

# ***US Special Operations Command***

---

## **Science and Technology in Irregular Warfare**



**Mr. Bill Shepherd  
Science Advisor  
11 Aug 2010**





# Commander's Guidance for USSOCOM S&T

---

- **Develop an R&D Effort Focused on Placing New Capabilities in the Hands of SOF**
- **Insert These Capabilities Rapidly Across the Force**





# S&T Strategy

---

- Focus on “Evolutionary” Technology
- Leverage Others to Lead High-Risk “Revolutionary” Technology Developments
- Synergize Efforts Across SOF
- Build Partner Capability and Interoperability
- Cultivate “Intellectual Capital”
- “Exploit” New Technologies—
  - Select and Insert Quickly



# Innovations in the Field



Minigun + M2 .50 cal

SOF Operators devised ‘two-gun’ turrets “in theater” for greater operational flexibility. Multiple weapons allow better long range engagement and short range ambush response



Operator designed, field developed power supply box, which restored critical “Minigun” Capability to SOF fighting vehicles



# “Unsanctioned R&D”



Bought –  
Mini GPS



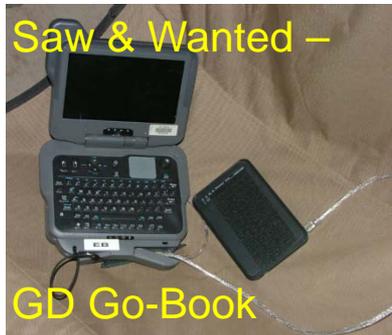
Bought –  
Gun Light  
for Berretta



Bought –  
Emergency Sight for  
Sniper Rifle



Fabricated –  
Twin M240 MG Mount



Saw & Wanted –  
GD Go-Book



Saw & Wanted –  
Multi-Cam  
Fatigues



Experimented –  
Mk 13 “Handgun”  
Modification

Imagined–



Tactical “Street-View”



Saw & Wanted –  
Miniature  
Rangefinder



Fabricated –  
Mk 44 Minigun Plus  
MK47 ALGL

# Mobile Technology and Repair Complex (MTRC)



8 Complexes to AFG May 2010



USSOCOM Pilot Project

## ■ Mission

- Innovate, modify, adapt, and repair material “in situ” to enhance capabilities of SOF forces
  - Supports SOF activities, including Security Force Assistance and Civil Affairs, with rapid technology and capability insertions

## ■ Capabilities

- Engineering “In Place”—Engineers and Technicians collocated with MTRC
- Design and Fabrication in wood, metal, plastics, electronics; “modules” tailored for specific field needs
- Self-contained generator and Environmental Control Unit
- Reconfigurable, expandable. Broadband connectivity, workstations, Video Tele-Conferencing
- 8’ ISU container--Expandable to 8’Wx24’L x8’H, Weight: 6,750 LBS
- Mobile—CH-47, 5T truck transportable



# MTRC Module Types

Typical Field Sites have 2 Modules — A “Complex”



*Closed –  
Ready for  
Transportation*



*Open – Workshop Deployed*



*Multipurpose Machine tools*

## ■ Module 1A: Base

### ➤ Hub/Office

- Communications / Electronics / Computers-CAD-basic tools

## ■ Module 1B: Tool Room

### ➤ Fabrication/Project Workspace

- Advanced tools, mill/lathe combo, welder/cutters, fabrication

## ■ Module 1C: Vehicles

### ➤ Large Projects/Vehicle Workspace

- Large vehicle tools, lifts, weapon repair kits, pneumatic tools

## ■ Module 1D: Small Footprint “Team” Box

### ➤ An “All in One” box for small teams

## ■ Module 1E: Micro Power

- Solar panel and wind generator arrays with battery storage, inverter and controls



# Strategic Engagement

**MTRC can be conduits to introduce Appropriate and Sustainable Technology (AST) for “Strategic Engagement”**



## **Appropriate and Sustainable Technology (AST)**

*Technologies that make best use of locally available resources to meet local needs. Appropriate technologies are generally low-cost, manageable in scale, and can be operated, sustained, and maintained by a local workforce. AST can help build local community infrastructure and develop viable small business enterprises. The technology must suit the user and his needs, and must be configured to foster self-reliance, cooperation, and responsibility while improving quality of life.*



# Appropriate and Sustainable Technologies (AST)

## Power



Solar, Wind, Micro hydro Power

## Water and Sanitation



Pumping, purification, sewage

## Subsistence



Incubator



Feed Mill

## Light Industry



Hand-Operated Sewing Machine



Hand-Powered Bench Grinder



Mini-Flour Processing Machine



Peanut Butter Mini-Plant

## Construction



Diesel Rock Crusher



Rammed Earth Wall Forms

## Communications



Portable Cell Towers



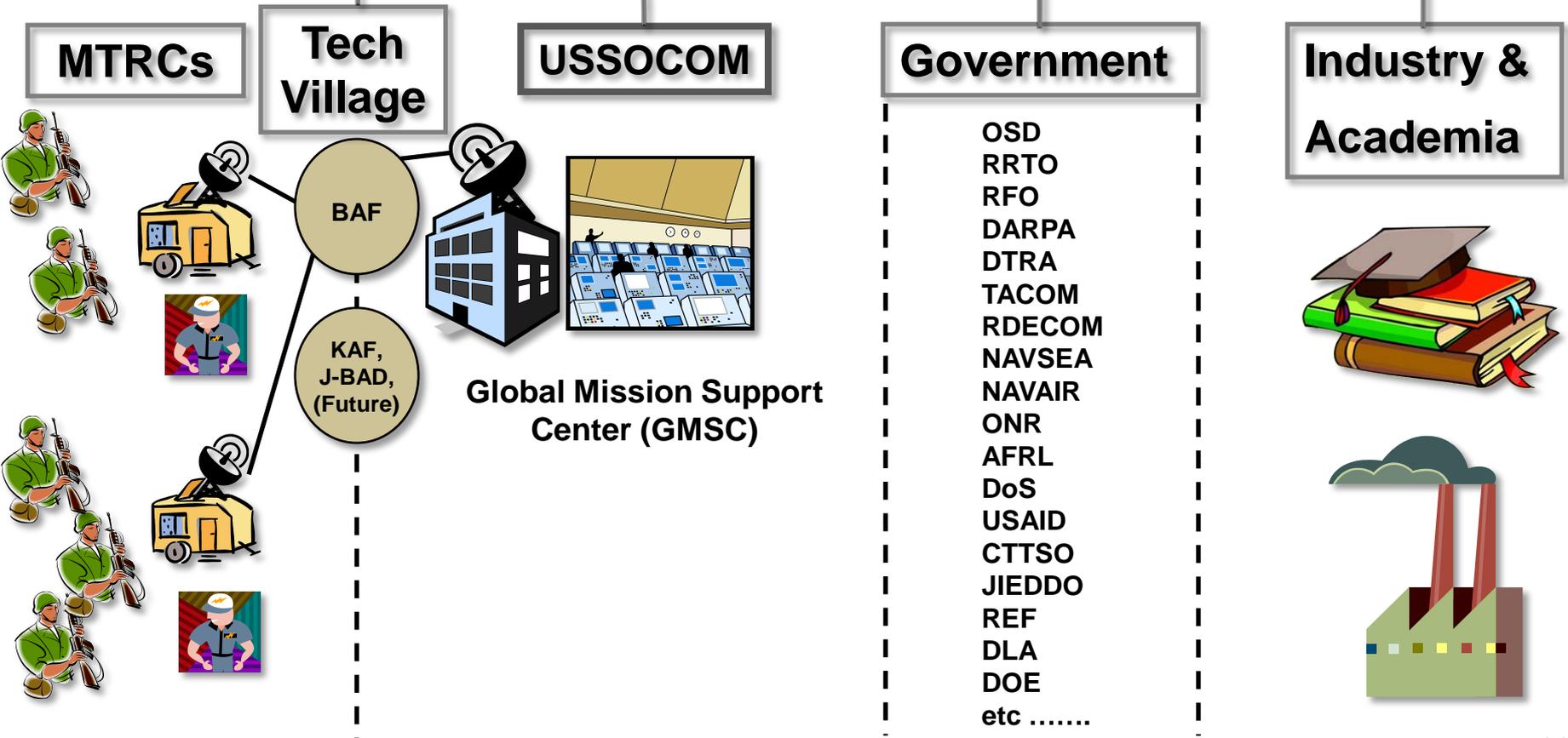
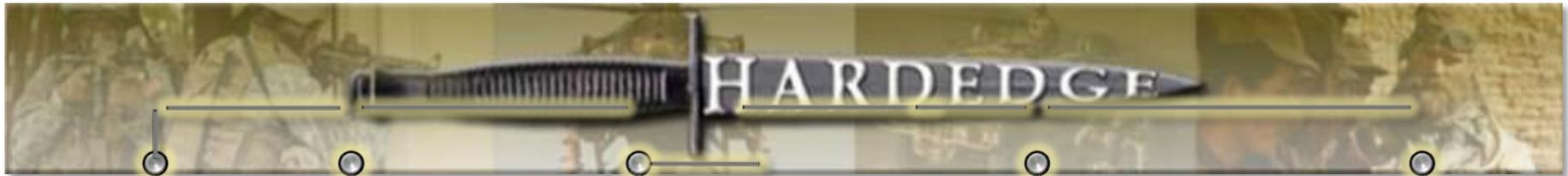
Used Cell Phones

- Transportation, Micro Finance, etc....



# Science & Technology Network

<http://hardedge.socom.smil.mil>





# Tech Village--Motivation

---

## A Joint Prototype Integration Facility (PIF)

- **Consolidated Hub for Engineering, Development, Complex Fabrication, Integration, Testing**
  - **A “Single Campus” for technical units and rapid prototyping shops**
  - **“Reachback” to CONUS Labs and Facilities**
  - **Leverage synergies and complementary capabilities—**
    - Paladin, Wolfhound, REF, FAST, SPG, Mobile Parts Hospital, MTC, CEXC, etc.
- **Showcase for appropriate, sustainable technologies for Village Stability Initiatives and other rural improvement projects**

Synergy on the Battlefield



# Tech Village Capabilities

---

- **Labs**
  - Computer lab, Electronics, Chem, Clean Room
- **Shops and Fabrication**
  - Machine Shop, Rapid prototyping machines, plastic and metal
  - Vehicle Bays
  - Aircraft Shelter
- **Test Areas**
- **Large Briefing Areas**
- **Isolated “Innovation/Project Rooms”**
- **“Petting Zoo” – A “Hands-On” Tech Display supporting Briefings, Orientation, Training**



# Future Projects

- **'County Fair'**
  - A demonstration area and "fair" where US and AFG officials and locals get 'hands on' familiarity with AST initiatives and technologies
- **Vocational Training**
  - Local "Technology Training" and a future Vocational Education Center (VOTEC)
- **Afghanistan Village of the Future**
  - A model village showcasing technology impacts on local quality of life and self-sufficiency





# Force Protection

## Base System



SPIDER



Omnisense UGS



Computers

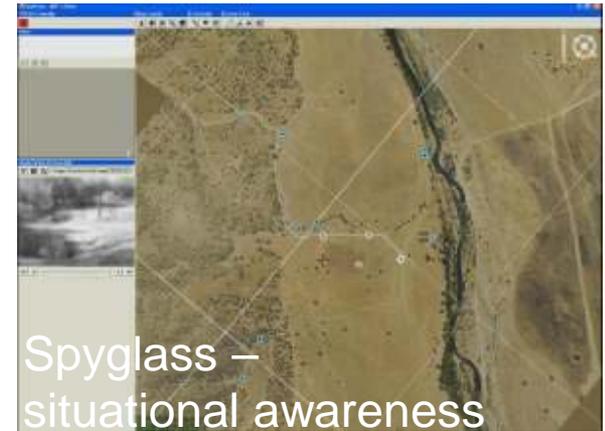
## Additional sensors --



Radar

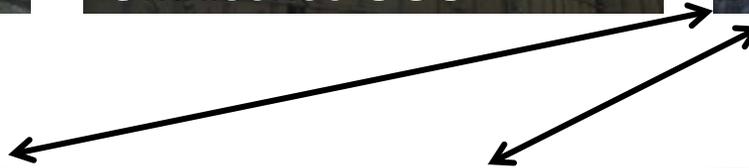


UGS



Spyglass – situational awareness

⚡ Wave relay  
Wireless link





# USSOCOM

## Technology Areas Of Interest

### SOF Warrior

- ▶ Reduce the load of the operator
- ▶ Human performance, conditioning, and reconditioning
- ▶ Advanced visualization and training systems
- ▶ Advanced protection

### Intelligence, Surveillance, and Reconnaissance (ISR)

- ▶ Advanced sensors including Tagging, Tracking, and Locating devices
- ▶ Multi-spectral optics
- ▶ Advanced processing techniques
- ▶ Persistent surveillance
- ▶ Advanced unmanned systems

### Command, Control, Communications, and Computers (C4)

- ▶ High bandwidth technologies
- ▶ Secure mesh, self-forming mobile ad-hoc networks
- ▶ Multi-level security systems
- ▶ Advanced multi-function software defined radios
- ▶ Advanced data management

### Weapons and Electronic Attack (EA)

- ▶ Precision guided munitions
- ▶ Tunable weapons
- ▶ Increased EA capabilities and capacity; portable systems

### Medical

- ▶ Far-forward Tactical Combat Casualty Care
- ▶ Rapid assays/diagnostics

### Mobility

- ▶ Advanced situational awareness in all environments
- ▶ Increased operational capacity and capabilities
- ▶ Low Observable and Counter Low Observable technologies
- ▶ Advanced lightweight armor and materials
- ▶ Advanced mobility platforms to access sensitive or denied areas
- ▶ Multi-domain mobility platforms

### Power and Energy

- ▶ Power system technologies; signature reduction
- ▶ Advanced surface craft power systems
- ▶ Advanced energy storage for underwater vehicles

### Irregular Warfare (IW)

- ▶ Tailored virtual training for language and regional expertise capability
- ▶ Psychological Operations; advanced multi-media techniques

### Cyberspace Operations (Attack, Defend, Exploit)

- ▶ Information assurance
- ▶ Exploitation and counter-threat



# Questions?



Corbis.com