UNITED STATES SPECIAL OPERATIONS COMMAND
SBIR FY06.1 Proposal Submission

The United States Special Operations Command's (USSOCOM) mission includes developing and acquiring equipment, material, supplies and services. USSOCOM is seeking small businesses with a strong research and development capability able to transition technology to meet USSOCOM needs.

Inquiries of a general nature or questions concerning the administration of the SBIR program should be addressed to:

United States Special Operations Command
Attn: SOAL-KS/Ms. Karen L. Pera
7701 Tampa Point Blvd.
MacDill Air Force Base, Florida 33621
Email: perak@socom.mil

During the pre-release period of this solicitation, any technical inquiries must be requested through the SITIS system (http://www.dodsbir.net/Sitis/Default.asp) listed in section 1.5c of the program solicitation.

USSOCOM will only accept proposals for those topics stated in this solicitation. The USSOCOM Program Executive Officers (PEOs) responsible for the research and development in these specific areas initiated the topics and are responsible for the technical evaluation of the proposals. The Phase I and Phase II proposal evaluation factors are listed below. Each proposal must address each factor in order to be considered for an award.

Selection of proposals for funding is based upon technical merit and the evaluation criteria included below. Phase I and Phase II funding is limited, therefore USSOCOM will select and fund only those Phase I and Phase II proposals considered to be superior in overall technical quality and technical merit. USSOCOM may fund more than one proposal in a specific topic area if the technical quality of the proposal is deemed superior, or it may fund no proposals in a topic area.

Evaluation Criteria – Phase I & II

1) The soundness, technical merit, and innovation of the proposed approach and its incremental progress toward topic or subtopic solution.

2) The qualifications of the proposed principal/key investigators supporting staff, and consultants. Qualifications include not only the ability to perform the research and development but also the ability to commercialize the results.

3) The potential for commercial (Government or private sector) application and the benefits expected to accrue from this commercialization.

Potential offerors must submit proposals in accordance with the DoD Program Solicitation at www.dodsbir.net/solicitation. The maximum amount of SBIR funding for a USSOCOM Phase I award is $100,000 and the maximum time frame for a Phase I proposal is 6 months. A Phase I proposal for less than 6 months and/or less than $100,000 is encouraged where low risk technologies are being proposed.

All firms shall include as part of the Phase I proposal transportation costs to travel to Tampa, Florida for two separate meetings. The first travel requirement shall be the Phase I kick-off meeting and the second travel requirement shall be for the Phase I out brief. The meetings shall take less than four hours and at least the Principal Investigator is required to attend both meetings. Notwithstanding the requirement for the Principal Investigator to attend both meetings, any other individual needed to discuss all aspects of the firm's approach to address the SBIR topic shall also attend the meetings.

USSOCOM, may request a Phase II proposal from any Phase I contractor, based on the results of the Phase I effort using the evaluation criteria above. A Phase II proposal for less than 24 months and/or less than $750,000 is encouraged. The maximum amount of **SBIR funding** allocated for a USSOCOM Phase II award is $750,000 and the maximum time frame for a Phase II award is 24 months. Proposals should be based on realistic cost and time estimates, not on the maximum time (months) and dollars. The cost of the project is based on the overall amount of hours spent to accomplish the work required and the overall term of the project should also be based on the same effort. In preparing the proposal, (including the statement of objectives and milestones), firms should consider that workload and operational tempo will preclude extensive access to government and military personnel beyond established periodic reviews.

Electronic Submission Instructions

All proposal information must be received electronically via the DOD SBIR/STTR Submission site. To submit, proceed to http://www.dodsbir.net/submission. Once registered, a firm must prepare (and update) Company Commercialization Report Data, prepare (and edit) Proposal Cover Sheets, complete the Cost Proposal form, and upload corresponding Technical Proposal(s). The proposal submission, exclusive of the Company Commercialization Report, must not exceed 25 pages.

Paper copies will not be considered. A complete electronic submission is required for proposal evaluation. An electronic signature is not required on the proposal. The DoD SBIR/STTR Submission site will present a confirmation page when a technical proposal file upload has been received. The upload will be available for viewing on the site within an hour. It is in your best interest to review the upload to ensure the server received the complete, readable file.

For additional information about electronic proposal submission, including uploading your technical proposal, refer to the instructions on the solicitation and the on-line help area of the DoD SBIR/STTR Submission site, or call the DoD SBIR/STTR Help Desk at 866-SBIRHLP (866-724-7457).

Please note that e-mail is the only method of communication that will be used by the contracting office to notify the submitter/proposer if they have or have not been selected for an award, therefore please include the e-mail address of the person authorized to negotiate contracts for your firm.

SOCOM SBIR 06.1 Topic Index

SOCOM SBIR 06.1 Topic Descriptions

SOCOM06-001 TITLE: Automated Detection and Cueing

TECHNOLOGY AREAS: Sensors, Electronics, Battlespace

ACQUISITION PROGRAM: Special Operations Technology Development

The technology within this topic is restricted under the International Traffic in Arms Regulation (ITAR), which controls the export and import of defense-related material and services. Offerors must disclose any proposed use of foreign nationals, their country of origin, and what tasks each would accomplish in the statement of work in accordance with section 3.5.b.(7) of the solicitation.

OBJECTIVE: The development of an innovative, inexpensive system that provides the ability to detect and cue observers to possible security threats using light weight, low power, man portable technology. Ideally, the system would utilize existing imagers, regardless of format, as well as data processing hardware, with an innovative software solution.

DESCRIPTION: Detection and cueing to possible security threats would be very valuable for military, law enforcement and commercial applications. While Industry predominately focuses on providing users with imaging systems to detect humans at a distance, the additional capability of automatic detection would reduce staff required for monitoring as well as increase the probability of detection while minimizing detection time. Application of this technology would include military and law enforcement surveillance activities, large-scale commercial security systems e.g. airport security, as well as security for retail stores and the gaming industry. Current surveillance technologies include pan-tilt-zoom (PTZ) cameras, low light level cameras and seismic detection systems to name a few. PTZ and low light level camera technologies show the most promise for large-scale standoff detection and cueing to possible security threats but have drawbacks and limitations. While low light level and PTZ cameras minimize the required monitoring force, both systems require a man in the loop for detection. The addition of an automatic detection and cueing device to the backend of these mature imaging systems would increase functionality while minimizing staffing, enabling the man on the loop approach to monitoring alerts generated by the detection system. Current state of the art automatic detection systems are capable of generating these alerts when detection occurs yet false alarm rates are unacceptably high and often require a response force to confirm the event. This effort researches innovative automatic detection and cueing systems that could be interoperable with a variety of imaging sensors as well as direct a precision human identification system, such as facial recognition technology, to the event location. Any new technology should satisfy the following requirements:

- Automatic detection and cueing should be feasible in all light/environmental conditions
- System should be capable of daytime human detection at 1000 meters (night at 500 meters)
- Any method used for detection must use existing imagers without manipulation
- System must provide user-defined visual and audible alerts with a low probability of false alarms
- Should be ruggedized and have a small, lightweight form factor
- Should utilize Commercial Off-The-Shelf equipment to minimize follow-on production costs
- Should be low power with the ability to use AC or DC power
- Should be designed with a network environment in mind to allow for unattended ground operations

Development of such a capability would satisfy aspects of Sensors, Electronics and Electronic Warfare a DoD Critical Technology Area.

PHASE I: Develop a proof of concept for the proposed method of detection and cueing.

PHASE II: Develop functional prototype that resembles the form factor of the final system for testing by end users in a real life working environment.

PHASE III DUAL-USE APPLICATIONS: Produce operational units that can be employed by the military, law enforcement and the commercial market sector. Major applications for this technology include security and surveillance cameras and automated warning systems, and the techniques could also be applied to commercial image

processing applications for industrial and manufacturing use.

KEYWORDS: BIOMETRICS, SENSORS, TAGGING, TRACKING, LOCATING

SOCOM06-002 TITLE: Conformal Appliqué Antennas for Unmanned Aerial Vehicles and Aircraft

TECHNOLOGY AREAS: Air Platform, Sensors

ACQUISITION PROGRAM: Global Reach Advance Concept Technology Demonstration

The technology within this topic is restricted under the International Traffic in Arms Regulation (ITAR), which controls the export and import of defense-related material and services. Offerors must disclose any proposed use of foreign nationals, their country of origin, and what tasks each would accomplish in the statement of work in accordance with section 3.5.b.(7) of the solicitation.

OBJECTIVE: To research, develop, test, and build a family of conformal appliqué antennae for high to low power broadcast of psychological operations messages at various frequencies from a wide variety of UAV and military and commercial aircraft.

DESCRIPTION: There is a definite need within the psychological operations (PSYOPS) community to have more conformal broadcast antennas on aircraft to improve the overall aerodynamic handling and maneuverability characteristics of the respective airframe. Conformal type antennas are needed both for transmission and reception on airborne platforms. Research needs to be done to determine what is the best location for the conformal antenna by aircraft type, with respect to its RF propagation coverage area and its function for Line of Sight (LOS) or Beyond Line of Sight (BLOS) operation. Research and testing must determine what would be the best engineering approach for putting a transmit antenna, operating in the VHF and/or UHF frequency bands (commercial FM radio station and VHF and UHF television) on an airborne or UAV platform to perform broadcast operations.

The conformal appliqué antenna must adhere to the outer surface of the aircraft at speeds up to 400 knots at -55º C at 65,000 feet altitude for a minimum of 90 days continuous operation without endangering the flight safety of the aircraft or UAV. A RF cable concept for powering the antenna without endangering the aircraft or interfering with aircraft flight instrumentation must be included as an integral part of the vendor proposal. The antenna appliqué must be able to be mounted on the aircraft and tested in the field within four hours. Removal of the antenna appliqué and cabling must be accomplished within six hours.

Possible antenna mounting platforms include: High Altitude Airship (HAA), Hover Hammer, Predator, Global Hawk and A160 Hummingbird UAVs, and the various iterations of the C-130 Hercules. Propeller driven commercial aircraft in wide use should also be considered.

Technical Parameters

- Frequency:

  FM: 87.5 to 108 MHz

  VHF TV: 174 to 230 MHz

  UHF TV: 470 to 806 MHz

Maximum RF Power:

  FM: 500 watts

  VHF TV: 1 KW

UHF TV: 2 KW

- Minimum RF Power:

  FM: 100 watts

  VHF TV: 250 watts

  UHF TV: 500 watts

- Polarization: Horizontal
- Transmit Radiation pattern: Omni-directional for angles between nadir and +45º (omni-directional tolerance: <5dB peak-to-peak)
- Impedance: 50 Ohms
- Gain: -2 to 0dB
- Maximum Weight: 100 lbs
- Operational temperatures: 150º+ C (ground) to -55º C (airborne)

Proposals should reflect the vendor's expertise, especially in antenna design, small package mechanical design, and the advantages of their technical approach. The proposal should concentrate on RF propagation characteristics, electrical/mechanical interfaces, maximum RF power allowable, performance testing, and flight safety certification. Phase I companies will discuss their proposed research in detail and propose in general what they would continue in Phase II.

Successful proposals will use novel ideas to improve military utility, create future commercial markets, and increase functional capability. Pluses include:

- Fully demonstrating the company's past and present experience;
- Supplying references on proposing company's products/programs (particularly government program managers);
- Giving detail on its proposed technologies to show expertise.
- Showing detailed expertise in technologies related to this SBIR.
- Experience designing products for use in commercial or military customers.
- Companies that can assist the topic author in commercializing the product.

The proposing company should be prepared to deliver products in accordance with the general information outlined in each of the phases as listed below:

PHASE I: Develop an overall design family of antennae that includes antennae materials, adhesives to be used, electro-mechanical interfaces, human operational factors in tactical installation and removal of antennae, low visual profile on platform when installed, minimum impact on platform flight characteristics and flight safety, and military operational requirements. Design documents must include MTBF projections, a maintenance concept, an overall concept for a family of lightweight conformal antenna systems, and a commercialization concept. Provide a Final Technical Report that will be evaluated to determine which Phase I company will be selected to continue development in Phase II.

PHASE II: Develop, build, and demonstrate a prototype system of each antenna variant and demonstrate again in a military field environment. Conduct extensive testing to prove feasibility over varied extended operational conditions, to refine/validate MTBF data, validate HMI and mechanical design, establish power efficiency data, and to validate the total system design. Make system design modifications, as necessary, within the proposed budget to ensure Government satisfaction with the prototype. Provide a Final Technical Report of Phase II activities, which will be evaluated to determine which Phase II company will be selected to continue development refinement in Phase II (Extended), or go into production in a Phase III contract. Provide the antennae variant prototypes and selected spare parts to the Government for 90 days of Government testing and validation.

PHASE III/DUAL USE APPLICATIONS: At the completion of successful Government test and validation a limited production run is envisioned for SOCOM requirements. The vendor may conduct marketing activities

initially for additional DoD customers to increase the initial production run. This antenna system could be used in a broad range of military, law enforcement, civilian disaster relief applications, and commercial broadcasting operations.

KEYWORDS: PSYCHOLOGICAL OPERATIONS, AIRCRAFT ANTENNA, UAV, UHF, VHF, BROADCAST, FM, TV, TELEVISION, CONFORMAL, ANTENNA, APPLIQUÉ, TACTICAL COMMUNICATION

SOCOM06-003 TITLE: Universal Longwire Antenna Module for Unmanned Aerial Vehicles and Aircraft

TECHNOLOGY AREAS: Air Platform, Sensors

ACQUISITION PROGRAM: Global Reach Advance Concept Technology Demonstration

The technology within this topic is restricted under the International Traffic in Arms Regulation (ITAR), which controls the export and import of defense-related material and services. Offerors must disclose any proposed use of foreign nationals, their country of origin, and what tasks each would accomplish in the statement of work in accordance with section 3.5.b.(7) of the solicitation.

OBJECTIVE: To research, develop, test, and build a longwire antennae module for high to low power broadcast of psychological operations messages at various frequencies from a wide variety of UAV and military and commercial aircraft.

DESCRIPTION: There is a definite need within the psychological operations (PSYOPS) community to have a universal longwire antenna module that can be fitted on a number of different aircraft and UAV platforms within a minimal timeframe. This is necessary to provide operational flexibility with respect to numbers and types of available aircraft and UAV and to improve the overall aerodynamic handling, maneuverability characteristics, and mission duration of the respective airframe when compared to present capabilities. Research and testing needs to be accomplished to determine what would be the best engineering approach for attaching or installing a universal transmit antenna module, operating in the MF and HF frequency bands (commercial AM station and Short Wave (SW)) on an airborne or UAV platform. Transmit antenna operating in the MF and HF frequency bands, requires antenna lengths, ranging from 15 to 460 feet. To maximize the efficiency of the transmission, the antenna needs to be held vertically (vertical polarization), as much as possible at speeds up to 150 knots (operational loitering).

Possible technical approaches include: fixed length antenna tunable to a specific frequency; specific length attachable antenna sections pre-cut to transmit frequency; and variable length antenna deployment module that is tunable (fine tuning) within a band. All antenna solutions must examine and consider a vertical polarization technical approach that uses aerodynamics rather than solely weight to achieve verticality of the antenna. The universal module must have a low drag (small cross section) design and must not interfere with flight safety. The antenna must only be deployable while airborne and must be retractable or detachable/droppable while airborne. Remote control of the antenna module is desirable. Antenna module must be designed for long term, multi-flight use. Antenna module must be designed to be installed/removed in less than one hour.

Possible antenna mounting platforms include: High Altitude Airship (HAA), Hover Hammer, Predator, Global Hawk and A160 Hummingbird UAVs, and the various iterations of the C-130 Hercules. Propeller driven commercial aircraft in wide use should also be considered.

Technical Parameters

- Transmit Frequency: 535 KHz to 1700 KHz (can be divided into sub-bands)
- Maximum RF Power: 2 KW
- Minimum RF Power: 500 watts
- Polarization: Vertical
- Transmit Pattern: Omni-directional for angles between nadir and +45º (omni-directional tolerance: <5dB peak-to-peak)
- Impedance: 50 Ohms

- Gain: -5 to 0dB
- Weight: Universal Module with cabling, remote control, and antenna wire must be as lightweight as is technically feasible. The total weight of the Universal Module package technical solution will be a major determining factor for Phase I contract award.
- Operational Altitude: Maximum: 65K feet.
- Operational Temperature: +60º C to -55º C

Proposals should reflect the vendor's expertise, especially in antenna design, small package mechanical design, and the advantages of their technical approach.. The proposal should concentrate on RF propagation characteristics, electrical/mechanical interfaces, and maximum RF power allowable. Phase I companies will discuss their proposed research in detail and propose in general what they would continue in Phase II.

Successful proposals will use novel ideas to improve military utility, create future commercial markets, and increase functional capability. Pluses include:

- Fully demonstrating the company's past and present experience;
- Supplying references on proposing company's products/programs (particularly government program managers);
- Giving detail on its proposed technologies to show expertise.
- Showing detailed expertise in technologies related to this SBIR.
- Experience designing products for use in commercial or military customers.
- Companies that can assist the topic author in commercializing the product.

The proposing company should be prepared to deliver products in accordance with the general information outlined in each of the phases as listed below:

PHASE I: Develop an overall design family of antennae that includes electro-mechanical interfaces, human operational factors in tactical installation and removal of antennae, low visual profile on platform when installed, minimum impact on platform flight characteristics and flight safety, and military operational requirements. Design documents must include MTBF projections, a maintenance concept, an overall concept for a family of lightweight antenna modules, and a commercialization concept. Provide a Final Technical Report which will be evaluated to determine which Phase I company will be selected to continue development in Phase II.

PHASE II: Develop, build, and demonstrate a prototype system of each antenna variant and demonstrate in military field environment. Conduct extensive testing to prove feasibility over varied extended operational conditions, to refine/validate MTBF data, validate HMI and mechanical design, establish power efficiency data, and to validate the total system design. Make system design modifications, as necessary, within the proposed budget to ensure Government satisfaction with the prototype. Provide a Final Technical Report of Phase II activities which will be evaluated to determine which Phase II company will be selected to continue development refinement in Phase II (Extended), or go into production in a Phase III contract. Provide the antennae variant prototypes and selected spare parts to the Government for 90 days of Government testing and validation.

PHASE III/DUAL USE APPLICATIONS: At the completion of successful Government test and validation a limited production run is envisioned for SOCOM requirements. The vendor may conduct marketing activities initially for additional DoD customers to increase the initial production run. This antenna system could be used in a broad range of military, law enforcement, and civilian disaster relief applications.

KEYWORDS: PSYCHOLOGICAL OPERATIONS, AIRCRAFT ANTENNA, UAV, LONGWIRE, ANTENNA, BROADCAST

SOCOM06-004 TITLE: Tactical Biometric Registration and Recognition Suite

TECHNOLOGY AREAS: Information Systems, Biomedical, Sensors, Electronics, Human Systems

ACQUISITION PROGRAM: Joint Threat Warning System

The technology within this topic is restricted under the International Traffic in Arms Regulation (ITAR), which

controls the export and import of defense-related material and services. Offerors must disclose any proposed use of foreign nationals, their country of origin, and what tasks each would accomplish in the statement of work in accordance with section 3.5.b.(7) of the solicitation.

OBJECTIVE: Develop lightweight and portable biometric toolset to allow in-theater registration and near real time recognition of personnel.

DESCRIPTION: SOCOM requires a biometric toolset. The toolset must provide users with accurate, timely, and efficient automated personnel tracking. The system shall be capable of enrolling personnel at a client terminal and storing the biometric data on a central server that is accessible via secure local or wide are network. The biometric data captured during enrollment can be used at a later time for identification or authentication purposes. The biometric devices must be lightweight and portable and must include multiple recognition criteria including fingerprints, iris scan, voice printing and facial recognition. The biometric devices will include recognition software, fingerprint reader, iris scan reader, voice printer and digital facial imaging device/camera configured for use with the notebook computers and compliant with the FBI's Integrated Automated Fingerprint Identification System (IAFIS) Image Quality Specifications. Equipment must be capable of writing input data (latent fingerprints, iris scans, and photographs) as well as providing output for comparison of recognition data to data on file (database). Devices should be used in conjunction with Windows-based laptop/notebook computers operating in a networked environment. The equipment must be able to withstand extreme environmental conditions and be user friendly. Use of COTS/GOTS hardware and software is encouraged.

PERFORMANCE REQUIREMENTS: The biometric devices must be lightweight and portable and must include multiple recognition criteria including fingerprints, iris scan, voice printing and facial recognition:

- Registration: Trained users must be able to complete detainee biometric registration in under 10 minutes, including 10 print rolled fingerprinting, iris scan, and facial recognition/photograph. Data must be capable of storage to a local drive and to in-theatre network storage devices.
- Recognition Interface: Users must be able to input latent finger print data, iris scans, and facial photographs in less than 5minutes for comparison with identification data on file.
- Recognition accuracy: Incidence of False Positives and/or False Negatives must be less than 2%.
- Power: All components of the biometric toolset must be capable of operating a minimum of 4 hours without recharging/replenishing power supply.
- Interoperability: The system must be interoperable with DOD's Automated Biometric Identification System (ABIS) and the FBI's Integrated Automated Fingerprint Identification System (IAFIS).
- Environment: The biometric devices should be capable of survival in a tropical environment in which heavy humidity is constant and intense rainfall frequently occurs as well as a desert environment where sand/dirt intrusion and cooling in electronics is problematic. The system should be expected to operate in both cold and hot weather. Temperature requirement for the system to operate is -40 to +140 degrees F.
- Mobility: One Man portable (including suitable computer)

PHASE I: The objective of Phase I will be to develop a design that meets the performance requirements as stated above. At the end of Phase I, the contractor shall deliver to the Government a preliminary design package which details the system's performance and form factor.

PHASE II: The contractor will develop a detailed design based on the Phase I preliminary design. After approval from the Government the contractor will build a prototype, and validate performance and form factor. The prototype will be tested and evaluated in an operational environment. A detailed design package and the prototype hardware and software will be deliverables to the Government.

PHASE III/DUAL USE APPLICATIONS: At the completion of successful Government test and validation a limited production run is envisioned for SOCOM requirements. The vendor may conduct marketing activities initially for additional DoD customers to increase the initial production run. This biometrics collection and analysis system could be used in a broad range of military, law enforcement and civilian security applications where personnel are required to interface with large numbers of unknown persons to perform their mission -- for example, in homeland security operations or in enhancing security in industrial facilities.

KEYWORDS: BODY WORN, TACTICAL, LIGHTWEIGHT, ELECTRONICS SYSTEMS, BIOMETRICS,

BIOMETRIC REGISTRATION

~~SOCOM06-005 TITLE: Solar Powered Micro Power Supply~~

TOPIC DELETED

SOCOM06-006 TITLE: Facility Blueprinting

TECHNOLOGY AREAS: Materials/Processes, Sensors

ACQUISITION PROGRAM: Integrated Survey Program

The technology within this topic is restricted under the International Traffic in Arms Regulation (ITAR), which controls the export and import of defense-related material and services. Offerors must disclose any proposed use of foreign nationals, their country of origin, and what tasks each would accomplish in the statement of work in accordance with section 3.5.b.(7) of the solicitation.

OBJECTIVE: Develop a mobile system deployable by ground forces that enables rapid measurement and blueprinting of internal building structures. The system shall be able to operate against structures having a variety of geometries and material compositions including masonry and metal. It shall be able to provide location of personnel, internal walls, and mechanical equipment. The system shall provide SOF operators with near real-time, remotely acquired information on key internal layout parameters of the structure of interest and also the presence and location of personnel.

DESCRIPTION: Personnel may be required to enter potentially hostile facilities with no prior knowledge of layouts or deployment of hostile forces. Operator survivability and effectiveness will be greatly enhanced by prior detailed knowledge of building layout, to include location of personnel, walls, corridors, stairwells, plumbing, electrical wiring, etc. Applied research is required to develop an operational integrated system that will be effective against a broad range of building types, materials, geometries, and environmental and operational constraints. Some building targets may be in hostile locations or conditions requiring stealth in the blueprinting measurements. The variety of target types will lead to a probable solution which involves creative or innovative approaches to the integration of multiple phenomenologies. The challenge in developing this system is not just the selection and integration of sensors, but also the development of algorithms to optimally integrate and exploit the sensor outputs. Ideally such a system should be portable and automatic as far as possible, requiring minimum specialized expertise on the part of the user.

Proposals should reflect the vendor’s expertise. Phase I companies will discuss their proposed research in detail and propose in general what they would continue in Phase II.

Design considerations:

- Performance is the primary concern.
- The total system design package (including batteries) must be less than 50 lbs at final design (Phase II).
- The system shall have AC/DC power. Capable of running independently on battery power or AC (both 120V and 110V).
- Battery power shall last at least 4-hours and have a 1-hour recharge capability and a 4-hour follow-on power capability.
- All components (including batteries and battery charger) should be able to fit in a normal size suitcase (within U.S. Airline standards).
- Military environmental standards are relaxed during development.

Successful proposals will use novel ideas to improve soldier usability, create future commercial markets, and increase functional capability. Pluses include:

- Fully demonstrating the company's past and present experience;
- Supplying references on proposing company's products/programs (particularly government program managers);
- Giving detail on its proposed technologies to show expertise.

- Showing detailed expertise in technologies related to this SBIR.
- Experience designing products for use in wilderness areas or for military customers.
- Companies that can assist the topic author in commercializing the product.

The proposing company should be prepared to deliver products in accordance with the general information outlined in each of the phases as listed below:

PHASE I: Develop an overall system design which combines multiple phenomenologies to answer the above stated requirements. This includes specification of an optimal integrated phenomenology set, key components, sensor technologies, and algorithms.

PHASE II: Assemble a test bed to demonstrate, evaluate and refine hardware and software algorithms using the design developed under Phase I. The evaluation will include tradeoff studies and evaluations to best meet SOCOM requirements.

PHASE III - DUAL-USE APPLICATIONS: Build and demonstrate a full-scale system capable of conducting analysis against realistic targets. This will be a fieldable prototype, a system with operational capabilities which can be used for evaluation of mobility, ruggedization, and performance parameters. Refined algorithms will be implemented in hardware and software for deployment in the full-scale system. Potential military applications include anti-terrorist activities, hostage rescues, detection of weapons of mass destruction storage and production. Potential commercial applications include law enforcement operations, including hostage standoff, search and rescue in collapsed or damaged buildings, location of criminal suspects and detection of clandestine drug laboratories.

KEYWORDS: BLUEPRINTING, MULITPLE PHENOMENOLOGY, ALGORITHMS, BUILDING LAYOUT

SOCOM06-007 TITLE: Enhanced Visual Obscurant and Rapid Dispersal System

TECHNOLOGY AREAS: Human Systems

ACQUISITION PROGRAM: Demolitions

The technology within this topic is restricted under the International Traffic in Arms Regulation (ITAR), which controls the export and import of defense-related material and services. Offerors must disclose any proposed use of foreign nationals, their country of origin, and what tasks each would accomplish in the statement of work in accordance with section 3.5.b.(7) of the solicitation.

OBJECTIVE: Develop a mobile, modular system deployable by ground forces that enables rapid smoke dispersal and coverage of any size room, road, or large open space. The system will be able to provide users with near instantaneous obscurant in sufficient quantities to attenuate the particular parts of the electromagnetic spectrum which permit detection or location via naked eye, Image Intensified (I2), or thermal optics of an enemy force. The obscurant performance should be effective against GEN II image intensifiers and thermal imagers in the 3-5mm and 8-12mm bands of the spectrum. The system should be modular, easily adaptable to changing battle-field situations, and provide ample smoke to provide concealment for an individual or team, and their vehicle with a non-toxic, bio-friendly smoke within a matter of seconds.

DESCRIPTION: Users are required to enter potentially hostile facilities, roadways, and open areas with no prior knowledge of hostile forces, and often times with decreased situational awareness. Soldier survivability and effectiveness will be greatly enhanced by the ability to rapidly “disappear” behind an instantaneous cloud of obscurant. The device will be a small, lightweight, self-contained, man portable unit that will be able to produce a sufficient amount of high-density smoke capable of concealing an individual or individuals or a large vehicle within seconds. The device will also be capable of dispersing other chemical agents such as CS or other Pepper Spray. At a minimum a single hand deployed device should be able to provide a 3 cubic meter cloud within 2 seconds and fill a 300 square foot room in less than 5 seconds with a .5-meter visibility. Therefore, discrimination of personnel beyond .5 meters by common sensors (eyes, I2, IR) should be negated. The smoke should also persist for as long as possible

to reduce the necessity of deploying another device.

The device should be capable of hand deploy, deployment from a weapon mounted 40mm grenade launcher or a multiple tube man portable system that could be vehicle mounted. Operation in temperature extremes from -40° to 120° F with minimal degradation of performance is desired.

PHASE I: Develop an overall system design that combines multiple devices to answer the above stated requirements. This includes specifications of an optimal obscurant agent, dispersal system, other key components, and techniques of employment.

PHASE II: Assemble a test bed to demonstrate, evaluate, and refine hardware systems using the design developed under Phase I. The evaluation will include tradeoff studies and evaluations to best meet user requirements over extended operating conditions.

PHASE III DUAL-USE APPLICATIONS: Build and demonstrate a full-scale system capable of producing the required obscurant level in a variety of realistic scenarios. This will be a fieldable prototype with operational capabilities that can be used for evaluation of portability, ruggedization, and performance parameters. This system could be used in a broad range of military and civilian applications. Potential military applications include offensive anti-terrorist activities, hostage rescues, convoy security, crowd dispersal, urban movement concealment, movement to contact, as well as multiple training applications (NBC, Fire Control, etc). Potential commercial applications include law enforcement operations, crowd control and riot applications, training at fire training centers, as well as NBC training for local and state responders.

KEYWORDS: Smoke, Obscurant, Grenade, M203

SOCOM06-008 TITLE: Enhanced Small Arms Ammunition

TECHNOLOGY AREAS: Materials/Processes, Weapons

ACQUISITION PROGRAM: Combat Assault Rifle, Joint Combat Pistol

The technology within this topic is restricted under the International Traffic in Arms Regulation (ITAR), which controls the export and import of defense-related material and services. Offerors must disclose any proposed use of foreign nationals, their country of origin, and what tasks each would accomplish in the statement of work in accordance with section 3.5.b.(7) of the solicitation.

OBJECTIVE: Design and build projectiles for users small arms to include assault rifles and sniper weapons that provide enhanced terminal ballistic performance over existing rounds. Terminal ballistics includes accuracy, penetration of steel and glass, and maximum tissue damaging effects. These developed rounds will pass all safety and legal reviews as well as environmental rules.

DESCRIPTION: Current assault rifle ammunition includes a family of rounds, each with specific purposes, but does not include an “all purpose” round that exhibits the best qualities of each. Recent improvements in small arms projectiles as well as advances in bullet technologies are believed to make it possible to produce enhanced munitions at a minimal cost increase over existing munitions. Additionally, increased interest in projectiles that are environmentally friendly provides motivation for development of advanced projectiles. This effort focuses on the development of all-round high performance, environmentally friendly, i.e. “green” small arms projectiles that function in existing cartridges. The assault rifle rounds (5.56mm and 7.62mm NATO) should have an accuracy of 2.0 Minutes of Angle (MOA) at 300 meters, plus or minus .25 in production lots. The rounds should penetrate NATO standard steel (1/8”) at a minimum of 300 meters. The rounds should be capable of penetrating auto glass at 100 meters without deflection and still have enough energy to penetrate 9 inches of ordnance gelatin. The rounds would meet maximum yaw and fragment at no more than 4 inches of bare ordnance gelatin, produce a maximum would cavity of between 6 and 10 inches, and have a total minimum total penetration of 12 inches when fired from 50 meters. The round should exhibit similar performance when fired at 5, 25, and 100 meters. At 300 meters the round should maintain a minimum total penetration of 12 inches.

PHASE I: Develop overall design that includes specifications of bullet design and metallurgy, to meet desired performance objectives listed above.

PHASE II: Develop and demonstrate prototype rounds that can be tested in current weapons and conduct testing to ensure objectives are met.

PHASE III - DUAL USE APPLICATIONS: This design could be used in the full spectrum of military, law enforcement, and civilian sport weapons systems that desire all-round performance at low cost.

KEYWORDS: MUNITIONS, METALLURGY, SMALL ARMS, AMMUNITION, BULLET, PROJECTILE

SOCOM06-009 TITLE: Individual Cooling Equipment

TECHNOLOGY AREAS: Ground/Sea Vehicles, Human Systems

ACQUISITION PROGRAM: Family of Vehicles

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OBJECTIVE: Design, develop and fabricate a small, lightweight, low power, gasless cooling system for the individual soldier that can be vehicle mounted or man-portable. Also, provide a capability to cool vehicle mounted communications and electronics equipment via the same micro cooling system being used for the individual soldier.

DESCRIPTION: Ground mobility forces are conducting mounted operations from armored High Mobility, Multi-Purpose Wheeled Vehicles (HMMWV); Ground Mobility Vehicles (modified HMMWV's); and the Family of Medium Tactical Vehicles (FMTV) with no environmental conditioning systems designed specifically for cooling the individual soldier (i.e. no vehicle air-conditioning system exists in these vehicles). During the summer months, interior temperatures of these combat vehicles soar to extremely dangerous levels. This interior temperature problem is further compounded by heat dissipation of the on-board communications equipment into the crew compartment. Furthermore, soldiers are wearing individual body armor while conducting mounted and dismounted operations, which adds an additional layer of restrictive, heat retaining material to their body in an already unbearable, oven-like environment.

Normal extreme weight loads present a very real problem for the vehicle performance. This creates a danger to the soldiers due to less than optimal vehicle performance in volatile combat situations encountered by forces on a routine basis. Adding a conventional compressed gas air-conditioning system to these vehicles would become a tremendous burden to the vehicle power plant and electrical systems. Additionally, a conventional vehicle air-conditioning system would only solve heat/temperature issues for mounted operations.

Mission failure and individual health risks (heat exhaustion and stroke) are real possibilities because of this super-heated environment. We require an individual micro cooling system that can be operated while conducting mounted operations and also be functional for limited periods while dismounted. This system must be lightweight, low volume, man-portable, free of compressed gas, low power, and capable of cooling on-board communications equipment during mounted operations.

External body-worn equipment for the purpose of micro cooling must not add undue bulk to current uniform and equipment configuration and be constructed of lightweight, breathable materials. In the event of a total system failure or inability to connect to the micro cooling system either mounted or dismounted, the material worn by the soldier must not degrade the normal physical performance level of the soldier while conducting high-stress, physically demanding combat operations.

PHASE I: Provide technical documentation that supports solution(s) to the dilemma described above and a suggested material resolution. Develop overall system design to include specifications for size, weight, power, maintenance, integration, cost and configuration.

PHASE II: Develop, demonstrate and provide complete prototype systems for testing and evaluation to be conducted in realistic urban and rural environment to prove merit and feasibility over extended operating conditions. Conduct testing to prove feasibility over extended operating conditions.

PHASE III: This system capability could be used in other military and civilian types of applications such as aircraft or commercial vehicles, as well as any other area that requires an advanced lightweight cooling system.

KEYWORDS: COOLING, GASLESS, COST PROHIBITIVE, LIGHTWEIGHT, LOW POWER CONSUMPTION, MOUNTED, DISMOUNTED, COMMUNICATIONS EQUIPMENT COOLING, BREATHABLE

SOCOM06-010 TITLE: Interactive Language Trainer

TECHNOLOGY AREAS: Human Systems

ACQUISITION PROGRAM: Foreign Language Office

OBJECTIVE: Develop an interactive computer-based training system to enable users to learn the language and customs of foreign cultures. The purpose is to train users in the face-to-face interactions when deployed to foreign countries. Users will practice their communication skills in a virtual / simulated village, town, business, residence or hospital, where they must develop rapport with the local people, who in term will help them accomplish various missions. The system should allow a user to gain competence (with an Inter-agency Language Round Table (ILR) Proficiency Level from 0+/0+/0+ to 3/3/3) in reading, writing, speaking and understanding the language, and additionally provide a basis for understanding the customs, courtesies, body language/gestures, and other significant idiosyncrasies of the culture of interest. Current training systems consists of in residence school, usually six months to a year or computer based training (Rosetta Stone, Regent, Berlitz, Language Training System, etc.) which also takes many months and are not focused on military applications and none of these teach culture. Further, current computer based systems are arduous due to many software programming modifications (layers on top of layers of programming code). This training system should run on a standard desktop or laptop computer with minimal upgrades. The software should keep the users interest, be fun, and teach basic language and culture within 30 days, a 60 plus percent reduction in training time. Further levels should provide advanced language and culture skills.

DESCRIPTION: It is the nature of users that they can occur at anytime, in any portion of the developed or undeveloped world. Regardless of the mission, one of the most significant challenges to the user is to successfully communicate and interact with foreign cultures. Mission success frequently depends on the ability of the user to express himself clearly, understand native peoples, and to gain their trust and respect. The following chart shows the desired period of necessary training time for the various Department of Defense language categories:

ILR Proficiency Level	Desired Training Time (in hours) by DOD Language Category		
	I/II	III	IV
0+/0+/0+	504	672	840
1/1/1	672	840	1008
2/2/2	1008	1512	2016
3/3/3	1344	1848	2352

Users deploy to foreign areas with little to no language or culture training. These deployments have been short notice, thus the user has had limited time for language preparation and cultural familiarization. Any proposed system must teach the user the necessary knowledge (military support) as quickly as possible, ideally in a matter of weeks or less. A tiered, modular system that focuses initially on the language skills and cultural awareness most needed to function in the culture of interest, and then adds additional modules for more in depth understanding is a possible solution.

The training system will be used on standard PCs, and will ideally be contained on a single or set of CD/DVD(s) and/or can be downloaded from a Government Web site. The system itself must be fully compliant with the Shareable Content Object Reference Model Initiative (SCORM). Additional input devices to be included in the proposed system, such as headsets with microphones, writing or touch pads, or joysticks, are acceptable. It is required that the system be engaging, interesting, and user friendly. User friendly in this case requires that an untrained non-information technology experienced user be able to simply load a CD/DVD with the software clearly directing all further actions the user must perform, which should be little more than unloading and loading subsequent CD/DVDs. The software should be able to assess system resources, retrieve updates and drivers from the web, and trouble shoot installation and any problems experienced. Interactive multimedia approaches that illustrate common cultural situations and integrate language education with learning the customs, rules of behavior, common body language, and background and history of the culture are ideal. A system design with a framework that could be rapidly adapted to develop additional modules for other cultures and languages at a reduced time and cost is desirable.

Ultimately, all languages and cultures could be included in different modules, however for now the effort is focused on languages and cultures commonly encountered by users, especially those where English language proficiency is rare.

- Cultures and locations of interest include: Iraq, Afghanistan, Sudan, Somalia, Indonesia, Malaysia, China, the Philippines, and many other cultures throughout the developing world.

Phase I: Develop and present a concept for an interactive computer based training system to educate users about a foreign culture and language.

Phase II: Demonstrate a prototype system capable of teaching one language and culture. The completed prototype system will be ready for initial testing to determine usability, accuracy, and efficacy. The prototype must be capable of teaching at least 50% of users previously untrained in the language/culture to an ILR level of 0+/0+/0+ while retaining 70% or better of the cultural content taught.

Phase III/Dual use: A fully developed interactive computer based training system capable of teaching both practical language skills and cultural understanding is the Phase III goal of this project. Such a system would have widespread use in the commercial and educational markets, as well as the obvious benefit to military and government agencies. Frequent travelers, foreign language students, and the public in general could have significant interest in purchasing a system that rapidly teaches functional ability in a foreign language and culture.

KEYWORDS: FOREIGN LANGUAGE TRAINING, TRANSLATION, CULTURAL AWARENESS, COMPUTERIZED TRAINING

SOCOM06-011 TITLE: Object Generation and Simulation

TECHNOLOGY AREAS: Information Systems, Battlespace, Human Systems

ACQUISITION PROGRAM: Tools, Mission Planning Analysis and Rehearsal Execution

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OBJECTIVE: Develop tools and methods to combine the Common Database (CDB) standard into gaming technologies which can be utilized to train the military soldier/operator. Tools developed under this effort shall automate the correlation of data source layers to allow a more efficient method of database development. This effort includes the development human behavior models which realistically portray battlefield behaviors to enhance existing Computer Generated Forces currently being utilized or under development. A desired result is for low

echelon users to easily generate and introduce new objects (equipment, activities, etc.) and modify existing objects into a common distributed modeling and gaming environment.

DESCRIPTION: USSOCOM has developed a simulation visualization standard referred as the CDB. This standard is a unique real-time data repository from which various simulator subsystem clients are able to simultaneously retrieve, in real-time, relevant information to perform their respective run-time simulation tasks. The deliverables under this effort shall be compatible with the CDB. War-games and virtual training environments have a proven value; however, implementation is limited due to the specialized expertise required to construct the correlated databases to support training and mission rehearsal. The three capabilities being sought that will benefit modeling and simulation at the unit level are:

1) A tool which allows the use of the CDB in commercial games which have military training application;
2) An automated method to correlate the layers of data associated with building a visual database;
3) Advanced human behavioral models for Computer Generated Forces (CGF) within the virtual environment.

With the CDB and tools developed under this effort, operators and database developers will be able to modify the virtual environment using automated techniques to reflect real world changes, new equipment, and new threat tactics.

PHASE I: Develop an approach and draft specifications for development and demonstration of the required software tools. Describe intended outcome of Phase II development.

PHASE II: Develop the tools and methodologies identified in Phase I. Demonstrate the capability utilizing standard layered raw source data provided by the Government. Conduct demonstrations to show feasibility across a spectrum of users to include material developers, mission planners, and unit trainers.

PHASE III DUAL-USE APPLICATIONS: The developed tools and methodologies could be used in a broad range of military and civilian modeling and simulation applications. The intention is to implement these tools and methodologies across various echelons in a distributed environment. The phase III deliverable will be non-proprietary fully government owned source code with full documentation that performs the required capabilities.

KEYWORDS: GAMING, SIMULATION, MODELING, REHEARSAL, COMBAT DEVELOPMENT