

**UNITED STATES SPECIAL OPERATIONS COMMAND  
SBIR FY11.1 Proposal Submission**

The United States Special Operations Command (USSOCOM) seeks small businesses with strong research and development capabilities to pursue and commercialize technologies needed by Special Operations Forces. The USSOCOM Program Executive Officers (PEOs) submitted the topics and most topics are expected to transition to an acquisition Program of Record or Concept of Operation.

**Phase I and Phase II Proposal Submission:** USSOCOM will only accept proposals for the topics included in this solicitation and selects and funds only those proposals considered to be superior.

Potential offerors shall submit all Phase I and Phase II proposals in accordance with the DoD Program Solicitation at [www.dodsbir.net/solicitation](http://www.dodsbir.net/solicitation). All proposals shall include the following documents: a cover sheet, a technical proposal and a cost proposal. The proposal submission, exclusive of the Company Commercialization Report and the Cost Form shall not exceed twenty five (25) pages. Reviewers will be directed not to read pages in excess of the twenty five (25) page limit.

Offerors must complete the cost proposal using the Cost Proposal form posted on the USSOCOM section of the [www.dodsbir.net/solicitation](http://www.dodsbir.net/solicitation) site.

Unless otherwise specified in the Phase I topic write-up, all firms shall include as part of the Phase I proposal transportation costs for two (2) round trips to travel to Tampa, Florida for (2) 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 meeting. USSOCOM typically allows four (4) hours for each meeting to ensure the firm and USSOCOM have sufficient time to ask questions and to clarify the way forward with the feasibility study. The Principal Investigator and all other representatives needed to discuss the firm's technology pursuit shall attend the Phase I Kick-Off and Out-Brief meetings. The location of the Phase II Kick-Off and Out-Brief meetings will be specified in the Phase II Statement of Objectives.

*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) their Company Commercialization Report Data, prepare (and edit) Proposal Cover Sheets, complete the Cost Proposal form, and upload corresponding Technical Proposal(s).*

*Paper copies will be deemed non-responsive and 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 in the solicitation and the on-line help area of the DoD SBIR/STTR Submission site, or call the DoD SBIR/STTR Help Desk at 1-866-SBIRHLP (1-866-724-7457).

USSOCOM does not participate in the Fast Track Program nor does it have a Phase II Enhancement Program.

**Site Visits:** Site visits will not be permitted during the pre-release and open stages of the solicitation.

**Security:** All of the topics in the solicitation are UNCLASSIFIED and only UNCLASSIFIED proposals will be accepted.

**Communications with USSOCOM:** During the pre-release period of this solicitation, any technical inquiries must be submitted in writing through [SOCOMSBIR@brtrc.com](mailto:SOCOMSBIR@brtrc.com). All requests must include the topic number in the subject line of the e-mail. During the solicitation open period, all questions must be submitted through the SBIR Interactive Topic Information System (SITIS) at [www.dodsbir.net/SITIS](http://www.dodsbir.net/SITIS). See Section 1.5c of the DoD 11.1 SBIR Solicitation instructions for additional information.

During the source selection period, e-mail is the only method of communication that will be used by the Government Contracting Officer to notify the submitter/proposer if they have or have not been selected for an award.

**Phase I Awards:** USSOCOM's SBIR Program is small compared to the other participating DoD agencies and on average awards three (3) Phase I contracts per topic. The maximum amount of SBIR funding for a Phase I award is \$100,000 and the period of performance is six (6) months. USSOCOM does not include options in the resulting Phase I SBIR contracts. Phase I SBIR contracts are Firm Fixed Price contracts.

USSOCOM conducts a formal source selection process to determine which firms should be awarded Phase I SBIR contracts. USSOCOM evaluates Phase I proposals using the below evaluation criteria listed in descending order of importance:

- 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.

**Phase II Awards:** USSOCOM generally awards one (1) follow-on Phase II contract should the feasibility study favorably conclude that further development will result in a technology that is suitable for its intended use. No Phase II SBIR contract will be awarded if the feasibility study concludes otherwise. A Phase II proposal is awarded with a period of performance of less than 24 months and at a price that ranges from \$750,000 to \$1 million. USSOCOM may elect to increase the Phase II award amount when it is deemed to be in its best interests. Proposals should be based on realistic cost and time estimates and not on the maximum time (months) and dollars. In preparing the proposal, firms should consider that workload and operational tempo will preclude extensive access to Government and military personnel beyond established periodic reviews.

USSOCOM invites the SBIR Phase II technology demonstration effort to the Phase I firm that delivered an innovative and feasible technology that is suitable for its intended use and that has the best chance to commercialize the technology. The Federal Acquisition Regulation mandate to compete federal procurements is satisfied during the Phase I source selection process.

For a follow-on Phase II effort, no separate solicitation will be issued and no unsolicited proposals will be accepted. Only those firms that were awarded Phase I contracts, and have successfully executed their Phase I efforts, will be invited to submit a Phase II proposal. Invitations to submit Phase II proposals will

be released at the end of the Phase I period of performance. Due to limited funding, USSOCOM reserves the right to limit awards under any topic.

USSOCOM invites Phase II proposal submissions and conducts the ensuing Phase II evaluations using the below evaluation criteria listed in descending order of importance:

- 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.

**Phase III Awards:** Public Law 111-84, Public Law 106-554, Public Law 111-10, Public Law 111-43, Public Law 111-66, Public Law 111-89, Public Law 111-214, S.3839 (Public Law 111-251) and the 2002 Small Business Innovation Research Program Policy Directive (Directive) provide for protection of SBIR data rights under SBIR Phase III awards. Per the Directive, a Phase III SBIR award is any work that derives from, extends or logically concludes effort(s) performed under prior SBIR funding agreements, but is funded by sources other than the SBIR Program. Thus, any contract or grant where the technology is the same as, derived from, or evolved from a Phase I or a Phase II SBIR/STTR contract and awarded to the company which was awarded the Phase I/II SBIR is a Phase III SBIR contract. This covers any contract/grant issued as a follow-on Phase III SBIR award or any contract/grant award issued as a result of a competitive process where the awardee was an SBIR firm that developed the technology as a result of a Phase I or Phase II SBIR. USSOCOM will give SBIR Phase III status to any award that falls within the above-mentioned description, which includes according SBIR Data Rights to any noncommercial technical data and/or noncommercial computer software delivered in Phase III that was developed under USSOCOM SBIR Phase I or II funding documents.

**USE OF NON-GOVERNMENT PERSONNEL:** All proprietary material should be clearly marked and will be held in strict confidence. Restrictive notices notwithstanding, proposals may be handled for administrative purposes by a support contractor that is bound by appropriate non-disclosure requirements. Input on technical aspects of the proposals may be solicited by USSOCOM from non-Government consultants and advisors who are bound by appropriate non-disclosure requirements. Non-Government personnel will not establish final assessments of risk, rate, or rank offerors' proposals. These advisors are expressly prohibited from competing for USSOCOM SBIR awards. All administrative support contractors, consultants and advisors having access to any proprietary data will certify that they will not disclose any information pertaining to this solicitation, including any submission, the identity of any submitters, or any other information relative to this solicitation, and shall certify that they have no financial interest in any submission evaluated. Submissions and information received in response to this solicitation constitutes the offeror's permission to disclose that information to administrative support contractors and non-government consultants and advisors.

**U.S. Citizen Status:** As part of the Phase I proposal, the offeror shall verify the US citizen status of each employee that will participate in the technology effort.

**Foreign Nationals:** The definition of a foreign national is included in Section 2.15 of the DoD SBIR solicitation. Consistent with Section 3.5.b (7) of the DoD solicitation instructions, the offeror shall identify all foreign nationals expected to be involved on the USSOCOM Phase I or Phase II effort to

include the foreign national's country of origin and their level of involvement (identify specific tasks) each would accomplish. The offeror shall identify all foreign nationals in the appropriate section of the proposal. USSOCOM SBIR Program oftentimes pursues technologies that require firms to complete the Department of Defense Contract Security Classification Specification (DD Form 254) to protect sensitive Government Furnished Property and Government Furnished Information during the Phase II period of performance. Offerors must ensure that individuals dedicated to participate in these USSOCOM technology pursuits have or are not barred from obtaining a personnel security clearance. USSOCOM may not award a Phase I SBIR contract to a firm whose personnel cannot obtain a security clearance.

**International Traffic in Arms Regulation (ITAR):** The identification of foreign national involvement in a USSOCOM SBIR topic is also needed to determine if a firm is ineligible for award on a USSOCOM ITAR designated topic. A firm employing a foreign national(s) on a USSOCOM ITAR topic must possess an export license to receive a SBIR Phase I or Phase II contract.

Inquiries concerning the USSOCOM SBIR Program should be addressed to [Shawn.Patterson@socom.mil](mailto:Shawn.Patterson@socom.mil).

**SOCOM SBIR 11.1 Topic Index**

SOCOM11-001	Helicopter Hostile Fire Indication Sensor
SOCOM11-002	Combat Swimmer Situational Awareness Systems Integration Effort
SOCOM11-003	Novel Power System for Extended Endurance of Air Launched SUAS
SOCOM11-004	Improved Tire Technology for Special Operations Vehicles

## SOCOM SBIR 11.1 Topic Descriptions

SOCOM11-001                    TITLE: Helicopter Hostile Fire Indication Sensor

TECHNOLOGY AREAS: Air Platform, Sensors

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 light weight, low power, low cost hostile fire sensor capable of detecting Small Arms through Rocket Propelled Grenade threats, which will integrate into the current AVR-2B laser threat detector or a stand-alone miniature sensor that integrates back into the Advanced Aircraft Survivability (ASE) suite.

DESCRIPTION: Helicopters continue to lead the fight in Overseas Contingency Operations by providing close air support and precisely delivering troops to and from the battlefield. The loss of aircraft due to Small Arms and Rocket-Propelled-Grenade fire is increasing. Although numerous efforts have been made to take ground hostile fire detection systems and integrate them on aircraft, no technology has been able to decrease the weight of the ground systems and adapt a sensor to account for a helicopters unique operating environment. Sensors must consider extreme vibration and environmental conditions while maintaining a small drag profile. For SOF specific operations on rotary wing aircraft, no technology exists that meets the current specialized need of SOCOM. This proposal is a development effort of a technology that is not currently available in DOD inventories or commercially. By alerting the helicopter crew to the distance and degree of the enemy gun fire, they will be able to conduct calculated evasive maneuvers and accurate suppressive fires without guessing where the enemy is located. The sensor technology will need to have an increased probability of detection and a reduced False Indication Rate. This novel technology is required to greatly improve helicopter survivability.

PHASE I: The objective of this Phase will be to verify feasibility of detecting from Small Arms through Rocket Propelled Grenades by degree and distance.

PHASE II: The objective of Phase II will be to develop lightweight, low cost HFI sensor technology prototype and demonstrate hardware/software performance within an integrated sensor or system. This will include integration of the HFI sensor technology onto AVR-2B or Advanced Aircraft Survivability Equipment (AASE) suite. Demonstrate functionality with AVR-2B or AASE suite and HFI effectiveness as an integrated system. The integrated sensor(s) will be tested on their ability to detect Small Arms through Rocket Propelled Grenades threats.

PHASE III DUAL USE APPLICATIONS: Civil police aircraft indication of small arms fire from situations of civil unrest. Military aircraft use across multiple platforms that lack situational awareness in hostile situations. Depending upon the type of sensor technology it may be able to improve Man Portable Air Defense System detection and enhance situational awareness in a visually degraded environment.

KEYWORDS: Optical, Laser, Sensor, Airborne Survivability Equipment, Threat Detection: Missile, Hostile Fire, Laser

SOCOM11-002                    TITLE: Combat Swimmer Situational Awareness Systems Integration Effort

TECHNOLOGY AREAS: Information Systems, Sensors, Human Systems

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 an integrated display of real-time vital diver biometric data and SCUBA status that can be transmitted acoustically through water, air, and between both.

**DESCRIPTION:** Naval Special Warfare Combat Swimmers, in particular SEAL Delivery Vehicle (SDV) Pilots and Navigators, have a need for continuous monitoring of vital information of the SCUBA data and the divers vital signs during SDV and combat swimmer dive operations. Their situational awareness and overall safety would be greatly enhanced through the use of an integrated system of biometric physiological monitoring and SCUBA status conditions into a helmet with an integrated full facemask (FFM) via a heads up display of the data. The data received from the SCUBA for air, oxygen, rig battery status, oxygen sensor status and the divers own vital signs for temperature, respiration and heart rate can be readily viewed and transmitted acoustically to a surface craft for the diving supervisor to monitor the divers status including their location underwater.

**PHASE I:** Conduct a feasibility study for the development and integration of vital diver biometric data and transmit to universal sized FFM and helmet that can provide and display biometric and open and closed circuit diving SCUBA data status.

**PHASE II:** Design and develop prototype systems based on the best design evaluated by Phase I. Demonstrate the ability of the systems to:

- Operate in an environment pressurized to 90 psi
- Operate in a seawater environment to 100 meters
- Operate in temperatures between 32-95 degrees F
- Display legible text information on the inside of the FFM under day light and nighttime conditions.

Demonstrate the ability of the potential designs to be real time monitored by a surface support dive boat and another submerged platform or diver.

**PHASE III:** Develop production ready variant of the biometric monitoring system.

**DUAL USE APPLICATION:** Underwater exploration such as cave diving and in the recreational sector where dive boats support large numbers of recreational divers there exists a market to monitor the location and maintain situational awareness of the divers.

#### REFERENCES:

1. NAVSEA SS800-AF-MAN-010/P-9290 System Certification Procedures and Criteria for Deep Submergence Systems.
2. U.S. Navy Diving Manual

**KEYWORDS:** biometrics, diver, monitor, U/W communications, data display, scuba, oxygen monitor, health monitoring

SOCOM11-003

**TITLE:** Novel Power System for Extended Endurance of Air Launched SUAS

**TECHNOLOGY AREAS:** Air Platform, Ground/Sea Vehicles, Materials/Processes

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 and demonstrate a novel power system that will be utilized in an air launched Small Unmanned Aerial System (SUAS). The end solution should not only extend the duration of the SUAS, but also address the growing need for more power by the payload.

**DESCRIPTION:** These air launched SUASs are in the Joint UAS Group 1 category of 0-20 lbs and can either be recoverable or expendable. Current solutions rely on lithium ion battery technology which only gives about 30

minutes duration; this power system should reach durations of 4 hours while meeting size, weight and power requirements. State of the art technology for Group 1 (0-20 lbs), provides approximately 25-60 minutes of endurance with conventional lithium ion batteries. However to make air launched expendable SUASs viable for multiple mission scenarios, technology must be developed to allow for a mission endurance of a minimum of 4 hours. There are four different designs that are categorized in Group 1; Table 1 gives more insight - each gives varying size, weight and power requirements. This challenge is complicated by the requirement to develop power solutions that do not produce potential explosive or environmental hazards while system is on-board aircraft or in storage. Also it must have the ability to be launched from a common launch tube where it is stowed initially with no initial air flow. It must be able to operate at temperatures at high altitudes. Manned platforms operate between 8,000 feet and 15,000 feet AGL. The SUAS is planned to be ejected from a “mothership”, following a specific separation regime, then transitions into autonomous flight dropping through the airspace from altitudes of FL250 down to a surface operating altitude between 200 and 1000 feet AGL. Temperatures vary from 0degC to 35degC and pressures vary from 24 to 30 inches Hg.

Table 1: Power Distributions.

	Alpha	Bravo	Charlie	Delta
Total System Weight (kg)	6.35	7.26	2.49	1.81
Peak Power (W)	740	844	400	230
Duration (min)	3	3	1	2
Cruise Power (W)	296	391	250	150
Duration (min)	60	30	10	20
Budgeted Power Weight (kg)	60	30	10	20
Delivered Energy (Whrs)	333.00	237.70	48.33	57.67
Specific Energy (Wh/kg)	104.72	262.17	204.80	80.09
Specific Power (peak)	232.70	930.54	1694.92	319.44
Specific Power (cruise)	93.08	431.09	1059.32	208.33
Energy Density (Wh/L)	266.40	Not avail	78.71	502.97

PHASE I: Conduct feasibility study. Design solution and concept of employment for use of novel power system. Demonstrate endurance potential, energy density and meeting of power requirements in lab environment.

PHASE II: Develop and integrate a prototype power system with a Group 1 SUAS and demonstrate SUAS air launch ability with total package. Test and evaluate maturity level of power system. Meet minimum endurance of 4 hours.

PHASE III: Develop a reliable system that can meet requirements for endurance.

Dual Use Applications: Applications for commercial applications include all untethered powered equipment and vehicles. Military applications include other unmanned systems. Such a group 1 UAS will be integrated, demonstrated and an initial operational assessment.

KEYWORDS: battery, hybrid power system, fuel cell, propulsion, SUAS, SUAV

SOCOM11-004 TITLE: Improved Tire Technology for Special Operations Vehicles

TECHNOLOGY AREAS: Ground/Sea Vehicles, Materials/Processes

ACQUISITION PROGRAM: Family of Special Operations Vehicles

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 high speed, true off-road ballistic tire - a tire that can provide high off-road mobility, while also being capable of running at high speeds on primary and secondary roads that also provides improved tire survivability versus terrain and ballistic threats.

**DESCRIPTION:** Current tire technology forces a trade between design for speed, design for stability and design for extreme off-road mobility. Current run-flat solutions, combined with tires and bead locks are very heavy and provide very limited mobility once hit or damaged. Zero pressure tire technology has been around for several years now but has not moved into military applications. The most significant concerns with current state of the art are weight, producibility, and cost, as well as concerns regarding performance and reliability. New tire technologies, approaches, and designs are necessary to optimize for both high speed on-road operation and for off-road operation in aggressive terrain while providing enhanced survivability and damage resistance versus gunfire and terrain.

The overarching goal would be for the improved tire technology to be applicable across the full suite of the Family of Special Operations Vehicles Program to include Mine Resistant Ambush Protected Vehicles (MRAP variants are RG33, RG31, AUV and M-ATV), the Ground Mobility Vehicle (the Special Operations Forces Peculiar HMMWV, currently the M1165), Light Transportable All Terrain Vehicle (side by side ATV), ATV (saddle seat), and commercial mobility vehicles (COTS vehicles such as the Toyota pickup truck).

An example of the current state of the art is Tireball technology, but that technology is limited because the wheel/Tireballs cannot be replaced or repaired in the field, without special tools and procedures, short of replacing the entire wheel/tire assembly. Another example is the current application for the GMV, which is the Hutchinson VFI runflat inside a load range E wheel and tire combination (Goodyear and Michelin currently produce the tires, while the wheel is manufactured by Accuride or Hutchinson). This wheel/tire/runflat has a weight of approximately 160 lbs.

A limitation with current run-flat solutions are that they have not been ballistically tested; the desired tire technology would be tested for survivability with a threshold of 2 shots of 7.62 x 39 mm PS Steelcore ball and an objective of surviving 2 or more shots of 7.62 x 54R LPS ball. At a minimum, the new tire must allow the vehicle to continue move for at least 30 miles with a complete loss of air pressure in any two tires, with 9 miles (primary/paved road) at 30 mph, 9 miles (secondary roads) at 21 mph and 12 miles (cross-country) at 12 mph.

A successfully developed prototype tire would be subjected to performance testing to meet a commercial or military standard such as SAE J2014. The tire prototype would also ultimately be expected to pass a standard 12,000 mile reliability, availability, maintainability, and durability test at an independent test facility. The initial application for proof of concept would be an 18 inch diameter wheel with a tire size of P275/65R18 such as used on a Toyota pickup truck.

**PHASE I:** Conduct feasibility study to develop or determine technologies that will produce a high-speed, off-road tire that can survive terrain and ballistic threats. Explore scalability of technology.

**PHASE II:** Develop prototype tires and conduct testing to prove technology is viable and can be used to provide a tire solution that is high speed capable (while maintaining or enhancing off-road performance) and provides increased damage resistance and survivability. Explore speed, ride quality characteristics, and performance once damaged.

**PHASE III:** The proposed tire technologies could be directly leveraged to provide enhanced tires for commercial vehicle markets, shipping, and racing applications.

**KEYWORDS:** tire, ballistic, all-terrain, off-road, high-speed, materials, survivability