

# Army Guide monthly



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## Exhibitions

### Top Bomb Disposal Specialists Convene For Counter IED Conference



June has been named as the deadliest month in the Afghanistan war, with at least 100 coalition troops being killed. IEDs alone account for two-thirds of all casualties and SMI's Counter IED and Force Protection conference is well timed to address this issue.

This event brings together the highest calibre experts in the field to examine and analyse the challenges we face with IEDs. Potential solutions to the threat will be presented and assessed by a range of international defence specialists, who are keen not only to take lessons from operations, but also ensure the most vital issue raised by Bob Sneddon's recent resignation is addressed: training for IED preparedness.

SMI's Counter IED and Force Protection Conference is chaired by Maj (Ret'd) Chris Hunter, prominent counter-terrorist bomb disposal specialist, who served in Iraq, Afghanistan and Northern Ireland between 1997 and 2007. He is joined by Robert Berish, Commander, EOD Flight, Eglin Air Force Base, Geof McCarthy, Section Head, Canadian Forces, Jim Blackburn, Assistant Capability Director, European Defence Agency and Lieutenant Colonel (Ret'd) Mike O'Bea, Capability Manager, Virtual Training Combined Arms Centre, TRADOC, US Army in addressing the issues of IEDs.

An Internationally-focused event, Counter IED and Force Protection is already gathering serious interest from many agencies around the world, such as TRADOC, CALL, Netherlands CIED Joint Task Force, US Air Force, Bundeswehr Technology and Procurement Office and Canadian Forces Land Requirements.

Full speaker line-up available online:  
<http://www.smi-online.co.uk/counter-ied.asp>

## Future Technologies

### Raytheon Links Acoustic Sensor, Netted Combat System for Enhanced Counter Sniper Capability

MCKINNEY, Texas -- Raytheon Company has linked its Boomerang acoustic sensor and network-ready Long Range Advanced Scout Surveillance System to provide an enhanced counter sniper solution for the warfighter.

"Connecting Boomerang and netted LRAS3 is a plug-and-play operation that results in a powerful

counter sniper capability," said Glynn Raymer, vice president, Raytheon Network Centric Systems Combat Systems. "Combined, these systems facilitate a slew-to-cue capability that places the high-performance LRAS3 'eyes' on the threat, day or night. The sniper then becomes the target with a number of prosecution alternatives available ranging from direct return fire to a digital call for fire via the network."

Raytheon first demonstrated its counter sniper solution at the May 2010 Armor Warfighting Conference. The demonstration showed the immediate value of linking two systems currently in the U.S. Army inventory – Boomerang, produced by Raytheon BBN Technologies, and LRAS3, made by Raytheon Network Centric Systems.

Boomerang provides bearing and elevation cues to the netted LRAS3. The sight operator can positively identify and geo-locate the sniper and send target location and image data with a push of a menu screen button.

"Boomerang delivers reliable sniper detection," said Mark Sherman, general manager, Boomerang. "With the LRAS3's strategic standoff surveillance and Boomerang's network-ready sensors, the soldier can locate and respond to the sniper threat immediately."

With production of net-ready sights ongoing, Raytheon is adding to more than 2,600 LRAS3 units delivered to date. Previous Block 1 systems can be upgraded in the field to include network communication capability.

Raytheon BBN Technologies, a wholly owned subsidiary of Raytheon Company, has delivered more than 5,000 Boomerang systems to the field.

Raytheon Company, with 2009 sales of \$25 billion, is a technology and innovation leader specializing in defense, homeland security and other government markets throughout the world. With a history of innovation spanning 88 years, Raytheon provides state-of-the-art electronics, mission systems integration and other capabilities in the areas of sensing; effects; and command, control, communications and intelligence systems, as well as a broad range of mission support services. With headquarters in Waltham, Mass., Raytheon employs 75,000 people worldwide.

## Defence Industry

### UK Ministry of Defence signs Scout SV contract with General Dynamics UK



London -- The UK Ministry of Defence (MoD) has signed a contract with South Wales-based General Dynamics UK to deliver the Specialist Vehicle (SV)

for the British Army.

The demonstration phase, which has been activated by the signature of the contract by Peter Luff MP, Parliamentary Under Secretary of State and Minister for Defence Equipment, Support & Technology, is worth J500m. The demonstration phase will see the development of seven prototypes for the Scout reconnaissance vehicle and supporting variants built on the ASCOD SV Common Base Platform, as well as providing associated training equipment.

ASCOD SV, which is a modified military off the shelf (MMOTS) platform already proven in service with a number of NATO allies, will replace the ageing CVR(T) fleet and will introduce new vehicle roles.

“The MoD chose General Dynamics UK’s ASCOD SV because it guaranteed the best protection for British troops, the best value for money for the British taxpayer, the best deal for the UK Industrial base, the best integrated solution, and the best growth potential for the British Army to combat future threats throughout the 30-year lifespan of the vehicle,” commented Dr. Sandy Wilson, president and managing director of General Dynamics UK.

“I am particularly proud that this vehicle has been designed in Britain by British engineers and will provide jobs for British workers, as well as saving the lives of British military personnel wherever they may be in the world over the next 30 or so years,” continued Dr. Wilson. “My team and I at General Dynamics UK look forward to working in partnership with the MoD over the next several years to deliver the vehicle the British Army deserves and needs in order to do their difficult jobs in the safest and most effective manner possible.”

Key advantages that the ASCOD SV delivers to the MoD include:

- A modern drivetrain, which is good for the 30-year life of the vehicle and thereby obviates the need for a mid-life upgrade;
- Load-carrying potential of up to 42 tonnes with a growth path to 45 tonnes, which provides the ability to meet future threats likely to appear over its entire 30-year life, as well as carry its heaviest variants;
- A Common Base Platform that will support variants such as an Armoured Personnel Carrier, Protected Mobility vehicle, a Repair vehicle and a Recovery vehicle;
- An open electronic architecture, available across all variants, which will make the SV fleet easier to maintain, ease the training burden, and play a key role in lowering costs throughout the life of the vehicles; and
- An advanced turret design which, because of its internal space and leading ergonomics, delivers improved survivability and fightability for its crew. General Dynamics UK has sub-contracted Lockheed Martin UK Ampthill to produce the turret..

ASCOD SV also has high export potential, as required under the Defence Industrial Strategy.

The trials of the prototype vehicles are expected to begin with the Army no later than 2013. Once the demonstration phase is successfully completed, the MoD

will be in a position to proceed to the Manufacture Phase and begin production of these battle-winning vehicles.

## Contracts

### PROTECTOR Contract valued at MNOK 140 with Renault Truck Defense

KONGSBERG has booked an order on PROTECTOR remote weapon stations (RWS) valued at NOK 140 millions from the French Renault Truck Defense.

The order is part of the NOK 500 million framework agreement with delivery of the PROTECTOR remote weapon control system to upgrade the French Army’s Renault VAB 4x4 armored personnel carriers. The order was signed in May 2008.

## Defence Industry

### FP Meets With Potential Suppliers for Australia`s \$1 Bn Vehicle Contract

Force Protection has completed a series of discussions with potential suppliers across four states as it refines its Australian manufacturing plans for the \$1 billion protected mobility vehicle contract.

The Australian Government in May announced that Force Protection was one of three Australian-based solutions to be given the opportunity to win the contract to manufacture up to 1300 next-generation protected mobility vehicles, under the 'Land 121 Phase 4' program.

Force Protection has again met with potential suppliers as well as State Government ministers and industry representatives in New South Wales, Queensland, Victoria and South Australia.

Force Protection Chief Executive Officer, Michael Moody, said discussions with suppliers last year had opened up several manufacturing options for its Ocelot vehicle across the four states, and it was important to further progress these discussions now that the company had been short-listed for the Australian Government contract.

"The reception we have received from both suppliers and government representatives over the past couple of weeks has been extremely positive, and confirmed our view that we can build a world class vehicle utilising the best of Australian military and automotive manufacturing expertise and know-how," Mr Moody said.

"We are committed to operating in Australia and we look forward to making further announcements about our plans."

Force Protection was one of the companies recently down-selected by the UK Ministry of Defence to tender for the Light Protected Patrol Vehicle Program - Demonstration, Production and Support Phases and has been awarded a contract by the UK MoD for the supply of two Ocelot light protected patrol vehicles for testing.

Its Ocelot vehicle has undergone significant

development in conjunction with leading independent technology provider Ricardo to provide high levels of survivability together with exceptional cross country mobility, flexibility and value for money.

The Ocelot's capabilities have already been proven by a sustained program of blast, ballistic, automotive and manoeuvrability tests conducted since 2009.

The Ocelot can be maintained and repaired quickly in the field to ensure maximum availability, while its unique modular design enables the vehicle to be reconfigured in theatre within two hours to meet a variety of different roles, such as patrol, fire support and protected logistics.

Force Protection continues to test and refine the Ocelot vehicle, taking in to account the specific operational requirements for the Australian Defence Force.



### Future Technologies

#### BAE Systems Receives \$17 Million Contract from U.S. Army for Headborne Energy

PHOENIX, Arizona -- BAE Systems has received an initial order of \$17 million from the U.S. Army for Headborne Energy Analysis and Diagnostic Systems (HEADS) to help address combat-related traumatic brain injuries (TBI), which according to many medical professionals are fast becoming a signature injury of the Iraq and Afghanistan wars.

The multi-million dollar award is part of an indefinite delivery/indefinite quantity contract with a maximum value of \$105 million. BAE Systems was one of two contractors selected.

Designed to better monitor soldiers and help identify their risk levels for combat-related TBIs, BAE Systems introduced its first HEADS sensor to the military in 2008. Since then, nearly 7,000 of the company's HEADS units have been fielded to the U.S. Army and U.S. Marine Corps—a testament to BAE Systems' commitment to integrating innovative lifesaving technologies into survivability products for troops.

With the new order, thousands of the company's Generation II HEADS helmet sensors will be produced and fitted inside the combat helmets for U.S. troops serving abroad.

"Diagnosing mild to moderate combat-related TBIs can be challenging. For example, following an explosion from a roadside bomb, soldiers will sometimes continue with their mission, unaware that the concussion from the blast may have lingering effects," said Joe Coltman, vice president of BAE Systems' Personnel Protection Systems business. "With the Generation II HEADS system, even if the injury isn't obvious, once the sensor collects data indicating a blast has exceeded a certain threshold, a LED light located on the sensor and will be activated and begin blinking, signifying to soldiers that they may have sustained a concussion warranting immediate attention."

In addition to alerting soldiers of possible concussions, the HEADS smart sensor is designed to provide medical

professionals with important data that may help determine the severity of a possible TBI. "With our Generation II HEADS system, we're providing medical teams with a valuable diagnostic tool that utilizes radio frequency technology," added Coltman. "With our new 'smarter' sensor, if a soldier is exposed to a blast, possibly sustaining a concussion, not only will the HEADS visual display be triggered at the time of the event, but once the soldier enters a specified area, such as forward operating base or dining facility, a series of strategically placed antennae will scan all available HEADS units and send data to a computer, identifying any soldiers who may have sustained a blast-related brain injury."

The sensor itself is small, lightweight and can be secured inside virtually any combat helmet. Although imperceptible to the wearer, it is designed to continuously collect critical, potentially lifesaving data, including impact location, magnitude, duration, blast pressures, angular and linear accelerations as well as the exact times of single or multiple blast events. That information is then securely stored until it can be quickly downloaded and analyzed by medical teams using a simple USB or wireless connection.

Compatible with most helmets, the HEADS sensor is unobtrusive and won't interfere with additional helmet-mounted equipment soldiers may need, such as goggles and other sensors.

Deliveries on the initial Generation II HEADS order are expected to begin in April 2011, and be completed by July 2011.

BAE Systems is a leading provider of soldier protective and load carriage equipment in the United States, producing a significant portion of the nation's body armor, tactical vests, combat helmets and load carrying systems. Not only is the company focused on the design, development and production of leading edge survivability products, its integration of advanced materials into manufacturing, rigorous product testing, and field trials support the company's focus on the men and women who serve in the armed forces.



### Contracts

#### BAE Systems Awarded \$70 Million for the HERCULES Recovery Vehicle



YORK, Pennsylvania -- BAE Systems was recently awarded a contract for \$70 million to convert 30 M88A1 hulls into M88A2 Heavy Equipment Recovery Combat Utility Lift and Evacuation System (HERCULES) vehicles and provide associated spare

parts. HERCULES is the latest configuration in the M88 family of vehicles.

HERCULES provides unparalleled capability for recovering today's 70-ton combat vehicles including the M1A1, M1A2, Leopard, bridging systems and other medium weight vehicles and answers the need for cost-effective, self-supporting heavy recovery performance. Key upgrades from the M88A1 to M88A2 HERCULES configuration include improved power-assisted braking, steering, electrical system and increased engine horsepower and additional armor protection, providing soldiers and Marines with 25 percent more towing muscle, 40 percent more lifting strength and 55 percent more winching power in meeting any mission requirement.

"The HERCULES is a stable, cost efficient vehicle that provides high recovery performance to our soldiers, Marines and Allied Forces," said Joe McCarthy, vice president and general manager of Heavy Brigade Combat Team Systems for BAE Systems.

Vehicle deliveries will begin in November 2012 and continue through March 2013. Work will be performed by the existing workforces at the BAE Systems facility in York, Pennsylvania. The contract was awarded by the U.S. Army TACOM Life Cycle Management Command.

This award brings the total value of U.S. Government contracts BAE Systems has been awarded on the HERCULES program to \$1.3 billion. To date, 329 HERCULES vehicles have been fielded against an overall U.S. Army requirement of 607 vehicles. A total of 67 vehicles have been fielded to the U.S. Marine Corps, which has pure fledged to the M88A2 configuration, plus an additional 114 vehicles to four allied nations - Egypt, Kuwait, Thailand and Australia.



## Defence Industry

### Artillery should remain a statistical weapon -by David Marsiano



In the next few decades the use of tube artillery will not decrease, on the contrary, it is expected to grow. - writes Col. (res.) David Marciano, former Head of the Weapons Development in the IDF Ground Forces Headquarters, and currently CEO for Soltam Systems.

Despite this significant statement - categorically, he argues: "There is no need to invest resources in developing an accurate shell." In his opinion there are more worthwhile directions for artillery development and in the following article he elaborates. The universal and main question that keeps the force builders busy is the analysis of the operational needs and deriving from them the desirable solution. The main difficulty is the constant dissonance between the understanding of the existing operational needs and those that the armies are expected to meet in the future. This dissonance increases even more the moment one takes into account the technology aspects.

In this article I will try to examine the future of artillery - supposedly a weapon system that has been around for scores of years and that the physical principle of its operation has not changed at all – a system based on a free ballistic trajectory, and as such, a statistical weapon.

Despite the fact that the overwhelming majority of casualties in the World Wars and other battles were caused by artillery weapons, there are ongoing processes that have led to the decline of the artillery's prestige. This phenomenon results from the introduction of exotic means of guided munitions such as the pinpoint PGM's,; the strengthening of air forces and their participation in the ground battle; the changing nature of conflicts that the world has experienced in the past few decades; low-intensity conflicts in which the weight of the fighting in built up areas has risen and that the fact that armies have "frozen up" on the development of artillery in directions and measures compatible with its potential.

It is still feasible to state that the scenarios in which a land maneuver is executed, the delivery of close, continuous and extended fire support is required and will continue to be so in the future. The only platforms suitable for this kind of fire support are tube artillery. In this regard I believe that "as long as in the future battlefield there will be statistical targets (infantry, antitank squads, and land-based maneuver forces) the requirement for statistical weapons will remain". Hence, it seems that in the next few decades the use of tube artillery will not decrease, on the contrary, it is expected to grow.

The starting point for examining the life expectancy of any weapon system depends on three basic questions:

1. What is the operational mission that the weapon system should fulfill?
2. Is there a better alternative in terms of cost against operational benefit?
3. What are the technological abilities available to upgrade the system best in order for it to be able to handle new operational objectives and tasks?

For tube artillery, the main task is, as noted, to provide close fire support to maneuvering forces in all forms of combat, and allow them freedom of operation by limiting the enemy's fighting ability. Additional tasks at the core of the artillery fire missions' effort are neutralizing enemy artillery and the participation in urban combat, which was not one of the core issues of

occupation in the past, but looking at the nature of the clashes in the last three decades shows that the artillery was not ready to ideally support these conflicts. Artillery has additional tasks such as destroying armor, handling sporadic targets and covering large-area targets.

The answer to the second basic question, "is there a better alternative?" is that some tube artillery tasks have more appropriate solutions. Such as destruction of armor, which should be done using Precision Fires or anti battery fire which is already handled effectively by rockets. On the other hand close fire support for the maneuvering forces which is a priority task is best done using the classic tube artillery units.

The answer to the third question, about technology, is that the tube artillery units hold enormous potential in terms of their operational capabilities and that their potential growth in terms of operational challenges will allow it to provide the much needed solutions for tomorrow's battlefield.

### **New challenges for the artillery**

The challenges associated with the traditional requirements from artillery include:

- Raising the effectiveness of the mission including increasing the accuracy.
- Creating continuous fire support.
- Providing a cycle of target engagements.
- High target-artillery unit ratio.
- Reducing the task cost in economic terms, flexibility in using force and more.

Among the new challenges that produce a wide range of new tasks are:

- Increasing the range of fire.
- Development of specialized capabilities to fight in low intensity conflicts.
- Assistance in electronic warfare, intelligence, laying and removal of land mines.

The common mistake, made mainly by engineers whom also influence the "force builders" responsible for developing the weapon systems, is the development of weapons for point targets with a terminal effect of "destruction", ie a precision bomb. This phenomenon is derived from the simple fact of the available technology of PGM's (precision guided munitions). During the last two decades we have witnessed an unnecessary drift towards the development and requirements of systems using this technology.

It should be clear enough if we review the amount of weapons that are allocated to "hard" targets: tanks, air craft, ground based PGM's, air to ground PGM's, rockets, anti-tank missiles - all these without the development of an accurate artillery shell.

This article claims to reject this trend under two main arguments: First, there is no need for the development of an accurate shell since there are enough weapons on the battlefield trusted with targeting armored forces. Second, that there is no need, since the nature and purpose of the artillery is to handle the targets of statistical nature.

This fundamental understanding should convince the engineers to develop tube artillery with a tendency which I have stated above. In order to improve the effectiveness for statistical "soft" targets such as infantry, antitank

squads and light vehicles, one has to deal with several challenges: improvement of accuracy, increasing the terminal effect on the target and increasing the firing range.

In terms of precision we have to distinguish between the need for increasing the accuracy and on the other hand the development of a PGM artillery shell with pinpoint accuracy. In terms of the terminal effect on the target one should direct the R & D efforts to achieve an effective first volley without the need for correcting fire, as well as creating a surprise and an effective continuous effect.

In terms of increasing the range the move to 52 caliber cannons should be made.

Another increasing trend, that is buying a foothold among many armies in the world, is the wheeled based tube artillery. United States and NATO lean in this direction in light of the need for deploying forces around the globe. Other non- Western armies are attracted to this solution mainly due to cost considerations: The system is cheaper in procurement and maintenance and with virtually no limitations to the operational performance considering the fact that artillery is not operated from the front lines and has nearly no limits in movement.

The main reason that IDF is examining this system is largely due to the need to transfer forces between arenas without the dependency on large tank movers. That is added to the economic consideration; since tube artillery systems based on a wheeled platform will improve life cycle costs without compromising their operational benefits.

I do not deny this trend, but I definitely suggest considering it well.



## **Defence Industry**

### **Textron Systems Acquires Crane Wireless Monitoring Solutions**

Adds MicroObserver Unattended Ground Sensor System and VantagePoint Remote Monitoring System to Intelligence, Surveillance and Reconnaissance Product Family.

WILMINGTON, Mass. -- Textron Systems, a Textron Inc. company, today announced that it has acquired Crane Wireless Monitoring Solutions (WMS), a Crane Co. business. WMS is a leading provider of wireless sensor networks for force protection, border and base security applications, servicing the U.S. Military as well as homeland security and commercial customers. Details of the acquisition were not disclosed.

Noted for its MicroObserver unattended ground sensor (UGS) system, VantagePoint Remote Monitoring System, and its work for the U.S. Army, U.S. Air National Guard, U.S. Department of Energy and other customers, WMS will become part of Textron Defense Systems, an operating unit of Textron Systems. The Richardson, Texas-based team of approximately 25 people will be an operation within Textron Defense Systems' Intelligence, Surveillance and Reconnaissance

(ISR) business line.

“Since 2000, WMS has developed, tested and delivered impressive sensors that communicate reliably over self-forming and self-healing radio networks. Their extensive radio communications, wireless systems and signal processing expertise complement our ISR products, including our Urban and Tactical Unattended Ground Sensors,” stated Mark Catizone, senior vice president and general manager of Textron Defense Systems. “We see a growing market for networked sensors and believe the addition of WMS extends our portfolio of offerings.”



### Contracts

## Oshkosh Defense Responds to U.S. Army`s Need for Tactical Vehicles; U.S. Army Program Maintains Original FMTV Contract Timeline

OSHKOSH, Wis. -- Oshkosh Defense, a division of Oshkosh Corporation (NYSE:OSK), announced today it has received two orders from the U.S. Army TACOM Life Cycle Management Command (LCMC) to supply 950 U.S. Army Family of Medium Tactical Vehicles (FMTV) trucks and trailers.

Oshkosh continues to hold fast to the Army’s original FMTV delivery schedule and expects to complete deliveries for these latest awards by December 2011.

“Oshkosh remains on target for FMTV production-unit deliveries starting in October of this year, allowing our men and women in uniform to receive these essential vehicles as quickly as possible,” said Mike Ivy, vice president and general manager of Army Programs for Oshkosh Defense. “From testing and production to training and service, we intend to satisfy every Army requirement related to the FMTV program with high quality Oshkosh products delivered on schedule.”

The two delivery orders, valued at more than \$136 million, include nearly 800 trucks and more than 160 trailers, increasing the total number of Oshkosh FMTV truck-and-trailer under order to 6,159. Oshkosh also will supply nearly 40 FMTV add-on armor “B” kits under the orders.

The five-year FMTV contract is for the production of up to 23,000 vehicles and trailers, as well as support services and training through fiscal 2014. The FMTV is a series of 17 models ranging from 2.5-ton to 10-ton payloads. Vehicles feature a parts commonality of more than 80 percent, resulting in streamlined maintenance, training, sustainment and overall cost efficiency for the U.S. Army.



### Defence Industry

## Global Defence Supplier MTL Group Moves to New Premises

Armour plate specialist MTL Group, has announced

expansion plans that will enable it to increase the range of services provided to customers.



MTL Group, which laser & waterjet cuts, bends, machines and fabricates steel to customers’ requirements has a global blue-chip customer base including BAE, General Dynamics, Renault Trucks Defense and Lockheed. High profile projects include the supply of armoured belly-plates for increasing IED protection on British Army Vehicles in Afghanistan and perforated steel add on armour.

The company has recently received its largest-ever export contract worth BJ4m to supply components to a German defence and aerospace group. It has expanded its export markets beyond Europe to North Africa, Asia, the Middle East and North America.

Following a management buyout in 2006, the business has already more than doubled in size and is now relocating from its current Sheffield base to a new 300,000 square feet advanced manufacturing facility in Rotherham, which will house the company’s state of the art equipment and will provide space for continued expansion.

The company has differentiated itself from its competitors by investing over BJ6m in world class equipment over the last four years including a 640 Tonne Robotic Press and 20m Big-Bed Bevel Laser. Over BJ2m is to be invested in the infrastructure of the new site to give a high efficiency, low energy facility.

MTL’s Managing Director Dr Henry Shirman commented; “By focusing on customer’s requirements we have expanded rapidly into new sectors and are now a world-leader supplying across the globe. The strategic investment in the new site will see MTL more than double in size and enable us to deliver a greater range of services to our customers.”



### Robots

## QinetiQ`s TALON robots now in use in Afghanistan under a UOR



QinetiQ is supplying its battle proven Talon robots

to the UK Ministry of Defence for route proving and clearance, under the British Army's Talisman programme.

Deployed since April 2010 in Afghanistan, but only just announced, Talisman is the Army's latest weapon to help counter the threat posed by Improvised Explosive Devices (IED) and mines. Delivered as an Urgent Operational Requirement (UOR) collectively worth more than BJ180m, Talisman is a suite of vehicles that provide an integrated route proving and clearance capability that is operated by the Royal Engineers. Much of the work on the Thales led Talisman project has been done and delivered by UK companies. Each Talisman system, in addition to having Talon units, comprises a variety of other vehicles including the Mastiff Protected Patrol Vehicle; a Buffalo Mine Protected Vehicle with a manipulator arm; a JCB High Mobility Engineer Excavator; and a T-Hawk Micro Air Vehicle.

This is the first order the MOD has placed for QinetiQ's larger battle proven Talon robots and they now join the 100 Dragon Runners robots announced and delivered into theatre last year by QinetiQ for Counter-Improvised Explosive Device (C-IED) and ordnance disposal operations. The order for Talons also includes training, spares and a support package.

"We are delighted that our Talon robots are now in use with the MOD and helping to save lives," stated Neville Salkeld, MD for QinetiQ's UK Technology Solutions Group. "Talon robots already have an excellent and proven record with US forces with over 3000 units having been supplied. Many are in constant use in-theatre and are supported by a rapid in theatre repair service which because of the systems' robust modular design means a damaged unit can often be returned to operational status within just a few hours."

"Talisman will improve our ability to manage the IED and mine threat with the system's primary mission being to protect vehicle convoys delivering supplies to Forward Operating Bases," added Patrick Beazley, Head of Combat Wheels Group at Defence Equipment and Support (DE&S). "It has been designed as a flexible manoeuvre support capability that can be quickly re-tasked and rearranged to meet different missions, operating independently or alongside other bomb disposal systems dependent on the threat. Talisman is now part of a wide range of tools, techniques and tactics we have to help mitigate the risk to our forces from the threat of IEDs."

Systems-Canada.



Under this contract, General Dynamics will perform trade-off studies, design work, prototype build and testing to define the upgrades that will be incorporated into Canada's fleet of LAV III vehicles. The resultant upgrade package will enhance LAV III performance in the areas of survivability, mobility and firepower.

"With this contract, we are now able to evolve the LAV III to an even higher standard of performance," said Dr. Sridhar Sridharan, senior vice-president of General Dynamics Land Systems-Canada. "The end product will be a much more capable and better protected vehicle ready to take on the threats and challenges of current and future battlefields."

Once the Government of Canada has authorized the implementation of the upgrade package, significant work will be performed at General Dynamics Land Systems-Canada facilities in London, Ontario, and Edmonton, Alberta, as well as the company's nationwide network of over 400 Canadian suppliers. All regions of Canada will benefit from this work.

## Defence Industry

### U.S. Army Awards General Dynamics \$30 Million for Stryker Double-V Hull Production

STERLING HEIGHTS, Mich. -- The U.S. Army TACOM Lifecycle Management Command has awarded General Dynamics Land Systems, a business unit of General Dynamics, \$30 million to begin production of a double-V-shaped hull for the Stryker infantry combat vehicle.

Preliminary testing of the new hull has proven that the design increases the level of protection and survivability provided to soldiers.

Deliveries will begin in January 2011 to allow vehicles to be available for use by the Stryker brigade that will rotate into Afghanistan next year, and will be completed by February 2012. General Dynamics employees in Anniston, Ala., and London, Ontario, will produce the vehicles.

Gordon Stein, senior director for the General Dynamics Land Systems Stryker program, said the increased blast protection provided by the double-V-shaped hull will make the vehicle one of the most versatile, mobile and survivable vehicles on the battlefield.

"Soldiers and Marines attending our Warfighter's forum earlier this year said their Stryker vehicles have performed superbly in Iraq and Afghanistan because of their speed, agility, stability and off-road capability," Stein said. "The double-V hull can easily be integrated

## Defence Industry

### Government of Canada Awards LAV III Upgrade Definition Contract to General Dynamics Land Systems-Canada

LONDON, Ontario -- The Honourable Peter MacKay, Minister of National Defence, and the Honourable Rona Ambrose, Minister of Public Works and Government Services, announced today that the Government of Canada has awarded a \$34.4 million contract to General Dynamics Land



into all variants of the Stryker.”

The Stryker family of vehicles stresses performance and commonality that reduces the logistics footprint and minimize costs. The 21-ton Stryker can reach speeds in excess of 60 mph with a range exceeding 300 miles on 53 gallons of fuel.

The Stryker is an eight-wheeled combat vehicle that is lighter, smaller and more readily deployable than other United States Army combat vehicles. The vehicles are designed in 10 different configurations: Infantry Carrier Vehicle, Anti-tank Guided Missile, Mortar Carrier, Command Vehicle, Reconnaissance Vehicle, Engineer Squad Vehicle, Medical Evacuation Vehicle, Fire Support Vehicle, NBC Recon and Mobile Gun System. It is C-130 transportable, with 14.5-mm basic armor protection.



### Defence Industry

#### French Army Continues M11 VBL Procurement



NEWTOWN, Conn. -- Serial production of the M11 Vehicule Blinde Leger (VBL) is ongoing, primarily for French Army procurement.

In 2002, the French Army placed a follow-on order for 500 vehicles. In April 2006, the French Army ordered an additional 91 VBL2L reconnaissance vehicles. The French Army VBL procurement objective now exceeds 1,600 vehicles.

Since Mexico placed the first export order for the M11 in 1985, the VBL has enjoyed moderate success on the international market. In June 2004, the United Arab Emirates became the latest customer, accepting delivery of 24 VBL vehicles.

In October 2008, the Kuwaiti Special Forces awarded Panhard a contract of undisclosed value for 20 VBL Mk 2 reconnaissance vehicles. Deliveries occurred during the second half of 2009. These vehicles are in addition to the 20 VBL vehicles that Kuwait already had in its inventory.

French Army orders alone will maintain a steady base level of production through 2019. Indeed, French Army follow-on orders have precipitated a nearly 58 percent increase in our production outlook for the VBL since 2005.



### Training And Simulators

#### Raydon awards \$36 M contract for MRAP simulator



Daytona Beach, Fla. – Raydon Corp. was awarded on July 9 a \$36,355,550 firm-fixed-price contract.

This contract is for 11 Mine Resistant Ambush Protected Vehicle virtual trainers for the Army National Guard. Work is to be performed in Daytona Beach, Fla., with an estimated completion date of Nov. 30, 2011. Over 50 bids were solicited with one bid received. National Guard Bureau, ZC-AQ, Arlington, Va., is the contracting activity (W9133L-10-F-0130).



### Robots

#### U.S. Army Natick Soldier Center Awards Lockheed Martin Contract To Perform HULC™ User Testing



ORLANDO -- Lockheed Martin has received a \$1.1 million contract from the U.S. Army Natick Soldier Center for test and evaluation of its next-generation HULC™ advanced robotic exoskeleton, designed to augment Soldiers' strength and endurance, as well as reduce load carriage injuries.

Under this contract, the U.S. Army will test Lockheed Martin's advanced ruggedized HULC design. The upgraded HULC system includes optimized control software, extended battery life and human factors improvements for quicker and easier sizing to each user. Lockheed Martin is also exploring exoskeleton designs to support industrial and medical applications.

“The tests performed on Lockheed Martin's HULC system will help us assess the current state of the technology,” said David Audet, U.S. Army Natick Soldier Research, Development and Engineering Center,

which awarded the contract. "Exoskeletons have the potential to reduce stress on the body from heavy loads."

Dismounted Soldiers often carry heavy combat loads that increase stress on the body, leading to injuries and exhaustion. HULC is designed to transfer the weight from heavy loads to the ground through the robotic legs of the lower-body exoskeleton, taking the weight off of the operator. An advanced onboard micro-computer ensures the exoskeleton moves in concert with the operator. HULC is an un-tethered, battery powered, hydraulic-actuated anthropomorphic exoskeleton capable of performing deep squats, crawls and upper-body lifting with minimal human exertion.

"We recognize the importance of perfecting the exoskeleton technology to redefine what is possible for our Soldiers," said Rich Russell, director of Sensors, Data Links and Advanced Programs at Lockheed Martin Missiles and Fire Control. "HULC will meet Warfighters' future mobility and sustainment needs. Working with the Natick Research Center to evaluate the system will further enhance our ability to meet our customer's needs and requirements."

Researchers at Natick Soldier Center will evaluate how the HULC affects Soldiers' performance. Additionally, biomechanical testing will measure the energy expended by a Soldier when using the HULC. The laboratory testing will also assess how quickly users learn to use the HULC system when carrying various loads and moving at various speeds. The contract includes options for field trials to test the system's utility in operational environments.

Headquartered in Bethesda, Md., Lockheed Martin is a global security company that employs about 136,000 people worldwide and is principally engaged in the research, design, development, manufacture, integration and sustainment of advanced technology systems, products and services. The Corporation reported 2009 sales of \$45.2 billion.

### HULC



Dismounted Soldiers often carry heavy combat loads that increase the stress on the body leading to potential injuries. With a HULC exoskeleton, these loads are transferred to the ground through powered titanium legs without loss of mobility.

The HULC is a completely un-tethered, hydraulic-powered anthropomorphic exoskeleton that provides users with the ability to carry loads of up to 200 lbs for extended periods of time and over all terrains. Its flexible design allows for deep squats, crawls and

upper-body lifting. There is no joystick or other control mechanism. The exoskeleton senses what users want to do and where they want to go. It augments their ability, strength and endurance. An onboard micro-computer ensures the exoskeleton moves in concert with the individual. Its modularity allows for major components to be swapped out in the field. Additionally, its unique power-saving design allows the user to operate on battery power for extended missions. The HULC's load-carrying ability works even when power is not available.

Lockheed Martin is a leading provider of advanced technology solutions for the Warfighter including ground Soldier systems such as wearable situational awareness equipment and mobility assistance systems. Future advancements in exoskeleton technologies will focus on specific user communities, shifting energy and performance requirements. Lockheed Martin is also exploring exoskeleton designs to support industrial and medical applications.

### Contracts

#### SAIC Awarded Two Contracts Valued at More Than \$10 Million by the Kingdom of Jordan

MCLEAN, Va. -- Science Applications International Corporation today announced it has been awarded two new contracts to support the Kingdom of Jordan with DNA consultancy services to the Jordan Public Security Directorate (PSD) new forensic lab, and provide command, control, communications, computers, and intelligence (C4I) support to the Jordan Armed Forces (JAF) Joint Special Operations Command (SOCOM).

The first contract has a five-year period of performance and is valued at more than \$3 million. Under the contract, SAIC will provide DNA consultancy services to the Jordan PSD in support of a forensic laboratory in Amman, Jordan. SAIC will help ensure that the new laboratory is a state of the art facility capable of providing support to the police, security, and law enforcement activities of the Kingdom.

The second contract, awarded by the JAF, has a two-year period of performance and is valued at more than \$7 million. Under the contract, SAIC will design and equip a new command and control (C2) center, and will integrate C4I system upgrades for JAF SOCOM, also in Amman. These upgrades will help enhance SOCOM's ability to control and communicate with military assets during field operations. The C2 center will be a central location for JAF command officers to meet and evaluate real-time events.

"We look forward to supporting the Kingdom of Jordan by providing quality services that help ensure the preparedness of the new forensic laboratory, and by helping deliver improved command and control capabilities to meet JAF's current and future needs," said Tom Baybrook, SAIC senior vice president and business unit general manager.

**Robots**

**Automated Vehicles Could Lighten The Load On Troops**



Farnborough, UK -- The soldier's burden on the battlefield could be eased thanks to a new semi-autonomous, Multi-Operated All-Terrain Vehicle (MOATV) being developed by BAE Systems.

The unique MOATV is designed to reduce the burden on the dismounted soldier and has a range of sophisticated features. As well as being driven like an ordinary vehicle, it can be tele-operated by a remote control or instructed to semi-autonomously follow or go directly to a soldier operating a Personal Digital Assistant or PDA.

The MOATV was developed after BAE Systems was charged with creating a vehicle that carries soldiers' backpacks. UK soldiers often have to carry more than 70Kg of equipment and protection during operations which can limit their mobility.

The BAE Systems project included teams from the UK working with colleagues in Australia to develop, test and trial a versatile solution that has a wider range of capabilities. Unlike other systems which are bespoke, the technology on MOATV can be applied to any vehicle.

In addition, MOATV incorporates collision detection and avoidance systems that allow it to negotiate around objects that lie in its path while operating autonomously.

Andy Wright, Director Technology Acquisition at BAE Systems Strategic Capability Solutions business said: "Each MOATV vehicle can be used across a platoon, with individual soldiers each having a separate hand held PDA so they can pass control of the vehicle from one to another.

But the MOATV can do far more than simply carry loads; it can also be used for evacuating casualties in high-risk environments, supplying ammunition, patrolling perimeters, vehicle convoys and land reconnaissance. "



The technology, dubbed 'liquid armour' by scientists and engineers at BAE Systems, harnesses the unique properties of shear thickening fluids which 'lock' together when subjected to a force to enhance the existing energy absorbing properties of material structures like Kevlar.

Ceramic based armour plates used in current body armour systems to cover large areas of the torso are heavy and bulky, restricting movement and contributing to fatigue, particularly in harsh environments like Afghanistan.

Liquid armour has been designed to address a requirement for materials which can offers troops increased protection with reduced mass, wider area cover, greater manoeuvrability and easy integration with other systems. The technology can be integrated into standard Kevlar body armour to offer superior, freedom of motion and a reduction in overall thickness of up 45 per cent.

Stewart Penney, Head of Business Development for Design and Materials Technologies at BAE Systems, said: "The technology is best explained by the example of stirring water with a spoon. In water you feel little resistance to the spoon. Whereas with 'liquid armour', you would feel significant resistance as the elements in the fluid lock together. The faster you stir, the harder it gets, so when a projectile impacts the material at speed, it hardens very quickly and absorbs the impact energy."

When integrated with Kevlar, the reduced flow of the fluids in the liquid armour restricts the motion of the fabric yarns in relation to each other, resulting in an increase in area over which the impact energy is dispersed. As a result, the material is also far less likely to distort than standard body armour, which generally bends inwards when a bullet strikes, preventing death, but causing considerable pain.

Trials conducted at BAE Systems' Advanced Technology Centre in Filton have shown the liquid armour allows thinner than standard armour to withstand equivalent levels of forces. An early prototype of the technology has been demonstrated to the UK Ministry of Defence and in the future BAE Systems hope to further develop liquid armour to create a super lightweight version of the material and incorporate the technology into body armour systems.

The team at BAE Systems is considering applications of the technology beyond the military. Stewart Penney said: "In addition to increasing the ballistic performance of combat body armour there is potential for developing a version that could be of interest to police forces and ambulance crews."



**Future Technologies**

**BAE Systems To Protect Frontline Troops With Liquid Armour**

Farnborough, UK -- A counterintuitive liquid which hardens when struck has been developed by BAE Systems as part of a project to create future body armour offering soldiers greater ballistics protection and ease of movement in combat situations.

**Contracts**

**BAE Systems M777 Howitzer Programme Exceeds BJ1bn Sales**

Farnborough, UK -- BAE Systems has received an order for 93 additional M777 howitzers, taking the order book to 955 systems and taking sales for the programme to over BJ1bn.

## Defence Industry

**Raytheon Awarded \$55 Million Contract to Deliver TOW Missiles to Saudi Arabia**

The US is buying 58 guns for the US Army and U.S. Marine Corps while Australia is acquiring 35 through the US Foreign Military Sales (FMS) program. The order makes Australia the third customer for the M777 system after the U.S. and Canada.



Mike Smith, managing director for BAE Systems' European Weapons business, commented on the gun acquisition contract: "The purchase of additional howitzers is further endorsement of M777 as the most effective howitzer system of its kind. Its proven combat effectiveness means we expect more orders through 2011 as we continue to promote the system globally.

"The U.S. government is currently discussing the provision of 145 systems to India as well as several other countries. In parallel, BAE Systems is responding to requests for information from a large number of countries wishing to expand their indirect fire capability."

BAE System's facility at Hattiesburg, Mississippi, is responsible for final integration and test of the weapon system. The prime contract management of the M777 program and manufacture and assembly of the complex titanium structures and associated recoil components are undertaken at Barrow-in-Furness in the United Kingdom.

The M777 continues to provide artillery support to coalition forces in Afghanistan where its performance exceeds expectations. The gun can fire the "smart" Excalibur round, co-developed by BAE Systems, up to 40 km (25m) accurately enough to target a specific room within a building, reducing the chance of innocent casualties and allowing supporting fire to be brought down much closer to friendly troops.

BAE Systems has also recently agreed to provide an \$18m (BJ12m) support package for M777 directly with Canada, which is procuring 37 guns via FMS. The contract covers the supply of spares and engineering support.

Weighing in at less than 4200kg, the revolutionary M777 is the world's first artillery weapon to make widespread use of titanium and aluminium alloys, resulting in a howitzer which is half the weight of conventional 155mm systems. This allows it to be deployed by medium-lift helicopter quickly and beyond the reach of roadside bombs to otherwise inaccessible areas, extending its reach over the theatre of operations.

The M777 effort is managed by the US Army/Marines Light Weight 155mm Joint Program Office at Picatinny Arsenal, New Jersey.



FARNBOROUGH, England -- Raytheon Company received a \$55 million contract to deliver TOW (Tube-Launched, Optically-Tracked, Wireless-Guided) 2A Radio Frequency missiles to the U.S. government as part of a foreign military sale to Saudi Arabia's National Guard.

"TOW RF missiles are tremendous weapons because of their high mobility, rapid response and close-fire support capabilities," said Jim Riley, Raytheon's vice president of Land Combat. "This missile can give soldiers at the lowest tactical echelon immediate, precision firepower."

TOW RF missiles include an RF transmitter added to the missile case and an RF receiver located inside the missile. Since no launcher modifications were required for the transition to wireless, this growth in capability is transparent to TOW customers.

"On today's battlefield, potential targets are hiding in caves, behind boulders or in the mountains," said Shawn Ball, Raytheon's TOW international business development manager. "TOW RF missiles are more than capable of taking out these kinds of targets. The RF link enhances operations in urban environments by providing greater reliability and precision performance."

TOW missiles are the most used precision heavy assault weapons in war today. Available on more than 10,000 airborne and ground platforms, the missiles are used by 40 countries in combat operations around the world.

## Exhibitions

**MBDA Offers Glimpse Into Future Soldier Support Weaponry**

At the 2010 Farnborough International Airshow, MBDA will present a tantalising look at ideas that could develop into next-generation support weaponry for the future soldier.

The Concept Visions initiative is a new company-wide drive to develop highly innovative system concepts to shape the future Defence market in key domains for 2030 and beyond.

MBDA's European workforce was challenged to provide ideas for ways in which the company's technologies and future system concepts might improve the capability of the infantry soldier. Following a filtering process, the winning solutions were subjected to an intensive programme of user consultation, experimentation and concept development to bring the ideas together - building a "concept car" approach within the missile market - to provide a tangible, interactive vision of the future.

The resulting Concept Visions outputs present an integrated fire support solution for the dismounted infantry and addresses the challenges they will face when operating in increasingly complex environments with the need to manage precision target identification along with severe constraints to reducing the collateral footprint.

Steve Wadey, Executive Group Director Technical / Managing Director UK, MBDA, said:

"The new Concept Visions process represents another example of MBDA driving innovation in the missile systems market, allowing us to develop a vision of the future for key Defence domains. It highlights the inherent capabilities of MBDA to innovate rapidly and radically, and bring to life the technological dreams of our workforce thereby permitting Customers, Suppliers and Employees to see the evolution of military capability in a different way".

The CVS101 system concept, which is unveiled today, is designed as an infantry fire support weapon system for 2030 and beyond. Its purpose would be to provide a light-weight, long range precision weapon allowing it to deliver a heavy "punch" for use at lower levels within a force structure. It is designed to meet urban challenges with greater freedom to engage opportunity targets and its flexibility, ready availability and responsiveness would deliver precision fire support against a wide range of military and peace keeping roles.

Unlike current weapons, the CVS101 system would be capable of dealing with threats that are intermingled with friendly forces or civilian populations by being able to abide by strict rules of engagement and collateral restraints. This operational edge would be provided via its highly accurate and precise targeting sensors, and aiming capability together with a contemporary, easy to use fire control system that ensures man-in-the-loop decision making at all times.

Importantly, its light weight is designed to help reduce the equipment burden on the dismounted soldier. Uniquely, the CVS101 would be capable of extreme Non-Line Of Sight targeting opportunities in complex urban environments thanks to its net-centric integration capability when used alongside sensors in the tactical information network.

The CVS101 system concept will be unveiled at 10:00 on Monday, 19 July, at a Press Conference at the MBDA Chalet, at the Farnborough International Airshow 2010.

## About MBDA

With industrial facilities in four European countries and within the USA, MBDA has an annual turnover of €2.6 billion and an order book of €12 billion. With more than 90 armed forces customers in the world, MBDA is a world leader in missiles and missile systems.

MBDA is the only group capable of designing and producing missiles and missile systems that correspond to the full range of current and future operational needs of the three armed forces (land, sea and air). In total, the group offers a range of 45 missile systems and countermeasures products already in operational service and more than 15 others currently in development.

MBDA is jointly held by BAE SYSTEMS (37,5%), EADS (37,5%) and FINMECCANICA (25%).



## Contracts

### PROTECTOR Contract with Croatia



KONGSBERG has booked an order on PROTECTOR remote weapons stations (RWS) valued at NOK 115 millions from the Croatian Duro Dakovic Specijalna vozila d.d.

The PROTECTOR RWS protects military troops by allowing the vehicle's weapons to be operated from a protected position inside the vehicle.

KONGSBERG is an international, knowledge-based group that supplies high-technology systems and solutions to customers engaged in the oil and gas industry, the merchant marine, and the defence and aerospace industries. In 2009, KONGSBERG had a turnover of NOK 13.8 billion, and the Group had 5 423 employees in more than 25 countries.



## Contracts

### PPG signs \$1.2 million BAE Systems contract for military vehicle transparencies

SYLMAR, Calif. -- The transparent armor and specialty products group of PPG Industries' aerospace business has won a contract with BAE Systems, Inc., for specialty transparencies that afford ballistics protection for gunners on U.S. Marine Corps tactical vehicles.

The \$1.2 million contract calls for PPG to supply

## Marine Corps Transparent Armor Gun Shields (MCTAGS).

PPG Aerospace has begun production of the units at its Sylmar aerospace transparencies and specialty products facility. Deliveries have begun to the BAE Systems U.S. Combat Systems plant in Louisville, Ky.

"As a previous supplier to BAE Systems, PPG Aerospace is pleased to have this additional opportunity to demonstrate its manufacturing excellence for transparent armor," said Duke Montague, PPG Aerospace segment manager, transparent armor and specialty products. "We value the confidence BAE Systems has shown in us and our product."

BAE Systems provides MCTAGS kits for Medium Tactical Vehicle Replacement units, High Mobility Multipurpose Wheeled Vehicles and Logistics Vehicle Systems under contract with the U.S. Marine Corps. MCTAGS kits further enhance survivability for Marines by providing a gunner's protection system that enables direct vision, situational awareness and target acquisition while providing enhanced protection from small arms fire and improvised explosive device (IED) fragments.

PPG Aerospace is the aerospace products and services business of PPG Industries. PPG Aerospace – Transparent Armor and Specialty Products produces a wide variety of ballistic transparent laminates for the military vehicle, military marine and rail industries.

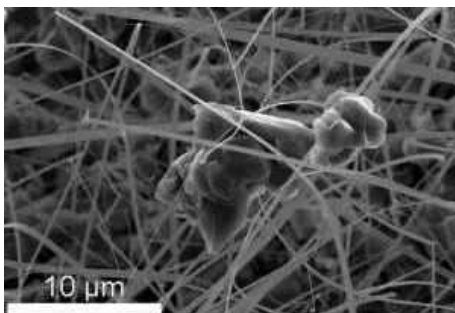
### About PPG

PPG Industries' vision is to continue to be the world's leading coatings and specialty products company. Founded in 1883, the company serves customers in industrial, transportation, consumer products, and construction markets and aftermarkets. With headquarters in Pittsburgh, PPG operates in more than 60 countries around the globe. Sales in 2009 were \$12.2 billion.



## Future Technologies

### Riley Selected for DARPA Armor Challenge



HOUSTON -- A new hybrid armor will undergo the most demanding and stringent testing by the Defense Advanced Research Program Agency (DARPA) in Ballston, VA in the fall of 2010. After passing selection, this armor will be able to provide U.S. military and law enforcement personnel serving at home or around the world with a better, lighter, and more cost effective protective solution than has ever been deployed before.

Riley Solutions Inc. (RSI) of Houston, TX, in close partnership with NanoRidge Materials, Inc., is delivering a groundbreaking armor for rigorous testing against the most destructive small arms fire. The armor is a remarkable blend of the very best in conventional light-armor materials with the most advanced application of nanomaterials. This blended layering fundamentally improves the armor's resilience to impact, penetration, and thus defeats the hostile round as it strikes the new composite material.

"After several years of independent development and research at our own expense, we were honored that DARPA selected RSI for the Armor II Challenge. RSI has developed a rigorous testing and evaluation program through independent certified test laboratories; we have outstanding scientists, military and law enforcement veterans who are committed to developing the finest solutions for our war fighters and law enforcement officers. Becoming a DARPA sponsored armor company will enable RSI to participate in the Government's long term development of new nano-enhanced armor," said John Tidrow, President of RSI.

RSI is a leading armor innovator located in Houston, TX. Kyle Kissell, Ph.D, RSI's Technical Advisor, stated, "On the successful completion of the DARPA Challenge, it is expected that the company will seek significant expansion both in production and market sales with the complementary increase in employment for the county and State of Texas. RSI has a next generation armor system that excels through nanotechnology and advanced processing systems making stronger and lighter armor."

RSI was founded in 2006 and established its initial Manufacturing facilities in Houston, TX. The company produces armor products that incorporate proprietary nanotechnologies into composite structures. The Company holds multiple patents and patent applications for the enhancement of ceramic & high density polyethylene. Teamed with NanoRidge Materials, Inc. for the design and production of all nano-enhanced products the Riley Team has identified the key to efficiently exploiting nanomaterials for mechanical reinforcement. Specialized and patented processes adapt the highly versatile chemistry of carbon nanotubes, altering its natural bundles to create stronger dispersed linkages that can then be incorporated into armor composites.

RSI has defined six levels of Nano-enhancement that are possible for ballistic armor products. These will control radio frequencies and provide embedded nano-monitoring systems for health and status of an armor panel. New advancement will provide the control of temperature on aircraft applications such as de-icing as well as reducing the heat signature and size footprint of an aircraft or vehicle.

This Houston based team is already delivering a rich technology platform and its foundational IP through industry-leading expertise in product applications of nanotechnology. With its strong Board of Directors and Advisory Team, in cooperation with its seasoned management, the RSI Team is commercially poised and

ready with the very best nano-enhanced armor and products. Aaron Westrick, Ph.D., Director of Armor Design, stated, "Our strategic focus is now on market growth and profitability through product sales and manufacturing. We are seeking application and product development partners among industry leaders engaged in law enforcement, commercial, and military security."



### Defence Industry

## GTV Delivers RHO JLTV Technology Development Vehicles On Schedule



LIVONIA, Mich. -- The General Tactical Vehicles (GTV) team of General Dynamics Land Systems and AM General today delivered two Right-Hand Operation (RHO) Joint Light Tactical Vehicles (JLTVs), one companion trailer and supporting equipment on schedule to the U.S. government for Technology Development (TD) phase testing in support of the U.S. and Australia's Land Force Capability Modernization Project Arrangement (PA).

The PA enables tactical vehicle interoperability and integration between the two countries. Delivery of the RHO JLTVs follows GTV's previous ahead-of-schedule deliveries of armor samples, ballistic hulls, seven vehicles and four trailers and spare parts for the TD phase.

Test and evaluation of the RHO JLTVs includes a five-month reliability and durability test and evaluation process at the Monegeetta Proving Ground in Monegeetta, Victoria, Australia. Test site management for GTV will be performed by General Dynamics Land Systems-Australia and supported by Australian in-country suppliers.

"Our RHO JLTVs provide increased protection, payload and performance for the Australian Defence Force, as well as over 90 percent commonality with the GTV JLTV vehicles delivered to the U.S. Army and Marine Corps in April," said Don Howe, GTV senior program director. "I am very proud of the effort demonstrated by our GTV team, including our supplier network, to deliver a balanced solution to meet the technical and programmatic challenges of the very demanding JLTV program, the U.S. government and the Australian Defence Force."

"The GTV team's significant experience with deployed global forces gives us unique and valuable insight into the needs of the Australian Defence Force," added Howe. "Delivering on schedule and within budget underlines our proven track record of dependability and

performance."

Drawing from the experiences of General Dynamics and AM General to build and support tactical and combat vehicles, GTV's vehicle design provides an armored crew capsule with an optimized V-shaped hull for protection against mines and IEDs, a state-of-the-art C4 architecture that accommodates future force technology capabilities, high-performance and off-road mobility and deployability by land, sea and air.

"Our robust, disciplined and focused system-engineering approach placed the American Warfighter at the center of product design. GTV has developed an innovative family of vehicles and trailers for the United States that meets transportability, survivability and mobility requirements while achieving maximum commonality of components to reduce parts, maintenance and training needs," said David Caldwell, GTV deputy program director.

"As our military prepares for future coalition operations, similarity of tactical vehicle solutions across allies will enhance global interoperability and reduce the maintenance and logistical burden," said Mark McCoy, U.S. Army JLTV product manager. "Australia's participation in the JLTV program will help reduce overall program risk through the testing and evaluation of additional prototype vehicles."

The JLTV TD phase is intended to validate the integration of mature technologies as a complete vehicle system, rebalancing payload, protection and performance while maintaining transportability and expeditionary capabilities; give the Army, Marine Corps and the Australian Defence Force an accurate assessment of the technical and performance capabilities and risks associated with entering the Engineering and Manufacturing Development (EMD) Phase; and establish a realistic set of requirements for the JLTV program.

GTV has invested in additional JLTV vehicles and trailers as part of its independent R&D program. "We are continuing our own extensive testing for reliability and durability to complement the government effort and prepare for the next, full-and-open competition phase of the JLTV development program," said Howe. "We're continuing to evaluate suppliers in Australia for emerging technologies, should the U.S. and Australia continue their JLTV partnership into the EMD phase – taking advantage of our JLTV's built-in capacity for technology insertion, growth opportunities and product improvements."



### Defence Industry

## Force Protection Selected to Continue in Canadian TAPV Program

Ladson, SC. -- Force Protection, Inc., a leading designer, developer and manufacturer of survivability solutions and provider of total life cycle support for those products, today announced it has received notification from the Government of Canada that it has been selected to continue in the procurement for the Tactical Armored Patrol Vehicle Project (TAPV).

Force Protection responded to the Solicitation of Interest and Qualification (SOIQ) phase with their Cougar 4x4 and 6x6 variants in June 2010. In addition to the two Cougar variants, seven vehicles from other equipment manufacturers have been selected in the TAPV program to now move into the Request for Proposal ("RFP") phase. The procurement is for up to 600 vehicles and related long term support services. Contract award to the final selected bidder is expected in 2011.

Randy Hutcherson, Chief Operating Officer of Force Protection, Inc. commented, "We are pleased that we have been selected to continue in the TAPV competition in Canada. The Cougars and Buffalos currently in service with the Canadian Forces are proven to save lives and perform critical missions to the efforts in Afghanistan. We look forward to responding to the request for proposal and continuing to build on our strong relationship with the Canadian Forces."

### Defence Industry

#### API Technologies Announces First North American Order for its Explosive Disposal Robot

RONKONKOMA, NY -- API Technologies Corp., a provider of highly engineered products and services to the global defense sector, announces that it has completed the sale of the teleMAX™ Explosive Ordnance Disposal (EOD) Robot to the City of Atlanta, Georgia.

The total sale, API's first in North America, is valued at approximately \$300,000. The EOD robot is for use at the Hartsfield-Jackson Atlanta International Airport, the world's busiest passenger airport, which serves approximately 88 million passengers per year.

The teleMAX™ robot weighs 175 pounds, is compact enough to fit into a truck or van and can be easily lifted by two people. It is mass-transit capable, making it ideal for use in aircraft, trains, buses, subways, and public spaces. The robot can easily climb stairs and inclines at an angle of up to 45°, access confined spaces and roll down the center aisle of a passenger jet. In addition, the robot's operator can remain at a significant and safe distance when the robot is in use.

The teleMAX™ robot was recently featured on the May 2010 cover of Unmanned Systems Magazine

The City of Atlanta represents the latest high-profile customer of API Technologies whose robotic capabilities include the teleMAX™ and tEODor™ EOD robots, as well as the M2P2™ inspection and surveillance robot.

API Technologies CEO Steve Pudles said, "Atlanta's purchase of the teleMAX™ robot represents API's first North American sale of this product. The Company anticipates a great market opportunity as other cities within North America learn about the robot's capabilities and discover what it can offer security forces charged with protecting a large population. We foresee considerable potential for sales as this technology, which

has already been deployed in dozens of other countries, becomes more widely appreciated and put into service throughout the continent."

### Defence Industry

#### U.S. Marine Corps Selects Oshkosh Defense to Advance Exportable Power Capabilities

OSHKOSH, Wis. -- Oshkosh Defense, a division of Oshkosh Corporation, has been selected by the U.S. Marine Corps Systems Command (MARCORSYSCOM) to supply on-board vehicle power (OBVP) kits for military testing.

The OBVP kits leverage the advanced Oshkosh ProPulse® diesel-electric drive technology, which is proven to power a small airport or entire city block from a single military vehicle.

"There is a rapidly-growing demand in the military for on-board power to support mobile radar systems, command centers, IED-defeat systems and many other applications," said John Bryant, vice president and general manager of Marine Corps Programs for Oshkosh Defense. "We are proud to partner with the Navy and Marine Corps to create a technology platform to provide our troops with increased tactical flexibility, while reducing their logistics footprint."

The OBVP kits will be installed on Marine Corps all-terrain Medium Tactical Vehicle Replacements (MTVR) for government evaluation and testing. The installation is expected to be completed in January 2012 and the evaluation and testing is expected to begin in March 2012. This contract follows successful OBVP technology-development efforts between Oshkosh Defense and the Office of Naval Research. The MTVR with OBVP will provide 120 kW of exportable military-grade power while stationary, and 21 kW of military-grade power while on the move.

Under the contract, valued at more than \$8 million, OBVP kits will be supplied and integrated on MTVR standard and extended cargo trucks. The scalable OBVP kits can be integrated on the assembly line during new vehicle production or as an aftermarket add on, which can be completed at the company's regional service facilities. Oshkosh also will provide the training and sustainment support required for the new technology during government testing.

The Oshkosh MTVR is a multipurpose logistics vehicle used by the Marines and Navy Seabees. The vehicle uses the Oshkosh TAK-4® independent suspension system to achieve superior off-road mobility. Oshkosh has supplied the Marines and Seabees with more than 10,000 MTVRs, which have been successfully operating in off-road missions in Iraq, Afghanistan and around the world.



**Defence Industry**

**LASSO® (Land, Air & Sea Special Operations) Vehicle Brings Off-Road Operations To A New Level**



Alexandria, Virginia -- The LASSO® (Land, Air & Sea Special Operations) vehicle is the result of thousands of hours of research, engineering, design and testing by VSE Corporation.

What sets this compact, all-terrain vehicle apart is its true, full-time, six-wheel drive with a fully independent suspension, 9-inches of suspension travel, 12-inches of ground clearance and a payload capacity of 3,000 pounds--allowing for high capacity load carrying in hard-to-travel environments.

The LASSO is designed to meet military specifications and incorporates many standard HMMWV features. Further, the LASSO was designed to fit inside tilt-rotor aircraft. Another main focus of the LASSO vehicle design was to use as many COTS (Components Off-The- Shelf) as possible to bring down pricing while facilitating a speedy and robust design.

“We developed the LASSO with a keen eye towards serviceability,” said VSE engineer and LASSO designer John Wasyluk. “The entire power pack (engine, transmission and accessories) is mounted to a separate sub-frame that is located under the seats, and can be quickly and easily removed from the vehicle for service or replacement. A two-man team can have the entire power pack “on the floor” in an hour. Each of the six ‘corners’ (wheel and suspension assemblies) also have common components such as upper a-arms, lower a-arms, toe links, knuckle assemblies, brake components and half shafts to keep parts and service costs down.”

The LASSO vehicle has been demonstrated on the SORT (Severe Off-Road Track) course at the U.S. Marine Corps Base in Quantico, Virginia where it exceeded all expectations of base personnel, and Finite Element Analysis concludes that the vehicle meets requirements for Roll-Over Protection (SAE J2194).

“We have designed the vehicle to be as compatible as possible with existing systems,” said Tom Dacus, President of VSE Federal Group. “This ensures minimal new training for our warfighters, and reduces the variety of parts needed – resulting in overall cost savings for our customers. The LASSO is a ‘get in and go’ piece of equipment.”

The LASSO vehicle’s carrying capacity of 3,000 lbs makes it a unique material handling vehicle. It is also equipped with both 12v & 24v power. This includes: (1) NATO slave plug; (2) 110v outlets; and (1) 12v dc power source. As a result, the vehicle can also be utilized as a

mobile generator and is fully equipped for black-out and infrared driving modes. According to Len Goldstein, VSE Chief Engineer, “These features are just the beginning. The possibilities for mission-specific variants of this vehicle platform include a Command and Control vehicle; Weapons Station Platform; Reconnaissance, Surveillance & Targeting; Ambulance; Fire Fighting; as well as serving as a personnel transport. There is also the option of an electrically-driven variant, a fuel cell variant and an autonomous LASSO vehicle.”

John Wasyluk concluded, “Anyone who has test driven the LASSO have been astounded by its extreme off-road capabilities. We are proud of our LASSO vehicle and we believe that it will be a great asset to our military, border protection and other government agencies which can quickly adapt from routine use to the most complex austere environments.”



**Defence Industry**

**Supacat completes 4th round of blast testing on SPV400 contender for UK MoD’s BJ200m LPPV Programme**



The all-new, all-British Supacat SPV400, which is competing to win a UK Ministry of Defence BJ200 million Urgent Operational Requirement for a Light Protected Patrol Vehicle (LPPV) to replace the Snatch Land Rover, last week completed a fourth round of blast tests.

These tests were conducted despite the LPPV bid having already been submitted to the MoD.

Previous blast tests have already proven the SPV400 protection levels exceed the stringent requirements of the LPPV Programme however, whilst protection levels cannot be revealed for security reasons, these latest tests have successfully achieved yet more. All tests conducted on the SPV400 have used the same automotive and protected composite crew pod systems to ensure consistent test data is gathered. The vehicle was repaired quickly between each blast underlining Supacat’s modular philosophy with regards to its ability to be repaired in theatre following an event. All tests have been conducted at UK test ranges under MoD guidelines, underscoring the fact that all the SPV400 Intellectual Property Rights for both automotive and protection solutions are UK based, residing respectively with Devon based Supacat and Coventry based NP Aerospace.

“Supacat and our Alliance partner, NP Aerospace, have further demonstrated our commitment to developing the absolute best lightweight protected

vehicle in the world. We have already reached the levels of protection asked for by the LPPV programme yet have chosen to continue our development to strive further still and these tests have proven that by the SPV400 withstanding some simply 'massive' explosions", said Nick Ames, Managing Director, Supacat Ltd. "The Supacat/NP Aerospace team believe it offers the best and a British solution – the SPV400. Its selection for LPPV would strengthen the UK's innovation and engineering skills base and support manufacturing jobs, sustaining between 1000 and 1200 jobs throughout the UK. The SPV400 is an entirely British Export and will have a potentially huge international market should it succeed in the LPPV competition".

Purpose designed to protect British troops from the threat of Improvised Explosive Devices in Afghanistan and perform patrol tasks in areas inaccessible to heavier vehicles, the Supacat SPV400 offers unprecedented levels of mobility and protection. This combination breaks new ground in military vehicle technology for a light patrol vehicle in the 7.5 ton class. Carrying a crew of six (2 +4), the SPV400 combines an integrated blast and ballistic protection system, including a protected all composite crew pod and V-shaped hull. On the desert plain it can reach speeds up to 80mph, comparable to the Supacat designed 'Jackal'.

Supacat and NP Aerospace, are respectively world leaders in high mobility, all terrain vehicles and in composite armour protection systems. NP Aerospace designed the SPV400's composite crew pod and protection system with access to the UK's classified armour technology. The materials used offer protection from a range of threats and at much lower weight than a traditional steel design.

Both have significant experience in working with the British Army, with Supacat currently supplying the Jackal and Coyote vehicles while NP Aerospace integrates and supplies the Mastiff, Ridgback and Wolfhound vehicles.

Over 90% of the SPV400 is UK sourced with a 30 strong supply chain stretching from Darlington, where Cummins UK produce the engine, down to Devon, where the SPV400 is designed by Supacat. Half of the key suppliers are concentrated in the West Midlands around NP Aerospace's Coventry production facility where the SPV400 will be built. They include GKN Aerospace and GKN Driveline, Pailton Engineering, CSES Engineering, Park Sheetmetal Ltd, Garforth & Goodman, Christy Hydraulics, Dana UK Axles, AFS Ltd, Lighting Aerospace.



## Defence Industry

### BAE, NGC Add Members to Ground Combat Vehicle Team

Arlington, Virginia -- BAE Systems and Northrop Grumman today announced additional members to their GCV team in their bid for the U.S. Army's Ground Combat Vehicle (GCV) competition.

BAE Systems-Northrop Grumman GCV teammates include:

- QinetiQ North America
- Saft

"We have built a team that has extensive experience and innovation in the development and production of combat systems and subsystems," said Mark Signorelli, vice president and general manager of Ground Combat Vehicles at BAE Systems. "With this team we bring more to our customer by providing a vehicle that will meet the Army's requirements for a highly survivable platform that can adapt to a constantly evolving and changing operational environment; from humanitarian relief to a full scale battlefield."

Each teammate will bring a different capability to GCV that will help to strengthen the BAE Systems-Northrop Grumman team offering. As the prime contractor, BAE Systems will provide the overall program management and systems integration for GCV and will also be responsible for providing the vehicle design, structure, logistical support as well as the readiness and sustainment of the platform. Northrop Grumman will serve as the C4ISR (command, control, communications, computers, intelligence, surveillance and reconnaissance) lead.

QinetiQ North America will provide the electric drive propulsion system or E-X-Drive(tm) for Ground Combat Vehicles. The E-X-Drive is the key component of the hybrid electric drive system, which minimizes electrical demand, saves on vehicle fuel costs, improves reliability, provides higher dash speed and acceleration and increased on-board and off-board power. Saft will provide the energy storage system for the GCV.

The BAE Systems-Northrop Grumman GCV offering will be the first combat vehicle designed from the ground-up to operate in an IED-threat environment. The team's offering will provide survivability, mobility and versatility that will address the operational requirements of the customer. The GCV mine survivability will exceed that of a Mine Resistant Ambush Protected vehicle, while the enhanced mobility capabilities will allow the GCV to operate in urban and cross country environments. The team's vehicle will also have an integrated electronic network capability and embedded intelligence, surveillance and reconnaissance assets to connect the warfighters. The open architecture electronics will also be adaptable to future network upgrades as new technologies mature. The modular armor system will allow the unit commander to rapidly apply or remove kits in the field to adjust to the tactical situation.

BAE Systems is the top producer of combat vehicles in the world and provides nearly 80 percent of the vehicles in the Heavy Brigade Combat Team (HBCT).

The GCV program is a development effort headed by the U.S. Army to develop the first combat vehicle designed from the ground up to operate in an IED-threat environment.



## Contracts

### Boeing-iRobot Team Receives New SUGV Task Order from US Army



HUNTSVILLE, Ala. -- The Boeing Company and partner iRobot Corp. today announced that they have received a new task order to an existing contract to provide Small Unmanned Ground Vehicles (SUGV) to the U.S. Army.

The order calls for 94 new model 310 SUGV robots, plus spares, for a total value of \$14.6 million.

This order, the contract's fifth, brings the total units ordered by the U.S. government to 323. The existing Indefinite Delivery, Indefinite Quantity contract will run through February.

"Boeing and iRobot are pleased to be working with our customers to provide this life-saving technology in response to urgent warfighter needs," said Bob DaLee, Robotics program manager for Boeing Network & Tactical Systems. "The 35-pound 310 SUGV system provides the dismounted Explosive Ordnance Disposal (EOD) technician with the ability to perform reconnaissance during extremely hazardous EOD missions involving unexploded ordnance and improvised explosive devices."

"Robots have played an important role on the battlefield for years now, and their numbers in theater are growing," said Joe Dyer, president of iRobot's Government and Industrial Robots division. "Warfighters can carry and quickly deploy the SUGV at a moment's notice, which is crucial in challenging environments such as Afghanistan. These robots are saving lives every day."

Boeing and iRobot developed the SUGV family of vehicles under a strategic alliance that began in 2007. SUGV is a smaller and lighter version of the combat-proven PackBot. It is designed to give warfighters real-time awareness of critical situations and to allow them to complete missions from safe standoff distances. It is ideal for a variety of mission types, including EOD, route clearance and reconnaissance. As the prime contractor, Boeing provides program management, contracts, government-test support and quality-control support from offices in Huntsville. iRobot is responsible for engineering, government-test support, manufacturing, training and logistics services, with the majority of work conducted in Bedford, Mass.

"The SUGV can increase the safety of U.S. and allied warfighters in uncertain situations," said William Boggs, director of Boeing Global Forces & Robotics Systems. "We will continue working with our customer not only to

provide these valuable assets, but also to continue to refine them so the SUGV we deliver tomorrow has even more capability than the one we deliver today."

## Contracts

### General Dynamics to Supply 27 RG-31 MRAP Vehicles to the U.S. Defense Department



LONDON, Ontario -- U.S. Marine Corps Systems Command (MCSC) has awarded General Dynamics Land Systems-Canada a \$33.2 million delivery order to produce 21 RG-31 Mk5EM and 6 RG-31 Mk5E vehicles for its Mine Resistant Ambush Protected (MRAP) vehicle program.

General Dynamics Land Systems, the Canadian company's parent corporation, is a business unit of General Dynamics.

Vehicle production will occur at BAE Systems Land Systems OMC of Benoni, South Africa. Deliveries will be completed by April, 2011. In total, General Dynamics Land Systems-Canada will have delivered 1,679 RG-31 vehicles under the MRAP program upon completion of this order.

The contract was signed through the Canadian Commercial Corporation, a Crown Agency of the Canadian Government.

## Defence Industry

### Force Protection and SNC-Lavalin Announce Partnership

Ladson -- Force Protection Industries, Inc., a wholly-owned subsidiary of Force Protection Inc., a leading designer, developer and manufacturer of survivability solutions and provider of total life cycle support for those products, and SNC-Lavalin Defense Contractors, Inc., a Canadian-based provider and one of the leading engineering and construction groups in the world, announced the formation of a strategic partnership to collaborate on the solution for the Canadian Government's Tactical Armoured Patrol Vehicle ("TAPV") program.

Force Protection Industries, Inc. previously announced that it has been selected by the Canadian Government as one of the competitor companies to provide up to 600 vehicles and related long term support services, with contract award to the final selected bidder in 2011.

Randy Hutcherson, Chief Operating Officer for Force Protection Industries, Inc., said, "We are very pleased to partner with SNC-Lavalin, a highly-respected and

experienced company in the Canadian defence sector, to provide the winning solution for the TAPV project. Force Protection Industries and SNC are committed to providing the Canadian Forces with the safest, most reliable vehicle while investing in Canadian industry. We are looking forward to working with SNC as they have a wide range of capabilities and experience that will help shape the winning technical, support, and industrial and regional benefit solution for the Canadian government that will help save the lives of Canadian soldiers.”

Peter Langlais, Senior Vice President and General Manager for SNC, commented, “Force Protection is bringing its expertise in design and supportability for its highly successful Cougar vehicles as the platform for the TAPV solution. Cougars are currently in use by Canada and have been instrumental in ensuring the safe transport of the men and women of the Canadian Forces. The Cougar TAPV will be specifically designed to meet the Canadian Government’s requirements. The primary manufacturing and supportability will be completed in Canada, and Force Protection and SNC will work closely together with other Canadian partners to ensure that Canadian troops get the best possible solution available in terms of safety and performance, as well as a great value for the government.”

