

# Army Guide monthly



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**Contracts****General Dynamics Awarded \$11 M U.S. Marine Corps Contract**

U.S. Marine Corps Systems Command (MCSC) has awarded General Dynamics Land Systems-Canada an \$11 million delivery order to produce 20 vehicles for its Mine Resistant Ambush Protected (MRAP) vehicle program. This contract is in addition to an order announced earlier for four MRAP vehicles for test and evaluation.

Under this latest agreement, General Dynamics will produce 10 Category I and 10 Category II MRAP vehicles. This Low Rate Initial Production (LRIP) order is being issued in advance of testing and full-scale production orders. With a stated requirement of 4,100 MRAP vehicles, General Dynamics continues to compete for the follow-on production orders.

The General Dynamics Land Systems-Canada MRAP vehicle is based on the RG-31 Mk5, the latest version of the highly successful RG-31 vehicle family. U.S. forces have previously ordered or received 424 RG-31 vehicles, including 265 Mk5s for the U.S. Army and Special Operations Command (SOCOM). The vehicles have proven to be highly effective against mines, improvised explosive devices and ballistic threats encountered by U.S. and Allied forces in both Iraq and Afghanistan.

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

**Contracts****Oshkosh Truck Announces \$30.6 Million Contract for U.S. Marine Corps Mine Resistant Ambush Protected (MRAP) Vehicles**

Oshkosh Truck Corporation announced today that the company has received a \$30.6 million contract award from the U.S. Marine Corps Systems Command for its Mine Resistant Ambush Protected (MRAP) vehicle program.

Under this production contract, Oshkosh will produce 100 Category I MRAP vehicles that will be deployed with U.S. military forces worldwide. Oshkosh plans to expedite its production schedule and deliver the first units within 120 days to meet the Marine Corps' urgent needs for additional armored vehicles in theater.

The MRAP program has current estimated requirements of 4,100 Category I and II vehicles with an approximate value of more than \$2 billion. Potential long-term requirements are estimated to be significantly higher. The Category I vehicle is the smaller of the two MRAP vehicles, intended for urban operations and referred to as the Mine Resistant Utility Vehicle (MRUV).

"Oshkosh is prepared to meet and exceed the critical delivery and protection requirements of the U.S. Marine Corps and the MRAP program. The armored proposed vehicles are engineered to save lives in the face of

today's asymmetric warfare threats such as mines and IEDs. Company's production and engineering capabilities will ensure the rapid delivery of world-class armored vehicles as the MRAP program continues to develop. Oshkosh is also prepared to provide the long-term logistics support required by a deployed MRAP fleet. The company has the experience and infrastructure in place in the theater of operation to provide whatever level of support is required. Oshkosh Truck Corporation have maintained and up-armored thousands of vehicles, of many makes and models, at company's facilities in theater over the past four years. Service installations and field service representatives are already in place, ready to support the MRAP fleet of vehicles as soon as it is operational.

The MRAP program is a joint acquisition between the Marine Corps and the U.S. Army and is taking place under Rapid Deployment Capability authority, intended to field protected vehicles to forces in theater in large quantities as rapidly as possible. In January, Oshkosh was one of nine companies awarded a contract to provide vehicles for testing under the MRAP program.

The Category I vehicle proposed by Oshkosh Truck is designed by Protected Vehicles, Inc. (PVI) of North Charleston, South Carolina. Over the past year, Oshkosh and PVI have forged a relationship that takes advantage of the experience, strengths and expertise of both companies. PVI will provide Oshkosh with armored hulls outfitted with their advanced armor technology, and Oshkosh will take advantage of its production capability and engineering expertise to provide completed vehicles with the performance, reliability, and quality standards that have become synonymous with Oshkosh Truck tactical wheeled vehicles.

The vehicle, dubbed the Alpha, is a 13-ton, 4x4 armored vehicle with room for eight occupants. It has a v-shaped hull and is designed to meet or exceed all ballistic and mine protection capabilities specified under the MRAP requirement. The vehicle is also fully air-transportable, making it simpler to re-deploy once in theater. The MRAP program is expected to greatly increase the safety of Marines and soldiers in the field.

**Defence Industry****Rafael Presents the Golan Armored Fighting Vehicle**

At the AUSA Winter Symposium March 2007 Rafael will present the Golan, Armored Fighting Vehicle. RAFAEL and PVI / USA are cooperating to develop and manufacture a 15 ton Armored Fighting Vehicle (AFV) for up to 10 troopers that will defeat small arms and RPG threats, medium size IED's, 7 kg mines under belly and 14 kg under wheels.

About a week ago the US Marine Corps has chosen the GOLAN for production order of 60 Category II vehicles, within the framework of the MRAP program. The Golan has been proposed by PVI (Protected Vehicles, Inc.), Rafael and Oshkosh Truck Corporation.

The GOLAN is based on a unique concept in which the armor protection system accounts for approximately fifty percent of Gross Volume Weight (GVW). According to the design philosophy, a spall liner was used to allocate weight externally to prevent penetration rather than allocate weight to the inside of the vehicle to minimize damage once a penetration has occurred (However, a spall liner is an option based on customer requirements).

The vehicle has a monocoque structure rather than internal framework or chassis. The integrity of the monocoque structure provides the strength to absorb the deformations generated by mines and IED blasts. It thereby provides an optimal solution to protect the crew and vehicle against the identified threats.

The crew compartment is designed to provide a scaled armor protection system. The maximum protection level includes reactive modular armor tiles while the medium and light levels are based on passive modular armor. The three protection levels are provided in the following table:

All three protection level configurations present the same physical silhouette. In the light and medium level configurations, there are no reactive armor tiles attached to the outer crew compartment structure. In their place, passive armor tiles (that include storage boxes) with an identical outer shape are attached.



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## Armor Holdings, Inc. Announces \$47 Million in MOLLE Orders



Armor Holdings, a leading manufacturer and distributor of military vehicles, vehicle armor systems and life safety and survivability systems

servicing military, law enforcement, homeland security and commercial markets, announced the award of a new delivery order valued at \$47.1 million from the U.S. Army Natick Contracting Activity.

The Company stated that this new order brings the total accumulated orders to \$108.6 million that have been issued under a \$258.9 million multi-year Indefinite Delivery/Indefinite Quantity (ID/IQ) contract received in August 2006 for the supply of Modular Lightweight Load Carrying Equipment (MOLLE). Production will be performed in 2007 and 2008 by the Armor Holdings Aerospace and Defense Group at its facilities located in Arizona, Kentucky, Pennsylvania and Tennessee.

The MOLLE line of products has been very well received in the field as the primary load carrying system for the U.S. Army. This system is an important part of a suite of products designed to function together to provide critical protection and survivability to the troops in the field.



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## Term of the day

### Assault Gun



An assault gun is a gun or howitzer mounted on a motor vehicle or armored chassis, designed for use in the direct fire role in support of infantry when attacking other infantry or fortified positions.

Historically the custom-built fully armored assault guns usually mounted the gun or howitzer in a fully enclosed casemate on a tank chassis. The use of a casemate instead of a turret limited these weapons' field of fire, but provided a simpler construction that was cheaper to build and less prone to mechanical breakdowns. The increased space and reduced weight of the turretless design also allowed mounting a larger weapon and providing heavier frontal armour on any given chassis, and in most cases these turretless vehicles also presented a lower profile as a target for the enemy.



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## Future Technologies

### BAE Systems Unveils Future Mortar Firing Platform

BAE Systems, the Future Combat Systems Lead Systems Integrator (LSI) team of Boeing and partner Science Applications International Corporation (SAIC), and the U.S. Army unveiled the first Future Combat Systems (FCS) Non-Line-of-Sight (NLOS) Mortar Firing Platform.

The NLOS Mortar is being designed by BAE Systems to transform the traditional role of the mortar on the

battlefield by providing greater crew survivability and enhanced fire support for infantry forces.



The NLOS Mortar is one of eight manned ground vehicles being designed and built as part of FCS - the Army's premier modernization program comprising a networked, fully integrated family of manned ground vehicles, unmanned ground and air vehicles, and sensors.

Lessons from Operation Iraqi Freedom demonstrated the value of responsive mortar fire and the need to enhance the safety of mortar crews. The advanced armament and survivability equipment being designed into the NLOS Mortar will give mortar crews unprecedented protection from enemy fire and enable soldiers to deliver critical fire support to troops on the frontlines faster and more accurately than ever before.

The NLOS Mortar Firing Platform, which features an automated, single-tube, 120-mm smoothbore turreted mortar mounted on a test stand, was developed by a team of 75 engineers at BAE Systems' System Integration Facility in Minneapolis. The milestone comes only six months after BAE Systems engineers successfully delivered the NLOS Cannon Firing Platform in September 2006. The NLOS Mortar Firing Platform is being delivered to Camp Ripley, Minnesota, where it will undergo test firing to confirm the reliability of its advanced armament technologies, such as automated ammunition storage and handling, breech-loading, in-bore air regulation system (IBARS) and automated mortar cooling system (AMCS) subsystems.

Engineers designed the NLOS Mortar to be breech loaded because the process allows the crew to fire the weapon under the protection of the vehicle's armor, rather than having an open firing platform as is common on today's self-propelled mortar platforms. BAE Systems engineers also incorporated the patent-pending IBARS technology, which allows soldiers to fire mortars at low angles to increase effectiveness and flexibility. It also provides a safe method for extracting misfired rounds without endangering the crew. The AMCS keeps the mortar tube cool to enable high rates of fire for long durations. It also ensures the tube is clean at all times to reduce soldier work load and increase system responsiveness.

## Defence Industry

### Oshkosh Truck Selected for Theater Provided Equipment Refurbishment (TPER) of Line Haul Tractors in Kuwait

Oshkosh Truck Corporation announced that it has been selected by the U.S. Army for Theater Provided Equipment Refurbishment (TPER) of M915 Line Haul tractors under a four-year Indefinite Delivery, Indefinite Quantity (IDIQ) contract.

The initial delivery is for a quantity of 137 units to be completed within the first 10 months of award and is valued at \$13.8 million. The contract can be extended to cover additional Line Haul units located throughout the Southwest Asia theater of operations. Work will be performed in Oshkosh's facility in Jahra, Kuwait, alongside the refurbishment of the Family of Heavy Tactical Vehicles (FHTV) manufactured by Oshkosh Truck.

The initial TPER Line Haul order covers multiple variants of the M915 Line Haul tractor, which was not originally produced by Oshkosh Truck. This is an urgent requirement to repair incoming tactical equipment that has become highly worn due to its continued operation under combat conditions. Following refurbishment, the vehicles will be returned to full mission capability and delivered to the Army to continue operations in the theater.

The TPER Line Haul award is a natural extension of the FHTV refurbishment effort that has just recently been awarded to Oshkosh Truck. The Army's intent to consolidate the efforts under Oshkosh Truck is a testament to the company's ability to respond and perform when the military customer has the greatest need. Since the beginning of the War on Terror, Oshkosh Truck has quickly responded in theater with repair facilities, add-on-armor facilities, field service personnel, and global delivery of high-quality service and supply parts. Aligning the Line Haul and FHTV TPER contracts will enable the U.S. Army to take advantage of the in-theater experience and proven performance of Oshkosh Truck by quickly and efficiently returning valuable logistics equipment to full mission capability.

The scope of work carried out by Oshkosh will include both scheduled and unscheduled maintenance as part of the ongoing contract. Since the start of Operation Iraqi Freedom, Oshkosh has had repair and armoring capabilities in the Southwest Asia theater of operations and currently has personnel deployed throughout the Middle East.

On February 20, 2007, Oshkosh announced that it had been selected by the U.S. Army for TPER of FHTV units under a four-year IDIQ contract valued at \$22 million for 319 units. Like the TPER Line Haul contract being announced today, the TPER FHTV contract can be extended to cover additional FHTV units located in Southwest Asia.

## Contracts

### BAE Systems Awarded \$7 M Contract Modification for M88A2 Hercules Recovery Vehicles



BAE Systems has been awarded a \$7 million contract modification from the U.S. Army TACOM Life Cycle Management Command to remanufacture and upgrade four M88A2 HERCULES recovery vehicles.

The M88A2 HERCULES has proven in combat that its ability to recover 70-ton tanks is invaluable to the Army's Heavy Brigade Combat Teams.

Work will be completed at the company's York, Pennsylvania facility by January 2010.

The modification is part of a contract award received last November worth \$251 million to remanufacture 113 vehicles. The \$251 million contract has since been modified in January 2007 to include four additional vehicles at \$7 million, and when combined with the current modification brings the total value to \$265 million.

HERCULES has provided unmatched capabilities during Operation Iraqi Freedom. To date 157 HERCULES vehicles have been fielded against a total U.S. Army requirement of over 595 vehicles. Sixty have been fielded to the U.S. Marine Corps, which has converted its total fleet to the M88A2 configuration, plus an additional 114 vehicles to allied nations.

HERCULES provides unparalleled capability for recovering today's 70-ton combat vehicles and answers the need for cost-effective, self-supporting heavy recovery performance. Key upgrades from the M88A1 include improved power-assisted braking, improved steering, improved electrical system and increased engine horsepower, 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.



## Future Technologies

### BAE Systems Unveils Mine-Protected Wheeled Vehicles



BAE Systems will show its RG33 series

mine-protected wheeled vehicles in the 4x4 infantry carrier and 6x6 ambulance configurations to military leadership at a major U.S. industry event showcasing technologies and capabilities for the U.S. Army.

BAE Systems will feature the RG33 series - already on order from the U.S. Marine Corps under its Mine Resistant Ambush Protected vehicle program - during the Association of the U.S. Army Winter Symposium and Exhibition in Fort Lauderdale, Florida, March 7-9.

The RG33 series design is focused on one thing - Soldier and Marine survivability. The design is a full-system, integrated approach that blends vehicle structure, blast resistant seating, high visibility transparent armor windows, tailorable add-on armor packages and other features.

The RG33 series is highly mobile, and the all-wheel drive and suspension are designed to accommodate additional mission requirements. With about 90 percent commonality between the 4x4 and 6x6 in the series, fielding and logistics support requirements are streamlined.

The RG33 is the company's latest in the series of mine protected vehicles that offers more volume under armor than any other mine protected vehicle and incorporates the latest designs in protecting against improvised explosive devices (IEDs). The entirely new vehicle design and production in record time resulted from the company's expertise and long history of designing mine protected and mine hardened vehicles in South Africa and providing high survivability combat vehicles in the U.S. The highly survivable RG33 incorporates a monocoque V-shaped hull design that leverages knowledge gained in recent and ongoing conflicts.

BAE Systems is working under an Indefinite Delivery, Indefinite Quantity (IDIQ) contract from the Marine Corps to provide 4x4 and 6x6 vehicles from the RG33 series. An initial delivery order on Jan. 26 called for two of each for Marine Corps testing, and was followed by a second delivery order Feb. 14 for 90 vehicles - 15 4x4 vehicles and 75 6x6 vehicles. Under the contract, the company will begin deliveries in March and will deliver all vehicles over the next 120 days to meet urgent military requirements.

The company has multiple tactical wheeled vehicles in production now and skilled employees with mine hardened vehicle production expertise in low-cost, low-risk U.S. production facilities.

BAE Systems used the latest design, modeling and simulation tools at its facilities in the U.S. and South Africa to rapidly prototype and produce the first vehicle, a 6x6 version of the RG33. The company has proven capability in rapidly producing and fielding highly survivable vehicles for the military.

The RG33 vehicle series is designed to address demanding requirements based on today's threats by delivering enhanced blast protection and survivability to the crew inside. The RG33 is available with base protection against medium machine gun or small arms fire and mine blast protection at a level equal to or exceeding any fielded mine protected vehicle. RG33

vehicles may be equipped with tailorable armor packages, as well. Advanced crew and passenger survivability is obtained through blast-resistant seating technology, transparent armor and unique reconfigurable interior stations. The platforms are designed with a power train equipped to handle upgrades and enhancements.

BAE Systems will deliver the mine-protected RG33 vehicle in 4x4 and 6x6 versions to meet the urgent requirements of the Nation's armed forces. The vehicle series is mission configurable for infantry carrier, ambulance, command and control, convoy escort, explosive ordnance disposal and other roles and is recoverable by another RG33. The vehicle features on-board exportable power for C4I and other mission equipment.

BAE Systems is a global defense and aerospace company, delivering a full range of products and services for air, land, and naval forces, as well as advanced electronics, information technology solutions, and customer support services. BAE Systems, with 88,000 employees worldwide, had 2006 sales that exceeded \$25 billion.



## Robots

### Additional Bomb-Disposal Robots to German Federal Defense Force



iRobot Corp. announced it received an order of more than \$2.8 million for 22 additional iRobot PackBot® EOD robots and spare parts from the German Bundeswehr (Federal Defense Force).

This is the second order from the German Federal Defense Force, which last year purchased 18 iRobot robots and has now exercised an option for 22 additional robots. These bomb-disposal robots will be used by German forces to identify and dispose of improvised explosive devices (IEDs) as part of the country's efforts to combat terrorism. iRobot expects to deliver the robots in Q2 2007.

The German Federal Defense Force first ordered PackBot EOD robots after conducting a competitive market search followed by an intensive 18-month test. During user training, participating soldiers reported they were impressed by PackBot's lightweight design, ease of use, speed, sensitivity and maneuverability. The successful training was one of the reasons for exercising this follow-on order.

Military organizations are embracing robots as a better way to address life-threatening field operations, such as explosive ordnance disposal. PackBot has become a mission-critical tool for agencies worldwide as more countries choose to deploy the combat-proven PackBot

rather than send soldiers into dangerous situations.

To date, iRobot has delivered more than 800 PackBot robots to a broad range of military and civilian customers around the world. The robots have performed tens of thousands of missions in Iraq and Afghanistan and are credited with saving soldiers' lives.

iRobot is a provider of robots that perform dull, dirty or dangerous missions in a better way. The company's proprietary technology, iRobot AWARE Robot Intelligence Systems, incorporates advanced concepts in navigation, mobility, manipulation and artificial intelligence. This proprietary system enables iRobot to build behavior-based robots, including its family of consumer and military robots.



## Term of the day

### Self-propelled Gun



A self-propelled gun is a gun, whether it be an artillery piece, anti-tank gun, or anti-aircraft gun, mounted on a motorized wheeled or tracked chassis. As such the gun can be manoeuvred under its own power as opposed to a towed gun that relies upon a vehicle or other means to be moved on the battlefield. Self-propelled guns are combat support weapons; they are employed by combat support units fighting in support of, or attached to, the main combat units: infantry and armour.

It may be armoured, in which case it is considered an armoured fighting vehicle. Although the two are superficially similar self-propelled guns should not be confused with tanks. As a rule self-propelled guns are more lightly armoured and without turrets. Tanks are armed with guns designed specifically to destroy other tanks while only true of some types of self-propelled guns are designed for anti-tank warfare.

Some self-propelled guns are used as artillery pieces in a similar manner to traditional towed howitzers and as such also fall under the umbrella description of self-propelled artillery, but the two terms are not the same and the one is not a sub group or specialization of the other.

The greatest tactical advantage in the case of artillery guns is clearly the greater degree of mobility they have compared to towed artillery. Not only is it important in offering military forces greater flexibility, but it is critical in avoiding attack from the enemy (counter-battery fire) by allowing the guns to change position immediately after firing one or more salvos and before their position can be located ("shoot-and-scoot"

tactics). A secondary advantage in the case of armoured – even lightly – guns is the increased protection offered to the gun crews.



### Defence Industry

## ATK and ARDEC to Develop Advanced Ammunition and Gun System to Counter Rocket, Artillery and Mortar Attacks

Alliant Techsystems has received a \$4.6 million contract from the U.S. Army Armament Research, Development and Engineering Center (ARDEC) to develop and demonstrate a next-generation ammunition and gun system for the Army's Extended Area Protection & Survivability (EAPS) program.

EAPS technologies are being developed to counter incoming enemy rocket, artillery and mortar (RAM) attacks against U.S. and allied troops.

During the 24-month development program, ATK and ARDEC will incorporate advanced technologies into a 50mm projectile that will be fired from a variant of ATK's battle-proven Bushmaster cannon line. The culmination of the development program will be live-fire tests where ATK and ARDEC demonstrate the ability to communicate with the round - via a data uplink - after it exits the barrel. In addition, the team will demonstrate a unique course-correction technology that increases the EAPS target defeat capability. Finally, ATK will demonstrate the effectiveness of the ARDEC warhead design to defeat incoming rockets, mortars and artillery shells.

"ATK is an industry leader in the development of force protection technologies for personnel, vehicles and facilities," said Dave Wise, Vice President and General Manager, ATK Advanced Weapons. "We have worked closely with ARDEC on a number of systems that are on the battlefield today, and we look forward to continuing that partnership as we create the technologies of tomorrow."



### Defence Industry

## Additional Armored Buffalo mine-protected vehicles for US Marines



Force Protection, Inc. announced that it has received a delivery order from the U.S. Marine Corps for an additional 19 Buffalo mine-protected vehicles worth an estimated \$16.2 million.

Under a November 2006 contract award administered by the Marine Corps Systems Command, Force Protection expects to deliver the 19 Buffalo vehicles by December 2007.

The Buffalo was initially deployed in the war on terror in 2003, being used to detect and remove thousands of suspected explosive threats by military engineers who credit the vehicle with saving lives. The Buffalo's unmatched performance for troop safety and sustainability in the field has also made it the sole source vehicle for the Marine's Mine Resistant Ambush Protected vehicle program Category III requirement.

Force Protection, Inc. manufactures ballistic- and mine-protected vehicles through its wholly owned subsidiary. These specialty vehicles are protected against landmines, hostile fire, and Improvised Explosive Devices (IEDs, commonly referred to as roadside bombs). Force Protection's mine and ballistic protection technology is among the most advanced in the world. The vehicles are manufactured outside Charleston, S.C.



### Contracts

## Northrop Grumman Awarded Contract for Main Battle Tank Laser Rangefinder

Northrop Grumman Corporation has received a contract from the U.S. Army to deliver Eyesafe Laser Rangefinders (ELRF) to be installed on the M1A2 Abrams Main Battle Tank.

Under the terms of the approximately \$20 million contract, Northrop Grumman's Laser Systems business unit will provide more than 500 rangefinder systems beginning in late 2007.

The ELRF is a highly accurate, hardened system for the fire control sight in the Abrams Main Battle Tank. The ELRF gives the tank gunner the ability to determine target ranges in all battlefield conditions including fog, smoke, dust, sand and haze. Additionally, the rangefinder allows U.S. forces to train safely against each other.

"The ELRF Main Battle Tank rangefinder has been used successfully by the U.S. Army for a number of years and has proven its accuracy and effectiveness most recently during combat in Iraq," said Gregory Williams, general manager of the company's Laser Systems business unit. "Giving our tank crews the ability to fire in all conditions with precision gives them a big advantage on the battlefield. Being able to see and determine the enemy's position, when they can't see you, is an ideal situation."



### Robots

## Elbit Systems Unveils VIPeR a Portable Combat Robot

Elbit Systems Ltd. introducing at AUSA Winter the Versatile, Intelligent, Portable Robot (VIPeR), the newest member of its unmanned systems family. The new robot is displayed at the company's booth at the USA Winter Symposium and Exhibition.

VIPeR was developed for the Israel Defense Forces (IDF) within the framework of its Portable Unmanned Ground Vehicle (PUGV) program, and in close cooperation with The Israeli Ministry of Defence's Directorate of Defense R&D (DDR&D). Following operational evaluation, the IDF plans on fielding VIPeR in its infantry platoons.



This portable, lightweight robot is operated by a single operator, and is designed to negotiate obstacles typical of an urban environment, such as climbing stairs and rubble,

when performing surveillance, reconnaissance and support troops in urban warfare missions. The vehicle uses the "Galileo Wheel", a patented system developed by Galileo Mobility Instruments Ltd. that allows automatic back and forth conversion among a wheel configuration, a track configuration and a special stair climbing configuration. (View a video showing the performance of the Galileo robot prototype).

VIPeR is designed to reduce the danger to the dismounted force during different phases of combat, employing various payloads including weapons, add-on sensors, modules and task oriented payloads. The robotic vehicle weighs 25 lbs (11.4 kg). It measures compact system measures 18"L x 18"W x 9"H (46 x 46 x 23 cm).

The intelligent, small-signature VIPeR can also be configured with weapons capability comprising a 9 mm mini-Uzi with scope and pointer, or grenade launcher. The system is remotely controlled via a control harness and helmet mounted display. Optional payloads include: P&T, FLIR, observation day/night zoom camera, explosives sniffer, disrupter, 4-foot robotic arm, gripper, in-building mapping and more.



## Contracts

### General Dynamics Awarded \$12 M U.S. Army Contract for Mortar Increment Charges

General Dynamics Ordnance and Tactical Systems, a business unit of General Dynamics, has been awarded a \$12 million contract by the U.S. Army Joint Munitions and Lethality Life Cycle Management Command for the production of mortar propelling increment charges for 81mm and 120mm mortar ammunition.

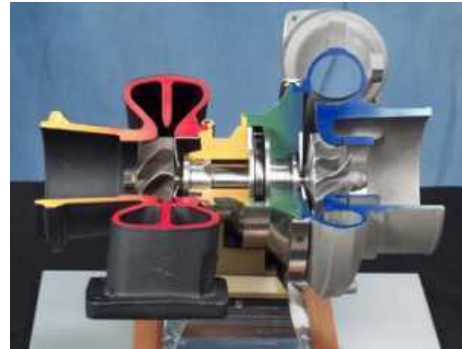
Under this contract, General Dynamics produces the 81mm M218, M219 and M220 propelling charges, as well as the M233 and M234 propelling charges for the

120mm mortar system. Production and program management will be performed at the General Dynamics medium-caliber ammunition facility in Marion, Ill. Work is expected to be completed by April 2010.



## Term of the day

### Turbocharger



A turbocharger is an exhaust-gas driven forced induction device used in internal combustion engines to improve engine performance by forcing compressed air into the combustion chambers, allowing more fuel to be burned, resulting in a larger power output.

A turbocharger consists of a turbine and a compressor linked by a shared axis. The turbine inlet receives exhaust gases from the engine exhaust manifold causing the turbine wheel to rotate. This rotation drives the compressor, compressing ambient air and delivering it to the air intake of the engine.

The objective of a turbocharger is to improve upon the size to output efficiency of an engine by solving for one of its cardinal limitations. A naturally aspirated automobile engine uses only the downward stroke of a piston to create an area of low pressure in order to draw air into the cylinder. Since the number of air and fuel molecules determine the potential energy available to force the piston down on the combustion stroke, and because of the relatively constant pressure of the atmosphere, there ultimately will be a limit to the amount of air and consequently fuel filling the combustion chamber. This ability to fill the cylinder with air is its volumetric efficiency. Since the turbocharger increases the pressure at the point where air is entering the cylinder, and the amount of air brought into the cylinder is largely a function of time and pressure, more air will be drawn in as the pressure increases. The intake pressure, in the absence of the turbocharger determined by the atmosphere, can be controllably increased with the turbocharger.

The application of a compressor to increase pressure at the point of cylinder air intake is often referred to as forced induction. Centrifugal superchargers operate in the same fashion as a turbo; however, the energy to spin the compressor is taken from the rotating output energy of the engine's crankshaft as opposed to exhaust gas. For



this reason turbochargers are ideally more efficient, since their turbines are actually heat engines, converting some of the kinetic energy from the exhaust gas that would otherwise be wasted, into useful work. Superchargers use output energy to achieve a net gain, which is at the expense of some of the engine's total output.



### Contracts

## U.S. Marine Corps Awards General Dynamics \$144 M Expeditionary Fighting Vehicle Contract



The U.S. Marine Corps Systems Command has awarded General Dynamics Land Systems, a business unit of General Dynamics, a \$144 million contract modification for the continuation of the System Development and Demonstration (SDD) phase of the Expeditionary Fighting Vehicle (EFV) program. The contract funds the Design for Reliability (DFR) effort through September 2008.

This contract validates the efforts of the joint General Dynamics-U.S. Marine Corps Expeditionary Fighting Vehicle program office to achieve a reliable system that will allow the Marines to fulfill their expeditionary warfare mission well into the 21st century. General Dynamics Land Systems has solid customer direction and the funding to implement a plan to achieve the desired results.

The EFV Mission Essential Functions (MEFs) of land and water high speed maneuver, firepower lethality, communication systems, and the ability to carry a reinforced infantry squad and armor protection have been met and validated. Achieving reliability is the only remaining performance parameter before low rate production can begin, which is projected for 2011. General Dynamics is working very closely with the U.S. Marine Corps and remains committed to achieving the EFV reliability requirement at the earliest practical date.



### Defence Industry

## Krauss-Maffei Wegmann and BAE Systems Australia team for LAND 17



Krauss Maffei-Wegmann (KMW) has partnered with BAE Systems Australia in a move to strengthen their bid for the Australian Army's Land 17 Artillery Replacement program.

Under the partnership, they will establish a KMW certified facility in Australia to support the PzH 2000, a leading contender for the protected self propelled 155mm howitzer requirement of the Land 17 program.

The PzH 2000 is an advanced, automated and mature artillery system currently in service with four European nations. It's formidable fire power has recently been demonstrated in Operation Medusa in Afghanistan, where the Dutch Army artillery units equipped with PzH 2000's have provided fire support for the Australian Operation Slipper task force and other coalition forces.

KMW has a long association with the Australian Army through the Leopard's distinguished service as Australia's Main Battle Tank for nearly three decades. KMW is keen to modernize the Army's Combat Support artillery regiments with the advanced and proven in service PzH 2000 protected self propelled howitzer to provide quantum leaps in fire power effects, range and accuracy. Adding to the effectiveness of these capability improvements will be enhanced artillery platform mobility and survivability. KMW's teaming with BAE Systems will enable the full capabilities of the PzH 2000 to be maintained at high readiness and availability levels to support the Australian Army's increased operational tempo and expeditionary demands.

This partnering agreement brings together the two most experienced developers and suppliers of tubed artillery systems in the world. It provides the Australian Defence Force with the most modern, mature, in-service protected self propelled and M777 light weight towed artillery platforms, ideal for Land 17. The agreement also marks BAE Systems return as a major player in land systems in Australia and signifies the company's enduring commitment to hardening and supporting the Australian Army.

### **PzH 2000 -The most modern tube artillery system in the world:**

The PzH 2000 is a modern and precise 155 mm/52 calibre weapon system with complete autonomy of the overall system in driving, navigation and firing, and system-derived stability enable individual options previously unfeasible in tube artillery systems. The system is highly automated in fusing, loading, laying and firing, enabling a crew of three to perform the manoeuvre and fire support mission. The capacity of the on board automatic ammunition storage and handling system is 60 rounds. Reliability, endurance and deployability are enhanced by a 360° effective range at all elevations, a firing range > 40 km, a cadence of up to 10 rounds per minute, and high tactical mobility. Thus, the PzH 2000 forms an essential element in combat support, both now and in future combat and crisis scenarios.

### **KMW:**

Krauss-Maffei Wegmann GmbH & Co. KG Europe's market leader for armoured wheeled and tracked vehicles. At sites in Germany, Greece, the Netherlands and the United States 2.800 employees develop, produce and support a product portfolio that ranges from airtransportable and highly protected wheeled vehicles (MUNGO, DINGO, FENNEK und BOXER), to

reconnaissance, air defense and artillery systems (FENNEK, GEPARD, PzH 2000 and AGM) all the way to main battle tanks (LEOPARD 1 and 2), infantry fighting vehicles (PUMA) and bridge layers (LEGUAN und PSB2). Furthermore KMW possesses a broad system competence in the field of civil and military simulation, command and control applications and fully automatic remote controlled gun mounts. The armed forces of more than 30 nations worldwide rely on operational systems supplied by KMW.

### **BAE Systems:**

BAE Systems is the premier transatlantic defence and aerospace company, delivering a full range of products and services for air, land and naval forces, as well as advanced electronics, information technology solutions and customer support services. With more than 100,000 employees worldwide, BAE Systems had 2006 sales that exceeded \$US25 billion.

BAE Systems Australia is a company committed to being the Australian Defence Force's through-life capability partner in integrated military systems and support solutions. It combines key skills in engineering and systems integration and is a leading provider of communications, electronic warfare systems, military air support, air defence, mission support systems and intelligence, surveillance and reconnaissance. It employs approximately 2,600 people and supports customers at more than 50 locations across the country.

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### **Term of the day**

#### **Tracer Ammunition**

Tracer ammunition (tracers) use special bullets that are modified to accept a small pyrotechnic charge in their base. Ignited upon firing, the composition burns very brightly making the projectile visible to the naked eye. This enables the shooter to follow the bullet trajectory relative to the target in order to make corrections to their aim.

Tracers can also serve to direct fire at a given target, because it is visible to other combatants. The disadvantage is that they betray the shooter's position. One simply follows the trace back to its source. To make it more difficult for an enemy to do this, most modern tracers have a 'delay element' that results in the trace becoming visible some distance from the muzzle. Its lethality is similar to conventional ammunition. However, the mass loss and the burning aspects can make the consequences of the impact slightly different.

Besides guiding the shooter's direction of fire, tracer rounds can also be loaded at the end of a magazine to remind the shooter that the magazine is almost empty. This is particularly useful in weapons that do not lock the bolt back when empty (such as the AK-47). During World War II, the Soviet Air Force also used this practice for aircraft machine guns. It has been said that a disadvantage in this practice is that the enemy is alerted that the pilot or shooter is low on ammunition and possibly vulnerable. However, it is generally agreed

upon that for ground forces, this offers no tactical advantage to the enemy since a soldier is supposed to alert his team that he is "dry", and rely on their support while he reloads. Thus, an enemy must expose himself in order to attack the reloading soldier. In the air, fights rarely involve firearms. Instead, modern aircraft tend to rely on missiles.

Tracers are usually loaded between one in four rounds to one in six rounds. Platoon leaders will sometimes load their magazines entirely with tracers to mark targets for their men to fire on.

For those on the receiving end of tracer ammunition, there is a well-known optical illusion whereby the tracer rounds appear to be travelling slowly, but as they get closer they speed up considerably.

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### **Contracts**

#### **Armor Holdings, Inc. Receives \$103 M Armor Component Order for Up-Armored HMMWV**



Armor Holdings, Inc., a leading manufacturer and distributor of military vehicles, vehicle armor systems and life safety and survivability systems serving military, law enforcement, homeland security and commercial markets, announced the receipt of new orders from AM General valued at \$103 million under a blanket purchase agreement to provide armor components for the M1151, M1152 and M1165 Up-Armored HMMWV programs.

The Company stated that work will be performed in 2007 by the Armor Holdings Aerospace and Defense Group at its Fairfield, Ohio facilities.

Robert Schiller, President of Armor Holdings, Inc., said, "Our ongoing business in support of AM General validates our investment in facilities and equipment to become a premiere armor component fabrication center. We are pleased to continue our long standing positive relationship with AM General in support of these Up-Armored HMMWV programs."

**Term of the day**

**Tankette**



A tankette is a type of small armoured fighting vehicle resembling a tank, intended for infantry support or reconnaissance. Tankettes were designed and built by several nations between about 1930 and 1935, and saw some combat in the Second World War.

Most tankettes were manned by a crew of two, although one-man prototypes existed. They usually had no turret (and together with the tracked mobility, this is often seen as defining for the concept), or just a very simple one that was traversed by hand. They tended to be armed with one or two machine guns, or rarely with a 20mm gun or grenade launcher.

The "classic" design was the British Carden-Loyd Mk.IV Tankette, with many others modelled after it. The French Armoured Reconnaissance type of the 1930s (Automitrailleuses de Reconnaissance - 'Machine-gun scout') was essentially a tankette in form, but specifically intended for scouting ahead of the main force. Japan meanwhile became one of the most prolific users of tankettes, producing a number of designs useful for jungle warfare.

The concept was later abandoned due to limited usefulness and vulnerability to antitank weapons, and the role of tankettes was largely taken over by armoured cars. However, the 1990s saw the renaissance of the concept with the Wiesel of the German Bundeswehr being introduced to provide airborne troops with some armoured capability.

order is part of previous technical support reset contract awarded to DRS by TACOM.

A reset contract involves the repair and retrofit of battle-worn or damaged products to a like-new condition (near zero miles/zero hours of wear and tear). To date, the company has been awarded approximately \$17 million in contracts to repair M707 Knight systems on U.S. Army HMMWVs.

TACOM placed the order on behalf of Program Executive Office Ground Combat Systems and its subordinate offices of Project Manager Heavy Brigade Combat Team, and Product Manager Fire Support Platforms.

The work for this order will be accomplished by the company's DRS Sustainment Systems unit in St. Louis, Missouri. This unit will repair, align and calibrate the Knight system's Mission Equipment Package, and perform base automotive repairs and reset. In conjunction with their work, the company's Reconnaissance Surveillance & Target Acquisition Segment will be involved in the repair of the system's Fire Support Sensor System/Long-Range Advance Scout Surveillance System components. The repairs are expected to start immediately and are expected to be complete by November.

The Knight system consists of a laser designator and rangefinder, a thermal imager, a digital command and control system, a blended inertial/global positioning system (GPS) navigation and targeting capability, and a self-defense weapon. It provides far-target location and laser target designation for both artillery and air-delivered, general-purpose and precision-guided munitions. It is most often employed by field artillery units.

DRS Technologies, headquartered in Parsippany, New Jersey, is a leading supplier of integrated products, services and support to military forces, intelligence agencies and prime contractors worldwide. The company employs approximately 10,000 people.

**Contracts**

**Defence Industry**

**DRS TECHNOLOGIES RECEIVES \$10 MILLION ORDER TO REPAIR KNIGHT PRECISION TARGETING SYSTEMS INSTALLED ON U.S. ARMY HMMWVs**



DRS Technologies, Inc. announced today that it received a \$10 million order from the U.S. Army's Tank-Automotive and Armaments Command (TACOM) in Warren, Michigan to repair Knight Precision Targeting Systems installed on High Mobility Multi-Wheeled Vehicles (HMMWVs). The

**Armor Holdings, Inc. Receives \$25.5 Million U.S. Army Body Armor Order**

Armor Holdings, Inc., a leading manufacturer and distributor of military vehicles, vehicle armor systems and life safety and survivability systems serving military, law enforcement, homeland security and commercial markets, announced the receipt of a new delivery order under an existing contract valued at \$25.5 million from the U.S. Army Research Engineering and Development Command, Aberdeen.

The Company stated that the new order is for the continued production of Enhanced Small Arms Protective Inserts (ESAPI) with work to be performed in 2007 by the Armor Holdings Aerospace and Defense Group at its facility located in Phoenix, Arizona.

Robert Schiller, President of Armor Holdings, Inc., said, "We are pleased that the U.S. Army is continuing to

call on Armor Holdings to provide this important soldier protection equipment, and we are continuing to invest in product development for this life saving body armor." ■

## Contracts

### ST Engineering's Electronics Arm Secures \$16.9 M MINDEF Contract to Supply Thermal Weapon Sights

Singapore Technologies Engineering Ltd (ST Engineering) announced that its electronics arm, Singapore Technologies Electronics Limited (ST Electronics), has been awarded a \$16.9m contract by the Ministry of Defence (MINDEF) for the supply of lightweight thermal weapon sights to the Singapore Armed Forces (SAF).

The contract was awarded through ST Electronics' subsidiary, STELOP Pte Ltd. The project will start immediately and be completed in 2009.

The thermal weapon sights will be mounted onto general purpose machine guns, enabling the gunners to detect and engage targets at long range, day or night, as well as under adverse weather and harsh operational environmental conditions, e.g. through battlefield smoke.

The lightweight thermal weapon sight serves to enhance the night-fighting capabilities of the SAF by extending the night observation and engagement range of its crew-served weapons. ■

## Robots

### Robotics as a Key Technology

Berlin, 28.03.07 -- With the "European Conference on Security Research SRC '07", held on 26 and 27 March in Berlin, the Federal Ministry of Education and Research is launching the "European Security Research Program".

Under this, the European Union will make available around €1,4 billion from 2007 to 2013 to promote research and innovation for strengthening internal security. In order to further develop its technologies and undertake research into new solutions for combating terrorism, the Berlin-based enterprise Robowatch Technologies will participate in this conference and in the "European Security Research Program".

"The feeling of security in Germany, and in Europe generally, is being increasingly undermined by terrorist attacks, like those in London or Madrid", said Robowatch's General Manager, Dr. Jens Hanke. "From our viewpoint, robotics is a key technology to effectively meet today's challenges of security policy. In this respect, it is necessary that politics, industry and research pull together. So increased backing for security research by the European Union can only be welcomed", continued Hanke.

The robotics specialists of Robowatch, which has already advanced as a pioneer in homeland security solutions in Germany, provides unique security products that have already proven themselves in numerous

missions. For years, this Berlin-based enterprise has been developing autonomous unmanned ground vehicles (AUGVs) that relieve the workload of persons in hazardous situations, issue warnings in good time, and provide a protection function, so enhancing the performance and safety of special assignment forces – criteria that play a major role in this promotion program.

Thus the autonomous platforms OFRO+detect and ASENDRO optimize reconnaissance for assignment teams in disaster control and civil protection, and support these during missions in high-risk zones. In addition to its capabilities in safeguarding property and in person detection, the reconnaissance robot OFRO+detect can detect nuclear and chemical hazards in fractions of a second. With the ASENDRO EOD, bomb defusing operations are possible even in very complex or constricted situations, like in aircraft or buses. Controlled from a safe distance, this defusing robot moves and investigates objects with its gripper arm. Such service robots for reconnaissance, mission support and averting dangers are likewise a highly relevant research topic for this promotion program.

Over that, Robowatch Technologies is among the top five finalists for the prestigious international technology prize of the HANOVER TRADE FAIR, which carries a money award of €100,000. This year, more than 70 companies submitted entries for this international technology prize, ranging from state-of-the-art energy storage technology and microsystems technology, through laser technology and sensor applications, up to robotics and electronic fuel injection. The winner will be announced on 15 April 2007 during the opening ceremony of the HANOVER TRADE FAIR. ■