SETTING THE PRECISION TARGETING STANDARD AROUND THE WORLD

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www.lockheedmartin.com/sniperatp
Rugged on the Move
Fighting Fire with Targeted Fire
The Tank Automotive Command is fielding a solution to bulky, short-lived ground vehicle fire extinguishers, making automatic fire suppression a reality.
By Louis Gorenc

Command Profile
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Commander, USMARFORCOM, executes force sourcing and synchronization and directs deployment of Marine Corps operating forces.
By Current Operations Team
Marine Corps Forces Command

Light Vehicle Evolution
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By Kevin Hunter

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FLIR at 50:
A Paradigm-shifting Capability
As the 50th anniversary of Forward-looking Infrared technology in U.S. defense applications passes, the capability enters the next level of military service application.
By Dr. Christina Bates
Industry Spotlight: Lockheed Martin’s sensors in the air and on the ground

Warfighters Gear Guide
A&M provides a snapshot of the best equipment—medical, clothing, optics, electronics—for the modern tactical operator.

Shelters
A&M speaks with seven major players in industry on their shelter products.

JOCOTAS: Supporting DoD’s Agile Basing Concept
From near-term solutions to S&T developments to service updates, one of the military’s top experts on shelters updates readers on the needs of the Joint Committee on Tactical Shelters.
By Frank Kostka

Shelters on the Market
A&M spoke with seven major players in industry on their shelter products.

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Cover: A U.S. Marine from Battalion Landing Team 3rd Battalion, 2nd Marine Regiment of the 22nd Marine Expeditionary Unit (22nd MEU), takes up a firing position in front of a light-armored vehicle to provide security during Exercise Bright Star 2009 in Alexandria, Egypt. (U.S. Army/Spc. Lindsey M. Frazier/Released)
A
s we enter the last quarter of 2013, tactical vehicles are rolling off the line at depots such as Red River Army Depot, tasked with refurbishing all of the U.S. Army- and USMC-owned late-model High Mobility Multi-Purpose Wheeled Vehicles (HMMWVs). The main thing these HMMWVs and other last-generation platforms have in common is that they represent a DoD commitment to upgrade sustainment life cycles for these and many tactical vehicles, ultimately saving the Department millions while next-generation vehicles such as the Joint Light Tactical Vehicle (JLTV)—the HMMWWV’s much anticipated replacement—proceed toward acquisition and fielding.

The September 2013 issue of Armor & Mobility offers readers an inside look at the world of tactical ground mounted and dismounted applications, from the latest in enhanced vehicle mobility systems to modularity in armor kitting to on-board vehicle fire suppressant systems (FSS) packaging. At the heart of these challenges, A&M offers an exclusive interview with MG H.R. McMaster, Commanding General, U.S. Army Maneuver Center of Excellence, Fort Benning, GA, who speaks to current and ongoing objectives for enhancing synergy in platform and infantry training evolutions.

In a special feature, the 50th year of Forward-looking Infrared (FLIR) technology within DoD, Army Program Manager for Night Vision/Reconnaissance Surveillance and Target Acquisition (PM NV/RSTA) offers a reflection on how far the state of art has come in providing advanced low-light/thermal sensory vision capabilities to enable U.S. and partnering warfighters to “own the night.”

From the warfighters and vehicles they depend on to the shelter systems and gear they rely on, the annual shelters/gear edition of A&M provides a look at some of the most commonly used utility and protective products found in the field today. As the rucksack has advanced, so has the gear it carries, from ventilated ballistic goggles and sound-localizing headsets to charging mats and personal water coolers. In the world of shelters and shelter systems, the Joint Committee on Tactical Shelters, in cooperation with Natick Soldier Research Development and Engineering Center (NSRDEC), Natick, MA, is ensuring that enhanced standardization and energy management is enabling greater reliability and functionality.

To put a wrap on the issue, we delve into an oft-overlooked capability: The latest in hermetically sealed fire suppression system technology is poised to keep tactical vehicle crews safe from the dangers of internal cabin fire outbreak. Also, be sure not to miss this issue’s Command Profile, which gives readers an inside look at the U.S. Marine Corps Forces Command (MARFORCOM), responsible for the retention, synchronization, and generation of Marine operating forces in support of Joint mission ops.

As always, feel free to contact us with questions or comments. Thanks for your continued readership!

Sincerely,

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Raytheon Demos 3-D Expeditionary Long-Range Radar Prototype

Raytheon Company successfully completed a customer demonstration of a new U.S. Air Force expeditionary ground-based prototype radar. Designed to replace the decades-old TPS-75 radar system, the Three-Dimensional Expeditionary Long-Range Radar (3DELRR) will help defend warfighters against emerging threats by detecting, identifying, and tracking fixed- and rotary-wing aircraft, missiles, and unmanned aircraft.

During the June 27 demonstration, which was witnessed by U.S. Air Force and Marine Corps personnel, Raytheon’s 3DELRR tracked targets of opportunity and maneuvering tactical aircraft. Raytheon’s advanced 3DELRR prototype also demonstrated integration into the Air Force’s next-generation Command and Control node.

Raytheon’s 3DELRR solution is a C-band gallium nitride (GaN)-based radar. This combination enables warfighters to affordably detect, identify, and track a wide variety of objects very accurately at great distances.

“Our 3DELRR solution meets the customer’s requirements, has a high level of system availability, and just as important, is extremely affordable to purchase, own, and operate,” said Andrew Hajek, 3DELRR program director for Raytheon’s Integrated Defense Systems business. “For example, as a DoD-recognized industry leader in GaN, Raytheon is able to capitalize on efficiencies and reduce costs in unique ways.”

More info: raytheon.com

TenCate Advanced Armor Launches Full Line of Body Armor

TenCate Advanced Armor North America in Newark, OH, has launched a new line of personal protection products, including two soft body armor materials, five soft body armor models, and 14 hard body armor plates. This full line of personal protection offers higher levels of life-saving capabilities than what is available on the market for law enforcement- and military operational environments.

“Our new line of personal protection product launch includes soft body armor materials, soft body armor inserts, and hard body armor plates. TenCate Aramid-Shield(TM) 1000 is a uni-directional aramid ballistic material. TenCate Pro-Tector 1000 is a woven aramid laminate multi-threat material. The TenCate Themis(TM) family of soft body armor inserts consists of five models that protect against ballistic, fragmentation, spike and edged blades. The TenCate Cratus(TM) family of hard body armor plates consists of 14 models that protect against the full range of handgun, edged blade, and rifle threats typically seen in law enforcement and military operational environments.

More info: tencate.com

General Dynamics Awarded $33 Million for U.S. Navy Aegis Illuminators

General Dynamics Armament and Technical Products was awarded a $32.6 million multi-year contract by the U.S. Navy for the production of MK82 gun and guided-missile directors and MK200 director controllers for six Aegis Weapon System ship sets.

The MK82 director, commanded by the MK200 controller, positions the fire control antenna to illuminate targets and provide guidance to missiles used for fleet defense from anti-ship missile threats and for ballistic missile defense. The Aegis Weapon System is the Navy’s most advanced and most capable integrated air and missile defense combat system.

Under this new contract the MK82 directors and MK200 director controllers will be installed on the Navy’s DDG 51 Arleigh Burke-class ships, starting with DDG 117. The delivery of all illuminator components will be completed by March 2018.

“The award of this competitive contract extends General Dynamics’ production of critical Aegis components over the next five years,” said Steve Elgin, vice president and general manager of armament systems. “The Aegis Weapon System provides the Navy with cutting-edge technology that will remain viable for decades to come.”

More info: generaldynamics.com
A Paradigm-shifting Capability
Forward-looking Infrared Moves to the Next Level

By Dr. Christina Bates, Strategy and Strategic Communications Specialist, PM, NV/RSTA

As DoD celebrates 50 years of FLIR, Project Manager Night Vision/Reconnaissance, Surveillance, and Target Acquisition, Army Program Executive Office for Intelligence, Electronic Warfare & Sensors is working to enhance “See Without Being Seen” mantra.

For centuries, man has leveraged the cover of darkness to conceal activities and maneuver without detection. As unstructured militia and, later, structured militaries became the most common means by which state actors defended themselves and waged war, darkness came to be seen as both a strategic advantage and an ever-present threat. World War II ushered in the first of several U.S. Army initiatives to achieve the ability to “see at night,” and, more important, to do so without being seen.

The earliest night vision technologies used near-infrared cathodes for illumination. While these technologies demonstrated the possibilities for ultimately achieving night vision, they were limited in range and left an unmistakable signature readily identified by the enemy. For the next 20 years, the focus remained on determining how to intensify the little light that is available at night. Then, in the 1960s, efforts shifted from light intensification to heat and thermal imagery—a shift that paved the way for the forward-looking infrared (FLIR) technology and proved pivotal in the Army’s ability to “own the night.”

The very first FLIRs, known as the first-generation FLIR (1GF), used cooled sensors to detect emissive thermal imagery. By the mid-1960s, the U.S. Air Force used these early FLIRs to help identify ammunition dumps, bases, and troop movements while flying missions over North Vietnam. While the 1GF represented a major technological breakthrough from the near-infrared cathodes of the 1940s and 1950s, their cost and size, weight, and power consumption significantly impeded their use and efficacy. Despite these limitations, the 1GF continued to be the Army’s primary night vision technology throughout the early 1990s.

The Second-Generation FLIR: The Advent of Horizontal Technology Integration

Lessons learned from Operations Desert Shield and Desert Storm in the early 1990s served as the impetus for the development of the second-generation FLIR (2GF). A clear need was identified for a new technology to provide combat troops with a clearer, more uniform view of the battlefield at longer ranges. This new technology (2GF) would ultimately reduce fratricide and improve probability of kill by providing twice the combat range and resolution of the 1GF and more sensitive FLIR performance in adverse weather conditions.

The 2GF Program was established in 1993 with two objectives: to enhance 2GF capabilities for the soldier and to achieve both an affordable and supportable 2GF system. While providing increased FLIR capability to the soldier was a massive task for the 2GF Program, it was not the most difficult task—doing so at an affordable and sustainable cost would necessitate a new approach to capability development, which came to be known as horizontal technology integration (HTI). Implementation of the HTI approach ultimately rested with the Product Manager, FLIR (now known as the Product Manager, Ground Sensors—PM GS—a subordinate command of the Project Manager, Night Vision/Reconnaissance, Surveillance, and Target Acquisition—PM NV/RSTA).

Under the traditional, stove-piped method of development, each platform (e.g., tank, fighting vehicle, etc.) procured its own FLIR system, resulting in a similar—but not identical—battlefield view among platforms. In contrast, the HTI approach would achieve the desired identical battlefield view for soldiers. To ensure success, PM GS instituted disciplined engineering strategies at program inception. These strategies were essential for managing the widespread disparity of requirements among the supported applications, which included the fire control of tube-launched, optically tracked, wire-guided (TOW)
missiles and the gun on the Bradley; the fire control of the Abrams main gun; and the passive, silent watch on the Long-Range Advanced Scout Surveillance System (LRAS3) and the Commander’s sights on both the Bradley and the Abrams.

The 2GF Program also required an unparalleled degree of collaboration and trust so that each Platform Manager would accept a new system developed by a separate product manager (i.e., PM GS). PM GS mitigated several of these and related challenges through a deliberate focus on inclusive integrated product teams (IPTs) and close partnerships across platform managers, industry, and the larger Acquisition Corps and Army.

The HTI approach, coupled with the vast improvements in the IGF technology, positioned the 2GF for success. Moreover, since its inception in 1998, the 2GF program has established an exceptional track record of cost reductions—including obsolescence redesigns and continuous production deliveries—achieved through government and industry partnerships.

The Improved FLIR (I-FLIR): Ensuring Technological Overmatch and Supremacy

In the mid-to-late 1990s, the 2GF represented the most advanced heat/thermal imagery technology. Today, there is a proliferation of FLIR technologies. This proliferation places the U.S. Army’s technological overmatch at serious risk. In response, PM GS is partnering closely with the Army’s Night Vision and Electronic Sensors Directorate (NVESD) and industry partners to develop the next generation of FLIR technology. Currently referred to as the I-FLIR, this new technology represents significant improvements over the 2GF. Specifically, the I-FLIR will comprise lighter, smaller FLIR systems that require less power and provide improved long-range identification to enable recognition of human activities in an urban environment. The I-FLIR will enable the U.S. Army to once again own the night.

More info: peoiews.apg.army.mil/nvrsta

Industry Spotlight: Lockheed Martin

By Gene Tener, Senior Fellow for Electro-optics

This is an exciting time for FLIR technology. The infrared industry has evolved from the days of a single material choice with 180 or fewer detector elements in the focal plane array (FPA). Now, FPAs have millions of detector elements with many material options. As many customers require more capability at a lower life-cycle cost, the trend is towards smaller pixels that reduce cost and allow the FPA to operate at higher temperatures, resulting in a longer system life, and with spectral agility to operate in multiple wave bands.

M-TADS/PNVS FLIR Technology

Lockheed Martin’s Modernized Target Acquisition Designation Sight/Pilot Night Vision Sensor (M-TADS/PNVS) provides Apache pilot’s with evolutionary FLIR technology for enhanced targeting and pilotage capability when conducting day-, night-, and/or adverse-weather missions. In 2005, the Legacy TADS/PNVS first-generation FLIR hardware was modernized using a field retrofit kit that was installed at the flight line. The modernization upgraded both the targeting and pilotage sensors with long-wave, high-definition FLIR based on the Standard Advanced Dewar Assembly I integrated detector cooler assembly and 21st-century digital electronics for enhanced image processing. The modernized FLIR sensors provide two times the performance and reliability of the legacy system.

The M-PNVS in the upper turret provides high-quality imagery on the pilot’s helmet-mounted display for safe nap-of-the-earth flight at night and in degraded visual flight environments. M-PNVS provides Apache pilot’s with a head-steered, 52-degree-wide field-of-view FLIR image. The lower M-TADS turret contains the targeting system, which has both day and night sensor assemblies. The targeting FLIR has three fields-of-view, a multi-target tracker, multiple-code laser spot tracking, and internal automated boresighting. The three fields of view include a wide-angle view for back-up pilotage, a medium field of view for target detection, and a magnified narrow field of view for target identification.

Sniper Advanced Targeting Pod (ATP) and F-35 Electro-optical Targeting System (EOTS)

The FLIR imaging sensor has evolved from a scanning linear array consisting of 180 detector elements used in the first-generation targeting pods, to the state-of-the-art staring FPA consisting of more than a million detector elements used in today’s Sniper Advanced Targeting Pod (ATP) and the F-35 Electro-Optical Targeting System (EOTS).

These high-density FPAs allow each detector element to represent a single pixel in the resulting FLIR imagery; as such, the staring FPA has greatly improved resolution, sensitivity, and signal-to-noise ratio performance characteristics.

In addition, advances in digital video processing provide real-time enhancements to the image displayed in the cockpit. Operationally, this allows the Sniper ATP to provide high-quality FLIR imagery to the aircrews, allowing them the capability to recognize and identify targets at significantly longer stand-off ranges.

FLIR systems continue to improve with the insertion of digital video interfaces and higher-contrast LCD displays. These are now in the integration phase and will eliminate noise sources from the current analog video implementation as well as provide larger, higher-resolution displays to the user, much like the HDTV improvements in commercial TV. Next-generation FLIR sensors will continue to improve resolution and frame rate, pushing the bandwidth requirements, and also improve sensitivity and multispectral capability. The multispectral capability will provide advantages for “seeing” under more adverse weather and atmospheric obscurants. These improvements will extend the Combat ID effectiveness of the overall system.

More info: lockheedmartin.com
DoD is working full reset of its older generation High Mobility Multi-Wheeled Vehicle (HMMWV) fleet while moving the next-generation Joint Light Tactical Vehicle (JLTV) toward full-rate platform production.

By Kevin Hunter, A&M Editor

HMMWV Sustainment: Ensuring Relevance for Tomorrow

DoD’s Joint High Mobility Multi-Wheeled Vehicle (HMMWV) sustainment modification initiative will improve the safety, reliability, durability, and mobility of the newest HMMWV Expanded-Capacity Vehicles (ECVs), extending projected platform service life to 2030.

The Sustainment Modification Initiative (SMI) will selectively insert combinations of commercially available automotive technologies on the ECV platform in order to provide the highest levels of affordable capability and utility, based upon incremental increases in performance corresponding to increases in estimated production, integration, and installation costs.

Depot-level Focus

“Although we are certainly proud of our achievement of recapitalizing 40 HMMWVs per day, we realize that we must continually look ahead to new and changing requirements as the Army charts a course to the future,” said COL Doyle Lassitter, Commander, Red River Army Depot (RRAD). “RRAD has the facilities and ability to surge to meet any and all future requirements including the Joint Light Tactical Vehicle (JLTV).”

RRAD has performed depot-level repairs in Iraq since the start of Operation Iraqi Freedom in 2003, providing 10/20 support to Army Installation Fort Bliss, TX. As a part of the Light Tactical Vehicle team, RRAD is continually working with all team members, including AM General and PD-LTV: Product Director – Light Tactical Vehicle, to be an active participant in the development of supportable characteristics to enhance the vehicle reliability and serviceability, building ease-of-maintenance without sacrificing survivability.

“We have consistently proven our capability to fluctuate with the demands of the Army through both successfully executed workload at the depot and deployed teams of Red River Army Depot civilians to both CONUS and OCONUS locations,” said Lassitter. “With our experienced workforce and fully facilitated operations, we remain the HMMWV provider of choice and the tactical wheeled vehicle Center of Industrial and Technical Excellence (CITE).”
ENGINEERED TO BE AS TOUGH AS THE WARFIGHTERS WHO RELY ON THEM.

Tomorrow’s High Mobility Multipurpose Wheeled Vehicle (HMMWV) fleet will be more maneuverable, durable and reliable than ever. Featuring Meritor® Defense’s ProTec™ High Mobility Independent Suspension Series 30 to increase gross vehicle weight capability up to 20,000 pounds, while providing better braking, stability and handling. It even bolts easily into existing HMMWV chassis, making for a suspension solution that’s as cost efficient as it is combat effective. It’s the future of combat-ready suspension technology, available today.

Watch the ProTec Series 30 in action at meritordefense.com.

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Industry Spotlight HMMWV

Textron M&LS

More Than Survivability
By Bill Kisiah, Vice President

Through four years of extensive government and private industry testing—including 11 tests at Aberdeen Test Center (ATC), MD—a team of Textron Marine & Land Systems (TM&LS) and Granite Tactical Vehicle has offered the Survivable Combat Tactical Vehicle (SCTV) crew capsule-equipped HMMWV as a means of enhanced crew protection from improvised explosive device (IED) attacks. The TM&LS/Granite team is installing its MECV-S protection system, a production-ready Technology Readiness Level 8 system, on two government-furnished HMMWVs and delivering them this summer to Aberdeen Proving Ground for IED testing.

“The Army is now, through its Modernized Expanded Capacity Vehicle-Survivability (MECV-S) program, seeking technical solutions to address current and future threats to its HMMWV tactical vehicle fleet through the use of scalable armor technologies,” said Bill Kisiah, Vice President, TM&LS. “We believe this formal government testing is critical to prove that the HMMWV is indeed survivable against these predominant threats.”

The Textron/Granite team recently delivered the first of two vehicles with its SCTV capsule for survivability testing under the U.S. Army MECV-S program. These SCTV-equipped vehicles include our latest improvements to enhance IED protection.

“Our monocoque capsule provides fully armored 360-degree crew protection and includes V-hull underbody protection,” said Kisiah.

The TM&LS/Granite vehicle protection system possesses a lower center of gravity than an up-armored HMMWV and is resistant to small arms fire, blasts, and the secondary effects of blasts such as fire, crushing, rollover, and collision. Besides MRAP-style survivability, the SCTV provides mobility and durability enhancements beyond what is offered by legacy HMMWV chassis. The SCTV has been driven more than 40,000 test miles.

“The fully upgraded SCTV still utilizes about 75 percent of legacy HMMWV parts, simplifying repair parts inventory and training requirements,” Kisiah said.

More info: textronmarineandland.com

Meritor Defense

Mobility at the Core
By Dave Damian, Director of Sales and Business Development

Development of the Meritor Defense Protec Series of high-mobility independent suspension (HMIS) systems began in 2004 for the Future Tactical Truck Systems Maneuver and Sustainment Vehicle (MSV). The Protec Series 30 suspension system was selected by two of the competing prime contractors during the JLTV’s technology development phase of the program, successfully accumulating over 100,000 miles during testing. Meritor Defense has delivered an additional 30 vehicle sets of Protec 30 suspensions in 2013 in preparation for further testing on the JLTV EMD Phase and for the HMMWV Sustainment program.

With HMMWV specific design efforts beginning in 2010, the Protec Series 30 system developed for that vehicle is arguably the most advanced and mature system in our product portfolio. Most subsystems in our HMMWV offering are TRL level 9 (in production), while the remaining subsystems are at TRL level 8

In addition to Light Tactical Vehicle development, Meritor Defense was selected to provide the Series 50 suspension system for upgrading over 2,000 BAE Caiman MRAP vehicles.

More info: meritordefense.com

AM General

Word from HMMWV Maker
By Jeff Adams, Executive Director, Global Communications & Marketing

AM General has been the primary supplier of parts to the U.S. Army HMMWV Recapitalization (Recap) Program, or SMI. The company has supplied parts for the recapitalization of tens of thousands of vehicles under DoD’s Expanded Capacity Vehicle (ECV) upgrade program.

“As reported, the Army and the Marine Corps have committed to utilize the HMMWV as their primary Light Tactical Vehicle through 2030,” said Jeff Adams, Executive Director for Global Communications and Marketing, AM General. “This commitment will require extensive sustainment parts support, recapitalization, and reset to keep the fleet mission capable operational.”

AM General has been recognized as having a unique ability to manage the large, complex supply chain of critical parts necessary for the recap program.

More info: amgeneral.com
PROVEN, TESTED
CREW PROTECTION

PRODUCTION-READY, TECHNOLOGY READINESS LEVEL 8 SYSTEM

Extensive government and industry tests show HMMWVs equipped with our lightweight Survivable Combat Tactical Vehicle™ (SCTV™) system protect crews from Improvised Explosive Devices as effectively as larger tactical wheeled vehicles. SCTV’s fully-armored monocoque v-hull capsule is resistant to small arms fire, blasts and secondary blast effects such as fire, crushing, rollover and collision. In addition to MRAP-style survivability, it delivers critical mobility and durability enhancements far beyond up-armed HMMWVs. Our innovative SCTV system replaces the crew compartment in a one-for-one exchange and is compatible with all HMMWVs in service, using 75 percent legacy parts to simplify parts inventory and training requirements.

It’s the right HMMWV crew protection solution, and it’s ready now.

For more about this vehicle solution, visit textronmarineandland.com under COMMANDO™ Utility vehicles.
Army Program Executive Office for Combat Systems & Combat Systems Support (PEO CS & CSS) is currently working through the delivery of 22 vehicles and six trailers from each EMD Phase-qualified vendor. All deliveries, as required, were made to the Army by the end of August 2013.

On 22 Aug 2012, the government awarded EMD phase contracts to Lockheed Martin, Oshkosh Defense, and AM General. The vendors were required to deliver 22 prototype vehicles and associated trailers by 22 August 2013, which each completed on schedule last month. Addressing a critical capability gap in today’s fleets, this important Army and Marine Corps modernization program will then enter a rigorous EMD phase government testing period, including live-fire, performance, suitability, reliability and maintenance, and operational testing. Testing will last into early fiscal year 2015, after which we anticipate Milestone C and Low Rate Initial Production contract award decisions.

“The program is well structured with stable requirements, costs, and development timelines and represents a leap-ahead in networked, protected mobility while effectively keeping cost and schedule on track,” said Michael Clow, Army spokesperson for JLTV. “The Joint Light Tactical Vehicle program continues to execute its successful Engineering and Manufacturing Development (EMD) phase on schedule, making progress to restore a balance of payload, performance, and protection in Army and Marine Corps light tactical wheeled vehicle fleets.”

A Joint Initiative

The JLTV program, a joint effort by the Army and Marine Corps, addresses gaps in the services’ light tactical vehicle fleets. The Marine Corps portion of the program is managed by PEO LS and supported by Marine Corps Systems Command.

“We cannot do this without the Marine Corps,” said Army COL John Cavedo, JLTV joint project manager. “It is definitely a joint effort.”

According to the joint program office, the requirement for new vehicles came about because recent combat experiences drove a need to substantially increase vehicle protection, thus creating an imbalance in tactical vehicle payload, performance, and protection.

Officials said the JLTV program is designed to restore that balance. It also meets the unique requirements of both services while fielding the first vehicle purpose-built to host emerging network capabilities. “The light tactical vehicle capability gap will be closed with the JLTV,” Cavedo said.

EMD Plus One Year

Closing that gap began in August 2012 when the three vendors, AM General, Lockheed Martin, and Oshkosh Defense, received engineering and manufacturing development contracts. The vendors are on track to deliver a total of 66 vehicles to undergo a government test phase, which began last month with the initial delivery of 22 vehicles by each vendor.

“This has been a fierce competition with these three vendors,” Cavedo said. “The JLTV prototype vehicles here at TDSA are part of the 22 vehicles each vendor delivered last month. These deliveries will be followed by 14 months of intensive testing.”

“We need a light tactical vehicle, employable in a forward-deployed expeditionary environment, [that] can also take a serious hit like a Mine-Resistant Ambush Protected (MRAP) vehicle and bring our warfighters back alive, mission accomplished,” said Lt. Col. Michael Burks, Joint Light Tactical Vehicle military deputy, USMC. “That’s the JLTV, where it successfully targets and overcomes the critical gap in light tactical vehicle capabilities.”

Burks added that the JLTV stands in the capability “gap” between MRAPs and HMMWVs. He has explained to Army and Marine Corps leadership that the JLTV will fill this gap in both services’ light tactical vehicle fleets.
With last month’s delivery of 22 prototype platforms to the Army from three EMD Phase contract vendors, DoD’s Joint Light Tactical Vehicle (JLTV) program now moves into a 14-month Test Phase evaluation period. A&M asked each competitor to discuss what sets their offering apart in this fierce competition.

**Lockheed Martin**

Lockheed Martin put more than 160,000 test miles on its JLTV prototypes in the technology demonstration phase of the program before winning a share of the engineering and manufacturing development contract last August. The company has since evolved its vehicle into a significantly lighter, more blast-resistant design with additional improvements in mobility, power generation, and fuel efficiency.

“In our effort to provide the Marine Corps and the Army with the most capable vehicle at an affordable price, we applied our proven systems engineering to provide a ‘total solution,’” said Scott Greene, Vice President of Ground Vehicles for Lockheed Martin Missiles and Fire Control. “It balances the ‘iron triangle’ of protection, performance, and payload while achieving cost reductions.”

“Our EMD vehicles already are demonstrating exceptional off-road performance and high reliability,” Greene said. “In June, the Lockheed Martin JLTV navigated the Quantico Severe Off-Road Track (SORT) for two weeks, with multiple runs each day, without a single significant maintenance issue. In the meantime, we are demonstrating superior fuel efficiency and MRAP levels of crew protection. We are confident that the vehicles we deliver to the Marines and the Army will protect the warfighters, restore mobility to get them where they need to go over difficult terrain, and deliver lower operations and sustainment costs. With this vehicle, Marines and soldiers also will get exportable power-generation that has substantial margin for future growth.”

“We have leveraged the manufacturing, systems engineering, and integration expertise of the JLTV Team and have built upon our successful results in the technology demonstration phase to provide the best-value-, most capable combat tactical vehicle at an affordable price,” noted Greene.

More info: lockheedmartin.com

**AM General**

Over the past 50 years, AM General has manufactured more than 1.5 million tactical ground vehicles for military application. BRV-O features a crew capsule of modular armor design currently undergoing government blast testing. The BRV-O design can be readily adapted to future changes in U.S. military missions, enemy threats, and new protection technologies as they emerge. BRV-O also features AM General’s lightweight, fuel-efficient, and high-performance engine and transmission powertrain; a self-leveling suspension system; electronic braking and stability control; a C4ISR backbone with open-standard networked architecture and clustered super-computing power; and other advanced components.

“BRV-O represents more than a decade of AM General investment in research, development, and testing for this next-generation vehicle,” said AM General Executive Vice President and Chief Operating Officer John C. Ulrich. “It was less than one year ago that the government selected the company’s proposal for a $64.5 million JLTV EMD contract to build the 22 vehicles for government testing.”

The BRV-O is designed on a common automotive platform that will be delivered as either a four- or two-seat variant. “From a commonality approach—not only in terms hull design but in terms of parts, armor packaging, and command and control capabilities—BRV-O offers an environment of interchangeable functionality that will greatly benefit users in keeping vehicle on mission where and when it’s called upon,” said Chris Vanslager, Vice President of Program Management and Business Development, AM General. “Regardless of variant, we’ve designed in 100 percent commonality of chassis and crew
cabin systems to provide warfighters with fully integrated situational awareness, on-demand critical diagnostics information, advanced vehicle suspension, transmission and engine systems, as well as scalable, modular kitted armor kits to enable mission success across the full spectrum of military operations.

More info: amgeneral.com

Oshkosh Defense

The Oshkosh Light Combat Tactical All-Terrain Vehicle (L-ATV) is our solution for the JLTV program. Oshkosh engineers developed the L-ATV across six vehicle generations, evolving the vehicle design over several years based upon extensive testing and updated government requirements. Today, our L-ATV meets or exceeds current JLTV requirements, has room for growth to meet changing operational needs, and is ready for production.

“Every part of the Oshkosh L-ATV is designed to deliver a new generation of performance, with special emphasis on crew protection and mobility,” said John Bryant, Senior Vice President of Defense Programs, Oshkosh Defense. “During the development of the L-ATV, our engineers extensively analyzed a wide range of threat events—from IEDs to aerial attacks—to develop a light vehicle that incorporates state-of-the-art components into a fully integrated survivability solution.” The L-ATV’s scalable crew protection system can accept multiple armor configurations for protection against a range of threat levels while delivering unsurpassed off-road mobility.

“Oshkosh challenged our engineers to design a next-generation independent suspension system for the L-ATV to support missions in any terrain, on any continent,” indicated Bryant. As a result, the L-ATV features the new TAK-4i intelligent independent suspension system, which has demonstrated unprecedented levels of ride quality, maneuverability, and off-road performance in testing performed on the most challenging terrain.

In addition to delivering exceptional survivability and mobility, Oshkosh also considers today’s budgetary environment, both acquisition and life-cycle costs, to be critically important. “The L-ATV was designed with manufacturability, reliability, and serviceability in mind to ensure it meets cost targets while providing a robust protected mobility solution,” noted Bryant.

More info: oshkoshdefense.com
Taking the Leap

First-time armor producer wins a major contract
By George Jagels

In March, Fidelity Technologies Corporation of Reading, PA, was awarded a contract to produce add-on armor (B-Kits) for the common crew cab on the Heavy Expanded Mobility Tactical Truck (HEMTT) family of vehicles; a specific kit for the Palletized Load System (M1075 A1); the Tanker Armor Module (TAM) for the HEMTT Tanker (M978 A4); and for the M915 A5 line haul truck for Project Manager Heavy Tactical Vehicles. As a company without a history of armor production, the complexity and variability of the armor kits—as well as the scale and weight of the armor plate and ballistic glass—necessitated a scaling up of processes and infrastructure at Fidelity’s Reading-based manufacturing facility. Since the contract’s award, Fidelity has established a modular production line that can produce any mix of the armor packages based upon the customer’s requirements.

Meeting these requirements is no simple feat, especially given the variety of vehicles involved. Applying LEAN, single-piece flow production methodology, Fidelity’s state-of-the-art production line can handle and manipulate the large, heavy components that comprise the armor kits. Fidelity has also established a system of mobile work cells that can be quickly adapted to the changing needs of the military customer. By working with established suppliers within the armor industry, Fidelity has built a team capable of producing and packaging complex armor systems for a variety of vehicle platforms.

“It is Fidelity’s goal to produce quality armor kits that exceed our customers’ expectations and help to protect our warfighters from the evolving threats inherent to the asymmetric nature in the current theater of operations,” said Eric Kemner, Program Manager, Military & Aerospace, at Fidelity.

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A&M: Since taking command of MCoE in June 2012, what changes have you made at the Center?

MG McMaster: I wouldn’t say that we’ve made a lot of changes at the Maneuver Center, but we have continued the great work that was going on here already. In general, this work was an effort to institutionalize the lessons of the last 12 years of combat and make a grounded projection into the future to ensure that our maneuver forces are prepared to fight and win in future conflicts as part of combined arms and joint and multi-national teams.

In this respect, we are progressing in four key areas: leader development and education, training, doctrine, and capabilities development.
We have modified a great deal of our curriculum so that the MCoE can enable maneuver leaders to make decisions and understand, visualize, describe, direct, lead, and assess operations in complex environments and against determined enemies.

Army (army.mil/mssp), the program gives maneuver leaders an opportunity to continue their education in a networked dialogue with peers and mentors. The self-study program consists of books, articles, doctrine, films, lectures, and practical application exercises to educate maneuver leaders about the nature and character of war, as well as their responsibilities to prepare their Soldiers for combat and lead them in battle. More than just a reading list, the Self Study Program provides a guide and a framework for further study—to include social media-facilitated discussions and debates—that will allow maneuver leaders additional opportunities to reflect and contextualize their experiences in institutional courses as well as operational assignments.

We are doing all we can to ensure that our leaders are able to understand the complex human and political dynamics that will define future conflict. Our leaders must be capable of visualizing future battles in the context of their mission as well as terrain, the enemy, and civilian populations. Enabling our leaders to do this, in close cooperation with multinational and indigenous forces, is absolutely critical to ensure that our future forces are able to seize, retain, and exploit the initiative against a broad range of potential enemies and adversaries.

**Training**

We are also incorporating innovative techniques to make our training more effective. Some of our best innovations in this area involve increasing the rigor of our courses: We are challenging our Soldiers to develop the competence and confidence to fight and win in combat. For example, the Infantry Officer Basic Course and the Noncommissioned Officer Academy (NCOA) recently refined their course outcomes to align with the MLDS and have increased their field training, incorporated the ground-breaking Advanced Situational Awareness Training and increased training on heavy weapons and demolitions.

Likewise, courses such as the Army Reconnaissance Course, the Armor Officer Basic Course, and the Reconnaissance and Surveillance Leader’s Course have incorporated the Adaptive Soldier Leader Training and Education model, which allows Soldiers and leaders to refine fundamental warfighting skills while simultaneously developing complex problem-solving techniques in adaptive, uncertain, and changing environments. At the same time, we are also focusing on the human and psychological dimensions of combat under a program called Advanced Situational Awareness Training.

**Doctrine**

We are also revising all of our brigade-level and below fighting doctrine. In general terms, our warfighting doctrine is absolutely critical to the entire maneuver force. Doctrine does many things—including guiding training and leader development as well as informing our organizational structure—but its most basic function is to describe how we will fight—and how we think about—future wars.

We are seeking to incorporate the lessons of recent conflict as well as a recognition of the continuities of war—namely, its political, human, and uncertain nature—into our doctrinal revision efforts. As a result, we are emphasizing understanding the enemy, potential threats, and adversaries that maneuver forces will face in the operating environment of the future. We know, for example, we have to be prepared to fight and win against a broad range of enemy organizations. These include not only the fielded forces of nation-states but also what some refer to as irregular forces and hybrid threats. Other areas of emphasis include the importance of effective reconnaissance and security operations and how our brigade combat teams (BCTs) can influence actors throughout the operational environment to consolidate tactical gains into strategic and political successes.

**Capabilities Development**

We are focusing on future capabilities developments that provide conceptual and materiel solutions to our current challenges and address what we may face in future combat. Specifically, we have been looking at ways to achieve overmatch at the lowest tactical level: the squad. Through Squad: Foundation of the Decisive Force initiative, we are bringing together key players from across the Army and industry to come up with solutions that will ensure our soldiers are never engaged in a fair fight. At the same time, we are also working closely with the acquisition community to modernize our combat vehicles. The top priority in our vehicle modernization effort is to ensure all our formations are able to employ an appropriate combination of mobile, protected, precision firepower—in the form of the Ground Combat Vehicle for our Airborne BCTs, increased firepower in our Stryker BCTs, and a light tank for our Infantry BCTs.

At the same time, we are also refining the movement and maneuver warfighting concept to institutionalize and consolidate lessons learned from the past 12 years of combat. Ultimately, our concepts will inform doctrine and guide the design of the Army in the future in order to ensure that in our next fight we will be able to employ cohesive units skilled in combined-arms air-ground operations that can achieve sustainable outcomes consistent with our strategic goals and worthy of the sacrifices our Soldiers make in combat.

**A&M: Why did you decide to reorganize the current Infantry and Armor School structures?**

MG McMaster: The 2005 Base Realignment and Closure Law did two things: It directed the Armor School to move thousands of Soldiers and civilians from Fort Knox, KY, to the Maneuver Center of Excellence at Fort Benning, GA, and it presented a great opportunity to improve the combined arms training for our Army’s maneuver force.
training exercises with tanks, and armor students are working with our basic training efforts. Infantry students are conducting applies to our NCO leadership development courses in the NCOA are training with elements from each others' branches. The same new lieutenants in the armor and infantry basic officer courses of professionalism and combined arms competencies. Already, our reorganize to a functional brigade alignment and to shape our the operational force. With that in mind, it just made sense to provide a better connection with other centers of excellence and sharing ideas and best practices across the organization, and also realized that we could continue to adapt and innovate by combined arms. And with a refined MCoE organization, we recognize an opportunity to preserve our ability to train branch decentralization mission-type orders. At the same time, we also recognized an opportunity to preserve our ability to train branch fundamentals while increasing our leaders’ ability to integrate combined arms. And with a refined MCoE organization, we also realized that we could continue to adapt and innovate by sharing ideas and best practices across the organization, and provide a better connection with other centers of excellence and the operational force. With that in mind, it just made sense to reorganize to a functional brigade alignment and to shape our training by using the tenets of the university system.

The MCoE reorganization will also reinforce the commonalities between the infantry and armor communities—a common culture of professionalism and combined arms competencies. Already, our new lieutenants in the armor and infantry basic officer courses are training with elements from each others’ branches. The same applies to our NCO leadership development courses in the NCOA and our basic training efforts. Infantry students are conducting training exercises with tanks, and armor students are working with dismounted elements and aviation support. This training is vital to the readiness of our Maneuver Force. Since we will fight together—and not as separate entities—on the battlefields of tomorrow, it only makes sense to train together today. The more exposure we can give our soldiers and leaders to working across branches before they have to do it downrange, the better. In this way, our reorganization will better facilitate our objective to develop agile, adaptive leaders and improve the combat effectiveness of the maneuver force.

**A&M: How will the new structure affect instructors and cadre?**

**MG McMaster:** The new structure will make it easier for instructors to share and borrow ideas between courses. This is important because as we considered our idealized vision of future conflict—conflict defined by uncertainty, incomplete information, and highly complex environments—we realized that we had to replicate the conditions of future conflict in our training and leader development and education. As a result, our instructors have had to develop a higher degree of competence in a broad range of skills.

The MCoE continues to improve the quality, selection, training, and education of our instructors through the Instructor Professional Development Program. This program does four things: improves the quality of instruction we offer at the MCoE; provides our officer and NCO instructors needed skills that they can apply across their military careers; offers educational incentives to our instructors, so we can attract the best talent to the MCoE; and develops key skills that instructors can use to ultimately ease their transition to civilian careers upon the completion of their military service. At the same time, instructors in the many courses we offer are encouraged to enroll in college courses. And the Directorate of Training, which oversees many of our programs of instruction including the Maneuver Captains Career Course (MCCC), provides opportunities for our MCCC small-group instructors to earn a master’s degree.

**A&M: Will the emphasis on integrating combined arms into the MCoE’s training mean that armor and infantry will be merged?**

**MG McMaster:** Not at all. Combined arms revolves around the basic idea that different “arms”—the combat capabilities of different branches—maximize the combat effectiveness of each other when used in concert. Combined arms teams employ combinations of infantry, scouts, mobile protected firepower, mobility and counter-mobility assets, aviation, and joint and interagency capabilities to throw enemy organizations off balance with powerful blows from unexpected directions, follow up rapidly to prevent recovery, and continue operations to translate tactical success into strategic gains. In other words, the complementary capabilities of different branches provide a much greater effect when they operate together than any one branch or arm could achieve by itself.
Doctrine does many things—including guiding training and leader development as well as informing our organizational structure—but its most basic function is to describe how we will fight—and how we think about—future wars.

Thus, infantry, armor, and cavalry cultures and competencies are and will continue to be an important part of our Army’s combat effectiveness and are necessary sub-components to our increased emphasis on developing combined arms capabilities. When trained together, the complimentary capabilities of Infantry, Armor, and Cavalry produce an integrated system—a cohesive team—that is able to maximize strengths and minimize vulnerabilities.

A&M: In this era of defense funding austerity, what have you done at Fort Benning to lower the cost of training?

MG McMaster: First, the MCoE has already reduced many of the contracts we use in order to generate $19.7 million in savings. More importantly, however, the MCoE is approaching how we spend our budgeted funds from a new perspective; we are no longer operating under the old assumption and culture that we have to spend all of our budgeted funds. Instead, we are employing a funding board to look for efficiencies in our systems and procedures and identify additional savings that we can return back to TRADOC and the Army. To date, that funding board has identified over $5 million in excess funding that we have been able to return to TRADOC. With this new perspective and through the hard work and significant efforts of a very talented team, we have saved over $23 million as we continue to identify efficiencies and savings without degrading the standards of the MCoE’s world-class training.

More info: www.benning.army.mil/mcoe
Warfighters Gear Guide

The equipment that warfighters require changes constantly. However, the needs for combat have remained quite similar for ages: Warriors have long needed medical supplies, protection from enemy weapons and the elements, packs to haul their gear, a way to see the enemy first, knowledge of the terrain and ways to communicate, and energy for the body and kit. We hope the Warfighters Gear Guide provides insights into valuable equipment in all of these essential categories.

H&H Medical Corporation

**Tension Pneumothorax Needle**
The H&H Tension Pneumothorax Needle is a 14-gauge-by-3.25-inch needle and catheter for use in the managing tension pneumothorax events. Made in the U.S., it comes with a hard case to protection against damage and harsh environmental conditions.

**Chest Dressings**
H&H Associates’ line of chest dressings are the choice of U.S. and international militaries for tactical products to treat chest wounds. The Bolin Chest Seal valved dressing and Wound Seal Kit occlusive dressing use H&H’s aggressive hydrogel and patented designs to provide immediate care and pneumothorax relief. Sterile and ruggedly packaged, both are available individually or in kits such as the Chest Wound Kit, which includes the Tension Pneumothorax Needle.

**Chest Tube Insertion Kit**
The H&H Emergency Chest Tube Insertion Kit contains the tools needed in emergency situations to perform a chest intubation: gauze, forceps, scalpel, an Argyle Chest Tube and Heimlich Drain Valve, sutures, and petrolatum gauze. Vacuum-sealed, sterile, and waterproof, the package can be stored in any major trauma response or lifesaver kit.

**Trauma Compression Bandages**
H&H’s combat-proven sterile compression bandages give first responders products for any hemorrhaging emergency. The bandages fit both small personal kits and large field packs. Sizes include 4” pads on the Thin Cinch and Thin H bandages, 8” pads on the popular H-Bandage and Cinch Tight, and 12” pads on the Big Cinch abdominal dressing. These bandages help first responders treat major trauma injuries quickly.

**Emergency Cricothyrotomy Kit**
The H&H Emergency Cricothyrotomy Kit contains the tools needed in emergency situations to perform a cricothyrotomy, including one #10 scalpel, one 6 mm endotracheal tube, one 10cc syringe, one curved Crile hemostat, and one News Tracheal Hook. It is one of many custom kits designed by H&H with the first responder in mind.

More info: gohandh.com or email info@gohandh.com
**ArmorWorks Protective Undergarment**

ArmorWorks’ Protective Undergarment (PUGZ) is designed to protect soldiers from IED blasts without restricting their freedom of movement. According to ArmorWorks, the garment protects the pelvic region and inner thigh against “small particle debris and fragmentation threats,” helping to secure the femoral arteries. The PUGZ also features breathable materials that resist moisture buildup and reduce chafing.

More info: armorworks.com

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**ESS Land Ops Ballistic Goggles**

The ESS Land Ops sport excellent fog resistance, particle filtration, and comfort. With their spacious frame, the goggles have been authorized by the U.S. Army for use over prescription eyewear. The Land Ops, according to ESS, “[feature] a full-perimeter ventilation and filtration system that ventilates humid air while filtering out airborne particles, air blasts, and splashes.” The company test showed that the Land Ops’ extra-thick polycarbonate lens resists impacts—a 12-gauge shotgun firing #6-shot from 10 meters dimpled but did not penetrate the lenses.

More info: esseyepro.com

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**HighCom Security Striker ACH-3A**

Designed with the most up-to-date military specs, the Striker ACH-3A features a multi-layered advanced composite shell well suited to protect against handgun ammunition (tested against .44 Magnum and 9mm rounds). The helmet’s reduced profile, HighCom notes, improves situational awareness while accommodating a range of goggles and comms devices. The Striker weighs between 2.8 and 3.3 pounds.

More info: highcomsecurity.com

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**KDH Defense Systems IMTV**

The Marine Corps’ new vest, the Improved Modular Tactical Vest (IMTV), provides significant side, groin, lower back, and neck/throat protection in addition to comms routing channels and numerous MOLLE attachment points. KDH says that the system has “more efficient weight distribution, [and] the IMTV provides increased protection to the lateral torso, with less exposed area on the side and under the arms.” Built to allow the wearer to add or subtract weight depending on the mission, the IMTV has a rifle bolster, an improved closure strap system, two-point quick release system, and reduced bulk collar.

More info: kdhdefensesystems.com

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**Infidel Body Armor Plates**

Infidel offers 10”x12” plates (individually or in a front-and-back set) and a set of two six-inch side plates, both of which are likely to fit most vests. The company says its plates are capable of stopping all manner of ammunition—they even claim that semiarmor piercing ammo “barely dented it” in tests. The plates are formed from 1/4” AR500 hardened steel and laser with a 20-degree bend that conforms to the human torso. After the preparing the metal, Infidel adds a special 1/4” polymer coating that serves to trap bullet fragments.

More info: infidelbodyarmor.com

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The low-profile MD1250 personal flotation device (PFD) provides flotation capability with minimum bulk or interference using separate independently operated left and right-side pouches. Each unit provides 35 pounds of buoyancy for a combined 70 pounds of buoyancy and can be worn on a standard or padded LE belt or be attached directly to PALS webbing on MOLLE vests.

More info: mustangsurvival.com/military/sea or call 360-676-1782

Crye Precision G3 All-Weather Combat Shirt and Pants
These made-to-order garments are based on the needs of the warfighter. The shirt features an advanced wicking-, midweight-, flame-resistant knit torso along with stretch laminate sleeves that, according to Crye, provide “a warmer base than our standard” shirt, all the while allowing for significant ventilation on demand. It also has places to insert elbow pads and a “stretch woven upper back coverage for added weather protection.”

The Combat Pants are also treated with NanoSTX for extreme weather resistance. Each cargo pocket conceals a water bottle/magazine stabilizer. There is also a dedicated knife/light holder that does not inhibit pocket access.

More info: cryeprecision.com

Mustang Survival Sentinel Series Tactical Operations Dry Suit (MSD674vTO)
The MSD674vTO is a waterproof, breathable constant-wear dry suit ideal for users engaged in potentially hostile military and law enforcement maritime operations. It was specifically designed with feedback from Naval Special Warfare, select U.S. federal tactical units, and state and local police SWAT teams. The result is a durable, lighter, better-fitting dry suit with features found on industry-leading combat and tactical uniforms.

More info: mustangsurvival.com/military/sea or call 360-676-1782

Tactical Tailor Phantom Trekker SBR
With the increase of operations where a low profile is a must, the Phantom Trekker SBR bag has been designed to look like a traditional large-size hiking backpack and allows you to carry your rifle in a near ready state without announcing it to the world. Designed to carry a 10.5” AR-style rifle, it can accommodate a variety of different weapon platforms, from collapsible stock AKs to SCARs—even a 16” AR can be securely carried broken down.

More info: tacticaltailor.com or call 253-984-7854
Leupold’s Mark 6 line has captured the attention of the U.S. military and competitive shooters everywhere. The Mark 6 3-18x44mm is less than 12 inches long, has a powerful 6x zoom range that provides an expansive field of view and rapid target acquisition at lower magnifications, and features outstanding long-range target engagement at higher powers. Reticle options include the new CMR-W 7.62, which enables both speed and long-range precision for shooters using 7.62 carbines and other battle/patrol rifles. “Our new Mark 6 3-18x44mm riflescope sets a new benchmark for size and performance. It’s all about smaller, lighter, faster with this scope,” said Kevin Trepa, vice president, tactical division, Leupold & Stevens, Inc. Supporting the troops and law enforcement everywhere, Leupold offers a discount program to individual active military and law enforcement.

More info: leupold.com/fed-mil-program or email tacticaloptics@leupold.com

Nivisys TAWS Series
The TAWS Series of dedicated thermal weapon sights from Nivisys provides an extremely rugged, compact, and lightweight thermal imaging package for detection and targeting during night and adverse weather conditions. The sights are easy to operate with simple and intuitive controls and range from medium range- to extended-range weapon sights. When configured with a 320 x 240 (17µm) VOx thermal detector, a system can provide detect human targets at greater than 2500m.

More info: nivisys.com

Armasight Zeus Sights
Armasight has introduced its most technologically advanced family of Zeus Thermal Imaging Weapon Sights to the law enforcement and military markets. An uncooled long-wave infrared weapon sight intended for 24/7 day and night engagements without the need to remove the scope from the rifle and with many features and unique user selection modes, the Zeus also allows operators to detect targets by cutting through snow, dust, smoke, fog, haze, and other atmospheric obscurants.

More info: armasight.com
Suunto Ambit2
The new Ambit includes the original’s popular functions—such as route navigation, barometric information, an altimeter with FusedAlti, and a 3D compass—and also adds sport-specific features for backpackers as well as those in rigorous training.
More info: suunto.com

Surefire 2211 WristLight
Featuring a high-performance LED and a special optic that discharges a 200-lumen beam with push of a button, the ambidextrous SureFire 2111 Wristlight provides enough light to overpower the enemy’s vision and evaluate threats in close quarters. The lightweight aerospace-aluminum device straps to the wrist via an adjustable nylon band and is powered by a rechargeable lithium-ion battery. Designed with feedback from active-duty cops, the Wristlight can also serve as a handgun light.
More info: surefire.com

Panasonic Toughbook H2 handheld tablet PC
Panasonic’s rugged Toughbook H2 handheld tablet PC is purpose-built for field applications, featuring a sealed all-weather design, a third-generation Intel Core i5 vPro processor, a 10.1” sunlight-viewable LED screen, and IP65- and MIL-STD-810G-certified durability. It also features hot-swappable twin batteries; USB-, serial-, and Ethernet ports; and optional integrated barcode and SmartCard readers. The Toughbook H2 handheld tablet PC is the ideal choice for today’s modern warfighters.
More info: panasonic.com/business/toughbook

Lumus designs and manufactures revolutionary see-through wearable displays. Through its ultra-thin patented LOE lens, Lumus provides large, high-resolution, full-color images over the wearer’s field of view, even in daylight. Already field-proven for air combat and recently selected for the Air Soldier helicopter program, Lumus’ transparent display can now provide the following to ground soldiers:
True Augmented Reality: Unobtrusive overlay of info over the wearer’s real world view for navigation, weapons targeting, ground target coordination, friendly force tracking, intuitive sniper detection
Small form factor, low power consumption: Systems as light as 11 grams and running on 200mW
Wearable computing: High resolution to enable detailed view of mission critical info
More info: lumus-optical.com
**Alta Devices**

Alta Devices enables high-output mobile power with flexible military charging mats. The 10W mat by Alta can produce up to 60 Wh per day in strong solar climates. Its flexible cells are robust and rugged, capable of surviving both harsh environments (temperature tested from -75 to +90°C) and tough handling. The mat, which is compliant to MIL-810-G specifications for temperature, humidity, shock, and other environmental stresses, features world-record cell and module efficiencies as well as low temperature coefficients and high sensitivity to low light to generate unsurpassed real-world performance.

More info: altadevices.com

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**Protonex SPM-612**

The Squad Power Manager (SPM) dramatically reduces the number and variety of batteries needed by today’s dismounted warfighter, while actively monitoring and managing power usage to assure mission success. By combining advances in ultra-high efficiency power conversion, equipment power management, and energy-harvesting technology, the SPM offers a lightweight, compact, and rugged intelligent power management solution designed to withstand harsh operating conditions. The SPM can manage and prioritize battery usage, power man-packable gear, recharge batteries, optimize solar/alternative power sources, monitor power sources and loads, and provide graphical display to show power trends.

More info: protonex.com/defense

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**Ultralife**

Ultralife’s rechargeable Conformal Battery fits right onto the soldier. Designed for MIL-STD-810 and EMI Compliance per MIL-STD-461E, the wearable battery—housed in a Noryl thermoplastic case—is easily concealed and about 5/8” thick. This lightweight, rugged power source also features an integrated state-of-charge indicator and internal protection circuitry, weighs 2.1 pounds, and offers a voltage range of 12.0–16.8V.

More info: ultralifecorporation.com

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**Cera Products**

Cera Products produces the most advanced rehydration drinks available. CeraSport, a high-performance hydration drink series, and CeraLyte, a medical rehydration product that prevents serious dehydration and the need for an I.V., have been scientifically developed and used by U.S. troops both in the field and in field hospitals. All products have NSNs, Class VIII & I certifications. GSA/FSS pricing available; government credit cards accepted.

More info: ceraproductsinc.com

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**BCB’s Chilly**

In hot, dry conditions, water in hydration packs used by soldiers can reach extreme temperatures. Warm water is unpalatable, which discourages essential regular water intake, and the resulting dehydration can lead to heat-stress-related injuries. BCB’s Chilly personal water cooler solves this problem by cleverly using the power of evaporation. Water passes through a series of cooling fins that use microscopic holes that allow three percent of the water to seep onto the wicking cloth that creates a cooling effect. It’s an effective, easy-to-use water cooling system that provides a supply of cool water without the use of batteries. The Chilly can reduce the temperature of a soldier’s drinking water by up to 25 degrees Celsius (45 degrees Fahrenheit).

More info: goodkit.co.uk/product/CHILLY-Water-Cooler
The JOCOTAS Executive Secretary and the Technical Working Group (TWG) Chairs are working on three efforts to keep our community informed and our industry and academic partners up to speed on the latest shelter developments.

- We will seek opportunities to update the broader shelter community by submitting multiple articles on shelter-world developments to our media partners.
- We will hold the 2013 Fall Government JOCOTAS Joint Working Group (JWG) meeting at Natick using a combination of direct attendance and video teleconferencing.
- We will investigate nontraditional venues for a spring 2014 meeting with industry ranging from webcast to industry sponsorship.

**Direction of Shelter Development Activities**

As we close out operations in Southwest Asia, the military is beginning to realign for a tilt towards the Asia Pacific (A/P). The ongoing unrest in northern and central Africa also cannot be ignored. Six months after President Obama announced the new focus for military operations, I began researching the topic as a potential leading indicator for new mission requirements. I built a database of articles focused on developing trend lines using...
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open-source documents. The data included 250 articles, maps, photos, and illustrations. A key feature of note is that both the A/P and Africa areas include tropical conditions not seen by U.S. forces since Vietnam, and this will impact a military force that for over 12 years has fought primarily in a relatively dry environment. The A/P realm consists of four thrusts: basing agreements, establishment of early warning radar systems, low-level sparing between regional players, and provocations from North Korea. On 17 December 2012, the Army Times identified eight exercises involving U.S. Forces in the Asia Pacific rim, many of which will be joint in nature.

From my research, it was clear that Africa will be a location of future conflict. Contributing factors include the Africanization of the Al Qaeda movement and rise of Boko Haram, Al-Qaeda in the Islamic Maghreb, Ansar al Shariah, M23, and al Moutalimin—terrorist groups that have wreaked havoc across fourteen countries, culminating with assaults on the U.S. Consulate in Benghazi, Libya, and a natural gas operation located at Amenas, Algeria. Based on open-source data, we are currently operating in at least two of these countries at a low level.

**Supporting Science and Technology Efforts**

In 2008, the U.S. Army Natick Soldier Research, Development, and Engineering Center (NSRDEC) asked for senior leadership authorization to reprogram internal science and technology funds to formally establish a shelter tech base project. Beginning in fiscal year 2012, the VT4/5 (6.2/6.3) project was initiated under the leadership of NSRDEC Technical Director Dr. Jack Obusek. Expeditionary Basing Directorate staff members Amy Soo Klopotoski and Jean Hampel established additional supporting programs under the Army Rapid Innovation Fund (RIF), OSD’s Operational Energy Improvement Fund (OEIF), and the Small Business Innovative Research (SBIR) program. The combined funding of these programs in fiscal year 2013 to date is $9.6 million.

According to Rod Fisher, the lead Expeditionary Modernization Engineer at the Air Force Civil Engineer Center (AFCEC), the Air Force is also actively working this area. The AFCEC and Air Force Research Lab (AFRL) will investigate technologies to improve energy efficiency of the medium and large shelters used in expeditionary settings for maintenance, supply, storage, and other uses. Some of the technologies being tested include coating the outside of the tents with low emissivity coatings to limit solar loading and the development of adjustable liners that they can drop down and reduce the ceiling height in the shelters, thereby limiting the volume of air needing to be cooled and creating an “attic” that can be vented. The goal is to maximize energy security for Basic Expeditionary Airfield Resources (BEAR) assets in the field while reducing energy consumption.

**Near Term Sustainment Solutions from the Services**

PM Force Sustainment Systems (PM FSS), led by LTC Ross Poppenberger and Mike Hope, is NSRDEC’s key shelter tech transition partner. They manage Force Provider (FP), the Army’s
premiere base camp program. FP is a totally contained 600 Warfighter camp complete with environmentally controlled shelters, hygiene facilities, combat feeding systems, laundries, morale and welfare functions, and command and control capabilities. FP is quickly deployable and brings its own facilities support package, including power generation and distribution, water storage, dispersion, processing and reuse, waste management, and security lighting. The system can be broken into four Warfighter camps of 150 troops each. Emerging requirements to support platoon size patrol bases and Special Operations activities are also being pursued. Some future systems will include modular ballistic protection.

Under the leadership of Mel Miles and Dianne Mofield, the Air Force’s BEAR program is a key Agile Combat Support (ACS) enabler that provides vital support required to stand up, bed down, and support our Warfighters. Lessons learned from increased operations showcased the need to redesign ACS capabilities to better support a constantly changing global security environment. In addition, because we are operating with limited resources, we must obtain all possible efficiencies. To support this reality, BEAR program managers modernized the program with the following key objectives: 1) better energy efficiencies, 2) smarter technology, 3) smaller footprint, and 4) lighter assets. BEAR is involved in Joint Modernization initiatives as members of the Joint Expeditionary Basing–Working Group (JEB-WG), Functional Capability Integration Board, JOCOTAS, and through the American Recovery and Reinvestment Act under the Joint Capabilities Technology Demonstration (JCTD). These initiatives not only encourage communication and awareness between services but also develop excellent joint solutions.

The America Recovery & Reinvestment Act granted $4.8 million to the BEAR program to develop alternative and sustainable energy sources. The AF BEAR project will support the requirement to reduce reliance on fossil fuels, reduce the U.S. dependence on foreign fuel, and decrease power consumption and our reliance on convoys to supply fuel to base camps. ACC/A4RX partnered with the Advanced Power Technology Office (APTO) and the BEAR Program Management Office (PMO) at Robins AFB, the Air Force Civil Engineering Center (AFCEC), and the Air Force Research Lab (AFRL) at Tyndall AFB, to identify projects for BEAR. The group decided on two major efforts:

1) To participate in the Joint Capabilities Technology Demonstration (JCTD) at Fort Erwin, CA. BEAR managers are working in concert with the Army to develop a Solar Integrated Power Shelter System (SIPSS) that will reduce bare base electrical demand by 50 percent. This initiative has now developed into a full joint Air Force/Marine acquisition of new small shelter energy-efficient systems.

2) The Smart-microgrid System (BEAR-SMS) that will automatically manage several power sources (including solar and wind) and all bare base load demands. Smart grid technology will coordinate the production of power from large numbers of distributed power producers such as solar panels, wind turbines, and primary and secondary diesel generators.

**Flexible Photovoltaic Update**

We are midway through the redesign of the PowerShade solar tent. This program, which also includes technology improvements, is on track to increase the power output of the PowerShade by over 50 percent while reducing the cost per watt by 25 percent. Along with these improvements, standard lifetime is being increased from three to 10 years, and the weight is being reduced to make installation easier. Electrical storage and electronics are in design to go with the new tents, which allow the systems to intelligently interact with generator sets to minimize run time and fuel consumption.

On the technology transition front, six brigades were partially equipped with 60W and 120W foldable amorphous silicon PV arrays from PowerFilm as part of systems to provide portable power for their electronics. Later this year another four brigades are scheduled to receive these systems, which are designed to enable longer missions without resupply of batteries. The 120W arrays weighed just 6.5 pounds and folded for transport in rucksacks. A new generation of these foldable power units is being targeted, which provides the same 120W of power but weighs less than 4.5 pounds, further reducing the weight burden on the soldier.

**Marine Corps Expeditionary Energy Office Update**

The Marine Corps recently completed its latest demonstration at 29 Palms, CA, in May 2013. The ExFOB process is designed to identify and evaluate commercial technologies that increase the self-sufficiency and capability of expeditionary forces for any future operating environment we may face. Marines trained to value resources, energy-efficient equipment, and renewable energy provide our commanders with a lighter, more capable, and versatile force that will go farther and stay longer at less risk.
Through the ExFOB process to date, the Marine Corps has conducted six demonstrations at bases across the country, reviewed over 300 technologies, purchased 11 for extended user evaluation in the United States and Afghanistan, and transitioned four to programs of record.

ExFOB 2013 focused on hybrid power systems that will redefine how the Marine Corps powers the future force. Hybrid power generation—combining smart controls, energy storage, and solar PV with traditional diesel generators—has demonstrated up to 50 percent fuel savings and ~80 percent reduced run time with less maintenance, which extends the life of current generators.

The Corps is working closely with the Army to develop requirements for a family of four hybrid power systems that will increase the combat effectiveness of both services. Two draft capabilities development documents (CDDs) are underway. The Marines are leading development of the first CDD for the two smaller hybrid systems (up to 10 kW), known as Mobile Electric Hybrid Power Sources (MEHPS). Army has the lead for the second CDD, focused on two larger systems (10–300 kW), known as Mobile Electric Microgrids (MEM). Production and fielding of hybrid power generation systems may begin as early as 2016.*

*Katherine Hantson from the Marine Corps Expeditionary Energy Office provided this update.

Technology Demonstration and Off-the-Shelf Evaluation Efforts

All services are working on systemic test and evaluation efforts. The Army’s prime efforts take place at the PM FSS Force Provider Base Camp Integration Laboratory (BCIL) at Fort Devens, MA. The BCIL compares state-of-the-art expeditionary basing systems currently in the field with new engineering developments and emerging technology using two approaches. The first variant compares two 150-soldier modules side by side on a component basis. One of these is the benchmark standard and the other is the “lab.” The alternative is to actually change out entire subsystems on the “lab” module, such as shower units, generators, laundries, or shelters. Each camp is then operated for a period of time under the same conditions to assess performance. Note user troops are living in the base camps during test operations. This provides real-life use comparable to FP camps deployed in theater. Over 11,000 troops have rotated through the BCIL in the past 18 months.

NSRDEC Capabilities for Independent Assessment of New Lighting Concepts and Photovoltaics (PV)

Karen Buehler and Gary Proulx at NSRDEC set up a lighting in-situ test capability to independently assess the performance of emerging technologies such as light-emitting diode (LED) light fixtures compared to standard MIL-PRF-44259E fixtures. The Marine Corps Systems Command requested that NSRDEC assess a new LED fixture for potential use in their Marine Corps Expeditionary Shelter System. Both individual fixtures and the fixtures as a system are being assessed within the ongoing evaluation. Individual fixture characterization is focusing on illumination from the fixture at varying heights, including light color comparison, correlated color temperature, dominant wavelength, power draw, current draw, power factor, and radiant temperatures. Basic measurements of fixture dimensions and masses were also gathered to use in calculations of system transport weight and volumes.

The evaluation of PV systems involves providing radiant illumination of the cells and measuring the electrical output.
The Sea Box
Collapsible Re-Deployable Shelter (CRS)

Efficiency In Every Aspect Of Design!

- Stackable, rigid wall structure with superior design flexibility.
- Rapidly re-deployable with a long, usable life span (20+ years).
- Fire-rated walls, doors and other safety features, designed to meet all DOD UFC 1-201-01 Standards.
- High thermal efficiency for reduced heating and cooling energy consumption.
- Energy efficient LED lighting, ECUs, and optional Solar Panel Platforms.
- Improved quality of life for the Warfighter.
- Design allows for various living area dimensions.

All elements of the CRS are completely modular! Walkways, Mezzanines, Solar Panel Platforms and Quadcon vestibules connect together to form their own 20' ISO Modules. This greatly reduces transportation costs by eliminating the need for additional shipping containers.

Sea Box also offers a full line of Modular Shower, Latrine, Laundry, Kitchen, EMI, Command & Control and Medical Service Shelters as well as Refrigerated Systems.
The panel illumination can be handled with either natural sunlight or simulated with an appropriate light source and filters. The Doriot Climatic Chambers located at NSRDEC recently installed a solar simulator that meets the requirements of irradiating the cells with a spectrum that simulates natural light. This is the standard spectrum used for evaluating PV systems for terrestrial applications. The climatic chambers allow for the control of ambient temperature, humidity, and wind speed. NSRDEC is using this system to evaluate commercial PV systems under these conditions. The test system is also being used to evaluate developmental PV systems for Soldier-borne applications.

Rapid Base Camp Establishment: Enabling Mobility and Lethality

The Army is looking at reducing base camp set-up time through rapidly deployable systems, including shelters and initial base defenses. During the Afghan campaign, it was not uncommon to spend several months establishing and fortifying a position. This provided our adversaries plenty of time to scope out our defenses. More important, it reduced the number of soldiers outside the wire on patrols, and this limited situational awareness as well as interaction with the local populations. One school of thought is that if camps could be set up in a matter of days and quickly redeployed, U.S. forces would be more agile.

This has led to the investigation of non-traditional, highly energy-efficient rigid wall shelters by PM FSS. Work is ongoing in the Technology and Engineering Development acquisition phases to fully assess this option. We know upfront that there is an initial transportation impact. The downstream side to the equation is that less site prep and construction of plywood floors is required saving both set up time and ancillary shipments. In addition, generator size or quantity can be reduced as HVAC is projected to be reduced by 75 percent and fuel shipments could be significantly reduced over the deployment.

On rapidly deployable base defense, NSRDEC and PM FSS have teamed on the Modular Ballistic Protection System (MBPS). It is a lightweight, low-cost, rapidly deployable, ballistic protection system comprised of a panel-and-strut construction. Program lead, Nick Tino provided this update. The MBPS can be deployed around at the rate of 100 linear feet per hour by four Warfighters. All system components are man-portable, and no special tools or training is required for set up (technical manual included). MBPS weighs near 4 pounds per square foot while offering protection from direct fire and fragmentation similar to the Advanced Combat Helmet (ACH). The system has undergone extensive laboratory ballistic testing in addition to arena testing (live fire) and blast overpressure testing according to UFC 04-010-01. The MBPS is currently a Pre-Milestone B program awaiting the signature of the Force Provider Expeditionary Capabilities Production Document (FPE CPD) to move forward as a Program of Record (POR) with PM Force Sustainment Systems. The system is ideal for expeditionary base camps, fighting positions, and village stability operations.*

*The MBPS program lead, Nick Tino, provided this update.

Implications for Future Shelter Development

For shelters and basing developers, this means that for the foreseeable future, the military will continue to operate in austere environments using contingency base camps as force projection platforms. This translates into an ongoing requirement that all military developmental efforts ranging from Science and Technology and Engineering Programs of Record through Sustainment drive to reduce footprint and minimize future energy demand.
The JOCOTAS community is at the leading edge of this endeavor, with multiple programs to passively and actively reduce energy demand while enhancing deployability. OSD took a major role on energy reduction with the initiation of the 2008 Joint Net Zero Joint Combined Technology Demonstration (JCTD) that was managed by Ms. Barbara Brygider and held at the National Training Center, Fort Irwin, CA. The Army, Air Force, and Marine Corps teamed over an 18-month period to assess shading materials, high-performance insulation, photovoltaic arrays, LED lighting, and microgrids. All Services followed with formal programs that include Marine Corps ExFOB evaluation and product improvement of best-of-breed off-the-shelf systems; the Army’s VT4/5 Expeditionary Mobile Base Camp Technology and Demonstration project; the Air Force’s Air Force’s Basic Expeditionary Airfield Resources Modernization program; and the Navy’s initiation of the Future Next Generation Expeditionary Outposts effort, Transformative Reductions in Operational Energy Consumption (TROPEC), focused on assessing technologies under tropical conditions and developing standard test protocols to accelerate development and fielding of effective energy solutions from all sources. The TROPEC work will be a key developmental enabler to support tropical operations.

Frank Kostka has worked in the shelter business area for 30 years at NSRDEC, a member of the the U.S. Army Research, Development, and Engineering Command (RDECOM) family. RDECOM is a major subordinate command of the U.S. Army Materiel Command, which is the Army’s premier provider of materiel readiness—technology, acquisition support, materiel development, and logistics.

More info: jocotas.natick.army.mil and nsrdec.natick.army.mil

The New Shelter Standard

The ability to quickly establish a force projection platform is critical to warfighting operations. More important, leadership remains vigilant on effectively managing the use of operational energy as a key tenet of mission planning and execution.

The New Shelter Standard

Collective Protection
“Single Skin” Solution

Hospitals • Base Camps
Reduced Logistics & Set-Up Time
Increased Durability & Energy Efficiency

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Armor & Mobility September 2013 | 31
AAR Corporation has been in a continuous stage of evolution since it began manufacturing aluminum cargo pallets for the United States Air Force in 1963. When the need arose for increased space for cargo per pallet position and better protection from the elements, AAR developed its intermodal ISU containers. Engineered to simplify loading and off-loading of cargo from aircraft and certified to helo-lift loads to remote areas, ISU containers have become a mainstay with forces worldwide. In the early 1990s, as troops were deployed to the desert, they began using ISU containers as living quarters and command posts. Recognizing the need for better living and working environments, AAR modified its base products into a new line of Air Mobile Shelters (AMS) to include insulation, electrical systems, and ECUs, while maintaining the functional loading and lifting characteristics of the company’s pallets and containers.

AAR fosters relationships with government and commercial customers alike by providing innovative products that support their programs in the most beneficial way. Among the many successful endeavors AAR has developed for the U.S. Army is the Petroleum Quality Analysis System Enhanced (PQAS-E) Configuration Shelter. This battlefield-ready shelter is a mobile fuel testing analysis and certification laboratory based on AAR’s proprietary 20-foot ISO shelter design. The PQAS-E is capable of testing virtually any fuel for air or land mobile forces prior to use. Tested and approved at Aberdeen Proving Ground, MD, the PQAS-E can be mounted on a truck or trailer, is CHU-compatible, and features air, land, and sea mobility features, including detent rails and a flat bottom for locking into 463L aircraft cargo systems.

More info: aarcorp.com

Sea Box, Inc. a Cinnaminson, N.J.-based ISO container and specialty shelter manufacturer, has designed and built the newest innovation in shelter products for the defense industry. With a major focus on energy/fuel conservation, the company has introduced a stackable, rigid-wall shelter with a footprint similar to that of a temper tent. The Collapsible Re-Deployable Shelter (CRS) is a solid structure that, when in transport mode, can stack in groups of four to create its own 20-foot equivalent unit (TEU). This allows four shelters to be transported for the cost of one. The design also incorporates fully modular solar panel platforms and walkways, which also stack together to form TEUs. Additional fuel-saving features include up to an R-28 insulation rating and a quick set-up design that allows deployment in just 20 minutes using a 10k forklift. Last year, at the request of the Army, Sea Box shipped their two-story CRS model to Fort Devon, where the military had created a facility for the sole purpose of testing and experimenting with new, energy-efficient shelter designs.

The company currently has a contract in place with the Air Force to supply Expandable Bicon Hygiene Systems to bases worldwide. These containerized hygiene systems provide insulated shower and latrine shelters with a full connectivity kit to allow “plug-and-play” capabilities with the current BEAR utility system.

More info: seabox.com
**Utilis USA** has developed a single-skin-, collectively protected shelter system that does not require an additional chemical/biological liner and therefore reduces logistics and set-up time. The system uses a chemically and biologically resistant barrier impregnated in the outer fabric. For increased man-portability, the Utilis frame separates from the fabric. This also makes the design ideal for single skin, since the fabric, floor, and plenum are included in one piece. This proven design has been in the field with the Air Force, Army, Navy, and Marine Corps for the last seven years.

At the customer’s request, we developed a tall version of the shelter to increase the useable space. The TM60 Tall provides about 750 square feet of floor space. We have also developed and tested a compact configuration to facilitate transportation in a HMMWV and TRICON containers. The Utilis USA Compact TM60 Tall comes in four manageable carry bags (including the standard Thermal Fly); all carry bags are less than 74 inches, and the total shipping volume is less than 72 cubic feet.

Utilis has been working with the Natick Soldier Systems Center, Air Force Research Lab (AFRL), and Air Force Civil Engineer Center (AFCEC) on an energy efficiency program sponsored by Assistant Secretary of Defense for Operational Energy Sharon Burke. The program is centered on the overall reduction of energy in a deployed field environment.

More info: utilisusa.com

**DHS Systems LLC**, a world leader of high-tech, soft-walled shelter systems serving medical, military, government, and civilian needs, offers its Deployable Rapid Assembly Shelter, or DRASH, a quick erect/strike shelter system that integrates shelter, mobility, lighting, heating, cooling, and power distribution in one flexible package to form the command post of the future. For more than 25 years, DRASH systems have played an integral role in the establishment of rugged, user-friendly facilities for military personnel around the world.

The first Army-wide DRASH system introduced was to support the Patriot Air and Missile Defense System. Since then, DRASH has gained increasing notoriety as part of the U.S. Army’s Standard Integrated Command Post System (SICPS) to provide a standardized command post to all maneuver brigades in the Army.

In cooperation with Northrop Grumman Corporations Command Post Platform (CPP), DRASH provides the Trailer Mounted Support System (TMSS) available in medium or large as part of the Army’s Standard Integrated Command Post System (SICPS). The goal is to field a high-mobility tactical operations center that can be rapidly deployed for command, control, and communications on the battlefield. More than 5,000 of these shelter systems are currently in use across the Army and by NATO forces.

The primary focus of the company’s technological efforts is on its proprietary Intelligent Power Technology (IPT), which dramatically reduces the fuel demands on heating, cooling, and powering DRASH shelters.

More info: drash.com
Saab Group When the U.S. Army Natick Soldier Systems Center and Product Manager – Force Sustainment Systems began gathering data on energy savings for personnel shelters during the NET Zero project at NTC in Fort Irwin, CA, in 2009-2010, little did they know that an old Army standby fit the bill.

Ultra-lightweight Camouflage Net Systems (ULCANS) are the latest generation of static “cammie” netting used by the Army and the USMC to protect military assets from detection by visual-, near-infrared-, thermal infrared-, and radar sensors. They also reduce the solar loading effects on soft- and rigid-walled shelters. After the year-long evaluation in the hot climate at NTC, ULCANS material significantly outperformed competitors.

The NET Zero results indicated that using an ULCANS shade fly would result in a 22 percent fuel savings, or about 100 gallons per day in a small 150-man forward operating base (FOB) environment. More important than monetary savings resulting from decreased FOB fuel usage ($11–12 per gallon) are the reduced American casualties as a result of fewer convoys related to fuel deliveries.

More info: saabgroup.com

Gichner Systems Group, a Kratos company, prioritizes advancements in the development of shelter systems to support the modern warfighter’s requirements for rapidly deployable, energy efficient, lightweight, and system-ready solutions. One of its current priorities is reduction of fuel consumption by maximizing thermal efficiencies and designing smarter power management systems.

Gichner offers a wide range of enclosures encompassing both lightweight aluminum (foam/beam or honeycomb core) shelters and robust steel containers. Recently developed products include nine-high stackable 20-foot ISO aluminum panel shelters, fifth-wheel-variant tactical trailer-based enclosure systems, modular ballistic-protected container units, and specialty electronic equipment facilities.

Gichner specializes in engineering and fabricating shelter systems with high levels of integration, including power distribution, environmental controls, generator and solar power systems, electromagnetic pulse shielding, chemical/biological protection, LED lighting, and computer systems. It has supplied turn-key shelter systems designed for a diverse range of mission-specific applications including UAV ground control stations and transporters, communications shelters, housing and storage units, command centers, and maintenance facilities.

More info: gichnersystemsgroup.com

A Box 4 U, LLC, longtime designer and manufacturer of blast- and ballistic-resistant modular shelters, recently announced that it is now a safe-room qualified producer member of the National Storm Shelter Association (NSSA). This designation means that A Box 4 U shelters can be manufactured to meet the ICC-500 (2008) and FEMA Spec 361 to withstand EF-5 tornados and Category 5 hurricanes.

The company continues to deliver safety in modular buildings. The U.S. military understands that providing a safe operating environment for soldiers is paramount to meeting mission critical objectives. A Box 4 U provides a shelter solution that combines blast resistance and ballistic resistance to NIJ Level III with added safety against environmental elements.

Designed and constructed to meet the individual user’s requirements, the buildings are often used as operation centers, forward operating bases, barracks, entry control points, and viewing bunkers. Whether the mission is conducting training here at home or operating within theater, A Box 4 U can now provide the solution.

More Info: abox4u.net
HDT Global Expeditionary Systems Group (ESG) designs and manufactures several shelter models including Base-X, Base Xpress, and AirBeam shelters within its rapid-deploying tactical shelter product line. HDT Base-X, Base Xpress, and AirBeam shelter system packages include sleep kits, hygiene/shower systems, medical accessories, decontamination systems, and command & control systems. Additionally, HDT provides soft-walled shelter solutions with collective protection capabilities to protect against chemical, biological, radiological, and nuclear air contamination.

HDT developed the ArctiX shelter as the newest addition to our Base-X product family. The HDT ArctiX shelter is an ultra-lightweight, rapidly deployed shelter that provides U.S. and allied forces the necessary infrastructure to operate in austere cold weather locations. As with all HDT Base-X shelters, the HDT ArctiX shelter offers inherent energy efficiency features, deploys with no additional tools, and requires few personnel for set up. Combined with an HDT SHC thermoelectric heater, the HDT ArctiX shelter can provide as many as 15 military personnel with comprehensive protection from harsh environmental conditions.

More info: hdtglobal.com
U.S. Army Tank Automotive Command is fielding a solution to bulky, short-lived ground vehicle fire extinguishers that is making automatic fire suppression a reality.


For dismounted troopers or military vehicles in combat, “hit avoidance”—ideally by completing the mission undetected—is a priority objective. While we cannot become invisible, we can protect ourselves by other means against personnel injury and vehicle damage. Foot soldiers are at a disadvantage due to added weight when increasing personal armor, but vehicles can be up-armored and equipped with fire suppression systems (FSS) to protect the crew if it is penetrated by an explosive device.

Today’s vehicular automatic fire extinguisher systems (AFES) are a sophisticated and complex integration of heat and flash sensors connected to a computer that directs the discharge of various extinguisher agents in 0.250 milliseconds, quicker than a blink of the eye. The rapid response extinguishes flame, reduces temperature, and prevents tissue burning. External and internal vehicle components such as fuel tanks, tires, engines, and drive trains can also be protected from fire damage.

FSS agents including halons and water are used for different purposes, with water mixtures and mists gaining future interest. Non-compatibility with human tissue limits the type of agents available for vehicular systems. Physicians, engineers, and others determine agents, amounts, and extinguishing factors to be used in various enclosures to minimize injury and damage.

Most ground vehicles use HFC 227 as the FSS agent. Halon is used in the Abrams and Paladin, and is being quickly phased out of the DoD ground vehicle inventory as drawbacks include contributing to global warming and ozone depletion.

Quantities must be controlled and limits placed on plans for future use. Vehicles’ AFES are usually a combination of computer-controlled fire/heat/flash sensors that trigger the extinguisher’s bottle assemblies. The bottle assembly is a pressurized vessel with pressures as high as 1,800 pounds per square inch (PSI), an agent release valve assembly discharging the agent, and in some systems, plumbing directing the agent to critical areas. These agent bottle assemblies are very reliable and efficient. However, once discharge occurs from fire, accidental crew trigger, or an errant discharge, the bottle assembly must be replaced before the vehicle is again mission capable.

In the past, while combat vehicles had AFES, most tactical vehicles added handheld extinguishers as afterthoughts. New MRAP vehicles blazed the way in fire protection and now recently designed ground vehicles feature AFES as standard equipment. However, they are not cheap. Both initial installation costs for AFES components are expensive, though hopefully sensors and computer controls represent one-time purchases. Recurring costs, which increase with errant and mistaken discharges absent true fire initiated discharges, persist for bottle assembly replacement. The average replacement cost of a common bottle assembly is approximately $1,500, and the vehicle must be serviced at a maintenance facility. The majority of bottle assemblies are refillable with proper procedures and trained personnel, or new bottle assemblies can be installed at maintenance facilities. With the huge number of vehicles in service in theater, the Army replaced tens of thousands of discharged bottle assemblies, costing hundreds of millions of dollars in replacements, transportation of AFES agents, replacement repair components, refilling stations, refilling personnel, training for personnel, and manpower losses.

A future solution is here today. With technology and engineering advancements, single-use plug & play disposable bottle assemblies weighing approximately half the current bottle units are available. These disposable bottle assemblies...
have reliably served in military and civilian aircraft worldwide for the past forty years. A current Army initiative replaces the heavy, cumbersome, short-lived, leak-prone, and expensive bottle assembly with lighter, hermetically sealed and less costly single-use throw-away bottle assemblies that have shelf lives of up to 20 years. This would lead to immediate cost savings by reducing manpower, transportation expenses, refilling stations, personnel training, and oversight. For those vehicles that lack AFES agent discharge plumbing for directing agents to specific areas, using only a nozzle, crews could safely and quickly replace their vehicles bottle assemblies themselves.

The end result of developments in fire suppression systems is improved survivability, reduced costs, and eased installation and replacement burdens. Together, all of these outcomes improve ground vehicles’ AFES performance and longevity while lessening environmental harm.

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### Battling Blaze without Burden

By Brad Hicks, Intelagard

The world’s first independent compressed air foam (CAF) backpack, the Intelagard Macaw is a powerful fire suppressant. Its compressed air foam (CAF) pumps have the ability to expand foaming solutions up to 35 times their liquid volume with a simple turn of a dial, and the system requires only an on-board liquid payload and a compressed air cylinder (SCBA cylinder)—not an external power source—to provide air energy. Depending on the nozzle and foam product deployed, the Macaw system can project foam up to 35 feet. With only five gallons of water and 20 ounces of concentrate, the backpack can deploy up to 150 gallons of finished foam or 350 gallons with the optional Mid-X nozzle. This ability to put a deployment apparatus on the back of a single user to emit such a significant volume of agent is unparalleled.

Intelagard began shipping Macaw systems to deployed Army units in 2006. Our troops found that on-board fire suppression systems were frequently disabled by IED blasts, and they were left to combat highly energetic vehicle fires with inefficient dry chemical fire extinguishers. One testimonial states that a Stryker vehicle burned for 14 hours despite the use of 20 ABC extinguishers to extinguish the fire. The inability to quickly extinguish the fire resulted in the total loss of a critical maneuver asset and all on-board equipment and subsystems. The Macaw’s reputation quickly circulated around the military, and by 2009, Intelagard had shipped well over 6,000 systems to U.S. forces in Iraq.

In 2009, the Marine Corps selected the Macaw system to satisfy an urgent need for an independent firefighting system to be transported on vehicles operating in hostile fire zones, and they procured and fielded over 1,500 Macaws to Marines serving in Afghanistan. Through this procurement the Macaw became an officially fielded item, type-classified and fully provisioned in the Marine Corps supply system.

The Army recently awarded Intelagard a contract for 800 systems. Following the Marines’ lead, the Army has added the Macaw, its components, and its firefighting solution to the supply system, assigning NSN’s for all pertinent items. U.S. Air Force pararescue units have also found the Macaw system to be a vital tool for saving lives, equipping deployed pararescue elements with the system to aid with combating fires encountered in rescue-type operations.

The Macaw’s reputation as a powerful, effective system that is easy to learn and maintain continues to flourish. Letterkenny Army Depot has recently developed a vehicle mounting system for MRAP platforms as part of a continuing effort to equip personnel with an effective and fully independent capability for rapidly and effectively extinguishing fires.

In summary, Intelagard has well over 11,000 systems in use worldwide with a diverse client base. Military, governmental organizations, municipalities, and rural volunteer firefighting departments have all found Intelagard’s systems to be highly effective and simple to own and operate while solving many of the logistical problems associated with firefighting in austere, mobility-restricted areas.

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### The Next Generation of Halon Replacement Technology

By Colleen A. Harris, 3M

3M™ Novec™ 1230 Fire Protection Fluid is an advanced clean agent fire suppression material that combines fast extinguishing performance with an outstanding safety and environmental profile. It is ideal for critical commercial and military aviation applications such as computer and telecommunications centers, radar rooms, and data storage areas as well as specific military applications including shipboard hazards, engine and crew bays in armored vehicles, and flightline protection.

Based on proprietary chemistry from 3M, Novec 1230 fluid addresses industry needs for clean agent fire protection that is safe and effective while offering an environmental profile that other halocarbon agents such as high-fructose corn syrups (HFCs) can’t begin to match:

- Zero ozone depletion potential
- 5-day Atmospheric lifetime
- Global warming potential of 1

Because of this, Novec 1230 fluid—unlike HFCs—is not targeted for phase-down or regulatory restrictions anywhere in the world. And it is approved for use in total flooding fire suppression systems by the U.S. EPA and most major regulatory bodies around the world. All of these factors make Novec 1230 fluid today’s sustainable choice for clean agent fire protection.
Based at Naval Support Activity Hampton Roads in Norfolk, VA, Commander, U.S. Marine Corps Forces Command (COMMARFORCOM) commands active retained operating forces; executes sourcing and synchronization to affect generation in the provisioning of joint capable Marine Corps forces; and directs deployment planning and execution of operating forces.

COMMARFORCOM coordinates Marine Corps-Navy integration of operational initiatives. In the role as Commanding General, Fleet Marine Forces Atlantic, (CG FMFLANT), it commands embarked Marine Corps forces and advises Commander, U.S. Fleet Forces Command (USFFC) on support to Marine Corps forces assigned to naval ships, bases, and installations. MARFORCOM also conducts Service-directed operational tasks as required.

A Storied Evolution

U.S. Marine Corps Forces Atlantic (MARFORLANT) was established in 1992 and was designated the Service component to U.S. Atlantic Command (USACOM). Additionally, Commander MARFORLANT (COMMARFORLANT) served as CG FMFLANT, Marine Forces Type Commander in support of the U.S. Atlantic Fleet, which is now U.S. Fleet Forces Command (USFFC). USACOM was re-designated as U.S. Joint Forces Command (USJFCOM) in 1999 to emphasize its evolving roles in joint-force providing, training, readiness, integration, and experimentation and its transfer of Caribbean responsibility to U.S. Southern Command. In 2003, USJFCOM transferred geographic responsibilities, Homeland Defense tasks, and support to Homeland Security to the newly established U.S. Northern Command. In 2004, the Secretary of Defense directed the expansion of Commander, USJFCOM’s mission as the primary joint force provider in order to recommend global sourcing solutions for assigned and unassigned conventional forces and capabilities worldwide. The expansion of USJFCOM’s mission and reduction in geographic responsibilities had significant implications for COMMARFORLANT, shifting MARFORLANT’s focus from regional to functional responsibilities.

In December 2005, COMMARFORLANT was re-designated COMMARFORCOM in order to institutionalize the command’s role as the Marine Corps lead for developing and coordinating recommended force sourcing solutions. When USJFCOM deactivated, the Commandant of the Marine Corps (CMC) retained MARFORCOM as the USMC coordinating authority for conventional force allocation planning and synchronization.

Key Piece of USMC Puzzle

MARFORCOM is unique among Marine Corps component commands because it is a functional component command with a substantial segment of operating forces assigned to it. MARFORCOM is a Service-retained component headquarters with the following command relationships:

- COMMARFORCOM reports to CMC.
- COMMARFORCOM commands the following subordinate commands: II Marine Expeditionary Force (II MEF), which includes 2D Marine Division, 2D Marine Aircraft Wing, and 2D Marine Logistics Group as well as 2D Marine Expeditionary Brigade Command Element, Marine Corps Security Forces Regiment and Chemical Biological Incident Response Force; Marine Corps Security Cooperation Group (MCSCG); and Headquarters and Service Battalion (HQSVCBN).
- COMMARFORCOM commands activated Reserve Forces upon mobilization.
- COMMARFORCOM is the general officer serving as COMMARFOREUR and Deputy COMMARFORCOM also serves as COMMARFORSOUTH

Key MARFORCOM tasks include:

- Reviewing combatant commanders’ requirements to determine Marine Corps capabilities that could source the need, analyzing capacity to sustain enduring requirements and assessing both associated costs and operational-, service-, and institutional risks to provide informed feedback to Service Headquarters and the Joint Staff.
- Integrating the activities of force provider commands and supporting service providers to synchronize the generation and provisioning of Marine forces ready for tasking by employing force component commanders.
- Monitoring, assessing, reporting, and ensuring the readiness of Marine Corps operating forces to support current operations, contingency plans, and emerging force requirements. MARFORCOM assists in the development and refinement of Joint/ Marine Corps readiness standards in collaboration with Deputy...
Offense Is Best Defense

Our defense strategy emphasizes a rebalancing toward the Pacific, a traditional maritime domain, while globally deterring and defeating aggression, building partner capacity, and maintaining counter-terrorism and irregular warfare capabilities. The world is experiencing an increase in instability and conflict, thereby placing a greater responsibility on our nation’s Naval capability to respond to those challenges in an uncertain environment. To support these efforts, amphibious- and sea-based forces are invaluable to engagement, crisis response, and power projection as the majority of the world’s population lives in close proximity to the littorals. Amphibious- and sea-based forces also reduce the need for basing rights and overflight clearances to operationally maneuver forces in crises to deter an adversary or be prepared to respond. Key to Marine Corps support to the defense strategy is our ability to influence the security environment through these flexible, forward-deployed, and forward-presence joint capable forces postured in areas of instability with ready CONUS-based forces to reinforce as needed.

MARFORCOM works with our fellow force to provide and force-employ MARFORs and Navy partners to maintain routine, responsive forward presence through the Unit Deployment Program in the western Pacific, deployed Marine Expeditionary Units embarked aboard Navy Amphibious Ready Group shipping, embarked- and ground-based Special Purpose Marine Air Ground Task Forces (SPMAGTF), and Fleet Antiterrorism Support teams (FAST) sourced in accordance with defense priorities. These various force packages along with training teams and training missions provide a visible presence, a deterrent capability, and a rapid crisis response force that demonstrate national will and can buy time for our national leadership to develop options.

Partnering through Training

A decade of constant combat and counterinsurgency operations limited the opportunity for the Navy and Marine Corps team to keep its amphibious- and sea-based core competencies at a high state of readiness to conduct large-scale amphibious and maritime prepositioning force (MPF) operations. In 2012, COMUSFFC and COMMARFORCOM published a joint campaign plan for amphibious operations training. Goals included the following:

- Attaining and maintaining proficiency at the Expeditionary Strike Group/Marine Expeditionary Brigade (ESG/MEB) level for amphibious and MPF operations.
- Increasing awareness of amphibious- and expeditionary force development and capabilities through the demonstration of relevant and capable amphibious force employment in a realistic sea-based environment.
- Sustaining a training and education continuum to allow for review, complementary experimentation, and validation of naval doctrine and tactics, techniques, and procedures (TTPs) associated with the conduct of amphibious and MPF operations in a sea-based environment.
- Increasing and sustaining training readiness for core mission essential tasks (METs) relating to amphibious and MPF operations and assess training readiness of core METs for deployment.

A cornerstone of achieving these campaign goals is the Bold Alligator (BA) exercise series. While the Navy and Marine Corps regularly engage in amphibious training, the focus in the past decade was at the Amphibious Ready Group/Marine Expeditionary Unit (ARG/MEU) level. The ability to operate from a sea base at a level beyond that ARG/MEU remains critical and must be exercised to maintain amphibious proficiency.

Started in 2008, BA is an annual exercise that alternates between live and synthetic environments in order to maximize training opportunities while minimizing costs. In addition to bringing together U.S. naval forces, BA incorporates participants from coalition partners such as Australia, Brazil, Canada, Colombia, France, Italy, Mexico, the Netherlands, New Zealand, Norway, Portugal, Spain, Sweden, Turkey, and the United Kingdom.

Future-shaping Refocus

As the Marine Corps transitions from Afghanistan and reinvigorates our amphibious roots, we need to be mindful of the lessons learned from over a decade of combat operations. While the Marine Corps integrates with our Navy partners, we must seek opportunities with special operations forces (SOF) whether in building partner capacity or conducting counterterrorism and irregular warfare operations.

The Marine Corps is America’s expeditionary force in readiness. Achieving this goal requires that the Navy-Marine Corps team be prepared to provide combatant commanders with ready, joint capable amphibious forces at the ESG/MEB-level and above as well as routine ARG/MEU, SPMAGTF, and fast forward presence. Marine forces need to be capable of integration with both Navy forces and SOF. In coordination with our Marine and Navy partners as well as the SOF community in the future, MARFORCOM can develop Marine Corps options that provide credible, responsive forward presence through amphibious-, sea-based-, and ground-based forces postured in areas of instability and backed by trained and ready CONUS-based forces to meet our nation’s needs in an uncertain global security environment.

More info: www.marforcom.marines.mil
Calendar of Events

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