UNITED STATES SPECIAL OPERATIONS COMMAND

Proposal Submission

The United States Operations Command's (USSOCOM) mission includes developing and acquiring unique special operations forces (SOF) equipment, material, supplies and services. Desired SOF operational characteristics for systems, equipment and supplies include: lightweight and micro-sized; reduced signature/low observable; built-in survivability; modular, rugged, reliable, maintainable and simplistic; operable in extreme temperature environments; water depth and atmosphere pressure proof; transportable by aircraft, ship and submarine, and deployable by airdrop; LLPI/LPD jam resistant C3I, electronic warfare capable of disruption and deception; near real-time surveillance, intelligence and mission planning; highly lethal and destructive; low energy/power requirements; and compatible with conventional force systems.

USSOCOM is seeking small businesses with a strong research and development capability and an understanding of the SOF operational characteristics. The topics represent a portion of the problems encountered by SOF in fulfilling its mission.

Inquires 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 33621-5316
Tel: (813) 828-7549
Fax: (813) 828-7504
Email: perak@socom.mil

USSOCOM has identified 4 technical topics for the FY '00.2 solicitation. Proposals will only be accepted for these 4 topics. The USSOCOM technical offices responsible for the research and development in these specific areas initiated topics. The same office is responsible for the technical evaluation of the proposals. Proposal evaluation factors are listed below. Each proposal must address each factor in order to be considered for an award. Scientific and technical information assistance may be requested by using the DTIC SBIR Interactive Technical Information System (SITIS).

The maximum amount of SBIR funding for a USSOCOM Phase I award is $100,000 and the maximum time frame for a Phase I is 6 months. Phase I proposals may be for less than 6 months and/or less than $100,000. The maximum amount of SBIR funding for a USSOCOM Phase II award is $750,000 and the maximum time frame for a Phase II is 24 months. Phase II proposals may be for less than 24 months and/or less than $750,000. 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.

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 of private sector) application and the benefits expected to accrue from this commercialization.

Selection of proposals for funding is based upon technical merit and the evaluation criteria included in the solicitation. As funding is limited, USSOCOM will select and fund only those proposals considered to be superior in overall technical quality and most critical. USSOCOM may fund more than one proposal in a specific topic area if the technical quality of the proposals are deemed superior, or it may fund no proposals in a topic area. Fast Track Phase II proposals will be selected for phase II award provided they meet or exceed the "technically sufficient" standard discussed in Section 4.3 of this solicitation. The total USSOCOM funds for a Phase I and the interim Fast Track funding will not exceed $140,000.

The Phase II enhancement plan for the Special Operations Command is intended to encourage the acquisition programs to leverage the technology being developed under the SBIR program. The SBIR program will provide a one to four match of SBIR dollars to non-SBIR program dollars (from acquisition programs, the private sector, etc.) for Phase II work, not to exceed $100,000 in additional SBIR funding. The additional SBIR dollars will only be available for testing and/or further development

that will result in a prototype as a deliverable. Offerors are strongly encouraged to develop a Phase II proposal that will include a tangible product to be used for marketing purposes.

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 your firm has been registered, they may prepare (and edit) Company Commercialization Report Data, prepare (and edit) Proposal Cover Sheets(s) (formerly referred to as Appendix A and B), complete the Cost Proposal form, and upload corresponding Technical Proposal(s). In addition to the electronic submission, one paper copy of the Proposal Cover Sheet, Company Commercialization Report, cost proposal, and technical proposal is required with original signatures and will be submitted to the address shown below by 3:00PM EST on August 16, 2000. The paper submission, exclusive of the Company Commercialization Report, may not exceed 25 pages.

United States Special Operations Command
Attn: SOAL-KB/SBIR Program, Topic 00-00_
7701 Tampa Point Blvd.
MacDill Air Force Base, Florida 33621-5316
(Phone number for express packages is 813-828-6512)

Paper copies alone will not be reviewed. TA complete electronic submission is required for proposal evaluation.

Refer to the on-line help area of the DoD SBIR/STTR Submission site for questions, troubleshooting, etc. For further assistance, contact the help desk at SBIRHELP@teltech.com or 1-800-382-4634. For help with proposal uploads, phone 727-549-7030 or duffj@ctc.com.

Electronic Technical Proposal Upload

The term "Technical Proposal" refers to the part of the submission as described in Section 3 of the Solicitation. WordPerfect, Text, and MS Word are the preferred formats for proposal submissions. You are encouraged, but not required, to embed graphics within the document. When including images, care should be taken to ensure images are not of excessive size. A resolution of 200 dpi or below is requested for all embedded images. Please use standard fonts in order to prevent conversion difficulties. An overall file size of 5MB or less is recommended for each electronic proposal submission.

You will receive a confirmation page via the submission site once the proposal has been uploaded. The upload will be available for viewing on the DoD SBIR/STTR Submission site within 24 hours. It is within your best interest to review the upload to ensure the server received the complete file. Questions or problems should be directed to the help desk as mentioned above.

You are responsible for performing a virus check on each proposal to be uploaded electronically. The detection of a virus on any submitted electronic technical proposal may be cause for the rejection of the proposal. USSOCOM will not accept e-mail submissions. You should contact your Internet Service Providers to if you have questions concerning the provider's file size transmission allowance.

USSOCOM offers information on the Internet about its SBIR program at http://www.socom.mil and http://www.acq.osd.mil/sadbu/sbir.

USSOCOM
FY'00.2 SBIR TOPIC INDEX

SOCOM 00-005 TITLE: Automated Continuous Wave Morse Code Device

SOCOM 00-005 Automated Continuous Wave Morse Code Device

TECHNOLOGY AREAS: Information Systems

ACQUISITION PROGRAM: Joint Base Station

OBJECTIVE: Develop an automated International Morse Code (IMC) send and receive capability for existing military and commercial CW radios. The capability must be able to read various standard English alphanumeric characters on either a hardcopy paper page or a digital page and correctly translate the information contained there into data that will cause an attached or network designated CW radio to correctly transmit the equivalent IMC symbols. Additionally, the capability must be able to correctly translate IMC symbols received from an attached or network designated CW radio into correct equivalent standard English alphanumeric characters that may be printed on to a digital page or to a high speed laser or impact printer. The speed that the capability is able to read English alphanumeric characters or receive IMC symbols must be adjustable in order to maximize the capability of various CW radios, reduce transmission time in order to reduce Radio Frequency signature during combat operations, and to reduce transmission errors during adverse atmospheric conditions. The capability must be adjustable to read/send/receive/print a minimum of two (2) five character groups per minute to a maximum of 50 five character groups per minute. The capability must have an automated and interactive training mode to train new Morse operators or to maintain Morse operator proficiency at 13 five character groups per minute.

DESCRIPTION: The capability must operate powered by standard commercial or military battery, and by 115 Volt AC. The capability must be small (2 Cubic Feet or less without radio or printer) and weigh no more than 20 pounds.

PHASE I: Perform research into appropriate technologies to meet the above need. Develop a system concept based upon size, weight, and power constraints and desired capabilities. Develop a technology approach, identify shortfalls, and develop a technology shortfall reduction plan. Demonstration of candidate technologies in phase I would be highly desirable.

PHASE II: Build two prototypes. Perform extensive testing using a variety of standard commercial and military CW radios under a variety of stressful operational, atmospheric, and distance conditions under Government observation. Perform limited environmental testing (not MILSPEC), under Government observation. Provide test reports. Develop and provide a commercialization plan.

PHASE III DUAL APPLICATIONS: Phase III would be formulated based upon Phase II performance and commercialization plan. Distinct possibility of incorporation of a successful capability into the USSOCOM Joint Base Station Program. Would be a valuable upgrade capability for existing High Frequency IMC Third World communications nets. Would be a valuable upgrade for US disaster-related backup communication nets.

SOCOM 00-006 TITLE: Lightweight Transparent and Opaque Ballistic Shield Materials

SOCOM 00-006 Lightweight Transparent and Opaque Ballistic Shield Materials

TECHNOLOGY AREAS: Materials/Processes

OBJECTIVE: Description: Recent developments in nanotechnology and armor materials/ systems engineering have opened the door to impending breakthroughs in lightweight transparent and opaque armor technologies for application to ballistic protective shields. Specifically, the technology should be configurable into a one-man carryable armor, approximately 7.0-lb/sq.-ft. for a transparent component and 4.0-lb./sq.-ft. for the opaque component. Both components should be capable of defeating 7.62-mm M80 Ball at 2750-ft./sec., 7.62-mm M1943 Ball at 2400-ft./sec. and 5.56-mm M855 at 3200-ft./sec. Both components should be capable of defeating 2 (two) M80 Ball impacts within a 6-in. (six) diameter. System transparency requirements range from .5 to 14 micron. Types of technology which may be exploited include but are not limited to Iron Carbon Compounds which have recently been extruded to 5-20-nm strands. This material when woven into fabric can provide fourteen times increased strength of a non-extruded material. Advanced Genetic Engineering may yield replication of naturally strong organic materials such as spider silk and animal shells. In addition, advanced ceramics which, can be fabricated in one piece, with compound curvatures and processed to near net shape are examples of technology enhancements.

PHASE I: Engineer baseline materials and provide detailed material property characterizations. Identify the material characteristics, which will potentially provide the desired system performance. Design test matrix, including ballistic tests, with the new technology providing for full exploitation the compared to state-of-the-art systems currently available to the

Government.

PHASE II: Fabricate coupons approximately 6 x 6-in. for ballistic testing. Demonstrate advanced technology(s) through ballistic, mechanical and optical tests as defined in the Topics part of this solicitation. Provide master plan for full-scale production and implementation of proposed design concepts to personnel protective ballistic shields. Ballistic testing at a minimum shall include V50 determinations against all three defined threats (V50s should be at least 125-ft/sec. higher than the velocities listed above). Ballistic tests should also investigate the multi-hit and multi-threat performance of proposed design(s).

PHASE III DUAL USE APPLICATIONS: The development of advanced armor materials could have widespread applications to both military and law enforcement. Based on technology and design(s) limitations (i.e. ballistic performance, fabrication, processing and costs) associated with the technology(s)provide clear technical rational describing the dual uses which could be employed. End item samples of such uses should be provided for demonstration purposes (i.e. personnel armor, windshields for vehicle applications, face shields, applique kit for up-armoring light vehicles and etc.). The end item demonstrations should provide examples of the boundaries of the available technology (i.e. various contoured pieces, novel design concepts and potential future applications).

SOCOM 00-007 TITLE: Sympathetic Detonation Underwater

SOCOM 00-007 Sympathetic Detonation Underwater

TECHNOLOGY AREAS: Ground/Sea Vehicles; Sensors; Weapons

OBJECTIVES: Sympathetic detonation of explosives is a highly desirable capability for use in precision demolition operations as it eliminates wire or other physical connections and supports increased stand-off from detonations. On land, a microwave or radio signal can be used to effect the triggering. However, there are mission requirements for sympathetic detonation underwater and, in particular, under surf conditions where radio and microwave signals do not penetrate. There has been some use of sound signals for triggering underwater, but new designs and technologies are required for triggering in surf-zones. The triggering must involve a secure signal so that accidental triggering, and premature triggering or triggering by hostile forces can be avoided. The triggering should be able to be initiated at least 1 km from the explosives although repeaters can be used to carry the signal from the 1 km distance to the explosives. The friendly forces installing the munitions may have limited time and the munitions may be moved to a limited extent by water action between the time of installation and detonation so the system cannot rely upon exceedingly precise measurement and alignment of the munitions. The signal to trigger the explosives can come from underwater or above water, so the triggering system must operate from underwater or from outside water to underwater. Ideally, the system will allow the installers to obtain a confirming signal from the system to verify readiness and to verify the pattern of sympathetic detonation.

DESCRIPTION: Although this requirement is for sympathetic detonation triggers, it is a major advantage if the technology also has capability for audio transmission and for digital transmission underwater. This will expand its potential use and enable dual use applications to be expanded. Commercial users of this technology will include demolition experts, SCUBA divers, ships and boats.

Technologies of interest include:

a) Magnetic Induction. The Navy Coastal Systems Station in partnership with Magneto-Inductive Systems LTD, a Canadian Company, is exploiting magnetic Inductive Communication technology. This technology takes advantage of the lower losses occurring when magnetic fields, rather than radio electromagnetic waves propagate through seawater. By reducing wave propagation frequency, the rates of change of the magnetic field induced current losses are lowered. Additionally, it has been discovered that as the depth of the transmission increases, the attenuation of the propagated field increases exponentially. With the use of large loop antennas, calculations indicate that the detection could take place to a depth of 50 meters. Though much advancement has been made in both solid state power conversion and ultra low bandwidth receivers, data rate transmission is below one hertz, and too slow to transmit a message. The transmitter loops are too heavy, having a cross section of 25 square meters.

b) Acoustic. The Army Research Laboratory is the lead organization in this area. A remote activation system (RAMS), using low transmission frequency was successfully developed for remote activation of explosives above the surface. This technology is now being leveraged for the development of a sympathetic detonation system. Though measurement of surface wave propagation appears promising for the development of an algorithm system that distinguishes explosive sounds from those generated by other means, it is the opinion of experts, that the development of an algorithm to account for the sounds ever present in the surf zone; is at best difficult if not impossible. Arrays of microphones and hydrophones must be combined and complex circuitry needs to be developed to detect the recorded signals. The acoustic signals are affected by surf and tidal changes or the shielding of man made

obstacles, like concrete cubes, jetties, long shore bars and reefs. Therefore, sound communication in the surf zone is not feasible with today's technology.

c) "Talking Light". Talking lights (see note below) is an innovative new communication network that transmits information by modulating a light source at a predetermined frequency. Since light is transmitted through water and across the water/air interface, a Talking Lights system can transmit information in underwater and surf environments. The modulated light carries digital or analog information, which when demodulated by a receptor signal yields give a data signal, such as a secure detonation signal. The emitting light is in the non-visible range and the signal is detected by a photosensitive diode in the receiver box. The signal is demodulated and the information is passed on to a microprocessor, which in turn activates a firing circuit. Light has no difficulty traversing the surf zone. Some testing may be required to determine the optimal transmission frequency. In this system, each SYDET component contains a light emitter and a receiver so that prior to detonation a modulated signal is transmitted to the next SYDET in line and to the next and so on... Though the system concept is new, the technology is old. The components that make up the system are commercially available, allowing the proof of the system to take place expediently and reliably. It seems that this technology is very practical for operation and detection in the surf zone.

Note: Talking Lights is a technology developed by Professor Steven Leeb of the Massachusetts Institute of Technology.

PHASE I: Demonstrate a technology, which can achieve secure triggering of sympathetic detonation underwater and under surf condition.

PHASE II: Develop triggering devices using this technology, which meet mission requirements and fit within an acceptable size, shape and weight footprint.

PHASE II DUAL USE APPLICATIONS: Although this requirement is for sympathetic detonation triggers, success, particularly of a surf-zone capability, would provide technologies for signal transmission underwater. This will expand its potential use and enable additional dual use applications. Commercial users of this technology will include demolition experts, SCUBA divers, ships and boats.

SOCOM 00-008 TITLE: Trimmable Waterjet Nozzle for Small Craft

SOCOM 00-008 Trimmable Waterjet Nozzle for Small Craft

TECHNOLOGY AREAS: Ground/Sea Vehicles

ACQUISITION PROGRAM: Naval Special Warfare Rigid Hull Inflatable Boat

OBJECTIVE: Develop modifications to waterjets commonly used in military small craft to permit positive dynamic trim adjustments of 5 degrees above current trim angles by raising the waterjet thrust angle above the current static configuration with no more than a 5% decrease in top speed and range when trimmed to current thrust angle.

DESCRIPTION: Military small craft use very efficient, shallow draft, high performance, mixed flow waterjets for propulsion. They have trim tabs that permit dynamic adjustment of athwartships trim and negative dynamic trim adjustment by pushing the stern up and the bow down. (Use of negative bow trim can provide a softer ride when going into a head sea.) Modern hull-forms contribute to a soft, dry ride, however, they are particularly susceptible to “stuffing” or “plunging” when traveling too fast in a following sea. When in a following sea, differing wave periods and gradient make it challenging for operators to gauge what speeds are excessive for a particular condition, particularly at night. Although stuffing rarely results in craft damage or injury to the passengers, it is a performance weakness that is exacerbated by the inability to adjust the angle of thrust of the installed waterjets to push the stern down and raise the bow. This would reduce the boat’s tendency to go through waves in following sea conditions, rather than over them.

PHASE I: Review designs of existing waterjets used in military small craft, and develop alternative approaches to providing positive dynamic trim control. This could include innovative materials, fluid-flow concepts, dynamic and reactive structural elements, and alternative employment concepts. The result of this phase should be an optimized approach proven out by modeling (accredited) and/or a laboratory-scale prototype, and an assessment of how to effectively implement this approach.

PHASE II: Phase II is intended to culminate in real-world application/operating environment demonstration/testing of the effectiveness of the prototype design/technologies for the Government to the degree necessary to provide data and information in support of the Phase III transition to production.

PHASE III DUAL USE APPLICATIONS: Medium size waterjets’ inability to provide positive dynamic trim control is a

significant performance disadvantage when compared with less efficient and less safe outdrive units. Development of a trimmable waterjet technology for medium sized waterjets will improve that technology's competitive position. Larger and larger recreational and commercial craft are utilizing waterjet drives. Positive dynamic control will enable more applications and allow for elimination of the complexity and cost of other trim control systems.