

# Army Guide monthly



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## Army

## Stryker `Double V-Hull` Proven Success



More than 18 months ago, the Army's Stryker combat vehicle underwent a game-changing transformation when the service took lessons learned from theater and incorporated an improved hull design to protect Soldiers from improvised explosive devices and roadside mines.

The new underbody design, known as a "double v-hull", or DVH, was based on proven technology similar to that found on mine resistant ambush protected vehicles which deflect blasts away from the vehicle and the Soldiers inside.

The Stryker DVH took the concept a step further by incorporating enhanced armor, a new suspension and blast-attenuating seats. This rapid engineering effort went from conception to production in less than one year and debuted in Afghanistan in early summer 2011.

As of this month, 673 Stryker DVHs have been produced, of which more than 450 have been fielded to Afghanistan. With more than a year and a half of combat experience now, there is enough data to declare the Stryker DVH a success, said Lt. Col. Eric Frutchey, product manager for the Stryker fleet.

"While deployed to Operation Enduring Freedom, the Stryker DVH has seen enemy fire and come through with outstanding survivability results," Frutchey said. "The majority of Soldiers involved in those instances have walked away from the vehicles, or returned to duty within a short period of time. Not only have the number of injuries and casualties dropped dramatically, but the severity of those instances has substantially decreased."

While better protecting Soldiers is the most important development of the DVH effort, the improved operational readiness rates are also an important advancement.

Frutchey said the Stryker DVH's operational readiness rate has "measurably improved" to an average monthly rate of 99 percent. That, he said, is largely due to the upgraded carrying capacity and the robustness of the new 55,000-pound capacity suspension.

The Stryker's operational readiness rate means that 99 percent of the time, it is "ready to roll" when called upon by Soldiers in the field. This means not only has the DVH cut down on Soldier injuries, but that it has done so while being ready for more combat missions.

The Army is looking to further enhance Soldier safety in Stryker DVHs by applying an integrated mine roller system to the front of select Stryker DVHs. By initiating the explosion away from the vehicles they are attached

to, Soldiers within Stryker DVH can gain even greater protection. Currently, 144 mine rollers and 80 kits for integration onto Strykers have been delivered in Afghanistan, and more are on the way.

As the Army continues to discuss the proper fleet mix of DVH and traditional flat-bottom Strykers, the project manager of the Stryker Brigade Combat Team has begun a pilot exchange program, in partnership with Anniston Army Depot and General Dynamics Land Systems, in response to the Army's request for additional DVH vehicles at a reduced vehicle cost.

"To maximize the use of fiscal resources, the Army started the exchange program to validate if components from the traditional Stryker flat bottom hull variants could be expeditiously refurbished and installed on a new, more survivable DVH, at less cost than producing a new vehicle," said David Dopp, PM SBCT.

The process includes reusing common parts from FBHs, refurbishing them, and re-using the parts in the new DVH structure. The DVH exchange vehicles are expected to have all of the same capabilities as new DVH production vehicles. The DVH exchange vehicles are built on the same production line as new DVH vehicles.

The exchange program is scheduled to be complete in early 2013. While further vehicles will have to be completed for the Army to know exact savings, it is currently estimated that DVH exchange vehicles will cost 40 percent less, when comparing them to a newly constructed DVH version. The first DVH exchange vehicle is scheduled to be fielded to the force in December.



## Term of the day

## Self-propelled Artillery



Self-propelled artillery (also called mobile artillery or locomotive artillery) vehicles are combat vehicles armed with artillery. Within the term are covered self-propelled guns (or howitzers) and rocket artillery. They are high mobility vehicles, usually based on caterpillar track carrying either a large howitzer or other field gun or alternatively a mortar or some form of rocket or missile launcher. They are usually used for long-range indirect bombardment support on the battlefield.

In the past, self-propelled artillery included direct-fire vehicles such as assault guns and tank destroyers. These were heavily armored vehicles, the former providing close fire-support for infantry and the latter acting as specialized anti-tank vehicles.

Modern self-propelled artillery vehicles may superficially resemble tanks, but they are generally lightly armored, too lightly to survive in direct-fire

combat. However, they protect their crews against shrapnel and small arms and are therefore usually included as armoured fighting vehicles. Many are equipped with machine guns for defense against enemy infantry.

The key advantage of self-propelled over towed artillery is that it can be brought into action much faster. Before the towed artillery can be used, it has to stop, unlimber and set up the guns. To move position, the guns must be limbered up again and brought — usually towed — to the new location. By comparison self-propelled artillery can stop at a chosen location and begin firing almost immediately, then quickly move on to a new position. This ability is very useful in a mobile conflict and particularly on the advance.

Conversely, towed artillery was and remains cheaper to build and maintain. It is also lighter and can be taken to places that self-propelled guns cannot reach, so despite the advantages of the self-propelled artillery, towed guns remain in the arsenals of many modern armies.



### Future Technologies

## Quantum Stealth: The Invisible Military Becomes A Reality



Once thought to be only a Science Fiction/Fantasy technology, Guy Cramer, President/CEO of Hyperstealth Biotechnology Corp., discusses the implications of militaries which can now become invisible with his light bending technology called "Quantum Stealth".

Hyperstealth is a successful Canadian camouflage design company with over two million military issued uniforms and over 3000 vehicles and fighter jets using their patterns around the world.

Quantum Stealth is a material that renders the target completely invisible by bending light waves around the target. The material removes not only your visual, infrared (night vision) and thermal signatures but also the target's shadow.

Two separate command groups within the U.S. Military and two separate Canadian Military groups as well as Federal Emergency Response Team (Counter Terrorism) have seen the actual material so they could verify that I was not just manipulating video or photo results; These groups now know that it works and does so without cameras, batteries, lights or mirrors...It is lightweight and quite inexpensive. Both the U.S. and Canadian military have confirmed that it also works

against military IR scopes and Thermal Optics.

For reasons of security, I can't discuss details about how it accomplishes the bending of light but I can explain how it might be used.

Scenario 1: A pilot ejects over open terrain in enemy territory, his parachute that deploys is made of the Quantum Stealth material to hide his fall. The enemy knows his aircraft crashed in a specific location, he has less than one hour to find cover, of which there is none. He takes the Quantum Stealth material from the parachute and throws it over top of him, the pilot is now undetectable to all visual sensors and human eyes unless they happen to trip over him. Now he radios out his coordinates and waits for rescue.

Scenario 2: Cameras and visual sensors are on the enemy beach, the Special Forces team decked out in Quantum Stealth swims up to the beach in the middle of the day as they no longer have to wait till night to hide their approach. The team infiltrates the defenses without detection, completes their mission and goes out the same way they came in. The enemy reviews the sensors and cameras; no anomalies were detected on any sensor, no shadows on the cameras, no jamming of the sensors, no thermal signatures, the only evidence discovered by the enemy are boot tracks leading up the beach right past of their defenses and another set of boot tracks going back into the water.

Scenario 3: The next generation of combat aircraft is undergoing trials, in the past these secret aircraft had to be moved into hangars whenever a spy satellite passed overhead. Now with Quantum Stealth, the aircraft is undetectable from spy satellites, aerial drones or surveillance balloons eyes at any time of the day or night.

Scenario 4: One of the most vulnerable times for a submarine is when it comes to periscope depth to look around to verify the enemy, ships or aircraft are not loitering in the area, before the submarine surfaces or fires on the enemy. The periscope can only be hidden with painted camouflage to a certain degree. With Quantum Stealth; the entire submarine can stay hidden near the surface as well as the periscope above the surface which also cannot be seen.



Scenario 5: One of the most dangerous missions for soldiers is Close Quarters Combat inside structures, Special Forces and Counter Terrorism teams train over

and over on these possible confrontations. Now the enemy will only know someone is there when they have to open or breach a door or hear movement, providing the specialized team more time to determine targets from hostages and allowing them time to wait to react when it's most favorable to do so.

\_Scenario \_6: A group of Canadian Battle Tanks in Quantum Stealth engage an enemy group of tanks, the only indication to the enemy of the Canadian Tanks location is the direction of the noise of the tanks engines and the sound of their guns firing. As the enemy looks through their targeting scopes to fire back, there is no indication on any sensor to where the Canadian tanks are located, nor can the enemy see the other Canadian tanks which are moving to flank them from the side and behind. As news spreads of an invisible Canadian army which can move without detection, the psychological effect on the enemy is devastating, they never know when or even if this invisible army has them targeted or surrounded. How can you hit a target you cannot see, how do you defend from the invisible?

\_Scenario \_7: A sniper is required to take out a high profile target at a specific location, however, there is no cover for miles. Prior to Quantum Stealth the sniper used to look for cover and concealment to hide their location, now they are able to remain undetected sneaking into the location, in open terrain, reloading without their movement being detected, changing locations without their motion being noticed and depart the location at any time day or night.

Why disclose this technology to the public? I have not disclosed how it's done, I have only said that I have done it and described potential applications for it. Many people believe that movies and T.V. shows are close to reality in how the U.S. government or U.S. military reacts to new technology, acquiring anything that provides an advantage. My experience is that this is not the case, at least not for a foreign company, it is much more boring and time consuming than you may think as there are approvals and agreements required between each participating country and few people who have the authority to sign off on these multi-country agreements. Many times you will meet with someone or some group in the military only to find they can't help, to find the right person who has the ability to take it to the next level can take months. Sometimes you need publicize your ability to get the attention of the right person. Most in the military were skeptical that the real photos and videos I was showing them were not manipulated (note the photos on this page do not show the real technology - they are mockups to show the media the concept).

I had an open channel in regards to new technology to the U.S. from 2004-2008 when I worked with the Chief of Staff for Senator John Warner (Chairman of the Armed Services Committee until 2007), but Warner retired in late 2008 and his people dispersed into other jobs, I developed Quantum Stealth after this time.

In October of 2010 I released a video of "Smartcamo" at a camouflage symposium in Brussels which showed a camouflage uniform changing colors from Woodland to

Transitional and then into Desert coloration. I assumed that the U.S. military was already there on this technology and I was playing catch-up. I was notified immediately after my talk by someone from the U.S. Military that I could not show that video again as I had just shown them that I had solved a problem they were still working on. Even professors in Textiles at the symposium were astonished when they saw the video.

Smart (Interactive/Intelligent textiles) are textiles embedded with some form of technology which can adjust to their surroundings or user. Most research in this area is being done with Nanotechnology or Metamaterials. Our Smartcamo approach showed how I could combine new technologies with preexisting for a cost effective - yet quick applicable solution to the problem. Slight modifications to the system will allow a mobile or moving camouflage for uniforms to mask movement. There are limitations to Smartcamo such as cost, weight of power source and limited activation time. What I was not saying at the time was that I had already developed something better without these limitations; Quantum Stealth.

I was speaking at a breakout session at ADS Inc. Warrior West in San Diego during May of 2011 on "The New Science of Stealth". Anyone was allowed to attend and being a military show in San Diego, there were a large number of U.S. Navy SEALs in the audience, but what I didn't know is that an editor from "Military Times" had traveled to the show just to hear this presentation, and when she heard about light bending material at the end of the talk she wanted more information. After the talk she came to me for an interview on the subject.

As with all media, I told her that I could describe where it could be used but not how I accomplished the light bending. She wanted images and I told her that I could not provide those images for public dissemination.

This is when the media became very interested in this technology and helped garner the interest of the U.S. Military.

Numerous stories have been written on the technology without any disclosure of how it's done, I released mock-up photos that the media wanted to show the public the concept without providing actual photos of the technology and many people remain skeptical, (as would I).

After enough press had been written on the subject, the U.S. Military Command finally asked to see the real material to verify that it worked. Those meetings took place with very limited "Need to Know" access and the technology is now moving forward.

Isn't there a risk that someone else may figure this out or copy what you've done? Yes, but I've already developed a countermeasure for Quantum Stealth so we would be able to detect anyone else with something identical or similar to Quantum Stealth.

Do I care that people remain skeptical? Nope, the people that need to know that it works have seen it and verified it and their opinions are the only ones that matter.

Will Quantum Stealth be available for the general public or commercial market? Not in the near future unless the Military decided to release the technology and I don't anticipate that will happen anytime soon.

Is there anything planned for the commercial market? I am working on a number of non-powered color changing camouflage materials for the commercial market which utilize different technologies than either Quantum Stealth or Smartcamo. Colors change with climate, seasons cause environmental colors to change and even the 24 hour day can cause a large color discrepancy between camouflage and the background as day becomes night. People want camouflage which can change with these variables.

Have you made camouflage obsolete? Not necessarily, standard camouflage should continue to have its place, however, on the front lines it might become your second choice behind Quantum Stealth if you're Canadian, American or British and your group is authorized to use it.



### Defence Industry

#### Supacat successfully delivers REDFIN 1B vehicle prototype to the Australian Defence Force



Supacat, partnering with a team of Australian companies, was selected in April 2012 as preferred bidder to provide a prototype vehicle for the Special Operations Vehicle element of the Australian Defence Material Organisation (DMO)'s JP2097 Ph 1B (REDFIN) program.

“With our partners and Elbit Systems of Australia, we are delighted to have delivered this initial phase of the REDFIN 1B program. We have worked closely with the customer and our joint commitment has enabled us to achieve this on time and to budget,” Michael Halloran, Managing Director of Supacat Pty Ltd said.

The vehicle is the latest version of Supacat's Special Forces HMT Extenda. The new vehicle retains a high level of commonality with the Australian Army's existing Nary HMT fleet, delivered by Supacat in 2009, but provides improved capabilities, particularly in crew protection and vehicle versatility.

“Supacat's REDFIN 1B solution offers capability improvements in the key areas of firepower, protection, capacity, operability and safety, based upon direct feedback from the worldwide operational use of existing HMT fleets. There are also a number of additional

options offered that the ADF may wish to choose,” Mr Halloran said.

The DMO will use the prototype during the evaluation phase in support of the options that will be provided to Government at second pass.

Nick Ames, Managing Director of Supacat Ltd, said,

“The completion of this key milestone in the REDFIN 1B program for the DMO is an important achievement by everyone at Supacat. Our investment in creating an in-country design and engineering capability and strong supply chain partnership will continue to be key to the success of the program and to future opportunities for our products in the wider Asia Pacific market”.

Supacat's HMT series is the most capable vehicle in its class and is the vehicle of choice for the elite land forces of the world's most active and influential armies. It combines high levels of mobility, protection, payload and firepower. Designed for use by Special Forces, the HMT Extenda is unique in being convertible to either a 4x4 or 6x6 configuration to meet different operational requirements by inserting or removing a self-contained third axle unit. Like other HMT series platforms, the HMT Extenda can be supplied with optional mine blast and ballistic protection kits and with a variety of mission hampers, weapons, communications, ISTAR and force protection equipment to suit a wide range of operational roles.



### Training And Simulators

#### KMW delivers Elk Test for Swedish Army



Munich -- Krauss-Maffei Wegmann GmbH & Co. KG (KMW) delivers an Egress Trainer for various types of military wheeled and tracked vehicles to the Swedish Armed Forces in 2013.

The purpose of the system is to simulate a vehicle rollover in order for vehicle crews to be trained to egress a vehicle lying on its side or upside down. KMW Training & Simulation will deliver the Egress Training System together with its partner MSE Weibull AB from Sweden in 2013.

The Egress Trainer contains the rollover simulator, the instructor station and the vehicle cabin which can be exchanged within short time due to the sophisticated design of universal mounting brackets. A digital audio/video surveillance system with record and replay function serves as the tool for training analysis and debriefing but is also the key component to provide

maximum safety during all training operations. The vehicle mock-ups can be as large as the Swedish CV90 IFV including a rotatable turret.

"This strong training need is the result of a rigorous analysis of incidents which happened during recent out of area missions under real combat conditions. At a very early stage we have developed our own ideas for a modular Egress Trainer." Dr. Dirk Schmidt, Senior Vice President Training & Simulation.

Krauss-Maffei Wegmann GmbH & Co. KG provides further information on the Egress Trainer at IITSEC 2012, the world's largest modeling, simulation & training conference (December 03rd -December 6th) in Orlando, USA (Booth #1201).

## Training And Simulators

### Soldiers train with remote-controlled mine-clearing system



Tripping improvised explosive devices and unexploded ordnance in a controlled way to avoid Soldier injury has become an automated process now for Soldiers here and at Fort Bliss, Texas.

Soldiers are now training on the M160 MV4 DO-KING, a remote-controlled, tracked mine clearance system to trip hidden IEDs, UXOs and anti-personnel mines. By sending the system out to look for explosive dangers, Soldiers can clear a route without putting themselves in danger.

"Never send a man to do a machine's job," said Mark Decker, a technician trainer and instructor with the Robotics Systems Joint Project Office.

The DO-KING is the first of its kind here and is the latest addition to the Mobilization Training Center, the route clearance training program at Fort Bliss.

Several Soldiers from First Army Division West's 5th Armored Brigade's "Task Force Rampant" recently trained on the vehicle, along with joint warfighters who are training with Rampant in preparation for deployment to Afghanistan. Included among those units are the 321st Engineer Company (Route Clearance) of Conroe, Texas; the 704th Engineer Company (Route Clearance) of Hot Springs, Ark.; and the 402nd Engineer Company (Sapper) of Des Moines, Iowa.

The DO-KING is currently used in Afghanistan by route clearance units.

"Having this equipment available to train our Reserve

Component forces during their post-mobilization training will allow these units to arrive in their forward-deployed theaters with a unique and critical skill set," said Lt. Col. Aaron Dorf, Task Force Rampant Commander.

Fielding of the DO-KING has been a priority of Task Force Rampant for some time now, said Task Force Rampant Command Sgt. Maj. Leonard Meeks.

"We are constantly striving to acquire combat systems that emulate what these joint warfighters will encounter downrange," Meeks said. "The more training we can provide to them in this environment the better. It's our job to prepare them for success, and having the right tools of the trade is key for this mission."

The Do-King employs a rotating shaft with chains attached to disturb the surface of the ground in an attempt to detonate or unearth deadly mines and unexploded ordinance. The flailing action is designed to establish a safe path of travel for dismounted troops in the area.

During the first day of the two-day training event, Soldiers received familiarization of the system's internal and external components, and training on the fuel system. This was followed by instruction on preventive maintenance checks and services and the proper methods to inspect the track area, engine compartment and its attachments.

"PMCS training and testing of the equipment is as important as operating it," said Master Sgt. Warner Stadler, the Task Force Rampant senior mechanic. "Without formal training on the care of equipment, it is very likely the equipment will not be available and ready when required."

Following PMCS, the Soldiers were taught to program the system and operate it using basic driving techniques. As part of the basic driving training, Soldiers were required to maneuver the system in forward and reverse, as well as negotiate left and right turns in a controlled environment.

Once proficient at maneuver, the Soldiers were taught methods for employing the robot to reducing obstacles. The flailing block of instruction was conducted on a 3,100-meter test lane that was used to simulate entering an unclear area.

The key to effective flailing was the ability to employ the DO-KING using a variable tool speed, the correct downward pressure and gear. Prior to entering the unclear area, Soldiers must perform a soil test to check the effectiveness of the settings, and then adjust as necessary.

"The M160 is definitely an asset to any deploying unit," said Staff Sgt. Daniel Denny, after two days of flailing. "I'm excited to be able to provide future training to engineer Soldiers."

A practical exercise allowed Soldiers to get a better feel for the machine and its combat role. Each Soldier took turns holding the remote control to maneuver the DO-KING along the training lane.

"The remote-control-operated vehicle is actually fun to drive and maneuver, said Staff Sgt. Chamberlain Wolfe. "However, its mission is very serious and critical to our

safe maneuver in what at times is a dangerous region."

By Capt. Jose A. Lopez, 5th Armored Brigade, First Army Division West

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### Training And Simulators

## Cubic Receives \$12.5 M and Completes 1st Deliveries of Instrumentable MILES Tactical Vehicle System



Cubic Defense Applications, the defense systems business of Cubic Corporation, has received a new \$12.5 million order for its Instrumentable MILES Tactical Vehicle Systems (I-MILES TVS) from the U.S. Army's Program Executive Office for Simulation, Training and Instrumentation (PEO STRI).

I-MILES TVS employs Cubic's wireless vehicle Multiple Integrated Laser Engagement System (MILES) technology to provide the real-time casualty assessment necessary for MILES tactical engagement training in direct-fire, force-on-force instrumented training scenarios. The system offers superior performance because of its weapon simulation and casualty assessment accuracy for vehicles and fixed structures. It adapts to any wheeled or tracked tactical vehicle and is also configurable for buildings, fixed equipment and other structures. The system includes new features that significantly improve ease of use for soldiers, including touch-screen displays with highly intuitive graphic interfaces.

In related news, Cubic just completed its first shipments of I-MILES TVS to the U.S. Army. Cubic delivered more than 1,000 kits to U.S. Army installations in November, with the U.S. Army Joint Readiness Training Center at Fort Polk, Louisiana, and the National Training Center at Fort Irwin, Calif., receiving most of Cubic's production.

The first six tactical vehicle systems went to Fort Carson, Colorado, where they will be used to train end users. Cubic is to deliver over 3,000 systems under the first option of its 2010 contract with the U.S. Army's Program Executive Office for Simulation, Training and Instrumentation (PEO STRI). Cubic will conclude deliveries under the first option in May 2013, then commence work on a second option, which includes the \$12.5 million order.

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### Robots

## Robot to Serve as Future Military's 'Pack Mule'

WASHINGTON -- The warfighter who carries up to 100 pounds of equipment on his back is expected to

get relief from the cumbersome weight, officials at the Defense Advanced Research Projects Agency say.



Enter the robot.

It's not just any robot. DARPA's semiautonomous Legged Squad Support System -- also known as the LS3 -- will carry 400 pounds of warfighter equipment, walk 20 miles at a time, and act as an auxiliary power source for troops to recharge batteries for radios and handheld devices while on patrol.

Now in trials, the "pack mule" robot might have numerous functions, but its primary responsibility is to support the warfighter, said Army Lt. Col. Joseph K. Hitt, program manager in DARPA's tactical technology office.

"It's about solving a real military problem: the incredible load of equipment our soldiers and Marines carry in Afghanistan today," Hitt said. The consequences of that kind of load can be soft-tissue injuries and other complications, he added.

And as the weight of their equipment has increased, so have instances of fatigue, physical strain and degraded performance, officials have noted. Reducing the load warfighters carry has become a major point for research and development, DARPA officials say, because the increasing weight of equipment has a negative effect on warfighter readiness.

DARPA's five-year, \$54 million LS3 project began in September 2009, and now is undergoing trials in the field. The LS3 must become familiar with different types of terrain, from wooded areas to deserts, and with varying weather conditions such as rain and snow, Hitt explained.

The LS3 prototype completed its first outdoor assessment in January, demonstrating its mobility by climbing and descending a hill and exercising its perception capabilities.

Following a "highly successful" trial at Fort Pickett near Blackstone, Va., earlier this month, Hitt said, the robot worked with the Marine Corps Warfighting Laboratory there and developed additional behaviors.

The robot's sensors allow it to navigate around obstacles at night, maneuver in urban settings, respond to voice commands, and gauge distances and directions. The LS3 also can distinguish different forms of vegetation, Hitt said, when walking through fields and around bushes. With the ability to avoid logs and rocks, the LS3's intelligent foot placement on rough terrain is a key element, he said.

The next trial will challenge the robot with the desert

terrain at Twentynine Palms Marine Corps Base in California, and subsequent trials will follow every three months, Hitt said.

“The vision is a trained animal and its handler,” he said, adding that a squad leader would learn 10 basic commands to tell the robot to do such things as stop, sit, follow him tightly, follow him on the corridor, and go to specific coordinates.

“The technology of the robot focuses on mobility, perception and human-robot interaction,” Hitt said.

With the expectation of delivering the first LS3 to a Marine Corps squad in two years, the program culminates a decade of research and development. Yet it still needs some tweaks, Hitt acknowledged.

“We have to make sure the robot is smart like a trained animal,” he said. “We need to make sure it can follow a leader in his path, or follow in its own chosen path that’s best for itself. The interaction between the leader and the robot [must be] intuitive and natural.”

## Contracts

### Wyle to Assist in Mine Resistant Ambush Protected Vehicles

EL SEGUNDO, Calif. -- Wyle has been awarded a contract worth \$22 million to perform engineering and development programs to help transition the logistics of the Mine Resistant Ambush Protected vehicle program from a joint program to the individual armed services including the Army, Navy, Air Force and Marines.

“Wyle has worked closely with this program for years,” said John Mikelaitis, Wyle’s senior manager, life cycle management. “These efforts provide an opportunity to build on that experience and take our support of this vital vehicle to the next level.”

Wyle will develop and maintain reliability and logistics analyses, modeling and report databases. In addition, the contract calls for a product update to support engineering change proposals. The company also will help develop research and analysis tools to examine historical program data.

The Mine Resistant Ambush Protected vehicles are a family of armored fighting vehicles used by the U.S. armed forces, among others. The purpose of the design is surviving improvised explosive device attacks and ambushes.

Wyle will provide real-time assessment of where scientific and technical information is needed, which will help reduce duplication of efforts and help improve reliability, maintainability and supportability to reduce costs and extend the life of the vehicles.

Work will take place in Jacksonville, Fla. with additional work performed in several other locations including Virginia, South Carolina and Michigan.

Wyle is a leading provider of high tech aerospace engineering and information technology services to the federal government on long-term outsourcing contracts. The company also provides test and evaluation of aircraft, weapon systems, networks, and other

government assets; and other engineering services to the aerospace, defense, and nuclear power industries.

## Contracts

### Qatar - HIMARS, ATACMS, and GMLRS



The Defense Security Cooperation Agency notified Congress Dec. 21 of a possible Foreign Military Sale to the Government of Qatar for rocket and missile systems and associated equipment, parts, training and logistical support for an estimated cost of \$406 million.

The Government of Qatar has requested a possible sale of 7 M142 High Mobility Artillery Rocket System (HIMARS) Launchers with the Universal Fire Control System (UFCS); 60 M57 Army Tactical Missile System (ATACMS) Block 1A T2K Unitary Rockets (60 pods, 1 rocket per pod); 360 M31A1 Guided Multiple Launch Rocket System (GMLRS) Unitary Rockets (60 pods, 6 rockets per pod); 180 M28A2 Reduced Range Practice Rockets (30 pods, 6 rockets per pod); 7 M68A2 Trainers, 1 Advanced Field Artillery Tactical Data System (AFATDS); 2 M1151A1 High Mobility Multipurpose Wheeled Vehicles (HMMWV); and 2 M1152A2 HMMWVs. Also included are simulators, generators, transportation, wheeled vehicles, communications equipment, spare and repair parts, support equipment, tools and test equipment, technical data and publications, personnel training and training equipment, U.S. government and contractor engineering, technical and logistics support services, and other related elements of logistics support. The estimated cost is \$406 million.

This proposed sale will contribute to the foreign policy and national security of the United States by helping to improve the security of an important partner which has been, and continues to be an important force for political stability and economic progress in the Middle East.

The proposed sale will improve Qatar's capability to meet current and future threats and provide greater security for its critical infrastructure. It will also enhance Qatar’s interoperability with the U.S. and its allies, making it a more valuable partner in an increasingly important area of the world. Qatar will have no difficulty absorbing these launchers into its armed forces.

The proposed sale of this equipment and support will not alter the basic military balance in the region.

The prime contractor will be Lockheed Martin Missile and Fire Control in Dallas, Texas. There are no known offset agreements proposed in connection with this potential sale.



Implementation of this proposed sale will require the assignment of two contractor representatives to Qatar for a minimum of one year to support delivery of the HIMARS and to provide support and equipment familiarization.

There will be no adverse impact on U.S. defense readiness as a result of this proposed sale.

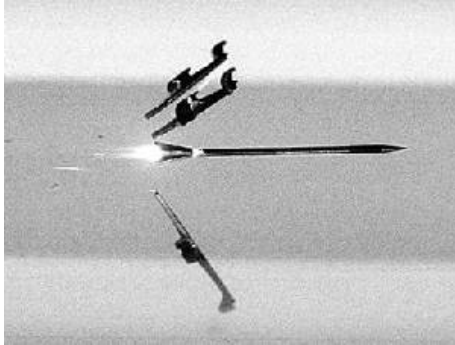
This notice of a potential sale is required by law and does not mean the sale has been concluded.

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### Term of the day

## Kinetic Energy Penetrator



A kinetic energy penetrator is a type of ammunition which, like a bullet, does not contain explosives and uses kinetic energy to penetrate the target.

The term can apply to any type of armour-piercing shot but typically refers to a modern type of armour piercing weapon, the armour-piercing fin-stabilized discarding-sabot (APFSDS), a type of long-rod penetrator (LRP), and not to small arms bullets.

The principle of the kinetic energy penetrator is that it uses its kinetic energy, which is a function of mass and velocity, to force its way through armour. If the armor is defeated, the heat and spalling (particle spray) generated by the penetrator going through the armor, and the pressure wave that would develop, would destroy the target.

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