

# Army Guide monthly



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## Defence Industry

### General Dynamics Selected as Preferred Prime System Integrator for Phase 1 of AUS\$800 Million Australian Battlespace Communications Systems Project



OTTAWA -- General Dynamics Canada, along with its Australian partners ADI Limited and Tenix Defence, has been selected by the Commonwealth of Australia as the Preferred Prime System Integrator for the first phase of the Battlespace Communications System (Land) project, referred to as JP 2072 valued at AUS\$97 (US\$74) million.

The project has a potential value of AUS\$800 (US\$608) million if all options are exercised. General Dynamics Canada is a wholly-owned subsidiary of General Dynamics. JP 2072 will provide the Australian Land Force with a deployable, scalable, secure and integrated battlespace communications system that allows ground forces to exchange information across all combat elements, improving soldiers' safety and their ability to accomplish their missions.

The system will meet the existing and emerging information exchange requirements of command support, intelligence, offensive fire, logistics, ground-based air defence and sensor-linked weapon systems. John Watts, president of General Dynamics Canada, said, "The Commonwealth's selection of the General Dynamics Canada-led team for the critical JP 2072 project delivers the best of two worlds for the Australian Defence Forces: it capitalizes on the extensive experience of General Dynamics in deploying systems of similar scale and complexity, and takes full advantage of the capabilities of Australia's largest defence companies, ADI and Tenix Defence."

"General Dynamics looks forward to providing an advanced communications system that will be designed largely by Australians, to meet the unique requirements of the Australian Defence Forces, and to support the critically important missions of the ADF," Watts said. As the focal point of General Dynamics' JP 2072 program and engineering management efforts, the company has established a new entity, General Dynamics Systems Australia, in Canberra. As subsequent phases of the program emerge, the new Australia-based organization will grow to include the engineering capabilities and integration facilities necessary to progressively update and support JP 2072 and associated projects while meeting the objectives of Australia's Defence Electronics Sector Plan.

General Dynamics Canada has a long history of integrating tactical battlefield communications systems

for major defence customers around the world. As prime system integrator for the Canadian Army's Iris tactical communications system, General Dynamics Canada deployed the world's first digital voice and data secure communications system. General Dynamics Canada went on to successfully capture the UK's Bowman battlefield communications programme. In addition, the company supports teams led by other General Dynamics units on several key U.S. battlefield communication system programs, including the Warfighter Information Network-Tactical (WIN-T) and the Joint Tactical Radio System (JTRS) Cluster 5 effort.

ADI Limited's managing director, Lucio Di Bartolomeo, said, "ADI is pleased to be a member of the General Dynamics team that will deliver to the ADF the most advanced battlespace communication system. ADI is ready to utilise our systems and related capabilities to benefit this important project and we look forward to the effective and sustainable partnership that JP 2072 will bring." ADI is Australia's largest defence company, with over 2,500 employees. Tenix Defence CEO Robert Salteri welcomed the announcement, saying Tenix was committed to working with General Dynamics Canada and ADI to deliver a world-class battlefield communications capability for the ADF.

"Our involvement consolidates our development as a broad-based systems company, developing and supporting strong relationships with key international and local partners," Salteri said. Tenix is a broad based, Australian owned systems company, which operates primarily in Australia and the Asia-Pacific region with offices in the United States and United Kingdom. Tenix Defence operates in the naval, aerospace, land and electronic system sectors, generates \$600 million in annual revenue and employs 2500 staff. General Dynamics, headquartered in Falls Church, Virginia, employs approximately 70,800 people worldwide and had 2004 revenue of \$19.

2 billion. The company is a market leader in mission-critical information systems and technologies; land and expeditionary combat systems, armaments and munitions; shipbuilding and marine systems; and business aviation.

## Contracts

### U.S. Marine Corps Awards General Dynamics \$19 Million for Expeditionary Fighting Vehicle Long-Lead Materials

STERLING HEIGHTS, Mich. - The U.S. Marine Corps Systems Command, Quantico, Va., has awarded General Dynamics Land Systems, a business unit of General Dynamics, a \$19 million contract for the advanced procurement of long-lead material (LLM) for the Expeditionary Fighting Vehicle (EFV) Low Rate Initial Production (LRIP) Lot 1.

The EFV is the Marine Corps' highest priority expeditionary modernization program. The EFV is an expeditionary vehicle that can launch forces from 20 to 25 nautical miles at sea and transport them to shore at

speeds in excess of 20 knots, three times faster than the current platform's speed. The EFV is capable of land speeds up to 45 mph while exhibiting mobility characteristics equal to or greater than the M1A1 Abrams tank.



The EFV's breakthrough expeditionary design provides outstanding cross-country mobility, lethal firepower, high water and land speed, extensive information and communications networking, and optimum crew protection and survivability. EFV provides elements of flexibility and tactical surprise critical to establishing battlefield dominance.

Under this contract, General Dynamics will provide all components, material, parts and technical effort required to procure the long-lead material for the anticipated future contract for EFV LRIP Lot 1. This amounts to 15 Lot 1 vehicles, including 13 EFV-P and 2 EFV-C variants. The EFV-P is the personnel variant and will be the primary infantry mobility vehicle as its three-man crew transports 17 combat-equipped Marines to missions on land and across water. The EFV-C is the command variant, and will be employed as a tactical command post for maneuver unit commanders at the battalion and regimental levels. The EFV-C will host a state-of-the-art command, control, communications, computing and intelligence (C4I) suite to fulfill Marine Corps mission needs during the 2008-2030 timeframe.

Work under this award will be performed in Indiana, Wisconsin, Arizona, Germany, the Netherlands, Florida, Virginia, New York, Alabama, Maryland, Ohio, Canada, California and Michigan and is expected to be complete by October 2006.

The Marine Corps awarded General Dynamics the EFV contract in 1996. The vehicle entered the system development and demonstration phase in 2001. LRIP Lot 1 begins in fiscal year 2007 and is slated to be followed by three additional annual LRIP lots for quantities of 17, 26, and 42 vehicles, respectively. Full-rate production will commence in fiscal year 2011 and continue through 2020, at which point total of 1,013 EFVs will have been produced. The EFV main assembly site will be the Joint Systems Manufacturing Center, Lima, Ohio.



## Defence Industry

### U.S. Increases Order for Combat-Tested Javelin



TUCSON, Ariz. -- On the heels of a \$119 million contract from the U.S. Army in May, the Raytheon-Lockheed Martin Javelin Joint Venture (JV) received a \$110 million modification to a firm-fixed-price contract for Javelin Anti-tank Weapon System production.

The contract is for an additional 901 command launch units and 101 trainer systems.

Work will be performed in Orlando, Fla., and Tucson, Ariz., and will be completed by September 2008. Javelin is currently in full-rate production. Javelin is in service with the U.S. Army and Marine Corps and has been deployed by the U.S. and Australia in Operation Iraqi Freedom, where more than 1,000 rounds have been fired successfully against tanks and alternate targets. Coalition forces are also effectively employing the CLU (Command Launch Unit) in surveillance and anti-IED (Improvised Explosive Device) operations. "In Operations Enduring Freedom and Iraqi Freedom, Javelin has been used successfully for surveillance, as an assault weapon, against buildings, against vehicles (including armor and pick-up trucks) and against fighting positions," said Col. Lloyd McDaniels, U.S. Army Close Combat Weapon Systems project manager.

In addition to its use by infantry and special forces, Javelin is currently being evaluated for integration onto ground and naval platforms. The Javelin JV is also working on a number of technology spirals in support of future requirements. "Our customer has told us that Javelin is its weapon of choice because of its impact on the battlefield. This was evident in the taking of Baghdad Airport and also in the Battle of Debecka Pass, where Javelin neutralized threat armor, saving soldiers' lives," said Mike Crisp, president of the Javelin JV. "We know that warfighters depend on their weapon systems to perform when they need them," added Howard Weaver, Javelin JV vice president.

"Two young Marines who used Javelin in the retaking of Fallujah have attested first-hand to its effectiveness as an urban assault weapon." Raytheon Company, with 2004 sales of \$20.2 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. Headquartered in Bethesda, Md., Lockheed Martin employs 135,000 people worldwide and is principally engaged in the research, design, development,



manufacture and integration of advanced technology systems, products and services.



**Contracts**

**Oshkosh Truck's Unmanned Vehicle Qualifies for Pentagon's \$2 Million Desert Race Team; TerraMax(TM) One of 20 teams to Compete in DARPA Grand Challenge**



OSHKOSH, Wis. --Oshkosh Truck Corporation and partners Rockwell Collins and the University of Parma, Italy, announced that their robotic truck, TerraMax(TM), qualified late yesterday to compete in the \$2 million DARPA Grand Challenge, a 150-mile race of unmanned vehicles across the Mojave Desert on Saturday, Oct. 8. TerraMax successfully completed all four scheduled runs of 2.2- and 2.9-mile qualifying obstacle courses at the California Speedway in Fontana, Calif.

"This is an unprecedented moment for Oshkosh Truck and our partners at Rockwell Collins and the University of Parma," said Robert G. Bohn, Oshkosh's chairman, president and chief executive officer. "TerraMax has done very well in all of the qualifying events, and we believe its technology could someday be an enormous asset to our nation's military."

TerraMax is based on the Medium Tactical Vehicle Replacement (MTVR) truck platform built by Oshkosh Truck for the Marine Corps. It operates without a driver or remote controls, using a guidance system based on standard, yet ruggedized navigational computers, a sophisticated global positioning system, laser range-finders, and a synthetic vision system. It can carry more than seven tons off-road, making it the largest entry in the Grand Challenge race.

Team TerraMax is now headed to Primm, Nev., where the DARPA Grand Challenge will begin on Saturday, Oct. 8 at 3:30 a.m. EDT. The final field of 20 teams, whittled down from 195, will receive course coordinates just two hours before race time. The information will then be programmed into TerraMax before it heads to the starting line.

"To successfully compete in the Grand Challenge will require awesome off-road capability, a really rugged design, and a fusion of software, laser, and synthetic vision systems," said Don Verhoff, Oshkosh's executive vice president of technology. "We're confident in our technology and hopeful about our chances to win."

The DARPA Grand Challenge is sponsored by the

U.S. Department of Defense's think tank for future technology, the Defense Advanced Research Projects Agency (DARPA). No vehicle successfully completed this race last year - the first year the race took place. This year's race will be webcast live at [www.grandchallenge.org](http://www.grandchallenge.org).

**The TerraMax Vehicle**

The platform for TerraMax is Oshkosh's combat-proven MTVR combat vehicle, which was originally designed for the U.S. Marine Corps to handle off-road terrain. The vehicle's 6x6 design is equipped with independent suspension to make desert terrain easier to handle. Drive-by-wire technology allows computers to control the steering via a servo motor, an actuator to operate the brakes, and direct electronic control of the accelerator and transmission.

Five ruggedized computers control the main functions needed for TerraMax to drive and navigate itself. The computers run on specialized software that Rockwell Collins developed for map and route planning, driving, obstacle detection and avoidance, sensor data input and interpretation, and diagnostics. Sensing systems, including laser range finders and digital video cameras, provide the inputs that TerraMax needs to detect roadways and avoid obstacles.

In addition to team partners Oshkosh Truck, Rockwell Collins and the University of Parma, Team TerraMax is sponsored by ArvinMeritor, Fastenal, Oxford Technologies, Parker Hannifin, Ricoh, Caterpillar, Landstar, Michelin, MCL Industries, TransPro and others.



**Contracts**

**BAE Systems Awarded \$11 Million Contract To Reset Bradley Vehicles**

BAE Systems has been awarded an \$11 million contract by U.S. Army Tank-automotive and Armaments Command for reset and modification for 15 M7 Bradley Fire Support Team (BFIST) Vehicles and one M2A3 Bradley Vehicle, and to add 131 Vehicle Intercom System (VIS) Kits for the Bradley 3rd CAV Operation Desert Storm vehicles.

This reset work will be accomplished under a BAE Systems/Red River Army Depot Public Private Partnership. BAE Systems is responsible for the Phase II vehicle teardown, shipment of components to repair facilities, vehicle assembly, quality assurance checks, configuration management, and vehicle fielding.

Work will be performed at Red River Army Depot, and BAE Systems facilities in Fayette County and York, Pennsylvania, USA, with delivery of vehicles beginning March 2006 and ending July 2006.



**Defence Industry**

**BAE Systems Signs Co-operation Agreement With Turkish Defence**

## Company For Wheeled Armoured Vehicles



BAE Systems Land Systems OMC has announced an agreement with Turkish private sector defence company FNSS Savunma Sistemleri A.S. (FNSS) for the joint marketing and supply of wheeled armoured vehicles to the Turkish Armed Forces.

The co-operation agreement comes in advance of the upcoming Turkish Armed Forces wheeled armoured vehicle requirement, particularly in the field of mine-protected vehicles where Land Systems OMC's RG-31 mine-protected Armoured Personnel Carrier (APC) could be a perfect fit. The RG-31 is already in service with a number of international customers and is thoroughly combat-proven under some of the harshest operating conditions.

FNSS is an American-Turkish joint venture company in which BAE Systems holds a 49% share through BAE Systems Land and Armaments (formerly United Defense LP) with Nurol Holdings (51%) of Turkey.

Signatories to the agreement signed in Ankara were Johan Steyn, Managing Director of Land Systems OMC and Mr Huseyin Esenergul, General Manager of FNSS.



(IBAS) can be seen on a screen in the Bradley.

“As soldiers dismount, they take a Dismounted Control Device (DCD) along, and continue to operate the Armed Robotic Demonstrator, receiving information on the single screen on the DCD,” said Steve Hammond, BAE Systems project manager for the Armed Robotic Demonstrator.

The Armed Robotic Demonstrator displays the existing robotic technologies available for use by today's forces. The Armed Robotic Demonstrator provides an immediate system to illustrate advanced robotic technologies, and provide engineers a hands-on prototype to assist in their design efforts. As the components for robotic vehicles are designed and built, they will be substituted for these Bradley components.

The Armed Robotic Demonstrator is equipped with advanced capability - leveraging some of the proven capabilities available on the Bradley by utilizing robust, existing components. These components provide the demonstrator with the high lethality obtained with the first-round hit, and the ability for the turret to slew to a cue from the Commander's Independent Viewer.

Planned enhancements include advanced robotic technology for autonomous mobility. This capability allows the Armed Robotic Demonstrator to plan routes, maneuver on the planned route, and avoid obstacles – all without operator intervention.



## Future Technologies

### iRobot and Boston Univ. Photonics Center Unveil Advanced Sniper Detection System for iRobot PackBot

BURLINGTON, Mass. and BOSTON - Oct. 3, 2005 - iRobot Corp. and The Photonics Center at Boston University introduced a tactical sensory system payload prototype, dubbed REDOWL, for the combat-proven iRobot PackBot robot. REDOWL, or Robot Enhanced Detection Outpost with Lasers, can detect and locate snipers and mortars on the very first shot fired at personnel or vehicles.

REDOWL is an ongoing rapid development program led by The Photonics Center at Boston University with iRobot, Insight Technology and BioMimetic Systems. The technology will be demonstrated publicly for the first time today at the Association of the U.S. Army (AUSA) Annual Meeting in Washington, D.C., at iRobot booth No. 1750.

REDOWL is a remote, deployable sensor suite designed to provide early warning information, gunshot detection, intelligence, surveillance and targeting capabilities to military forces and government agencies. The REDOWL equipped PackBot has been field-tested for the Army's Rapid Equipping Force at a rifle and trapshooting range. Of the more than 150 rounds fired from 9 mm pistols, M-16 and AK-47 rifles from over 100 meters, the REDOWL system located the source of the gunfire successfully 94 percent of the time.

The iRobot PackBot is a Tactical Mobile Robot that can be hand-carried and deployed by a single soldier.

## Robots

### BAE Systems Displays Armed Robotic Demonstrator At AUSA



ARLINGTON, Va. -- BAE Systems is displaying an Armed Robotic Demonstrator at the Association of the U.S. Army's 2005 Annual Meeting and Exposition this week in Washington to illustrate the synergy between current and future forces.

The demonstrator is an early prototype of an armed robotic vehicle equipped with operative turret components from the Bradley Combat Systems program.

The Armed Robotic Demonstrator can be controlled from the operator's station in the back of a manned system – illustrated from the crew compartment of a Bradley at AUSA. Gun and turret position, as well as information from a Commander's Independent Viewer (CIV), and the Improved Bradley Acquisition System

Proven in Afghanistan and Iraq, PackBot searches dangerous or inaccessible areas, providing soldiers with a safe first look so they know what to expect and how to respond.

“REDOWL more than satisfies mission requirements to provide advanced optical and acoustic detection capabilities to the U.S. military for use in its growing inventory of unmanned ground vehicles,” said Dr. Glenn Thoren, director of Project REDOWL. “Combining optics and acoustics systems together with iRobot’s PackBot to detect and locate a source of hostile fire or track moving vehicles, day or night, is a first in systems integration for unmanned vehicles.”

REDOWL features an array of optics and acoustic detection systems including a laser pointer and illuminator, acoustic localizer and classifier, thermal imager, GPS positioning, an infrared and daylight camera and two wide-angle cameras. When integrated with the PackBot, these systems enable the robot to accurately detect, locate and identify the origination point of hostile gunfire. These systems also make REDOWL ideal for day and night urban surveillance, reconnaissance, hostage/barricade situations, forward observation outposts and perimeter protection missions.

“Snipers have had the advantage of being effectively invisible – making them a deadly threat on the battlefield and in urban settings,” said Vice Admiral Joe Dyer (U.S. Navy, Ret.), executive vice president and general manager, iRobot Government & Industrial Robots. “REDOWL is a mobile system, which means snipers can run but they cannot hide anymore.”

REDOWL features an Acoustic Direction Finding (ADF) system developed by BioMimetic Systems. The ADF is based on advanced “neural circuits” emulating human hearing and provides accurate detection and bearing information in high background noise environments.

In addition to providing its PackBot robot platform, iRobot developed the software and behaviors for the robot. Insight Technology, a manufacturer of high-performance visible and infrared laser and illuminator systems, is heading up the development of REDOWL’s optics systems. BioMimetic Systems, a Photonics Center portfolio company, is responsible for REDOWL’s acoustic detection and location systems. The Army Research Laboratory is the primary source of funding for the project.

### Future Technologies

#### Rheinmetall takes part in FCS unmanned aerial vehicle contract

In cooperation with Teledyne Brown Engineering, Inc, Rheinmetall Defence Electronics, Bremen, awarded a contract for phase one of the FCS Class III Unmanned Aerial Vehicle (UAV) development.

With the cooperation and licensing agreement from the beginning of 2005 Teledyne Brown adapts Rheinmetall's proven UAV system KZO as the baseline

vehicle for the "Americanization" of the system under the name "Prospector". To fulfil the Class III performance requirements, Prospector is developed to be a multipurpose reconnaissance system that requires no runway launch, and provides high precision navigation.

The FCS Class III UAV effort is a multi-phase award. Phase one will last approximately 10 month and includes requirements assessment and risk reduction trade studies.

"Our partner and we are more than confident with this selection", said Hans-Georg Morawitz, member of the Management Board of Rheinmetall Defence Electronics. "Shortly before the delivery of KZO in November 2005 to the German Army this contract is a great effort and a proof for the quality and capability of our UAV system."

### Defence Industry

#### Gavial, a new tactical vehicle for the Bundeswehr: Rheinmetall and Panhard/Auverland enter cooperation agreement



Rheinmetall and Panhard/Auverland have agreed to work together in the field of wheeled, 5 ton-class armoured vehicles for the German market.

As part of this agreement, Rheinmetall Landsysteme GmbH of Kiel, the Land Systems division of the Rheinmetall Group, has obtained the German rights to Panhard/Auverland's newly developed A4 AVL. Rheinmetall Landsysteme (RLS) will be responsible for adapting the vehicle to the needs of the Bundeswehr, as well as the integration of application-specific assemblies and weapon stations. The new RLS vehicle will be marketed under the name Gavial after the strong and well-fortified Asian crocodile.

During intensive trials the basic vehicle has already been successfully qualified and is being procured in large numbers by the French army for the PVP programme (Petit Vehicule Protege).

Under the rubric of its so called "Geschützte Führungs- und Funktionsfahrzeuge - Armoured Command and Operations Vehicle" project, the Bundeswehr has also announced its interest in vehicles, which are well protected, helicopter transportable and highly mobile. Specifically designed to meet the multifaceted requirements levied on vehicles of this type, the Gavial will make a major contribution to protecting troops during dangerous deployments. At the same time, the Gavial completes Rheinmetall's portfolio of wheeled vehicles, thereby further reinforcing the company's global status as a competent system supplier and



manufacturer of high-quality wheeled tactical vehicles.

The Gavial is a highly mobile, helicopter transportable, all-terrain four-wheel drive vehicle. It offers in this class a high degree of modular ballistic and mine protection.

Powered by a EURO-III-diesel engine, the vehicle features high on and off-road mobility. The versatile Gavial can carry up to four persons incl. equipment and can be used to perform an extremely wide variety of missions, such as reconnaissance, command and control, transport and patrolling and is capable of accommodating various weapon stations.

(HMMWV), M151 Heavy Jeeps, armored personnel carriers and Improved TOW Vehicles, as well as Marine Corps' Cobra helicopters and Light Armored Vehicles.

## Future Technologies

### Volkswagen and the Stanford Racing Team Win DARPA Grand Challenge

PRIMM, Nev. -- With the technological support of the Volkswagen Electronics Research Laboratory (ERL), Stanford University's robotic Volkswagen Touareg, known as Stanley, has won the 2005 DARPA Grand Challenge, run in the Mojave desert near Primm, Nevada.

Stanley's time of 6 hours, 53 minutes, 8 seconds (6:53:08) was 11 minutes, 42 seconds faster than the second place finisher (7:04:50) netting the \$2 million prize. In all, 23 autonomous vehicles went head-to-head over 130 miles of tough desert roads, mountain trails, dry lake beds and tunnels, using only onboard sensors and navigation equipment with no human assistance.

These 23 vehicles were selected from a field of 195 teams through a series of qualifying races. The Grand Challenge, sponsored by the Defense Advanced Research Project Agency (DARPA), a division of the U.S. Department of Defense, aims to advance autonomous vehicle technology. "We had a good day," said Sebastian Thrun, director, Stanford Artificial Intelligence Laboratory. "It has been quite rewarding to partner with Volkswagen on an event that contributes to such significant advancements in vehicle technology. Our win today is a testament to the hard work and dedication of the entire team.

"Project sponsors include Mohr, Davidow Ventures, Red Bull and Android. Dr. Carlo Rummel, executive director, Volkswagen of America, Inc.'s Electronics Research Laboratory, said: "It has been exciting and challenging to prepare the Touareg for this day. The lessons we have learned in building this highly complex vehicle will ultimately benefit consumers as we apply this knowledge to make our vehicles safer, smarter and more exciting to drive." Stanley is built from a stock, diesel-powered Volkswagen Touareg R5 modified with full-body skid plates and a reinforced front bumper.

It is actuated by a drive-by-wire system developed by the ERL. All processing takes place on 6 Pentium M computers. Measurements are incorporated from GPS, inertial measurement unit, wheel speed, lasers, a camera and a radar system. Founded in 1955, Volkswagen of America, Inc. is headquartered in Auburn Hills, Michigan. It is a subsidiary of Volkswagen AG, headquartered in Wolfsburg, Germany. Volkswagen is one of the world's largest producers of passenger cars and Europe's largest automaker. Volkswagen of America and its affiliates employ approximately 3,000 people in the United States and are responsible for the sale and service of Audi, Bentley, and Volkswagen products through retail networks comprising in total more than 900 independent U.

## Contracts

### DRS Technologies Receives \$15 Million Contract To Provide Missile Launch System For U.S. Army Combat Vehicles

Parsippany, NJ, -- DRS Technologies, Inc. announced today that it has been awarded a new contract to provide the missile launch system on the Tube-launched, Optically-tracked, Wire-guided (TOW) Weapons System for the U.S. Army's M2A3 Bradley vehicle program. The Bradley is among the most formidable ground force capabilities in U.S. Army inventory and continues to be an integral part of the military's operations in Iraq.

The \$15 million contract was awarded to DRS by BAE Systems. For this award, DRS will manufacture, assemble and test the dual-launch tube system and armament control unit (ACU) for over 450 TOW systems. Work for this contract will be performed by the company's DRS Training & Control Systems unit in Fort Walton Beach, Florida. Deliveries are expected to begin in spring 2006 and continue for approximately two years.

"DRS is a major supplier to the Bradley Combat System program and a key provider of command-to-line-of-sight systems supporting U.S. Army ground force warfare," said Fred L. Marion, president of DRS's Surveillance and Reconnaissance Group. "DRS remains committed to providing systems that play a crucial role in battlefield dominance."

The TOW missile system is a crew-portable, vehicle-mounted, heavy anti-armor weapon system that consists of a launcher and one of five versions of the TOW missile. The launcher serves as a housing container for the missiles and acts as a steady platform during firing. Attached to the vehicle via a turret-mounted motor that drives the launcher's elevation and rotation, it provides the circuitry to remotely arm and disarm the missile. The launcher is designed to defeat distant armored vehicles and other far targets, such as field fortifications.

The TOW missile system is the most widely distributed anti-tank guided missile in the world, with over half a million in service with the U.S. Army, Marine Corps and military forces of approximately 43 allied countries. In addition to the Bradley Fighting Vehicles, the TOW is commonly mounted on the Army's High-Mobility Multipurpose Wheeled Vehicles

## Future Technologies

## Improvised Explosive Devices (IEDs)

## BAE Systems Fires Multiple Round Simultaneous Impact Missions From NLOS-Cannon

BAE Systems has successfully fired a four-round Multiple Round Simultaneous Impact (MRSI) mission from the Non-Line-of-Sight Cannon (NLOS-C) Concept Technology Demonstrator (CTD). The NLOS-C is one of eight Manned Ground Vehicles in the U.S. Army's Future Combat Systems program, and leads the others in its current state of development. The firing achievement was reached in late August 2005 at Yuma Proving Ground, Arizona.

The NLOS-C CTD, which features a fully-automated Zone 4, 38-caliber, 155-mm howitzer, fired six four-round MRSI (pronounced "mercy") missions. During each mission, all rounds impacted within four seconds of each other. The missions were fired at Zones 2 and 3 using a combination of M231 and M232 Modular Artillery Charge System (MACS) propellants.

This firing mission is the first time a U.S. howitzer fired a MRSI mission using more than one type of standard MACS propellant. The ability to fire multiple types of MACS propellant increases the number of the howitzer's firing ranges between the gun's minimum and maximum ranges, giving soldiers more mission flexibility on the battlefield.

"The Army is pleased to see the development of the NLOS-C rapidly progressing," said Lt. Col. James Day, U.S. Army product manager for NLOS-C. "NLOS-C's ability to fire MRSI missions will enable us to deliver more firepower with greater effects faster and more accurately than ever before. And, we'll be able to do it with fewer soldiers and fewer systems."

The MRSI mission demonstrations were conducted to prove the viability of the architecture and functionality of fire mission equipment software for the NLOS-C Increment 0 prototypes. While program engineers were not originally planning to demonstrate MRSI missions using the NLOS-C CTD, they felt the system's software was robust enough to attempt an early demonstration. As a result, they have successfully demonstrated a capability that wasn't expected to be proven until late 2006, when hardware tests would begin on the NLOS-C Firing Platform.

"These successful MRSI missions demonstrate the advancement, strength and versatility of the NLOS-C's software and automated ammunition and fire control system," said Jim Unterseher, director of Army Programs at BAE Systems. "Achieving this capability ahead of schedule shows soldiers they are another step closer to having NLOS-C's unprecedented firepower at their disposal."



HUNTSVILLE, Ala. -- Teledyne Brown Engineering, Inc. has developed, built and tested an armored troop carrier system, the Multipurpose Troop Transport Carrier System (MTTCS), which is designed to protect soldiers from small arms fire and most fragments from Improvised Explosive Devices (IEDs).

The MTTCS successfully supported numerous transport and convoy missions recently in Iraq as part of the Army Rapid Equipping Force's operational evaluation in a combat environment.

The MTTCS is a modular armor troop transportation system that mounts directly on the bed of any of the common family of Army trucks (2S, 5, or 7 tons). It provides armor protection from most common battlefield weapons being used against American soldiers today. It also has the capacity to mount any of the Army's crew-served weapon systems such as the M2 and M240 machine guns or the MK19 automatic grenade launcher in order to provide protection from attack for the truck and the convoys they travel in. The system is multipurpose since it can be dismounted and used for defensive positions on the ground or buried for greater security.

"We're hopeful that getting this system into Iraq will result in less casualties and lives being saved," said Jim Link, president, Teledyne Brown. "Every day, soldiers are being transported in the back of the Army's fleet trucks with limited protection. The MTTCS not only meets this need but can also provide increased armor protection for Army base camps and critical facilities. The multi functionality of the MTTCS provides the Army with a level of protection that is not currently available anywhere else."

In addition to its use in transporting troops, the MTTCS modules can be dismounted from the vehicles and be used in fixed position on the ground or buried. This makes the system ideal for Force Protection missions such as defensive positions, access control points, check points, base camp infrastructure such as sleeping quarters and Command and Control Centers. MTTCS, therefore, provides armor protection capabilities not currently seen in the Army today.

Teledyne Brown Engineering has an exclusive license for production and sales of the MTTCS. The technology was developed by SAIC with patent pending.

## Defence Industry

## Teledyne Brown Develops First Armored Multi-Purpose Troop Carrier System Protects Against Most Fragments from



**Contracts**

**DRS Technologies Awarded \$30 Million Contract To Provide Electronic Manufacturing Services For U.S. Army Bradley Fighting Vehicles**

Parsippany, NJ -- DRS Technologies, Inc. announced today that it has been awarded a \$30 million contract to manufacture cable sets for the U.S. Army's A3 Bradley Combat Systems. The Bradley is among the most formidable ground force capabilities in U.S. Army inventory and continues to be an integral part of military operations in Iraq.

The contract was awarded to DRS by BAE Systems, the prime contractor for the development and production of the Bradley. For this award, DRS will produce build-to-spec cable sets for the Bradley A3. Work for this order will be performed by the company's DRS Laurel Technologies unit in Johnstown, Pennsylvania. Deliveries are expected to commence in July 2006 and continue through July 2007. To date, DRS Laurel Technologies has delivered more than 41,000 cables for over 500 Bradley vehicles.

"An integral, long-term member of the Bradley team, DRS continues to support BAE Systems through various initiatives driving operational excellence. We have contributed to the quality and cost-effectiveness of the vehicle, helping to raise the team's competitive profile in the military vehicle market place," said Steven T. Schorer, president of DRS's C4I Group. "Our customer's confidence in the quality of our services and reliability of our performance supports their objectives for cost-effective, sustainable and maintainable combat systems and reaffirms our position as a leading defense industry supplier of 'best value' electronic manufacturing services."

A ceremony commemorating this most recent award was held yesterday at DRS Laurel Technologies' facility in Johnstown, Pennsylvania. Congressman John P. Murtha, 12th District, Pennsylvania, joined executives from both DRS and BAE Systems for the event.

The Bradley A3 is the Army's most advanced, integrated digital ground system, providing outstanding survivability, mobility and lethality to soldiers in all types of close-combat urban scenarios or in open combat desert warfare. It provides twice the survivability and combat effectiveness of earlier versions and arms U.S. soldiers with some of the most technologically advanced battlefield capabilities available in the world. The Bradley A3 incorporates the DRS-produced Improved Bradley Acquisition Subsystem (IBAS) and Second Generation Forward Looking Infrared (SG FLIR) technology supporting the Army's Horizontal Technology Integration (HTI) initiative. Other system improvements include built-in digital test capability, embedded training and electronic logistics reporting.



**Defence Industry**

**RAFAEL Offers Newly Armored Vehicles To The US Army And NATO Forces**



Haifa, -- RAFAEL Armament Development Authority has released two new light armored vehicles, together with partners FPI and International, which are intended for the US Army and NATO Forces.

The vehicles: Cougars, produced by Force Protection, Inc. and the International, produced by International and Griffin, are currently being introduced into the US Marines.

The changes to the modern battlefield, including increased activity in urban environments, make it necessary to find better solutions for protecting soldiers. This is especially true for soldiers on the move from place to place; in danger of being attacked by roadside bombs, anti-armor weapons and a variety of other threats.

Following the success RAFAEL has had with its armor in Iraq and the additional order from the US Army for reactive armor to be used on the Bradley fighting vehicles (an order worth \$20M), together with the success the IDF has reported having with RAFAEL's Wolf light armored vehicles in operational situations, RAFAEL developed a new line of armor for thin plated vehicles, such as the Cougar and International.

These vehicles carry 12 soldiers and RAFAEL's armor will provide them with optimal protection against such threats as anti-armor weapons and roadside bombs, typically used in the urban fighting situations found in Iraq and Afghanistan.

Both the Cougar and the International join a long line of vehicles equipped with RAFAEL's advanced, innovative armor, including the American Bradley, the AAV7 used by the US Marines, the CV-90, FV-432 and the M-113.

The same technology used for armoring the American vehicles, which have successfully withstood a variety of threats, will also be used to protect the M-113 APC in the IDF.



**Defence Industry**

**Saab awarded US \$65M in new delivery orders for Ultra Lightweight Camouflage Net Systems products from the US Defense**

Saab Barracuda LLC was awarded two delivery orders totaling U.S. \$65 Million for Ultra Lightweight Camouflage Net System (ULCANS) from the U.S. Defense.

"These two delivery orders increased our leading position within Signature Management which gives our employees a sense of security in planning their future and allows our suppliers to forecast demand and be in a better position to provide us with materials used in our production." says Dottie Womack, Acting President of Saab Barracuda LLC.

Since 1997, Saab Barracuda LLC has been the sole provider of ULCANS to the U.S. Army. ULCANS, available under NSN for both Woodland and Desert variants, is being fielded by the U.S. Army as the replacement of the former generation camouflage nets. Together with Saab Barracuda AB in Sweden, Saab Barracuda is the world leader in producing customized advanced Signature Management products offering multi-spectral protection against visual, near infrared, thermal infrared, and radar detection and targeting devices.

Saab is one of the world's leading high-technology companies, with its main operations focusing on defense, aviation and space. The group covers a broad spectrum of competence and capabilities in systems integration.

JACKSONVILLE, Fla., -- Armor Holdings, Inc., a leading manufacturer and distributor of security products and vehicle armor systems serving military, law enforcement, homeland security and commercial markets, announced today that it has received a contract award from Oshkosh Truck Corporation with a value not to exceed \$110.1 million to support the U.S. Marine Corps Medium Tactical Vehicle Replacement program (MTVR).

Armor Holdings also indicated that it will continue to subcontract to its Israeli based partner, Plasan Sasa, for production of the additional MTVR armor kits to be delivered to the USMC in 2006. Work under the new award will also be performed at the Armor Holdings Aerospace and Defense Group facilities in Ohio.

Robert Schiller, President of Armor Holdings, Inc., said, "We are pleased that our past performance has resulted in Oshkosh Truck Corporation's decision to continue our role on the MTVR program into 2006. This order builds additional backlog for 2006 and gives further opportunity to work on significant armor component programs with a premier tactical wheeled vehicle OEM. Most importantly, we are extremely proud to be able to continue our contribution to the needs of the U.S. Marine Corps."

### Training And Simulators

#### Arotech awarded over \$1M for logistical support of driving simulators

Arotech Corporation announced that its Simulation and Security Division, through its FAAC subsidiary, has received orders totaling over \$1 million for contractor logistical support of its driving simulator contracts.

"The new orders are evidence of our strong service reputation and dedication to our customers which continues long after the sale," stated Kurt Flosky, Executive Vice President of Arotech's FAAC subsidiary.

"Our continued support to our customers, which includes on-site maintenance, support staff and extended hardware warranty packages, ensures worry-free operations for years to come," said Robert S. Ehrlich, Chairman and CEO of Arotech Corporation. "This level of confidence and the demonstrated reliability of our simulation systems attest to the high quality of our products and services".

### Contracts

#### Armor Holdings, Inc. Receives \$110.5 Million Order for New HMMWV Armor System



JACKSONVILLE, Fla., -- Armor Holdings, Inc., a leading manufacturer and distributor of security products and vehicle armor systems serving military, law enforcement, homeland security and commercial markets, announced today the receipt of orders valued at \$110.5 million from AM General under a blanket purchase agreement supporting the M1151 and M1152 HMMWV program.

The Company advised that this new award is for production to supply specific armor sub-system components to AM General for inclusion in the vehicle manufacturing process as well as a specifically designed armor package which may be added to the vehicle when warranted by threat conditions. Work under the new award will be performed during 2006 at the Armor Holdings Aerospace and Defense Group facilities in Ohio and Arizona.

Robert Schiller, President of Armor Holdings, Inc., said, "This order increases our backlog for 2006, but more importantly, it reflects the benefits of our early and aggressive investment in the development, design and production process for M1151/52. We are proud to work closely with AM General and to continue our

### Contracts

#### Armor Holdings, Inc. Announces \$110.1 Million Order for MTVR Vehicle Armor Components



contribution to the men and women in uniform." ■

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## Contracts

### Harris Corporation Awarded Potential \$205 Million Contract For U.S. Marine Corps MBMMR Radio Standardization Program

ROCHESTER, NY, -- Harris Corporation has been awarded a competitive procurement contract to supply the U.S. Marine Corps' MBMMR (Multiband, Multimission Radio) Standardization Program with its combat-proven Falcon® II AN/PRC-117F(C) radios. The first delivery orders of \$67 million have been awarded as part of a multi-year \$205 million blanket purchase agreement. Deliveries of the new MBMMR systems will begin in the company's second fiscal quarter.

"We have had the opportunity for the past several years to provide the U.S. Marine Corps with advanced HF and multiband tactical radios and support. The selection of the Falcon II AN/PRC-117F(C) as the MBMMR standard is a strong validation of the operational performance and reliability of our radios," said Dana Mehnert, vice president and general manager of U.S. Government products, Harris RF Communications Division. "We are extremely pleased to further strengthen our partnership with the Marine Corps and to support its mission-critical communications requirements for many years to come."

Under the contract, Harris will supply its AN/PRC-117F(C) manpack and AN/VRC-103(V) vehicular systems. The Harris AN/PRC-117F(C) is an advanced multiband radio covering the entire 30 to 512 MHz frequency spectrum. Its embedded COMSEC has NSA certification, ensuring compliance with secure U.S. Government Type-1 encryption algorithms. In addition, the radio is JITC certified for operation over military standard satellites. The AN/VRC-103(V) vehicular product is a fully integrated, compact communications system that includes the Harris AN/PRC-117F(C) tactical radio and the Harris AM-7588 Multiband Power Amplifier. This system also covers the entire 30 to 512 MHz frequency range, offering 50 watts PEP transmit power, embedded COMSEC, SATCOM, and ECCM capabilities.

The radios will be used to upgrade and replace the Marine Corps' active duty and reserve components' legacy tactical radio systems, and also will be used for other USMC programs such as Target Location, Designation, and Hand-Off System (TLDHS), Counterintelligence/Human Intelligence (CI/HUMINT), and Assault Breacher Vehicle (ABV). ■

BAE Systems, under the U.S. Army's Tank and Automotive Research, Development and Engineering Centre (TARDEC) survivability program, has achieved new milestones in the Integrated Army Active Protection System (IAAPS) program.

IAAPS successfully defeated multiple objective tank-fired threats recently at Yuma Proving Ground, Arizona, including static vehicle testing and with the target vehicle on the move at speeds near 30 mph. Two foreign, tank-fired High Explosive Anti-Tank (HEAT) threats were killed at speed, in addition to one fragmentation round and three HEAT rounds defeated statically.

"These successes validated what we predicted in our modelling and simulation," said Mark Middione, BAE Systems' Survivability Programs Manager at Santa Clara, California. "The achievements demonstrate the advancement of the state-of-the-art in lightweight protection for ground combat vehicles and that active defense systems are ready for Systems Development and Demonstration (SDD) - offering near-term, low-weight alternatives to heavy armour, reactive armour or passive non-explosive reactive armour. The IAAPS team has made each incremental step in capability look relatively easy, but the experience of the team is what makes the continued progress towards full spectrum protection possible."

Team members from TARDEC, BAE Systems facilities in Santa Clara and Nashua, N.H., and Northrop Grumman Space Technologies, Redondo Beach, California performed the testing at Yuma Proving Ground.

The IAAPS test bed vehicle is a flexible and expandable platform for Army research and development. The test bed has performed numerous experiments with many types of sensors for passive cueing (IR, UV, laser), demonstrated cue by a search radar, defeated threats with jammers, decoys and developed pulse power systems, two types of rocket countermeasures and one non-rocket multigun countermeasure close-in RPG defeat.

The open architecture permits future programs to readily add technologies and new approaches that reduce hit avoidance risk. Existing infrastructure, including an active protection test site at Yuma Proving Ground, is being used for current tank-fired HEAT and KE tests. The IAAPS program is a universal test bed that has undergone continuous incremental technology maturation over the last four years. ■

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## Defence Industry

### Ukrainian armored vehicle manufacturers get federal support

Kharkiv, October 25. The President of Ukraine V. Yushchenko during his visit to Kharkiv was a guest of the Malyshev plant – main Ukrainian manufacturer of armored vehicles and confirmed the defence orders for the next year.

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## Defence Industry

### BAE Systems IAAPS Program Defeats Objective Tank-Fired Threats On-The-Move Under TARDEC Survivability Program



Earlier in this year the Malyshev plant carried out modernisation of 17 tanks T-64, which after modernisation were named MBT BULAT. Besides they got assurance that modernisation would continue and at least 30-40 vehicles a year would undergo modernisation. And now V. Yuschenko personally has confirmed that the plant would get defence orders.



During his visit V. Yuschenko was acquainted with new developments of A.A. Morozov Machine Building Design Bureau (KMDB), among which the biggest interest present main battle tank Yatagan and upgraded tank T-72-120.

These two tanks correspond to the NATO standards. Tank T-72-120 was developed in 1999 and at that time it was envisaged that the modernisation could be ordered by the Eastern European countries with the big quantity of tanks T-72 adopted at their armed forces. At present tank T-72-120 is the only operating piece of upgraded tanks that can fire standard 120 mm NATO ammunition. Among its other advantages are auto loader, 1000 hp engine, high degree protection and low weight.

Tank Yatagan took part in trials at tender for the Turkish Main Battle Tank in 2000. Turkey has not yet taken its final decision.

Nowadays, with the officially announced course of Ukraine to join NATO, these both tanks can present interest and for the Ukrainian army. As they not only correspond to the NATO standards but preserve traditional for SOE KMDB developments - low weight and small dimensions. In addition to other advantages it will enable to reduce the logistics expenses, maintain transport infrastructure, which will greatly reduce overall cost for transition to new equipment.

Besides, these tanks can be transported by railroad and cargo aircraft, that makes them attractive for peacemaking missions.

### Future Technologies

## Northrop Grumman Integrating, Fielding Counter-Mortar Capability

HUNTSVILLE, Ala., -- The U.S. Army has selected Northrop Grumman Corporation as the prime contractor for the Counter-Rocket, Artillery, Mortar (C-RAM) Integration and Fielding contract. C-RAM will help protect U.S. and coalition troops against mortars and rockets fired by insurgents.

Northrop Grumman's Mission Systems sector is developing a systems architecture and integrating the C-RAM target acquisition, fire control, warning and engagement subsystems. Under a \$38 million contract,

Northrop Grumman will first deploy a mortar-attack warning capability and install that capability at eight forward operating bases in Iraq.

Northrop Grumman Mission Systems will also train soldiers to use the system and integrate an intercept subsystem as it is fielded.

The contract is managed by the Director, Counter-Rocket, Artillery and Mortar in the Army's Program Executive Office, Command Control and Communications Tactical.

C-RAM uses target acquisition sensors, including Firefinder and Lightweight Counter Mortar Radar, to detect and track fired rounds. The AN/TPQ-36 Firefinder radar system is produced by Northrop Grumman's Electronic Systems sector.

Once a threat is detected, audio and visual alarms sound to warn exposed soldiers. A fire-control subsystem predicts the mortar's flight path, prioritizes targets, activates the warning system, and provides cueing data to defeat the mortar round while still in the air.

"Northrop Grumman has applied an innovative combination of fielded technology and advanced systems concepts to integrate and field this system that is urgently needed to protect our soldiers in the field," said Otto Guenther, vice president and general manager of Northrop Grumman's tactical systems division. "The Army's confidence in Northrop Grumman's ability to provide this critical capability was based in large part on our strong systems-integration and command-and-control expertise and our proven performance fielding the Forward Area Air Defense Command and Control (FAAD C2) system."

The fire-control subsystem Northrop Grumman Mission Systems provides for C-RAM uses software modified from FAAD C2, which ties together the sensors and weapons of the Army's short-range air-defense battalions. Northrop Grumman is the prime contractor for FAAD C2, which is operational throughout the world and has been especially critical to homeland security efforts in the Washington, D.C. area.

### Defence Industry

## Theissen Delivers 23 Containers of Deployable Training Systems

Theissen Training Systems GmbH (TSS) has delivered 23 containers of deployable training systems from the production facility "De Rijk" in Belgium.

Deployable equipment and the "Range in a Box" system are a part of TheissenBrs effort to bring deployable solutions to customers serving not only at designated training ranges, but in the actual zones of conflict. Right there where appropriate training equipment is really required!

Before soldiers are deployed to serve in combat zones, they undergo complete and intensive live fire training. Naturally this status quo needs to be kept on the highest possible level, particularly after deployment in theatre. If

soldiers do not have access to constant live fire training facilities they are not going to be able to perform at their best. Training instructors know that reaction and friend-foe discrimination rapidly decrease if not constantly practiced.

With the "Range in a Box" system Theissen has developed a complete deployable system which allows our customers to operate a training facility in the actual combat zone. It allows continuous and uninterrupted training wherever troops are temporarily based at. Within hours whole scenarios can be installed – right from the container with minimal infrastructural requirements.

This modular, turnkey and ready-to-go mobile live fire shooting camp trains mechanized and infantry combat teams using high-tech, radio-controlled and battery-powered training facilities not only in remote out of areas missions. Autonomous container systems with diesel generators, solar panels and chemical WC facilities are available to create a temporary range control center. Optionally available are office modules, battery charging room, carpenter module, repair shop, WC and washroom module, kitchen / mess module.

Deployable target solutions are specifically designed to provide modular, dynamic and scalable training during out-of-area missions. Live-fire training must be available in combat zones. While being apart from any infrastructure our deployable target solution can be installed and dismantled in very few time and can be stored and deployed in standard containers. This provides live fire training facilities under all out-of area conditions and keeps your troops always well prepared. Deployable armor targets and deployable infantry targets in both stationary and moving versions are available from TTS.



of companies worldwide that work with the US Navy in the field of add-on armor for lightweight military vehicles and trucks. Plasan's solution for both the armor protection itself and the design of the rear troop carrier complied with the highest technological demands stipulated by the US Navy. Engineered from composite materials, Plasan's battle-proven armor solution is tailored to meet the multiple challenges of today's combat scenarios – traditional battlefields, urban warfare and low intensity conflicts. The armor was chosen for the high level of all-round protection it provides to both vehicle and crew against Improvised Explosive Devices, mines and other threats.

In addition, Plasan's highly cost-effective APK allows easy and swift assembly and disassembly by crews in the field, according to changing mission specifications. Its fully modular nature allows it to be easily transferred from one vehicle to another. Plasan's Armor Protection Kit (APK) was chosen over those from competing contractors after extensive rigorous tests by the USMC, in order to ensure the troops have the most effective protection.

"This contract, as a direct subcontractor for Oshkosh, demonstrates the manufacturer's confidence in our ability to offer superior protection to patrol vehicles, trucks or other lightweight platforms against IEDs, landmines and various terrorist and insurgent threats. We have successfully shown that our solutions reduce truck vulnerability on the modern battlefield. The US Marines recognize that our battle-proven armor solutions meet the most demanding operational requirements," said Plasan's CEO, Dan Ziv. Plasan Sasa is a preferred supplier to the Israeli Defense Forces and an approved supplier to Ministries of Defense around the world. The focus of its core business is the development, manufacturing and assembly of Add-On Armor Protection Kits for lightweight military tactical truck and wheeled vehicles, fixed and rotary wing aircraft, naval platforms and commercial vehicles.



## Contracts

### Plasan Sasa Wins \$M100 Contract to Supply US Marines



KIBBUTZ SASA, Israel -- Plasan Sasa, a leading developer and manufacturer of combat proven ballistic protection products, announced that it has won a contract with the US Department of Defense contract to supply an additional 1,000 MTVR protection for Oshkosh trucks.

Oshkosh selected Plasan exclusively for this \$100 million project.

This contract is the next step in the US Marines' plans to fully equip its Oshkosh Medium Tactical Vehicle Replacement (MTVR) fleet with Plasan's advanced Armor Protection Kit (APK). Full deployment is scheduled to be completed by year-end 2006.

This contract places Plasan among the small number