

### **OVERVIEW:**

Reporting to Department of the Army, Deputy Chief of Staff, G-3/5/7, the Rapid Equipping Force (REF) is a small and unique organization with a large operational impact. It combines requirement validation, acquisition authority and flexible funding under one roof and provides the Army's Title-10 rapid response capability to develop, prototype, acquire, integrate and assess commercial and government off-the-shelf solutions to meet urgent combat requirements for deployed forces. Since its creation in 2002, the REF has rapidly equipped solutions in support of IED detection and neutralization, intelligence, surveillance and reconnaissance, force protection, soldier load reduction, operational energy and more, the majority of which are tailored for small units in austere locations.

As of June 30, 2013, REF received 398 new requirements during fiscal year 2014 and has 298 active projects. During FY14, REF delivered 2,565 end items to units in U.S. Central Command, Africa Command, Pacific Command and others. In June 2014 alone, REF received 117 new requirements. This is the largest overall number of requests since August 2010.

### **MISSION:**

The Rapid Equipping Force harnesses current and emerging technologies to provide immediate solutions to the urgent challenges of U.S. Army forces deployed globally.

### **VISION:**

The REF is led by an experienced combat leader with the mindset of a warfighter, whose guidance drives the REF to employ Soldier ideas and innovations into its game-changing solutions, while simultaneously seeking the latest capabilities from industry, academia and government.

### **LINES OF EFFORT:**

Per its charter, REF operates along three lines of effort: 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 business practices to refine, modify and streamline actions and provide Army senior leaders with transformational change recommendations.

### **FUTURE:**

In January 2014, the Office of the Under Secretary of the Army issued a memo approving REF's long-term implementation plan, stating "the capabilities afforded the Army by the REF must be rendered enduring." As part of the long-term plan, REF will transition to the Training and Doctrine Command (TRADOC) no later than September 30, 2015.

As the REF looks to the future, it will reposition to anticipate global, emerging requirements associated with an expeditionary Army. As units are identified to support the Regionally Aligned Forces, REF will share its predictive analysis and work closely with the units to appropriately fill urgent capability gaps as required.

## FREQUENTLY ASKED QUESTIONS

**Q: What is “rapid equipping”?**

**A:** “Rapid equipping,” means acting quickly to procure and deliver nonstandard equipment for a specific time, place and unit to mitigate urgent capability shortfalls. REF’s goal is to fill a requirement in less than 180 days to meet unit deployment cycles.

**Q: What is the difference between “equipping” and “fielding”?**

**A:** Equipping is providing a timely solution to address the urgent operational needs of a specific unit. Fielding, conversely, is a complete and detailed doctrine, organization, training, material, leadership, personnel and facilities (DOTMLPF) approach and focuses on a general solution for the entire Army.

**Q: What makes REF unique?**

**A:** The REF combines three core authorities, requirement validation, acquisition and flexible funding, integrating all elements of Life Cycle Management on a much smaller scale, into a single organization to address urgent requirements for specific units.

**Q: Who is the REF customer?**

**A:** REF provides immediate commercial-off-the-shelf (COTS) and government-off-the-shelf (GOTS) solutions to deployed and pre-deploying Army units.

**Q: I am a Soldier with a capability gap. How do I get REF support?**

**A:** Any Soldier can contact the REF operations center to request a 10-Liner, the HQDA requirements authorization document that allows REF to procure COTS and GOTS solutions. This simple form gathers information about the capability gap and operational intent for the solution.

Visit [www.ref.army.mil](http://www.ref.army.mil) for more information.

## RAPID EQUIPPING FORCE

United States Army

REF OPERATIONS CENTER –

FORT BELVOIR:

703-704-0937

NIPR EMAIL:

USARMY.BELVOIR.HQDA.MBX.REF-OPS-CENTER@MAIL.MIL

SIPR EMAIL:

USARMY.BELVOIR.HQDA.MBX.REF-OPS-CENTER@MAIL.SMIL.MIL

REF FORWARD TEAM –

BAGRAM AIR FIELD

BAF BUILDING #13997

SVDIP:

308-431-6063/5733/5012

DSN:

318-481-8775/9278



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Soldier-Driven Solutions

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### Mission:

The Rapid Equipping Force (REF) harnesses current and emerging technologies to provide immediate solutions to the urgent challenges of U.S. Army forces deployed globally.

### Lines of Effort:

**Equip** operational forces with solutions in order to reduce operational capability shortfalls, increase Soldier safety and reduce overall risk.

**Insert** future force technologies, threshold capabilities and surrogates into operational forces to speed development and validate concepts in an operational environment.

**Assess** the full range of desired capabilities and Army business practices to refine, modify and streamline actions and provide Army senior leaders with appropriate change recommendations.

## UNIQUE AUTHORITY

The REF Director is authorized by HQDA G-3/5/7 to generate requirements for near-term solutions for an identified capability gap. REF is rapid because it combines requirement validation, acquisition and flexible funding under one roof.

The REF's primary focus continues to be support to U.S. troops deployed to Afghanistan, followed by support to Iraq, Horn of Africa and the Philippines. Direct access to Soldiers is a critical component of the REF process, and a small REF forward team remains in Afghanistan today, working directly with end users to define requirements and identify potential capabilities. Additionally, the forward team oversees delivery and sustainment of REF systems in theater.

In addition, the organization is leaning forward to anticipate requirements from the Global Response Force and Regionally Aligned Forces. Through active engagement with Army units deployed globally, REF will identify emerging, urgent needs by region and identify corresponding off-the-shelf solutions when requirements for non-standard equipment are anticipated.

The Army deemed REF an enduring capability in January 2014. With this decision, it retains a mechanism for rapid acquisition, adaptation in unpredictable operational environments and technological advantage over our adversaries. Milestone Decision Authority, or PM REF, is provided by PEO Soldier. In October 2014, REF will transition under the Army's Training and Doctrine Command (TRADOC).

### REF Capability Areas:

REF solves Soldier problems across all warfighter function areas. The organization focuses on tactical challenges faced by units at the Brigade-level and below.

- Mission Command, including Blue Force Tracking and Communications
- Intelligence, Surveillance and Reconnaissance
- Small Combat Outpost Sustainment
- Force Protection
- Dismounted Soldier Support
- Counter-Improvised Explosive Device





# Rapid Equipping Force



## ENGINEERING SOLUTIONS



### Expeditionary Laboratory (Ex Lab)

Rapidly prototype and engineer solutions to the urgent operational needs of forward-deployed Soldiers

### M249 Bipod Link

#### The Challenge

The standard issue bipod attachment for the M249 is fixed and does not allow horizontal movement. The M249 must be picked up and physically repositioned to point in a new direction.

#### The Solution

In less than one week, Ex Lab staff developed a prototype for fit testing and Soldier approval. REF was able to manufacture aluminum versions on the milling machine, and ultimately, provided designs to the appropriate Program Manager for further evaluation.

#### The Result

The M249 can engage multiple directions without having to be manually repositioned, reducing Soldier exposure.



Bringing Scientists and Soldiers Together to Find Solutions to Challenges in the Field



### Valve Stem Guard



#### The Challenge

The exposed valve stems on several military vehicles were torn off by obstacles causing convoy delays.

#### The Solution

Within five weeks of the request, Ex Lab staff designed, machined and worked with partners to manufacture and install more than 100 metal guards over vehicle valve stems.

#### The Result

No issues or broken valve stems have been reported on the trucks receiving the guards.

### X90 USB Power Supply



#### The Challenge

Soldiers carry various electronic devices on missions that consume power and have limited operational time. The x90 is a standard military battery that is readily available for Soldiers; however, the x90 does not support charging a USB powered device.

#### The Solution

In one week from the initial idea, Ex Lab staff produced the first version of an x90 USB power adapter by modifying commercial-off-the-shelf equipment. Over the next several weeks, Ex Lab staff provided iterative versions, improving current and charging capacity.

#### The Result

Any electronic device that can be charged through a USB cable can now be charged by a readily available battery in theater, greatly increasing runtime of support devices for longer missions.

## MK-48 Mounts

### The Challenge

Soldiers prefer to use the MK-48 on dismounted missions due to its reduced weight, but the Ironman backpack is designed to only feed ammunition into the M-240B and M-240L, which are both much heavier weapons.

### The Solution

Within three weeks, the Ex Lab staff designed and fit a 3D-prototype bracket to the Ironman feeder. Following initial testing, the lab staff partnered with a manufacturer to produce and distribute 44 functional, aluminum MK-48 adaptors to Soldiers in the requesting units.

### The Result

After the initial equipping, 40 additional adaptors were requested by the Soldiers in three units and on six teams.



## Handheld IED Detector Light Mounts

### The Challenge

Soldiers on night patrols lacked a way to light the ground beneath their handheld IED detectors and were using duct tape to adhere flashlights to the systems, which caused interference.

### The Solution

It only took nine days for the Ex Lab staff to equip Soldiers with the first iteration of the light mount system. The lab designed several versions and now the mounts can secure three tactical lights to the system, greatly improving the range of ground-illumination.

### The Result

Word of the light mount solution spread quickly and REF quickly received many follow-on requests. The number of requirements for light mounts outpaced the REF's ability to print them. Ultimately, the REF partnered with the Department of Energy, Kansas City plant to print and deliver approximately 500 light mounts.



## Route Chalker

### The Challenge

While on patrol, infantry and EOD Soldiers mark IED-cleared routes using poker chips, chemical lights or powders. These methods require troops to bend over and place the marker, slowing missions and causing strain on the Soldiers' backs.

### The Solution

In the week they were approached, the Ex Lab staff designed and tested a powder shaker that meters out colored chalk attached to a collapsible pole to assist with route-marking.

### The Result

After several months of end-user assessment, the lab continuously improved the marker design. Secondary iterations allowed Soldiers to attach different types of chalk bottles and added weighted balls and rods as anti-clogging measures to better dispense the marking chalk.



## Locking Pintle Mount

### The Challenge

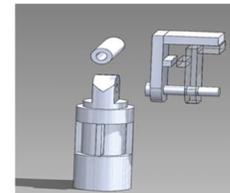
A unit approached the lab and requested that the staffers design a mechanism to lock crew-served weapons into guard towers.

### The Solution

The lab designed several versions of a locking pintle mount that could be used on a heavy or light barrel weapon. After testing, REF partnered with industry to manufacture the final version from steel before being issued to units.

### The Result

The locks limit the field of fire both horizontally and vertically, preventing the weapon from engaging incoming aircraft or from being turned inward onto the base.





# TWELVE YEARS OF RESULTS

The U.S. Army Rapid Equipping Force addressed thousands of requirements in support of the Global War on Terrorism. Many of these efforts informed further Army research and development or became Programs of Record. The following notable projects demonstrate the breadth of REF capabilities in support of deployed units.

## 1. PACKBOT

The Packbot was inserted into Afghanistan in 2002 after the Vice Chief of Staff of the Army, General John Keane challenged Colonel Bruce Jette with finding a solution to mitigate Soldier casualties from booby traps and grenade blowback during cave search missions. Packbot was the first man-packable robot deployed to theater and provided Soldiers with visual confirmation capabilities. The system led to the development of follow-on robots that are still in use today. Because this system illustrates a leap in technological capability, the Packbot is featured at the Smithsonian American History Museum's "Price of Freedom" exhibit in the tribute to the Global War on Terrorism.



*The Packbot's first mission in Afghanistan. (July 2002)*

## 2. RAVEN

During the early years of Operation Iraqi Freedom, the REF equipped units with the Raven, a hand-launched, unmanned aerial system to provide Soldiers with real-time situational awareness. Today, the Raven is organic equipment and managed by PM UAS.



*U.S. Army Spc. Ryan Dickinson launches the Raven UAS. (U.S. Army photo by Sgt. Garrett Hernandez/Released)*

## 3. BIOMETRICS

After the fall of Baghdad in 2003, DoD leadership directed REF to partner with the Coalition Provisional Authority, the State Department and the FBI to develop an Iraqi national identification program, including an identification card system and the Automated Fingerprint Identification System, to be used to identify insurgents involved in IED-warfare and to identify known terrorists. This project was transitioned to the Biometrics Task Force.

## 4. BOOMERANG

The Boomerang, which uses acoustic sensors to detect the source location for sniper fire, was initially developed by DARPA and the Marine Corps. Then in 2006, the Army directed REF to equip units in Iraq with the systems, while integrating it with slew-to-cue weapons to improve Soldiers' ability to confirm and engage the enemy. In 2008, this system transitioned to PM Ground Sensors.

## 5. RAPID DEPLOYMENT INTEGRATED SURVEILLANCE SYSTEM

Originally a temporary solution while a more robust small base, force protection system was being developed, RDISS monitors movement along multiple avenues of approach. Following positive performance in the field, RDISS was incorporated with the more comprehensive Base Expeditionary Targeting and Surveillance Systems- Combined protection system, managed by the Army Communications and Electronics Command.

## 6. MAN PORTABLE LINE CHARGE (MPLC)

In 2011, REF partnered with AWG to develop a lane-interrogation capability. These lightweight charges are designed to clear a narrow footpath and expose, disrupt or neutralize IED trigger mechanisms. Due to its success, the MPLC is being considered by the Counter-Improvised Explosive Device Non-Standard Equipment Army Requirements Oversight Council to earn enduring capability status.



*Pfc. Grant Winters deploys the MPLC system during a training exercise in Afghanistan.*  
(U.S. Army Photo by Cpl. Alex Flynn)



*U.S. Army Cpl. Andrew Strickland operates a REF Minotaur in Afghanistan.*  
(U.S. Army photo by Spc. Joshua Edwards)

## 7. LMAMS

The Lethal Miniature Aerial Munition System provides Soldiers with a precision-guided, non-line-of-sight aerial munition. The system can be employed in less than two minutes and allows operators to visually confirm a target prior to engagement. The Soldier also has the option to abort a mission up to two seconds before detonation and to redirect the munition to a safe area, minimizing collateral damages.

## 8. KRAKEN

The Combat Outpost Surveillance and Force Protection System, nicknamed the Kraken, provides Soldiers with a transportable,

single-container surveillance and force protection system. Its plug-and-play design allows units to set up just the parts of the systems required for their specific situation. REF partnered with Joint PM Guardian to devise the system and after the initial equipping, REF fully transitioned the project to the PM.

## 9. MINOTAUR

In September 2011, the REF deployed the Minotaur, a remote-controlled Bobcat with a front-mounted mine roller used for IED detection. Its design supports operations in mountainous terrain and the robotic control lets units operate from a safe standoff distance. A second iteration of the Minotaur is equipped with ground penetrating radar for better IED detection.

## 10. EXPEDITIONARY LAB (EX LAB)

Though the REF maintained forward, fixed-site workshops in Afghanistan since 2004, the organization partnered with government, industry and academia in 2011 to design and manufacture containerized engineering labs that include 3D-printers, a Computer Numerical Control machine, a wide array of fabrication tools and a global communications system that allows reach back to REF headquarters. The labs are easily relocatable to smaller forward operating bases.



*The Ex Lab allows Soldiers in the field to fabricate tactical solutions to fill capability gaps.*



# RAPID EQUIPPING FORCE

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# Rapid Equipping Force

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## **REF MISSION**

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

## **CALL TO ACTION:**

*Want to learn more about the Rapid Equipping Force?*

*Check us out at*

**[WWW.REF.ARMY.MIL](http://WWW.REF.ARMY.MIL)**

## **OVERVIEW**

The Rapid Equipping Force (REF) began as a challenge. In 2002, Vice Chief of Staff of the Army, General (GEN) John Keane charged Colonel (COL) Bruce Jette with identifying, procuring and inserting then-groundbreaking, field-ready, robotic technologies into Afghanistan in less than 90 days to aid Soldiers in clearing local caves. Remarkably, COL Jette established a team, known as the Rapid Integration of Robot Systems, partnered with government agencies as well as industry, and procured the PackBot in less than 30 days.

Following this success, COL Jette recommended that the Army retain the rapid equipping capability proven in theater. With this suggestion, the Rapid Equipping Force was founded and nested under the Army G-3/5/7. Its charter gave the organization uniquely combined requirement validation and acquisition authorities, enabling REF to procure government- and commercial-off-the-shelf products for units in need.

The REF has produced more than 11 years of tangible results. In January 2014, the REF capability was declared enduring. The organization is slated to transition to the U.S. Army Training and Doctrine Command (TRADOC) before October 2015. Throughout this period of change, the REF will continue its mission and provide deployed Soldiers with the technology they need to be successful. In calendar year 2013, the REF addressed 312 urgent requirements and shipped 29,248 pieces of equipment to Soldiers on the frontlines. The following effort vignettes illustrate the diversity of tactical challenges submitted to the organization and its unique impact on the warfighter.

## REF DIRECTOR



In August 2013, **COL Steven Sliwa** became the fifth director of the REF. COL Sliwa has served for 27 years and has commanded Field Artillery units at the platoon through brigade levels, performing fire support, maneuver and

stability operations. He participated in Operations Desert Storm, Uphold Democracy and Iraqi Freedom. Prior to becoming the REF Director, COL Sliwa completed his second assignment on the Joint Staff as the Assistant Deputy Director for Joint Strategic Planning.

*“This year the army affirmed the continued existence of the REF. With this decision, the Army ensures the institutionalization, not only of a rapid equipping capability, but also the invaluable lessons learned from twelve years of war.”*

*“I’m proud to lead an organization that is designed to maintain focus on deployed troops and deliver new technologies to Soldiers in days and weeks, not months or years.”*

**–COL Steven A. Sliwa**

## REF PROJECT MANAGER



### **REF PM Tami Johnson**

The REF’s acquisition authority is provided by a dedicated Project Manager (PM) under the Office of the Assistant Secretary of the Army for Acquisition, Logistics and Technology (ASA(ALT)). The PM ensures the organization

continues to perform in accordance with standard acquisition regulations and best practices. On March 7, 2014, Ms. Heidi Shyu designated Program Executive Office (PEO) Soldier as its Milestone Decision Authority, maintaining the organization’s critical acquisition capability.

*“REF leadership recognizes that they accomplish no equipping success alone. As the organization transitions to the REF of the future, it will continue to emphasize partnerships within TRADOC, PEOs and PMs, Army Materiel Command, RDECOM as well as the Centers of Excellence.”*

**–Ms. Tami Johnson**

## REF SENIOR ENLISTED ADVISOR

**REF SGM Jose Quinones Jr.** became the senior enlisted advisor for the REF in April 2013. Quinones joined the Army in June 1983 and earned his Green Beret in 1999. He has deployed numerous times to U.S. Southern and Pacific Commands in addition to tours in support of Operations Iraqi Freedom and Enduring Freedom.

*“I am very honored to help lead the partnership between REF and the Special Operations Forces. Feedback from these units can shed light on emerging conventional force requirements, as well as new technology solutions.*

*I am committed to visiting as many Army units as possible to educate our Soldiers on what the REF capability can do for them.”*

**–SGM. Jose Quinones Jr.**





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## **Rapid Equipping Force**

United States Army

# **TACTICAL CHALLENGE FOCUS AREAS**

THE REF INTEGRATED PRIORITY LIST IDENTIFIES THE TACTICAL CHALLENGE AREAS THE REF CAN SUPPORT. ADDITIONALLY, IT PROVIDES A FRAMEWORK FOR ASSESSING AND VALIDATING REQUIREMENTS.

### **SOLDIER - FOCUSED**

## **DISMOUNTED OPERATIONS**

- SOLDIER LOAD
- IED DEFEAT
- COMMUNICATIONS

## **SMALL COMBAT OUTPOST PATROL BASE**

- SUSTAINMENT
- FORCE PROTECTION

## **MISSION COMMAND**

- INTELLIGENCE
- SURVEILLANCE AND RECONNAISSANCE
- BLUE FORCE TRACKING



### **CALL TO ACTION:**

ARE YOU A DEPLOYED SOLDIER WITH A CAPABILITY GAP? VISIT THE REF WEBSITE TODAY AT [WWW.REF.ARMY.MIL](http://WWW.REF.ARMY.MIL)

EST. 2002

**ARMY REF**





## THE FIVE KEY STEPS TO REF RAPID ACQUISITION



### REQUIREMENT VALIDATION

When the REF receives a 10-Liner, acquisition teams conduct a mission analysis, assess the problem statement and provide recommendations to the director. Valid requirements can be met with existing REF technologies, a credit card purchase, or in some cases, by formally contracting with industry partners.

### CSP APPROVAL

Once approved, each requirement gets an assigned Project Officer who researches possible technology solutions and then develops the Cost, Schedule, Performance plan for the project. This plan is presented to REF leadership and must be approved to begin execution.



### EQUIPPING APPROVAL

At this milestone, the solution is ready to be shipped to the requesting unit. It goes through one more approval process by the REF Director of Operations before the logistics team sends it downrange.

### ASSESSMENTS

REF receives operational feedback from the requesting unit about how well the solution is filling the identified capability gap.



### TRANSITION DECISION

Typical REF projects do not exceed 12 months for execution. When a project is nearing completion, the REF reviews assessment data and makes a recommendation for its future disposition. Projects can be terminated, transferred or transitioned.



# Rapid Equipping Force

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## THE REF FAST TRACK

The REF mantra is to deliver technology solutions in days and weeks, and not months and years. What does that mean exactly? Sometimes, the REF can repurpose solutions from previous REF efforts. A requirement can also be met with mature, government- or commercial-off-the-shelf (GOTS/COTS) technologies purchased with a government credit card. The REF considers these “fast track” efforts. These decisions are for nonstandard equipment and are not standard Army supply requisitions.

### PROJECT SOUTHPAW

Requirement Dates: 3 - 25 April 2013

REF provided left-eye dominant Soldiers with chin straps for the Advanced Combat Helmet. This gives troops the option of buckling the strap on the right side of their face, increasing comfort.



### PROJECT MANTIS

Requirement Dates: 1 - 29 April 2013

For this project REF procured a body-worn Tactical Vest Antenna System that is optimized at 30-88 MHz for a longer radio range for intra-squad communications.

### PROJECT BERAL

Requirement Dates: 10 May - 14 June 2013

These U-tube, battery powered lanterns safely illuminate low-light areas at Forward Operating Bases without the risk of spilled fuel.



### PROJECT SANDPIPER

Requirement Dates: 10 May - 11 September 2013

REF equipped scout and sniper teams with a high-powered spotting scope linked to a digital camera so spotters can capture imagery at a significant distance.

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# ARMY REF





## PROJECT CHAMELEON

**Requirement Dates: 5 April - 27 May 2013**

**REF procured the Tactical Command Industries Modular Antenna System to reduce Soldiers' antenna silhouette without the loss of line-of-sight or a reduction of radio reception.**



## PROJECT COHO

**Requirement Dates: 8 March - 2 May 2013**

**To assist Soldiers in providing cover fire and neutralizing enemy threats at a distance, the REF procured the Eliminator III Laser Scope - a compensating weapons spotting scope with a pinpoint laser range finder and precision trajectory compensation.**

## PROJECT LEATHERBACK

**Requirement Dates: 29 April - 28 June 2013**

**Mortarmen need to carry large loads, so to provide them with an efficient and comfortable means to carry 60mm mortar systems, REF procured the London Bridge mortar pack. This tactical rucksack is designed to carry loads in excess of 100 pounds.**



## PROJECT TAPIR

**Requirement Dates: 28 May - 27 July 2013**

**Project Tapir equips the Soldier with a lightweight tactical battle belt to lower the profile of a Soldier's kit. The battle belts distribute the load onto the Soldier's hips and feature MOLLE loops.**

**Sometimes Soldiers downrange need a more complex solution that requires in-depth analysis and additional time. The REF partners with other Army organizations, industry and academia to fill these requirements. The following pages describe a variety of initiatives that demonstrate the breadth of REF's ability to serve the Soldier.**

# EQUIP

**Rapid Equipping Force**  
United States Army



*Soldiers must get up close and personal when investigating terrain for route clearance purposes.*

## COUNTER IED INTERROGATION KNIVES

**REQUIREMENT ORIGIN:**

10 LINER  
10 MAY 2011

**FIRST EQUIPPED:**

13 OCTOBER 2011

**NUMBER EQUIPPED:**

2,200

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ARMY REF

## IED INTERROGATION KNIVES

Improvised Explosive Devices (IEDs) pose a constant threat to coalition forces in Afghanistan. Soldiers receive training to identify the telltale signs of a recently buried munition, such as displaced dirt or wires, and Soldiers often use a knife to brush away topsoil while investigating a suspicious site. However, using standard issue knives for this purpose can be unsafe; the metal can potentially complete the circuit components, causing the IED to detonate.

REF partnered with the Army Research Laboratory (ARL) to develop a fiberglass knife to investigate suspected IEDs in a safer manner. Though a simple solution, these knives enable limited ordnance interrogation and prevent casualties.

**Update: Second Gen. Knives Ship to OEF**

In December 2013, REF and ARL designed the second generation of interrogation knives, changing the design to a probe shape for the investigation of denser terrain. The iteration of the newly designed tools shipped to Operation Enduring Freedom (OEF) in February 2014.



# LETHAL MINIATURE AERIAL MUNITIONS SYSTEMS

Engaging the enemy effectively, without clear line-of-sight, is a unique challenge. The need to mitigate collateral damage can delay response times and restrict the use of standard weapons. To address this challenge REF, PM Close Combat Weapon Systems (CCWS) and the Asymmetric Warfare Group (AWG) partnered to introduce the Lethal Miniature Aerial Munitions Systems (LMAMS), a revolutionary non-line-of-sight, direct-fire munition for the small unit. The munitions transmit video back to the operator in real time. This technology allows Soldiers to identify and eliminate specific targets with little collateral damage. Its unique operating system can be waved off or can be reprogrammed to reengage the target from another angle. Soldiers carry the entire system in a backpack and can deploy within two minutes.

## Update: Project Transition

This system expands small unit capability and has proven successful in Afghanistan. LMAMS is completing a transition to PM CCWS and Maneuver Center of Excellence (MCoE) for further requirement and product development.



## LMAMS

**REQUIREMENT ORIGIN:**  
10 LINER  
2010

**FIRST EQUIPPED:**  
2010

**NUMBER EQUIPPED:**  
158

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*The LMAMS can be easily carried in a Soldier's backpack and deployed within minutes, making it a valuable asset for smaller units.*

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### EX LAB

**REQUIREMENT ORIGIN:**  
DIRECTOR'S INITIATIVE  
17 MARCH 2011

**FIRST EQUIPPED:**  
MAY 2012

**NUMBER EQUIPPED:**  
3

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## EXPEDITIONARY LAB

The Expeditionary Lab (Ex Lab) is a containerized engineering hub that can be transported anywhere in the world. The REF currently owns three Ex Labs, each equipped with 3D printers, a Computer Numerical Control milling machine and a variety of tools. The lab communications suite enables REF engineers and Soldiers in Afghanistan to collaborate with reach-back support in the U.S. to rapidly prototype and engineer solutions.

Though REF has maintained forward workshops on large bases in Afghanistan since 2004, these mobile containers were inserted in 2012 and move around theater supporting missions on smaller Forward Operating Bases (FOBs).

### Update: REF Acquires Third Ex Lab

In August 2013, REF accepted its third lab, which is the first lab to come with a second 3D printer contained in a separate 10x10x10 container. The new lab also includes two upgraded portable kiosks, each housing a subset of tools, and can accompany units to the tactical edge.

Lab 3 currently provides support to Afghanistan from its location at REF headquarters. For example, in late 2013 REF forward received a requirement to mount tactical flashlights onto handheld IED detectors to support nighttime patrols. Lab 3 printed more than 100 light mounts in a matter of weeks. This incremental printing and shipping plan expands the capabilities of the labs downrange, increasing the number of solutions REF can provide in a limited amount of time.

In 2013, Lab 3 also supported, Army CoCreate, a REF proof-of-concept effort to test the applicability of crowdsourcing techniques for the Army. The lab relocated to Fort Benning, Ga., in November 2013. It served as the workshop for MCoE Soldiers as they developed a mobile command post prototype based on a modified Kawasaki Teryx 750cc.

The REF is currently working with theater commanders to determine how the labs will continue to support Soldiers downrange during the OEF transition. These containerized workshops are available to deploy anywhere in the world based on urgent requirements.

### CALL TO ACTION:

DO YOU KNOW A UNIT THAT IS INTERESTED IN LEARNING MORE ABOUT THE LAB CAPABILITY? VISIT THE REF WEBSITE TODAY AT [WWW.REF.ARMY.MIL](http://WWW.REF.ARMY.MIL)



#### LAB SOLUTION

##### **Base Defense Weapons Bracket**

To prevent green-on-blue incidents, the lab prototyped and produced a weapons bracket that restricts excessive turning or removal of machine guns from perimeter towers.

The mechanism operates with a standard military lock and allows for the appropriate amount of range to cover the operational area. Each mechanism cost less than \$40. The final version was manufactured from steel and over 40 mounts have been delivered since February 2014.

#### LAB SOLUTION

##### **USB Port Charger**

One of the lab's most requested items in 2013 was a converter that allows Soldiers to charge USB-capable devices with a standard BA 5590 Army-issued battery.

Ex Lab engineers designed and prototyped the first version of the charger in less than one week. After two months of user testing and improved iterations, a final product emerged. To date, REF has equipped more than 2,200 converters and has shared this simple tactical solution with partner organizations like PEO Soldier for future consideration.

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*The new REF Ex Lab boasts a second 3D printer housed in an ISU 90.*

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## Rapid Equipping Force

United States Army

*The small gray sensors shown here, will capture vital data if this Soldier ever experiences a blast.*



## IBESS

**REQUIREMENT ORIGIN:**  
VICE CHIEF OF  
STAFF OF THE ARMY  
APRIL 2011

**FIRST EQUIPPED:**  
AUGUST 2011

**NUMBER EQUIPPED:**  
1,048

UNITED STATES ARMY  
EQUIP  
INSERT  
ASSESS

EST. 2002

ARMY REF

## INTEGRATED BLAST EFFECTS SENSOR SUITE (IBESS)

Throughout the conflicts in Iraq and Afghanistan, IEDs have proven to be the adversary's weapon of choice, resulting in long-lasting, and sometimes unseen, effects on Soldiers. In 2011, former Vice Chief of Staff of the Army, GEN Peter Chiarelli, tasked the REF to develop, insert and assess a way to document blast effects. The REF solution, IBESS, captures blast data for analysis as well as Soldier electronic health records. REF equipped the first Soldier-worn systems in less than six months.

In support of this Army-wide priority, REF united the efforts of multiple Army organizations specializing in Soldier systems, vehicles and health. REF continues to support the further development and assessment of the integrated suite, as well as the dedicated efforts by PEO Soldier on the Soldier-worn system.

### **Update: Integration of Vehicle-mounted Sensors**

In 2013, REF equipped the first systems to integrate Soldier-worn blast effects sensors with additional sensors mounted onto Army vehicles. This combination allows analysts to recreate the event by capturing blast overpressure and acceleration data from multiple source locations. The suite is currently installed on military vehicles and more than 1,000 Soldiers received the body units.



## CROSSHAIRS 4G LTE

ENHANCED NETWORKING & SHOT DETECTION

In 2010, REF partnered with the Defense Advanced Research Projects Agency (DARPA) to develop Counter Rocket Shooter System with Highly Accurate Immediate Response (CROSSHAIRS).

The system integrates direct fire detection and direction finding with a slew-to-cue capability, using the Common Remotely Operated Weapon System (CROWS), and a command and control display that can be mounted on any vehicle. This system-of-systems solution gives convoys the situational awareness required to make critical operational decisions, such as to engage an enemy or not based on positive identification of a combatant.

### Update: 4th Generation (4G) Long Term Evolution

The REF integrated a 4G LTE system onto the Mine-Resistant Ambush Protected (MRAP) vehicles, creating a networked bubble that provides dismounted Soldiers the same situational awareness the convoy receives, via Nett Warrior applications on smart phones. The feeds provide Soldiers with maps, reports, friendly dismount locations and video from several sources. This integration effort supports a much larger networking effort called the Joint Operational Long Term Evolution Deployable Tactical Cellular System (JOLTED Tactics).

The 4G suite connects Soldiers to the original CROSSHAIRS system and is supported by 4G antennas, Unmanned Aerial System (UAS) signal processors, networking equipment and the necessary power supply and air conditioning units.

The REF and its partners demonstrated the CROSSHAIRS Enhanced at several exercises in 2013 prior to equipping units. These exercises showed the value of “on-the-go” connectivity for Soldiers conducting dismounted operations.

### CALL TO ACTION:

ARE YOU AWARE OF A COMMERCIAL TECHNOLOGY THAT COULD ENABLE TACTICAL COMMUNICATIONS?

VISIT THE REF WEBSITE TODAY AT

[WWW.REF.ARMY.MIL](http://WWW.REF.ARMY.MIL)

## CROSSHAIRS 4G LTE

### REQUIREMENT ORIGIN:

10 LINER  
3 JULY 2013

### FIRST EQUIPPED:

DECEMBER 2013

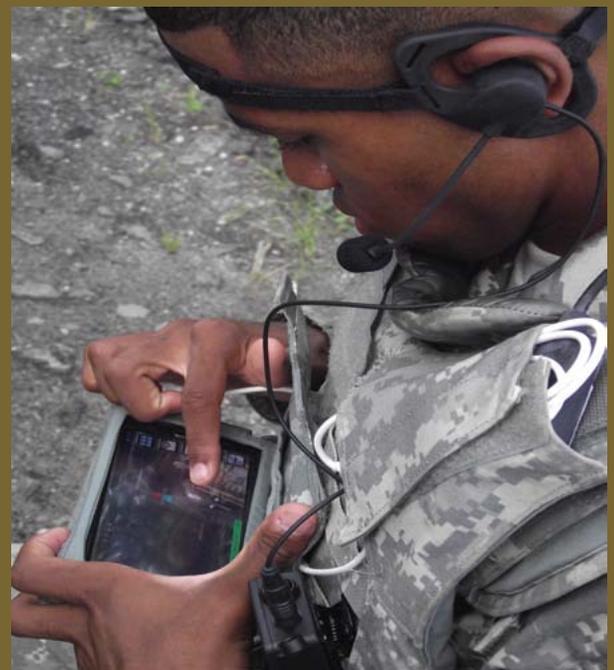
### NUMBER EQUIPPED:

4 SYSTEMS WITH 40 PHONES

UNITED STATES ARMY  
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ASSESS

EST. 2002

ARMY REF



A Soldier uses the CROSSHAIRS Enhanced handheld receiver to access live-feeds during a technology demonstration at Fort Dix, N.J.

### LAIL

**REQUIREMENT ORIGIN:**

10-LINER  
26 AUGUST 2011

**FIRST EQUIPPED:**

JUNE 2012

**NUMBER EQUIPPED:**

4

UNITED STATES ARMY  
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ARMY REF

## LIVE AERIAL ISR LINK

The Live Aerial Intelligence Surveillance and Reconnaissance (ISR) Link (LAIL) is a COTS handheld radio receiver that allows dismounted Soldiers in remote locations to receive communications feeds from multiple UASs. The system provides information, previously only available to units at Tactical Operations Centers, directly to units in the field. REF identified this emerging capability through its partnership with the Special Operations Command (USSOCOM) and is now providing systems to conventional forces.

### Update: Enhanced Capability & Reduced Load

After the first LAIL system debuted in Afghanistan in June 2012, REF started working with a large number of DoD partners to develop the second iteration. LAIL 2.0 is downsized but more robust with improved range and capabilities. The new system also allows Soldiers to access feeds from UASs and fixed-wing aircraft. This technology not only provides Soldiers with the invaluable ISR data, but it uses a split screen to place the feed in context on a map.

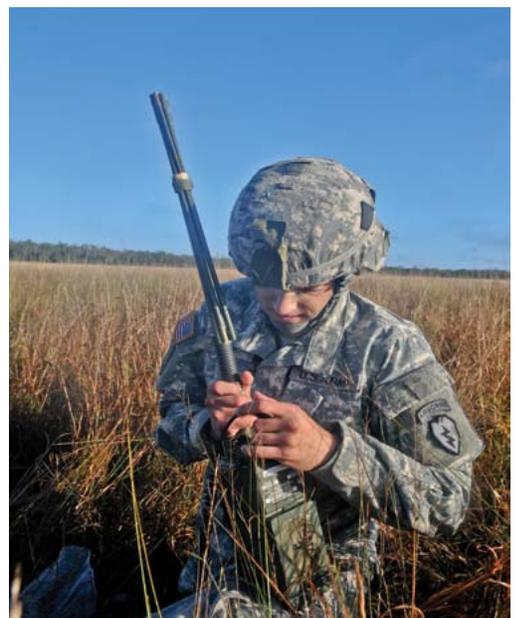
In 2013, REF provided the LAIL system to units participating in Exercise Talisman Saber, a joint exercise between the U.S. Pacific Command and Australia. Based on positive performance during this event, REF received requests for additional systems from the battalion commanders involved in the exercise.

### CALL TO ACTION:

ARE YOU AN ADVOCATE FOR AN  
EMERGING TECHNOLOGY SOLUTION?  
VISIT THE REF WEBSITE TODAY AT  
[WWW.REF.ARMY.MIL](http://WWW.REF.ARMY.MIL)

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*U.S. Army Spc.  
Nicholas Frey, 1st  
Battalion, 501st  
Parachute Infantry  
Regiment, 4th  
Brigade Combat  
Team (Airborne),  
25th Infantry Division,  
participates in  
Exercise Talisman  
Saber, where LAIL  
was first put into use.*





*Sgt. Michael Tackett, Headquarters and Headquarters Company, 3rd Brigade Combat Team, 25th Infantry Division launches Puma during training, Schofield Barracks. Photo by Sgt. Hillary Rustine*

## ENHANCED PUMA

REF regularly partners with PMs to bridge gaps during incremental upgrades to Programs of Record (PORs). REF first equipped conventional forces with the Puma systems in 2009. Recently, it partnered with PM UAS to support upgrades to the systems in theater. The three-phase upgrade includes an extended battery capability for three hours of operation, a 9DB antenna to extend range, micro-laser markers for improved targeting and a communications relay for an organic, beyond line-of-site capability, and a tactical launcher. This launcher has proven to be a great asset and is now being used by USSOCOM and the Marine Corps.

REF's flexible acquisition authorities allowed the PM to quickly insert enhancements to this technology to support Soldiers in Afghanistan.

### PUMA

**REQUIREMENT ORIGIN:**

PM UAS  
22 JANUARY 2012

**FIRST EQUIPPED:**

8 APRIL 2013

**NUMBER PROCURED:**

809 BATTERIES: 801 ANTENNAS:  
57 LAUNCHERS: 5 RELAYS:  
4 LASER MARKERS

UNITED STATES ARMY  
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EST. 2002

ARMY REF





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# Rapid Equipping Force

United States Army

*Aerostat platforms provide Soldiers downrange with invaluable ISR capabilities, increasing their security.*



## AEROSTATS

Since the earliest days of the REF, the organization has consistently received and fulfilled requirements for aerostat platforms. These commercially available balloons serve as universal platforms for ISR technologies, communications relay packages and other sensor systems.

### Update: Equipping Units

As bases close and realign in support of Afghanistan retrograde operations, REF has seen an increased number of requirements for modular and portable aerostat platforms. The reduced force structure creates a demand for a smaller, more mobile system that can be easily transported, launched and recovered by a limited number of Soldiers.

In 2013, REF received requirements for 13 systems. The existing POR aerostat systems are large and complex, and did not meet the requirements of small, tactical units.

## EQUIP

### REQUIREMENT ORIGIN:

10 - LINER  
30 OCTOBER 2013

### FIRST EQUIPPED:

15 NOVEMBER 2013

### NUMBER EQUIPPED:

13 SYSTEMS

UNITED STATES ARMY  
EQUIP  
INSERT  
ASSESS

EST. 2002

ARMY REF



REF canvassed industry, reviewed capabilities and equipped the first systems to units within one month. Ultimately, the requirement was met by procuring a combination of previously fielded REF systems, in addition to a never-before-seen model. The new generation of small, tactical aerostats are more mobile, primarily due to their reliance on battery-operated power sources rather than generator-produced power.

**Update: Inserting & Assessing New Technology**

After equipping the initial systems, the REF began assessing new, Soldier-packable aerostats. These systems, which can be transported by as few as two Soldiers, were demonstrated at Fort Dix, N.J., in November 2013. Following the demo, REF inserted 15 systems into Afghanistan for end-user feedback.

REF has received additional requests for these platforms, and the organization is forecasting continuing aerostat requirements for the duration of the OEF mission. The REF forward team receives the aerostat packages and then works closely with commanders to oversee the distribution and sustainment of these capabilities across the area of responsibility.

**INSERT**

**REQUIREMENT ORIGIN:**  
DIRECTOR'S INITIATIVE  
6 SEPTEMBER 2013

**FIRST INSERTED:**  
DECEMBER 2013

**NUMBER INSERTED:**  
15 SYSTEMS

UNITED STATES ARMY  
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**ARMY REF**



*Small aerostats enhance Soldiers' communication capabilities in addition to supporting ISR needs.*

**EQUIP | INSERT | ASSESS**

## **Rapid Equipping Force**

United States Army

*In 2013, REF identified E2E equipment no longer needed in OEF and repurposed it for JTF-B.*



# E2E

**REQUIREMENT ORIGIN:**  
DIRECTOR'S INITIATIVE  
9 JUNE 2011

**FIRST EQUIPPED:**  
15 NOVEMBER 2011

**NUMBER EQUIPPED:**  
300 SOLDIER-WORN SYSTEMS;  
40 HYBRID ENERGY SYSTEMS;  
100 1KW GENERATORS;  
9 LIGHT-WEIGHT 50-MAN CAMPS;  
1 RIGID-WALL 100-MAN CAMP

UNITED STATES ARMY  
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**ARMY REF**

## **ENERGY TO THE EDGE (E2E)**

The sustainment of units operating in austere locations is a REF priority, and operational energy is a top concern for Army senior leadership. To increase operational effectiveness, optimize logistics and improve power surety, REF initiated the E2E program. It assesses, equips and advises units on existing standard equipment, emerging energy efficient technologies and their employment methods. Realizing water and waste-remediation operations distracts from a unit's primary mission, the program evolved into the current "Net-Zero to the Edge" initiative adding water production and recycling capability to its portfolio. In 2013, REF E2E teams expanded their efforts to support units in Africa and Central America. To date, REF advisors have assessed more than 50 sites in Afghanistan and 60 sites globally.

A key element to the program's overall success is the collaboration and synchronization with the Army and DoD operational energy communities. Partner organizations include the Assistant Secretary of Defense for Operational Energy Plans and Programs, Assistant Secretary of the Army (Installation, Energy & Environment), Army G-4 Operational Energy Office and Project Manager Mobile Electric Power.



## AFGHANISTAN

### WEATHER STATIONS

REF installed 3-kilowatt (kW), 5kW and 10kW hybrid power solutions to provide tailored, reliable power for weather stations at a very active airfield. Regular servicing of these locations would have hindered aircraft movement and reduced the number of missions. This effort ensured continuous operation of the mission-critical systems.

### AEROSTAT IMPROVEMENTS

The REAP aerostat systems in theater were experiencing frequent power outages and surges that damaged the tethers and camera packages. This resulted in a reduced operating rate for the REAP, degrading the Combat Outpost's force protection posture. Prior to the E2E advisor team assessment, the REAP was down approximately two to three days a week due to power-related issues. E2E advisors installed a 3kW hybrid solution providing clean reliable power to the REAP. The system included a Tactical Quiet Generator (TQG) with auto start, solar panels for renewable capability and battery storage. Operators were trained on installation and preventative maintenance techniques. In the four months since the installation of the hybrid system to support the REAP, no power-related issues have been reported.

### FIXED-SITE ISR CAMERA SYSTEM

The camera system at a small outpost required 24-hour power generation, and the generator required 10 gallons of fuel daily. E2E advisors installed a 3kW hybrid power solution, including a TQG with auto start and solar panels for renewable capability and battery storage. This saved fuel, reduced system sustainment logistics burden and freed manpower for primary mission support.

## CENTRAL AMERICA

REF delivered four soft-shelter expeditionary camps to Joint Task Force-Bravo (JTF-B), Honduras, and provided on-site training to the receiving unit. Each camp includes four billeting shelters to sleep up to 50 Soldiers, one tactical operations shelter, one communications system shelter and one readiness system equipped with shower units and latrines. Expeditionary elements also included trailer-mounted fossil fuel and hybrid power generation systems. These systems reduce dependence upon ground resupply and improve efficiency.

## AFRICA

REF advisors assessed several sites in West Africa in early 2013, recommending materiel and non-materiel improvements to commanders at Joint Special Operations Task Force Trans Sahara in four separate countries. These solutions began delivering in April 2013, primarily small Soldier-oriented systems, with the large platoon and company-sized hybrid and camp systems being delivered in November 2013. Hybrid power, efficient soft and rigid walled shelters and water management will have major impact in the immature African environment.



*E2E solutions improved power surety at an airfield in Afghanistan.*

# REF

## Rapid Equipping Force

United States Army

**CAPABILITY GAPS OR SOLUTIONS?**

CONTACT US

WWW.REF.ARMY.MIL

**REF OPERATIONS CENTER**

(703) 704-0937

**NIPR EMAIL**

USARMY.BELVOIR.HQDA.MBX.REF-OPS-CENTER@MAIL.MIL

**SIPR EMAIL**

USARMY.BELVOIR.HQDA.MBX.REF-OPS-CENTER@MAIL.SMIL.MIL

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Rapid Equipping Force  
10236 Burbeck Road  
Ft. Belvoir, Virginia 22060-5852  
www.ref.army.mil



**Colonel Steven A. Sliwa, U.S. Army**  
**Director, Rapid Equipping Force**  
**Fort Belvoir, Virginia**



Colonel Steven Sliwa became the fifth Director of the U.S. Army's Rapid Equipping Force (REF) in August 2013. The REF harnesses current and emerging technologies to provide immediate solutions to the urgent challenges of U.S. forces deployed globally and has met challenges as diverse as; defeating improvised explosive devices, increasing Army contingency operation energy efficiency, gathering blast effect data to better understand traumatic brain injury and improving ISR and force protection austere locations. As the U.S. Army adjusts to force reduction and realignment post Afghanistan, Sliwa prepares the REF, an evolving organization, to provide global support while maintaining focus on urgent requirements for the remaining units serving in Operation Enduring Freedom.

With 27 years in uniform, COL Sliwa has served in and commanded Field Artillery units at the platoon through brigade levels, and has performed fire support, maneuver, and stability operations. His operational assignments include Germany, Haiti, Iraq, and Korea. He participated in Operations Desert Shield, Desert Storm, Uphold Democracy and Iraqi Freedom. In addition to these operational assignments, he also served as National Security Fellow at the JFK School of Government at Harvard University and as the Chief of the Current and Future Warfighting Capabilities Division within Headquarters of the Army G-3/5/7. Prior to becoming the REF Director, he served as the Deputy Director for Joint Strategic Planning where he synchronized activities for the development of the National Military Strategy, Chairman's Risk Assessment, Unified Command Plan and Joint Operational War Plans. His efforts resulted in a broad range of responsive assessments and recommendations to the Chairman of the Joint Chiefs of Staff.

COL Sliwa has received numerous military awards and decorations to include; the Defense Superior Service Medal, the Legion of Merit (one Oak Leaf Cluster), the Bronze Star Medal (one Oak Leaf Cluster), the Army Superior Unit Award, (received for actions following the shelling of Yeonpyeong-Do Island by North Korea while commanding the 210<sup>th</sup> Fires Brigade), the Republic of Korea Order of National Security Merit Sam-II Medal, the Joint Staff Identification Badge, the Army Staff Identification Badge, the Combat Action Badge, the Air Force Space Badge, Parachutist Badge, Air Assault Badge and the Ranger Tab.

COL Sliwa was commissioned in 1986 from the United States Military Academy, West Point, New York and earned a Masters of Military Arts and Sciences in Military Space Applications from United States Army Command and General Staff College (CGSC) in 1998.

**Sergeant Major José Quinones Jr.**  
**Sergeant Major, Rapid Equipping Force**  
**Fort Belvoir, Virginia**



Sergeant Major Jose Quinones Jr. became the senior enlisted advisor for the U.S. Army's Rapid Equipping Force (REF) in May 2013. Reporting directly to the senior leadership of the Army, the REF harnesses current and emerging technologies to provide rapid solutions for urgent combat requirements faced by Soldiers on today's battlefield. The Department of the Army formed the REF in 2002 to support warfighter requirements in Afghanistan, and during the past ten years, the REF has met challenges as diverse as; defeating improvised explosive devices, increasing Army contingency operation energy efficiency, gathering blast effect data to better understand traumatic brain injury and improving ISR efforts in austere locations. As a senior Special Forces noncommissioned officer, SGM Quinones provides critical links with special operators throughout the Army.

SGM Quinones was born in Arecibo, Puerto Rico, and later resided and joined the U.S. Army in Killeen, Texas. He enlisted in the Army under the Delayed Entry Program on June 11, 1983, and completed basic training and Infantry Advanced Initial Training at Fort Benning, GA as an Infantryman (11BC2).

SGM Quinones' career assignments include: United States Army Special Forces Command ACoS G8 Sergeant Major, Fort Bragg, NC; Combined Forces Special Operations Component Command G35 Sergeant Major, North Kabul Compound, Afghanistan; S2 NCOIC, 7th Special Forces Group (Airborne), Fort Bragg, NC; Team Sergeant Special Forces Operational Detachment Alpha-782 and 776, Fort Bragg, NC; S3 Operations SGM/NCOIC, 3rd Battalion, 7th Special Forces Group (Airborne), Fort Bragg, NC; Operations Sergeant, Special Forces Operational Detachment Bravo-770, Co. A, 7th Special Forces Group (Airborne), Fort Bragg, NC; Intelligence Sergeant and Senior Weapons Sergeant Special Forces Operational Detachment Alpha-782, Fort Bragg, NC; Instructor Writer (Spanish), United States Army School of the Americas, Fort Benning, GA; Scout Platoon Sergeant and Team Leader, 9th Infantry Regiment, 7th Infantry Division (L), Fort Ord, CA; Squad Leader and Team Leader, Co. A, 1st BN, 27th Infantry Regiment, 25th Infantry Division (L), Schofield Barracks, HI; Rifleman, 2nd BN, 4th INF, 56th Field Artillery Brigade, Neu Ulm, FRG.

SGM Quinones has deployed numerous times to SOUTHCOM and PACOM AORs. Additionally, he participated in Operation Iraqi Freedom and conducted five tours in support of Operation Enduring Freedom.

His military awards include: Bronze Star Medal (3OCL); Meritorious Service Medal (3OCL); Joint Commendation Medal; Army Commendation Medal (4OLC); Joint Service Achievement Medal; Army Achievement Medal (4OLC); Army Good Conduct Medal (9BARB); National Defense Service Medal (2Stars); Global War on Terrorism Expeditionary Medal; Global War on Terrorism Service Medal; NCO Professional Developmental Ribbon (4Numeral); Army Service Ribbon; Overseas Ribbon (2Numeral); NATO Medal; Valorous Unit Award; Superior Unit Award; Special Forces Tab; Ranger Tab; Combat Infantryman Badge, Expert Infantryman Badge; Master Parachutist; Air Assault.



SGM Quinones' military education includes the following: Army Force Management Course, Fort Belvoir, VA, United States Army Sergeants Major Academy, Fort Bliss, TX; Special Forces Advanced Noncommissioned Officers Course, Fort Bragg, NC; Infantry Basic Noncommissioned Officers Course, Schofield Barracks, HI; Primary Leadership Development Course, Schofield Barracks, HI; Sniper Course Level I, Fort Bragg, NC; Mountain Warfare School (Summer Session), Jericho, VT; Jumpmaster School, Fort Benning, GA; Special Operations Training, Fort Bragg, NC; Instructor Training Course (Spanish), Fort Benning, GA; Air Assault School, Schofield Barracks, HI; Ranger School, Fort Benning, GA; Special Forces Qualification Course, Fort Bragg, NC; Special Forces Advanced Urban Combat Course, Fort Bragg, NC; Long Range Surveillance Course, Fort Benning, GA.

SGM Quinones earned a Bachelor of Science Degree and Homeland Security Certificate from Excelsior College, Albany, NY, and is a graduate of Ellison High School, Killeen, TX. He is currently pursuing a Masters Degree in Homeland Securities from Webster University.

SGM Quinones married the former Felipita Jane Pete for 29 years and has an 18 year old Daughter Alyssa Marie and a 15 year old son Antonio Jose residing in Fayetteville, North Carolina.



**Mr. Kurt A. Frulla**  
**Deputy Director, U.S. Army Rapid Equipping Force**  
**Fort Belvoir, Virginia**



Mr. Kurt Frulla became the Deputy Director of the U.S. Army Rapid Equipping Force (REF) in July 2014. The REF harnesses current and emerging technologies to provide immediate solutions to the urgent challenges of U.S. forces deployed globally and has met challenges as diverse as defeating improvised explosive devices, increasing operational energy efficiency, gathering blast effect data to better understand traumatic brain injury and improving ISR and force protection in austere locations. As the REF transitions to an enduring Army capability, Mr. Frulla will oversee the REF

solution development process.

Mr. Frulla joins the REF following many years of commissioned and civilian service. He served in conventional, special operations and acquisitions assignments during his twenty-year military career, including deployments to Kuwait for Operation Desert Shield and Desert Storm and to South America in support of U.S. Southern Command counter-drug efforts. In addition to these operational assignments, he also served as the Special Programs Product Manager, Direct Support to Asymmetric Warfare Group (AWG); Deputy Project Manager, PM Special Programs (SP), USSOCOM; Assistant Product Manager, C4ISR, PM SP; Acquisition Advisor, U.S. Southern Command; and Contracting Officer, Industrial Operations Command.

Mr. Frulla entered Government service as an Army Civilian upon retirement. From 2007 to 2014, he was assigned to PEO Soldier and served as both the Director of Operations and Plans, G3 and the Chief of Staff.

Mr. Frulla earned a Bachelor of Arts in Administration of Law and Justice from the University of Lowell in 1986. He also earned a Master of Science in Material Acquisition Management from the Florida Institute of Technology in 1996. He holds a level II certification in Contracting and level III certification in Program Management.