Army REF Overview Brief
The Rapid Equipping Force (REF) provides innovative materiel solutions to meet the urgent requirements of U.S. Army forces employed globally, informs materiel development for the future force, and on order expands to meet operational demands.

**ASSESS** emerging combat requirements; identify commercial and government off-the-shelf solutions and technologies to equip the warfighter.

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

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

**INFORM** HQDA, TRADOC, ASA(ALT), AFC, AMC, Centers of Excellence, maneuver elements, and the greater Army of REF assessments and information received.

_Army REF delivers! We don’t want to break this._ – Honorable Ryan McCarthy (USA)
PAST
2002- Afghanistan
Soldiers conducting combat operations sustained casualties from booby traps and grenade blow-back while searching and clearing caves.

Solution:
Then Vice Chief of Staff of the Army formed a task force to identify and test commercial-off-the-shelf robots. In less than 30 days, the team procured the PackBot and travelled to theater for operational testing; the equipping success led to a new organization, the U.S. Army Rapid Equipping Force.

PRESENT
2018 – FORSCOM
Army electronic warfare officers have limited tools to detect/attack enemy communications and networks at the tactical level.

Solution:
The REF has tested and equipped the EWTV, which provides a sensing and jamming capability of enemy communications and networks from an operationally relevant range. The vehicles are designed to be self-contained and independent, operated by Electronic Warfare Soldiers within the vehicle.

FUTURE
2020-2028
Soldiers around the globe require rapid materiel solutions to ever increasingly complex problems. Our Warfighters require advanced technology that does not simply optimize intelligence information to get it to the Warfighter, it needs to make sense to the decision maker at the leading edge.

Solution:
The U.S. Army REF will provide solutions that meet the demands that enhances Soldiers’ readiness and Soldier protection by rapidly equipping readily available modern technology and/or rapidly prototyping limited solutions at the point-of-use.
REF is rapid because it combines **requirement validation**, **flexible funding**, and **acquisition authority** under one roof.

**REQUIREMENT VALIDATION**
- HQDA, G-3/5/7 delegated requirement approval authority to **REF Director** via submitted **10-Liner** or **Director’s Initiative** to leverage technologies for identified capability gaps.
- HQDA, G-3/5/7 retains the authority to direct **ONS** on perceived Army problem sets.

**FUNDING**
- REF is appropriated a **mixture of base and OCO OMA, OPA, and RDTE funds** enabling the agility to fulfill requirements from globally deployed forces.

**ACQUISITION**
- ASA(ALT) designated **PEO-Soldier** as REF’s **Milestone Decision Authority (MDA)** (May 28, 2014).
- REF Project Director reports to PEO-Soldier and provides direct acquisition support to the REF.
- **Limited acquisition**: not an ACAT program.
**How REF Equips Soldiers**

**Requirements Validation**
- Receive urgent Warfighter requirement from globally employed Soldiers.
- Unit coordination
- De-conflict with DA G38
- Mission Analysis, assesses the problem and provides recommendations to the Director
- Director either:
  - Validates Capabilities Requirement Document (CRD)
  - Recommends PM fill
  - Non support and returns
- Passes a MFR to requesting unit CDR/O6 for awareness

**CSP/Equipping Approval**
- Refine mission analysis; researches potential technology solutions and develops **Cost, Schedule, Performance (CSP) Plan**.
- Options: **COTS/GOTS** or conducts
- Limited development/integration
- Initiates shipment & delivery
- Identify potential transition pathway

**Delivery, Assessments & Follow-up**
- Establish property accountability with requesting unit & MOA
- Continuous feedback on the equipped technology’s performance
- Provides hasty DOTM to inform both internal REF decisions and broader Army decisions

**Transition Decision**
- One year after delivery, begin property disposition analysis recommendation for TRADOC: terminate, sustain, or transition
- Terminate an effort
- Sustain on battlefield & expand equipping to additional units
- Transition to program of record or office of primary responsibility as enduring capability

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UNCLASSIFIED
REF PARTNERSHIPS

Globally Employed Units

Federal Research Laboratories and Government Agencies

Industry & Academia

Access to Materiel Solutions

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WORLDWIDE SUPPORT TO THE FIELDED FORCE

Protection
- Counter UAS
- Electronic Warfare
- Vehicle barriers
- Big Voice Notification
- CCTV (DOG System)
- Containerized Weapon Systems

Movement + Maneuver
- GPS Denied and Electromagnetically contested environments
- SFAB Support
- Robotic Platforms
- Subterranean Operations

Intelligence
- Squad ISR
- Small AEROSTATS
- Persistent ISR
- SIGINT systems
- Kraken

Sustainment
- Medical Readiness
- Tactical Edge Communications Kit – VSAT
- Reduction of sustainment through rapid prototyping

Fires
- Drone Buster
- Drone Defender
- TECK-V
- Switchblade Drone (LMAMS)
- Blood Coolers
- Expeditionary Lab (EXLAB)
- Instant Eye
- C5ISR

Mission Command
- Subterranean (SubT) Operations
- LOS & NLOS Comms
- SFAB Support
- Communication interoperability

Training + Assessment
- >30 x Unit Outreach Visits
- >50 x Equipment Training/MTTs Conducted
- 20 x PAX deployed in support of ARCENT
- Partnered with CALL and AWG

End User Displays
Wave and/or MESH networked Radios

Robotics

"REF is a great outfit, supported thousands of globally deployed Soldiers over the years and will continue to be a valuable Army resource in the future." – GEN (R) Votel

**REF ENHANCED CAPABILITIES**

**Ex Lab (Bagram, Afghanistan)**

- Identify Problem
- Design/Refine Prototype
- Fabricate

- Mortar lifting Straps
- Crows Lens Cover

- Vehicle Optic Sensor System Protection

**Additional Ex Lab capabilities:**
- Globally deployable containerized system
- Readily transportable via air, land, sea or rail
- Mobile power generation with secure communication
- Lead engineer onsite

**REF Fabrication Facility (Fort A.P. Hill, VA)**

- Press Brake
- Laser Water Jet
- FARO Arm

- Industrial Printers
- Manual Lathe
- Paint and Sewing Shop
- CNC Lathe

- 3D Printer

**Machining + Welding + Sheet Metal + Fabrication + 3D Printing + Paint Booth**

**Improves Soldier readiness and Soldier protection**

- Rapidly prototype and engineer solutions for select replacement parts and force protection measures at the point of need

- REF subject matter experts accompany units to observe potential requirements firsthand
# Future Technology Investments

<table>
<thead>
<tr>
<th>Electronically Degraded Environment</th>
<th>UAS / CUAS Technologies</th>
<th>Dense Urban Terrain</th>
<th>Surveillance</th>
<th>Signature Reduction</th>
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<tbody>
<tr>
<td>Assured Communications</td>
<td>Early Warning</td>
<td>Movement /Protection</td>
<td>Squad ISR Refresh</td>
<td>EM Reduction</td>
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<tr>
<td>Expeditionary Communications in all operational environments</td>
<td>Expeditionary ISR</td>
<td>Lightweight and Reinforced Breathing Apparatus</td>
<td>The REF continues to receive Squad ISR requirements on top systems equipped</td>
<td>Deter or mitigate electromagnetic interference</td>
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<td>Interoperability Systems</td>
<td>Kinetic capabilities</td>
<td>Environmentally friendly; simulates the firing of ammunition</td>
<td>Tethered ISR Refresh</td>
<td>Communications and awareness</td>
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<tr>
<td>Software Network</td>
<td>Physical capabilities</td>
<td>Power/Water Capabilities</td>
<td>Camera Systems</td>
<td>Optical Augmentation</td>
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<td>Synchronization of expeditionary data/communication</td>
<td>Physically disrupt or destroy unmanned systems</td>
<td>Water/soldier/vehicle energy efficiency /power generation</td>
<td>Optical system visual, recording, thermal</td>
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<td>Mission Command</td>
<td>Rapid deployable, anti-jam, Non GPS reliant, endurance, payload capabilities</td>
<td>Movement /Protection</td>
<td>Camera, Thermal</td>
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<td>Effectively communicate and provide information to leaders</td>
<td>Environmentally friendly; simulates the firing of ammunition</td>
<td>Intelligent 5KW</td>
<td>Camera Systems</td>
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<td>Antennas</td>
<td>Kinetic capabilities</td>
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<td>Expeditionary; supporting legacy and emerging waveforms</td>
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<td>Software Network</td>
<td>Non-Kinetic capabilities</td>
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<td>Synchronization of expeditionary data/communication</td>
<td>Ability to Detect, Identify, Disrupt UAS</td>
<td>Waterproof microphone assembly for MPU-5</td>
<td>Optical system visual, recording, thermal</td>
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<td>Antennas</td>
<td>Standoff / Close Contact Engagement</td>
<td>Robotics</td>
<td>Autonomous Systems</td>
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<td>Expeditionary; supporting legacy and emerging waveforms</td>
<td>Layered defense</td>
<td>Remote Tunnel Mapping 2-D and 3-D tunnels and room images</td>
<td>Network of networks, single entity</td>
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<td>Software Network</td>
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<td>510 Robot</td>
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<td>Facilitate remote viewing of video wireless or hard line</td>
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**The REF is the Army’s lead for immediate materiel solutions—we are the Army’s Quick Reaction Capability (QRC)**
WHAT THE REF VALUES!
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