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Defence Industry

Barco Will Deliver Vetronics Displays for the Belgian Upgraded Pandur Vehicles

Barco was selected by Thales Communications Belgium and Thales Optronics of France for the supply of over 40 vetronics display systems. Barco's 10-inch rugged display systems will be integrated into the electro-optical observation and detection systems of the Pandur Armored Reconnaissance Fire Support Vehicles of the Belgian army. This delivery, which is part of an extensive upgrade of the Pandur reconnaissance system, includes customization of the displays in order to meet the specific functionality demands of the Belgian army.

Barco's 10-inch vetronics display was chosen by Thales because of its optimum image quality and high level of ruggedness. For this program, Barco customized the display to meet the specific connectivity requirements of the Pandur observation system. The contract further includes Barco's easy-to-use HMI software toolbox ACTEV, which will allow the Belgian army to implement its own desired functionality into the vetronics display system without time consuming code programming.

Barco's vetronics display system has been designed for observation and visualization on board armored vehicles. Thales opted for the DM-1126 Display Module, a single ruggedized display unit which combines a 10-inch SVGA (800 x 600) Panel Module (PM-1126) with a Video Control Module (VCM-1101). Barco's DM-1126 can handle a wide range of external RGB and video sources, including digital maps and Forward-Looking Infrared (FLIR). Furthermore, Barco's 10-inch vetronics display system complies with the most stringent environmental specifications regarding shock, vibration, temperature and Electromagnetic Compatibility (EMC), including MIL-STD and DEF-STAN.

First deliveries for the Pandur upgrade program took place in September 2006.

Term of the day

Oscillating Turret

The oscillating turret is a two-piece turret where the bottom half allows a 6400 mils (360 degrees) rotation on a conventional turret ring, but the upper half is mounted on trunnions at either side. The gun is fixed in the upper part of the turret and gun elevation and depression is obtained by tilting the whole of the upper part of the turret.

The main advantage from this system accrues from the gun being fixed in relation to the upper turret. The sighting and fire control system are greatly simplified as there was no need for complex mechanical linkage between gun and sight (in a modern application the linkage would be electronic) since both are mounted in the upper part of the turret and move together. As the gun is fixed to the upper turret, the swept volume requirement inside the turret due to the elevation and depression is also greatly reduced.

The gun can be mounted close to the turret roof and so reduces the frontal area presented to the enemy when engaging a target with the main armament. Because the gun is fixed in relation to the upper turret, a human loader would have a very difficult task and therefore an autoloader is essential. The loader can be eliminated, reducing the silhouette of the tank and enhancing protection.

The attraction of a simple autoloader is lost if the magazine is positioned anywhere except in the bustle, where the ammunition maintains a constant position relative to the gun and breech. Problems then arise in light tanks where there is a limit to the number of ready rounds of ammunition available. Ammunition magazines mounted on oscillating turrets usually have to be replenished from the outside and if the magazine has a small capacity the need to expose the crew to reload could be a serious operational disadvantage for a tank in battle though it would not be of such critical importance for a tank destroyer.

Apart from the limitations on the quantity of ready rounds that can be stowed in the turret bustle, the weight problems are increased very considerably when the vehicle is scaled up to main battle tank (MBT) levels. The sheer weight of the upper turret, which includes armour, gun, ammunition and autoloader, necessitates very considerable gun trunnions and large amounts of hydraulic or electrical power for stabilisation. These trunnions have, in turn, to be supported by a substantial thickness of metal in an area where the protection levels (the sides) would not necessarily require such thickness.

NBC protection is particularly difficult to provide in an oscillating turret. Practically all armoured fighting vehicles rely on crew compartment over-pressure as a means of countering the inevitable leakage mainly from the hull/turret interface. However, the gross leakage caused by the inability to seal effectively the upper and lower halves of the turret and the turret ring itself renders it impossible to utilise a collective NBC protection system.

Future Technologies

BAE Systems First Round from NLOS Cannon Firing Platform

BAE Systems successfully fired the first round from the Future Combat Systems (FCS) Non-Line-of-Sight (NLOS) Cannon Firing Platform.

The Firing Platform is an ultra-lightweight 38-caliber, fully automated 155-mm howitzer featuring a fully automated ammunition handling system integrated onto a tracked chassis. Today's firing event launched an official Firing Platform testing and evaluation program that will

run through 2008.

This successful firing is a testament to the excellent work being done by BAE Systems and the NLOS Cannon design and development team, including the Armaments Research and Development Command, Benet Laboratories and Watervliet Arsenal. This dedicated workforce is committed to delivering the NLOS Cannon to the armed forces by 2008 and today's first round demonstrates the company is right on schedule."

BAE Systems will continue single-round firing tests with the Firing Platform during the coming weeks. Those tests will be followed by rate-of-fire testing to demonstrate the effectiveness of the NLOS Cannon's automation system, which will give soldiers the capability to fire a four-round Multiple Round Simultaneous Impact mission with the push of a button.

The NLOS Cannon is the lead Manned Ground Vehicle of the Boeing/Science Applications International Corporation (SAIC) led FCS Program and the 155-mm Firing Platform is the first step toward development of complete NLOS Cannon pre-production units scheduled to be delivered to the Army by the end of 2008.

Defence Industry

Elop awarded $5 million for Portable Lightweight Designator/Rangefinder

Elbit Systems Ltd. announced that its subsidiary Elbit Systems Electro-Optics Elop Ltd. was awarded a contract to supply Portable Lightweight Designator/ Rangefinders (PLDR) and the Coral thermal imager to the German Armed Forces. The order is valued at approximately $5 million.

Elop's PLDR has a compact and lightweight design that can be carried by an individual soldier, yet is rugged enough to meet harsh environmental conditions. The designator system has a number of advanced features including a built-in tactical computer for target location calculations, an integrated spot camera and remote data transmission capability. A similar version of the PLDR has also recently been selected by the US Marine Corps.

This contract testifies to company's leading role in the growing market of advanced laser designator systems for defense and homeland security applications. Elop's laser designators and systems for land, air and naval applications are providing advanced solutions for modern day battlefield needs. The company is proud of the selection of their solution for a major NATO member such as Germany and believes that this selection will facilitate contracts with other potential customers in Europe and across the globe.

Future Technologies

DRS Technologies Receives $76M to Produce New Thermal Weapon Sights

DRS Technologies, Inc. announced that it has received approximately $76 million in new orders to produce next-generation Thermal Weapon Sights II (TWS II) for U.S. Army ground force applications.

DRS received the new orders from the U.S. Army's Communications-Electronics Command (CECOM) acquisition center in Fort Monmouth, New Jersey, acting on behalf of Program Executive Office Soldier. For these orders, DRS will produce Light, Medium and Heavy Thermal Weapon Sights, which will utilize the company's uncooled infrared technology. Work for this contract will be accomplished by the company's DRS Sensors & Targeting Systems - Optronics Division and Infrared Technologies Division. Product deliveries will be in excess of 1,600 Light, 3,900 Medium and 2,000 Heavy Thermal Weapon Sights.

This order is part of a competitively secured five-year contract awarded to DRS in March 2004. The contract has a total potential value of $375 million, including options.

As an industry leader in uncooled, high-performance, thermal imaging systems, the TWS II produced by DRS are contributing immediately to the military's current and future force objectives. The urgency and demand for TWS II by commanders continues to increase significantly. Improving soldiers' surveillance, targeting and combat effectiveness 24 hours a day, in zero illumination and in obscurants, such as fog, smoke, dust and sand storms, DRS's TWS II is optimized to place increased lethality in the hands of individual war fighters and enhances their survivability on the open and urban battlefields.

The DRS family of Light, Medium and Heavy TWS II use advanced uncooled thermal imaging sensors that currently support the U.S. Army, Marine Corps, Air Force and Special Operations forces. They provide soldiers and armament crews with greater range of threat detection and wider field of view at a reduced cost. Offering superior image quality, greater battery life,

soldier-friendly ease of use and lightweight, these sights better equip war fighters to see the battlefield under vision-obscured conditions and engage the enemy. The Light TWS produced by DRS will mount onto M4, M16 and M136 assault rifles; the Medium TWS will operate on M249 and M240B Squad Automatic Weapons; and the Heavy TWS will operate on M2, M107, MK19, M24, M4/M16 Sniper Weapon Systems.

The variety of DRS's uncooled infrared sensors ensures availability to international militaries, as well. The company's thermal weapon sights product line also is applicable to homeland defense initiatives supporting first responders and government customs and border control/protection agencies, in addition to private security companies, domestic law enforcement agencies, and for applications where the protection of high-value assets and critical infrastructure from terrorist threats are priorities.

Contracts

General Dynamics Awarded $38 Million Contract for M1A1 Abrams Tank Reset

General Dynamics Land Systems, a business unit of General Dynamics, has been awarded a $38 million U.S. Army contract to reset 89 M1A1 Abrams main battle tanks. The reset program is designed to reverse the effects of combat stress on military vehicles.

Work will be performed in US, by existing General Dynamics employees, and is expected to be completed in late December 2007.

Through the reset program, General Dynamics, in partnership with the Anniston Army Depot, will completely tear down, repair and apply select modifications to bring the tanks to a pre-combat condition and reissue them to Army units prior to their next deployments. The reset program is the first activity of a partnership formed in February between General Dynamics and the Anniston Army Depot to maintain core skills at both facilities, and provide continuous improvements and maintenance of both Abrams and Stryker fleets.

Future Technologies

Barco to provide rugged display workstations for BAE Systems' NLOS-Cannon early prototypes

Visualization specialist Barco has been selected by BAE Systems Land & Armaments LP, Armament Systems Division, for the Non-Line-of-Sight Cannon (NLOS-Cannon) early prototypes. Through its dedicated subsidiary for mission-critical applications Barco Federal Systems, the company will provide rugged display workstations. The NLOS-Cannon early prototypes are 155mm, self-propelled cannon systems developed for the US Army's Future Combat Systems program. Each system will be equipped with 4 display workstations configured in a 2 man crew station.

Barco's state-of-the-art 17-inch displays and computers were chosen by BAE Systems because of their technological innovation. The rugged displays incorporate the latest backlight solution using LED technology, while the computers integrate the latest in desktop graphics boards within a small and sealed package. The displays and computers are then mounted together to form a small, easy-to-install workstation core.

The selected 17-inch display was in design prior to this program selection as part of Barco's efforts to invest in the US Army's Future Combat Systems program. The company are working hard to design products that fully meet the needs of the Future Combat Systems program and are fully committed to internal development to show the capabilities and willingness to support the Integrated Product Teams and the US Army.

The new display and processing product designed for this program is an extension of Barco's existing Modular Rugged Display System (MRDS) product range, providing the next generation of powerful embedded computing with high-performance display capabilities within a single product platform.

The NLOS-Cannon early prototypes are the lead systems for the Boeing/SAIC led Future Combat Systems Manned Ground Vehicle program and will be delivered for developmental testing beginning in 2008.

Defence Industry

Force Protection, Inc. Received a Delivery Order for 10 Additional Buffalo Mine-protected Clearance Vehicles

Force Protection, Inc. announced that it had received a delivery order from the U.S. Army for 10

additional Buffalo mine-protected clearance vehicles. The order, worth an approximate $7.5 million, marks the fulfillment of a contract awarded by the Tank, Automotive and Armaments Command in Warren, Michigan for a total of 41 Buffalo vehicles.

Force Protection's Buffalo and Cougar vehicles have been featured in major national news publications in recent weeks. A Fox News Channel report broadcast on 10/31 cited the fact that there have been no fatalities in Force Protection vehicles since their deployment to Iraq and Afghanistan in 2003, despite thousands of IED attacks. Similar reports have been published in USA Today, Forbes Magazine, and Fortune Small Business Magazine.

"The performance of our vehicles speaks for itself," said Force Protection CEO Gordon McGilton. "We are pleased with the attention their critical role has received, and, most importantly, are gratified to hear constantly from the men and women in the field that the Buffalo and Cougar are saving lives everyday. This shows us that our objective to keep soldiers safe in the face of explosive threats by providing the most advanced blast protection technology available continues to be met."

About Force Protection

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.

For more information on Force Protection and its vehicles, go to www.forceprotection.net.

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Term of the day

Turbocharger

A turbocharger is an exhaust gas-driven compressor used to increase the power output of an internal-combustion engine by compressing air that is entering the engine thus increasing the amount of available oxygen. A key advantage of turbochargers is that they offer a considerable increase in engine power with only a slight increase in weight.

A turbocharger is a dynamic compressor, in which air or gas is compressed by the mechanical action of impellers, vaned rotors which are spun using the kinetic movement of air, imparting velocity and pressure to the flowing medium.

The mechanical concept turbocharger revolves around three main parts. A turbine is driven by the exhaust gas from a pump, most often an internal combustion engine, to spin an impeller whose function is to force more air into the pump's intake, or air supply. The third basic part is a center hub rotating assembly (CHRA) which contains bearing, lubrication, cooling, and a shaft that directly connects the turbine and impeller. The shaft, bearing, impeller, and turbine can rotate at speeds in the tens or hundreds of thousands of RPM (revolutions per minute).

The lubrication system can be either a closed system or be fed from the engine's oil supply. The lubrication system may double as the cooling system, or separate coolant may be pumped through the center housing from an outside source. Oil lubrication and water cooling using engine oil and engine coolant are commonplace in automotive applications.

The turbine and impeller are each contained within their own folded conical housing on opposite sides of the center hub rotating assembly. These housings collect and direct the gas flow. The size and shape can dictate some performance characteristics of the overall turbocharger. The area of the cone to radius from center hub is expressed as a ratio (AR, A/R, or A:R). Often the same basic turbocharger assembly will be available from the manufacturer with multiple AR choices for the turbine housing and sometimes the compressor cover as well. This allows the designer of the engine system to tailor the compromises between performance, response, and efficiency to application or preference. Both housings resemble snail shells, and thus turbochargers are sometimes referred to in slang as snails.

By spinning at a relatively high speed the compressor turbine draws in a large volume of air and forces it into the engine. As the turbocharger's output flow volume exceeds the engine's volumetric flow, air pressure in the intake system begins to build, often called boost. The speed at which the assembly spins is proportional to the pressure of the compressed air and total mass of air flow being moved. Since a turbo will spin to RPMs far beyond what is needed or of what it is mechanically capable of, the speed must be controlled, and thus is also the property used to set the desired compression pressure. A wastegate is the most common mechanical control system and is often further augmented by an electronic boost controller.

The implementation 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 heat 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.

Defence Industry

Force Protection Awarded a Contract for 100 Joint EOD Rapid Response Vehicles and 44 Buffalo vehicles

Force Protection Industries, Inc., Ladson, S.C., is being awarded a $125,000,000 letter contract for 100 Joint EOD Rapid Response Vehicles (JERRV) and 44 Buffalo vehicles with associated manuals, deployment kits, field representative support and training.

Vehicles will be deployed to and supported in Iraq. This contract contains options, which if exercised, would bring the total estimated contract value to $200,000,000. The maximum ordering quantity will be 200 JERRV vehicles and 82 Buffalo vehicles. Work will be performed in Ladson, S.C., and is expected to be completed by November 2007 and their support will continue up to a year after fielding. Contract funds will not expire by the end of the current fiscal year. This contract is a sole source award to Force Protection Industries, Inc., based on an urgent and compelling need for the Government.

Defence Industry

Raytheon Selects ATK for Stunner Interceptor Booster Motor Development

Raytheon Company has selected Alliant Techsystems Inc. (ATK) to develop the booster motor for the flexible, affordable and lethal Stunner Interceptor, an element of the Short Range Missile Defense (SRMD) program.

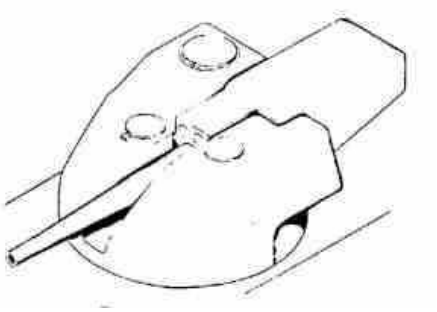
ATK Tactical Systems' composite booster motor solution for the Stunner Interceptor supports Raytheon's strategy of disruptive innovation in the terminal missile defense mission area.

Israel and the U.S. have a critical and immediate need for an affordable, highly effective short-range missile defense capability and ATK Tactical Systems Division look forward to working with Raytheon and Rafael to develop the booster motor for the Stunner Interceptor.

Raytheon Company and Rafael Armament Development Authority were selected in May by the U.S. Missile Defense Agency and Israel Missile Defense Organization to develop the Stunner Interceptor under the U.S-Israel SRMD program. The joint program aims to develop a common interceptor solution to defeat the proliferating threat of short-range ballistic missiles and rockets. Such threats are cheap, plentiful, easily concealed and largely exempt from international arms control accords.

Term of the day

Cleft Turret



It is a type of turret where the gun is set between the two turret crewmen, one either side.

The true cleft turret should not be confused with the narrow, high turret of the M60 A1E2, a tank using the 152 mm gun from the unsuccessful Sheridan reconnaissance vehicle programme. The true cleft turret has a shape rather as if one had taken half an orange, placed it on a flat plate and then pressed a pencil down into it so that the upper part of the pencil was level with the orange.

The particular advantage that this system bestows is that the gun can depress fully without the constraint of the turret roof. If the height of the turret roof, or strictly speaking the height of the turret either side of the cleft can be reduced then the weight of armour required to provide the desired level of protection can also be reduced. As the breech of the gun is lying in the valley between the two sides of the turret it is afforded a measure of protection.

Despite the fact that the cleft affords some protection, it also causes some design problems. Elevation, and not depression, of the gun now becomes a major limiting factor, the turret ring below the turret (engine decks) being the limiting factor. As the gun is now disassociated from the crew, loading and servicing is difficult. Also, trials have proved that the isolation of the turret crewmen on their separate sides of the turret creates psychological problems which have to be taken into account, especially when operating the tank for long periods closed down. An external autoloader becomes essential and care must be taken to ensure that the elevation of the gun is not obstructed by spent cases and debris. Because servicing the gun is virtually impossible without getting out of the turret, reliability is of paramount importance.

As the gun is lying in the cleft of the turret and gun recoil is not constrained by turret ring diameter, it may be possible to reduce the size of the tank. However, by its very nature, the gun divides the turret in two halves which can lead to crew control problems. However, as two identical crew stations are required, crew duties, particularly for surveillance, can be relatively easily exchanged.

Defence Industry

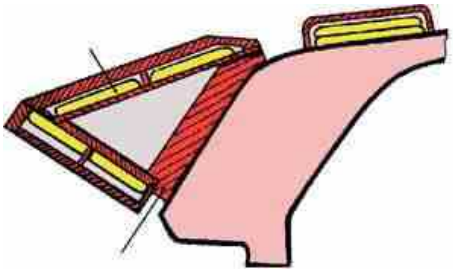
Armor Holdings Awarded $32M in Soldier Force Protection Equipment

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 $32.1 million in delivery orders on existing contracts with the Defense Logistics Agency, Defense Supply Center Philadelphia (DSCP).

The Company stated that these delivery orders include $26 million for Outer Tactical Vests and components as well as $6.1 million for Modular Lightweight Load-Carrying Equipment (MOLLE). Production work on these delivery orders will be performed in 2007 by the Armor Holdings Aerospace and Defense Group at its facilities located in Alabama, Arizona, Kentucky, Pennsylvania and Tennessee.

Term of the day

Explosive Reactive Armour (ERA)



Is is a form of armour in which explosive is sandwiched between two thin armour plates. The force of the penetrator hitting the front armour plate causes the explosive to detonate, reducing penetration. ERA is more effective against high-explosive anti-tank projectiles.

The most important aspect of explosive reactive armour (ERA) is that it can be used to enhance the protection of existing vehicles though it is likely to lie more effective if its characteristics are taken into account at the vehicle design stage. ERA armour consists of a series of individual panels installed onto the sloping surfaces of the tank hull and turret. Each panel is made up of a layer of explosive material sandwiched between two metal plates. These panels, which are attached at an oblique angle to the vulnerable areas of a tank's superstructure will on attack from a shaped charge warheard, explode, dispersing the high-explosive anti-tank warhead plasma jet generated on impact. A number of countries market ERA armour under various proprietary names. Claims for their effectiveness vary but a useful rule of thumb is that they can provide protection equivalent to ten times the weight of homogeneous rolled steel armour and that penetration of the charge jet can be reduced by more than 75%. Though designed primarily to protect against chemical energy warheads they provide some small additional protection against kinetic energy attack.

ERA can be easily and quickly applied to a wide range of vehicles. Even though each panel has only a 'one-shot' capability, their modular design and light weight enable them to be exchanged in the field. A simple fixing system also enables ERA to be retro-fitted to existing vehicles, giving an extremely cost-effective improvement in armoured protection. The need for high standards of safety has been taken into account in the design of the explosive material used between the plates. ERA represents a major departure for many armies in that explosive will be carried on the external surfaces of a tank and there are may be environmental objections in some countries to mounting ERA on tanks in peace. Special insensitive explosive has been developed to ensure that the panels can be handled, cut, drilled and welded without risk and that small arms fire and rough usage will not detonate them. When attacked by a hollow charge warhead the panels are so designed that there is no risk of sympathetic detonation of the other panels in close proximity.

Contracts

BAE Systems Awarded a $251 Million Contract Modification for Hercules Recovery Vehicles

BAE Systems has been awarded a $251 million contract modification from the U.S. Army TACOM Life Cycle Management Command to remanufacture 113 M88A2 HERCULES recovery vehicles, provide spare parts and extend system technical support for the U.S. Army.

These combat proven vehicles will help the Army meet the projected fielding of the modular Heavy Brigade Combat Teams.

Work will begin immediately at the company's York, Pa. facility, with vehicle deliveries scheduled to begin in December 2007 and continuing through November 2009 and is the largest continuous production run of M88A2 vehicles since the program began.

The contract provides for two options worth up to an additional $18.9 million to remanufacture eight additional vehicles for the U.S. Army and two for the U.S. Marine Corps.

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 more than 500 vehicles. The U.S. Marine Corps has fielded 60 vehicles in the M88A2 configuration. An additional 114 vehicles have been delivered 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.

Army

Army is to Deploy Troops to Iraq with Computerized Equipment

Following successful field testing last summer, the Army is planning to deploy its new Land Warrior system within the year, bringing the Army a giant step closer to electronic networking of the battlefield. The wearable, computerized system includes lasers, navigation modules, radios, and other technologically advanced equipment to help Soldiers shoot, move, and communicate more accurately on the battlefield. Ultimately, it will improve their ability to fight effectively and survive, according to the Army.

Testing of the Land Warrior package was conducted over a three-month period by Stryker Brigade Combat Team (SBCT), at Fort Lewis, Washington. It culminated in an Army Evaluation Command (AEC) Limited User Test (LUT) in September and October. Battalion Commander LTC Bill Prior said, "the "4-9" has been training for anticipated deployment next summer. Based on assessment results, it looks like we will be going to deploy with the new Land Warrior and Mounted Warrior systems." For the first time, U.S. Infantry troops will be carrying digital gear that will help address some of the chronic difficulties for Soldiers on the ground, such as locating other Soldiers, identifying the enemy, and getting the latest orders.

Thanks to the successful demonstration at Fort Lewis, US now have the first Army unit ready to go real-world operational with Land Warrior capabilities. Land Warrior marks the path forward to a more capable, lighter weight Ground Soldier system. The leadership of the Army takes great pains and great care to ensure that the American Soldiers are well equipped, well trained, and well organized to accomplish the mission that the Nation sends them on.

Program Executive Office (PEO) Soldier and the U.S. Army Infantry Center conducted the comprehensive Land Warrior assessment, during which the Stryker Brigade Combat Team at Fort Lewis was equipped with 440 Land Warrior Systems as well as 147 Mounted Warrior Systems designed for combat vehicle crewmen. For the Land Warrior first time ever, large-scale map displays were used to show the Soldier his location, the location of his buddies, vehicle locations, known enemy positions, and up-to-the minute mission plans and orders. Weapon systems equipped with multifunctional laser sights, day and night vision feeds, and direct connectivity to the Land Warrior and Mounted Warrior networks increase the Soldiers' combat effectiveness while minimizing exposure to the enemy. Precise navigation and real-time, common situational awareness were shown to substantially reduce the risk of fratricide or surprise enemy attacks.

Term of the day

Composite armour

Composite armour is a term used to describe armour which uses a number of different techniques to defeat the anti-armour threat, e.g., rolled homogenous armour, explosive reactive armour, spaced armour.

If the form and type of attack is known, then it is possible to optimise tank armoured protection to give the highest protection levels against the specific attack. If, as is more usual, the tank has to protect itself against several varieties of attack then the choice of a suitable armour becomes a more difficult problem. If each separate threat were to be given the highest protection levels in the design without regard to other design

factors, then the combination would undoubtedly give the best all-round performance but the penalty would be an excessively bulky and heavy armour leading to an impractical vehicle design.

Contracts

Scania Awarded 100 Million Euro Contract for 555 trucks

Scania has won a service contract with the Dutch army. The contract is worth about 100 million Euros and covers the repair and maintenance of 555 trucks and their ancillary equipment.

The contract, which covers a period of 13 years, also includes training of the army's mechanics, who will repair and maintain the trucks during operations in the field and on international assignments. Under the terms of the agreement, the Dutch army gains access to most of Scania's 50 workshops in the Netherlands.

The agreement covers the 555 multi-wheeled trucks that Scania has delivered to the Dutch military over the past 12 months. The four-axle trucks are fitted with 420 hp 12-litre engines driving all four axles to ensure good off-road ability in demanding terrain.

It was in November 2003 that Scania secured the contract to sell 555 trucks in fierce competition from Europe's leading truck manufacturers, making this the company's biggest-ever military order outside Scandinavia. The final decision was made after exhaustive testing by the Dutch army under a variety of climate and terrain conditions.

Term of the day

Rolled Homogeneous Armour (RHA)

In order to achieve the best possible strength, it is essential to have armour plate with the same hardness and structure throughout. The production of armour plate involves a rolling process to bring it to the correct thickness and to induce some desirable metallurgical properties. The expression 'rolled homogeneous armour' is used as a measure of the ability of a penetrator to defeat armour. Usually measured in millimetres, the rolled homogeneous armour can be used to assess one type of armour against another, i.e., spaced armour and monoblock (solid) armour.

The classic material for vehicle armour is a range of special nickel/chrome alloy steels. Steel is a very versatile material and can be produced in a variety of forms but more recent practice favours the use of homogeneous plate which has the same hardness and structure throughout. The production of plate involves a rolling process to bring it to the correct thickness and to induce some desirable metallurgical properties. The armour produced by this method is known as Rolled Homogeneous Armour (RHA) and is used as the current standard of comparison for protection levels offered by other materials. However, different nations have different ways of calculating depth of RHA penetration and care must be taken to compare like with like.

Defence Industry

Denmark buys state-of-the-art large-calibre ammunition from Rheinmetall

The Danish armed forces are the first to order Rheinmetall's newly developed PELE 120mm KE round. PELE stands for "Penetrator with Enhanced Lateral Effect". The procurement package includes the modification of existing tank ammunition (the DM 33 A2) in order to improve its effectiveness in modern combat scenarios, including possible military operations in urban terrain. Never attained before, the prime advantage of the PELE system is its pinpoint effectiveness in the target zone, resulting in a drastic reduction in collateral damage.

After Finland, Denmark is the second Scandinavian country to procure the new DM 53 A1, an advanced version of Rheinmetall's DM 53 120mm KE tank round. The ammunition, currently being supplied in series to the armed forces of Germany, Austria and Turkey as the DM 63, uses the newly developed TIPS "temperature-independent propulsion system". TIPS is qualified for a substantially wider operational temperature range (-46 deg.C to 63 deg.C), meaning that the ammunition is safe to use in extreme climate zones. This closes an important capability gap.

Moreover, the DM 63 can defeat the latest armour. It also causes less barrel erosion thanks to this state-of-the-art propulsion system, in turn resulting in longer barrel life.

A live-fire campaign in mid September 2006 at the Danish Army's training area in Oksboel, Denmark once again demonstrated the soundness of this decision: representatives from 12 nations were able to see for themselves the effectiveness of Rheinmetall's 120mm DM 53 A1 / DM 63 and 120mm PELE ammunition, all of which are qualified for use in the Leopard 2 gun.

As part of this 120mm ammunition procurement package, all service ammunition in the Danish inventory will be equipped with measurement technology: developed by Rheinmetall, new high-tech data boxes form the foundation for lifecycle ammunition management. Here, too, Denmark is the pilot customer.

Compared to previous techniques, Rheinmetall data boxes are a much more accurate means of detecting and recording data on stored and transported ammunition. Among the principal data recorded are information on relative humidity, temperature and shocks experienced

during shipping. With regard to ammunition safety and ammunition monitoring, the accumulated data enable highly reliable statements on the usability and remaining lifetime of the ammunition. The system thus makes an important contribution to cutting costs.

Term of the day

Top Roller (Track Support Roller, Track Return Roller)

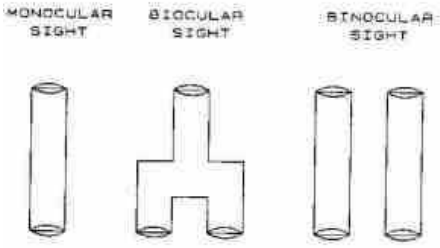
It is a small wheel supporting the top run of the track.

The top run of track of a tracked vehicle could simply be left to hang in a catenary between the idler and sprocket; indeed this is the practice on a number of tracked vehicles. One objection to this is that the arrangement will limit the travel available before the wheels hit the top run, with consequent adverse effect on the ride. Another concerns the dynamics of the track itself, which results in lateral vibration resonances taking the form of a travelling wave moving from front to rear. These may reach violent proportions, and the resultant fluctuations in tension can cause an increase of as much as 20-30% in rolling resistance at certain critical speeds.

By making the road wheels sufficiently large, the top run can be allowed to rest n the tops of the wheels. The consequent crease in unsprung mass makes this an unsatisfactory solution for the higher speed vehicles, especially those with heavy tracks, and the modern tanks all use separate top rollers (also called track support rollers, or track return rollers) to support the track and to keep it clear of the wheels, a price has to be paid for these in the form of added weight, inertia and friction.

Term of the day

Monocular, Biocular, and Binocular Sights



Monocular sight is an optical system with a single objective lens and a single eyepiece.
Biocular sight is an optical system with one objective lens and two eyepieces, in which the same image is presented to each eye.
Binocular sight is an optical system with an independent channel for both eyes. Each channel has its own objective lens and eyepiece, so that the images presented to the eyes are slightly different.

The eyepieces of most modern high magnification sights are either monocular or biocular. Monocular sights, in which the scene is presented to one eye, are the simplest and produce the minimum light loss, although they can cause eye strain and other physiological problems, especially when used for long periods. Also, since each eye is connected to one side of the brain, the monocular system does not make full use of the operators cognitive facilities.

With biocular eyepieces, the light enters the sight via a single objective lens and is divided by a beam splitter, with the same image being presented to both eyes. Although the beam splitter causes some light loss, the overall effect is beneficial. Apart from the reduction in eye strain, there is evidence that operator performance is improved by some 10% to 15% when both eyes are used.

From the performance point of view, the optimum system is the binocular, in which each eye has a totally independent channel. However, binocular systems are rarely used because they have a number of disadvantages. In particular, they need a larger aperture in the turret, the increased number of components makes them more expensive and they require careful setting up and maintenance to keep the two channels optically aligned.

Army

DRS Receives $19M Order to Produce Battlefield Digitization Systems for the U.S. Army

DRS Technologies, Inc. announced today that it has received an order valued at approximately $19 million to provide rugged Applique Computer Systems and peripheral equipment for the U.S. Army's Force XXI Battle Command, Brigade and Below (FBCB2) program.

Installed on over 40 U.S. Army and Marine Corps vehicle platform types, including wheeled and tracked vehicles, as well as Tactical Operations Centers and other command post platforms, DRS's Applique Computer Systems support the Army's Blue Force Tracking requirements, which include beyond line-of-sight reporting and tracking and significant improvements in vertical and horizontal information integration for incorporation into the military's overall battlefield visualization efforts.

The order was received by DRS from the U.S. Army's Communication-Electronics Life Cycle Management Command (CELCMC) in Fort Monmouth, New Jersey. For this order, the company's DRS Tactical Systems unit in Melbourne, Florida, will provide more than 1,700 rugged Applique Computer Systems, including processors, displays and keyboard units, as well as more

than 300 rugged solid-state hard disk drives and over 4,200 rotating media hard disk drives.

"This additional order on the FBCB2 program reflects DRS's strong track record for innovative design, highly reliable performance, product quality and timely delivery," said Steven T. Schorer, president of DRS's C4I Group. "More than 25,000 DRS-built Applique Computer Systems have been fielded successfully under the FBCB2 program. This new order ensures they will continue to serve as crucial assets for our forces in the Army's network-centric communications infrastructure."

The FBCB2 program is focused on developing a digital battle command information system designed to provide commanders, leaders and soldiers, from brigade to individual soldier and across all the battlefield functional areas, with improved information for command and control and enhanced situational awareness. Supporting the Army's overall battlefield visualization efforts, the Applique Computer Systems provide a seamless flow of battle command information and interoperability with external command and control and sensor systems.

Incorporating the latest developments in digital information processing and networking, DRS-built FBCB2 systems provide improved combat support for lower-echelon battle command tactical mission requirements, including near real-time command and control capabilities, enhanced interoperability, situational awareness, and graphical combat area displays, throughout the force structure at the soldier, weapons and platform levels. These systems assure that U.S. armed forces keep pace with advanced technology developments of the 21st century. The situational awareness component collectively displays the geographical location of all weapons, platforms, soldiers, command posts and other facilities and is being used in conjunction with the Army's Tactical Internet (TI) and satellite-based communications, a seamless Internet connection, for ease in communication. The TI interfaces with the Army Battle Command Systems (ABCS), collects information from both the operation center and the individual units, and disseminates the data through the FBCB2 computers for improved situational awareness.

Contracts

Netherlands' Armed Forces Order Thales Datalink Management Systems

On 23 November, the Netherlands' Ministry of Defence and Thales Communications B.V. signed a contract for the delivery of Thales' Datalink Interface Processor equipment, Thales Datalink Network Management Software and peripheral equipment.

With this suite, a Datalink Management System will be set up in Nieuw Milligen and three Remote Terminal Sites in Den Helder, Vredepeel and Ried (all locations in the Netherlands). The contract also includes the delivery of one Deployable Network Management System including one Deployable Remote Terminal Site. The products will be delivered early 2008. A second contract for the maintenance of these systems for a period of ten years was also signed on 23 November. The combined value of both contracts amounts to well over 4 million euro.

The systems are procured for the effective management of the Link 16 data network that provides the war fighter with the instant and amalgamated picture of the operational environment. This picture is not only obtained through the fighter's own sensors but more and more compiled on the basis of data received from other sources, such as ground reconnaissance, AWACS, etc. Thus, the Thales system will substantially increase the war fighter's situational awareness, will prevent loss of valuable decision time and hence will increase the effectiveness of the Netherlands Armed Forces. The Netherlands' Data Link Management System will be operated by the Netherlands' National Datalink Management Cell in which Air Force, Navy and Army are represented.

The Netherlands' Ministry of Defence selected the Thales Network Management System on the basis of the success of these systems in other countries and a favourable cost/performance ratio.

Defence Industry

Raytheon Successfully Completes Extended-Range Test for Excalibur Block Ia-2

TUCSON, Ariz., -- Raytheon Company's Missile Systems business and BAE Systems-Bofors successfully fired the first extended-range GPS-guided Excalibur projectiles at Yuma Proving Ground, Ariz., last month.

Excalibur is the next-generation family of projectiles for U.S. Army and Marine Corps artillery.

The so-called Guided Series-6 test of the Excalibur Block Ia-2 consisted of two inert rounds configured with tactical base and live base bleed. Base bleed is a solid fuel that burns in the base of the projectile, expelling gas that reduces drag with the result of extending range. The primary test objectives were to demonstrate the navigational functionality throughout the flight with live base bleed and to verify base-bleed performance.

"Continued test successes demonstrate Excalibur's ability to meet the full Block Ia requirements," said Lt. Col. Joe Minus, U.S. Army product manager for the Excalibur program. "The base bleed with charge five will propel Excalibur beyond the 40-kilometer (24.8 miles) objective range from the current U.S. howitzers."

The Archer, the Swedish 52-caliber howitzer, will achieve an Excalibur range of approximately 33 miles (50 kilometers). The Block Ia-2 tests will include full system performance testing, to include maximum range shots from the Archer, and will be conducted in parallel with Block Ia-1 urgent fielding.

The Excalibur program is responding to an urgent request from the warfighter to accelerate fielding because of the projectile's better than 10- meter (33

feet) accuracy that is not available from any other artillery projectile. With its accuracy and increased effectiveness, Excalibur provides operational flexibility and reduces the logistical burden for deployed ground forces.

It also reduces collateral damage through increased precision, near- vertical descent and optimized fragmentation pattern. Excalibur Ia-1 is to be fielded to deployed forces in early 2007. The extended range of the Ia-2 Excalibur, with a planned initial operational capability in fiscal year 2008, will enable optimal positioning of forces and further extend a maneuver unit's tactical reach.

Raytheon Company, with 2005 sales of $21.9 billion, is an industry leader in defense and government electronics, space, information technology, technical services, and business and special mission aircraft. With headquarters in Waltham, Mass., Raytheon employs 80,000 people worldwide.

During the test, one round was fired with the Modular Artillery Charge System, charge three, to approximately 5 miles (8 kilometers) in range, the system's minimum range requirement with live base bleed. The second round was fired with a charge four at 45 degrees cannon tube quadrant elevation, a low elevation to accommodate range limitations at Yuma, and achieved a range of approximately 16 miles (25 kilometers).

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Contracts

General Dynamics Awarded $380 Million for Abrams Main Battle Tank Work

General Dynamics Land Systems, a business unit of General Dynamics, has been awarded a $380 million contract to upgrade Abrams tanks with the M1A2 System Enhancement Package (SEP).

The M1A2 SEP fully digitized platform is the most technologically advanced Abrams tank. It features the most sophisticated command and control system, second-generation thermal sights and improved armor. This contract is part of an overall M1A2 tank upgrade program that integrates new information technologies to improve soldier warfighting capability with enhanced command and control features, like color maps and displays, high-density computer memory, increased microprocessing speed and networked communications.

Work will be performed by existing General Dynamics employees in Anniston, Ala.; Tallahassee, Fla.; Lima, Ohio; Sterling Heights, Mich.; and Scranton, Pa. Vehicle upgrades will begin in November, with deliveries scheduled for May 2008 through November 2009.

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Defence Industry

DRS Awarded $7m Electro-optical/infrared Sensors Contract for U.S. Army FCS UAV

DRS Technologies, Inc. announced today that it has been awarded a new $7 million contract to produce lightweight electro-optical/infrared (EO/IR) sensor systems for the U.S. Army's Future Combat System (FCS) program Class I Unmanned Aerial Vehicles (UAVs).

The sensors will provide imagery during reconnaissance, surveillance and target acquisition (RSTA) missions and enhanced reconnaissance and security/early warning capabilities, which will increase situational awareness. They also will provide common operating picture information to aid line-of-sight (LOS), non-LOS and beyond LOS targeting.

The contract was awarded to DRS by Northrop Grumman Corporation's (NYSE: NOC) Integrated Systems sector, California Microwave Systems unit, located in Belcamp, Maryland. Northrop Grumman is the airborne systems integrator on the Future Combat System program. For this award, DRS will develop and provide emulators and prototypes of an EO/IR system that meets the RSTA requirements of the FCS Class I UAV. Work will be accomplished by the company's DRS Sensors & Targeting Systems unit - California Division, in Cypress, California, and will continue through September 2008.

"This new award expands DRS's role on the Future Combat System program as a UAV sensor provider and an industry leader in uncooled, high-performance thermal imaging solutions for the military," said James M. Baird, president of DRS's Reconnaissance, Surveillance & Target Acquisition (RSTA) Segment. "DRS is providing a best-value solution by leveraging the common components of the Forward Looking Infrared (FLIR) sensor in the Thermal Weapon Sights (TWS) and Driver Vision Enhancers (DVE) we produce for the U.S. Army. The successful completion of the system development phase on this program will place the company in a solid position as the supplier of choice for full rate production."

DRS's sensor system provides commonality with manned and unmanned ground operations. The company's sensor and imaging technology also supports other U.S. Army, Navy and Air Force mission applications and can be used to support emerging RSTA

missions on multiple platforms for multiple applications.

Contracts

BAE Systems Awarded $1.16 Billion Contract for Bradley Combat Systems Vehicles

YORK, Pennsylvania - BAE Systems has received contract modifications worth $1.16 billion from the U.S. Army TACOM Life Cycle Management Command to remanufacture and upgrade 610 Bradley Combat Systems and to provide spare components for these systems.

BAE Systems, working through its Public Private Partnership with Red River Army Depot (RRAD), will remanufacture and upgrade 490 Bradley A3 systems and 120 Bradley A2 (ODS) systems under the awards. Initial disassembly and subsystem rebuild will be performed at RRAD, final disassembly and structural modifications will be performed by BAE Systems in Fayette County, Pennsylvania and final assembly, integration and test will be conducted at the BAE Systems facility in York, Pennsylvania.

"Bradleys have been delivering excellent capability to our war fighters since March 2003," said Andy Hove, BAE Systems' director of Bradley Combat Systems. "BAE Systems and RRAD are focused on ensuring these critical combat systems get into soldier's hands as quickly as possible."

Work on the contracts will begin immediately, with deliveries scheduled to begin in April 2008 and run through April 2009.

Bradley Combat Systems continue to provide outstanding survivability, mobility and lethality to U.S. soldiers in all types of close-combat urban scenarios and in open-combat, open-terrain scenarios over three completed rotations. The Bradley fulfills five critical mission roles - infantry fighting vehicle, cavalry fighting vehicle, fire support vehicle, battle command vehicle and engineer squad vehicle - for the Army's Heavy Brigade Combat Teams (HBCTs).

Bradley Combat Systems are playing a critical role in the success of the Army's HBCTs during Operation Iraqi Freedom, where operational readiness has exceeded 94 percent in urban and cross-country missions that have covered more than 8 million miles. The C4ISR (Command, Control, Communications, Computers, Intelligence, Surveillance and Reconnaissance) -equipped, network-enabled Bradley Combat Systems feature a proven set of survivability solutions designed to protect soldiers against a wide variety of threats.

BAE Systems has been awarded contracts totalling $501 million under fiscal year 2006 funding for reset and remanufacturing of 545 Bradleys. The current award for 610 Bradleys at $1.16 billion is under fiscal year 2007 funding. Approximately 620 Bradley A3 vehicles have been delivered against the Army's requirement for more than 2,000 total Bradley A3s planned for the fleet.

Defence Industry

Elop to Provide Thermal Imaging Sensors for the Korean Tank K1A1

Elbit Systems Ltd. announced that its subsidiary Elbit Systems Electro-Optics Elop Ltd. ("Elop") will supply Thermal Imaging kits for the Gunner Periscope Sights of the Korean Tank K1A1. The contract is valued at approximately $19 million.

Selected as primary contractor of the project to upgrade Gunner Periscope Sights for the Korean tank K1A1, the Samsung-Thales Company will supply, install and test the systems. Sub contractor, Elop will provide the main components for the thermal sensors - the key element of the Gunner Periscope Sights that provide the night capability to the tank.

Elbit Systems Electro-Optics Elop General Manager, Haim Rousso said: "This latest order testifies to our leading role in the growing market of advanced electro-optical systems for defense and homeland security applications, as much as it reflects our vast experience in the development of advanced solutions for both the Israeli Defense Forces and other customers worldwide".

Elop provides turnkey and tailor-made integrated gunner and commander sight solutions for virtually every Main Battle Tanks (MBT) and Armored Fighting Vehicles (AFV) in service today. The Integrated Sights modular design combines direct view observation, TV channels, eyesafe laser rangefinders and a wide variety of night vision technologies with LOS stabilization and hunter-killer solutions.