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# Defense 🗑 Update

### AUSA 2012 ANNUAL EXPOSITION - SHOW PREVIEW

Vehicle Modernization	Armor & Protection	<b>Special Forces Mobility</b>	<b>Connecting the Edges</b>
Development and market trends	Trends in the development and	The Special Forces Command is	The US Army is set to equip its
influencing the US Armored	fielding of armor, blast	after new wheels and industry is	Brigade Combat Teams with the
Vehicles marketplace	protection and techniques	offering their best	latest, advanced networking
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Every four years, the annual AUSA 2012 Exposition, taking place in Washington DC next week, is well timed to reflect the priorities - and constraints on defense budgets, reflected by the political debate toward the elections. In 2012 the debate is becoming more intense, as sequestration looming over the horizon could topple any agenda the candidates or their supporters promote. Even without the drastic reductions mandated by sequestration, U.S. Army leaders realize that significant cuts in programs, force structure and procurement will be made. The theme this week will therefore be – carry on building the future force, with the resources and capabilities we already have.



### Defense Update is covering AUSA-2012 throughout the show, highlighting:

- Armored Vehicles
- Armor & Protection
- Electro Optics & ISR
- UVS & Robotics
- Precision Strike
- Battle Command and more...

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## **US Army technology Outlook - 2012**

A preview of the main technological themes at AUSA 2012 Annual Meeting and Exposition



Contrary to the Army planner's foresight in the 2000s, this decade is not about grand programs, but on reconstruction, reconstitution and incremental building of forces. Those military units surviving the cuts will have to do more with less. For the defense industry, it means that there will be fewer platforms to build, but more parts and kits resets, modifications and modernization to deliver. Doing more with less also means more effective processes. Hence, saving energy costs, in fuels, batteries, and harnessing renewable energy with affordable costs would become more popular. It also means fewer soldiers mastering more skills, for which training, simulation and expert assistance will become critical. Among these modernization programs are the replacement of M-113 armored carriers. At present, the leading candidate is the Bradley platform, made by BAE Systems. Currently, the Heavy Brigades in the US Army are equipped with the Bradley infantry carrier and scout vehicle.

The Joint Light Tactical Vehicle (JLTV above, the L-ATV candidate from Oshkosh defense) and Ground Combat Vehicle (GCV seen below is the version proposed by BAE Systems) are the two leading new starts in combat vehicle procurement for the upcoming decade.

### Vehicle Modernization Programs

BAE is offering to replace the M-113 support vehicles such as medical evacuation, medical treatment, mortar carrier and command post vehicles with Bradley chassis versions. In addition, the company is supporting the reset of existing vehicles – in October the company was awarded \$97 million contract to reset 146 Bradley Fighting Vehicles, as part of the vehicle's life cycle support program.

The Ground Combat Vehicle (GCV) is one of two Army new starts, along with the Joint Tactical Light Vehicle, procured under a joint program with the US Marine Corps. BAE Systems and General Dynamics Land Systems (GDLS) are competing on the GCV, while Lockheed Martin, Oshkosh Defense and AM General are racing for the JLTV. For some, losing a program could spell doom. While Oshkosh





(which recently celebrated the delivery of the 100,000th military vehicle) maintains its military trucks production lines and BAE Systems has high hopes for the continuation of Bradley platforms, for GDLS and AM General, the GCV represents the single large-scale prospect for the future.

### Armor and Protection

Another area facing a temporary slowdown is ballistic and blast protection. In past years, armor manufacturers were relatively small and specialist companies that supplied armor products to prime contractors like GDLS and BAE Systems. This has changed in the mid 2000s, as the US raced to build armorprotected vehicles to counter the growing threats in Southwest Asia. Bigger ones acquired smaller specialists, and prime contractors obtained their own capabilities, expanding production volumes. Now, as the demand for such armor is reduced, smaller, specialist manufacturers that leverage lower production volumes could once again have that advantage, by pursuing new opportunities to supply lighter also benefit from a small, but steady and more effective protection to new growing threats. The planned selection of prime contractor for the Ground Mobile

Special Forces vehicle fleet modernization opens new opportunities for specialty vehicle manufacturers like HDT (above). Small manufacturers of armor protection can also benefit from steady demand for improved armor, such as this Q-NET anti-RPG system produced by QinetiQ.



Vehicle (GMV 1.1) for the Special Operations Command could represent such opportunity. These manufacturers could demand for armor replacement kits, replacing worn out, or obsolete applique armor 'B-Kits' with new and lighter

materials are introduced, offering more benefits to the user.

Another growing area is the long neglected blast protection. Blast mitigation features belly plates, blast protecting seats and paddings, introduced as part of combat vehicle reset and modifications, enhancing ballistic protected vehicles with blast-proof designs protecting the occupants from excessive blast accelerations caused from IEDs and mines. Blast protection is not limited to the vehicle, but also extend to the warfighter's own gear - helmet, boots and combat suit.

Effectiveness in military means that deployed forces are being well prepared, equipped, informed and connected – the key for all these attributes are excellent leaders and superior command and control. Advanced, broadband networking, intelligence gathering, particularly at the tactical level, where timely dissemination of data is critical, is essential for success.

While the regular and reserve forces are about to be reduced, the investment in Special Operations is expected to grow, as these forces are viewed more effective and efficient in dealing with 'low profile' and hybrid international challenges. Since they usually operate covertly, their failures remain secretive while politicians quickly attribute to their successes. For industry, Special Forces contracts will also become important again, after years where mainly small niche players addressed these smaller, low-volume programs.

### **Special Forces Mobility**

The opportunity to sell thousands of medium and light tactical vehicles to SOCOM has attracted almost all major US military vehicle manufacturers to last months' Modern Day Marine 2012 expo

(MDM) in Quantico, and is bound to repeat precision guidance for missiles and aerial here at AUSA this week. Some of these requirements address certain 'special application', particularly combat rescue. Others are needed to replace vehicles worn down by years of use under harsh conditions.

SOCOM looks at purchasing several types of vehicles, including some high mobility vehicles of the All Terrain Vehicle (ATV) class for which a contract award is expected in few months. Others are aimed to replace the HMMWVs with a new Ground Mobility Vehicle (GMV 1.1) – SOCOM is looking after about 1,300 such vehicles. With an RFP expected for January 2013 and a contract in January 2014.

The vehicles on display at MDM were representative of the different applications, and hint on the different approaches and priorities each competitor is focused on. These vehicles included the SRTV from HDT, Spectre from GDLS and Flyer displayed by Flyer Defense and GD-OTS and the new S-ATV from Oshkosh. Polaris displayed the MRZR and ArmorWorks also displayed another model of the Polaris, configured into the LVATV. At AUSA more competitors are showing their vehicles, including a team by Northrop Grumman and BAE Systems, competing for the GMV 1.1 program the debut of the Hyena fast attack recon vehicle from ArmorWorks.

### **Precision Fires**

In terms of weapons systems the trend today is towards smaller, focused effects. The days of "big bang and carpeting" are long gone. Today, the yield is not measured by body count, but in the high precision and minimized collateral damage. The military is seeking higher precision kits for its artillery, rockets and mortars, and

delivered weapons. At the tactical unit level, enhancing fire precision by using improved rifle sights and improving sniper accuracy are considered, along with more exotic methods, such as miniature suicide drones trained to seek and hit a fleeting target from a distance of several miles.

Controlling kinetic effects is another aspect in the use of force, as the military seek to minimize the use of firepower as much as possible, particularly in the presence of noncombatants and civilians. In the asymmetric warfare, every action is supervised, monitored and cleared by higher command, a mode of operation that will not be possible in other forms of combat. Nevertheless, the evolution of 'common picture' shared at multiple levels will contribute to the ability of tactical elements to employ maneuver and firepower to gain the upper hand in future combat.

Another aspect of asymmetric warfare is the necessity to minimize the use of lethal force throughout military operations. This goal is achieved through adequate training and fielding of various non-lethal effects, employed with existing weapons or from dedicated devices. These could be laser dazzlers used for warning, denying or limiting movement of personnel and vehicles, as well as non-lethal ammo and suppressant. All these could prevent military forces from using lethal force only to the instances it is absolutely necessary.

### **Better Force Protection**

In the past 10 years force protection has been at the focus, as the military invested tens billions of dollars buying anything that could enhance the survivability and protection of troops. However, since such devices are often required to counter



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specific, or evolving threats that were uncommon and unfamiliar before, most of these acquisitions are managed as 'urgent requirements' and procured through accelerated acquisition by the Rapid

Equipping Force (REF). While REF is mostly responsible for the adaptation, evaluation and fielding of existing equipment, the Joint IED Defeat Organization (JIEDDO) is responsible for combating the No 1 threat to warfighters today - Improvised Explosive Devices (IED). Like REF, JIEDDO is responsible for the acquisition of equipment, but this organization also invests and motivates industry and research institutions to suggest and develop new countermeasures, and methods to detect, and fight IEDs and the networks that support them. It also manages training and knowledge centers supporting deployed forces throughout the world,

by collecting information on threats, and suggesting recommended tactics and countermeasures, in an effort to enable front line units to stay ahead of the threat.

equipping specialized teams of combat engineers tasked with the job. A large acquisition program currently underway will prepare ordinary units to better deal with IEDs, using simple-to-use manportable unmanned ground vehicles (UGV).

The Ultra-Light Recon Robot (ULRR) program is equipping combat units with special robots that can defeat IEDs employing simple and tested methods. While initial orders have already been issued to some of the bidders, the

competition is still open, and all the robots competing for this program are present at AUSA to promote their products. These include the SUGV from iRobot and DragonRunner from QinetiQ, MTGR



MTGR from Roboteam is one of the new lightweight robot being fielded under JIEDDO's ULRR program

from Roboteam and the miniature Throwbot from recon Robotics Improving the warfighters' situational awareness is another facet of force protection – by expanding the security and surveillance Until recently, C-IED equipment focused on circles beyond the unit perimeter. Radars, ground and aerial observations, unmanned aerial vehicles and unattended sensors are all part of this growing capability. Yet, since fewer, and smaller deployed units are expected to do 'more with less', all these sensors must work together, supporting the mission by providing a common situational picture. They should trigger an alarm before the enemy can act, and minimize false alarms, thus reducing the possibility of collateral damage from unnecessary response and reduce the workload of the troops.

Among the new sensors currently being fielded or completing development are advanced radars, designed to trigger automatic alarms and localize sources of

artillery, mortar and rocket fire, and even small arms and RPGs. Such radars are available in large sizes, covering wide sectors, or tactical mobile or vehicle mounted radars, offering protection for battalions, companies and even smaller units. Utilizing similar technologies, other Ground Surveillance Radars are providing troops with standoff surveillance capability looking many miles into enemy area, others are designed to cover close-range, to maintaining a safe perimeter of few hundred meters protecting ambushes out in the open or forward operating bases and other facilities, located in urban terrain.

Other systems extending the situational awareness of forward operations bases (FOB) are unattended ground sensors, providing persistent monitoring of specific locations of interest (for

intelligence gathering) or wider areas around the bases (perimeter security). New types of seismic, acoustic and visual (VIS) UGS enable operations over months, even years with one power pack. Other devices provide enhanced coverage with autonomous EO/IR/Radar sensors, remotely controlled and monitored from a distance, offering persistent surveillance for force protection and border security applications.

Other sensors are tailored specifically for urban terrain and underground warfare rely primarily on robotic systems backed by dedicated MESH networking to support uninterrupted communications and navigation in radio and GPS denied environments.

### Connecting to the Edge

This process, known as Capability Set Management, is a significant departure from the previous practice of fielding systems individually and often to only one element of the operational force at a time. access to network capabilities found in Tactical Operation Centers while mounted in combat vehicles; other applications in CS13 are delivering the network to individual soldiers at the squad level.

element of the operational force at a time. The main elements included in CS 13 are Capability Set Management is executed in a the General Dynamics C4 (GDC4S) while individual Soldiers will be connected with the Rifleman Radio.

Looking beyond the current Capability Sets, industry is already preparing for future broadband military network, to rely heavily in commercial protocols, and COTS. Such networks employing WiMAX or GEN 4/

deliberate and disciplined process in accordance with the Army Force Generation (ARFORGEN) Process. Improvements in command, control, communications and computing (C4) have been

(C4) have been part of military modernization for decades. While in the past, such modernization focused on specific projects and



An Army M-ATV undergoing integration of Capability Set 13 communications, networking and C4I gear prior to delivery to the first Brigade Combat Team.

capabilities, in recent years, the military is taking a holistic approach to field incremental upgrades throughout its systems, removing technological bottlenecks to maximize system efficiency, improve services and assets utilization. To maximize the performance and efficiency of new equipment, modernization is implemented in 'Capability Set' delivered and installed with brigade combat teams, through all their command elements and subordinate units. The current upgrades implemented in the CS 13 phase addresses 11 critical Operational Need Statements submitted by theater, giving commanders and soldiers vastly increased abilities to communicate and share information. Significant capability enhancements include Mission Command on the Move, allowing leaders

Warfighter Information Network-Tactical (WIN-T) Increment 2, Joint Capabilities Release (JCR) Blue Force Tracker 2 from Northrop Grumman, Joint Battle Command-Platform (starting 3Q FY13), Company Command Post capability, Mission Command Common Operating Environment v1.0 and Harris tactical radios that include the AN/PRC-117G with Advanced Network Waveform 2 (AWN2), the GDC4 AN/PRC-154 Joint Tactical Radio System (JTRS) Rifleman Radio and Handheld Manpack Small Form Fit (HMS) radio and Harris AN/PRC-152A Soldier Radio Waveform (SRW) appliqué radios. For dismounted operations, yet-to be awarded Nett Warrior dismounted C2 kits will provide situational awareness and networking down to the squad leader level,

LTE technology, hardened for military use, could offer the services the advantages of affordable hardware, improved obsolescence and reduced development costs. Implementation of tactical networks serving military operations in contingency areas will also improve with the deployment of adequate numbers of wireless devices employing ad-hoc MESH networks. Protocols supporting these functions are already implemented in the new generations of

radios. Unique applications, such as sensor feeds and ISR have specific requirements met by specific types of radios. Serving those needs are dedicated sets that are optimized for such services, using spectrum segments, waveforms and protocols optimized for high data throughput for realtime and on-demand applications.

#### Supporting the warfighter

Sustaining combat operations in high intensity 'linear' warfare has always represented a huge challenge to military planners, pushing supplies to forward supply bases and forward units by sea, air and land. Engaged in asymmetric warfare, without a clear 'forward line of troops', where every truck, supply base or civilian tanker supplying water to a FOB becomes a target

for an RPG or IED, today's military is focused primarily on protecting its supply lines over hundreds of miles. Reducing the vulnerability of those elements and the 'logistical footprint' supporting the combat units in those areas, without eroding overall security or mission objectives. Future developments in this area call for aerial vehicles capable of delivering large cargo,

including tanks, via hybrid airships. The first hybrid airship called LEMV, designed to provide persistent surveillance over the battlefield, has flown recently but designs that will be able to carry heavy loads are yet to be developed. In the meantime, heavy lift helicopters like the Boeing CH-47F Chinook continue to deliver supplies in theater.

Reducing the logistical footprint could be achieved by optimizing energy consumption, by exploiting renewable energy, generating the water and electrical power necessary for local consumption, rather than pushing it forward from logistical centers. Minimizing cooling and heating requirement by using efficient isolation materials can also reduce fuels consumption (with the added benefit of saving in energy costs). It also means standardizing fuels and electrical power sources (batteries), thus minimizing supply bottlenecks and optimizing logistical reserves maintained at the different levels.

Improving the survivability of convoys is another aspect dealt with by the military. First, minimizing the need for ground transportation means less trucks will be exposed to ambushes and IEDs. The marine Corps is already implementing aerial resupply by unmanned helicopters, while the Air force employs precision aerial delivery using guided parachutes, to deliver supplies reliably and precisely to forward bases, with minimal risk of losing cargo or exposing troops on the ground to enemy fire. Yet, for the bulk of the heavy loads, truck convoys are necessary. Logistics trucks are utilizing protected cabins, offering relatively good protection for the crew, but the goal is to reduce the number of drivers, by using semi-autonomous driving systems, enabling fewer 'drivers' to control many more robotic trucks.

The Army has tested such a concept before and the Marine Corps Warfigting Lab (MCWL) is currently conducting such test to evaluate the operational effectiveness of

this concept.

Other robotic vehicles are employed to support small unit dismounted operations. Often referred to as a 'mule', these support vehicles are much more than weight carriers, supporting the unit with power generation capability to recharge batteries, a platform for

casualty evacuation or even remotely operated lookout, carrying mast mounted sensors or counter-IED systems such as a flail or explosive line charge. Some of these robots, like the STSS and Probot are almost ready for fielding today, while others – like DARPA's 'Big Dog' Legged Squad Support System (LS3) are still in early experimentation.

Unmanned vehicles like REX, will move loads currently carried by the soldiers and provide a useful power source for battery charging.





Oshkosh MTVR trucks modified into TERRAMAX robots trucks are being tested by the Marine Corps Warfighting Lab operating as part of manned convoys or independently. Below: Two LS3 'walking mules' are also undergoing testing at the lab.







Integrated soldier systems, such as this Gladius kit from Rheinmetall Defense, are becoming common with elite fighting units and will span throughout the military to improve command and control of military operations. More coverage

The publisher is not responsible for the accuracy of the information provided in this publication.

Defense Update is covering AUSA-2012 throughout the show, focusing on different aspects of land-warfare:

- Passive & Active Protection
- Electro Optical Sensors & ISR
- Unmanned Systems & Robotics

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