



RAPID EQUIPPING FORCE

United States Army



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Rapid Equipping Force

United States Army

FROM THE DIRECTOR'S DESK:



Fiscal Year 2014 (FY14) was an exciting and busy year for the Rapid Equipping Force (REF). The organization remained focused on providing critical capabilities to units in Afghanistan, primarily Intelligence, Surveillance, and Reconnaissance (ISR) and Force Protection solutions, while also leaning forward to support Soldiers in both Iraq and the Horn of Africa (HOA). It continued executing three key portfolio efforts: issuing tactical aerostats to units closing bases across Afghanistan, rapid prototype design through our Expeditionary Labs (Ex Labs) and providing tailored operational energy solutions through our Energy to the Edge program. Though the REF is primarily funded with Overseas Contingency Operation dollars, we successfully executed limited base funds to support Army units within seven Army Service Component Commands (ASCC) and U.S. Army Forces Command this year.

In the next few pages, you will find some of the REF's recent success stories. The solutions range from custom-designed grenade belts for sergeants in Afghanistan to complex social media exploitation tools for the commanders of units at U.S. Army Pacific and U.S. Army

Central. This range of commercial- and government-off-the-shelf (COTS/GOTS) tools exemplifies the REF mission: providing the Soldier, the unit and the Commander with the tools needed to mitigate urgent capability gaps and accomplish the assigned mission.

FY14 also represented a year of change for the organization. As the U.S. reduced its footprint in Afghanistan, the REF closed its Kandahar office and consolidated the team at Bagram Air Field (BAF). Given the rising threat presented by the Islamic State in Iraq and the Levant (ISIL) in the Middle East and the initiation of Operation Inherent Resolve (OIR) in Iraq, the team is now leaning forward to establish a REF forward office in Kuwait, where members can mobilize quickly to provide over-the-horizon support to the entire Army Central region.

In addition to all the great technologies we equipped and the challenges we tackled, the most significant event of the year proved to stem from a memo signed by the Under Secretary of the Army. In January, former Under Secretary Joseph W. Westphal released a memo deeming the REF an enduring Army capability and outlining the organization's long-term implementation plan, which includes transferring the REF from Headquarters, Department of the Army (HQDA) G-3/5/7 to the U.S. Army Training and Doctrine Command (TRADOC) no later than 30 September 2015. The transition does not impact the REF's mission or authorities. This commitment is codified in a tri-signed Memorandum of Agreement between HQDA, the Assistant Secretary of the Army for Acquisition, Logistics, and Technology and TRADOC. Per this agreement, the Army G-3 will continue to delegate 10-Liner authority to the Director of the REF. The REF will continue to equip, insert and assess urgently required technology solutions to Army units stationed worldwide. This decision ensures the REF will be around to solve urgent challenges for many years to come.

As we look to the future, one thing will remain constant: warfighters will always need quick access to technologies to defeat emerging threats and address operational shortfalls. The Army agrees with this premise and is taking the steps necessary to retain lessons learned after more than 12 years of war by institutionalizing one quick-reaction capability.

Regards,

COL Steven Sliwa, Director, Rapid Equipping Force



REF MISSION:

The Rapid Equipping Force harnesses current and emerging technologies to provide rapid solutions to the urgently required capabilities of U.S. Army forces deployed globally.

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The REF was established in 2002 to harness current and emerging technologies to provide immediate solutions to the urgent challenges of U.S. Army forces deployed globally. In its charter, the REF was given a unique combination of requirement validation and acquisition authorities, enabling it to procure GOTS and COTS technologies for units. Soldiers experiencing a materiel challenge or shortfall work directly with REF requirements officers to submit 10-Liners, a HQDA requirements authorization document. The 10-Liner prompts the requesting unit to explore the root of its tactical challenge and is submitted to the REF. The REF Director then has the authority to approve the requirement and provide a materiel capability to meet the unit's need.

Following a 10-Liner submission and validation, the REF operates along three lines of effort to support units: equip, insert and assess.

- **Equip** operational forces with solutions in order to reduce operational capability shortfalls, increase Soldier safety and reduce overall operational risk
- **Insert** future force technologies, threshold capabilities and/or surrogates into operational forces to speed development and validate concepts in an operational environment
- **Assess** the full range of desired capabilities and Army practices to refine, modify and streamline actions and provide Army senior leaders with appropriate recommendations

The REF is focused on near-term force adaptation. It mitigates risk for deployed and deploying units by remaining focused on the current fight and supporting urgent challenges as they occur. Through a variety of acquisition methods, ranging from using a government purchase card for simple solutions to working with Army and industry partners to accelerate more complex systems, the REF is able to immediately address the various challenges facing American Soldiers in all regions of the world.



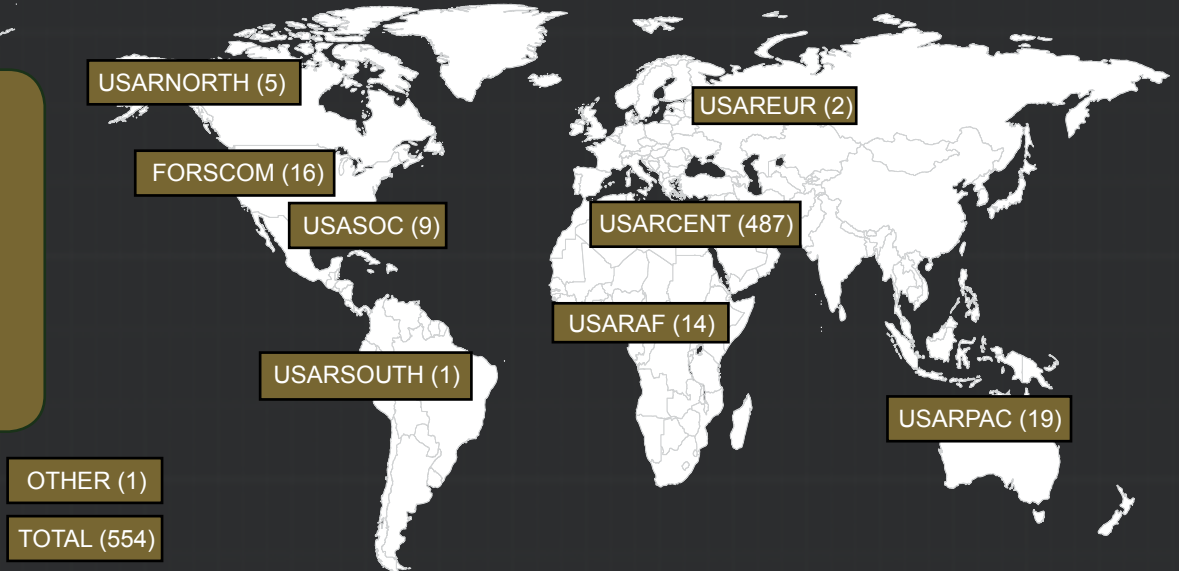
U.S. Army Photo



FISCAL YEAR 2014 AT A GLANCE

GLOBAL REQUIREMENTS

Average of
140 Days
from
Requirement
to
Delivery



As funding allows, REF supports requirements from Soldiers stationed worldwide. In FY14, the organization received 554 requirements from 7 Army Service Component Commands and U.S. Army Forces Command.

\$167,730,000
DOLLARS
EXECUTED

165 units served
from Team –
Regional
Command

6,472
ITEMS
SHIPPED

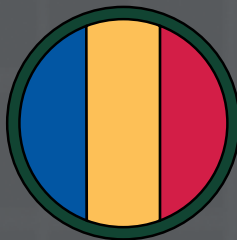
Most Common Rank of 10-Liner Submitters



REF received requirements from Soldiers ranking
from Sergeant to Major General
47% of requirements came from company-grade officers

REF LEADERSHIP

The REF is a subordinate of the U.S. Army Training and Doctrine Command (TRADOC), and the REF Director holds the authority to generate requirements for near-term solutions. To ensure compliance with acquisition regulations, the Army Acquisition Executive has designated PEO Soldier as REF's Milestone Decision Authority. A PEO-S Project Manager is embedded at REF Headquarters and serves as oversight for all procurement actions.



COL Steven A. Sliwa
Director



SGM Jose Quinones Jr.
Sergeant Major



Todd R. Wendt
Project Manager



John R. Porter
Business Manager



Kurt A. Frulla
Deputy Director /
Chief of Solutions

REF Focus Areas

The majority of the REF's portfolio falls within six broad categories that cross multiple warfighter functions: Counter Improved Explosive Device (IED), Dismounted Operations, ISR, Mission Command, Force Protection and Forward Operating Base (FOB) and Combat Outpost (COP) Sustainment. The REF's goal is to find new and innovative technologies to address urgent gaps in these and other operational categories. Recently evaluated, potential approaches are highlighted here.

COP Force Protection

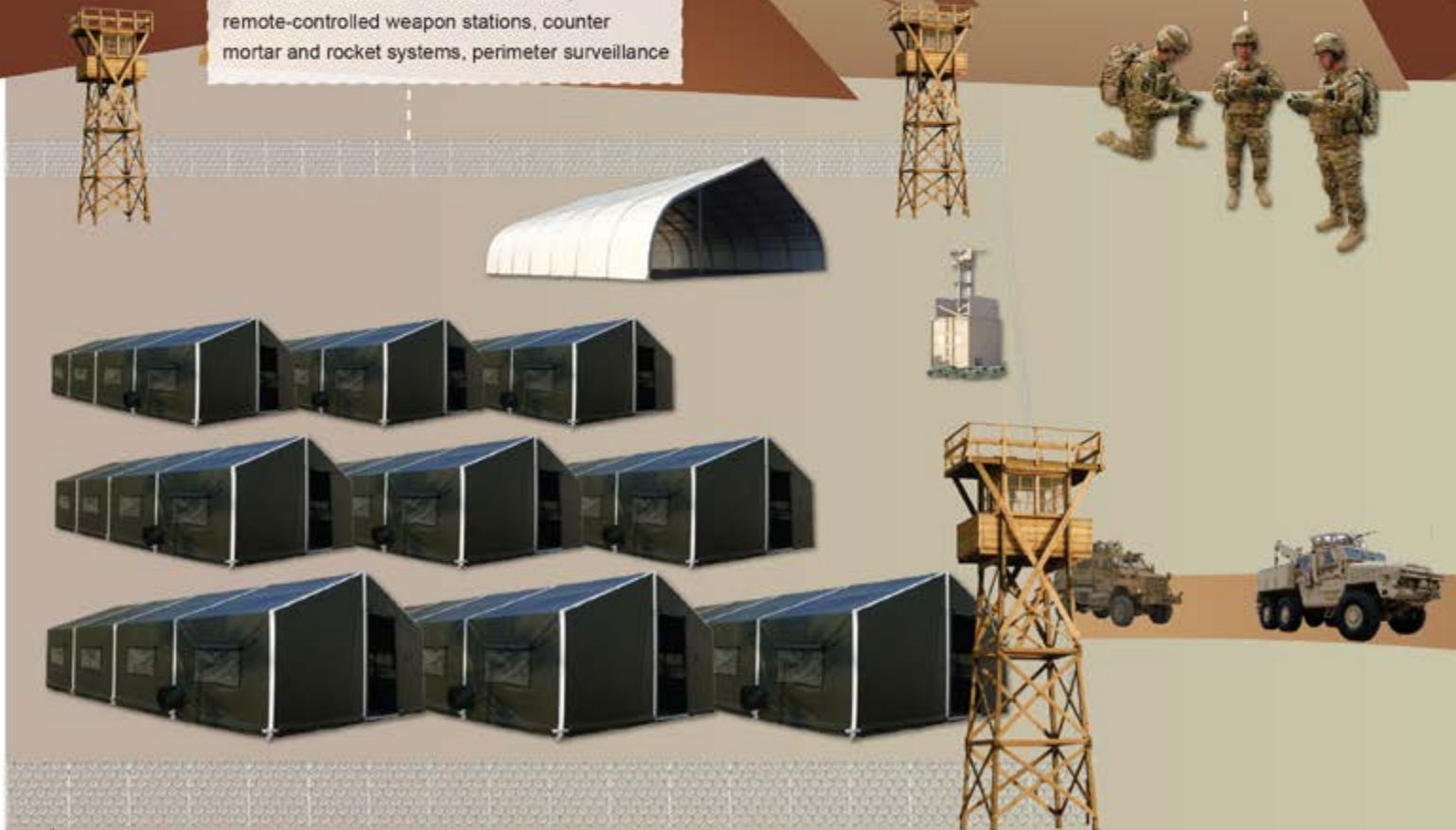
Focusing On: Optimizing ISR, lethality and standoff capabilities, limiting logistical and manpower requirements, providing low-profile systems

Potential Solutions: Portable barriers, remote-controlled weapon stations, counter mortar and rocket systems, perimeter surveillance

Mission Command

Focusing On: "Blue Force Tracking" capability for dismounted formations in a contiguous environment, interoperable capability

Potential Solutions: Personnel tracking systems with communication capability, smart tablets, headsets, heads-up information display





ISR

Focusing On: ISR capabilities in inhospitable environments, enhanced ISR capabilities, ISR challenges beyond the line of sight, such as sewers, tunnels and culverts

Potential Solutions: Unmanned sensors, extended/enhanced range IR optics, unmanned ground sensors, surveillance equipment, micro Unmanned Aircraft Systems

FOB/COP Sustainment

Focusing On: Power efficiency, limiting signature and reducing logistical re-supply burden

Potential Solutions: Solar/hybrid power, water purification, wastewater management, properly sized-generators and fuel filters



Dismounted Operations

Focusing On: Assisting dismounted formations with force protection, maneuverability and lethality

Potential Solutions: Enhanced optics, driver operated and/or autonomous support vehicles with haul capacity, Soldier Power and novel load bearing kit

Counter IED

Focusing On: IED detection devices, stand-off explosive detection, disturbed earth detection and imaging systems

Potential Solutions: Miniature robotics, maneuver enhancement tools, command wire detection, metal and mine detection



REF'S GLOBAL SUPPORT

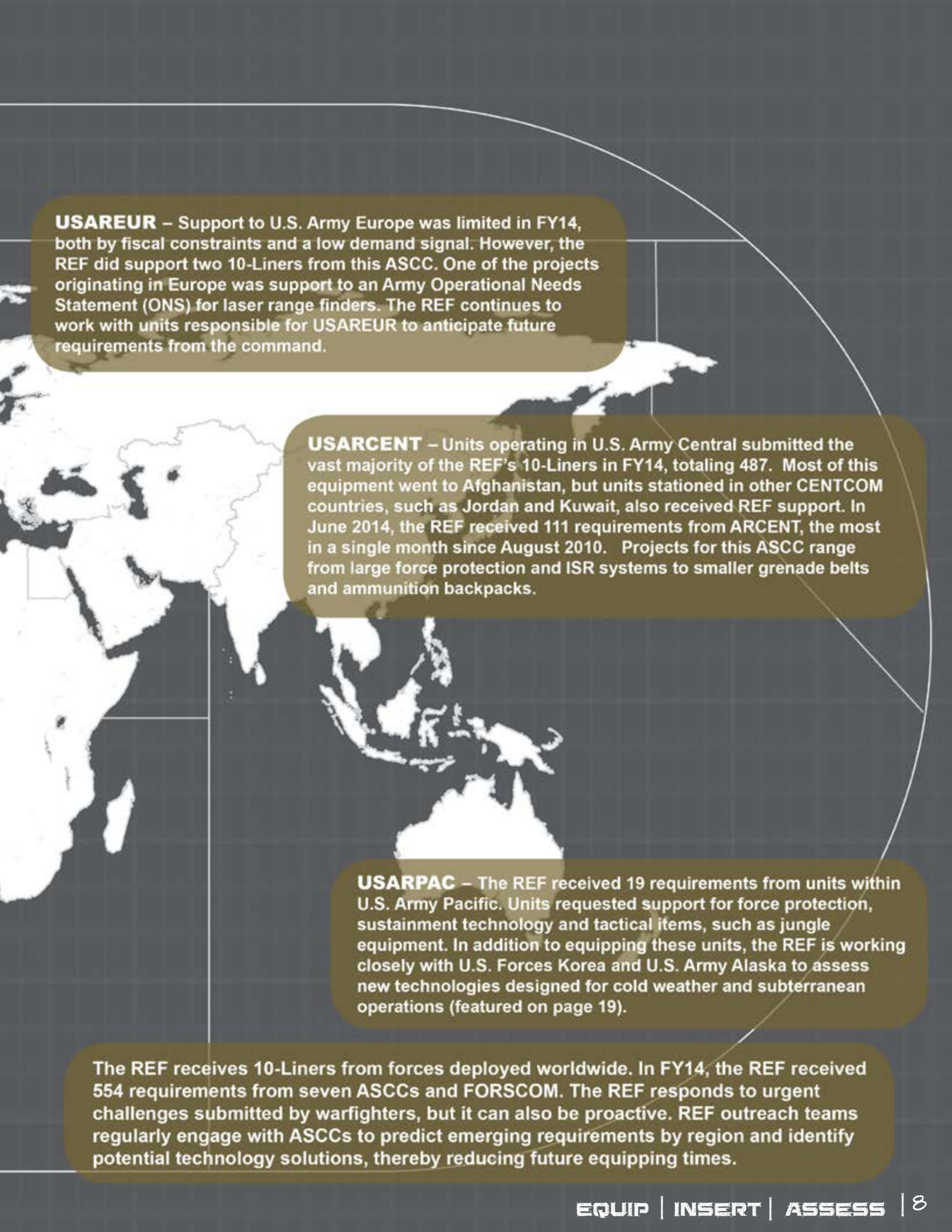


USARNORTH – The REF received five requirements from U.S. Army North in FY14 for force protection and boarder defense. Much of the REF and ARNORTH's partnership is focused in collaborative forums that include other U.S. Government agencies focused on the homeland. Efforts include a government-wide additive manufacturing library.

FORSCOM – The REF received 14 requirements from FORSCOM in FY14. The vast majority of these 10-Liners came from the units aligned with the Global Response Force (GRF), while the rest supported units preparing for deployments or training. By continuing to equip the GRF in the future, the REF will refine its ability to predict global requirement trends based on feedback from the field. In the long-term, the REF aims to use this outlet as a way to continuously hone its rapid acquisition capabilities, even after forces leave named operations.

USASOC – The REF, as a Title X organization is able to equip Army Special Operations units. Many of these requirements fall into other ASCCs, particularly ARCENT as support to Operation Enduring Freedom. However, the REF received nine requirements from USASOC units outside of Operation Enduring Freedom in FY14. These requirements include sustainment systems, the Containerized Weapons System (featured on page 16) and elevated ISR platforms.

USARSO – The REF received one requirement from U.S. Army South for a water purification system. The REF equipped the unit with Water in a Box (featured on page 20) and the unit will provide the REF with operational assessment data. The REF anticipates that future requirements from this region will focus on sustainment and partnership-building tools, given the command's priorities.



USAREUR – Support to U.S. Army Europe was limited in FY14, both by fiscal constraints and a low demand signal. However, the REF did support two 10-Liners from this ASCC. One of the projects originating in Europe was support to an Army Operational Needs Statement (ONS) for laser range finders. The REF continues to work with units responsible for USAREUR to anticipate future requirements from the command.

USARCENT – Units operating in U.S. Army Central submitted the vast majority of the REF's 10-Liners in FY14, totaling 487. Most of this equipment went to Afghanistan, but units stationed in other CENTCOM countries, such as Jordan and Kuwait, also received REF support. In June 2014, the REF received 111 requirements from ARCENT, the most in a single month since August 2010. Projects for this ASCC range from large force protection and ISR systems to smaller grenade belts and ammunition backpacks.

USARPAC – The REF received 19 requirements from units within U.S. Army Pacific. Units requested support for force protection, sustainment technology and tactical items, such as jungle equipment. In addition to equipping these units, the REF is working closely with U.S. Forces Korea and U.S. Army Alaska to assess new technologies designed for cold weather and subterranean operations (featured on page 19).

The REF receives 10-Liners from forces deployed worldwide. In FY14, the REF received 554 requirements from seven ASCCs and FORSCOM. The REF responds to urgent challenges submitted by warfighters, but it can also be proactive. REF outreach teams regularly engage with ASCCs to predict emerging requirements by region and identify potential technology solutions, thereby reducing future equipping times.

PRIORITY: TACTICAL AEROSTATS

In 2010, the REF inserted its first tactical aerostat into Afghanistan. This initial effort spurred a number of follow-on 10-Liners from units across theater looking to use these small, man-portable systems as an Intelligence, Surveillance and Reconnaissance (ISR) and force protection capability.

After four years of observing the success, the International Security Assistance Force (ISAF) Joint Command issued an Operations Order requiring units closing bases to deploy a tactical aerostat system after bringing down the larger Persistent Threat Detection System and Persistent Ground Surveillance System. The Command's validation of the system signaled the need to increase inventory downrange so the REF Forward team could quickly issue the system to units as they were needed. This allowed the REF to support 22 base closures around Afghanistan in 2014.

Additionally, using the downrange inventory, the REF equipped tactical aerostats to a U.S. Army unit supporting the Afghan National Security Force (ANSF) during the Afghan elections. In the days leading up to the election, REF Forward delivered the system and trained the unit to deploy and operate the aerostat, which flew above a polling station, monitoring surrounding activity. Feedback from other ISAF and ANSF units suggested the system could be seen several miles away and was likely an effective deterrence mechanism.

Given the tactical aerostat performance during long and short-term operations, the REF is working with Product Director Aerostats to transition the capability to an enduring program. The REF's aerostat efforts have helped define the capabilities required for future tactical models, advancing the Army's larger and enduring program.



A joint operation in Afghanistan uses REF tactical aerostats to support election security.
(U.S. Army Photo)



A REF hybrid energy solution powers the TALS, a critical system at BAF.
(U.S. Army Photo)



PRIORITY: OPERATIONAL ENERGY

A steady power supply is critical to Army operations around the world. To increase operational effectiveness, the REF works closely with units to assess their specific energy needs and equip them with solutions that reduce the energy burden in austere operating environments. In FY14, the REF's Operational Energy (OE) advisors found that one of the most prevalent energy challenges stemmed from the need for increased endurance of mission-critical assets. Additionally, the reduction of available Soldiers strains unit availability to sustain critical systems.

For example, the REF's OE advisors worked with a unit to ensure that their Tactical Automatic Landing System (TALS) did not experience power shortages during operations. The system helps land unmanned aircraft. It is typically placed in remote regions or near active runways, making the power production equipment difficult to access. Standard-issue generators present an additional challenge, as they often experience power surges, that could damage the TALS. After assessing the situation, the OE advisors equipped the unit with a 3kW hybrid power solution that included a diesel generator for backup power. This solution has increased the TALS operational readiness by preventing power surges and has reduced fuel consumption and maintenance requirements, allowing the unit to limit the number of times they have to sustain the system.

Not all solutions are as clear cut, however. In August 2014, REF received a requirement from a unit responsible for maintaining a RAID Tower at the summit of a mountain. The system's location required dedicated forces to travel outside the wire, potentially in harm's way, for refueling and maintenance. In a two-phased approach, REF first equipped the unit with a custom combination of tactical quiet generators, solar panels, battery storage and power management. Then REF partnered with Product Manager Electro-Optic/Infrared Payloads and plans to equip and validate their next generation hybrid power systems designed specifically for the RAID Tower. REF will work with the receiving unit to provide initial in-theater operational evaluations for the upgraded systems.

By training Soldiers on proper energy practices, decreasing the sustainment burden and improving power surety of critical systems, the REF's OE team is helping improve unit readiness and effectiveness worldwide.

OVER 25 SITES ASSESSED GLOBALLY INCLUDING IN AFGHANISTAN, MAURITANIA, NIGER, KENYA, DJIBOUTI AND KUWAIT.



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THE REF FAST TRACK

REF aims to deliver technology solutions in days and weeks, not months and years. Whenever possible, particularly for tactical requirements, REF purchases COTS and GOTS technologies that fill Soldiers' capability shortfalls using a government purchase card. This method of acquisition allows for faster delivery of nonstandard equipment to Soldiers deployed worldwide. Oftentimes, the REF receives multiple 10-Liners with the same materiel challenge and will equip proven solutions multiple times. Therefore, the "Fast Track" projects below highlight the total quantity equipped in FY14 and the average number of days from receiving the requirement to equipping the unit.

PROJECT: SOFT LITTER

Capability Gap: Standard issue litters are heavy and difficult to carry on patrols. Soldiers needed a lighter option to ensure that they always have the ability to move casualties.

Solution: The REF purchased a 15-ounce, COTS litter that fills minimal space. The litter can be attached to the MOLLE webbing of the Plate Carrier System, allowing individual squads to always have the capability to evacuate casualties.

Days to Delivery: 7 Days

Number Equipped: 18 Litters

Units Equipped: 1 Unit



PROJECT: 40MM GRENADE BELT

Capability Gap: Many units in Afghanistan have an assigned Grenadier, who historically has carried 40mm ammunition in a standard assault pack. This practice increases reload time and ultimately delays their ability to place effective fire on the enemy.

Solution: The REF purchased belts specifically designed to carry rounds of 40mm ammunition. This capability enables the Grenadier to quickly reload, so he can more effectively engage the enemy.

Average Number of Days to Delivery: 13 Days

Number Equipped: 44 Belts

Units Equipped: 4 Units



All Soldier kit requirements are routinely coordinated with PEO Soldier to share information on when the need is deemed urgent and the product is not available through other Army channels.



PROJECT: COMPACT TENTS

Capability Gap: Soldiers requested lightweight, individual shelter systems capable of being transported in assault packs.

Solution: The REF purchased COTS tents that only weigh 4.5 pounds and provide instant shelter with space for one individual and a fully loaded pack.

Days to Delivery: 27 Days

Number Equipped: 25 Tents

Units Equipped: 1 Unit



PROJECT: M320 GRENADE LAUNCHER HOLSTER

Capability Gap: Grenadiers typically store their launchers in standard-issue assault packs while using their primary weapon. This makes it difficult to quickly reach their launchers when needed for supporting fire, reducing the unit's effectiveness. **Solution:** REF purchased a COTS holster designed to provide a tactically proficient means to quickly draw, fire and store the M320 Grenade Launcher. These particular holsters are designed around the standard Army load-carriage MOLLE system and provide ease of carry and access.

Average Number of Days to Delivery: 41 days

Number Equipped: 44 Holsters

Units Equipped: 3 Units



PROJECT: AN/PRC-148/152 ANTENNA DISPLACEMENT KIT

Capability Gap: Traditionally, AN/PRC-148/152 radio antennas are placed on the front of a Soldier's body armor for easy accessibility. However, this placement often blocks the Soldier's line-of-sight when aiming and firing his or her weapon.

Solution: The REF purchased COTS antenna relocation kits to attach the antenna to the back of Soldiers' body armor or assault packs, thereby maintaining usability and improving visibility.

Average Number of Days to Delivery: 58 days

Number Equipped: 30 Kits

Units Equipped: 6 Units



downrange Soldier kit challenge trends. The REF approves COTS purchases for Soldier-kit s.



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*One of REF's Ex Labs deployed to Afghanistan.
(U.S. Army Photo)*

THE REF EXPEDITIONARY LAB

The REF Expeditionary Labs, or Ex Labs, are containerized engineering hubs designed to be transported anywhere in the world. They connect Soldiers with scientists and engineers trained to design solutions at the point of need. Currently, the REF owns three Ex Labs, two of which spent FY14 in Afghanistan, while the other supported requirements from Fort Belvoir, Va. Each lab deploys with a non-commissioned officer, who is able to liaise with Soldiers when they come into the lab and explain their concerns to the on-site engineers. Following a request from a Soldier, the lab personnel use a variety

of additive and reductive manufacturing techniques, to include 3D printers and Computer Numerical Control machines, to prototype solutions.

At the end of FY14, REF redeployed the lab at Kandahar Air Field (KAF) after removing the most critical tools and sending them to the lab at BAF. Upon its return to the U.S., the KAF lab will undergo a refurbishment and technology update. In the future, the KAF lab and the lab at Fort Belvoir will be available to deploy to other regions of the world to support units as needed.

CALL TO ACTION:
DO YOU KNOW A UNIT
THAT IS INTERESTED IN
LEARNING MORE ABOUT
THE LAB CAPABILITY?

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*The REF Ex Lab before departing Kandahar.
(U.S. Army Photo)*



EX LAB SOLUTIONS

Ironman Backpack Feed Tray Adaptors

Challenge: Soldiers who used the IRONMAN ammunition backpack, a COTS solution the REF equipped to units in Afghanistan, praised the capability to carry their ammo for the MK48 or M240B, but wanted the same flexibility for the M249.

Solution: Lab engineers fabricated an adaptor for the IRONMAN backpack that placed the ammunition into the correct position to feed into the M249. This allowed Soldiers to carry whichever weapon they deemed necessary for their mission and ample ammo.



A Soldier tests the REF Ironman Backpack adaptor. (U.S. Army Photo)

Ram's Head SATCOM Antenna

Challenge: A unit came to the Ex Lab looking for a custom fabricated, ruggedized satellite communications (SATCOM) antenna that required little assembly before use.

Solution: Over the course of one day, lab engineers tested several antenna models with the unit's equipment and chose the best prototype to refine. The improvised antenna was housed in a cover to increase the durability and allow Soldiers to continuously wear the system on their rucksacks. During tests, the unit maintained communications in a notoriously spotty area. Lab personnel will gather operational feedback from the unit to further improve the solution.

CREWS Detection System

Challenge: Vehicles entering a FOB must turn off their Counter Radio Electronic Warfare (CREW) systems, as it can interfere with the base's radio frequency (RF)-reliant operations.

Solution: Lab engineers designed an RF-detection system to alert drivers when the CREW is on using both visual and audible alerts. The requesting unit was able to test the prototype and make adjustments before finalizing its order. Lab personnel are working with reach-back support in the U.S. to manufacture more than 30 of the systems.



A Soldier testing the Ram's Head SATCOM Antenna at the REF Lab. (U.S. Army Photo)

Modified HEMTT RPG Defeat System

Challenge: While installing a rocket-propelled grenade defeat system onto their Heavy Expanded Mobility Tactical Truck (HEMTT), a unit noticed that the system's netting prevented operators from removing the spare tire and gaining access to the air filter.

Solution: After canvassing commercial solutions, lab personnel concluded that there was no COTS technology solution for this unit's challenge. The team designed and fabricated a quick-release mechanism to allow for tool-less hinged opening of the netting. After testing the solution, the team requested that the REF outfit seven more trucks with the solution.



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PROJECT: WAVE SATCOM UPLINK

Because rapid equipping means prioritizing speed-of-delivery over completing a full DOTMLPF evaluation, REF projects accept a certain level of approved risk in product performance and utility. As units use REF solutions, they often provide operational feedback, which can often lead to additional requirements and 10-Liner requests. For example, in FY13, units conducting dismounted and mounted missions in Afghanistan requested low-level voice intercept systems to support network analysis, voice biometric identification and targeting effort. The REF partnered with the Intelligence and Information Warfare Directorate to equip systems in March 2013. WAVE provided the units with a great capability. However, they found it was only effective if the sensors were within line-of-sight of the base station, and subsequently submitted a follow on 10-Liner to extend the systems' range.

The REF identified commercial uplink technologies to upgrade three WAVE systems by enabling the sensors to transmit signals via satellite. There are several advantages to this upgrade. First, it allows Soldiers to work with the WAVE system in rugged terrain. Second, the uplink allows units to consolidate data in multiple locations for shared access and analysis. By sending the data via satellite, multiple stations receive, record and analyze the feed, allowing Commanders in the Tactical Operations Center access as well.

CALL TO ACTION:
CONTACT THE REF OPS CENTER
TO SUBMIT A 10-LINER FOR URGENT
TECHNOLOGY SOLUTIONS.

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Soldiers adjust the WAVE system in Afghanistan.
(U.S. Army Photo)

HALF OF THE REF WAVE SYSTEMS IN THEATER
HAVE BEEN UPGRADED WITH
THE SATCOM UPLINK



U.S. Army Photo

PROJECT: CONTAINERIZED WEAPON SYSTEM (CWS)

The Containerized Weapon System (CWS) provides Soldiers the ability to combat threats from a protected position. The system employs the combat-proven M153 Common Remotely Operated Weapon Station (CROWS) managed by Project Manager Soldier Weapons (PM SW), which is mounted onto a large extendable mast housed in a discreet shipping container. Typically, the CROWS is raised above the container and operators control the system from a distance; however, the CWS's computer can use shot detection sensors to "slew to cue" and engage threats in combat situations. The CROWS is compatible with a variety of weapons, which in the near future may include less-than-lethal weapons.

The CWS was initially equipped to a unit in Afghanistan that often manned an outpost designed to draw the enemy away from the main FOB. The unit integrated the CWS into the perimeter defense and force protection systems. During an indirect fire attack, the unit was able to take cover and use the CWS' slew-to-cue capability to rapidly and successfully engage the enemy. Given the system's success, it has been incorporated into many base defense systems around theater.

In FY14, units deploying to outposts in both Trans-Saharan West Africa and the Horn of Africa submitted REF 10-Liners to bolster their defense systems. The REF approved the requirement and plans to provide funding and acquisition oversight of the system, while PM Close

Combat Weapons System (PM CCWS) will provide management oversight and training for a total of 22 systems in the future.

Partnerships such as the one between the REF, PM SW and PM CCWS are symbiotic. The ability to work closely with the Army's traditional acquisition groups gives the REF a wealth of solution developers and access to emerging government-off-the-shelf technologies. Meanwhile, the REF is able to assist the PM in making well-informed procurement decisions by providing Soldier feedback and information on requirement trends. Additionally, the REF often provides funds to accelerate new iterations of PM products to meet urgent operational requirements. Finally, partnerships like this position successful materiel solutions toward the path to become programs of record, which, given its success, is the ultimate goal for CWS.

OF THE 10 CWS EQUIPPED IN FY14, 8 WERE "HARVESTED" FROM LOCATIONS IN THEATER THAT NO LONGER REQUIRED THE SYSTEMS.



PROJECT: SOCIAL MEDIA ANALYTICS

In 2011, during the Arab Spring, the world witnessed social media's power to spread ideas and movements around the world. Since those events, the enemies of the United States have harnessed the same techniques to mobilize followers and call for action. In FY14, a unit submitted a 10-Liner for social media exploitation program for proactive analysis of open source information.

Social media networks are fabricated by hundreds of thousands of users. Scanning for threats may be a daunting task, so the REF partnered with members of the intelligence community to identify a cloud-based, COTS program that uses advanced analytics to identify key influencers on social media. The program, which is accessible from any computer, rapidly identifies accounts linked to particular interests, groups or events. This allows analysts to quickly sift through the thousands of innocuous posts and identify "who matters" then focus on their information to understand motives and intent. The software can be setup to update the information as often as the user needs, while also allowing real-time event tracking. By analyzing open source information as it is published, Soldiers can now anticipate threats and preempt their intended outcome. All these capabilities reduce the cognitive burden on analysts, freeing them up to focus on other intelligence sources.

During the first five-day training session with the requesting unit, the program proved its capability. The Soldiers identified two direct threats, one only 11 seconds after it was published. The first threat came from an account closely linked to, and heavily influenced by, extremists. The user called for an attack on American military members stationed in Saudi Arabia. After it was identified, the threat was quickly reported up the chain of command. A second user posted a photo containing a threat to an allied government. The Soldiers training on the software were able to pinpoint the location of the photo from its geo-tag and alert authorities of the threat.

The REF believes this capability will be a valuable tool for Intelligence Soldiers assigned to commands around the world. REF will share lessons learned and provide feedback to its partners at Army Cyber Command to test and evaluate the capability for Army-wide application.

24 LICENSES & DATA PLANS PURCHASED

Soldiers use social media analytic software to track current and emerging threat networks.
(U.S. Army Photo)



PROJECT: HAND-HELD PRECISION TARGETING DEVICE

In 2012, the Fires Center of Excellence approached the REF to procure hand-held precision targeting devices (HHPTD) for a unit deploying downrange. After approving the requirement, the REF turned to its partners at Product Manager Soldier Precision Targeting Devices (PM SPTD) at PM Soldier Sensors and Lasers, the Army's fielding authority for Soldier-portable precision targeting systems. The team at the PM responsible for developing the Army's HHPTD Program of Record, the Joint Effects Targeting System (JETS), was the most knowledgeable about current and emerging technologies in the field, and therefore could provide the REF acquisition team with the best interim solution recommendations. In return, the REF provided the PM with funding and operational feedback to bridge the materiel gap until the fielding of JETS.

The REF and PM SPTD identified two models of COTS HHPTD technologies that fit the requirement's specifications. Both systems featured a celestial navigation system, the same system being used in JETS. During the initial system evaluations, the navigation did not perform correctly. So, the responsible, original equipment manufacturer spent time in FY13 fixing the issues. Then, in FY14, the REF funded the systems'

official safety confirmation tests at White Sands Missile Range (WSMR), New Mexico.

Tested in separate events, both models received safety releases and capability and limitation reports. Since March 2014, 15 systems have been equipped with two as spares. The second model will be equipped in FY15.

The REF's interim HHPTD solution provided many lessons taken into consideration by the PM for the development of the JETS program. Primarily, by catching the defect in the celestial navigation system before the JETS program was released, the Army saved a significant amount of time and money. Additionally, the interim solutions proved that industry could supersede the initial JETS baseline requirements in size, weight, power and cost. So although the REF solution took longer than the goal of 180 days to deliver, the process of getting the interim-solution right will inform larger Army programs.

PROJECT ONGOING:
34 HHPTD SYSTEMS PROCURED
FOR DEPLOYING UNITS.

A Soldier tests the second HHPTD model at WSMR in the summer of 2014.

(U.S. Army Photo)





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United States Army

ASSESSMENT: SUBTERRANEAN OPERATIONS

Current and potential adversaries, including foreign militaries, terrorist groups and criminal organizations across the globe, employ tunnels and underground facilities to defeat modern intelligence, surveillance and reconnaissance capabilities. These subterranean (SbT) facilities are becoming more sophisticated and valuable to enemy operations, increasing the likelihood of U.S. forces encountering military-purposed SbT structures on future battlefields. It is imperative that U.S. ground forces organize, train and equip to prepare for the unique challenges and hazards associated with SbT operations.

The REF and the U.S. Army Asymmetric Warfare Group (AWG) are working to identify required operational capabilities for conducting operations in a subterranean environment and to establish SbT operations materiel and non-materiel baselines. Working together, the two organizations canvassed industry in search potential solutions and developed Tactics, Techniques and Procedures (TTP) trainings to support SbT operations.

After hosting a series of vendor demonstrations, the REF conducted a Concept of Employment and Integration event at the Colorado School of Mines to assess selected technologies from the perspective of a conventional force Soldier. During the event, observers assessed how the selected technologies mitigated seven technical challenge areas related to SbT operations: mobility, protection, reconnaissance, communication, life support, visibility and situational awareness.

The SbT operations assessment will deliver a report including a portfolio of readily available COTS and GOTS solutions, the associated TTPs and concepts of employment. Assessments such as this reduce future testing requirements and shorten the lead time for safety and capability reports required before any equipping actions. By investing the time and resources today, the REF and AWG are building capability against the current and emerging threat while ensuring lessons learned are captured to enhance the enduring solution.

PARTNERS:

ASYMMETRIC WARFARE GROUP
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ARMY TESTING AND EVALUATION
COMMAND
RESEARCH, DEVELOPMENT AND
ENGINEERING COMMAND



Soldiers test various technologies in a SbT assessment, Summer 2014.
(U.S. Army Photo)



ASSESSMENT: WATER IN A BOX (WIAB)

Water resupply missions to units in austere locations create a large burden on logistics teams. Therefore, the Army is reducing the amount of bottled water shipped to the field by employing local purification locations around Afghanistan. However, specialized Military Occupation Specialty (MOS)-skilled Soldiers must be on hand to monitor the testing, a resource not always available at the company level or below.

To mitigate the water burden on units, the REF identified COTS and GOTS technologies and integrated them to create a system, called Water in a Box (WiaB) that can purify fresh, brackish or ocean water to meet Environmental Protection Agency and Army Public Health standards. One Soldier can remotely monitor multiple WiaBs, reducing the personnel commitment of other water-purification options. The system can store up to 1,000 gallons of purified water in a storage bladder and can package it into three-liter pouches compatible with CamelBak-like backpacks. By facilitating remote water purification and quality testing, WiaB can reduce the demand for resource constrained MOS personnel and logistics burden.

In FY14, the REF participated in TRADOC's Network Integration Exercise 14.2 and the preceding New

Equipment Training at Fort Bliss, Texas. During this exercise, the REF validated its training program for non-MOS-trained Soldiers to setup, operate and maintain WiaB. Though the planned assessment evaluated the system's ability to produce water supplies for a Combat Outpost of 103 personnel, the system exceeded planned performance and delivered drinking water for an additional 600 Soldiers.

In September 2014, the REF equipped units with U.S. Army South with WiaB for additional field testing and training. WiaB will also support Army Pacific Command in the FY15 Pacific Pathways exercise. The REF is anticipating that there will be many follow-on requests as reducing the burden of water will always be a priority for units working in austere environments.

"THIS TASTED AS GOOD AS EVIAN, AND BELIEVE ME I KNOW MY WATER. I'M KIND OF LIKE A WATER CONNOISSEUR."

-SG, 1-35TH AR

Soldiers enjoy water produced by the WiaB.
(U.S. Army Photo)





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ON THE HORIZON

Moving into FY15, the REF will complete its transition to TRADOC. This move puts the REF in prime position to inform TRADOC of emerging requirements from the field, as they develop requirements for the broader Army. To do this efficiently, the REF will work closely with the TRADOC Forward Liaison Officers, the AWG and the Research, Development and Engineering Command Forward Elements. This will help REF support the RAF and understand the challenges in various theaters around the world. This type of predictive analysis not only informs the Army of upcoming challenges, it also allows the REF to posture itself to solve potential problems before units deploy.

Though the REF is broadening its scope, it will

continue to support units serving in current theaters. In Afghanistan, as the number of Soldiers decrease, the number of 10-Liners submitted remained consistent. The remaining troops are facing a new type of mission, which reveals new challenges and materiel gaps.

To comply with U.S. Force Manning Level in Afghanistan, the REF has consolidated its forward footprint to BAF. From this location, the REF will operate one Ex Lab to quickly solve Soldier problems. Additionally, the REF office at BAF will be a hub for any Field Service Representatives needed to sustain the REF systems remaining in theater. Finally, the REF will continue to analyze systems being retrograded from Afghanistan for use in other regions facing similar materiel challenges.



One region that the REF anticipates will need increased support is Iraq. At the end of FY14, ISIL gained momentum spurring Army advisory deployments to the region. The REF quickly leaned forward to explore ways to support. In FY15, the REF will establish a forward location in Kuwait. From this location, the forward team will have better access to Soldiers deploying to Iraq and can be better postured to support Soldiers within the region.

The Kuwait office will also serve as an access point to the Horn of Africa. The REF anticipates an increased number of requirements from HOA and other regions of Africa

in FY15 and will continue to lean forward to support this unique operating environment. Additionally, this support includes working with Regionally Aligned Forces an Army Special Forces teams training partner militaries across the continent.

As the events of FY14 show, it is nearly impossible to predict global crises and challenges. In FY15, the REF will continue to mitigate the risk of the unknown, by providing units with materiel solutions to urgent shortfalls. Wherever U.S. Army troops deploy, the REF will be behind them, ready to equip them with the latest technologies.



U.S. Army Photo

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**DOES YOUR ORGANIC
EQUIPMENT MEET
YOUR NEEDS?**

**DO YOU HAVE A
TECHNOLOGY
SOLUTION?**

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