

US Special Operations Command



Science and Technology Overview for Industry

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The overall classification of this briefing is:
UNCLASSIFIED

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Purpose

Provide an Overview of United States Special Operations Command's Science and Technology (S&T) Program and Technology Development Objectives for Industry

- **SOF Warrior Concept / SOF Uniqueness**
- **USSOCOM Advanced Technology Directorate**
- **S&T Program / Technology Development Objectives**
- **How To Reach Us**



USSOCOM Mission

Provide fully capable Special Operations Forces to defend the United States and its interests. Plan and synchronize operations against terrorist networks.

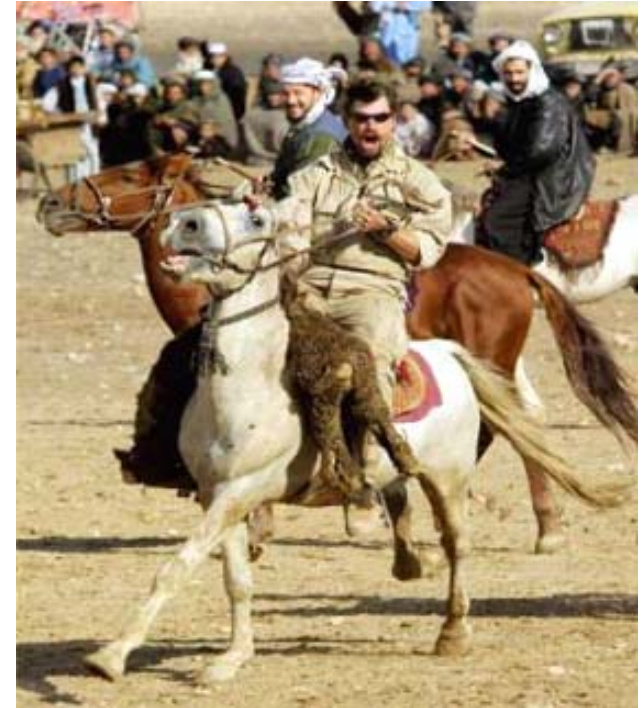


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The SOF Operator

- Through Exhaustive Training, Which Includes Language and Cultural Skills, **SOF Deploys Into Remote Areas**, Works with Indigenous Personnel, Coalition Forces, and Enemy Supporters. Through Close Interaction with the Local Populations, SOF Reaps Valuable Intelligence For GWOT--Find and Fix
- The Operations Tempo (OPTEMPO) Often Demands **Rapid Transition Into New Areas**, Languages, Cultural Roots, and Necessitates Forces Train and Prepare Whenever the Operator Has Time
- In Such Employments the Operator **Must Be Self-sufficient, Survivable**, Equipped with Advanced Information Mining Tools, and Naturally Occurring in the Environment
- **SOF Operates Alone in Austere Environments** with Only the Items They Can Carry





National Defense Authorization Act of 1986

A Unified Combatant Command...

- Command of All U.S. Based SOF
- Plan and Synchronize DoD Activities in the Global War on Terrorism
- Deploy SOF to Support Geographic Combatant Commanders
- As Directed, Conduct Operations Globally
- Plan and Execute Pre-Crisis Activities



...With Service-like Responsibilities

- Organize, Train, and Equip SOF
- Develop Strategy, Doctrine, and Tactics
- Programs and Budget
- Procure SOF-peculiar Equipment
- Monitor SOF Personnel
- Ensure Interoperability



Definition

Special Operations-Peculiar

- **Equipment, Materiel, Supplies, and Services with No Documented Service-common Requirement**
 - Often a Time – Priority Related Issue
 - Numbers May Not Justify Cost of Service Process
 - Items Initially Supported by USSOCOM Funding May Be Adopted by a Service

- **SOF Peculiar Modifications to Service Common Items**
 - Approved by the CDR USSOCOM for Application to Items Used by Other DoD Forces
 - Modifications Initially Supported with USSOCOM Funds May be Adopted by Service

- **Critically Urgent Items / Service Supporting SOF Activities**
 - Combat Mission Need Statement
 - Emerging Technology Prototypes Approved for SOF Use

Reference: DODD 5100.3, “Support of the Headquarters of Combatant and Subordinate Joint Commands”



USSOCOM Organization

UNITED STATES SPECIAL OPERATIONS COMMAND (USSOCOM)

SERVICE COMPONENTS

SUB-UNIFIED COMMAND

UNITED STATES ARMY
SPECIAL OPERATIONS
COMMAND
(USASOC)

NAVAL SPECIAL
WARFARE COMMAND
(NAVSPECWARCOM)

AIR FORCE
SPECIAL OPERATIONS
COMMAND
(AFSOC)

MARINE CORPS
FORCES
SPECIAL OPERATIONS
COMMAND
(MARSOC)

JOINT SPECIAL
OPERATIONS COMMAND
(JSOC)



- Special Forces
- Rangers
- 160th SOAR
- PSYOP
- Civil Affairs
- USAJFKSWCS



- SEAL Teams
- Special Boat Teams
- SEAL Delivery Vehicle Teams
- Naval Special Warfare Center



- Special Operations Squadrons
- Special Tactics
- Combat Weather
- Air Force Special Operations School

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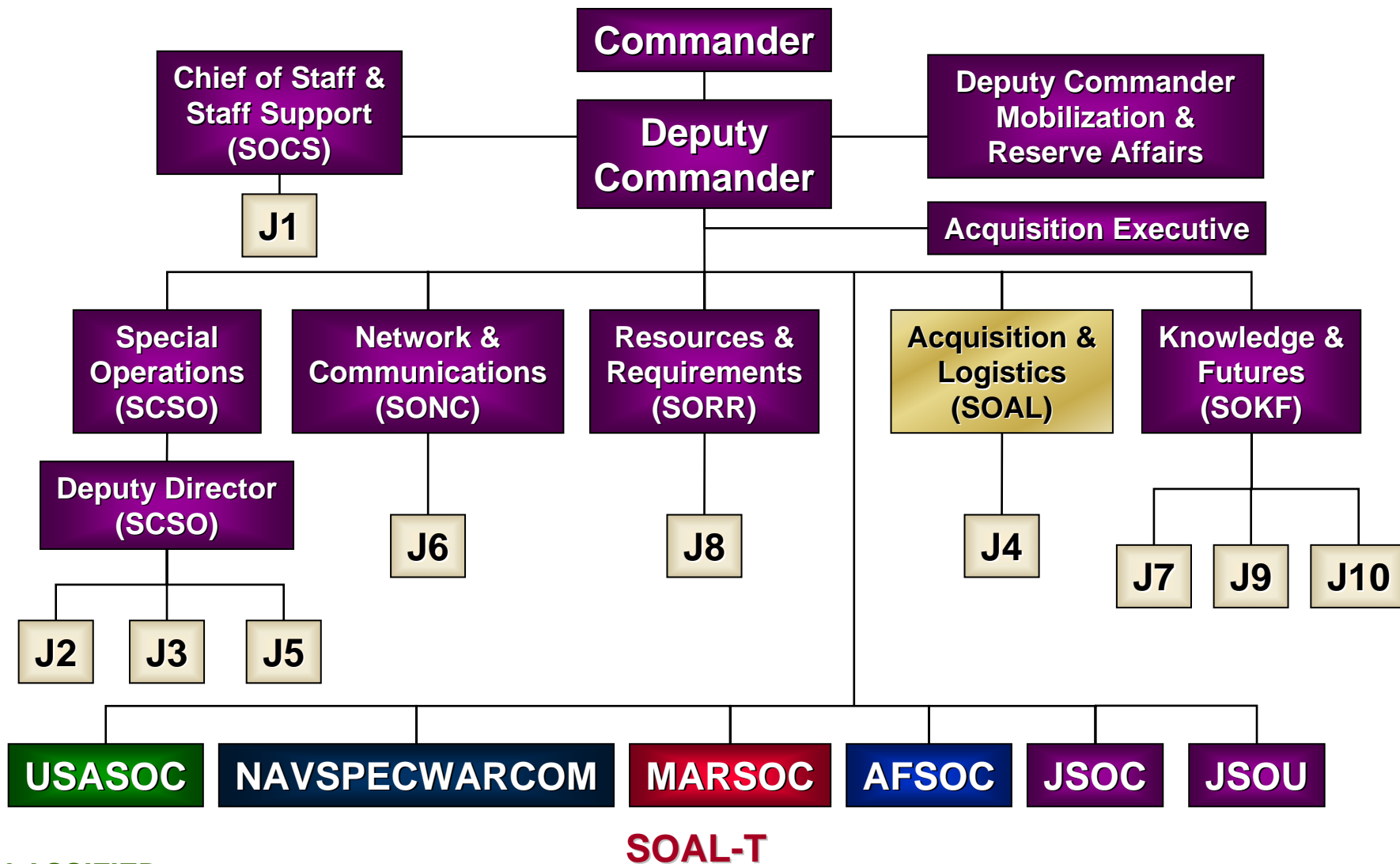
- Special Operations Battalions
- Foreign Military Training Unit
- Special Operations Support Group
- Marine Special Operations School



- Ensures SOF Interoperability
- Develops Joint Special Operations Plans and Tactics
- Conducts Joint Special Operations Exercises and Training

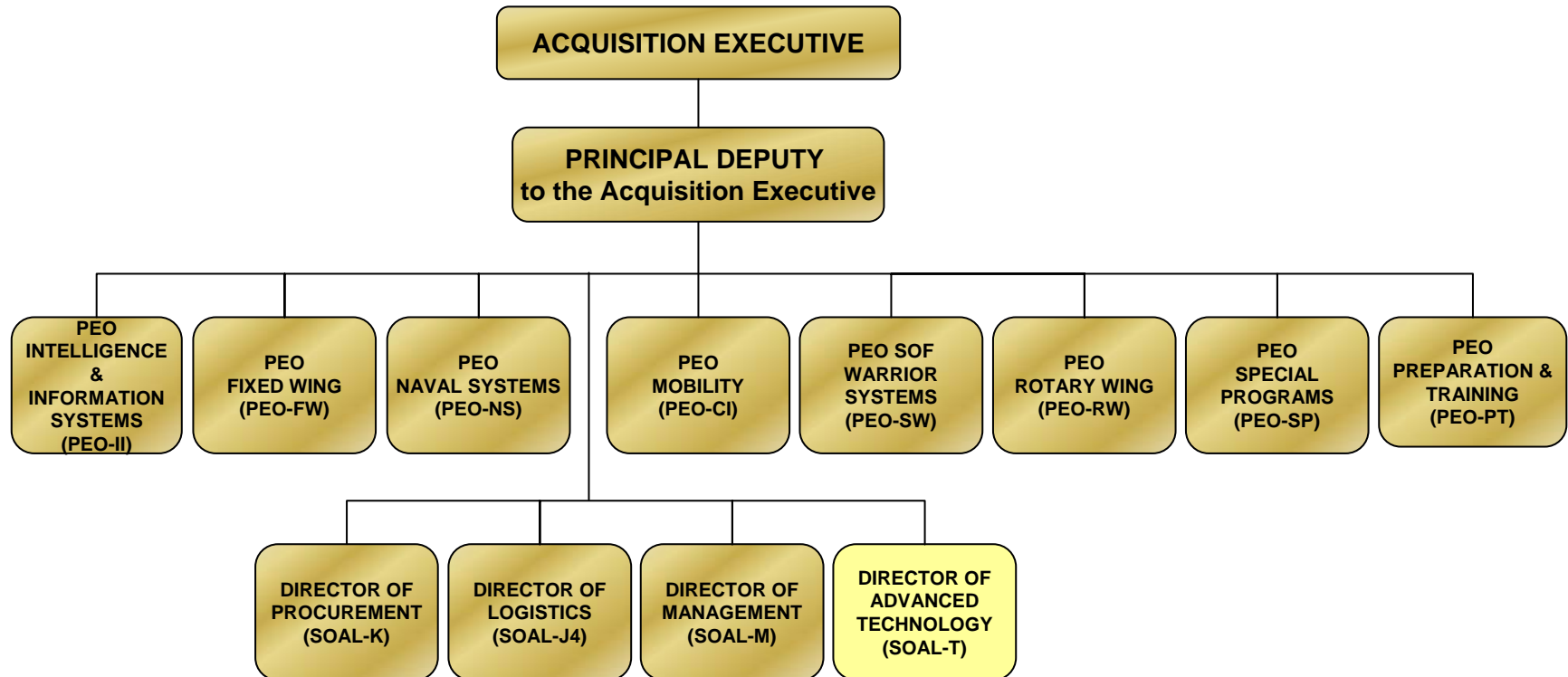


USSOCOM Organization (Cont.)





Special Operations Acquisition and Logistics Center (SOAL)



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Advanced Technology Directorate

Science and Technology Strategy

- **Apply and Invest Available S&T Resources Against Command Strategic Requirements / Capabilities to Maximize SOF Warfighting Abilities**
- **Leverage MILDEPs / DoD Agencies / Laboratories / Academia and Other S&T Programs and Products**





SOF Transformation

- **Department of Defense Lead: Plan, Prioritize, and Synchronize DoD Global Operations Against Terrorist Networks**
- **Global Presence: Establish a Worldwide Continuous Joint SOF Presence to Shape Operational Environments**
- **Global Expeditionary Force: Create Quick Reaction, Mission-focused, Task Organized Joint SOF Teams**

**"...time and the world do not stand still.
Change is the law of life and those
who look only to the past or present are certain
to miss the future."**

John F. Kennedy



S&T Investment Strategy Transformation

- **Refocus USSOCOM S&T Investments on Fewer Items with the Potential to Deliver a High Payoff SOF End Item or Technology**

- **Singular S&T Thrusts**
 - **Larger Scale SOF S&T Investments (Similar to Tagging, Tracking, and Locating Initiative)**
 - Apply Funds From Multiple USSOCOM S&T Programs
 - Maximize Leveraging Opportunities Across MILDEPs and Government Agencies (e.g. DARPA)



Technology Development Objectives (TDOs)

- **Capability Gap Analysis Was Conducted in 2005 and Approved By the Commander, USSOCOM (General Brown) on 28 Feb 06**
- **Command Guidance Was Established Based on the Capability Gap Analysis That Identified Capability Areas and Overarching Technology Threads**
- **Guidance Provided a Baseline for S&T Investment**
- **TDOs Were Developed by USSOCOM Component Commands, Program Executive Offices (PEOs) That Define Specific Technologies and Capabilities**
- **General Officer / Flag Officer Supported S&T Initiatives Have Been Included**

Overarching Technology Threads
Advanced Power Sources
Signature Management
Command, Control, Communications, Computers, and Intelligence (C4I)
Capability Areas
Tagging, Tracking, and Locating (TTL)
SOF Warrior
Mobility
Information Operations (IO) & Psychological Operations (PSYOP)
Sensors
Fire Support
Training Systems
Logistics
Medical



Technology Development Objectives

- Advanced Power Sources -

▪ **Power System Technologies**

Pursue Advanced Replacements for Standard Batteries That Provide Five to Ten Times the Current Battery Capacity Life for the SOF Operator. Pursue Micro-battery Technology Solutions with Extended Duration Capability for Miniature TTL Devices. Replacement Batteries Cannot Create a Thermal Signature that Can Be Detected.

▪ **Advanced Surface Craft Power Systems**

Pursue SOF Combatant Craft Advanced Power Systems That Provide Significantly Better Power-to-weight Ratios at Top Speed and Significantly Better Fuel Efficiency at Cruise Speed.

▪ **Advanced Energy Storage For Underwater Vehicles**

Pursue Advanced Energy Storage Systems That Are Significantly Higher Capacity Than Those Currently Used in SOF Underwater Vehicles.



Technology Development Objectives

- Signature Management -

- **Low-Probability-of-Intercept/Low-Probability-of-Detection (LPI/LPD) Systems**

Develop LPI/LPD Systems with the Capacity to Support SOF Mission Objectives in Denied and High Threat Areas That Incorporate the Technical Characteristics Required to Defeat the Threat.

- **Unmanned Aerial Vehicle (UAV) Engine Noise Suppression Technologies**

Develop Noise Suppression Technologies That Can Drastically Reduce the Sound of Medium-sized UAV Engines.



Technology Development Objectives

- Command, Control, Communications, Computers, and Intelligence (C4I) -

▪ **SOF Universal Radio Frequency (RF) System**

Develop a Multi-purpose, Fully Integrated, Man-portable RF Capability That Can Provide SOF-unique Functional Attributes. The Handheld System Should Provide SOF Functionalities Including Command and Control; Situational Awareness and Tracking; Navigation and Geolocation; Hostile Force TTL; Signals Intelligence; SOF Blue Force Tracking; Communications; and Counter-IED Capabilities.

▪ **Low-power, Low-Noise Amplifiers (LNAs)**

Develop LNAs with Ultra-high Linearity and Higher Dynamic Range RF Front-ends for Use in Command, Control, and Communication Systems Without Compromising System Sensitivity (Noise Figure).

▪ **Digital Receiver and Transceiver**

Develop Advanced Digital Receivers and Transceivers with Reduced Size, Weight, and Power; Enhanced Programmability, Flexibility, and Performance; and Reduced Life Cycle Cost.



Technology Development Objectives

- C4I (Cont'd) -

▪ **Mobile Ad-Hoc Networking**

Develop Robust, Affordable, Mobile Ad-hoc Networking Data Link Technologies Suitable for Use By Sensors, Tactical Unmanned Aerial Systems, and Dismounted Ground Units in Small Battery-powered Applications.

▪ **Secure Mesh**

Develop a Secure, Type 1-accredited Device to Allow the Establishment of Secure Self-forming, Ad-hoc Networks for Tactical Units on the Move.

▪ **Distributed Data System Technologies**

Develop Technologies That Provide Automatic Data Synchronization, Fusion, and Indexing of Data Collected By Widely Dispersed Tactical Teams.

▪ **Datalinks**

Develop Continued Technology Improvements in the Cost, Weight, and Bandwidth Capability to Enable More Datalink Access, Particularly By Disadvantaged Access Users.



Technology Development Objectives

- C4I (Cont'd) -

- **Persistent Intelligence, Surveillance and Reconnaissance (ISR)**

Develop Persistent ISR Capabilities That Rapidly Disseminate Operational Information to Key Elements on the Battlefield Through a Combination of Manned and Unmanned Airborne ISR to Flexibly Support the Dynamic SOF Mission Set.



Technology Development Objectives

- TTL -

- **Reduce the Size, Weight, and Power Requirements for Tags and Sensors to Allow Improved Clandestine Operations**

Develop Personnel and Equipment Identification and Location Technologies That Can Provide a Small Form Factor, Clandestine Capability for Rapid Identification at Various Distances. These Technologies Must Work in All Environments Such as Jungle, Desert, Maritime, Mountain, and Polar.

- **Introduce New Capabilities for Detecting, Identifying, and Tracking Targets Based on Unique Observables**

Natural Signatures: e.g. Biometrics, Unique Mechanical Defects, and Augmentation of Natural Signatures Such as “Perfumes” and “Stains”

- **Provide New Mechanisms to Deploy, Monitor, and Manage Clandestine Devices with Reduced Exposure of Operational Personnel**



Technology Development Objectives

- SOF Warrior Systems -

▪ **Night Vision**

Develop Night Vision Technologies That Provide Small, Lightweight, Low Power, and Hyper- or Multi-spectral Sensors Coupled With Digital Color-fusion Processing and Display Technologies.

▪ **Tunable Weapons**

Pursue a Greater Variety of Integrated, Tunable Weapons—Non-lethal Weapons With a Tunable Destructive Potential—to Accommodate a Broad Variety of Missions While Limiting or Eliminating Collateral Damage and Casualties.

▪ **Miniature Laser Ring Gyroscope**

Pursue a Miniature, Three-axis, Hemispherical or Laser Ring Gyroscope, Inertial-navigation Capability as a Replacement for the Digital Magnetic Compass.



Technology Development Objectives

- SOF Warrior Systems (Cont'd) -

- **Low Observable (LO) and Counter Low Observable (CLO)**

Develop Technologies That Pursue Passive, Active, Adaptive, Single, and Multi-spectral Means That Provide LO and CLO Capabilities to Individual Soldier Systems.

- **Advanced Conformal Body Armor**

Develop Advanced Conformal Body Armor Technologies That Can Provide SOF with a Superior Conformal Body Armor Capability By Increasing Ballistic Protection and Body Coverage While Reducing Weight, Thickness, and Bulk.



Technology Development Objectives

- Mobility -

- **Next Generation Sea-Air-Land (SEAL) Delivery Vehicle (SDV)**

Develop a Next-generation, Shallow-water Submersible Vehicle That is Dry-Deck-Shelter Capable.

- **Next Generation Modular Ground Vehicles**

Develop Technologies That Support Improvements to SOF Ground Mobility Vehicles Through a Family Of Vehicles (FOV) Approach That Will Allow SOF Units to Move Tactically Over Urban, Desert, Woodland, Jungle, Mountains, and Arctic Terrain in All Threat Conditions.

- **LO and CLO**

Develop LO And CLO Capabilities Employable Across the Spectrum of SOF Manned and Unmanned Aircraft, Ground Vehicles, and Combatant Craft.



Technology Development Objectives

- Mobility (Cont'd) -

▪ **Aircraft Occupant Ballistic Protection Systems (AOBPS)**

Develop New Forms of Lightweight, Transparent Ballistic Armor for Areas Such as Aircraft Windscreen and Chin Bubbles and Lightweight Ballistic Protection to Replace Existing Steel and Kevlar Panels. Transparent Systems Should Provide Protection Against a Variety of Small Arms Rounds without Impeding Aircrew Vision or Field of View with or without the Use of Night Vision Devices.

▪ **Enhanced Pilotage Systems**

Develop Enhanced Pilotage Systems That Provide Reduced Pilot Workload While Improving Situational Awareness in Obscure Conditions and Avoiding Small Obstacles Such as Wires.



Technology Development Objectives - Information and Psychological Operations -

- **Small Conformal Amplitude Modulation (AM) Antenna Array Technologies**

Develop Small Conformal AM Antenna Array Technologies That Provide a Small, Lightweight AM Transmit Antenna That Can Be Mounted on SOF UAVs.

- **Sonic Projection Technologies**

Develop Technologies That Provide the Capability to Direct Sound Waves to Long Distances to Target an Individual or a Group with a Specific Audible Message Using a "Beam Of Sound."

- **Electronic Paper (EP) Technologies**

Develop EP Technologies That Allow the Production of Scatterable Media Payloads That Use a Paper Format That Incorporates Audio and/or Video Containing PSYOP Messages.



Technology Development Objectives

- Sensors -

- **Degraded Environmental Conditions Capable Sensors**

Develop Sensor Technologies That Will Provide High Resolution in Foul Weather and Low-contrast Environments.

- **Multi-spectral Aircraft Sensors**

Develop Advanced, Portable, Multi-spectral Sensors That Are Compatible With All SOF Aircraft and That Allow a Walk-on Modular 'Plug-in' Capability to Speed Fielding to Battle.



Technology Development Objectives - Training Systems -

- **Virtual Training**

Develop Technologies That Will Provide the Capability to Format Virtual Training Classes That Adapt to The Individual's Knowledge Level.



Technology Development Objectives - Medical -

■ Tactical Combat Casualty Care

Develop Improved, Self-contained Field Medical Care Kits That Contain the Materials Necessary to Treat Time-critical Injuries Typically Encountered by SOF.

■ Micro Lab

Develop a Compact, Lightweight, Highly Multiplexed Medical Assay Device That Will Analyze a Host of Body Substances for Presence of Disease-causing Pathogens and Other Significant Biomarkers Relevant to Patient Assessment and Management of Diseases of Military Importance in Far-forward Locations.

■ Performance Enhancements

Protocols, Technologies and Equipment Designed to Vastly Improve the Performance of the SOF Warrior



Technology Development Objectives

- Weapons -

■ Precision Guided Munitions

Develop Technology That Improves the Accuracy, Reliability, and Lethality of Small, Lightweight, Precision-guided Munitions for SOF Application While Reducing the Cost, Weight, and Integration Complexity.

■ Advanced Ammunition

Develop Technologies That Provide Increased Accuracy, Multi-purpose Small Arms Ammunition. Develop a Medium-velocity, Shoulder-fired 40mm Round That Has Integrated Fire Control Systems for Ballistic Solutions.



Technology Development Objectives

- Weather -

■ In-situ Weather Forecasting

Develop Improved Near- to Mid-term Insitu Weather Forecasting Capabilities That Incorporate Various Meteorological Data Sources to Provide an Accurate Projection of Weather Conditions for a Localized Tactical Operating Area.



Technology Development Objectives

- Mobility -

▪ **Terrain Following-Terrain Avoidance (TF-TA) Radar**

Develop a TF-TA Radar Design That is Common Across All SOF Aircraft. The TF-TA Radar Should Be a Software-based Sensor with a Wide Front-end Bandwidth Capacity, Where Capabilities and Modes of Operation Are Derived From Software Algorithms and Common Modular Programming. The TF-TA Radar Should Provide Imagery, Guidance, and Alerts for Man-made Structures and Include the Capability for High-resolution Ground-mapping with Moving Target Indicator to Detect Landmarks, Landing Zone Obstructions, and Vehicular Traffic.

▪ **Aircraft Avionics**

Develop Continued Technology Improvements to Allow Better Performance on Existing Aircraft Data Bus and Wiring without the Large Cost to Rewire Current Aircraft Fleet.

▪ **Ultra Lightweight Joint Airdrop System**

Develop an Advanced Precision Resupply Capability for Scenarios in Which Enemy Forces Possess a Significant Anti-air Threat, Situations in which Denied Use of Airspace Occurs Due to Political Concerns, or Incidents in which Clandestine Resupply is Required.



Balancing Requirements

- **Existing Program of Record with a Validated Requirement:**
 - Get the Applicable Program Manager (PM) in on the Program at the Very Beginning. Without Their Buy in, There Will Be No Support in Competing with the Aspects of the Program.
 - Get a Transition Agreement
 - Get the SOF Subject Matter Experts (SMEs) or Intended Users at the Demonstration

- **If No Requirement:**
 - Link it to a USSOCOM Capability Gap
 - Link it to a USSOCOM Combat Mission Needs Statement or a Joint Staff Urgent Need if the New Capability Will Meet Their Timeline, Etc.
 - Assist in the Development of an Initial Capabilities Document (ICD)



How to Contact Us

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- **Small Business Innovation Research (SBIR) Process**



Summary

“This nation expects to have forces that can respond to the sound of guns with speed and skill and discipline whenever and wherever they are needed.

The nation also expects to have forces that can operate with knowledge and wisdom well ahead of the sound of guns in order to prevent violence from erupting.

And the nation expects to have forces that can emerge from darkness with precision and daring to conduct missions that are especially demanding and sensitive.”

ADM Eric T. Olson



Questions?



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