



SBIR



Small Business Innovation Research

FY2013

Program Solicitation: **NOAA 2013-1**
Amendment 0001 dated February 4, 2013

Opening Date: January 4, 2013
Closing Date: February 27, 2013

U.S. DEPARTMENT OF COMMERCE
<http://www.techpartnerships.noaa.gov>

TABLE OF CONTENTS

1.0 PROGRAM DESCRIPTION	5
1.1 Introduction	5
1.2 Three-Phase Program	5
1.2.1 Phase I – Feasibility Research	6
1.2.2 Phase II – Research and Development	6
1.2.3 Phase III – Commercialization	7
1.3 Manufacturing-related Priority	7
1.4 Energy Efficiency and Renewable Energy Priority	7
1.5 Eligibility and Limitations	7
1.6 Contact with NOAA	8
1.7 Fraud, Waste and Abuse	9
2.0 CERTIFICATIONS	1110
2.1 Certification of Size, Ownership, and SBIR Program Requirements	1110
2.2 Research Projects with Human Subjects, Human Tissue, Data or Recordings Involving Human Subjects	11
2.2.1 Protection of Human Subjects	11
2.2.2 IRB Education Documentation	13
2.3 Research Projects Involving Vertebrate Animals	1413
3.0 DEFINITIONS	15
3.1 Commercialization	15
3.2 Essentially Equivalent Work	15
3.3 Feasibility	15
3.4 Funding Agreement	15
3.5 Historically Underutilized Business Zone (HUBZone) Small Business Concern	16
3.6 Joint Venture	16
3.7 Principal Investigator (PI)/Project Manager	16
3.7 Primary Employment	16
3.8 Research or Research and Development	16
3.9 SBIR Technical Data	1716
3.10 SBIR Technical Data Rights	17
3.11 Small Business Concern	17
3.12 Socially and Economically Disadvantaged Small Business Concern	17
3.13 Subcontract	17
3.14 Women-Owned Small Business	17

4.0 PROPOSAL PREPARATION INSTRUCTIONS AND REQUIREMENTS	17
4.1 Proposal Requirements	17
4.2 Phase I Proposal Limitations	18
4.3 Phase I Proposal Submission Forms and Technical Content	19
4.3.1 Cover Sheet	19
4.3.2 Project Summary	20
4.3.3 Technical Content	20
4.4 Similar Proposals or Awards. WARNING	22
4.5 Prior SBIR Phase II Awards	23
4.6 Proposed Budget.....	23
4.7 Multiple Proposals	24
5.0 METHOD OF SELECTION AND EVALUATION CRITERIA	2524
5.1 Introduction	2524
5.2 Phase I Screening Criteria	25
5.3 Phase I Evaluation and Selection Criteria	2625
5.4 Phase II Evaluation and Selection Criteria	27
5.5 Release of Proposal Review Information.....	27
6.0 CONSIDERATIONS	27
6.1 Awards.....	27
6.2 Reports.....	28
6.3 Payment Schedule.....	3029
6.4 Deliverables	30
6.5 Proprietary Information, Inventions, and Patents.....	30
6.5.1 Limited Rights in Information and Data	30
6.5.2 Copyrights	31
6.5.3 Rights in Data Developed under SBIR Contracts	3231
6.5.4 Patents	32
6.6 Considerations	33
6.7 Additional Information.....	34
6.8 Technical Assistance for Proposal Preparation and Project Conduct	35
7.0 SUBMISSION OF PROPOSALS	35
7.1 Deadline for Proposals and Modifications.....	35
7.2 Proposal Submission	36
7.3 Warning	37
8.0 SCIENTIFIC AND TECHNICAL INFORMATION SOURCES.....	37

8.1 General Information..... 37
8.2 Oceanography and Marine Science 37
9.0 RESEARCH TOPICS..... 38
10.0 SUBMISSION FORMS 55
10.1 NOAA SBIR Cover Page..... 55
10.2 NOAA SBIR Project Summary Form 56
10.3 NOAA SBIR Proposed Budget 57
10.4 NOAA SBIR Budget Instructions 58
10.5 SBIR Funding Agreement Certification 61
11.0 NOAA/SBIR CHECKLIST 65
12.0 SBIR NATIONAL CONFERENCES..... 66

**DEPARTMENT OF COMMERCE
NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION**

PROGRAM SOLICITATION FOR SMALL BUSINESS INNOVATION RESEARCH (SBIR)

1.0 PROGRAM DESCRIPTION

1.1 Introduction

The Department of Commerce (DOC) National Oceanic and Atmospheric Administration (NOAA) invites small businesses to submit research proposals under this solicitation. Firms with strong research capabilities in any of the areas listed in Section 9 of this solicitation are encouraged to participate. The SBIR Program is not a substitute for existing unsolicited proposal mechanisms. **Unsolicited proposals are not accepted under the Small Business Innovation Research (SBIR) program.**

The SBIR program was originally established in 1982 by the Small Business Innovation Development Act (P.L. 97-219). It was then expanded by the Small Business R&D Enhancement Act of 1992, extending the program to the year 2000 and then to 2008. The program was reauthorized under Public Law 112-81, Section E and extended through September 30, 2017.

Eleven federal agencies set aside a portion of their extramural research and development budget each year to fund research proposals from small science and technology-based firms. The objectives of the SBIR program are to: stimulate technological innovation in the private sector; strengthen the role of small business in meeting Federal research and development (R&D) needs; foster and encourage participation by socially and economically disadvantaged persons and women-owned small business concerns in technological innovation; and increase private sector commercialization of innovations derived from federal research and development. The NOAA SBIR Program identifies and solicits proposals in subtopics that fall within NOAA's mission.

1.2 Three-Phase Program

Legislation requires the Department of Commerce to establish a three-phase SBIR program by reserving a percentage of its extramural R&D budget to be awarded to small business concerns for innovation research. SBIR policy is provided by the Small Business Administration through the SBA Policy Directives.

The funding vehicles for NOAA's SBIR program in both Phase I and Phase II are contracts. This document solicits Phase I proposals only. A Phase II proposal can be submitted only by a Phase I awardee. NOAA has the unilateral right to select SBIR research topics and awardees in both Phase I and Phase II and award several or no contracts under a given subtopic.

1.2.1 Phase I – Feasibility Research

The purpose of Phase I is to determine the technical feasibility of the proposed research and the quality of performance of the small business concern receiving an award. Therefore, the proposal should concentrate on research that will significantly contribute to proving the feasibility of the proposed research, a prerequisite to further support in Phase II. NOAA Phase I awards are up to \$95,000 and up to a six (6) month period of performance with an additional month allowed for completion of the Final Report.

1.2.2 Phase II – Research and Development

Only firms that are awarded Phase I contracts under this solicitation will be given the opportunity to submit a Phase II proposal immediately following completion of Phase I. Phase II is the R&D or prototype development phase. It will require a comprehensive proposal outlining the research in detail, plan to commercialize the final product, and may require a company presentation to the panel. Instructions for Phase II proposal preparation and submission requirements will be provided to Phase I awardees toward the end of the Phase I period of performance. NOAA may also require delivery of the prototype. Phase II applicants will be required to provide information for the SBA Tech-Net Database System (<http://tech-net.sba.gov>) when advised this system can accept their input.

Further information regarding Phase II proposals and Tech-Net requirements will be provided to all firms receiving Phase I contracts. The following provides information for submitting a Phase II proposal to the Department of Commerce (DOC) National Oceanic and Atmospheric Administration (NOAA) SBIR program.

Phase II awards shall be for no more than **\$400,000** (except for subtopics submitted under Phase I with the suffix “SG”, which are limited to **\$300,000**). The period of performance for Phase II will depend upon the scope of the research, but should not exceed **24 months**. For planning purposes, historically NOAA Phase II awards are usually made in the month of July.

Each Phase II proposal will be evaluated against the criteria set forth in Solicitation NOAA 2013-1 (see section 5.4). Phase II award decisions will be made based upon scientific and technical quality, commercial potential, and available funds. Final award decisions will be made by NOAA selection committees based upon ratings assigned by reviewers and consideration of other factors including possible duplication of ongoing research, and the importance of the proposed research as it relates to NOAA needs.

Phase II proposals should be more comprehensive than Phase I proposals and are **NOT** limited to 25 pages. One year after completing R&D activity the awardee shall be required to report on their commercialization activities.

1.2.3 Phase III – Commercialization

In Phase III, it is intended that non-SBIR capital be used by the small business to pursue commercial applications of Phase III.

1.3 Manufacturing-related Priority

Executive Order (EO) 13329 “Encouraging Innovation in Manufacturing” requires SBIR agencies, to the extent permitted by law and in a manner consistent with the mission of that department or agency, to give high priority within the SBIR programs to manufacturing-related research and development (R&D). “Manufacturing-related” is defined as “relating to manufacturing processes, equipment and systems; or manufacturing workforce skills and protection.”

The NOAA SBIR Program solicits manufacturing-related projects through many of the subtopics described in this Solicitation. Further, NOAA encourages innovation in manufacturing by giving high priority, where feasible, to projects that can help the manufacturing sector through technological innovation in a manner consistent with NOAA’s mission. This prioritization will not interfere with the core project selection criteria described in Section 5.3.

1.4 Energy Efficiency and Renewable Energy Priority

The Energy Independence and Security Act of 2007 (P.L. 110-140) directs SBIR Programs to give high priority to small business concerns that participate in or conduct energy efficiency or renewable energy system R&D projects.

The NOAA SBIR Program solicits energy efficiency or renewable energy system R&D projects through many of the subtopics described in this Solicitation. Further, NOAA encourages innovation in energy efficiency or renewable energy system R&D by giving high priority, where feasible, to projects that conduct energy efficiency or renewable energy system R&D through technological innovation in a manner consistent with NOAA’s mission. This prioritization will not interfere with the core project selection criteria: scientific and technical merit and the potential for commercial success.

1.5 Eligibility and Limitations

Proposers for both Phase I and Phase II **must** qualify as a small business concern for research or R&D (R/R&D) purposes (Section 3.11) at the time of the award and at any other time set forth in the SBA’s regulations at 13 CFR 121.701-121.705. Each Phase I and Phase II awardee must submit a certification stating that it meets the size, ownership and other requirements of the SBR Program at the time of award, and at any other time set forth in SBA’s regulations at 13 CFR 121.701-705. In addition, the primary employment of the

principal investigator (PI) must be with the small business at the time of the award and during the conduct of the research. More than one-half of the principal investigator's time must be spent with the small business for the period covered by the award. **Primary employment with a small business precludes full-time employment with another organization.**

For both Phase I and Phase II, all work must be performed by the small business concern and its subcontractors in the United States. "United States" means the fifty states, the territories and possessions of the United States, the Commonwealth of Puerto Rico, the District of Columbia, the Republic of the Marshall Islands, the Federated States of Micronesia, and the Republic of Palau. However, based on a rare and unique circumstance, for example, a supply or material or other item or project requirement that is not available in the United States, NOAA may allow that particular portion of the R/R&D work to be performed or obtained in a country outside of the United States. Approval by the funding agreement officer after consultation with NOAA SBIR Program Manager for each such specific condition must be in writing.

NOAA elects to not use the authority that would allow venture capital operating companies (VCOCs), hedge funds or private equity firms to participate in the SBIR Program.

For Phase I, a minimum of two-thirds of the research and/or analytical effort must be performed by the awardee. For Phase II, a minimum of one-half of the research and/or analytical effort must be performed by the awardee.

Unsolicited proposals or proposals not responding to subtopics listed herein are not eligible for SBIR awards. Only proposals that are directly responsive to the subtopics as described in Section 9 will be considered.

Potential awardees may not participate in the selection of any topic or subtopic nor in the review of proposals. All offerors, including Guest Researchers, contractors, Cooperative Research and Development Agreement (CRADA) partners and others working with NOAA may only submit a proposal if they:

- Had no role in suggesting, developing, or reviewing the subtopic
- Have not been the recipient of any information on the subtopic not available in the solicitation or other public means
- Have not received any assistance from DOC in preparing the proposal (including any 'informal' reviews) prior to submission.

NOAA may not enter into, or continue an existing CRADA with an awardee on the subtopic of the award.

1.6 Contact with NOAA

In the interest of competitive fairness, oral or written communication with NOAA or any of its components concerning additional information on the technical topics described in Section 9 of this solicitation **is strictly prohibited**.

For general information on the NOAA SBIR program contact:

Kelly Wright, Acting SBIR Program Manager
1305 East West Highway, Room 7606
Silver Spring, MD 20910

Telephone: (301) 713-3565

Email: Kelly.Wright@noaa.gov

For Information on the Solicitation and other Contractual Issues contact:

(Prior to January 17, 2013)

Joan Clarkston, Contract Specialist
601 E. 12th Street, Rm. 1756
Kansas City, MO 64106

(On or after January 22, 2013)

FEDEX AND UPS ONLY

Joan Clarkston, Contract Specialist
DOC/NOAA-EAD-KC
1500 E. Bannister Road
Kansas City, MO 64131

US POSTAL SERVICE ONLY

Joan Clarkston, Contract Specialist
601 E. 12th Street, Rm. 1756
Kansas City, MO 64106

Telephone: (816) 426-7469

E-mail: joan.e.clarkston@noaa.gov

Additional scientific and technical information sources are listed in Section 7.

1.7 Fraud, Waste and Abuse

Fraud includes any false representation about a material fact or any intentional deception designed to deprive the United States unlawfully of something of value or to secure from the United States a benefit, privilege, allowance, or consideration to which an individual or business is not entitled. Waste includes extravagant, careless, or needless expenditure of Government funds, or the consumption of Government property, that results from deficient practices, systems, controls, or decisions. Abuse includes any intentional or improper use of Government resources, such as misuse of rank, position, or authority or resources. Examples of fraud, waste, and abuse relating to the SBIR Program include, but are not limited to:

- (i) misrepresentations or material, factual omissions to obtain, or otherwise receive funding under, an SBIR award;
- (ii) misrepresentations of the use of funds expended, work done, results achieved, or compliance with program requirements under an SBIR award;
- (iii) misuse or conversion of SBIR award funds, including any use of award funds while not in full compliance with SBIR Program requirements, or failure to pay taxes due on misused or converted SBIR award funds;
- (iv) fabrication, falsification, or plagiarism in applying for, carrying out, or reporting results from an SBIR award;
- (v) failure to comply with applicable federal costs principles governing an award;
- (vi) extravagant, careless, or needless spending;
- (vii) self-dealing, such as making a sub-award to an entity in which the PI has a financial interest;
- (viii) acceptance by agency personnel of bribes or gifts in exchange for grant or contract awards or other conflicts of interest that prevents the Government from getting the best value; and
- (ix) lack of monitoring, or follow-up if questions arise, by agency personnel to ensure that awardee meets all required eligibility requirements, provides all required certifications, performs in accordance with the terms and conditions of the award, and performs all work proposed in the application.

Report any allegations of fraud, waste and abuse to:

Department of Commerce
Office of Inspector General
Complaint Intake Unit, Mail Stop 7886
1401 Constitution Avenue, N.W.
Washington, DC 20230

Telephone:

Local	202-482-2495
Toll free	1-800-424-5197
TTD	1-855-860-6950

Email: hotline@oig.doc.gov

Fax: 855-569-9235

Website: <http://www.oig.doc.gov/Pages/online-hotline-complaint-form.aspx>

2.0 CERTIFICATIONS

2.1 Certification of Size, Ownership, and SBIR Program Requirements

Awardees will be required to certify size, ownership and other SBIR Program requirements with the submission of SBIR proposal, at the time of award, and during the funding agreement life cycle. A copy of these certifications are provided in section 10.5.

2.2 Research Projects with Human Subjects, Human Tissue, Data or Recordings Involving Human Subjects

2.2.1 Protection of Human Subjects

Any proposal that includes contractor participation in research involving human subjects, human tissue/cells, data or recordings involving human subjects must meet the requirements of the Common Rule for the Protection of Human Subjects (“Common Rule”), codified for the Department of Commerce (DoC) at 15 C.F.R. Part 27. In addition, any such proposal that includes research on these topics must be in compliance with any statutory requirements imposed upon the Department of Health and Human Services (DHHS) and other Federal agencies regarding these topics, all regulatory policies and guidance adopted by DHHS, the Food and Drug Administration, and other Federal agencies on these topics, and all Executive Orders and Presidential statements of policy on these topics.

NOAA reserves the right to make an independent determination of whether a proposer’s research involves human subjects. If NOAA determines that your research project involves human subjects, you will be required to provide additional information for review and approval. If an award is issued, no research activities involving human subjects shall be initiated or costs incurred under the award until the NOAA Contracting Officer issues written approval. Retroactive approvals are not permitted.

NOAA will accept proposals that include research activities involving human subjects that have been or will be approved by an Institutional Review Board (IRB) currently registered with the Office for Human Research Protections (OHRP) within the DHHS and that will be performed by entities possessing a currently valid Federal wide Assurance (FWA) on file from OHRP that is appropriately linked to the cognizant IRB for the protocol. NOAA will not issue a single project assurance (SPA) for any IRB reviewing any human subjects protocol proposed to NOAA. Information regarding how to apply for an FWA and register an IRB with OHRP can be found at <http://www.hhs.gov/ohrp/assurances/index.html>.

Generally, NOAA does not fund research involving human subjects in foreign countries. NOAA will consider, however, the use of **preexisting** tissue, cells, or data from a foreign source on a limited basis if all of the following criteria are satisfied:

- (1) the scientific source is considered unique,
- (2) an equivalent source is unavailable within the United States,
- (3) an alternative approach is not scientifically of equivalent merit, and
- (4) the specific use qualifies for an exemption under the Common Rule.

Any award issued by NOAA is required to adhere to all Presidential policies, statutes, guidelines and regulations regarding the use of human embryonic stem cells. The DOC follows the NIH Guidelines by supporting and conducting research using only human embryonic stem cell lines that have been approved by NIH in accordance with the NIH Guidelines. Detailed information regarding NIH Guidelines for stem cells is located on the NIH Stem Cell Information website: <http://stemcells.nih.gov>. The DOC will not support or conduct any type of research that the NIH Guidelines prohibit NIH from funding. The DOC will review research using human embryonic stem cell lines that it supports and conducts in accordance with the Common Rule and NOAA implementing procedures, as appropriate.

Any request to support or conduct research using human embryonic stem cell lines not currently approved by the NIH, will require that the owner, derivator or licensee of the human embryonic stem cell line apply for and receive approval of the registration of the cell line through the established NIH application procedures: http://hescregapp.od.nih.gov/NIH_Form_2890_Login.htm. Due to the timing uncertainty associated with establishing an embryonic stem cell line in the NIH registry, the use of existing human embryonic stem cell lines in the NIH Embryonic Stem Cell Registry may be preferred by applicants or current award recipients. The NIH Embryonic Stem Cell Registry is located at: http://grants.nih.gov/stem_cells/registry/current.htm.

A proposer or current award recipient proposing to use a registered embryonic stem cell line will be required to document an executed agreement for access to the cell line with the provider of the cell line, and acceptance of any established restrictions for use of the cell line, as may be noted in the NIH Embryonic Stem Cell Registry.

If the proposal includes exempt and/or non-exempt research activities involving human subjects the following information is required in the proposal:

- (1) The name(s) of the institution(s) where the research will be conducted;
- (2) The name(s) and institution(s) of the cognizant IRB(s), and the IRB registration number(s);
- (3) The FWA number of the applicant linked to the cognizant IRB(s);

- (4) The FWAs associated with all organizations engaged in the planned research activity linked to the cognizant IRB;
- (5) If the IRB review(s) is pending, the estimated start date for research involving human subjects;
- (6) The IRB approval date (if currently approved for exempt or non-exempt research);
- (7) If any FWAs or IRB registrations are being applied for, that should be clearly stated.

Additional documentation may be requested, as warranted, during review of the proposal, but may include the following for research activities involving human subjects that are planned in the first year of the award:

- (1) A signed (by the study principal investigator) copy of each applicable final IRB-approved protocol;
- (2) A signed and dated approval letter from the cognizant IRB(s) that includes the name of the institution housing each applicable IRB, provides the start and end dates for the approval of the research activities, and any IRB-required interim reporting or continuing review requirements;
- (3) A copy of any IRB-required application information, such as documentation of approval of special clearances (i.e. biohazard, HIPAA, etc.) conflict-of-interest letters, or special training requirements;
- (4) A brief description of what portions of the IRB submitted protocol are specifically included in the proposal submitted to NOAA, if the protocol includes tasks not applicable to the proposal, or if the protocol is supported by multiple funding sources. For protocols with multiple funding sources, NOAA will not approve the study without a nonduplication-of-funding letter indicating that no other federal funds will be used to support the tasks proposed under the proposed research or ongoing project;
- (5) If a new protocol will only be submitted to an IRB if an award from NOAA issued, a draft of the proposed protocol may be requested;
- (6) Any additional clarifying documentation that NOAA may request during review of proposals to perform the NOAA administrative review of research involving human subjects.

2.2.2 IRB Education Documentation

A signed and dated letter is required from the Organizational Official who is authorized to enter into commitments on behalf of the organization documenting that appropriate IRB education has been received by the Organizational Official, the IRB Coordinator or such person that coordinates the IRB documents and materials if such a person exists, the IRB Chairperson, all IRB members and all key personnel associated with the proposal. The

NOAA requirement of documentation of education is consistent with NIH notice OD-00-039 (June 5, 2000). Although NOAA will not endorse an educational curriculum, there are several curricula that are available to organizations and investigators which may be found at: <http://grants.nih.gov/grants/guide/notice-files/NOT-OD-00-039.html>.

2.3 Research Projects Involving Vertebrate Animals

Any proposal that includes research involving live vertebrate animals must be in compliance with the National Research Council's "Guide for the Care and Use of Laboratory Animals," which can be obtained from National Academy Press, 500 5th Street, N.W., Department 285, Washington, DC 20055. In addition, such proposals must meet the requirements of the Animal Welfare Act (7 U.S.C. § 2131 et seq.), 9 C.F.R. Parts 1, 2, and 3, and if appropriate, 21 C.F.R. Part 58. These regulations do not apply to proposed research using preexisting images of animals or to research plans that do not include live animals that are being cared for, euthanized, or used by the project participants to accomplish research goals, teaching, or testing. These regulations also do not apply to obtaining animal materials from commercial processors of animal products or to animal cell lines or tissues from tissue banks.

NOAA reserves the right to make an independent determination of whether your research involves live vertebrate animals. If NOAA determines that your research project involves live vertebrate animals, you will be required to provide additional information for review and approval. If an award is issued, no research activities involving live vertebrate animals subjects shall be initiated or costs incurred under the award until the NOAA Contracting Officer issues written approval.

If the proposal includes research activities involving live vertebrate animals, the following information is required in the proposal:

- (1) The name(s) of the institution(s) where the animal research will be conducted;
- (2) The assurance type and number, as applicable, for the cognizant Institutional Animal Care and Use Committee (IACUC) where the research activity is located. [For example: Animal Welfare Assurance from the Office of Laboratory Animal Welfare (OLAW) should be indicated by the OLAW assurance number, i.e. A-1234; a USDA Animal Welfare Act certification should be indicated by the certification number i.e. 12-R-3456; and an Association for the Assessment and Accreditation of Laboratory Animal Care (AAALAC) should be indicated by AAALAC.]
- (3) The IACUC approval date (if currently approved);
- (4) If the review by the cognizant IACUC is pending, the estimated start date for research involving vertebrate animals;
- (5) If any assurances or IACUCs need to be obtained or established, that should be clearly stated.

Additional documentation will be requested, as warranted, during review of the proposal, but may include the following for research activities involving live vertebrate animals that are planned in the first year of the award:

- (1) A signed (by the Principal Investigator) copy of the IACUC approved Animal Study Proposal (ASP);
- (2) Documentation of the IACUC approval indicating the approval and expiration dates of the ASP; and
- (3) If applicable, a nonduplication-of-funding letter if the ASP is funded from several sources.
- (4) If a new ASP will only be submitted to an IACUC if an award from NOAA issued, a draft of the proposed ASP may be requested.
- (5) Any additional clarifying documentation that NOAA may request during review of proposals to perform the NOAA administrative review of research involving live vertebrate animals.

3.0 DEFINITIONS

3.1 Commercialization

The process of developing products, processes, technologies, or services and the production and delivering (whether by the originating party or others) of the products, processes, technologies, or services for sale to or use by the Federal government or commercial markets.

As used here, commercialization includes both Government and private sector markets.

3.2 Essentially Equivalent Work

Work that is substantially the same research, which is proposed for funding in more than one contract proposal or grant application submitted to the same Federal agency or submitted to two or more different Federal agencies for review and funding consideration; or work where a specific research objective and the research design for accomplishing an objective are the same or closely related to another proposal or award, regardless of the funding source.

3.3 Feasibility

The practical extent to which a project can be performed successfully.

3.4 Funding Agreement

Any contract, grant, or cooperative agreement entered into between any Federal agency and any small business concern (SBC) for the performance of experimental, developmental, or research work, including products or services, funded in whole or in part by the Federal Government.

For purposes of this Solicitation, NOAA intends to award contracts in accordance with the Federal Acquisition Regulation.

3.5 Historically Underutilized Business Zone (HUBZone) Small Business Concern

(See 13 CFR Part 126 for additional details)

Status as a qualified HUBZone Small Business Concern is determined by the Small Business Administration.

3.6 Joint Venture

See 13 CFR 121.103(h).

NOAA HAS CHOSEN NOT TO PERMIT MAJORITY-OWNED BY MULTIPLE VENTURE CAPITAL OPERATING COMPANIES, HEDGE FUND, OR PRIVATE EQUITY FIRMS.

3.7 Principal Investigator (PI)/Project Manager

The one individual designated by the applicant to provide the scientific and technical direction to a project supported by a funding agreement.

3.7 Primary Employment

The primary employment of the principal investigator must be with the SBC at the time of award and during the conduct of the proposed project. Primary employment means that more than one half of the principal investigator's time is spent in the employ of the small business concern. This precludes full-time employment with another organization.

3.8 Research or Research and Development

Any activity that is (a) a systematic, intensive study directed toward greater knowledge or understanding of the subject studied; (b) a systematic study directed specifically toward applying new knowledge to meet a recognized need; or (c) a systematic application of knowledge toward the production of useful materials, devices, systems, or methods, including design, development, and improvement of prototypes and new processes to meet specific requirements.

In general, the NOAA SBIR program will fund Phase I and Phase II proposals with objectives that can be defined by (b) and (c) in the above paragraph.

3.9 SBIR Technical Data

All data generated during the performance of a SBIR award.

3.10 SBIR Technical Data Rights

The rights an SBIR awardee obtains in data generated during the performance of any SBIR Phase I, Phase II, or Phase III award that an awardee delivers to the Government during or upon completion of a Federally-funded project, and to which the Government receives a license.

3.11 Small Business Concern

A concern that meets the requirements set forth in 13 CFR 121.702.

3.12 Socially and Economically Disadvantaged Small Business Concern

See 13 CFR 124, Subpart B.

3.13 Subcontract

Any agreement, other than one involving an employer-employee relationship, entered into by an awardee of a funding agreement calling for supplies or services for the performance of the original funding agreement.

3.14 Women-Owned Small Business

An SBC that is at least 51% owned by one or more women, or in the case of any publically owned business, at least 51% of the stock is owned by women, and women control the management and daily business operations.

4.0 PROPOSAL PREPARATION INSTRUCTIONS AND REQUIREMENTS

4.1 Proposal Requirements

NOAA reserves the right not to submit to technical review any proposal which it determines has insufficient scientific and technical information, or one which fails to comply with the administrative procedures as outlined in the NOAA/SBIR Checklist in Section 11. Proposals that do not pass the screening criteria (outlined in Section 5.2) will be rejected without further consideration.

The offeror must provide sufficient information to demonstrate that the proposed work represents a sound approach to the investigation of an important scientific or engineering innovation. The proposal must meet all the requirements of the subtopic in Section 9 to which it applies.

A proposal must be self-contained and written with all the care and thoroughness of a scientific paper submitted for publication. It should indicate a thorough knowledge of the current status of research in the subtopic area addressed by the proposal. Each proposal should be checked carefully by the offeror to ensure inclusion of all essential material needed for a complete evaluation. The proposal will be peer reviewed as a scientific paper. All units of measurement should be in the metric system.

The proposal must not only be responsive to the specific NOAA program interests described in Section 9 of the solicitation, but also serve as the basis for technological innovation leading to **new commercial products, processes, or services**. An organization may submit different proposals on different subtopics or different proposals on the same subtopic under this Solicitation. When the proposed innovation applies to more than one subtopic, the offeror must choose that subtopic which is most relevant to the offeror's technical concept.

Proposals principally for the commercialization of proven concepts or for market research must not be submitted for Phase I funding, since such efforts are considered the responsibility of the private sector.

The proposal should be direct, concise, and informative. Promotional and other material not related to the project shall be omitted.

NOAA will notify offeror whether it has been selected for an award within 90 calendar days of the closing of this solicitation. If selected, offeror can expect to receive an actual award within 180 calendar days of the closing of the solicitation.

4.2 Phase I Proposal Limitations

- Page Length - **no more than 25 pages**, consecutively numbered, including the cover page, project summary, main text, references, resumes, other applicable technical enclosures or attachments, and the Proposed Budget (Section 10.3). The only exception to the page count limitation are the additional Supporting Budget Documentation for the Proposed Budget (See Section 10.4 for a more detailed discussion); forms 10.5; and those pages necessary to comply with the itemization of prior SBIR Phase II awards, per Section 4.5.

- Paper Size - must be standard size (21.6 cm X 27.9 cm; 8 ½" X 11").
- Format - must be easy to read with a font of at least 10 point. Margins should be at least 2.5cm.

Supplementary material, revisions, substitutions, audio or video tapes, or other electronic media will **not** be accepted.

Proposals not meeting these requirements will be rejected without review.

4.3 Phase I Proposal Submission Forms and Technical Content

This section includes instructions for completing required forms and writing the Technical Content section. A complete proposal application must include:

Five (5) copies of each of the following:

- (a) Cover Page (required form, see Section 10)
- (b) Project Summary (required form, see Section 10)
- (c) Technical Content (up to 22 pages)
- (d) Proposed Budget (required form, see Section 10)

Two (2) copies of each of the following:

- (a) Supporting Budget documentation (see Section 10.4)
- (b) SBIR Funding Agreement Certification (required form, see Section 10.5)

Proposals received missing any of these required items will be rejected without further review. For instructions on proposal submission, see Section 7.2.

4.3.1 Cover Sheet

Complete all items in the "Cover Page" required form and use as page 1 of the proposal. Ensure that required signatures are included. The government may reject any unsigned offers received. **NO OTHER COVER PAGE WILL BE ACCEPTED.**

If you check the Yes box on #6 of the Cover Sheet, your contact information will be provided to NIST Hollings Manufacturing Extension Partnership (MEP). You will be contacted by your local MEP to explore business-related support services that could benefit the potential of the project you proposed.

Before NOAA can award a contract to a successful offeror under this solicitation, the offeror must be registered in the System for Award Management (SAM). SAM is a consolidation of Federal procurement systems including the Central Contractor Registration (CCR) database. To register, visit <https://www.sam.gov/portal/public/SAM/> or call 1-866-606-8220.

The DUNS number is a nine-digit number assigned by Dun and Bradstreet Information Services. If the offeror does not have a DUNS number, it should contact Dun and Bradstreet directly to obtain one. A DUNS number will be provided immediately by telephone at no charge to the offeror. For information on obtaining a DUNS number, the offeror, if located within the United States, should call Dun and Bradstreet at 1-866-705-5711, or access their website at <http://fedgov.dnb.com/webform>.

No award shall be made under this solicitation to a small business concern without registration in SAM.

Be sure to identify proposal page numbers that contain confidential information in the Proprietary Notice section at the end of the Cover Sheet.

4.3.2 Project Summary

Complete all sections of the “Project Summary” form and use as page 2 of your proposal. The technical abstract should include a brief description of the problem or opportunity, the innovation, project objective, and technical approach.

In summarizing anticipated results, include technical implications of the approach and the potential commercial applications of the research. **Each awardee’s Project Summary will be published on the NOAA SBIR website and, therefore, must NOT contain proprietary information.**

4.3.3 Technical Content

Beginning on page 3 of the proposal, include the following items with headings as shown: **(All headings must be included. If a particular section does not apply, please include the heading, followed by N/A)**

- (a) **Identification and Significance of the Problem or Opportunity.** Make a clear statement of the specific research problem, technical problem, or opportunity addressed. Indicate its innovativeness, commercial potential, and why it is important. Show how it applies to one of the specific subtopics in Section 9.
- (b) **Phase I Technical Objectives.** State the specific objectives of the Phase I research or research and development effort, including the technical questions it will try to answer to determine the feasibility of the proposed approach.

- (c) **Phase I Work Plan.** Include a detailed description of the Phase I Research or Research Development plan. The plan should indicate not only what will be done, *but also* where it will be done and how the Research will be carried out. The method(s) planned to achieve each objective or task, mentioned in item (b) above, should be discussed in detail. In most cases, **this section is typically at least one-third of the proposal.**
- (d) **Related Research or R&D.** Describe research or R&D that is directly related to the proposal including any conducted by the principal investigator or by the proposer's firm. Describe how it relates to the proposed effort, and describe any planned coordination with outside sources. **The purpose of this section is to demonstrate the offeror's awareness of recent developments in the specific topic.**
- (e) **Key Individuals and Bibliography of Related Work.** Identify key individuals involved in Phase I, including their directly related education, experience, and bibliographic information. Where vitae are extensive, summaries that focus on most relevant experience or publications are desired and may be necessary to meet proposal size limitation. List all other commitments that key personnel have during the proposed period of contract performance.
- (f) **Relationship with Future R&D.** Discuss the significance of the Phase I effort in providing a foundation for the Phase II R&D effort. Also state the anticipated results of the proposed approach, if Phases I and II of the project are successful.
- (g) **Facilities and Equipment.** The conduct of advanced research may require the use of sophisticated instrumentation or computer facilities. The proposer should provide a detailed description of the availability and location of the facilities and equipment necessary to carry out Phase I. NOAA facilities and/or equipment will be available for use by awardees only if specifically provided for in the subtopic description. All related transportation/shipping/insurance costs shall be the sole responsibility of the contractor. If expressed in the subtopic description that access to NOAA resources will be made available, then under mutual agreement between awardee and NOAA staff, arrangements will be planned prior to NOAA labs visits, samples testing or exchange, and any collaborative discussions.
- (h) **Consultants and Subcontracts.** The purpose of this section is to show NOAA that: (1) research assistance from outside the firm materially benefits the proposed effort, and (2) arrangements for such assistance are in place at the time of proposal submission.

Outside involvement in the project is encouraged where it strengthens the conduct of the research. Outside involvement is not a requirements of this solicitation and is limited to no more than 1/3 of the research and/or analytical effort in Phase I.

1. Consultant – A person outside the firm, named in the proposal as contributing to the research, must provide a signed statement confirming his/her

availability and role in the project. Additionally, it should document the total amount anticipated with hours and an agreed consulting rate for participation in the project. This statement is part of the page count.

2. Subcontract – Similarly, where a subcontract is involved in the research, the subcontracting institution must furnish a letter signed by an appropriate official describing **the programmatic arrangements and confirming its agreed participation in the research. This letter is part of the page count. The proposed budget for this participation shall be included in the Supporting Budget Documentation section and does not contribute to the 25 page count limitation.**

No individual or entity may serve as a consultant or subcontractor if they:

1. Had any role in suggesting, developing, or reviewing the subtopic; or
 2. Have been the recipient of any information on the subtopic not available to the public.
- (i) **Potential Commercial Applications and Follow-on Funding Commitment.** Describe in detail the commercial potential of the proposed research, how commercialization would be pursued, benefits over present products on the market, and potential use by the Federal Government. Address the following:
1. Market opportunity – Describe the current and anticipated target market, the size of the market, and include a brief profile of the potential customer.
 2. Technology and competition – Describe the competitive landscape, the value proposition and competitive advantage of the product or service enabled by the proposed innovation. Also include what critical milestones must be met to get the product or process to market and the resources required to address the business opportunity.
 3. Finances – Describe your strategy for financing the innovation.
- (j) **Cooperative Research and Development Agreements (CRADA).** State if the applicant is a current CRADA partner with NOAA, or with any other Federal agency, naming the agency, title of the CRADA, and any relationship with the proposed work. An Agency may NOT enter into, nor continue, a CRADA with an awardee on the subtopic of the award.
- (k) **Guest Researcher.** State if the offeror or any of its consultants or subcontractors is a guest researcher at NOAA, naming the sponsoring laboratory.

Cost Sharing. Cost-sharing is permitted for proposals under this program solicitation; however, cost-sharing is not required. Cost-sharing will not be an evaluation factor in consideration of your Phase I proposal.

4.4 Similar Proposals or Awards. **WARNING**

While it is permissible, with proposal notification, to submit identical proposals or proposals containing a significant amount of essentially equivalent work for consideration under numerous Federal program solicitations, **it is unlawful to enter into funding agreements requiring essentially equivalent work.** If there is any question concerning this, it must be disclosed to the soliciting agency or agencies before award.

If an applicant elects to submit identical proposals or proposals containing significant amount of essentially equivalent work under other Federal program solicitations, a statement must be included in each such proposal indicating:

- (a) the name and address of all agencies to which a proposal was submitted or from which awards were received;
- (b) the date of proposal submission or date of award;
- (c) the title, number, and date of solicitation(s) under which a proposal(s) were submitted or award(s) received;
- (d) the specific applicable research topic for each proposal submitted or award received;
- (e) the title of the research project; and
- (f) the name and title of the principal investigator or project manager for each proposal submitted or award received.

If no equivalent proposal is under consideration or equivalent award received, a statement to that effect **must** be included in this section of the technical content area of the proposal and certified within the Cover Page.

4.5 Prior SBIR Phase II Awards

If a small business concern has received more than 15 SBIR Phase II awards from any of the Federal agencies in the prior five (5) fiscal years, it must submit on a separate page, the names of awarding agencies; dates of awards; funding agreement numbers; amounts; topic or subtopic titles; follow-on agreement amounts; sources and dates of commitments; and current commercialization status for each Phase II. The offeror shall document the extent to which it was able to secure Phase III funding to develop concepts resulting from previous Phase II SBIR Awards. **This required information shall not be part of the page count limitation.**

4.6 Proposed Budget

Complete the “NOAA SBIR Proposed Budget” (See Section 10.3) for the Phase I effort, and include it as the last page of the technical proposal. Verify the total request is accurate and does **not exceed \$95,000**. The Proposed Summary Budget must be signed by the Corporate Official. Some items of the form under Section 10.3 may not apply to every proposal. Additionally, some firms may have different accounting practices for their overhead rates. Offerors should use indirect rates consistent with their own accounting system, even if different from the rate categories shown on the form. These differences should be discussed in the Supporting Budget Documentation. Enough information, though, should be provided on the Proposed Budget to allow NOAA to understand how the offeror plans to use the requested funds if the award is made. A complete cost breakdown should be provided giving direct costs, indirect costs, other direct costs G&A, and profit. The offeror is to submit a cost estimate with detailed information consistent with the offeror's cost accounting system. A reasonable profit will be allowed.

As reminder in completing the Proposal Budget Summary for Phase I, a minimum of two-thirds of the research and/or analytical effort must be performed by the proposing small business concern. The total cost for all consultant fees, facility leases, usage fees, and other subcontract or purchase agreements may not exceed one-third of the contract price. For Phase II, a minimum of one-half of the research and/or analytical effort must be performed by the proposing small business concern. The total cost for all consultant fees, facility leases, usage fees, and other subcontract or purchase agreements may not exceed one-half of the contract price.

Offerors shall provide additional supporting budget documentation for the Proposed Budget for the Government's Cost and Pricing Review. ***This Supporting Budget Documentation shall NOT be utilized for evaluation of the Technical Proposal. Offerors must ensure that all relevant technical information is included within the 25 page technical proposal.*** The Supporting Budget Documentation does **NOT** count towards the 25 page count requirement. Additionally, the government **only requires two (2) hard copies** of the Supporting Budget Documentation. The Supporting Budget Documentation shall include a coversheet and be organized, stapled, and easy to understand. The information should only supplement and help to justify and explain the amounts requested on the Proposed Budget sheet. Additionally, the documentation should indicate any known or anticipated source, quantity, unit price, competition obtained, and basis used to establish source and reasonable costs (e.g. Other Direct Costs and Equipment)

A more detailed discussion of completing the Proposed Budget and the Supporting Budget Documentation is provided in Section 10.4

4.7 Multiple Proposals

Offerors may submit multiple proposals to this solicitation. Offerors should submit separate proposal packages for each topic area they wish to be considered. If offerors have multiple proposals with different method or deliverables that they wish to propose on the same topic area, a separate proposal package should be provided for each method or deliverable.

5.0 METHOD OF SELECTION AND EVALUATION CRITERIA

5.1 Introduction

All Phase I and II proposals will be evaluated and judged on a competitive basis. **A proposal will not be deemed acceptable if it represents presently available technology.** Proposals will be initially screened to determine responsiveness. Proposals passing this initial screening will be technically evaluated through by engineers or scientists (reviewers may be NOAA employees or outside of NOAA) to determine the most promising technical and scientific approaches. Each proposal will be judged on its own merit. NOAA is under no obligation to fund any proposal or any specific number or proposals in a given topic. It also may elect to fund several or none of the proposed approaches to the same topic or subtopic.

5.2 Phase I Screening Criteria

Phase I proposals that do not satisfy all of the screening criteria shall be rejected without further review and will be eliminated from consideration for award. Proposals may not be resubmitted (with or without revision) under this solicitation. The screening criteria (also see Section 11) are:

- (a) The proposing firm must qualify as a small business, in accordance with Section 3.11.
- (b) The Phase I proposal must meet **all** of the requirements stated in Section 4.
- (c) The Phase I proposal must be limited to one subtopic and clearly address research for that subtopic.
- (d) Phase I proposal budgets must not exceed \$95,000.
- (e) The project duration for the Phase I feasibility research must not exceed six months.
- (f) The proposing firm must carry out a minimum of two-thirds of expenditures under each Phase I project.
- (g) The proposal must contain information sufficient to be peer reviewed as research.

Screening Criteria for Phase II Proposals shall be provided at a later date for all Phase I awardees.

5.3 Phase I Evaluation and Selection Criteria

Phase I proposals that comply with the screening criteria will go through the following process:

Step 1: The proposals will be rated by internal NOAA and/or external scientists or engineers via peer review in accordance with the following criteria:

- (1) The technical approach and the anticipated agency and commercial benefits that may be derived from the research. (25 points)
- (2) The adequacy of the proposed effort and its relationship to the fulfillment of requirements of the research subtopic. (20 points)
- (3) The soundness and technical merit of the proposed approach and its incremental progress toward subtopic solution. (20 points)
- (4) Qualifications of the proposed principal/key investigators, supporting staff, and consultants. (15 points)
- (5) Consideration of a proposal's commercial potential as evidenced by (20 points):
 - a) the SBC's record of commercializing SBIR or other research;
 - b) the existence of second phase funding commitments from private sector or non-SBIR funding sources;
 - c) the existence of third phase follow-on commitments for the subject of the research;
 - d) the presence of other indicators of the commercial potential of the idea.

Technical reviewers will base their ratings on information contained in the proposal. It is assumed that reviewers are not acquainted with any experiments referred to, key individuals, or the firm. No technical clarifications may be made after proposal submission.

After the technical review, the superior Phase I proposals will be priority ranked to ensure that the proposed research is consistent with the objectives of NOAA's research.

Step 2: A NOAA-wide selection panel will review the content of the technically superior proposals and score them based on the following evaluation factors and develop a final ranking:

- (1) Proposal priority ranking resulting from Step 1.
- (2) The potential of the proposed research to meet NOAA program priorities.
- (3) Economic impact (e.g., ability of the company to develop a commercially viable product, service or process); number and record of past performance for SBIR and STTR

awards; consideration given to companies without previous SBIR awards; existence of outside, non-SBIR, funding or partnering commitments; and/or the presence of other relevant supporting material contained in the proposal that indicates the commercial potential of the idea (such as letters of support, journal articles, literature, Government publications).

(4) SBIR program priorities (manufacturing-related research; energy efficiency or renewable energy; participation by minority and disadvantaged persons and HUBZones).

Final award decisions will be made by NOAA based upon ratings assigned by the selection panel and consideration of additional factors, **including possible duplication of other research**, the importance of the proposed research as it relates to NOAA needs, and the availability of funding. In the event of a “tie” between proposals, manufacturing-related projects as well as those regarding energy efficiency and renewable energy systems will received priority in the award selection process. NOAA may elect to fund several or none of the proposals received on a given subtopic. Upon selection of a proposal for a Phase I award, NOAA reserves the right to negotiate the amount of the award.

5.4 Phase II Evaluation and Selection Criteria

During the feasibility study project performance period, Phase I awardees will be provided instructions for preparation and submission of Phase II proposals. Phase II proposals that comply with the screening criteria as stated in those instructions will be rated by NOAA and external scientists and engineers in accordance with the step 1 and 2 evaluation criteria.

Upon selection of a proposal for Phase II award, NOAA reserves the right to negotiate the amount of the award. NOAA is not obligated to fund any specific Phase II proposal.

5.5 Release of Proposal Review Information

After final award decisions have been announced, the technical evaluations of proposals that passed the screening criteria will be provided to the offeror with written notification of award/non-award. The identity of the reviewers will not be disclosed.

6.0 CONSIDERATIONS

6.1 Awards

NOAA will award firm-fixed price contracts to successful offerors. A firm-fixed price contract identifies a price that is not subject to any adjustment on the basis of the contractor’s cost expenditure in performing the effort. This agreement type places upon the contractor the risk and full responsibility for all costs and resulting profit or loss. It provides maximum incentive for the contractor to control costs and perform effectively and imposes a minimum

administrative burden upon both parties. NOAA also does not allow any advance payments to be made on its awards. The firm-fixed price shall be inclusive of all transportation/shipping/insurance costs for government furnished property (if requested in the proposal and accepted by the government) made available for use by awardee and all deliverables/prototypes to be furnished to NOAA.

Contingent upon availability of funds, NOAA anticipates making approximately **eight (8) to ten (10)** Phase I firm-fixed price contracts of no more than **\$95,000** each. Total performance period shall be no more than six (6) months. Historically, NOAA has funded about ten percent of the Phase I proposals submitted.

Phase II awards shall be for no more than \$400,000 (except for subtopics with the suffix "SG", which are limited to \$300,000). The period of performance to complete Phase II effort will depend upon the scope of the research, but the final report due date should not exceed 24 months. One year after completing the R&D activity, the awardee shall be expected to report on their commercialization activities. The total period of performance for Phase II is anticipated to be approximately 36 months.

It is anticipated that **approximately half of the Phase I awardees will receive Phase II awards**, depending upon the availability of funds. To provide for an in-depth review of the Phase I final report and the Phase II proposal and commercialization plan, Phase II awards will be made approximately five months after the completion of Phase I.

For planning purposes, proposers should understand that Phase I awards are tentatively issued in July 2013, Phase II proposals are due approximately February 2014 and Phase II awards are issued tentatively June 2014.

This Solicitation does not obligate NOAA to make any awards under either Phase I or Phase II. Furthermore, NOAA is not responsible for any monies expended by the proposer before award of any contract resulting from this Solicitation.

6.2 Reports

Phase I awardees will be required to submit two progress reports and a final report. Phase I reports are due at 2, 4, and 6 months after award. Phase II awardees will be required to submit four progress reports, a final report, and a commercialization report. Phase II reports are due at 2, 6, 12, 18, and 24 months, or as to be negotiated on a case by case basis. The commercialization report is due 36 months after award. The payment schedule in paragraph **6.3** are tied to these reports.

Phase I and Phase II progress reports will include all technical details regarding the research conducted up to that point in the project and will provide detailed plans for the next stages of the project. The acceptance of each progress report will be contingent upon appropriate alignment with the solicited and proposed milestones. Consideration will be given to changes from the solicited and proposed milestones if results from experimentation warrant a deviation

from plan. Inclusion of proprietary information within the progress reports and final report may be necessary in order to effectively communicate progress and gain appropriate consultation from NOAA experts regarding next steps. All such proprietary information will be marked according to instructions provided in section 6.5.

Final reports submitted under Phase I and Phase II shall include a single-page project summary as the first page, identifying the purpose of the research, and giving a brief description of the research carried out, the research findings or results, and the commercial applications of the research in a final paragraph. The remainder of the report should indicate in detail the research objectives, research work carried out, results obtained, and estimates of technical feasibility.

All final reports must carry an acknowledgement on the cover page such as: "This material is based upon work supported by the National Oceanic and Atmospheric Administration (NOAA) under contract number _____. Any opinions, findings, conclusions or recommendations expressed in this publication are those of the author(s) and do not necessarily reflect the views of the NOAA."

The information provided in the Phase II commercialization update reports will be compiled and used as general statistics to help determine the value of NOAA SBIR Program, educate stakeholders about the outcomes and impact, and attract new entrants.

The Phase II commercialization update report shall include the following:

a. A description of the company's efforts to further develop, commercialize and derive revenues from the technology resulting from this SBIR award. These may include but are not limited to: customer/potential customer base, overview of marketing and sales strategies, other uses of knowledge gained, partners, licensing, committed resources, market readiness, use of knowledge gained for other projects, manufacturing, and financing strategy. Also discuss difficulties, and barriers to entry.

If work has ended on the project, please provide an explanation as to why (i.e. technical objective not met, existing barriers to entry, could not obtain follow-on funding, technology not economically viable, alternative technology entered the market, or other explanation).

b. Information about any follow-on funding commitment(s) and investments to further the development and/or commercialize the Phase II technology.

If follow-on funding was not obtained, provide possible reasons (i.e. technical objective not met, technology not economically viable, alternative technology entered the market, or other explanation).

c. Details about products and /or processes being developed, used for other projects, or currently in the marketplace resulting from the SBIR project.

d. A list of any patents or published patent applications resulting from the SBIR project.

e. Sales revenue from new products or processes received from the commercialization of this SBIR project include: sales, manufacturing, product licensing, royalties, consulting, contracts, or other.

To help assess the effectiveness of our program in meeting programmatic and SBIR objectives, NOAA may periodically request information from small businesses about progress taken towards commercialization of the technology after the completion of Phase I and II contracts.

6.3 Payment Schedule

If selected for award, the government shall contact the potential awardee to negotiate the appropriate amounts tied to the reports in paragraph 6.2. The specific payment schedule (including payment amounts) for each award will be incorporated into the resulting contract.

No advance payments will be allowed. To receive an SBIR payment the SBC must re-certify that they remain eligible as SBC to receive funding and have not changed their SBC status or any other terms of condition of initial award.

For Phase II, a total of six payments are anticipated to coincide with the reports. The government shall negotiate with the potential awardee regarding the payment schedule for payments one through five (excluding \$5,000.00 for payment six). The sixth payment for \$5,000.00 will be made after the commercialization report is accepted. Failure to submit the report within thirteen months of the completion of the R&D activity period for Phase II may result in a de-obligation of the \$5,000,00.

6.4 Deliverables

Offers submitted in response to subtopics that require delivery of a prototype should state in the proposal, the plan to develop and deliver the specified prototype. Notwithstanding the absence of such an explicit statement in the offeror's proposal, delivery of the developed prototype as called for by the Solicitation subtopic is required.

6.5 Proprietary Information, Inventions, and Patents

6.5.1 Limited Rights in Information and Data

Information contained in unsuccessful proposals will remain the property of the proposer. Any proposal, which is funded, will not be made available to the public, except for the "Project Summary" page.

The inclusion of proprietary information is discouraged unless it is absolutely necessary for the proper evaluation of the proposal. Information contained in unsuccessful proposals will remain

the property of the offeror. The Government may, however, retain copies of all proposals. Public release of information in any proposal submitted will be subject to existing statutory and regulatory requirements. If proprietary information is provided by an offeror in a proposal, which constitutes a trade secret, proprietary commercial or financial information, confidential personal information or data affecting the national security, it will be treated in confidence, to the extent permitted by law. This information must be clearly marked by the offeror with the term “confidential proprietary information” and the following legend must appear on the first page of the technical section of the proposal:

“These data shall not be disclosed outside the Government and shall not be duplicated, used, or disclosed in whole or in part for any purpose other than evaluation of this proposal. If a funding agreement is awarded to this offeror as a result of or in connection with the submission of these data, the Government shall have the right to duplicate, use, or disclose the data to the extent provided in the funding agreement and pursuant to applicable law. This restriction does not limit the Government’s right to use information contained in the data if it is obtained from another source without restriction. The data subject to this restriction are contained on pages _____ of this proposal.”

Any other legend may be unacceptable to the Government and may constitute grounds for removing the proposal from further consideration, without assuming any liability for inadvertent disclosure. The Government will limit dissemination of such information to its employees and, where necessary for evaluation, to outside reviewers on a confidential basis.

Examples of laws that restrict the government to protect confidential/proprietary information about business operations and trade secrets possessed by any company or participant include: Freedom of Information Act (FOIA) – 5. U.S.C. § 552(b); Economic Espionage Act – 18 U.S.C. § 1832; and Trade Secrets Act – 18 U.S. C. § 1905.

In view of the above, proposers are cautioned that proposals are likely to be less competitive if significant details are omitted due to the proposer’s reluctance to reveal confidential/proprietary information.

6.5.2 Copyrights

The contractor may normally establish claim to copyright any written material first produced in the performance of an SBIR contract. If a claim to copyright is made, the contractor shall affix the applicable copyright notice of 17 U.S.C. 401 or 402 an acknowledgment of Government sponsorship (including contract number) to the material when delivered to the Government, as well as when the written material or data are published or deposited for registration as a published work in the U.S. Copyright Office. For other than computer software, the contractor gives to the Government, and others acting on its behalf, a paid-up, nonexclusive, irrevocable, worldwide license to reproduce, prepare derivative works, distribute copies to the public, and perform publicly and display publicly, by or on behalf of the Government.

For computer software, the contractor gives to the Government, and others acting on its behalf, a paid-up, nonexclusive, irrevocable, worldwide license for all such computer software to reproduce, prepare derivative works, and perform publicly and display publicly, by or on behalf of the Government.

6.5.3 Rights in Data Developed under SBIR Contracts

Except for copyrighted data, the Government shall normally have unlimited rights to data in Phase I, II, or III awards, such as:

- (a) data specifically identified in the SBIR contract to be delivered without restriction;
- (b) form, fit, and function data delivered under the contract;
- (c) data delivered under the contract that constitute manuals or instructions and training material for installation, operation, or routine maintenance and repair of items, components, or processes delivered or furnished for use under the contract; and
- (d) all other data delivered under the contract.

The contractor is authorized to affix the following "SBIR Rights Notice" to SBIR data delivered under the contract:

SBIR RIGHTS NOTICE

These SBIR data are furnished with SBIR rights under Contract No. _____ (and subcontract _____, if appropriate). For a period of four years after acceptance of all items to be delivered under this contract, the Government agrees to use these data for Government purposes only, and they shall not be disclosed outside the Government (including disclosure for procurement purposes) during such period without permission of the contractor, except that, subject to the forgoing use and use by support contractors. After the aforesaid four-year period, the Government has a royalty-free license to use, and to authorize others to use on its behalf, these data for Government purposes, but is relieved of all disclosure prohibitions and assumes no liability for unauthorized use.

(END OF NOTICE)

The Government's sole obligation with respect to any properly identified SBIR data shall be as set forth in the paragraph above. The four-year period of protection applies for Phases I, II, and III.

6.5.4 Patents

Small business firms normally may retain the worldwide patent rights to any invention made with Government support. The Government receives a royalty-free license for Federal Government use, reserves the right to require the patent holder to license others in certain circumstances, and requires that anyone exclusively licensed to sell the invention in the United States must substantially manufacture it domestically. To the extent authorized by 35 U.S.C. 205, the government will not make public any information disclosing a government-supported invention for a minimum 4-year period (that may be extended by subsequent SBIR funding agreements) to allow the awardee a reasonable time to pursue a patent.

SBIR awardees must report inventions to the NOAA SBIR Program within two months of the inventor's report to the awardee. The reporting of patents and other patent obligations shall be completed through the iEdison System unless noted in resulting contract. For additional information on the iEdison System go to <https://s-edison.info.nih.gov/iEdison/>.

6.6 Considerations

Upon the award of a funding agreement, the contractor will be required to make certain legal commitments through acceptance of numerous clauses in Phase I funding agreements. The outline that follows illustrative of the types of clauses to which the contractor would be committed. This list is not a complete list of clauses to be included in Phase I funding agreements, and is not the specific wording of such clauses. Copies of complete terms and conditions are available upon request.

- (a) Standards of Work. Work performed under the contract must conform to high professional standards.
- (b) Inspection. Work performed under the contract is subject to Government inspection and evaluation at all reasonable times.
- (c) Examination of Records. The Comptroller General (or a duly authorized representative) shall have the right to examine pertinent records of the contractor involving transactions related to this contract.
- (d) Default. The Government may terminate the agreement if the contractor fails to perform the work contracted.
- (e) Termination for Convenience. The Government may terminate the contract at any time if it deems termination to be in the best interest, in which case the contractor will be compensated for work performed and for reasonable termination costs.
- (f) Disputes. Any dispute about the contract, which cannot be resolved by agreement, shall be decided by the Contracting Officer with right to appeal.

- (g) Contract Work Hours. The contractor cannot require an employee to work more than eight hours a day or 40 hours a week, unless the employee is compensated accordingly (i.e. received overtime pay).
- (h) Equal Opportunity. The contractor will not discriminate against any employee or applicant for employment because of race, color, religion, sex, or national origin.
- (i) Affirmative Action for Veterans. The contractor will not discriminate against any employee or applicant for employment because he or she is a disabled veteran or veteran of the Vietnam era.
- (j) Affirmative Action for the Handicapped. The contractor will not discriminate against any employee or applicant for employment because he or she is physically or mentally handicapped.
- (k) Officials Not to Benefit. No Government official shall benefit personally from any SBIR contract.
- (l) Covenant Against Contingent Fees. No person or agency has been employed to solicit or secure the contract upon an understanding for compensation, except bona fide employees or commercial agencies maintained by the contractor for the purpose of securing business.
- (m) Gratuities. The Government may terminate the contract if any gratuity has been offered to any representative of the Government to secure the contract.
- (n) Patent Infringement. The contractor shall report each notice or claim of patent infringement based on the performance of the contract.
- (o) American-Made Equipment and Products. When purchasing either equipment or a product, under the SBIR funding agreement, purchase only American-made items whenever possible.

6.7 Additional Information

- (a) **Projects**. The responsibility for the performance of the principal investigator, and other employees or consultants, who carry out the proposed work, lies with the management of the organization receiving an award.
- (b) **Organizational Information**. Before award of an SBIR contract, the Government may request the proposer to submit certain organizational, management, personnel, and financial information to assure responsibility of the proposer.
- (c) **Duplicate Awards**. **If an award is made under this solicitation, the contractor will be required to certify that he or she has not previously been,**

nor is currently being, paid for essentially equivalent work by any agency of the Federal Government. Severe penalties may result from such actions.

- (d) Your firm is required to obtain a Dunn and Bradstreet Number (DUNS) and register in the System for Award Management (SAM) database and complete the Online Representations and Certifications (in order to be eligible to receive a contract award.**
- (e) If there is any inconsistency between the information contained herein and the terms of any resulting SBIR contract, the terms of the contract are controlling.**
- (f) The Government is not responsible for any monies expended by the offeror before award of any contract.**
- (g) NOAA may provide technical assistance to awardees as allowed by legislation.**

6.8 Technical Assistance for Proposal Preparation and Project Conduct

Proposers may wish to contact the NIST Hollings Manufacturing Extension Partnership (MEP), a nationwide network of locally managed extension centers whose sole purpose is to provide small- and medium-sized manufacturers with the help they need to succeed. The centers provide guidance to high-technology companies seeking resources and teaming relationships. To contact a MEP center, call 1-800-MEP-4MFG (1-800-637-4634) or visit MEP's website at www.mep.nist.gov.

Proposers may also contact independent state, regional, or area specific resources, for example, economic development agencies for additional assistance and resources.

7.0 SUBMISSION OF PROPOSALS

7.1 Deadline for Proposals and Modifications

**Deadline for Phase I proposal receipt (five copies) at the NOAA Eastern Region Acquisition Division is 4:00 p.m. (CST) on February 27, 2013.
NOAA does not accept electronic submission of proposals.**

All offerors should expect delay in delivery due to added security at NOAA. It is the responsibility of the offeror to make sure delivery is made on time.

Offerors are responsible for submitting proposals that adhere to the requirements of the solicitation (see 11.0 NOAA/SBIR Checklist) so as to reach the government office by the time specified in the solicitation. Any proposal that is received after the exact time specified for receipt of proposals is "late" and will not be considered.

Modifications to proposals may be submitted at any time before the solicitation closing date and time, and the offeror may submit modifications in response to an amendment, or to correct a mistake at any time prior to award. A late modification of an otherwise successful proposal that makes its terms more favorable to the Government will be considered at any time it is received and may be accepted. Revised proposals may only be submitted when requested or allowed by the Contracting Officer. Proposals may be withdrawn at any time before award. Withdrawals are effective upon receipt of notice by the Contracting Officer.

Letters of instruction will be sent to those eligible (e.g. completed Phase I within the required time frame) to submit Phase II proposals. The Phase II proposals are due after receipt of the Phase I Final Report, approximately seven months after commencement of the Phase I contract.

Offerors are cautioned of unforeseen delays that can cause late arrival of proposals at NOAA, resulting in them not being included in the evaluation procedures. No information on the status of proposals under scientific/technical evaluation will be available until formal notification is made.

7.2 Proposal Submission

Five (5) hard copies of each proposal must be received no later than 4:00 pm (CST) on February 27, 2013. Proposals are to be mailed to:

DOC/NOAA – EAD-KC
ATTN: SBIR Proposals/Joan Clarkston
1500 E. Bannister Road
Kansas City, MO 64131

Telephone: 816-426-7469

DO NOT SUBMIT ANY PROPOSALS PRIOR TO JANUARY 22, 2013 DUE TO THE GOVERNMENT OFFICE BEING RELOCATED.

Proposals may be sent to the above address via US Mail or other commercial carriers. **WALK-INS AND COURIER DELIVERIES ARE NOT PERMITTED.** All deliveries must be made no later than the due date and time stipulated in the solicitation.

Acknowledgment of receipt of a proposal by NOAA will be made. All correspondence relating to proposals must cite the specific **proposal number** identified in the acknowledgment.

- (a) Packaging: Secure packaging is mandatory. NOAA cannot process proposals damaged in transit. All five copies of the proposal must be sent in the same package. Do not send separate “information copies,” or**

several packages containing parts of a single proposal, or two packages of five copies of the same proposal. The top copy must be signed as an original by the principal investigator and the corporate official. Other copies may be photocopies. Proposals without appropriate signatures may be rejected.

- (b) **Bindings: Do not use special bindings or covers.** Staple the pages in the upper left hand corner of each proposal. Separation or loss of proposal pages cannot be the responsibility of NOAA.

Proposals in response to this solicitation shall be valid for a period of 240 calendar days after the closing date of the solicitation.

7.3 Warning

While it is permissible, with proper notification to NOAA, to submit identical or essentially equivalent proposals for consideration under numerous Federal program solicitations, it is unlawful to enter into contracts requiring essentially equivalent effort. Offeror, if awarded, will be required at the time of the award and during the term of the award up to final payment to certify that essentially equivalent work is not being done under funding agreements from any other federal agencies. If there is any question concerning this, it must be disclosed to the soliciting agency or agencies before award.

8.0 SCIENTIFIC AND TECHNICAL INFORMATION SOURCES

8.1 General Information

The following web pages may be sources for additional technical information:

<http://www.noaa.gov>

<http://www.lib.noaa.gov>

8.2 Oceanography and Marine Science

Scientific information in the areas of oceanography and marine science may be obtained from organizations shown in the website:

<http://www.seagrant.noaa.gov/other/programsdirectors.html>

9.0 RESEARCH TOPICS

9.1 TOPIC: Resilient Coastal Communities and Economies

9.1.1SG SUBTOPIC: Development of Technologies Related to Siting and Environmental Evaluation of Ocean and Coastal Renewable Energy Systems

Summary: The ocean and coastal zones of the United States contain reserves of potential energy that have not yet been tapped to meet the increasing demands of an energy-hungry nation. Successfully tapping this energy will rely on more than just new energy harvest technologies – it will rely on the ability to site such projects in an environmentally sound way, and to assess the environmental impacts of such emplacements in a logical, efficient manner.

Project Goals: Projects should involve the development of innovative observing technologies that support siting decisions and/or evaluation of environmental impacts of renewable ocean energy technologies such as a) biofuels developed from microalgae or macroalgae, b) wave, c) tidal/current, d) geothermal, e) offshore/coastal wind, or f) ocean-thermal energy conversion. NOAA is not interested in development of energy systems at this time.

Phase I Activities and Expected Deliverables:

- Clearly identify need
- Develop proof of concept

Phase II Activities and Expected Deliverables:

- Develop prototype
- Test prototype

9.1.2 R,N SUBTOPIC: Unmanned Aircraft System-Borne Gravimeter

Summary: The National Geodetic Survey (NGS) within NOS has a federal mandate to provide accurate positioning, including heights, to all federal non-military mapping activities in the USA. The NOAA NGS leads the GRAV-D Project (Gravity for the Redefinition of the American Vertical Datum) with a specific goal to model and monitor Earth's geoid (a surface of the gravity field, very closely related to global mean sea level) to serve as a zero reference surface for all heights in the nation. Accurate heights are critical information needed for better understanding of threats to low-lying communities and coastal ecosystems from inundation by storms, flooding, and/or sea level rise. The GRAV-D Project has successfully utilized airborne gravimetry observations to collect highly precise gravity measurements throughout CONUS, Alaska, and their littoral regions. However, more than 85% of the targeted surface area still needs to be economically surveyed, including portions of Alaska, the Aleutian Islands, Hawaii, the U.S. Pacific Island holdings, and most of interior CONUS.

Project Goals: As Unmanned Aircraft Systems (UAS) mature in flight capabilities and operational readiness, UAS provide a feasible alternative to manned airborne gravimetry missions. Gravity data collection by manned aircraft can typically be categorized as very dull due to long, repetitive flight paths as the aircraft "mows the lawn" over a given data collection region. These missions pose a safety challenge for pilots who must maintain concentration and focus during the mundane flight patterns. UAS can also offer fuel savings over comparable manned aircraft, leading to more energy efficient data collection, and quicker survey completion because of the long endurance of the platform.

The NOAA UAS Program is partnering with the GRAV-D Project to explore cost and operationally feasible UAS observing strategies for gravity data collection. We request a Phase I study to demonstrate the design feasibility of an airborne gravimeter suitable for autonomous data collection onboard a low or medium altitude long endurance UAS operating in turbulent environments. The design of the system must describe the detailed system interface between the UAS and gravimeter payload, including power, navigation, and data communication systems.

Phase I Activities and Expected Deliverables: The purpose of this Phase I is to determine the technical feasibility of the proposed research and the quality of performance of the small business concern receiving an award. We request a Phase I study to demonstrate the design feasibility of an airborne gravimeter suitable for autonomous data collection onboard a low or medium altitude long endurance UAS operating in turbulent environments. The design of the system must:

1. Identify a UAS platform (Predator Band IKHANA are promising candidates),
2. Identify a gravimeter payload suitable for gravimetric geoid modeling,
3. Describe the detailed system interface between the UAS and gravimeter payload,
4. Describe the power, navigation, and data communication sub-systems,
5. Provide a cost analysis for Phase II and future operational system.

Phase II Activities and Expected Deliverables: Phase II will be the Research & Development (R&D) and prototype development phase which will require:

1. Comprehensive proposal outlining the research in detail,
2. New technology flight demonstration of proposed UAS/GRA V-D system (small business may request government owned equipment in this phase),
3. Delivery of the prototype design including drawings,
4. Plan to commercialize the final product,
5. A company presentation to the SBIR panel.

9.1.3 N SUBTOPIC: Bathymetric Radar

Summary: The U.S. marine transportation system moves \$10 trillion of cargo and 95 percent of our international trade (by weight) annually. In an intricate dance, mariners use nautical charts with decades-old depth measurements, annual tidal data interpolated from distant

stations, and rules-of-thumb to estimate the amount of safe water when navigating supertankers and mega-container ships. Often ships have only inches of clearance from the seabed. The uncertainties of this process put the safety of navigation and of our environment at risk from groundings and collisions.

A growing and credible body of scientific research has established that it is possible to measure water depths in real time using X-band radars. This research validates that the dispersion relation from fluid mechanics directly relates wave speed to water depth in the marine environment. Further research establishes that wave speeds can be measured using inexpensive and common marine X-band radar. Innovation is now needed to apply and couple these 2 results to measure water depths in real time with a precision, accuracy, and resolution suitable for navigation use.

Bathymetric radar would revolutionize hydrographic surveying and marine navigation, ensuring that critical navigation lanes are monitored continuously rather than at discrete intervals. It could eliminate groundings and delays caused by today's uncertain bathymetry. Further, it could permit NOAA to get more for the \$100M it spends annually on surveying and charting and contribute to reducing our surveying backlog including the massive new requirements in the Arctic.

Project Goals:

The short term goals of this project are:

- Develop algorithms that can receive and process signals from commercial X-band radars and produce a continuous stream of accurate water depth measurements, over a large area, in real time;
- Measure the precision, accuracy, and resolution in both location and depth of the resulting depth measurements to establish any limitations to their use and their adequacy for navigation purposes; and
- Determine the maximum and minimum depths to which the technique can measure.

The long term goals of this project are:

- Produce robust versions of the algorithms, reduced to software that can be used by NOAA, port and harbor authorities, and other agencies to measure water depth in real time so as to be able to provide that information to ships for safe navigation.
- Develop a complete commercial system incorporating the software and which is suitable for permanent deployment in ports and harbors to monitor water depth.
- Generalize the algorithms and software so they can be included in any marine X-band radar, including those already aboard ship, to give them real time water depth measurement of their own with look-ahead capability.

Phase I Activities and Expected Deliverables:

- Starting with existing scientific research results, produce algorithms to compute water depth and position from X-band radar signals.
- Using the algorithms and a commercial X-band radar, experimentally measure the precision, accuracy, depth and position resolution, and maximum and minimum depths achieved.

- Compare the achieved results with the existing national standards for hydrographic surveys and nautical charts.
- Deliver the results as a professional-level report.

Phase II Activities and Expected Deliverables:

- Based on the results of Phase I, develop software capable of being used in a production environment to measure water depths from a single brand/model of X-band radar.
Note: This software may be run on remote computers.
- Design and fabricate a prototype system incorporating the software and including the radar, interfaces, and processing capability.
- Produce operator and maintenance manuals sufficient to operate and sustain the prototype system. Include documentation of the algorithm(s) being used so that subsequent field use of the system can be thoroughly understood.
- Perform field tests using the prototype demonstrating its ability to achieve or exceed the precision, accuracy, depth and position resolution, and maximum and minimum depths reported in Phase I.
- Deliver a professional level report documenting the results of the field tests.
- At NOAA's option, deliver the prototype, documentation, and familiarization training sufficient for NOAA to perform more exhaustive field tests.

References:

- McNinch, Jesse and Brodie, Katherine; "Shallow-water bathymetry measurements during storm events using Bar and Swath Imaging Radar (BASIR), A MOBILE x-BAND RADAR"; U.S. Hydro '2009 Conference, May 11-14, 2009; <http://www.thsoa.org/us09papers.htm>.
- Bell, P.S.; "Shallow water bathymetry derived from an analysis of X-band marine radar images of waves"; Coastal Engineering; 37 (1999); pp. 513-527.
- "Use of ground based radar in hydrography"; Marine Biodiversity Wiki; http://www.marbef.org/wiki/Use_of_ground_based_radar_in_hydrography.
- Holland, Todd K.; "Application of the Linear Dispersion Relation with Respect to Depth Inversion and Remotely Sensed Imagery"; IEEE Transactions on GeoScience and Remote Sensing; Vol. 39, No. 9; September 2001.

More extensive references can be found by Googling "x-band radar bathymetry", "x-band radar water depth" and like terms, and by examining the references included in the papers above.

9.2 TOPIC: Healthy Oceans

9.2.1F Subtopic: Automated Image Analysis for Fisheries Applications

Summary: Video and Image recording systems are increasingly being used by NMFS for a multitude of applications. Underwater systems are deployed on or near the seafloor or towed above the seafloor to record images of fish that are later analyzed to estimate numbers, sizes, and species composition of fish in an area. Underwater systems are also installed in trawls to collect images that can be used to determine numbers, sizes, and species of fish caught in the trawl with the end goal of developing non-destructive trawls that collect all necessary information without actually catching the fish. Other systems are installed on commercial fishing vessels to monitor what fish are caught, kept, and discarded during fishing operations. The effort required to analyze data from these systems is time consuming and expensive. Computer automated analysis to identify fish species contained in an image sequence or video segment has been moderately successful in very controlled photographic conditions when the potential number of species in the images is limited to just a few. Fish lengths are successfully measured using stereo camera systems but require significant manual input by an analyst. There is a need for innovative approaches to automated recognition and counting of fish species and estimation of length of fish in the images collected by these systems.

Project Goals: The long term goal is to automate analysis of video and/or image sequences for two focal areas [(1) live fish underwater and (2) captured fish on vessels] to reduce the labor required to produce numerical data from the video or image sequences. Each focal area presents a number of technical challenges. Underwater images are frequently required to make use of ambient light to avoid influencing fish behavior and the resulting images are usually low contrast. Fish in these images may be viewed from any aspect and distance from the camera. Accurate counting of these fish requires tracking each individual during the time it is in the camera view to avoid counting one fish multiple times. In contrast, captured fish could be imaged using artificial light at a fixed range but may (on a conveyor belt, for example) be positioned in any orientation in close proximity to, or partially obscured by, other fish. Some fish species exhibit multiple color phases underwater and most fish change color and appearance with time after capture. Successful projects will produce either software or hardware/software systems, applicable to one or more of these scenarios, that accept or collect sequences of images and count the number and sizes of each fish species present in the images.

Phase I Activities and Expected Deliverables: This section should list the specific activities that will be carried out during the Phase I award. It should also list the expected deliverables that must be met to address the project goals. Phase I is the feasibility study. Activities and deliverables should be written in bullet form.

For focal areas 1 (live fish underwater) and/or 2 (captured fish on vessels):

- Identify potentially quantifiable features of commercially important and frequently encountered fish species occurring in the southeast US Atlantic Ocean, Caribbean Sea, and Gulf of Mexico that can be used for automated classification such as shape and color patterns.
- Develop and demonstrate capability to automate data collection, potentially including but not necessarily limited to:
 - Identification of images or segments of video when fish are present
 - Species classification
 - Species-specific metrics of abundance and individual sizes
 - Habitat characteristics
- Quantify error associated with data generated (e.g., proportion of fish correctly identified to species; degree of error about abundance or size estimates). Demonstrate level of repeatability of results across multiple users
- Deliverable: a detailed report documenting methods and results, with discussion of results and identification of successes and remaining challenges

Phase II Activities and Expected Deliverables: (Same format as for Phase I.) Phase II is the prototype development stage and where the majority of the R&D takes place.

For focal areas 1 (live fish underwater) and/or 2 (captured fish on vessels):

- Develop one or more transferable software packages / platforms with user-friendly interface to accomplish data processing capabilities developed during Phase I activities
- Products should allow improvement in species classification performance through incorporation of new training data and information on additional species.
- Products should allow analyst intervention/correction in instances where confidence in species identification is low.
- Desired analysis results include:
 - Individual fish length measurements and species identifications
 - Summary information on species composition and length distributions collected over multiple image sequences
 - Confidence intervals associated with individual species identifications and length measurements within a sequence and summary statistics for analysis of multiple sequences.
- Deliverable: software package(s) / platform(s)

References:

- NOAA Annual Guiding Memorandum - November 2011_ http://www.ppi.noaa.gov/wp-content/uploads/fy14-18_agm.pdf

9.2.2 F **SUBTOPIC: Improving Environmental Sustainability and Competitiveness of U.S. Marine Aquaculture**

Summary: The purpose of this subtopic is to develop innovative products and services to support the development of an environmentally, socially, and economically sustainable marine aquaculture industry in the U.S. in a way that is compatible with healthy marine ecosystems and other users of coastal and ocean resources. As marine aquaculture technology moves from research to operations, aquaculture producers need affordable and reliable techniques, products, and services to support growth and economic viability of sustainable aquaculture operations. There is also a need for reliable and affordable equipment, instruments, tools and techniques to assess the potential risks and benefits of marine aquaculture facilities and to monitor any impacts of marine aquaculture operations on marine ecosystems.

NOAA's mission includes enabling sustainable marine aquaculture to maximize economic and social benefits and provide safe seafood. Enabling the development of sustainable marine aquaculture figures prominently in NOAA's Next Generation Strategic Plan and in NOAA's recent new Policy for Marine Aquaculture (currently in draft form and awaiting final release after public comment). The three areas of focus for SBIR grants in aquaculture this year closely align with these guiding principles. They are:

1. Alternative feeds
2. Improved health management
3. Novel production technologies and techniques

1. **Alternative feeds**

Summary: Currently available aquafeeds are highly dependent on fish meal and fish oils. These cost of fish meal and fish oil has increased dramatically in recent years, reducing profit margins in finfish aquaculture operations. In addition, some question whether the forage fish from which fish oil and meal are derived can continue to be sustainably managed as demand for aquafeeds continues to increase. New diets and ingredients are needed which successfully replace these marine components with non-traditional sources of protein and oils that result in sustainable and economical feeds. There is a need to meet the nutritional requirements of marine species in all life stages (from hatchery to market size), including use of diets that rely less on fish oil and fish meal without sacrificing the human health benefits of seafood consumption.

Project Goals: Develop aquafeeds that successfully replace fish meal and fish oils with novel ingredients from sustainable sources, including biological or chemical methods for de novo production of long chain n-3 fatty acids and/or high value nutritional products from marine algae. Reduce the "fish in, fish out" ratio for cultured species.

Phase I Activities and Expected Deliverables: Research and development geared towards the development of sustainable replacements for fish meal and fish oils in aquafeeds, or the development means to produce fish meal and oil from seafood byproducts (e.g. fish trimmings).

Deliverables include reports from trials of the proposed diets showing biological and economic feasibility of the new feeds.

Phase II Activities and Expected Deliverables: Prototype pilot-scale trials of the products developed in phase I showing biological and economic feasibility of the feeds under commercial conditions.

2. Improved health management

Summary: Disease is one of the main causes of losses in aquaculture operations. Transmission of disease from wild to farmed animals and vice versa is also a concern in aquaculture operations. Better therapeutants and techniques are needed to prevent, diagnose, and manage diseases in aquaculture operations.

Project Goals: Develop improved products and tools for preventing, diagnosing, and controlling disease in marine aquaculture operations.

Phase I Activities and Expected Deliverables: Execute research and development of preventive measures, vaccines, diagnostic tools, and other management techniques for marine aquatic diseases that impact aquaculture operations. Report to show promise for commercial application of such techniques.

Phase II Activities and Expected Deliverables: Prototype trials of the techniques and products developed in phase I showing biological and economic feasibility under commercial conditions.

3. Novel production technologies and techniques

Summary: As U.S. aquaculture develops to fill the gap between domestic demand and supply, new technologies and techniques are needed to help the industry develop in a sustainable way. Sustainable production and management technologies and techniques complement the improved feeds and health management focus areas.

Project Goals: Development of improved aquaculture technologies and techniques and management measures for raising marine organisms to market size in land-based, coastal, and in open-ocean grow-out facilities with careful monitoring, minimizing, and mitigating of environmental impacts. Examples of projects considered under this focus area include projects to develop technologies and techniques related to: production of fish, shellfish, and marine algae in hatcheries; evaluation and selection of appropriate sites for marine aquaculture operations and prevent or reduce effluents and escapes from facilities; and engineering technologies (e.g. cage designs, moorings, cleaning and feeding systems).

Phase I Activities and Expected Deliverables: Research and develop improved aquaculture techniques and management measures for raising marine organisms in a sustainable way. Report to show promise for commercial application of such techniques.

Phase II Activities and Expected Deliverables: Prototype trials of the techniques and products developed in phase I showing biological and economic feasibility under commercial conditions.

References:

- Nash, C.E., 2004. Achieving Policy Objectives to Increase the Value of the Seafood Industry in the United States: The Technical Feasibility and Associated Constraints. Food Policy 29, 621-641.
- National Marine Fisheries Service, 2007. Summary of the National Marine Aquaculture Summit. Available at <http://ftai.com/articles/MarineAquaSummitSummary07.pdf> National Oceanic and Atmospheric Administration, 2007.
- NOAA 10 Year Plan for Marine Aquaculture available at http://www.nmfs.noaa.gov/aquaculture/docs/policy/final_noaa_10_yr_plan.pdf
- The Future of Aquafeeds. Michael B. Rust, Fredric T. Barrows, Ronald W. Hardy, Andrew Lazur, Kate Naughten, and Jeffrey Silverstein (2010). NOAA/USDA Alternative Feeds Initiative. http://www.nmfs.noaa.gov/aquaculture/docs/feeds/the_future_of_aquafeeds_final.pdf
- NOAA Annual Guiding Memorandum - November 2011_ http://www.ppi.noaa.gov/wp-content/uploads/fy14-18_agm.pdf

9.3 TOPIC: Climate Adaptation and Mitigation

9.3.1 R,C SUBTOPIC: Climate Impact Visualization Tools/Toolbox for City/Town Planning and Outreach

Summary: Small and medium-sized towns and cities need access to actionable information on local climate change impacts to better understand and visualize climate impacts on their jurisdictions, enhance their ability to visualize and show climate-related risks and impacts to their constituents and their governing bodies, send and receive real-time communications to and from their constituents in a timely manner, and use all the gathered information to improve planning and decision-making.

Large cities such as New York City and Chicago have staff devoted to studying and communicating climate impacts in their jurisdictions. These cities have climate adaptation plans and have projects aimed at adapting infrastructure and social systems to a changing climate. Smaller jurisdictions lack the resources and the expertise for similar activities, yet they face similar risks and challenges.

Funding will be used to develop new and innovative climate visualization tools and/or toolboxes containing virtual tools in response to these jurisdictional needs. These tools will improve jurisdictions' ability to understand, plan for and adapt to climate variability and change and will also ensure that they have an ability to communicate data and information in a timely manner, even during natural disasters when conventional means of communications become unavailable due to gridlock or system overload.

There are a variety of freely available climate impact visualization tools available (e.g., www.csc.noaa.gov/digitalcoast, www.droughtmonitor.unl.edu, <http://radar.srh.noaa.gov/fire>). However there is a need to better integrate these existing data visualization tools with the mapping and planning tools that local planners currently use, in order to make climate information useful for actionable local decision-making.

Project Goals: In the last decade, there has been an increased awareness and understanding of global, regional, and local-scale impacts of climate variability and change. The Intergovernmental Panel on Climate Change (IPCC) and the U.S. government, through national climate assessments, have alerted the public that we will continue to see changes in our climate through more intense precipitation and temperature-related weather and climate events as well as longer droughts and more devastating floods. Those living in coastal areas are also more aware of the potential for a rising sea and many have personally witnessed increased storm surges.

Increasingly, local municipal authorities realize that they need to make plans to cope with and adapt to these changes, and a number of organizations and federal agencies have begun to provide tools and services to support this planning. For example, the National Integrated Drought Information System (NIDIS) is studying how to best provide information on drought; and the NOAA Coastal Services Center has a number of tools for coastal planners on their website (e.g., www.csc.noaa.gov/digitalcoast, www.droughtmonitor.unl.edu, <http://radar.srh.noaa.gov/fire>).

However, these planning tools and services are not always integrated effectively or used optimally because local planners may not: (a) be aware the tools exist, (b) know what information they need, and where or how to access it, (c) have information at a usable spatial or temporal scale, and/or (d) have skills needed to use or manipulate the tools.

The goal of this project is to develop new and innovative climate visualization tools and/or toolboxes that help local urban planners understand and plan for ongoing and future climate impacts. Included in the scope of this project is a guaranteed ability for local government official and decision makers to send and receive communications to and from their constituents in a very timely manner (within seconds) during weather- and climate-related disasters and extreme events.

Phase I Activities and Expected Deliverables:

- Identify a sector to target tool
- Evaluate existing tools and websites used by city and urban planners
- Work with advisory board to assess needs for tools

- Develop list of modules and parameters that are necessary for visualization tool or toolbox (with help of advisory board) – some potential sections might include (but are not limited to) direct links to other cities’ plans, the ability to produce a briefing packet for outreach, ability to analyze discreet problems and suggestions for adaptation strategies
- List all input parameters
- Identify any information or data that will require significant manipulation for inclusion in tool
- Identify robust communication pathways or networks that will remain viable even during times of “bandwidth gridlock”; characterize the database and transmission protocols that will be needed; and describe any programming and/or integration work that will be necessary.
- Complete a work plan and design for prototype visualization tool or toolbox.

Phase II Activities and Expected Deliverables:

- Develop prototype visualization tool or toolbox with help of person knowledgeable in communication of information
- Test tool with advisory board or local jurisdiction
- Revise tool after testing
- Test tool with another jurisdiction
- Revise accordingly, develop production-ready prototype
- Identify professional organizations and trade magazines in which to market tool, as part of overall market strategy
- Demonstrate proof-of-concept tools and network that ensures very timely communications will remain viable even during times of conventional telecommunication “gridlock.”

9.3.2 W SUBTOPIC: Detection and Evidence Collection of Climate Buoy Vandalism

Summary: NOAA climate buoy arrays in the equatorial Pacific have seen increasing incidences of vandalism which reduce buoy data availability leaving gaps in critical climate observation data. In particular, fishing boats frequently damage climate buoys and/or damage buoy moorings by using “slingshot” fishing techniques which put undue stress on buoy moorings that may cause mooring failures. In addition, vandals often remove solar panels, batteries, and electronics, or buoy superstructure metal for salvage.

NOAA is seeking the capability to detect attempts at vandalism or intrusions on its climate buoys and a means to deter, dissuade, or preclude vandalism, “sling shot” fishing using buoys, or other interference with climate observation buoys. A variety of methods might be employed to mitigate vandalism on NOAA buoys that include: detection of buoy bumping, pulling or other disturbances to trigger defensive responses or evidence capture; detection of the presence of vessels near buoys and/or detection of the presence of people boarding buoys; deterrence of buoy boarding; deterrence of buoy “sling shot” fishing. In addition, it is desired to capture photographic and other evidence to identify either vessels or individuals engaged in buoy vandalism, storing the evidence for later retrieval and/or real-time transmission of this evidence.

Because of limited space and power availability on climate buoys, a system for detection/recording of evidence of vandalism would be a self-powered, stand-alone system that would not require changes to climate buoy design, have sufficient power and recording or reporting capacity to last for a minimum of 1 year and up to 2 years, limit size and weight to the capability of the buoy to host the device, be easy to maintain and replace in the field while operating from small service vessels, survive a marine environment, and be relatively lowcost.

Project Goals:

- Conceptual design of a prototype system to detect, deter, and collect evidence of vandalism attempts to NOAA climate buoys
- Design, develop prototype system
- Perform laboratory testing of prototype system
- Build and field test at least two prototype systems for detection, deterrence, and collection of evidence of vandalism attempts to NOAA climate buoys

Phase I Activities and Expected Deliverables:

- Review of climate buoy power, size, and weight limitations as pertaining to potential Anti-vandalism detection and evidence collection systems. Deliverable: Summary report of buoy power, size, and weight limitations.
- Review of potential technologies for vandalism detection, vandalism deterrence, and vandalism evidence collection, storage, and real-time transmission. Deliverable: Report detailing potential technologies for addressing vandalism detection, deterrence, and evidence collection, storage and transmission
- Conceptual design of self-powered system for detection, deterrence, and evidence collection, storage and real-time transmission of vandalism on climate buoys. Deliverables: Design review, block diagrams, prototype schematics, drawings, and prototype hardware mock-up.

Phase II Activities and Expected Deliverables:

- Complete design of production prototype system. Deliverables: Critical design review, production prototype schematics, drawings, and draft system documentation.
- Fabrication of 4 each prototype systems. Deliverables: 4 each prototype systems ready to install on climate buoys, final draft of system documentation, laboratory testing of prototype systems, and report on system laboratory testing.
- Installation of at least two systems on NOAA climate buoy for field testing for a 1 year period. Deliverables: System installation, installation and activation procedures for field personnel, and report on test results at the end of test period.

References:

- World Meteorological Organization, Data Buoy Cooperation Panel, “Vandalism on Data Buoys,” <http://www.wmo.int/pages/prog/amp/mmop/JCOMM/OPA/DBCP/vandalism/vandalism-background-info.pdf>
- Dr. C.C. Teng, et. al, Buoy Vandalism Experienced by NOAA’s National Data Buoy Center, Presentation to the 25th session of the Data Buoy Cooperation Panel, IOC of UNESCO, http://ioc-unesco.org/hab/index.php?option=com_oe&task=viewDocumentRecord&docID=4358

9.4 TOPIC: Weather-Ready Nation

9.4.1 D SUBTOPIC: Low-Cost High Frequency Passive Microwave Radiometer for Ground Measurements

Summary: Passive microwave sensors are key sensor payloads on many operational satellites, including those operated by NOAA and EUMETSAT – the Advanced Microwave Sounding Unit (AMSU) and the Microwave Humidity Sounder (MHS). Over the past decade, satellite-based high frequency measurements at and above 150 GHz (including those near the 183 GHz water vapor absorption band) have become extremely useful for the retrieval of several parameters, including precipitation rate and snowpack properties. In order to advance our understanding of the relationship between these parameters and the emitting microwave energy (and to advance radiative transfer model development), a sensor that can be used on the ground (either pointing upward or downward) which takes measurements at these high frequencies needs to be developed – presently, such sensors typically make measurements at 90 GHz or lower.

Project Goals: It is envisioned that the prototype sensor would work off of the design of an existing instrument and potentially have a full complement of measurements spanning the range of 10 – 190 GHz (i.e., have channels that are comparable to existing or future planned microwave sensors such as the Advanced Technology Microwave Sounder (ATMS) and the GPM Microwave Imager (GMI)). As such, a prototype sensor is envisioned for Phase I whereas a fully operational instrument with the following attributes would be produced during Phase II:

- (1) Dual Polarization: Ice crystals scatter and depolarize microwave radiation depending on particle size and observation frequency (Matzler, 1984; Hewison et al., 1999). Emission and scattering of snow depends on depth, density, morphology and liquid water content. Polarized microwave observations can provide this important information.
- (2) Upward- and downward-looking Mobility: Upward for liquid cloud water path retrieval (for cloud and precipitation, downward for simultaneous cloud liquid water path and surface emissivity retrievals).

- (3) Scanning ability: Cross-track sensors such as AMSU, MHS and ATMS view the earth at varying angles.

Phase I Activities and Expected Deliverables:

- Prototype radiometer design and test data
- Deliverable – Working model with at least some of the requested attributes

Phase II Activities and Expected Deliverables:

- Development of full working radiometer with required measurement bands, polarizations, scanning geometry
- Test data sets documenting instrument performance under a variety of meteorological and surface conditions
- Deliverable – Fully functional instrument

References:

- Hewison, T. J., and English, S. J., 1999: Airborne retrievals of snow and ice surface emissivity at millimeter wavelengths, *IEEE Trans. Geosci. Rem. Sens.*, **37**, 1871-1879.
- Matzler, C., 1994: Passive microwave signatures of landscapes in winter. *Meteor. Atmos. Phys.*, **54**, 241-260.

9.4.2 R,D,W SUBTOPIC: Developing Mobile VHF Lightning Mapping Technology

Summary: Lightning observations have many meteorological applications, which are continuously expanding as lightning detection technology improves. Lightning detection networks monitor the low (LF), very-low (VLF), and very-high (VHF) frequency radiation emitted by lightning flashes. Since cloud-to-ground (CG) flashes emit most strongly in the LF and VLF range, LF/VLF networks can detect a fraction of CG flashes globally with as few as 50 sensors. However, intra-cloud (IC) lightning is more closely related to updraft intensity than CG lightning, making it more beneficial for diagnosing severe convection. IC flashes emit most strongly in the VHF range, which propagates along a line of site and attenuates quickly, requiring a dense network of sensors to provide 3-D lightning observations within relatively small geographical regions. Although Lightning Mapping Array (LMA; Rison et al. 1999) networks currently provide valuable information, their fixed locations limit the number and variety of storm environments that can be sampled. Therefore, this proposal seeks to develop VHF lightning mapping technology that can be transported to remote regions (e.g., deep oceans and field campaign locations), deployed quickly, and operated remotely. This new tool must leverage existing lightning detection technologies and recent field campaigns that have proven the value of unmanned aircraft systems (UASs) for observing thunderstorms.

Project Goals: It is expected that this technology will be used to better diagnose and predict extreme weather during future field campaigns and significant weather events, and also for validation of future space-borne lightning detection technologies (e.g., GOES-R Geostationary Lightning Mapper; GLM). Several LMA networks are currently being deployed, which

demonstrates the value of these 3-D lightning observations. Recent field campaigns also have expended considerable effort to deploy LMA networks to Sao Paulo, Brazil and Northern Colorado. The proposed tool would reduce the amount of effort required to deploy LMA networks for future field campaigns, and will lessen the need to deploy static LMA networks when they are only needed for significant events (e.g., rocket launches from government or private facilities). VHF lightning observations from an aerial platform will reduce contamination from RF sources on the ground, and provide IC detection capabilities over a larger geographical area than present ground-based LMA networks. The new technology also should include video observations to help understand how the amount of light leaving the cloud is related to both the intensity of lightning and amount/type of precipitation inside a cloud. Outside of the present LMA domains (e.g., over the oceans), no technology currently exists to evaluate the quality of space-borne IC lightning observations relative to ground-based measurements. Thus, this new technology will provide a valuable tool for validating the lightning observations provided by the GLM outside of the present LMA domains. Once proven, the overall approach could be expanded upon to include different sensors and scientific objectives.

Phase I Activities and Expected Deliverables:

- Identify VHF lightning detection technologies that are suitable for use aboard a small UAS
- Examine potential aerial platforms that can house this sensor suite (e.g., VHF, GPS, video)
- Determine the best option for flying multiple UASs in tandem
- Identify methods for communication between individual sensors and a central hub

Phase II Activities and Expected Deliverables:

- Incorporate lightning detection equipment into an UAS
- Develop navigation and communication systems
- Deploy a prototype network
- Validate the new technology relative to an existing LMA network

References:

- Rison, W., R. J. Thomas, P. R. Krehbiel, T. Hamlin, and J. Harlin, 1999: A GPS-based three dimensional lightning mapping system: Initial observations in central New Mexico. *Geophys. Res. Lett.*, 26, 3573–3576.

9.4.3 W SUBTOPIC: Delivering a Solar Flare Forecast Model that Improves Flare Forecast (Timing and Magnitude) Accuracy by 25%

Summary: The Nation’s critical infrastructure and economy are increasingly susceptible to the impacts of space weather. Leadership at the highest levels of government, including DHS, DoD, and the White House, are involved in efforts to prepare and respond to severe space weather outbreaks. Nearly all major space weather storms are associated with major solar flares. And yet, the ability to forecast solar flares is currently limited to qualitative assessment

of sunspots. There has been little advance in operational flare forecasting techniques in more than 20 years. Customers are requesting more accurate flare forecasts with multiple hour lead-times allowing them to plan and adjust their systems and operations to impending space weather impacts.

New observations from NASA sensors such as the Atmospheric Imaging Assembly (AIA) and Helioseismic and Magnetic Imager (HMI) on the Solar Dynamics Observatory (SDO) satellite provide new insight into the internal workings of the sun. These and other measurements have resulted in a number of new scientific techniques and discoveries that could provide improvement over the current flare forecasting technique. Moving these research discoveries into operational forecasting tools and models could greatly improve flare forecasts.

Project Goals: The goal of this activity would be to develop a model or technique for improving the multi-hour and multi-day forecasts of solar flare eruptions.

Initial work would be applied towards developing an improved model and/or assessing model performance against observations. Some of these techniques may require fairly complex computational modeling and data processing. The performance of a model would need to be established by comparing with current flare forecasting accuracy. The value and viability of a model would need to be assessed based on performance, reliability, and computational complexity. These techniques would need to be tested and refined with the goal of running a model in real-time to provide forecasts. The results of initial research would be the development of a new model or technique and/or the evaluation of several models based on model performance metrics.

Later work would be required to begin the transition of the selected research model into operations. This work would involve further testing and validation of the model performance, the development of model outputs and products, and the development of the model itself to improve performance and reliability.

Possible commercial applications would include the use of a flare forecast by a small business to provide tailored products for specific end users such as commercial airlines and emergency managers.

Phase I Activities and Expected Deliverables:

Activities:

- Model development
- Model performance evaluation and testing
- Model operational concept development
- Proof of concept testing
- Validation and verification of results
- Feasibility assessment development

Deliverables:

- Model performance statistics

- Prototype of operational model
- Implementation feasibility assessment

Phase II Activities and Expected Deliverables:

Activities:

- Concept implementation and product development
- Product expansion and tailored outputs for specific user groups

Deliverables:

- Prototype Solar Flare Forecast model to be evaluated for possible transition to operations. This should include the prototype software for data ingest, data processing, and the development of intermediate products used for forecasting solar flares.

10.0 SUBMISSION FORMS

10.1 NOAA SBIR Cover Page

NOAA/SBIR SMALL BUSINESS INNOVATION RESEARCH	This firm and/or Principal Investigator_ has_ has not submitted proposals for essentially equivalent work under other federal program solicitations, or_has_has not received other federal awards for essentially equivalent work		
SOLICITATION NO.: NOAA 2013-1	CLOSING DATE: February 27, 2013		
NAME OF SUBMITTING FIRM			
TAXPAYER IDENTIFICATION NUMBER			
DUNS NUMBER			
ADDRESS OF FIRM (INCLUDING ZIP CODE + 4)			
TITLE OF PROPOSED PROJECT			
REQUESTED AMOUNT: \$		PROPOSED DURATION: Six (6) Months	
SOLICITATION SUBTOPIC NO.		SOLICITATION SUBTOPIC TITLE	
THE ABOVE ORGANIZATION CERTIFIES THAT:			YES
1. It is a small business firm as defined in Section 3.11.			NO
2. The primary employment of the principal investigator will be with the firm at the time of award and during the conduct of the research.			
3. A minimum of two-thirds of the research will be performed by this firm in Phase I.			
4. It qualifies as a socially and economically disadvantaged small business as defined in Section 3.11.			
5. It qualifies as a woman-owned small business as defined in Section 3.14.			
6. It will permit the government to disclose the title and technical abstract page, plus the name, address and telephone number of the corporate official if the proposal does not result in an award to parties that may be interested in contacting you for further economic development information or possible investment			
7. Is your business in a HUB Zone? (See: http://map.sba.gov/hubzone/maps/)			
8. Certification of Section 1.5 of the Solicitation that the firm is not involved in the selection of any topic or subtopic. The firm shall not participate in the review of proposals.			
PRINCIPAL INVESTIGATOR/ PROJECT DIRECTOR	CORPORATE OFFICIAL (BUSINESS)	OTHER INFORMATION	
NAME (Printed)	NAME (Printed)	YEAR FIRM FOUNDED	
SIGNATURE	SIGNATURE	NUMBER OF EMPLOYEES	
DATE	DATE	Average Previous 12 months _____ Currently _____	
TITLE	TITLE	HAS THIS PROPOSAL BEEN SUBMITTED TO ANOTHER AGENCY? Yes <input type="checkbox"/> No <input type="checkbox"/>	
TELEPHONE NO. + AREA CODE	TELEPHONE NO. + AREA CODE	IF YES, WHAT AGENCY? _____	
E-MAIL (Printed)	E-MAIL (Printed)	FAX #	

PROPRIETARY NOTICE

For any purpose other than to evaluate the proposal, this data shall not be disclosed outside of the Government and shall not be duplicated, used or disclosed in whole or in part, provided that if a funding agreement is awarded to this proposer as a result of or in connection with this submission of this data, the Government shall have the right to duplicate, use, or disclose the data to the extent provided in the funding agreement. This restriction does not limit the Government's right to use information contained in the data source without restriction. The data in this proposal subject to this restriction is contained on separate proprietary page(s).

10.2 NOAA SBIR Project Summary Form

NAME OF FIRM:	
AMOUNT REQUESTED:	
ADDRESS:	PHONE #:
	FAX #:
	E-MAIL:
PRINCIPAL INVESTIGATOR (NAME AND TITLE)	
TITLE OF PROJECT	
SOLICITATION SUBTOPIC NUMBER	SOLICITATION SUBTOPIC TITLE
TECHNICAL ABSTRACT (LIMIT 200 WORDS)	
SUMMARY OF ANTICIPATED RESULTS	

10.3 NOAA SBIR Proposed Budget

COMPANY NAME					
A. PERSONNEL (<i>Employees</i>) NAME	ROLE IN PROJECT Principal Investigator	EST. HOURS	HOURLY RATE	FRINGE BENEFITS	TOTAL COST
B. EQUIPMENT (<i>specify type, whether purchased or leased, and cost</i>)					
C. TRAVEL					
D. OTHER DIRECT COSTS					
1. Materials and Supplies					
2. Testing Services					
3. Computer Services					
4. Research Institution					
5. Subcontracts (Including Consultants)					
6. Other					
TOTAL OTHER DIRECT COSTS					
E. TOTAL DIRECT COSTS (<i>A through E</i>)					
F. INDIRECT COSTS (<i>specify rate(s), as applicable</i>)					
TOTAL INDIRECT COSTS					
G. TOTAL COSTS (<i>F plus G</i>)					
H. FEE OR PROFIT					
I. TOTAL AMOUNT OF THIS REQUEST (<i>H plus I</i>)					
J. Has any executive agency of the United States Government performed any review of your accounts or records in connection with any other grant or contract within the past year? Yes No					
If Yes, give name, address, and phone number of reviewing office and official:					
K. CORPORATE/BUSINESS AUTHORIZED REPRESENTATIVE – TYPED NAME AND SIGNATURE DATE:					
(Signature)					
If additional space is needed, please attach a separate sheet.					

10.4 NOAA SBIR Budget Instructions

In accordance with Section 4.6 of the solicitation, the offeror is to submit a cost estimate with detailed information for each element, consistent with the offeror's cost accounting system.

NOAA SBIR Proposed Budget

Complete the "NOAA SBIR Proposed Budget" (See Section 10.3) for the Phase I effort, and include it as the last page of the technical proposal. Verify the total request is accurate and does **not exceed \$95,000**. The Proposed Summary Budget must be signed by the Corporate Official. Some items of the form under Section 10.3 may not apply to every proposal. Additionally, some firms may have different accounting practices for their overhead rates. Offerors should use indirect rates consistent with their own accounting system, even if different from the rate categories shown on the form. These differences should be discussed in the Supporting Budget Documentation. Enough information, though, should be provided on the Proposed Budget to allow NOAA to understand how the offeror plans to use the requested funds if the award is made. A complete cost breakdown should be provided giving direct costs, indirect costs, other direct costs G&A, and profit. The offeror is to submit a cost estimate with detailed information consistent with the offeror's cost accounting system. A reasonable profit will be allowed.

As reminder in completing the Proposal Budget Summary for Phase I, a minimum of two-thirds of the research and/or analytical effort must be performed by the proposing small business concern. The total cost for all consultant fees, facility leases, usage fees, and other subcontract or purchase agreements may not exceed one-third of the contract price. For Phase II, a minimum of one-half of the research and/or analytical effort must be performed by the proposing small business concern. The total cost for all consultant fees, facility leases, usage fees, and other subcontract or purchase agreements may not exceed one-half of the contract price.

Supporting Budget Documentation

Offerors shall provide additional supporting budget documentation for the Proposed Budget for the Government's Cost and Pricing Review. ***This Supporting Budget Documentation shall NOT be utilized for evaluation of the Technical Proposal. Offerors must ensure that all relevant technical information is included within the 25 page technical proposal.*** The Supporting Budget Documentation does **NOT** count towards the 25 page count requirement. Additionally, the government **only requires two (2) hard copies** of the Supporting Budget Documentation. The Supporting Budget Documentation shall include a coversheet and be organized, stapled, and easy to understand. The information should only supplement and help to justify and explain the amounts requested on the Proposed Budget sheet. Additionally, the documentation should indicate any known or anticipated source,

quantity, unit price, competition obtained, and basis used to establish source and reasonable costs (e.g. Other Direct Costs and Equipment). If additional room is required, and not available on the SBIR Proposed Budget Form, it may be incorporated into the Supporting Budget Documentation. The Proposed Budget Form should annotate the location of this information appropriately.

Instructions for Proposed Budget Summary Form:

Lines A Direct Labor. List the key personnel by name and function or role in the project. Other direct personnel need not be named, but their role, such as “technician,” total hours and hourly rate should be entered. Personnel whose costs are indirect (e.g. administrative personnel) should be included in Line F. Fringe benefits can be listed for each employee in the space provided, or they may be included within the indirect costs in Line F. In the Supporting Budget Documentation, information shall be provided regarding the development of the Fringe Overhead rate or Other Indirect Rates, as applicable.

As a reminder, the PI must be employed by the small business concern at the time of contract award and during the period of performance of the research effort. Additionally, at least 51% of the PI's time must be spent with the awardee during the contract performance.

Line B, Equipment. List items costing over \$5,000 and exceeding one year of useful life. Lesser items may be shown in Line D. Indicate in the Supporting Budget Documentation whether equipment is to be purchased or leased. Where equipment is to be purchased or leased. List each individual item with the corresponding cost. Include a copy of the quote or catalog price with the Supporting Budget Documentation. Discuss any competition utilized, basis of source, and reasonableness of price. The inclusion of equipment will be carefully reviewed relative to need and appropriateness for the research proposed.

Line C, Travel. Include the overall requested Travel Amount. In the Supporting Documentation, the offeror shall itemize by destination, purpose, personnel, period, and cost for both staff and consultants. Budgets including travel funds must be justified and related to the needs of the project. Inclusion of travel expenses will be carefully reviewed relative to need and appropriateness for the research proposed. Foreign travel is not an appropriate expense.

Line D, Other Direct Costs. The overall materials and supplies, testing and/or computer services, and subcontracts (including consultants), and any other direct costs required for the project must be identified. In the Supporting Budget Documentation, it shall specify type, quantity and unit cost (if applicable), and total estimated cost of these other direct costs. Incorporate a quote/proposal or catalog price for any other direct costs listed. The proposal should identify direct (e.g. labor categories, hours, & rates), indirect, other direct costs (e.g. materials, travel, etc.), and

profit, as applicable. Discuss any competition utilized, basis of source, and reasonableness of price.

Line E, Total Direct Costs. Enter the sum of Lines A through E.

Line F, Indirect Costs. Cite your established Overhead (OH) and General and Administrative (G&A) rate, as appropriate. If you utilize different or additional overhead rates in accordance with your accounting practices, incorporate this information in this section with appropriate rate information. In the Supporting Budget Documentation, include information on the development of your indirect cost and their pools. A discussion of Indirect Costs and samples can be obtained at www.dcaa.mil/chap6.pdf or <http://oamp.od.nih.gov/dfas/idc3tierexample.xls>. If you have a negotiated Indirect Cost Rate with another federal agency, include a copy of this documentation with your Supporting Budget Documentation.

Line G, Total Costs. Enter the total amount of the proposed project, the sum of Lines F and G.

Line H, Profit. The small business concern may request a reasonable profit.

Line I, Total Amount of this request. Enter the sum of Lines G and H. This amount must equal the amount entered in the Cover Sheet Form.

Line J, Review of Accounts. Answer yes or no. If yes, enter name, address, and phone number of reviewing office and official.

Line K, Corporate/Business Authorized Representative. A signature of someone with the authority to commit the company must be given.

Appendix A – CERTIFICATIONS

A. SBIR Funding Agreement Certification (at time of award)

All small businesses that are selected for award of an SBIR Funding Agreement must complete this certification at the time of award and any other time set forth in the Funding Agreement that is prior to performance of work under this award. This includes checking all of the boxes and having an authorized officer of the Awardee sign and date the certification each time it is requested.

Please read carefully the following certification statements. The Federal Government relies on the information to determine whether the business is eligible for a Small Business Innovation Research (SBIR) Program award. A similar certification will be used to ensure continued compliance with specific program requirements during the life of the Funding Agreement. The definitions for the terms used in this certification are set forth in the Small Business Act, SBA regulations (13 C.F.R. Part 121), the SBIR Policy Directive and also any statutory and regulatory provisions referenced in those authorities.

If the Funding Agreement officer believes that the business may not meet certain eligibility requirements at the time of award, they are required to file a size protest with the U.S. Small Business Administration (SBA), which will determine eligibility. At that time, SBA will request further clarification and supporting documentation in order to assist in the verification of any of the information provided as part of a protest. If the Funding Agreement officer believes, after award, that the business is not meeting certain Funding Agreement requirements, the agency may request further clarification and supporting documentation in order to assist in the verification of any of the information provided.

Even if correct information has been included in other materials submitted to the Federal Government, any action taken with respect to this certification does not affect the Government's right to pursue criminal, civil or administrative remedies for incorrect or incomplete information given in the certification. Each person signing this certification may be prosecuted if they have provided false information.

The undersigned has reviewed, verified and certifies that (all boxes must be checked unless otherwise directed):

(1) The Awardee business concern meets the ownership and control requirements set forth in 13 C.F.R. § 121.702.

(2) If a corporation, all corporate documents (namely: articles of incorporation and any amendments, articles of conversion, by-laws and amendments, shareholder meeting minutes showing director elections, shareholder meeting minutes showing officer elections, organizational meeting minutes, all issued stock certificates, stock ledger, buy-sell agreements, stock transfer agreements, voting agreements, and documents relating to stock options, including the right to convert non-voting stock or debentures into voting stock) must evidence that the corporation meets the ownership and control requirements set forth in 13 C.F.R. § 121.702. (Check one box).

Yes N/A Explain why N/A:

(3) If a partnership, the partnership agreement evidences that it meets the ownership and control requirements set forth in 13 C.F.R. § 121.702. (Check one box).

Yes N/A Explain why N/A:

(4) If a limited liability company, the articles of organization and any amendments, and operating agreement and amendments, evidence that it meets the ownership and control requirements set forth in 13 C.F.R. § 121.702. (Check one box).

Yes N/A Explain why N/A:

(5) The birth certificates, naturalization papers, or passports show that any individuals it relies upon to meet the eligibility requirements are U.S. citizens or permanent resident aliens in the United States. (Check one box).

Yes N/A Explain why N/A:

(6) The Awardee business concern has no more than 500 employees, including the employees of its Affiliates.

(7) SBA has not issued a size determination currently in effect finding that this business concern exceeds the 500 employee size standard.

(8) During the performance of the award, the Principal Investigator/Project Manager will spend more than one half of his/her time (based on a 40 hour workweek) as an employee of the Awardee or has requested and received a written deviation from this requirement from the Funding Agreement officer. (Check one box).

Yes Deviation approved in writing by Funding Agreement officer: %

(9) All, essentially Equivalent Work, or a portion of the work proposed under this project (check the applicable line):

- Has not** been submitted for funding to this Agency or another Federal agency.
- Has** been submitted for funding to this Agency or another Federal agency but has not been funded under any other grant, contract, subcontract or other transaction.
- A portion has been funded by another grant, contract, or subcontract as described in detail in the proposal and approved in writing by the Funding Agreement officer.

(10) During performance of award, the Awardee will perform the applicable percentage of work unless a deviation from this requirement is approved in writing by the Funding Agreement officer (check the applicable line and fill in if needed):

- SBIR Phase I: at least two-thirds (66 2/3%) of the research.
- SBIR Phase II: at least half (50%) of the research.
- Deviation approved in writing by the Funding Agreement officer: _____%

(11) During performance of award, the research/research and development will be performed in the United States unless a deviation is approved in writing by the Funding Agreement officer (Check one box).

- Yes Waiver has been granted

(12) During performance of award, the research/research and development will be performed at the Awardee's facilities by the Awardee's employees, except as otherwise indicated in the SBIR application and approved in the Funding Agreement.

(13) The SBIR Awardee has registered itself on SBA's database as majority-owned by venture capital operating companies, hedge funds or private equity firms (check one box).

- Yes No N/A Explain why N/A:

(14) The SBIR Awardee is a Covered Small Business Concern (a small business concern that: (a) was not majority-owned by multiple venture capital operating companies (VCOs), hedge funds, or private equity firms on the date on which it submitted an application in response to an SBIR NOFO; and (b) on the date of the SBIR award, which is made more than 9 months after the closing date of the NOFO, is majority-owned by multiple venture capital operating companies, hedge funds, or private equity firms). (Check one box).

- Yes No

15) I will notify this Federal agency immediately if all or a portion of the work authorized and funded under this award is subsequently funded by another Federal Agency.

16) I understand that the information submitted may be given to Federal, State and local agencies for determining violations of law and other purposes.

17) I am an officer of the business concern authorized to represent it and sign this certification on its behalf. By signing this certification, I am representing on my own behalf, and on behalf of the business concern that the information provided in this certification, the application, and all other information submitted in connection with this application, is true and correct as of the date of submission. I acknowledge that any intentional or negligent misrepresentation of the information contained in this certification may result in criminal, civil or administrative sanctions, including but not limited to: (1) fines, restitution and/or imprisonment under 18 U.S.C. § 1001; (2) treble damages and civil penalties under the False Claims Act (31 U.S.C. § 3729 *et seq.*); (3) double damages and civil penalties under the Program Fraud Civil Remedies Act (31 U.S.C. § 3801 *et seq.*); (4) civil recovery of award funds, (5) suspension and/or debarment from all Federal procurement and nonprocurement transactions (FAR Subpart 9.4 or 2 C.F.R. Part 180); and (6) other administrative penalties including termination of SBIR/STTR awards.

Signature _____ **Date** ____/____/____

Print Name (First, Middle, Last)

Title

Business Name

11.0 NOAA/SBIR CHECKLIST

Please review this checklist carefully to assure that your proposal meets the NOAA requirements. Failure to meet these requirements will result in your proposal being rejected without consideration.

Five copies of the proposal must be received by 4:00 p.m. (EST) February 27, 2013.

- _____ 1. The **COVER PAGE** has been completed and is page 1 of the proposal. Required signatures are included.
- _____ 2. The **PROJECT SUMMARY** has been completed and is page 2 of the proposal. The abstract contains no proprietary information.
- _____ 3. The **TECHICAL CONTENT** of the proposal begins on **PAGE 3** and includes the items identified in **SECTION 4.3.3** of the solicitation. The technical content section of the proposal is limited to 22 pages in length.
- _____ 4. The **PROPOSED BUDGET** has been completed, including signature, and is the **last page** of the proposal. The proposal budget is for \$95,000 or less. No more than one-third of the budget is allocated to consultants and/or subcontractors.
- _____ 5. **Other supporting budget documentation is provided in accordance with 10.4.**
- _____ 6. Form 10.5 completed and provided and offeror meets program requirements.
- _____ 7. The entire proposal, including forms and technical content, is **25 pages or less in length**.
- _____ 8. The proposal, Cover Page and Project Summary contains an easy-to-read font (fixed pitch of 12 or fewer characters per inch or proportional font of point size 10 or larger) with no more than six lines per inch, except as a legend on reduced drawings, but not tables.
- _____ 9. The proposal contains only pages of 21.6cm x 27.9cm size (8 ½ " x 11").
- _____ 10. The proposal is limited to only one of the subtopics in Section 9.
- _____ 11. The P.I. will be employed by the company at least 51% of the time during the award period.

NOTE: **Proposers are cautioned that late arrival of proposals shall result in them being rejected without evaluation.** Potential offerors are advised to sign up within <https://www.fedbizopps.gov> to receive notification of any amendment to the solicitation that may be released after opening date.

12.0 SBIR NATIONAL CONFERENCES

FEDERAL R&D OPPORTUNITIES FOR TECHNOLOGY INTENSIVE FIRMS

Marketing Opportunities for R&D and Technology Projects with Federal Agencies and Major Corporations.

Techniques and Strategies for Commercializing R&D through Venture Capital, Joint Ventures, Partnering, Subcontracts, Licensing, and International Markets.

Management Seminars in Marketing and Business Planning.

Working with Academia and the States.

Agency and company exhibits and/or One-on-One tables will be open for networking opportunities for all attendees!

For further information on dates and times of upcoming conferences, see the SBIR Homepage: www.sbir.gov