2.2 sought to evaluate technologies and capabilities being developed for future missions.

“Seven Marines were trained on our UGVs' operations in only three days at the EMO LOE 2.2,” said John Beck, chief unmanned systems engineer for Oshkosh Corporation. “That's a testament to the TerraMax technology's ease of control and user-friendly design. The capabilities of our highly sophisticated UGV systems require minimal user intervention to complete their missions – opening the door for future logistics operations to be conducted with fewer Warfighters, reducing cost and saving lives.”

Combat-veteran Marines were trained on the Oshkosh UGV technology for the first time in August 2011 and also assessed it in a series of tests in challenging terrain and environments. Following that successful evaluation, Oshkosh delivered a second TerraMax-equipped MTVR earlier this year, and in June the government evaluated two Oshkosh UGVs operating in concert with a manned command-and-control vehicle. Several key tasks were accomplished, including:

- One operator supervised the operation of two unmanned MTVRs in convoy operations
- Vehicles operated successfully in complete blackout mode during night operations with no degradation in performance
- Vehicles navigated a wide range of terrain, including deep sand trails, clay roads with

encroaching vegetation, two-track trails overgrown with grass and narrow creek crossings, and adjusted speeds to maintain proper intra-vehicle spacing

#### TerraMax UGV Technology

The Oshkosh TerraMax UGV technology is designed as a scalable kit. It can be integrated on new-production vehicles, including those built by other manufacturers, or retrofitted on existing vehicle fleets. Vehicles using the TerraMax technology can retain original payload and performance capabilities, and they can run planned missions in full autonomous mode or by “shadowing” a leader vehicle.

The TerraMax technology can function in the same weather conditions and operating environments as manned vehicles, requiring minimal human interaction and operator training. Oshkosh is teamed with the National Robotics Engineering Center of Carnegie Mellon University for perception system and autonomy software development.

The Cargo UGV project is sponsored by MCWL and the Joint Ground Robotics Enterprise Robotics Technology Consortium. Oshkosh received a contract for the Cargo UGV initiative in June 2010.

Oshkosh executives will be on hand to discuss the Cargo UGV initiative and the TerraMax technology at booth #4232 at AUVSI's Unmanned Systems North America 2012.



## Future Technologies

### LM to Integrate Fuel Cells, Solar Power for Military Applications

Lockheed Martin [NYSE: LMT] secured a contract with the Office of Naval Research for the design and development of solid oxide fuel cell generator sets as an alternative to traditional battlefield power generation equipment.

Lockheed Martin's fuel cell technology will be integrated with solar panels, providing the military with the power needed to perform missions while using dramatically less fuel.

At the end of the 32-month development program, Lockheed Martin will demonstrate and deliver a multi-kilowatt JP-8 compatible Fuel Cell Efficient Power Node for evaluation by the U.S. Marines. The goal of the approximately \$3 million dollar contract is to reduce overall fuel usage required for tactical electrical generation by 50 percent or more.

More than 100,000 military generators are used worldwide to power services from lighting and air conditioning to computers, radios, and command and control systems. Solid oxide fuel cells convert fuel into electricity using a chemical reaction that is 30 to 50 percent more efficient than the combustion engines used in diesel generators, which are the largest consumers of fuel on the battlefield today. Because fuel cells require less fuel to create the same amount of power, they offer the potential to save billions of dollars in operational costs and to reduce the number of military casualties that

are directly related to the delivery of fuel.

“Lockheed Martin shares the U.S. Department of Defense’s top goals of increasing the safety of our troops and reducing operational costs,” said Dan Heller, vice president of new ventures for Lockheed Martin Mission Systems & Sensors. “Alternative energy solutions, such as the fuel cell we are developing for the Office of Naval Research, can help mitigate these challenges, advancing the strength and flexibility of our military operating in some of the world’s toughest conditions.”

Lockheed Martin is working with Cleveland-based TMI to mature the fuel cell technology. In addition to Lockheed Martin-funded research and development, this team has received competitive grants from the Ohio Third Frontier, a program committed to creating new technology-based products, companies, industries and jobs. In 2011, Lockheed Martin became the first company to continuously operate a solid oxide fuel cell generator set for over one thousand hours on standard DoD-supplied JP-8, and remains the only company to do so to date.



### Future Technologies

#### Camouflage research blending in with future ADF needs



Research that could significantly enhance the Australian Defence Force (ADF) vehicle camouflage scheme has commenced - in unassuming form, on a light board at the back of a Defence Science and Technology Organisation (DSTO) laboratory, in Melbourne.

The work is focussed on the development of electrochromic materials that change colour with subtle variation in applied voltage. It now forms the basis of a new collaboration with the University of South Australia.

“An outcome is still some years off,” explains DSTO researcher Vivienne Wheaton, “but the ADF has expressed interest in the concept.”

Currently, ADF vehicles are coated with a paint scheme, devised by DSTO, according to a standard specifying colours and near-infrared properties.

“Historically, we have developed camouflage that works very well against specific backgrounds. However, backgrounds change, obviously, by moving from one location to the next – and the ADF can expect to deploy vehicles to a wide variety of operational areas.”

“Even if we stay motionless in the same position, the

same scene can look very different at different times of the day, under different weather conditions and throughout different seasons. A camouflage scheme that worked effectively in one instance may be completely ineffective in another,” she says.

Indeed, Australia’s military deployment since the 1960s attests to the variety of environments that the armed forces are expected to operate in: Vietnam, the Gulf, East Timor and the Solomon Islands, each with comparative geographical differences that required specific camouflage to suit respective environments.

Vivienne powers the small concept display in the DSTO laboratory – a voltage supply connected to five board-mounted polymer film panels, known commercially as ‘SPD- Smart’ film.

“The panels are purchased samples of electrochromic material that can be deposited onto glass or other polymer surfaces,” Vivienne says.

Within moments, the densely coloured panels illuminate to a murky green; minimally at first, but enough to visualise the potential of the energy transfer at play – as a chameleon lizard alters its appearance to avoid prey, could a military vehicle’s camouflage change, to enhance its safety?

Applied voltage changes the alignment of small particles in the film, to give a darker or lighter appearance depending on orientation of the particles. The SPD smart film is a high voltage system, but other types of smart materials exist that are low voltage, low power systems more suitable for camouflage applications.

“Applied voltages of less than 5 V will generally initiate colour changes in electrochromic materials, where the change is a result of the chemical species switching between oxidation states.”

“We’re talking about electrochromic pixels that are only effective in the visible band.”

That poses a problem for future implementation of this form of technology.

“It’s important that modern camouflage covers most of the electromagnetic spectrum – from visible light, through infrared and radar wavelengths, because battlefield sensors exploit many different parts of the spectrum.”

In short, a military vehicle suitably camouflaged to one, or few parts of the electromagnetic spectrum, is potentially exposed to other parts – increasing its ‘visibility’ to hostile parties.

“A number of adaptive technologies are under development throughout China, North America and Europe, focusing on different parts of the electromagnetic spectrum, but integrating them into a multi-spectral solution is a significant future challenge.”

As this work is at a concept stage, there are still many technical challenges to surmount.

“If this technology were to be developed to create an adaptive camouflage system, ideally the materials would be controlled so as to respond automatically to changes in the environment around them.”

“That would require sensors, integrated with the system, to sense the environment and appropriate signal



processing to make enough sense of the environment's stimuli, and effectively guide the colour transition and pattern generation," Vivienne says.

"Most current implementations of electrochromics use materials like glass or shiny films that are not well suited to a camouflage application on military vehicles."

Accordingly, DSTO is progressing a related PhD collaboration with the University of South Australia, to investigate the science behind the panels, with the view to developing the concept into something that can go into the field.

"The collaboration is examining the challenge of developing electrochromics that can be packaged in a more robust, field-ready way."

"If we can resolve these field issues for electrochromic materials, in the future we may be able to assist the ADF with adaptive improvements to their camouflage systems."

Vivienne disconnects the modest concept display – the SPD films at once return to charcoal black again.

### Contracts

#### Fidelity Wins \$176 M Manufacturing Contract from US Army

Fidelity Technologies Corporation, a Reading-based defense contractor, has secured a five-year contract valued at approximately \$176 million with the U.S. Army to construct power generators, company officials announced today.

The contract with Project Manager-Mobile Electric Power (PM-MEP), based in Fort Belvoir, VA, covers production through July 2017 of 3 kilowatt Tactical Quiet Generator sets (3kW TQG). The 3kW TQG is a rugged, self-contained, portable generator designed for peak military performance in any global environment. The light-weight, diesel fueled generators have radically improved survivability, mobility, reliability and maintainability, providing a source of safe, basic power to the warfighter.

The first delivery order will produce 20 units that will undergo rigorous testing at Fidelity's Exeter, PA manufacturing facility, plus initial production units. Production will continue at a rate of up to 245 generators per month.

"To meet production demands, we anticipate creating as many as 40 new manufacturing and technician jobs, as well as 10-15 administrative positions," said Fidelity President David Gulati. "This contract aligns perfectly with our Military and Aerospace Manufacturing Division's strategic plan to expand market share in the military mobile electric power space."

Since July 2008, Fidelity has manufactured man-portable power distribution equipment and cable assemblies for the U.S. Army. The addition of the lightweight, portable 3kW TQG increases Fidelity's capabilities as a supplier of military power distribution equipment.

"Our team has certainly proven to be a supplier of

quality mobile electric power equipment – reliable, on time and competitively priced," said Bob Lesko, General Manager of Fidelity's Military & Aerospace Manufacturing Division. "This contract allows us to build on past success and open more doors within the military mobile electric power market."

### Contracts

#### LM Receives US Marine Corps Contract For Personnel Carrier Vehicle Study and Demonstration



Underscoring the company's ability to deliver cost effective ground vehicle solutions, Lockheed Martin received a \$3.5 million contract from the U.S. Marine Corps to test and validate the company's Havoc 8x8 vehicle as part of the Marine Personnel Carrier (MPC) program.

During an eight-month evaluation period, the U.S. Marine Corps will verify human factors and amphibious capabilities of Lockheed Martin's vehicle at the Amphibious Vehicle Test Branch at Camp Pendleton, Calif. Related protection evaluations will occur at the Nevada Automotive Test Center in Carson City, Nev.

"Our Havoc 8x8 is a low-risk, combat-proven solution that is in service with six countries and manufactured on multiple, active production lines," said Scott Greene, vice president of ground vehicles in Lockheed Martin's Missiles and Fire Control business.

The Lockheed Martin Havoc 8x8 vehicle leverages the combat-proven Patria Land Systems' 8x8 Armored Modular Vehicle, which has been selected by six different European countries, is currently in production, and is deployed in Afghanistan. Lockheed Martin is embedding U.S. content into the design, including technology and protection systems.

"Lockheed Martin has extensive experience integrating advanced C4ISR, weapons and protection systems for armored vehicles," said Greene. "Havoc will provide the Marines with high degrees of mobility and protection while being simple to operate and maintain in challenging conditions."

### Defence Industry

#### Iconic Armoured Mamba Hulls to be made by MTL Group

Leading global armour specialist MTL Group has been awarded a significant contract to supply fabricated armoured hulls to Panzer Technologies

for its Mamba Vehicle.



The armoured vehicles which are intended for use in peace keeping operations will be manufactured at MTL Group Headquarters in the UK then shipped ready for final assembly to South Africa.

Simon Hurst Sales Manager for Defence said:

“This is an important order for MTL Group and it makes it even more special manufacturing such an iconic vehicle such as the Mamba”.

The Mamba vehicle has been around a long time and has proven itself over and over again. MTL Group was chosen as the preferred supplier for various reasons. Along with its state of the art manufacturing capability and competitive pricing, MTL Group adds value to THE project through its unique DFM (Design for Manufacture) service.

“The customer liked the idea that we wouldn't just weld the product rather that we would support and provide a DFM review that would enhance the product”

MTL Group's objective is always to look at areas for design improvement where weight and cost can be removed and ideas to improve protection can be implemented, giving its customers an enhanced value proposition.

MTL Group's DFM is a proven service and has really taken off with many leading OEMs engaging with MTL Group at the design stage to help them produce more cost effective vehicles that can compete in today's economic climate.

“The key thing our customers like" says Hurst "is the innovation we bring, we are helping designers around the world to improve the integrity of the structure whilst reducing manufacturing costs”

MTL Group will exhibiting its one piece blast floors and IMPAS armour at African Aero Defence 2012 in Johannesburg this September.

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### Contracts

## KONGSBERG Wins next phase CROWS Contract

KONGSBERG has been awarded a new framework agreement from the U.S. Army for production, system support and technical engineering support of the M153 CROWS Remote Weapon Stations (RWS).

The contract was won in a full and open competition. The framework agreement has a value up to \$970M and extends over a 5 year period. KONGSBERG has

received the first order under the framework agreement. The order carries a value of \$9.1M. The total scope of the agreement will depend on future demand and annual allocations. KONGSBERG has delivered RWSs to the U.S. Army's CROWS program since 2007.



“KONGSBERG is very proud to have been selected as the supplier for the next phase of the CROWS program. We have produced and delivered PROTECTOR RWS systems for over a decade and this new contract reflects the U.S. Army's confidence in the ability of KONGSBERG to provide high quality systems, services and solutions.” says Walter Qvam, CEO, Kongsberg Gruppen.

“This contract award is a product of KONGSBERG's longstanding commitment to successfully deliver innovative solutions that meets our customers' high demands for quality and efficiency, says Egil Haugsdal, President of Kongsberg Protech Systems. Our team looks forward to continuing the excellent relationship we have with the U.S. Army and to delivering highly advanced systems that meet customer's current and future needs.”

M153 CROWS is the primary remote weapon station being used by U.S. forces. KONGSBERG, working under the previous CROWS contract, has delivered over ten thousand M153 CROWS units to the U.S. military to date.

“It is an important contract, and winning this program in the midst of a tough market ensures KONGSBERG's world leading position in the market for remotely operated weapon stations,” continues Egil Haugsdal.

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### Defence Industry

## Armoured SISU 8x8 Fire Truck brings extinguishing operations to new level



Finnish Defence Forces have recently introduced a new flagship for fire extinguishing and rescue operations, an armoured SISU 8x8 fire fighting vehicle.

The design for the new extinguishing concept started five years ago. The result, an impressive thirty-ton vehicle is now undergoing field tests, during which the performance of the vehicle is demonstrated in connection with e.g. live firing exercises. The field tests of the new extinguishing concept are scheduled to be succeeded by serial production from 2013 onwards.

The vehicle carries a 10-ton extinguisher container, which can be quickly decoupled from its eight-wheel carrier. Further to the comprehensive decoupling feature, the essential properties of the new fire-fighting vehicle include remote control system for the extinguisher, and high protection level for the crew.

- A video camera, and a thermal camera located on cabin roof of the vehicle transmit an image to the control panel screen inside the cabin. Water cannon can thus be remote controlled from the cabin. The crew does not need to leave the vehicle cabin, but all the operations can be carried out with protection against smoke, fire and explosions comment rescue chiefs Jukka Hämäläinen and Raimo Toppi from the Finnish Defence Forces in article published earlier on Forces' web page.

Cabin of the SISU 8x8 fire-fighting truck is NBC protected, providing protection against the potentially dangerous aerosols on the field during the operations. The SISU 8x8 military truck has also advanced mine- and ballistic protection features. The mine- and ballistic protection of the vehicle meets with the criteria of STANAG 4569 standard, and the related properties have been tested and proven in live tests in co-operation with the Finnish Defence Forces.

In addition to the newly introduced fire extinguisher variant, the versatile SISU 8x8 military truck currently is in service also, for example, as missile launcher vehicles, radar carrier vehicles and recovery vehicles. The generous available payload and the advanced armoring solutions in connection with the outstanding off-road mobility together make the SISU 8x8 as a preferred answer to various performance requirements in the field of military logistics.

### Defence Industry

## Oshkosh Defense Delivers 10,000 FMTVs to the U.S. Army in Less Than Two Years

OSHKOSH, Wis. -- The United States Army and Oshkosh Defense, a division of Oshkosh Corporation, today commemorated the production of the 10,000th Oshkosh-built Family of Medium Tactical Vehicles (FMTV) truck – less than two years after Oshkosh began producing FMTVs under a contract awarded in October 2009. Sept. 30, 2012, will mark a production milestone for Oshkosh Defense as the company will manufacture more vehicles for the FMTV program than it has ever produced in a single fiscal year.

The U.S. Army and National Guard rely on the FMTV at home and abroad in tactical and combat operations, relief efforts and unit resupply missions. Over the life of the contract, Oshkosh will deliver upwards of \$2 billion in cost savings to the Department of Defense through

relatively lower priced vehicles that still offer quality and reliability improvements.

“Our number one priority is providing soldiers with very high quality vehicles that meet the Army’s needs,” said Mike Ivy, vice president and general manager of Army Programs for Oshkosh Defense. “Delivering the 10,000th vehicle within two years of starting production demonstrates Oshkosh Defense’s commitment to our nation’s defense. The FMTV program is one in a long history of programs that represent our unparalleled support to the men and women in uniform.”

Oshkosh has delivered unprecedented vehicle quality and value through its flexible assembly lines that allow the company to build different vehicles for different programs at any given time. Oshkosh also operates an enterprise-wide supplier network for multiple defense and commercial programs to provide economies of scale across its vehicle portfolio – from snow removal trucks, refuse haulers to fire apparatus and access equipment.

The Oshkosh FMTV is a series of 17 models and 23 configurations ranging from 2.5-ton to 10-ton payloads. The vehicles feature crew-protecting armor and advanced technologies to provide the capability, versatility, mobility and protection to move troops and supplies, recover vehicles and weapon systems or haul equipment wherever the mission requires. Commonality of parts of over 80 percent across chassis variants optimizes logistics efficiency and reduces operational costs. The Long-Term Armor Strategy-compliant cab and other advanced technologies give military personnel the enhanced protection they need to confidently complete their missions.

Oshkosh Defense has received orders for more than 30,000 FMTV trucks and trailers from the U.S. Army TACOM Life Cycle Management Command (LCMC). The five-year requirements contract for the production of trucks and trailers, as well as support services and training, runs through fiscal year 2014.

### Contracts

## Finland Orders Weapon Stations for RG32M Armoured Vehicles



Finland’s Ministry of Defence has placed an order for manned weapon stations to equip its fleet of RG-32M mine hardened armoured patrol vehicles. Valued at more than US\$1.7 million, the contract was placed with Australian weapon mount producer, W&E Platt.

It will involve supply of 39 Platt MR550 Bi-Metal Ring Mounts, which are to be shipped to Finland for installation on Finnish Army RG-32M vehicles.



The MR550 Bi-Metal Ring Mount provides firepower and protection for vehicle gunners and utilises a dual layer of armour to save weight yet still provide protection against improvised explosive device blast and small arms fire. The protection level is upgradeable to STANAG Level 3.

This is the second order of the MR550 Bi-Metal Ring Mount by Finland, coming off the supply of 10 mounts to a similar configuration in late 2011. Sweden also operates the RG32M fitted with the MR550 Bi-Metal Ring Mount, where it has been deployed on operations in Afghanistan.

At a fraction of the cost and complexity of remote weapon stations, the MR550 Bi-Metal Ring Mount is tailored for wheeled and tracked armoured vehicles with a gross vehicle mass under 10 tonnes, or larger vehicle designs sensitive to changes in centre-of-gravity. Finnish MR550 Bi-Metal Ring Mounts will be fitted with various mission kits such as wire cutters, ammunition stowage racks, M72 light anti-armour weapon holders and brackets for high-powered lights to enable night operations.

In Finnish Army service the MR550 Bi-Metal Ring Mount will be equipped with legacy Soviet-era weapons such as the NSV/12,7 ITKK 96 12.7mm heavy machine gun and PKM 7.62mm machine gun, as well as the M2HB 12.7mm heavy machine gun and HK 40mm Grenade Machine Gun. The ring mount is manually operated via gearbox and traverses through 360 degrees. Maximum weapon elevation is +65 degrees and depression -35 degrees.

Deliveries of MR550 Bi-Metal Ring Mounts to Finland will commence in the 4th quarter of 2012.



### Future Technologies

## Oshkosh Receives EMD Contract to Develop JLTV - the Future of Light Tactical Vehicles



The U.S. Department of Defense has awarded Oshkosh Defense, a division of Oshkosh Corporation, a contract for the Joint Light Tactical Vehicle (JLTV) program's Engineering, Manufacturing and Development (EMD) phase. The JLTV program aims to replace many of the U.S. military's aged HMMWVs with a lightweight vehicle that offers greater protection, mobility and transportability.

“The JLTV program is critical to supporting our troops who stand in harm's way and deserve the best equipment that industry can provide,” said John Urias, Oshkosh Corporation executive vice president and

president, Oshkosh Defense. “The Oshkosh JLTV solution will allow the Army and Marine Corps to provide unprecedented levels of protection and off-road mobility in a light vehicle – so that their troops can accomplish their missions and return home safely.”

JLTV is managed by the Joint U.S. Army and U.S. Marine Corps program, under the leadership of the U.S. Army's Program Executive Office for Combat Support and Combat Service Support (PEO CS&CSS). Under the contract, Oshkosh will deliver 22 Oshkosh-designed and manufactured JLTV prototypes within 365 days of contract award, and support government testing and evaluation of the prototypes.

Since 2006, Oshkosh has invested significantly in independent R&D to develop its JLTV solution. Oshkosh employed a generational product development approach that aligned to rapidly evolving technical requirements. As a result, the Oshkosh JLTV delivers the latest automotive technologies, an advanced crew protection system, and a next generation TAK-4i™ independent suspension system to achieve JLTV performance at an affordable price. The Oshkosh JLTV is fully tested, ready for initial production, and meets or exceeds the requirements of the JLTV program.

“The Oshkosh JLTV solution was designed with a purpose – to keep Warfighters safe on future battlefields with unpredictable terrain, tactics, and threats,” said John Bryant, vice president and general manager of Joint and Marine Corps Programs for Oshkosh Defense. “Oshkosh has a 90-year history of delivering high quality military vehicle programs on-time and on-budget, and our JLTV program is no exception. We understand how critical this light, protected, off-road vehicle will be to Warfighters.”

The Oshkosh JLTV solution, called the Light Combat Tactical All-Terrain Vehicle, or L-ATV, offers an advanced crew protection system that has been extensively tested and is proven to optimize crew survivability. The L-ATV can accept multiple armor configurations, which allows the vehicle to adapt easily to changing operational requirements. The L-ATV also applies the Oshkosh TAK-4i™ intelligent independent-suspension system to provide significantly faster speeds when operating off-road, which can be critical to troops' safety.

Oshkosh Defense has an unwavering commitment to the men and women who serve our nation. Notably, Oshkosh was awarded the M-ATV contract in June 2009 on an urgent needs basis. Oshkosh ramped up production at a historical pace – delivering 1,000 vehicles per month within six months. Oshkosh delivered more than 8,700 M-ATVs, most of which were deployed in Afghanistan and are credited for saving thousands of troops' lives.

“Oshkosh's M-ATV is the only vehicle in the combat theater in Afghanistan performing the JLTV's mission profile,” said Bryant. “We delivered more than 8,700 M-ATV's on-time and on-budget, and Oshkosh will bring the same level of commitment to the JLTV program.”



## Army

## UK Ministry of Defence has announced plans to procure 25 extra Foxhound vehicles to add to the Army's existing fleet



The MOD made an initial order for 200 Foxhound vehicles in November 2010 and a further 100 were requested late last year as part of a BJ400m package. The latest 25 will be in addition to this at a cost of BJ30m

The MOD made an initial order for 200 Foxhound vehicles in November 2010 and a further 100 were requested late last year as part of a BJ400m package. The latest 25 will be in addition to this at a cost of BJ30m.

Foxhound, the Army's state-of-the-art light protected patrol vehicle, arrived in Helmand province in June of this year.

The Minister for Defence Equipment, Support and Technology, Peter Luff, made the procurement announcement today at an event at the Army's Bulford Camp showcasing the capabilities of Service personnel from 4th Mechanized Brigade who are preparing to deploy on Operation HERRICK 17.

Mr Luff said:

"I was very pleased to be able to confirm the purchase of 25 additional new Foxhound vehicles.

"Foxhound's cutting-edge technology gives our troops the ability to engage with Afghan civilians, as they must, whilst benefiting from a high level of protection. Personnel from 4th Mechanized Brigade will be amongst the first to use this outstanding new vehicle.

"This is another example of how the MOD, having balanced the budget, is now able to confidently spend money on the equipment that our personnel really need."

Personnel from 4th Mechanized Brigade will be amongst the first to make use of the new Foxhound vehicle on operations. For its size and weight, Foxhound provides unprecedented levels of blast protection against the threats faced by troops on the front line.

Robust enough to withstand the blast from an IED, it has a top speed of 70mph (113km/h). The engine can also be removed and replaced in just 30 minutes and it can drive away from an ambush on only three wheels.

4th Mechanized Brigade will deploy to Afghanistan in October for a six-month tour as the lead formation of Task Force Helmand. Due to the significant progress in the development of the Afghan National Security Forces it will be the first brigade to oversee a drawdown of British troops from Helmand province, with the UK's

military commitment there due to be cut by 500 by the end of the year.

The showcase at Bulford has enabled members of the Task Force to show off their skills, from marksmanship and search dog handling, through to the challenges of having to cook for thousands of soldiers, sailors and airmen and women on a daily basis.

Brigadier Bob Bruce, Commander of 4th Mechanized Brigade, said:

"Today has enabled many of the men and women who will deploy on HERRICK 17 to showcase not only the high quality equipment with which they will deploy but also the result of the extensive pre-deployment training that they have conducted.

"4th Mechanized Brigade previously deployed to Afghanistan in 2010, but a lot has changed since then. Now we are well down the path of transition - the handover of security responsibilities to our Afghan colleagues - and our strategic outlook is very different to what it was two years ago.

"Notably, we will be the first Task Force to see our numbers reduce during the course of our tour, a big challenge but one we will embrace.

"We are an experienced and well-balanced Task Force; while based on a regular Army formation we also have a number of regular Royal Navy and RAF Service personnel in our ranks, as well as a number of reservists who have readily volunteered their time to accompany us to the front line."

The tour will see 'The Black Rats', as 4th Mechanized Brigade is also known, working in support of the Afghan National Army's 3/215 Brigade and the Afghan National Police in their mission to bring security and stability to a region that has known years of unrest but has seen steady progress thanks to the efforts of Afghan, British and other international forces.

Approximately 10 per cent of the personnel who deploy on Op HERRICK 17 will be reservists, including elements of 6th Battalion The Royal Regiment of Scotland, 103 Battalion Royal Electrical and Mechanical Engineers, 243 (Wessex) Field Hospital and 101st (Northumbrian) Regiment Royal Artillery.

Mr Luff added:

"I was delighted to have the opportunity to meet some of the members of 4th Mechanized Brigade who will deploy to Afghanistan in the autumn and will face an entirely new challenge.

"They continue the work of their predecessor brigades and also oversee the beginning of our drawdown as Afghanistan looks ahead to a future with its own Armed Forces taking the security lead."

4th Mechanized Brigade will replace 12th Mechanized Brigade when they deploy on Op HERRICK 17 in October 2012.

## Future Technologies

### Lockheed Martin Wins \$65 Million JLTV Engineering and Manufacturing Development Phase



DALLAS -- Lockheed Martin [NYSE:LMT] received a \$65 million contract from the U.S. Army and U.S. Marine Corps to continue developing the Joint Light Tactical Vehicle (JLTV) through the Engineering and Manufacturing Development (EMD) phase.



The Lockheed Martin team optimized a JLTV model already proven in government testing to create its EMD design. The production-enhanced JLTV maintains the proven force protection, mobility, transportability and reliability of the earlier Technology Demonstration (TD) model, while significantly reducing weight and cost. The team's JLTV design reflects improvements from more than 160,000 combined testing miles.

"We are extremely pleased to announce the selection of the Lockheed Martin JLTV design as one of three mature vehicles selected to enter the Engineering and Manufacturing Development Phase of the JLTV Program," said Col. David Bassett, project manager at the JLTV Joint Program Office. "We are confident that the Lockheed Martin team, along with the other two selected vehicles, are ready to demonstrate their ability to meet and exceed our requirements, deliver vehicles on schedule, and achieve the manufacturing and sustainment costs necessary to compete effectively for production."

Formed in 2005, the Lockheed Martin-led JLTV team includes tactical wheeled vehicles expertise at BAE Systems in Sealy, Texas, which is an industry leader in advanced armor solutions and high volume assembly. The team also includes numerous Tier 1 suppliers, including: Allison Transmission, Cummins Engine, L3 Combat Propulsion Systems, Meritor Defense, Robert Bosch LLC and Vehma International of America. "We've had a consistent team since day one, and this win highlights the merits of a stable, proven design," said Scott Greene, vice president of ground vehicles at Lockheed Martin's Missiles and Fire Control business. "Two JLTVs have been produced on an active manufacturing line, so we are already well prepared for rapid production and testing."

The firm fixed-price contract has a 27-month performance period with deliveries of 22 vehicles taking place within 12 to 14 months. Primary variants with companion trailers include the utility carrier and shelter (JLTV-UTL), a two-seat prime mover with an open bed; and the general-purpose vehicle (JLTV-GP), which is a four-seater that will carry troops, ammunition and small supplies.

Lockheed Martin's JLTV EMD vehicles are more affordable than their predecessors, offering lower-cost materials with high fuel efficiency and low logistical support costs. The vehicles offer enhanced crew safety

based upon government tests that show the design meets the high blast-protection standards, with margin, of many existing mine-resistant vehicles serving in combat today. Additionally, the Lockheed Martin team shaved hundreds of pounds off the TD design, which was already proven in helicopter lift tests.



### Future Technologies

## AM General's BRV-O Selected for Next Phase of Joint Light Tactical Vehicle Development



SOUTH BEND, Ind. -- AM General's independent proposal for the U.S. military's new Joint Light Tactical Vehicle (JLTV), was selected today for a \$64.5 million Engineering, Manufacturing and Development (EMD) phase contract. AM General will produce and deliver 22 prototypes of its Blast Resistant Vehicle - Off road (BRV-O) for government testing under the EMD phase.

"We are pleased to receive this contract award for the next step in the JLTV program," said Charles M. Hall, president and CEO of AM General. "It's a tribute to the design, engineering and program management team that developed, built and tested BRV-O, and to the AM General workforce that has established such a great track record of supporting our military customers with innovative, affordable and dependable light tactical vehicle products and services for more than five decades. As the most experienced tactical wheeled vehicle provider in the United States, AM General is uniquely focused on meeting the needs of the U.S. armed forces and our team is prepared to move forward - shoulder-to-shoulder with our customer - on this critical national initiative. BRV-O is ready now to meet warfighter's demands for a new light tactical vehicle."

BRV-O is based on more than a decade of AM General investments in research, development and testing for this next-generation light tactical military vehicle. Its mobility technology, matured to meet Warfighter demands, accumulated more than 300,000 operational test miles and demonstrated high reliability and maintainability. BRV-O features a crew capsule and modular armor already proven effective in government-supervised blast testing. The BRV-O design can be readily adapted to future changes in U.S. military missions, enemy threats and new protection technologies as they emerge. BRV-O also features AM General's

lightweight, fuel efficient and high performance engine and transmission powertrain; a self-leveling suspension system; a C4ISR backbone with open-standard networked architecture and clustered super-computing power; and other advanced components.



**Defence Industry**

**COMBAT CRITICAL CARE CORPORATION Announces The O2PAK CHEMICAL OXYGEN GENERATOR**



COMBAT CRITICAL CARE CORPORATION, a subsidiary of Pacific Precision Products, proudly announces the launch of a very unique product - the O2PAK portable chemical oxygen generator.

The O2PAK™ provides armed forces the capability to provide oxygen, immediately at the point of contact, to battlefield casualties within seconds of injury, thereby increasing chances of survival and recovery in cases of life-threatening injury.

The O2PAK™ is a compact, lightweight, hand-held unit (9 inches/ 23 centimeter high, for 2.8 pounds/ 1,3 kilogram) and is small enough to be carried by every soldier in a standard military backpack - it is activated within seconds, delivering 99% pure oxygen at a flow-rate of 4-to 8 LPM for 20-25 minutes in any position (vertical, horizontal). The O2PAK™ is a single-use/disposable source of oxygen that can be very rapidly deployed and activated in the most challenging or stressful situations.

The O2PAK™ has been specifically designed to address field requirements and is qualified for use in hostile and inaccessible environments (extreme high/low temperatures, pressure, humidity) as well as high altitudes (up to 12 000 m/40 000 ft). Extensive scientific research and development and testing has been done under a wide variety of operational conditions to prove safety and efficacy - these include medical, ballistic, blast and fire tests. The O2PAK™ has been cleared by the FDA.

The O2PAK™ is not pressurised, requires no filling or mixing, no maintenance and has an extra-long shelf-life of 4 years. Solid-state chemical oxygen is utilised to produce oxygen, thereby eliminating the risk of explosion under enemy fire or hazardous conditions (eg. mine/IED detonation). It does not require electricity,

battery connection or recharging and can be stored under severe conditions for prolonged periods, immediately ready for use when required.

The O2PAK™ is particularly suitable for units operating in abnormal and remote environments who are exposed to a high risk of serious injury - these include special operations forces, early entry and rapidly mobile land forces, airborne forces, marines, navy divers, demining/ EOD engineers, peacekeeping forces, SWAT teams, search and rescue teams, and disaster relief organizations.

The O2PAK™ is also ideal for storage and readily-available use in a variety of military vehicles such as mine proof vehicles, infantry fighting vehicles, NBC protected vehicles, fire fighting vehicles, armoured personnel carriers, tanks, helicopters and naval vessels.



**Defence Industry**

**AT FMCW Radar Solutions**



AT Electronic and Communication International is pleased to announce the availability of its advanced FMCW Radar Solutions; The AT PSR Perimeter Surveillance Radar and AT PGSR Portable Ground Surveillance Radar.

The AT PSR and AT PGSR provide high resolution surveillance solutions for manportable, mobile or fixed installation applications.

Both AT PSR and the AT PGSR allow the interception, detection and tracking of targets in single or networked sensor environments. The units are able to classify and differentiate targets and display them as an icon in an easy to read digital map.

A combination of the AT PSR and AT PGSR and other sensors such as thermal imagers and laser range finders can be integrated in a whole of surveillance solution which is easy to setup and train an operator to become very efficient in a short timeframe.

Applications for the radars are Military, Civilian and Industrial applications e.g.; Border Guard, Battlefield surveillance, Perimeter security for mine sites, power stations, refineries, military compounds, airports and ports and harbours.

For further information visit

<http://surveillance-radars.at-communication.com/en/>



**Contracts**

**ManTech Awarded \$30 Million to Support U.S. Marine Corps' Cougar**

## Family of Mine Resistant Ambush Protected Vehicles

FAIRFAX, Va.-- ManTech International Corporation (NASDAQ:MANT) was awarded a new contract by the U.S. Marine Corps Systems Command to provide maintenance and on-the-job training for the Cougar family of mine resistant ambush protected (MRAP) vehicles. The award is valued at \$30.3 million with a four month base period and two option years for a total twenty-eight month period of performance.

ManTech will provide field service representatives to conduct initial inspections and perform vehicle repairs, sustainment maintenance, retrofits, instruction, and modifications to all Marine Corps Cougar MRAP vehicles in Afghanistan and the continental United States. ManTech will also provide field-level maintainer instructors and certified instructors teaching all courses at Camp Lejeune, N.C., Camp Johnson, N.C., and the U.S. military's MRAP operator and maintenance training facility at the Red River Army Depot in Texarkana, Texas. Additional work will be performed at overseas locations including Japan and Jordan, as requested.

This is the second major MRAP contract won by ManTech in the last three months. In May the U.S. Army's TACOM Contracting Center awarded ManTech a five-year contract with a \$2.85 billion ceiling to continue sustainment of the U.S. Army's MRAP family of vehicles.

"MRAP vehicles continue to save lives, and ManTech has been helping keep MRAP and route clearance vehicles operational since 2003," said Louis M. Addeo, president and chief operating officer of ManTech's Technical Services Group. "We are honored to be selected to extend our support to the Marine Corps' Cougar MRAP fleet."

"ManTech is proud of our sustainment record in support of Army and joint force MRAP programs," added Kevin C. Cody, business unit president of ManTech's Systems Sustainment and Integrated Logistics business unit. "We are excited to take on this new work supporting U.S. Marine Corps MRAP vehicles."

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