



United States
Department
of
Agriculture

Program Solicitation

Small Business Innovation
Research Program – Phase I
Fiscal Year 2017

National Institute of
Food and Agriculture

Competitive

Programs SBIR-17-1

Phase I Application Deadline: October 6, 2016

Telephone: 202-401-4002

Email: sbir@nifa.usda.gov

Internet: www.nifa.usda.gov/fo/sbir

Catalog of Federal Domestic Assistance Number (CFDA)

10.212 Small Business Innovation Research

NIFA Funding Opportunity Number

USDA-NIFA-SBIR-005943

TABLE OF CONTENTS

Acronym List	4
1.0 GENERAL PROGRAM DESCRIPTION	5
1.1 Introduction.....	5
1.2 Three-phase Program	6
1.3 Potential Commercial Outcome	6
1.4 Eligibility.....	7
1.5 USDA SBIR Program Priority Areas.....	8
1.6 NIFA National Challenge Areas	8
1.7 Agency Contacts	9
1.8 Stakeholder Input	10
2.0 APPLICATION PREPARATION INSTRUCTIONS AND REQUIREMENTS	11
2.1 Application Requirements.....	11
2.2 USDA SBIR Application Submission Overview	11
2.2.1 Resources	12
2.2.2 Registration Procedures for Companies	13
2.2.3 Special Considerations	14
2.3 Application Guidelines.....	16
2.3.1 SF-424 R&R Cover Sheet.....	16
2.3.2 R&R Project/Performance Site Location(s).....	17
2.3.3 R&R Other Project Information Form	17
2.3.4 R&R Senior/Key Person Profile – (PDF Format is Required).....	20
2.3.5 R&R Personal Data	20
2.3.6 R&R Budget.....	21
2.3.7 R&R Subaward Budget Attachment - (PDF Format is Required)	22
2.3.8 NIFA Supplemental Information	22
2.3.9 SBIR/Small Business Technology Transfer Program (STTR) Information.....	23
3.0 SUBMISSION OF APPLICATIONS	32
3.1 When to Submit.....	32
3.2 What to Submit	32
3.3 Questions Pertaining to the USDA SBIR Program or to this Solicitation.....	32
3.4 Information on Application Status	32
4.0 METHOD OF SELECTION AND EVALUATION CRITERIA.....	34
4.1 Introduction.....	34
4.2 Administrative Requirements Criteria	34
4.3 Phase I Evaluation Criteria.....	35
4.4 Phase I Review Process.....	36
4.5 Notice to Applicants.....	36
5.0 CONSIDERATIONS	38
5.1 Awards	38
5.2 Reports	38
5.2.1 REEport.....	38
5.2.2 Technical Reports.....	39
5.2.3 Financial Reports	39
5.3 Proprietary Information.....	39
5.4 Rights in Technical Data.....	39
5.5 Copyrights	39
5.6 Patents and Inventions.....	40
5.7 Research Involving Special Considerations	40
5.8 Responsible and Ethical Conduct of Research.....	41

5.9 Grantee Commitments	41
5.10 Additional Information.....	41
5.11 Administrative and National Policy Requirements.....	42
6.0 SCIENTIFIC AND TECHNICAL INFORMATION SOURCES.....	43
7.0 Sample Application Training Module.....	46
8.0 RESEARCH TOPIC DESCRIPTIONS AND INSTRUCTIONS.....	47
8.1 Forests and Related Resources.....	47
8.2 Plant Production and Protection - Biology.....	49
8.3 Animal Production and Protection	51
8.4 Air, Water and Soils.....	53
8.5 Food Science and Nutrition.....	55
8.6 Rural and Community Development	57
8.7 Aquaculture.....	59
8.8 Biofuels and Biobased Products.....	61
8.9 through 8.11 Reserved.	62
8.12 Small and Mid-Size Farms	63
8.13 Plant Production and Protection - Engineering	65
9.0 DEFINITIONS.....	67

ACRONYM LIST

ADO – Authorized Departmental Officer
APHIS – Animal and Plant Health Inspection Service
AOR – Authorized Organizational Representative
AR – Authorized Representative
ASAP – Automated Standard Applications for Payment System

CFDA – Catalog of Federal Domestic Assistance
CFR – Code of Federal Regulations
COI – Conflict of Interest
CRADA – Cooperative Research and Development Agreement

DHHS – Department of Health and Human Services
DUNS – Data Universal Number System

E-Business POC - E-Business Point of Contact

F&A – Facilities and Administration
FR – Federal Register
FY – Fiscal Year

HUBZONE – Historically Underutilized Business Zone

M-PIN – Marketing Partner Identification Number

NIFA – National Institute of Food and Agriculture
NPL – National Program Leader

PD – Project Director
PDF – Portable Document Format
PI – Principle Investigator
POC – Point of Contact
PRS – Peer Review System

REEPort – Research, Education, and Extension project online reporting tool
R/R&D – Research or Research and Development
R&D – Research and Development
R&R – Research and Related

SBA – Small Business Administration
SBC – Small Business Concern
SBIR – Small Business Innovation Research Program
STTR – Small Business Technology Transfer Program

U.S. – United States
USDA – United States Department of Agriculture

USDA PROGRAM SOLICITATION SMALL BUSINESS INNOVATION RESEARCH PHASE I FISCAL YEAR 2017

1.0 GENERAL PROGRAM DESCRIPTION

1.1 Introduction

The U.S. Department of Agriculture (USDA) invites science-based small business firms to submit research applications under this program solicitation entitled “Small Business Innovation Research Program (SBIR) - Phase I, Fiscal Year 2017.” Firms with strong scientific research capabilities in any of the topic areas described in section 8.0 are encouraged to participate. USDA will support high-quality research or research and development (R/R&D) applications containing advanced concepts related to important scientific problems and opportunities that could lead to significant public benefit.

Objectives of the SBIR program include stimulating technological innovation in the private sector, strengthening the role of small businesses in meeting Federal research and development needs, increasing private sector commercialization of innovations derived from USDA-supported research and development efforts, and fostering and encouraging participation by women-owned and socially and economically disadvantaged small business firms in technological innovation.

The National Defense Authorization Act for Fiscal Year 2012, enacted on December 31, 2011, reauthorized the SBIR and STTR programs through September 30, 2017. This program is administered by the National Institute of Food and Agriculture (NIFA) of the USDA.

This program is subject to the provisions found at 7 CFR Part 3403. These provisions set forth procedures to be followed when submitting grant applications, rules governing the evaluation of applications and the awarding of grants and regulations relating to the post-award administration of grant projects.

This RFA is being released prior to the passage of an appropriations act for FY 2017. Enactment of additional continuing resolutions or an appropriations act may affect the availability or level of funding for this program.

The SBIR Program is aligned with the USDA 2014-2018 Strategic Plan (<http://www.usda.gov/documents/usda-strategic-plan-fy-2014-2018.pdf>) by addressing Strategic Goals:

1. Assist rural communities to create prosperity so they are self-sustaining, re-populating, and economically thriving (sub-goals 1.1, 1.2 and 1.3);
2. Ensure our national forests and private working lands are conserved, restored, and made more resilient to climate change, while enhancing our water resources (sub-goals 2.1, 2.3, and 2.4);
3. Help America promote agricultural production and biotechnology exports as America works to increase food security (sub-goals 3.1 and 3.2);
4. Ensure that all of America’s children have access to safe, nutritious, and balanced meals (sub-goals 4.1, 4.2, 4.3 and 4.4).

Also the USDA SBIR program is aligned with the USDA Research, Education, and Economics Action Plan (http://www.ree.usda.gov/ree/news/USDA_REE_Action_Plan_03-2014.pdf), and addresses Goals:

1. Sustainable Intensification of Agricultural Production (sub-goal 1A, 1B, 1C and 1D);
2. Responding to Climate and Energy Needs (sub-goal 2B);
3. Sustainable Use of Natural Resources (sub-goal 3A and 3B);
4. Nutrition and Childhood Obesity;
5. Food Safety;
6. Education and Science Literacy and
7. Rural Prosperity/Rural-Urban Interdependence.

USDA SBIR is aligned with the National Institute of Food and Agriculture (NIFA) Strategic Plan (<http://nifa.usda.gov/sites/default/files/resource/NIFA%20Strategic%20Plan%20FY2014-FY2018.pdf>) and specifically addresses Goal 1: Science Catalyze exemplary and relevant research, education and extension programs (sub-goal2 1.1, 1.2, 1.3, 1.4, 1.5, 1.6 and 1.7).

1.2 Three-phase Program

The USDA SBIR program is carried out in three separate phases. Phase I is to determine the scientific or technical feasibility of ideas submitted by applicants on research topic areas described in section 8.0 of this solicitation. **This program solicitation is only for the preparation and submission of Phase I applications.** Phase I awards may not exceed \$100,000 for a period normally not to exceed eight (8) months. However, longer grant periods, of up to 20 months, may be considered if the proposed research project will require more than 8 months to complete. The Phase I application should concentrate on research that will significantly contribute to **proving the scientific or technical feasibility** of the approach or concept and will be a prerequisite to further USDA support in Phase II.

Phase II applications promote principal R/R&D and will require a more comprehensive application, outlining the proposed effort in detail and the commercialization strategy for the effort. Only prior Phase I grant recipients are eligible to submit a Phase II application at the conclusion of the Phase I grant period. At the appropriate time, the SBIR program will provide Phase I awardees with instructions for preparing these applications and a deadline (normally late February of each year) for submitting applications. USDA recognizes that Phase II awards may not be sufficient in either dollars or time for the firm to complete the total R/R&D and the commercialization activities required to bring the project results to a marketplace. Therefore, completion of the research under these circumstances may have to be carried into Phase III.

The purpose of Phase III is to stimulate technological innovation and the national return on investment from research through the pursuit of commercialization objectives resulting from the USDA-supported work carried out in Phases I and II. USDA SBIR does not provide Federal SBIR funds to support Phase III projects. Firms are strongly encouraged to secure Phase III funding from their own resources or other public and private sources.

FY 2017 Phase I applications must be received by 5:00 p.m. Eastern Time on October 6, 2016.

1.3 Potential Commercial Outcome

In addition to supporting scientific research and development, another program goal is to provide incentives and opportunities for small business firms to convert USDA-sponsored research into

technological innovation in the private sector. All proposed research should have some potential commercial outcome. Phase I applications should contain a brief description of any potential commercial application(s) and whether or not the small business concern will attempt to secure follow-on, non-SBIR funding to pursue the commercial development of the expected products from the proposed research (See Section 2.3.3 R&R Other Project Information, Field 8., (9) – Potential Post Application). Additionally if a Phase I applicant has received a prior Phase II grant from the USDA SBIR Program, the applicant is requested to provide USDA with an update on the commercialization activities of the prior project (See Section 2.3.9 SBIR/Small Business Technology Transfer Program (STTR) Information; Field 8. Documentation of Prior SBIR Phase II Awards).

1.4 Eligibility

Each applicant submitting an application must qualify as a Small Business Concern (SBC) for R/R&D purposes at the time of selection (see definitions in section 9.0). A potential grantee that is a subsidiary must show that the parent company is also a small business entity and the parent company must provide documentation supporting their small business status (the documentation should be included in Field 12, Other Attachments, of the Research and Related (R&R) Other Project Information form). If the parent company is not a small business entity, then the subsidiary is not eligible to submit an SBIR application. In addition, the primary employment of the Project Director (PD) must be with the small business concern at the time of award and during the conduct of the proposed research, unless otherwise approved in writing by NIFA. Eligible primary employment means that more than one-half of the PD's time is spent in the employ of the small business. Primary employment with the small business precludes the applicant as a full-time employee with another organization. Prior Federal Employees must provide documentation that post termination requirements have been completed at time of submission per 2 CFR parts 180 and 417. **These requirements apply** to Phase I awards and any deviations from this requirement must be approved in writing by the USDA Authorized Departmental Officer (ADO) after consultation with the appropriate National Program Leader (NPL). While the PD must work more than one-half of his/her time for the small business during the entire grant period, there is no time requirement for the PD's work on the proposed research.

(A) Size

An SBIR awardee, combined with its affiliates, must not have more than 500 employees. The small business concern must be the primary performer of the proposed research effort. In Phase I, a minimum of **two-thirds (2/3)** of the research or analytical work, as determined by budget expenditures, must be performed by the proposing organization. Occasionally, deviations from this requirement may occur, and must be approved in writing by the ADO after consultation with the USDA SBIR NPL.

(B) Work in the United States

For Phase I, the **R/R&D work must be performed in the United States**. On rare and unique circumstances, for example, a supply, material or project requirement may not be available in the United States, agencies may allow that particular portion of the R/R&D work to be performed or obtained outside of the United States. Approval, in writing, is necessary by both a USDA SBIR NPL and the ADO for such specific conditions.

(C) Benchmark

All Phase I applicants must meet a minimum benchmark rate for converting Phase I awards into Phase II awards to be eligible to submit a Phase I application. Any company that has received at least 20

Phase I awards, regardless of the awarding agency, during the five-year period (Fiscal Year 2011 through 2016) must have received a minimum of five Phase II awards (25% conversion rate), regardless of the awarding agency, over the same five-year period to be eligible to submit a Phase I application in response to this solicitation.

1.5 USDA SBIR Program Priority Areas

The USDA recognizes Agriculturally-related Manufacturing Technology and Energy Efficiency and Alternative and Renewable Energy as two cross-cutting priorities with relevance to all topic areas listed in Section 8.0 of this program solicitation. USDA encourages applicants to address these priorities, as appropriate, within their applications for submission to one of the topic areas. Special consideration will be given to applications that address one of these priorities under the Project Narrative, item 2. under subsection 2.3.3.-Field 8, Responsiveness to USDA SBIR Program Priorities and National Challenge Areas. For additional information on the review criteria see section 4.3.

Agriculturally-related Manufacturing Technology

On February 26, 2004, the President issued Executive Order 13329 (69 FR 9181) entitled “Encouraging Innovation in Manufacturing.” In response to this Executive Order, USDA encourages the submission of applications that deal with some aspect of agriculturally-related manufacturing technology. Since manufacturing impacts all aspects of agriculture and rural development, applications dealing with manufacturing could be submitted to any of the topic areas.

Energy Efficiency and Alternative and Renewable Energy

In an effort to find alternatives to fossil fuels and to reduce overall energy usage, the USDA established research on energy efficiency and alternative and renewable energy as a high priority. Such research includes development of new energy crops, improved methods for producing biofuels, such as ethanol, butanol and biodiesel, producing hydrogen and other fuel gases from agricultural waste, and more efficient use of energy in agricultural production and in rural communities. Energy issues impact all aspects of agriculture and rural development and thus applications dealing with energy efficiency and alternative and renewable energy could be submitted to any of the topic areas.

1.6 NIFA National Challenge Areas

NIFA supports six national challenge areas in which departmental research and development programs are structured. Special consideration will be given to applications that address one of these challenge areas under the Project Narrative, item 2. under subsection 2.3.3. Field 8, Responsiveness to USDA SBIR Program Priorities and National Challenge Areas. For additional information on the review criteria see section 4.3.

1) Food Security

New technologies are needed to boost food production by developing improved sustainable production systems, developing better ways to protect agricultural production systems from diseases and pests, and developing innovative ways to enhance food accessibility to vulnerable populations.

2) Climate Variability and Change

New technologies are needed to enable agricultural producers and natural resource managers to

develop better mitigation strategies aimed at reducing greenhouse gas emissions and increasing carbon sequestration, and to develop better approaches for adapting to climate change by reducing carbon, nitrogen and water footprints and developing new plant cultivars and animal breeds adapted to changing environmental conditions.

3) Bioenergy

New technologies are needed to convert biomass to biofuels, design optimum biomass for sustainable bioenergy production systems, and to produce value-added biobased industrial products derived from agricultural and forest materials in order to reduce the U.S. dependence on foreign oil and achieve energy independence.

4) Childhood Obesity

New technologies are needed to ensure that nutritious foods are affordable and available and that individuals and families are able to make informed decisions about their health and wellbeing in order to reduce the prevalence of obesity among children and adolescents.

5) Food Safety

New technologies are needed to reduce the incidence of food-borne illnesses and death through a safe food supply, improve our ability to detect food-borne pathogens, and develop improved food processing technologies.

6) Water

New technologies are needed to optimize water management conservation at both the farm level and at a watershed scale, monitor the quality of surface water and groundwater resources, develop improved methods for the reuse of waste water, promote watershed restoration and develop improved irrigation technologies for both farming and landscaping applications that will provide more efficient and cost-effective delivery of water and chemicals.

1.7 Agency Contacts

The NPL for each topic area is listed below. If applicants have questions or need more information about a topic area, they should to contact the NPL at any time.

Dr. Charles Cleland (ccleland@nifa.usda.gov)

Telephone: (202) 401-6852

8.1 Forests and Related Resources

8.4 Air, Water, and Soil

8.8 Biofuels and Biobased Products

Dr. Denis Ebodaghe (debodaghe@nifa.usda.gov)

Telephone: (202) 401-4385

8.12 Small and Mid-Size Farms

Dr. Beth Honadle (Beth.Honadle@nifa.usda.gov)

Telephone: (202) 720-4570

8.6 Rural Development

Dr. Gene Kim (Gene.W.Kim@nifa.usda.gov)

Telephone: (202) 401-1108

8.7 Aquaculture

Dr. Rachel Melnick (rmelnick@nifa.usda.gov)

Telephone: (202) 401-4980

8.13 Plant Production and Protection – Engineering

Dr. Robert Nowierski (rnowierski@nifa.usda.gov)

Telephone: (202) 401-4900

8.2 Plant Production and Protection- Biology

Dr. Robert Smith (rsmith@nifa.usda.gov)

Telephone: (202) 401-4892

8.3 Animal Production and Protection

Dr. Jodi Williams (jwilliams@nifa.usda.gov)

Telephone: (202) 720-6145

8.5 Food Science and Nutrition

Questions of a general nature about this SBIR solicitation should be sent to sbir@nifa.usda.gov or can be directed to:

Mr. Scott Dockum

(sdockum@nifa.usda.gov)

Telephone: (202) 720-6346

SBIR Program Coordinator

Mr. Elden Hawkes

(sbir@nifa.usda.gov)

Telephone: (202) 401-4002

SBIR Program Specialist

1.8 Stakeholder Input

The National Institute of Food and Agriculture (NIFA) seeks your comments about this RFA. We will consider the comments when we develop the next RFA for the program, if applicable, and we'll use them to meet the requirements of section 103(c)(2) of the Agricultural Research, Extension, and Education Reform Act of 1998 (7 U.S.C. 7613(c)(2)). Submit written stakeholder comments by the deadline set forth in the DATES portion of this Notice to: Policy@nifa.usda.gov. (This e-mail address is intended only for receiving comments regarding this RFA and not requesting information or forms.) In your comments, please state that you are responding to the Small Business Innovation Research Phase I program solicitation.

2.0 APPLICATION PREPARATION INSTRUCTIONS AND REQUIREMENTS

2.1 Application Requirements

Applications must address only scientific research activities. **A small business must not propose technical assistance, demonstration projects, classified research, or financial assistance to start or create a company or patent applications.** Many of the research projects supported by the SBIR program lead to the development of new products based upon the research results obtained during the project. However, projects that seek funding solely for product development where no research is involved (i.e., the funds are needed to permit the development of a product based on previously completed research) will not be accepted. Research may be carried out through the construction and evaluation of a laboratory prototype, where necessary.

Literature surveys should be completed prior to the Phase I application and should not be proposed as part of the R&D effort. Applications that deal principally with developing proven concepts for commercial markets or scaling up previously developed prototypes for commercial production should not be submitted unless the concepts align with topic areas 8.6: Rural and Community Development and/or 8.12: Small and Mid-Sized Farms. Efforts that are aligned with USDA SBIR topics other than 8.6 and 8.12 are considered the responsibility of the private sector and therefore are not supported by USDA. An application must be limited to only one research problem.

Applicants may respond to any of the topic areas listed under section 8.0. **The same application, however, may not be submitted under more than one topic area.** Organizations may submit separate applications under different topic areas or different applications under the same topic area outlined in this solicitation. Where similar research is discussed under more than one topic area, the applicant should choose the topic area description that is most relevant to the applicant's research concept. **Duplicate applications will not be reviewed.**

The purpose of a research application is to provide a written statement that contains sufficient information to persuade members of the research community who review the application and then advise the USDA SBIR professional staff that the proposed research is a sound approach to an important scientific question and is worthy of support under the stated USDA evaluation criteria (see section 4.0). The application should be self-contained and written with the care and thoroughness accorded papers for publication. Each application should be reviewed carefully by the applicant prior to submission and by others knowledgeable on the subject to ensure inclusion of data essential for comprehensive evaluation.

2.2 USDA SBIR Application Submission Overview

For all FY 2017 applications, the USDA SBIR program will require electronic application submission through Grants.gov (www.grants.gov). Submission through Grants.gov requires the use of forms located at the Grants.gov Website. Applications not submitted electronically are not eligible to be considered for a Phase I SBIR award and will not be reviewed.

Additionally all SBC's that apply to this program are required to register their company with the Small Business Administration.

Please note that NIFA has developed both this Program Solicitation and a document titled "A

Guide for Preparation and Submission of NIFA Applications via Grants.gov,” also known as the “NIFA Grants.gov Application Guide,” to assist in completing the application forms. Both documents are needed to complete the application process. Information about how to access the forms and the NIFA Grants.gov Application Guide are included below (see Steps to Obtain Application Package Materials).

Section 3.0 of this program solicitation provides additional information that is specific to the USDA SBIR program. Applicants are advised to refer to this program solicitation to determine if specific information is required during the submission of the forms on Grants.gov.

Steps to Obtain Application Package Materials

To receive application materials:

1. You must download and install a version of Adobe Reader compatible with Grants.gov to access, complete, and submit applications. For basic system requirements and download instructions, see <http://www.grants.gov/web/grants/applicants/adobe-software-compatibility.html>. Grants.gov has a test package that will help you determine whether your current version of Adobe Reader is compatible.
2. To obtain the application package from Grants.gov, go to <http://www.grants.gov/web/grants/applicants/download-application-package.html> and enter the funding opportunity number

Funding Opportunity Number: USDA-NIFA-SBIR-005943

In the appropriate box and click “Search.” From the search result, click “Select Package” to access the application package. A Grant Application Package is tied to a particular funding opportunity. You may submit an application ONLY to the particular funding opportunity to which the Grant Application Package is associated.

Contained within the application package is the “NIFA Grants.gov Application Guide.” This guide contains an introduction and general Grants.gov instructions, information about how to use a Grant Application Package in Grants.gov, and instructions on how to complete the application forms.

2.2.1 Resources

If you require assistance to access the application package (e.g., downloading or navigating Adobe forms) **or submitting the application**, refer to resources available on the Grants.gov website (<http://www.grants.gov/web/grants/applicants.html>). Grants.gov assistance is also available at:

Grants.gov customer support
800-518-4726 Toll-Free or 606-545-5035
Business Hours: 24 hours a day, 7 days a week. Closed on [federal holidays](#).
Email: support@grants.gov

Grants.gov iPortal: Top 10 requested help topics (FAQs), Searchable knowledge base, self-service ticketing and ticket status, and live web chat (available 7 a.m. - 9 p.m. ET).
Get help now!

Have the following information available when contacting Grants.gov:

- Funding Opportunity Number (FON)
- Name of agency you are applying to
- Specific area of concern

Any program-specific questions concerning the USDA SBIR program, such as the appropriateness of your proposed research or work plan, should be directed to the NPL responsible for the topic area where you wish to submit your application (see section 1.7 and 8.0). For general questions you can also contact the USDA SBIR office at sbir@nifa.usda.gov or 202-401-4002.

2.2.2 Registration Procedures for Companies

Grants.gov Registration

Information related to the steps necessary to submit an application through Grants.gov can be found at <http://www.grants.gov/web/grants/applicants/organization-registration.html>.

The registration procedure for companies or individual proprietorships intending to submit a grant application through Grants.gov requires several steps and must be finished prior to submitting an application. **The registration process can take up to one month to complete so it is critical that companies begin this process as soon as possible. Companies that have previously registered with Grants.gov must contact Grants.gov to ensure that the company's registration is updated and complete prior to submission. Grants.gov requires all companies to update their registration on an annual basis.**

Small Business Administration (SBA) Registration

All applicants for an SBIR or STTR award must be registered on www.sbir.gov. Applicants should be sure to update their information on the Company Registry at least once per year. To open or update an SBIR/STTR Company Registry account, go to www.sbir.gov/user and register as a Small Business User. After the registration is complete, the SBA will issue your company a unique SBC Control ID and .pdf file to be used attached to this application.

NOTE: EACH YEAR THE SBA NOTIFIES FIRMS THAT DO NOT MEET THE ELIGIBILITY REQUIREMENTS DESCRIBED BELOW. FIRMS WILL NOT BE ELIGIBLE TO RECEIVE A PHASE I AWARD FOR ONE YEAR AFTER THIS SBA NOTIFICATION.

Before responding to this solicitation, all applicants should verify their Transition Rate and Commercialization Rate eligibility for Phase I awards. Each year the SBA will perform an evaluation of companies and the SBA will notify the companies of their status. Phase I applicants that meet the below criteria must meet two Performance Benchmark requirements to be eligible for a new Phase I award: the Phase I to Phase II Transition Rate and the Commercialization Rate benchmarks. General information on the Performance Benchmark requirements is available on www.sbir.gov on the "Solicitations/Performance Benchmarks for Phase I" tab.

The Phase I to Phase II Transition Rate requirement applies only to SBIR and STTR Phase I applicants that have received more than 20 (21 or more) Phase I awards over the past 5 fiscal years (excluding the most recent year). For these applicants, the ratio of the number of Phase II awards (awarded during the past 5 fiscal years) to the number of Phase I awards (awarded during the past 5 years excluding the most recent year) must be at least 0.25.

The Commercialization Rate requirement applies only to SBIR and STTR Phase I applicants that have received more than 15 (16 or more) Phase II awards over the past 10 fiscal years, excluding the last two

years. These companies must have realized, to date, an average of at least \$100,000 of sales and/or investments per Phase II award (awarded during this period), or have received a number of patents resulting from the SBIR work equal to or greater than 15% of the number of Phase II awards.

Each year, SBA assesses the Performance Benchmark rates for all applicable SBIR/STTR awardees in the Company Registry. Rates are based on a company's total SBIR/STTR awards, across all the participating agencies. Companies that fail to meet either of the two Performance Benchmark requirements are not eligible to receive a Phase I award for a period of one year from the assessment. Note that this does not affect a company's eligibility for Phase II or Phase III awards.

SBA sends three notifications each year to companies affected by the benchmark performance requirements and will also communicate these to the USDA SBIR program. The SBA will also notify the USDA SBIR Program of those companies that have not met the benchmarks as detailed above.

When logged in to the Company Registry at www.sbir.gov, awardees can view their last assessed Transition Rate and Commercialization Rate by clicking on the "Performance Benchmark" side-bar. These company-specific rates appear under the heading "At Last Assessment." A thumbs-up/thumbs-down indicator shows whether or not the company passed the benchmark rates at the last assessment. If at any time, a company believes the award information on SBIR.gov is not correct, it should notify SBA using the dispute link provided. If a company's dispute of the data used for the rates is under review, it will see "TBD" under the "At Last Assessment" heading. Companies with less than the threshold number of awards (21 Phase I awards for the Transition Rate and 16 Phase II awards for the Commercialization Rate) will see "N/A" displayed because the requirement did not apply to them.

Under the heading "Current (On-Going)", the page displays a running calculation of the benchmark rates using the next years' time periods (each period moved up by one year) and current data in the system. Companies should monitor these rates to anticipate their standing for each upcoming June 1 Assessment. Prior to proposal preparation, all applicants to this solicitation that have received more than 20 Phase I awards across all federal SBIR/STTR agencies over the past five (5) years should verify that their company will not have a failing status on the Transition Rate Benchmark at the time of award. Applicants that have received more than 15 Phase II awards across all federal SBIR/STTR agencies over the past ten (10) years should verify that their company will not have a failing status on the Commercialization Rate benchmark at the time of award.

USDA/NIFA SBIR does not accept proposals from firms that are currently ineligible for Phase I awards as a result of failing to meet the benchmark rates at the last assessment.

2.2.3 Special Considerations

Complete, error-free applications must be submitted via Grants.gov by 5:00 p.m. Eastern Time on October 6, 2016. Applications received after this deadline will not be considered for review.

Applicants must allow additional time for electronic submission and plan ahead to allow time for correction of technical errors identified by Grants.gov. It is recommended that applicants begin submitting their completed application at least one day prior to the deadline.

USDA SBIR will rarely accept late applications. Exceptions are made for delays due to natural disasters or technical problems experienced by Grants.gov that impacts the entire applicant community. Registration issues, Adobe problems and individual applicant issues with Grants.gov are not considered valid reasons and will result in the application being excluded from review. Applicants that wish to appeal the decision to not review an application will have to provide documentation of the problem and document a reasonable effort to overcome Grants.gov

submission problems prior to the deadline. Applicants who have problems with their submissions to Grants.gov must call the Grants.gov help desk, not the USDA, to resolve the problems and keep a record of the following:

1. Grants.gov Tracking Numbers
2. Case numbers provided by Grants.gov
3. Any correspondence with Grants.gov regarding the submission problem
4. Any correspondence with SAM and Dunn and Bradstreet during the registration process

Once the application is successfully submitted to Grants.gov the applicant must forward the information above via email to sbir@nifa.usda.gov. Information obtained from the case number and correspondence will be used to verify if the submission problem was due to a Grants.gov system failure or due to a problem with the applicant. This information will be used to determine the final decision to accept or not accept a late application.

Throughout the program solicitation, the following is specified, “Attachment Format – (PDF Format is Required).” You should refer to Part III, 3.1 of the NIFA Grants.gov Application Guide for attachment requirements. It is your responsibility to correctly submit the attachments in the correct format. Grants.gov will not check the application for adherence to this requirement at the time of submission.

USDA SBIR electronic application submissions consist of Adobe forms and PDF attachments.

THE USDA SBIR PROGRAM WILL ONLY ACCEPT ATTACHMENTS IN PDF.

If you do not own PDF-generating software, Grants.gov provides online tools to assist applicants. To download the necessary software, go to <http://www.grants.gov/web/grants/applicants/adobe-software-compatibility.html>. PDF documents submitted as a part of the application must also adhere to the following guidelines:

- Margins not less than 1 inch; 2.5 cm on all sides;
- Type no smaller than 12 point font size regardless of whether it is single or double spaced;
- Font type should be Times New Roman, Geneva, Helvetica, Arial;
- Tables and graphics may be included; text for captions, headings and graphic explanations must not be smaller than 9 point and must be the same font type as the rest of the application;
- Applicants should use simple PDF-formatted files, do not use Portfolio or similar PDF features to bundle multiple files into a single PDF, disable security features such as password protection, keep file names to 50 characters or less and no special characters and use meaningful filenames.

NON-PDF DOCUMENTS WILL BE EXCLUDED FROM CONSIDERATION DUE TO NIFA SYSTEMS NOT BEING ABLE TO ACCEPT THESE FILES. Incomplete applications will also be excluded from NIFA review.

Page Limitations

Applications submitted electronically via Grants.gov consist of forms and PDF attachments. **Page limitations for certain attachments must be followed, see section 2.3.3. APPLICATIONS THAT DO NOT FOLLOW THE PAGE LIMITS OUTLINED IN SECTION 2.3.3 ARE NOT ELIGIBLE TO BE CONSIDERED FOR A PHASE I SBIR AWARD AND WILL BE EXCLUDED FROM NIFA REVIEW.**

Changes, Additions or Corrections

Modifications to the application will not be accepted after the closing date of this program solicitation. Under some circumstances, changes, additions, or corrections may be necessary to an application submitted to the USDA SBIR program via Grants.gov **before the specified program solicitation closing date.** Modifications to applications will require a resubmission of the entire application package and the applicant must notify the program at sbir@nifa.usda.gov of the resubmission. **Submitting changes to Grants.gov without contacting the program could significantly delay your application submission and may result in the application not being reviewed.**

2.3 Application Guidelines

Those who wish to submit an application to the USDA SBIR program should submit the following components and associated attachments via Grants.gov. Below are instructions for completing each field within each of the forms required in the application package. Page limitations indicated in bold are applicable to the specific section/attachment.

If there is a discrepancy between the program solicitation and the NIFA Grants.gov Application Guide, the information contained in this program solicitation is overriding.

2.3.1 SF-424 R&R Cover Sheet

Information related to the questions on this form is dealt with in detail in Part V, 2. of the NIFA Grants.gov Application Guide. See Part V., Section 2.18. of the NIFA Grants.gov Application Guide for the required certifications and assurances (e.g., Prohibition Against Entities Requiring Certain Internal Confidentiality Agreements).

Field 5. Please note: the USDA SBIR program’s official correspondence will be with either the PD or AOR.

Field 12. Proposed Project Start Date and End Date – The proposed duration of Phase I projects should normally not exceed eight months, except in special, justified circumstances. In most circumstances, the following dates should be used for these fields:

	Start	End
Phase I	6/1/2017	2/28/2018

Field 17. Complete Certification – Please refer to the NIFA Grants.gov Application guide for information on the Certifications that are being agreed to by checking this box.

NOTE: An applicant who is delinquent on Federal debts must attach explanatory information detailing all relevant particulars concerning the Federal debt in PDF format in Field 12 of the R&R Other Project Information form (Other Attachments).

Field 20. Pre-application – This is not applicable to the USDA SBIR program. No attachments should be added.

2.3.2 R&R Project/Performance Site Location(s)

Information related to the questions on this form is dealt with in detail in Part V, 3 of the NIFA Grants.gov Application Guide.

2.3.3 R&R Other Project Information Form

Information related to the questions on this form is dealt with in detail in Part V, 4 of the NIFA Grants.gov Application Guide unless otherwise noted below.

Field 7. Project Summary/Abstract – (PDF Format is Required)

1 PAGE is the Page Limit for the Summary/Abstract.

In the technical abstract, include a brief description of the problem or opportunity, project objectives, and a description of the effort. Provide another paragraph discussing the anticipated results and potential commercial applications of the proposed research. **The project summary/abstract of successful applications will be published by USDA and, therefore, should not contain proprietary information. IT IS THE RESPONSIBILITY OF THE APPLICANT TO REVIEW THE ABSTRACT ATTACHMENT FOR PAGE LIMIT AND PDF COMPLIANCE BEFORE SUBMISSION.**

Field 8. Project Narrative – (PDF Format is Required)

16 PAGES is the Page Limit for the Project Narrative (The only exception to this page limit requirement will be found in the directions as noted below under (1) Response to Previous Review.) NOTE: The USDA SBIR Program encourages applicants to only include information pertaining to the items listed below. Applicants must **not** include additional information such as cover sheets, table of contents, reference listings, budgets, and appendices **unless the applicant intends for these to be considered in the page count. Applicants that do not address the items listed below risk being excluded from NIFA review.**

IT IS THE RESPONSIBILITY OF THE APPLICANT TO REVIEW THE PROJECT NARRATIVE ATTACHMENT FOR PAGE LIMIT AND PDF COMPLIANCE BEFORE SUBMISSION.

1. Response to Previous Review –For applicants who are submitting an application in which the project described was previously submitted to the SBIR program, but not funded, the page limit for the Project Narrative is increased to 17 pages to permit a one page response to the previous reviews. Applicants should provide a clear statement acknowledging comments from the previous review, indicating revisions, rebuttals, etc. This response is a critical part of the screening criteria as noted in subsection 4.2(H). Furthermore, the revised application should clearly indicate the changes that have been made in the project. **If more than one page is required, additional pages should be taken from the 16 page limit of the Project Narrative so that the Project Narrative does not exceed a total of 17 pages when including the Response to Previous Review.**

2. Responsiveness to USDA SBIR Program Priorities and National Challenge Areas. – Please indicate if the application has a connection to agriculturally–related manufacturing technology, energy efficiency and alternative and renewable energy (see Section 1.5) or one or more of the National Challenge Areas (see Section 1.6). Provide a brief explanation of how the application is

related to the area indicated.

3. Identification and Significance of the Problem or Opportunity – Clearly state the specific technical problem or opportunity addressed and its importance.

4. Background and Rationale – Indicate the overall background and technical approach to the problem or opportunity and the part that the proposed research plays in providing needed results. As a part of this section, it is critical that applications adequately cite relevant scientific literature. Moreover, all citations provided must be properly referenced in the Bibliography & References Cited as a separate attachment (see 2.3.3 – Field 9).

5. Relationship with Research or Research and Development – Discuss the significance of the Phase I effort in providing a foundation for the follow-on Phase II R&D effort. State the anticipated results of the approach if the project is successful. This should address: (a) the technical, economic, social, and other benefits to the Nation and to users of the results, such as the commercial sector, the Federal Government or other researchers; (b) the estimated total cost of the approach relative to benefits; and (c) any specific policy issues or decisions that might be affected by the results.

6. Technical Objectives – State the specific objectives of the research or research and development effort. Include the technical questions needed to establish the technical feasibility of the proposed approach.

7. Work Plan – The work plan must provide an explicit, detailed description of the research or research and development approach. The plan should list the tasks to be performed, provide details of the methodology that would be used to research each task, including statistical analysis, if applicable, and indicate how and where the work will be carried out. The effort should attempt to determine the technical feasibility of the proposed concept. The work plan should be linked with the technical objectives of the research and the questions the effort is designed to answer. This section should constitute a substantial portion of the project narrative.

8. Related Research or Research and Development – Describe significant research or Research and Development (R&D) activities that are directly related to the proposed effort, including any conducted by the Project Director or by the proposing small business concern, how the proposed effort expands on the related work, and any planned coordination with outside sources. The applicant must persuade reviewers that he or she is aware of related research in the selected subject. It is critical that the applicant make a convincing case that the proposed research builds upon previous research and, if successful, will lead to the development of a new product, process, service, or technology or to substantial improvement of an existing product, process, service, or technology.

9. Potential Post Application – Briefly describe the commercialization potential of the proposed research after Phase I funding. In addition, indicate whether there appears to be a potential use of the proposed research by the Federal Government. Include a brief description of the proposing company (e.g., date founded, number of employees, and its field of interest). What are the major competitive products in this field, and what advantages will the proposed research have over existing technology in application, performance, technique, efficiency, or cost?

10. Satisfying the Public Interest - Specify how the proposed research will satisfy one or more of the following USDA strategic goals: (more information can be found at <http://www.ocfo.usda.gov/usdasp/usdasp.htm>)

a. Strategic Goal 1: Assist Rural Communities To Create Prosperity So They Are Self-

- Sustaining, Repopulating, And Economically Thriving
- b. Strategic Goal 2: Ensure Our National Forests And Private Working Lands Are Conserved, Restored, And Made More Resilient To Climate Change, While Enhancing Our Water Resources
 - c. Strategic Goal 3: Help America Promote Agricultural Production And Biotechnology Exports As America Works To Increase Food Security
 - d. Strategic Goal 4: Ensure That All Of America's Children Have Access To Safe, Nutritious, And Balanced Meals

Field 9. Bibliography & Cited References – (PDF Format is Required)

Provide a complete list of all references cited in the application. **For each reference, provide the complete name for each author, the year of the publication, full title of the article, name of the journal or book published, volume, and the page numbers.** The references should be listed in alphabetical order using the last name of the first author.

Field 10. Facilities & Other Resources – (PDF Format is Required) Describe the types, location, and availability of instrumentation and physical facilities necessary to carry out the work proposed. This letter should be included as a part of Other Attachments, see Field 12 below.

Field 11. Equipment Documentation – (PDF Format is Required) Describe the types, location, and availability of equipment necessary to carry out the work proposed. Items of equipment to be purchased must be fully justified under this section. When purchasing equipment or a product under the SBIR funding agreement, the small business should purchase only American-made items whenever possible and should normally not exceed 10 percent of the budget request.

Field 12. Other Attachments – (PDF Format is Required) See Part V, 4.12 for instructions for documentation to be included in this field. The following are additional instructions for documentation that may be required for your application.

- (1) **Use of Facilities or Equipment** – If university facilities, private facilities, or government laboratories are being used, there must be a letter in the application from the authorized organizational representative of the university, private facility, or government laboratory describing the arrangement and testifying that the facilities will be subject to the exclusive use and control of the applicant.
- (2) **Outside Services** – Involvement of university, government, or other outside personnel in the planning and research stages of the project as consultants or through subcontracting arrangements is permitted and may be particularly helpful to small businesses that have not previously received Federal research awards. By statute, the USDA SBIR program can only allow up to **one third (1/3)** of the grant funds to be used for subcontracting and consulting purposes. Establishment of a Cooperative Research and Development Agreement (CRADA) with a USDA laboratory or other Federal laboratory may also be beneficial to proposing firms. If the application involves outside consultants, subcontracts, or involvement with a CRADA partner, these arrangements must be described in detail. **Applications must include letters from proposed consultants, subcontractors or CRADA or license cooperators indicating their willingness to serve in order for such participation to be considered during the application review and evaluation process (see subsection 4.3 as appropriate).**
- (3) **Letters of Support** – General letters of support from potential end-users of the technology or from individuals/organizations that want to express support for the application.

- (4) **Duration Exceeds Normal Project Period** – The proposed duration of Phase I projects should normally not exceed eight months, except in special, justified circumstances. Where a proposed research project requires more than eight months to complete Phase I, a longer project period, not to exceed twenty months, may be requested. An applicant of a Phase I project with an anticipated duration beyond eight months should specify and justify the length of duration in the application at the time of its submission to USDA.
- (5) **Applicant is a Subsidiary** – A potential grantee that is a subsidiary must show that the parent company is also a small business entity and the parent company must provide documentation supporting their small business status. The subsidiary must provide documentation to support its independent viable financial status.
- (6) **Statement as to Delinquency on Federal Debts by Applicants for Federal Assistance** – An applicant that is delinquent on Federal debts must attach, in PDF format, explanatory information detailing all relevant particulars concerning the Federal debt.
- (7) **Non-Domestic Performance Explanation** – Requests for foreign travel or work are discouraged, but may be approved based on the justification provided in the application (see Field K. under 2.3.6 below).
- (8) **SBA Company Control ID (PDF Format is Required)** – SBA will issue your company a unique SBC Control ID and PDF file after the company is registered with SBA (See Section 2.2.2). The PDF file must be attached to this application.
- (9) **Felony Tax and Certification Form** - This form will be required for processing of awards. Please include your institution’s tax and felony certification form with your application. See Part V., Section 4.12 of the NIFA Grants.gov Application Guide (Field 12 on the Form) for instructions regarding mandatory Felony Convictions or Tax Delinquent Status.

Missing forms can delay the award of selected projects. Applicants need to ensure that these attachments are completed at the time of submission.

2.3.4 R&R Senior/Key Person Profile – (PDF Format is Required)

PD Profile Attachment

Applicants must fill out a profile for the PD and anyone that will be supported by the budget. For instructions on completing the profile part of this form, applicants must reference Part V.5 of the NIFA Grants.gov Application Guide for directions. This section of the Guide includes information about the people who require a Senior/Key Person Profile and details about completing the Biographical Sketch.

Current and Pending Support Attachment

Applicants must reference Part V.5 of the NIFA Grants.gov Application Guide for directions to complete the Current and Pending Support form. The NIFA Grants.gov Application Guide provides a link to a suggested template for the Current and Pending Support.

Missing forms can delay the award of selected projects. Applicants need to ensure that these attachments are completed at the time of submission.

2.3.5 R&R Personal Data

As noted in Part V, 6. of the NIFA Grants.gov Application Guide, the submission of this information is voluntary and is not a precondition of award. Part V.6. also notes the importance and use of the information.

2.3.6 R&R Budget

Information related to the questions on this form is dealt with in detail in Part V.7 of the NIFA Grants.gov Application Guide unless otherwise noted below. Applicants who plan to have a sub award (subcontract) will need to reference section 2.3.7 for directions.

A Research & Related Budget form must be completed for each year (or partial year) for which work is proposed under this program solicitation. **Applicants must include a budget request that is appropriate for this solicitation. All USDA SBIR Phase I grants have a cap of \$100,000. Applications with a budget request that exceeds this cap will be excluded from review.**

Fields C1-C11. Equipment Description - Performing organizations are expected to have appropriate facilities, suitably furnished and equipped. However, funding for items of equipment may be requested provided that they are specifically identified with the dollar amount and adequately justified, see Field K (2) Budget Justification of the R&R Budget for specific requirements.

Field D2. Foreign Travel Costs Funds Requested - Requests for foreign travel are discouraged, but may be approved based on the justification provided in the application. See Field K (4) Budget Justification of the R&R Budget for specific requirements.

Field J. Fee - Applicants must reference the NIFA Grants.gov Application Guide for directions. If an applicant requests a fee, the combined total of “Section I - Total Direct and Indirect Costs” and “Section J – Fee” on the Research & Related (R&R) Budget form must not exceed the funding ceiling of this program solicitation.

Field K. Budget Justification – (PDF Format is Required) - A budget justification with supporting detail for each budget category as noted in items (1) through (5) of this subsection must be attached. **A budget justification is required for each entity for which a Research & Related Budget Form is submitted.**

- (1) **Salaries and Wages** – Indicate the number and kind of personnel for whom salary support is sought, including job tasks. Provide the base salary for senior personnel. For key personnel, also indicate the number of work months of involvement to be supported with USDA funds, and explain how the level of compensation was established (e.g., the hourly rate of pay, the monthly rate of pay, or the yearly rate of pay).
- (2) **Equipment** – Performing organizations are expected to have appropriate facilities, be suitably furnished and equipped. However, funding for items of equipment may be requested, provided that they are specifically identified with the dollar amount and adequately justified. **Such requests should normally not exceed 10 percent of the budget.** Equipment is defined as an article of nonexpendable, tangible personal property having a useful life of more than one year and an acquisition cost of \$5000 or more per unit. Awardees are usually allowed to retain title to equipment purchased with funding provided under a SBIR funding agreement. However, in some instances, USDA may direct the awardee to vest title to a third party. **Awardees should plan to lease expensive equipment.** The inclusion of equipment will be carefully reviewed and will require prior approval from NIFA per 2 C.F.R. 200.439 with respect to need, reasonableness, and

appropriateness for the research proposed.

- (3) **Materials and Supplies** – The types of expendable materials and supplies required should be indicated in general terms with estimated costs.
- (4) **Travel** – The type and extent of travel and its relationship to the project should be specified. Funds may be requested for field work or for travel to professional meetings. Requests for foreign travel are discouraged, but may be approved based on the justification provided in the application. In the budget justification, provide the purpose, the destination, method of travel, number of persons traveling, number of days, and estimated cost for each trip. If details of each trip are not known at the time of application submission, provide the basis for determining the amount requested.
- (5) **All Other Direct Costs** – Other anticipated direct costs not included above should be itemized. Examples include, but are not limited to, subcontracts and consultants. See Field 12 “Other Attachments” of the R&R Other Project Information form for required documentation associated with subcontracts and consultants. A budget and budget justification stating sub-contractual and consulting costs and the rationale for the amount of the costs are required. Consultants’ rate of pay is limited to \$608/day for an eight hour day. Applicants should reference Section 1.4(B) Size, to determine the total amount of funds a Phase I SBIR project can provide to subcontracts and consultants.
- (6) **Fee** - A reasonable fee, not to exceed seven percent of total Federal funds awarded (.07527 of Field I, Total Direct and Indirect Costs) is permitted under this program solicitation, but applicants are encouraged to minimize fee requests due to the small amount of funds available. **All fees are subject to negotiation with USDA.** If a fee is requested, the amount should be indicated in Field J “Fee” on the R&R Budget form. **Applicants who are not familiar with the definition of a fee, should reference section 9.0 of this Program Solicitation.**
- (7) **Indirect Costs** - See Part V, section 7.9 of the NIFA Grants.gov Application Guide for information about requesting indirect cost.

2.3.7 R&R Subaward Budget Attachment - (PDF Format is Required)

Information related to the questions on this form is dealt with in detail in Part V, 8. of the NIFA Grants.gov Application Guide. By statute the USDA SBIR program can only allow up to **one third (1/3)** of the grant funds to be used for subcontracting and consulting purposes.

You should note that the check application feature in the Grants.gov application package will not check the Subaward budget forms. However, once the application is submitted to Grants.gov, Grants.gov will validate the subaward budget forms for compliance. If the subaward budget forms fail the Grants.gov validation, the application will be rejected and an email will be sent to the applicant notifying them of this problem. USDA NIFA will not accept late applications due to a non-compliant subaward budget form. You must plan ahead and submit early in order to correct any problems you may have with your submission to Grants.gov.

2.3.8 NIFA Supplemental Information

Information related to the questions on this form is dealt with in detail in Part VI, 1. of the NIFA Grants.gov Application Guide unless otherwise noted below.

Field 2. Program to Which You Are Applying and Program Code – This refers to the topic area (see section 8.0) to which you are submitting your USDA SBIR application. For example:

Program Code Name: *Forest and Related Resources*

Program Code: *8.1*

If you have a question about which topic area is appropriate for your application, please contact the NPL in the area(s) in question. An application can only be submitted to one topic area. It is extremely important the Program Code Name and Program Code are spelled correctly and match exactly one of the topic areas indicated in section 8.0 of this program solicitation. Failure to complete these fields correctly could significantly delay the acceptance of your application into the program and the application may not be reviewed.

Field 8. Conflict of Interest List – PDF Attachment. No Page Limit. Title the attachment as ‘Conflict of Interest’ in the document header and save file as ‘ConflictofInterest’. See Part VI, 1.8 of the NIFA Grants.gov Application Guide for further instructions and a link to a suggested template.

Missing forms can delay the award of selected projects. Applicants need to ensure that conflict of interest attachments are completed at the time of submission.

2.3.9 SBIR/Small Business Technology Transfer Program (STTR) Information

Information related to the questions on this form is dealt with in detail in Part VI, 3 of the NIFA Grants.gov Application Guide unless otherwise noted below.

Field 1b. Anticipated Number of Personnel to be employed at your organization at the time of award? – Enter a number.

Field 7. Commercialization Plan – Leave this section blank.

Field 8. Documentation of Prior SBIR Phase II Awards – PDF Attachment.

There are two documents Phase I applicants must provide.

Attachment 1: A small business firm that submits a Phase I application and has received more than 15 Phase II SBIR awards during the preceding five fiscal years must document the extent to which it was able to secure Phase III funding to develop concepts resulting from previous Phase II SBIR awards. In addition, the documentation must include the name of the awarding agency, date of award, funding agreement number, amount, topic or subtopic title, follow-on agreement amount, source and date of commitment, and current commercialization status for each Phase II award. USDA shall collect and retain the information at least until the General Accounting Office submits the report required under section 105 of the Small Business Research and Development Enhancement Act of 1992.

If the applicant falls under the threshold indicated above, the applicant must provide an attachment stating that less than 15 Phase II awards have been granted to this organization/company during the preceding five fiscal years.

Attachment 2: Five (5) Page Limit.

A small business firm that submits a Phase I application and has previously received Phase II funding

under the USDA SBIR Program in the preceding five fiscal years must document the extent to which it was able to secure Phase III funding and commercialize the technology, product or service funded by USDA SBIR. The documentation must include:

1. Company & Phase II Grant Information
2. Partnership-Related Activities
3. Funding: Describe any funding and third-party investments
4. Revenue & Sales
5. Intellectual Property Assets
6. Other Success Indicators (Employees, Acquisitions, Return on Investment (ROI), etc....)
7. Company Achievements

USDA SBIR shall collect and retain the information for its internal use. Any data provided under this section of the application may lead to USDA contacting the applicant to coordinate the development of additional information that can serve to inform the public and the Federal Government on the benefits of the USDA SBIR program to Small Businesses.

If the applicant does not have any prior USDA SBIR Phase II awards, the applicant must provide an attachment stating “No prior USDA SBIR Phase II awards have been issued to [Insert Company Name]”.

3.0 SUBMISSION OF APPLICATIONS

3.1 When to Submit

All Phase I applications must be received by Grants.gov by **5:00 p.m. Eastern Time on October 6, 2016**. Applications received after this deadline normally will not be considered for funding.

For the convenience of all potential applicants, the following schedule is provided for informational purposes:

Phase I

Deadline date for applications: October 6, 2016

Standard period of performance: June 1, 2017 through February 28, 2018

3.2 What to Submit

USDA SBIR electronic application submissions consist of forms (viewed, completed, and submitted through the Grants.gov Web site) and attachments. All of the necessary forms and instructions will be found on the Grants.gov Web site (see section 2.0 of this program solicitation). One way applicants can access the appropriate page on Grants.gov is by visiting the USDA SBIR funding opportunity page at <http://www.nifa.usda.gov/fo/sbir>.

Applicants need to ensure that all forms are submitted as directed in section 2.0 of this solicitation. Missing forms can delay the award of selected projects or could result in an application not being reviewed.

All attachments submitted with the application must follow the requirements listed under Part III, 3.1 of the NIFA Grants.gov Application Guide.

ANY PROPOSALS CONTAINING NON-PDF DOCUMENTS WILL BE AT RISK OF BEING EXCLUDED FROM NIFA REVIEW. Partial applications will be excluded from NIFA review. Applications with critical documents which are write protected or password protected will not be reviewed.

Please note: Applicants must have successfully completed the entire registration process, see subsection 3.2.2, prior to being able to submit an application through Grants.gov.

3.3 Questions Pertaining to the USDA SBIR Program or to this Solicitation

Written or verbal questions of a general nature about the USDA SBIR program, as well as general questions pertaining to this solicitation, but not pertaining to requests for additional copies of the solicitation, should be sent to sbir@nifa.usda.gov or can be directed to the SBIR Program Coordinator, SBIR Program Specialist or one of the USDA SBIR NPLs, see section 1.7.

3.4 Information on Application Status

It is anticipated that the evaluation of Phase I applications will require approximately five months from

October 6, 2016. No information on application status will be available until final selections have been made.

Successful applicants will be notified of the intent to fund their applications within approximately six months after submission with a final award on or around June 1, 2017.

Unsuccessful applicants will be notified of a final decision approximately six months after submission.

4.0 METHOD OF SELECTION AND EVALUATION CRITERIA

4.1 Introduction

All Phase I applications will be evaluated on a competitive basis. Applications will be initially screened to determine responsiveness to the program solicitation.

Applications passing this administrative requirement will be evaluated by technical reviewers to select those with the highest scientific and technical merit. **Applications received after the specified closing date or not following application guidelines of this program solicitation will not be considered for a Phase I SBIR award and will not be reviewed.**

External peer reviewers will be used during the technical evaluation stage of this process. Selections will be made from among recognized specialists who are highly qualified by training, education and experience in their respective fields to render expert advice on the merit of applications received. It is anticipated that these experts normally will be drawn from universities, Government, and non-profit research organizations.

Final decisions will be made by USDA based upon the ratings assigned by reviewers and consideration of other factors, **including the potential commercial application**, possible duplication of other research, any critical USDA requirements, program balance, and budget limitations. There is no commitment by USDA to fund any particular application, to support any specific number of applications in a given research topic area, or to make a specific number of awards. USDA also may elect to fund several or none of the proposed approaches to the same topic. Care will be taken to avoid actual and potential conflicts of interest among reviewers. Evaluations will be confidential to USDA staff members, peer reviewers, and the proposed Project Director to the extent permitted by law.

4.2 Administrative Requirements Criteria

To avoid any misunderstandings, applicants should be aware that applications that do not satisfy all of the screening criteria are at risk of being excluded from NIFA review. Returned applications may not be resubmitted (with or without revision) under this solicitation. The initial screening criteria are the following:

- (A) The proposing firm must qualify as a small business concern as defined in section 9.0.
- (B) The application must be received by **5:00 p.m. Eastern Time on October 6, 2016.**
- (D) The application must meet the Application Content and Format requirements as described in section 2.0.
- (E) The application must meet the required page lengths as described on section 2.0.
- (D) Applications must be limited to one research problem as described in section 2.0.
- (E) The proposed budget must be within the dollar limit identified in subsections 1.2 and 2.3.6.
- (F) The proposed Phase I research must fall within a solicited topic area in section 8.0.
- (F) An application must contain adequate scientific/technical information clearly stating the research

plan and objectives. USDA reserves the right not to submit for review any application that it finds to have insufficient scientific/technical information (See Section 2.3.3, Field 8, numbers (1) through (10)).

(G) The application will be screened to determine if it is a duplicate by comparing the title and abstract.

(H) A resubmitted application must address concerns of the previous review panel. USDA reserves the right not to submit for review any application found not to be responsive to the previous reviews.

4.3 Phase I Evaluation Criteria

USDA plans to select for award those applications offering the best value to the nation. The primary evaluation criteria used by reviewers are listed below. Approximately equal consideration will be given to each criterion **except for item (A), which will receive twice the value of any of the other items.**

(A) Scientific and Technical Feasibility:

- The application should contain a thorough background section with an up-to-date literature review.
- The application should clearly state the objectives logically and indicate how they will lead toward proving the technical feasibility of the approach or concept.
- The research plan should offer an original and innovative approach to the problem and sufficient detail to indicate how each research objective will be investigated.
- The research plan should be completed in the requested grant period.

(B) Importance of the Problem:

- The application should provide sufficient justification for the importance of the problem and clearly indicate the anticipated commercial potential of the proposed research.
- The proposed project should be in the public interest and satisfy one or more of the USDA strategic goals and objectives listed in subsection 2.3.3 (item 10. of Field 8).

(C) Investigator and Resource Qualifications:

- The bibliographic information should be provided to document that the Project Director, other key staff and any consultants have the appropriate training and experience to carry out the proposed research plan.
- If consultants, subcontractors or CRADA cooperators are involved in the project, letters from these individuals should be included in the application verifying their willingness to participate in the research study, their rates of pay and any other budgetary information.
- Adequate research facilities that are available should be owned or controlled by the small business for the duration of the grant.
- Instrumentation available should be adequate to complete the proposed research plan.

(D) Budget:

- The budget should be appropriate for the proposed research plan.
- Budget detail should include subcontract, consultant, and CRADA and license agreement data to indicate clearly how the funds would be utilized.

(E) Duplication:

- Duplication of any ongoing or previous research by the small business firm or by other

- researchers will not be considered.
- The application should clearly indicate how the proposed technology would differ significantly from existing technology.
 - If the small business firm or a consultant has received or applied for patent(s) pertaining to the proposed technology, the proposed research should constitute a legitimate feasibility study.

Additional factors that will be considered in the review process include whether an application involves a CRADA with a USDA laboratory, a licensing agreement, is a resubmission or meets one of the USDA SBIR Program Priority Areas or NIFA National Challenges (see section 1.5 and 1.6). In the event that two or more applications are of approximately equal merit, the existence of a CRADA with a USDA laboratory, a licensing agreement with a USDA Laboratory, is a resubmission or meets one of the USDA SBIR Program Priority Areas or NIFA National Challenges will be given additional consideration and preference over applications that do not address these areas.

4.4 Phase I Review Process

USDA SBIR evaluates applications using a confidential peer review system. Separate review panels are held that correspond to each of the topic areas listed in Section 8.0. Reviewers are normally drawn from universities, government and non-profit research organizations. For each topic area, a NPL is appointed as a topic manager. The NPL for each topic area recruits a Panel Manager, and in consultation with USDA SBIR leadership, a review panel is appointed. The Panel Manager ensures that the review panel evaluates applications fairly. Applications are reviewed both by members of the review panel and by ad hoc reviewers with specific expertise appropriate for each application. The panel discusses each application carefully and then ranks the applications. The panel rankings are used in determining which applications are funded.

Considerable effort is made to ensure that the review process is confidential. Reviewers are instructed to handle all applications in complete confidence and each reviewer is provided written guidelines to follow. All reviewers are obligated to certify that they will maintain confidentiality at the time they prepare a review and submit it through the Agency's electronic Peer Review System (PRS).

Every effort is made to avoid even the appearance of a conflict-of-interest (COI). The USDA has rules on COI that are followed during the review process. If a panel member has a COI on an application, he/she will not review the application and will be excused from the panel meeting when the particular application is being discussed. USDA/NIFA is committed to ensuring a fair and confidential review process. During the peer evaluation process, we take extreme care to prevent any actual or perceived conflicts of interest that may impact review or evaluation. See http://www.nifa.usda.gov/business/competitive_peer_review.html for further information about conflicts of interest and confidentiality as related to the peer review process.

4.5 Notice to Applicants

Technical reviewers will base their conclusions and recommendations on information contained in the application. It cannot be assumed that reviewers are acquainted with any experiments referred to within an application, with key individuals, or with the small business firm itself.

USDA SBIR will send copies of reviews, not including the identity of reviewers, and a summary of the panel comments to the applicant PD after the review process has been completed. Due to funding limitations and USDA's desire to support as many worthwhile projects as possible, it may be necessary

for USDA/NIFA to reduce the amount of an award below the amount requested by a small business or to fund only certain objectives outlined in the application. Any significant changes will be discussed with the proposing small business, which may then be asked to submit a revised budget reflecting the reduced amount. In the event that this occurs, specific instructions will be provided to the applicant.

5.0 CONSIDERATIONS

5.1 Awards

Depending upon the availability of funds, USDA expects to make approximately 75 Phase I awards, not to exceed \$100,000 each, to small businesses in FY 2017. Awards are anticipated to be made on or about June 1, 2017. USDA will announce the names of those concerns receiving awards and successful applicants will then typically have eight months after awards are made to carry out their proposed Phase I effort.

Additional factors that will be considered in the review process include whether an application involves a cooperative research and development agreement (CRADA) with a USDA laboratory, or a license to a USDA technology, or is a resubmission. In the event that two or more applications are of approximately equal merit, the existence of a CRADA with a USDA laboratory or a license to a USDA technology will be an important consideration and given additional consideration and preference. If one application is a resubmission, this will also be an important consideration.

A list of available technologies for licensing and CRADAs that may be considered as projects under the SBIR program can be found at the USDA Office of Technology Transfer (OTT) website <http://dbnrrc.ars.usda.gov/business/docs.htm?docid=763&page=6>. Each of these technologies would be appropriate for one of the topic areas in section 8.0 of this program solicitation. If an applicant is interested in proposing a research project that addresses one of these technologies, the applicant should contact the OTT office at 301-504-6905 or <http://www.ars.usda.gov/business/Docs.htm?docid=763> to discuss the possibility of signing a licensing agreement and possibly also a CRADA agreement prior to submitting the proposal to the SBIR program.

All Phase I awards will be issued as research grants in accordance with the guidelines contained in 31 U.S.C. 6301-6308, the authority contained in Section 630 of the Act making appropriations for Agriculture, Rural Development and Related Agencies' programs for fiscal year ending September 30, 1987 and for other purposes, as made applicable by Section 101(a) of Public Law Number 99-591, 100 Stat. 3341.

A reasonable fee may be requested as part of the budget. See 2.3.6, Field J.

5.2 Reports

The output and reporting requirements are included in the award terms and conditions (see <http://nifa.usda.gov/terms-and-conditions> and scroll down for information about USDA SBIR award terms). If there are any program or award-specific award terms, those, if any, will be identified in the award.

5.2.1 REEport

Reports submitted to REEport are entered into the CRIS database. CRIS is a public database of all projects funded by USDA. Because the CRIS database is open to the public, reports submitted to REEport must not contain any proprietary information.

5.2.2 Technical Reports

For successful Phase I applications, the grantee is required to submit interim and final technical reports to program officials in accordance with the terms and conditions of the award, in addition to the Web-based reports referenced above. **Reporting instructions will be found in the Terms and Conditions which will be provided at the time of award.**

Please note: All technical reports are held confidential for a period covering four years after the termination of the project. **As such, proprietary information should be included in all technical reports only when necessary to provide the USDA SBIR Staff adequate information to evaluate the outcome of the project.**

5.2.3 Financial Reports

For Phase I applications, a final “**Financial Status Report**” (SF-425) is due within 90 days after the expiration date of the grant and should be submitted in accordance with instructions contained in the award terms and conditions.

5.3 Proprietary Information

When an application results in an award, it becomes a part of the record of NIFA transactions, available to the public upon specific request. Information that the Secretary determines to be of a confidential, privileged, or proprietary nature will be held in confidence to the extent permitted by law. Therefore, any information that the applicant wishes to have considered as confidential, privileged, or proprietary should be clearly marked within the application. The original copy of an application that does not result in an award will be retained by the Agency for a period of three years. Other copies will be destroyed. Such an application will be released only with the consent of the applicant or to the extent required by law. An application may be withdrawn at any time prior to the final action thereon.

5.4 Rights in Technical Data

Rights in technical data, including software developed under the terms of any funding agreement resulting from an application submitted in response to this solicitation, shall remain with the grantee. However, the Government shall have the limited right to use such data for Governmental purposes and shall not release such data outside the Government without permission of the grantee for a period of four years from completion of the project under which the data were generated. Effective at the conclusion of the four- year period, the Government shall retain a royalty-free license for Governmental use of any technical data delivered under the agreement, whether patented or not.

5.5 Copyrights

With prior written permission of the ADO, the grantee normally may copyright and publish (consistent with appropriate national security considerations, if any) material developed with USDA SBIR support. USDA receives a royalty-free license for the Federal Government and requires that each publication contain the following acknowledgment and disclaimer statement:

“The project was supported by the Small Business Innovation Research program of the U.S.

Department of Agriculture, grant number #. Any opinions, findings and conclusions or recommendations expressed in this publication are those of the author(s) and do not necessarily reflect the views of the U.S. Department of Agriculture.”

The last sentence may be omitted from articles published in scientific journals.

5.6 Patents and Inventions

Allocation of rights to inventions shall be in accordance with 35 U.S.C. 202-206 and the Department of Commerce implementing regulations entitled “Rights to Inventions Made by Nonprofit Organizations and Small Business Firms under Government Grants, Contracts and Cooperative Agreements” at 37 CFR Part 401. These regulations provide that small businesses normally may retain the principal worldwide patent rights to any invention developed with USDA support. USDA receives a royalty-free license for Federal Government use, reserves the right to require the patentee to license others in certain circumstances, and requires that anyone exclusively licensed to sell the invention in the United States must normally manufacture it domestically. To the extent authorized by 35 U.S.C. 205, USDA will not make public any information disclosing a USDA-supported invention for a four-year period to allow the grantee a reasonable time to file an initial patent application. Additional information may be obtained by contacting:

Bart Hewitt, Director of Planning, Accountability, and Reporting
National Institute of Food and Agriculture, USDA STOP 2213
1400 Independence Avenue, SW Washington, DC 20250-2213
Telephone: (202) 720-5623
Facsimile: (202) 720-7714
bayhdole@nifa.usda.gov

SBIR awardees must report inventions to the awarding agency within two months of the inventor’s report to the awardee. The reporting of inventions must be made through submission to Interagency Edison (www.iedison.gov). Specific instructions for invention reporting are contained in the agency’s terms and conditions, a copy of which can be provided upon request.

5.7 Research Involving Special Considerations

A number of situations frequently encountered in the conduct of scientific research require the submission of special information for a particular project. Since some types of research targeted for SBIR support have high probability of involving human subjects at risk or vertebrate animals, special instructions follow:

If the proposed research will involve human subjects at risk or vertebrate animals, the application must so indicate by checking “Yes” on the R&R Other Project Information form. Further, in the event that the project is funded, the applicant may be required to have the research plan reviewed and approved by the appropriate review board or committee. It is suggested that applicants contact local universities, colleges, or nonprofit research organizations that have established such reviewing mechanisms to have this service performed.

Guidelines to be applied and observed when conducting such research are outlined below.

- (A) **Human Subjects at Risk** - Regulations issued by the Department of Agriculture to be used in safeguarding the rights and welfare of human subjects used in research supported with USDA grant funds are contained in 45 CFR Part 46 and USDA regulations set forth in 7 CFR Part 1c. All nonexempt research projects involving human subjects must be approved by an Institutional Review Board prior to commencing actual substantive work.
- (B) **Animal Care** - The performing organization must comply with the Animal Welfare Act (7 U.S.C., 2131-2156); Public Law 89-544, 1996 and the regulations issued by the Department of Agriculture in 9 CFR parts 1, 2, 3 and 4. In the case of domesticated farm animals housed under farm conditions, the grantee must adhere to the principles stated in the Guide for the Care and Use of Agricultural Animals in Agricultural Research and Teaching, and Federation of Animal Sciences Societies, 1999. In the event a project involving the use of living vertebrate animals results in a grant award, funds will be released only after a qualified Institutional Animal Care and Use Committee has approved the project.

5.8 Responsible and Ethical Conduct of Research and Reporting Waste, Fraud and Abuse

See <http://nifa.usda.gov/responsible-and-ethical-conduct-research> for further information.

Reporting Waste, Fraud and Abuse - In the event a company or individual suspects any waste, fraud and/or abuse, the company or individual can contact the USDA Office of Inspector General (OIG)'s hotline at <https://www.usda.gov/oig/hotline.htm> or at (800) 424-9121.

5.9 Grantee Commitments

Upon issuance of a research grant by USDA, the awardee will be required to make certain legal commitments through acceptance of the award document and the terms and conditions attached thereto, as well as any project-specific terms or conditions outlined.

5.10 Additional Information

- (A) This program solicitation is intended for informational purposes and reflects current planning. If there is any inconsistency between the information contained herein and the terms of any resulting SBIR funding agreement, the terms and conditions of the funding agreement are controlling.
- (B) Before the award of an SBIR funding agreement, USDA requires the submission of certain organizational management, personnel, and financial information to assure responsibility of the applicant, including certification that the proposing organization is in compliance with the Civil Rights Act of 1964. These forms will be provided to the small business concern by the Office of Grants and Financial Management, NIFA, prior to the forwarding of the funding agreement for acceptance. The information contained in both forms must normally be submitted on a one-time basis only. (If sufficient changes occur within the organization to warrant submission of new or additional information, additional forms should be requested by calling (202) 401-4986. It is anticipated that all Phase I awardees will be required to submit the above information. **Please note that NIFA will not issue an award until all requested organizational management and financial information has been received. Delaying or failing to submit this information**

- could result in the application not being funded.**
- (C) If an applicant or a grantee is contemplating any type of transaction involving the entity (i.e., merger, spin-off or sale), it is advised that the applicant or the grantee contact one of the SBIR NPLs (see subsection 1.7) for knowledge of how the transaction may affect a potential grant or existing grant, as applicable.
 - (D) USDA is not responsible for any monies expended by the applicant prior to the award of any funding agreement.
 - (E) This program solicitation is not an offer by USDA and does not obligate USDA to make any specific number of awards. Also, awards under this program are contingent upon the availability of funds.
 - (F) Unsolicited applications will not be accepted under the SBIR program.
 - (G) The applicant must provide the total number of employees for the organization and its subsidiaries and/or parent company, if applicable.

5.11 Administrative and National Policy Requirements

Several federal statutes and regulations apply to grant applications considered for review and to project grants awarded under this program. These may include, but are not limited to, the ones listed on the NIFA web page - <http://nifa.usda.gov/federal-regulations>.

NIFA Federal Assistance Policy Guide—a compendium of basic NIFA policies and procedures that apply to all NIFA awards, unless there are statutory, regulatory, or award-specific requirements to the contrary is available at <http://nifa.usda.gov/policy-guide>.

6.0 SCIENTIFIC AND TECHNICAL INFORMATION SOURCES

Listed below are some of the sources that can provide technology search and document services which may be useful in preparing SBIR applications. They can be contacted directly for service and cost information.

National Agricultural Library
Service Desk
U.S. Department of Agriculture
10301 Baltimore Avenue
Beltsville, MD 20705-2351
(301) 504-5755
www.nal.usda.gov

National Technical Information Service
5285 Port Royal Road
Springfield, VA 22161
(800) 553-6847
www.ntis.gov

REReport
PARS/NIFA/USDA
Stop 2213
1400 Independence Ave., SW
Washington, DC 20250
<http://nifa.usda.gov/tool/reeport>

Regional Technology Transfer Centers

Far West
Western Research Application Center (WESRAC)
3716 South Hope Street, Suite 200
Los Angeles, CA 90007
(213) 743-2732
<http://wesrac.usc.edu/>

Mid-Continent Technology Transfer Center
Texas Engineering Extension Service
The Texas A&M University System
301 Tarrow
College Station, TX 77843-8000
(979) 845-8762
Fax (979) 845-3559
www.teex.com

Mid-Atlantic
TECC - the Technology Commercialization Center
144 Research Drive
Hampton, VA 23666
(757) 766-9200
Fax (757) 766-2402
www.teccenter.org

Agricultural Technology Innovation Partnership (ATIP) Program

California Association for Local Economic Development
550 Bercut Drive, Suite G
Sacramento, CA 95811
916-448-8252
<http://www.caled.org/>

Center for Innovation at Arlington, TX (CFI)
202 E Border St.
Arlington, TX 76010
817-543-4298
<https://thecenterforinnovation.org/>

Center for Innovative Food Technology, Toledo, OH (CIFT)
5555 Airport Hwy., Ste. 100
Toledo, OH 43615-7320
www.ciftinnovation.org

Georgia Research Alliance (GRA)
50 Hurt Plaza, Suite 1220
Atlanta, GA 30303
404-332-9770
www.gra.org

Innovate Mississippi
134 Marketridge Drive
Ridgeland, Mississippi 39157
601-960-3610
www.innovate.ms

Maryland Technology Development Corporation (TEDCO)
5565 Sterrett Place
Suite 214
Columbia, MD 21044
1-800-305-5556
www.tedco.md

Wisconsin Security Research Consortium (WSRC)
455 Science Drive #240

Madison, WI 53711
920-527-1950
www.wisecurity.org

7.0 SAMPLE APPLICATION TRAINING MODULE

USDA NIFA has set up a website that provides new applicants the experience with using Grants.gov without having to go to the live site. The training module can be located at:
<http://nifa.usda.gov/resource/sample-application-training-module>.

8.0 RESEARCH TOPIC DESCRIPTIONS AND INSTRUCTIONS

Applicants are encouraged to submit applications that address the research priorities stated for each topic area described in this Program Solicitation (see topic areas 8.1 through 8.13 below). They are further encouraged to submit applications related to agriculturally-related manufacturing technology, energy efficiency and alternative and renewable energy or one or more of the National Challenge Areas; see section 1.6. Applicants should pay attention to specific instructions located within each of the topic area descriptions when developing their proposal. Each topic area description provides background information, FY 2017 research priorities and other key information. Although applicants should apply to the topic area they deem most appropriate, USDA reserves the right to shift applications between topic areas when necessary to achieve the most effective review. Questions regarding the suitability of research for a specific topic area should be directed to the appropriate NPL.

8.1 Forests and Related Resources

Contact Dr. Charles Cleland, NPL for SBIR Forests and Related Resources at ccleland@nifa.usda.gov or (202) 401-6852 regarding questions about the topic area or to arrange a telephone consultation.

Background

The Forests and Related Resources topic area aims to address the health, diversity and productivity of the Nation's forests and grasslands to meet the needs of present and future generations through the development of environmentally sound approaches to increase productivity of forest lands, improve sustainability of forest resources, and develop value-added materials derived from woody resources. New technologies are needed to enhance the protection of the Nation's forested lands and forest resources and help to ensure the continued existence of healthy and productive forest ecosystems. Proposals focused on sustainable bioenergy and development of value-added biofuels from woody biomass, and on the influence of climate change on forest health and productivity are strongly encouraged. Proposals that utilize nanotechnology in their approach to developing new wood-based products or that utilize wood-based nano-materials are also encouraged.

To meet the identified needs in forestry and wood utilization, the program's long-term goals (10 years) are to achieve increased utilization of woody resources for value-added products from wood; healthy and sustainable forest ecosystems that are more resilient to wildfires and the impact of pathogens and insects; improved environmental and economic methods of sustainable harvesting; and improved growth and yield of forest species that will lead to more efficient use of forested lands.

FY 2017 Research Priorities:

Examples of appropriate subtopics for research applications from small businesses include, **but are not limited to the following:**

1. Growth and Yield

Improving growing stock, tissue culture, genetic manipulation or vegetative reproduction of forest trees, and other means of increasing the regenerative abilities of forests; developing systems to increase the survival of newly planted trees through mechanical, physical or chemical means that are environmentally safe and through improved nutrient/water utilization; reducing the adverse impact of pathogens and insects by developing better methods to monitor infestations and improved control strategies for combating insects and pathogens that attack important woody

species.

2. Increasing the Utility of Forest-Grown Material

Research to improve the yield of lumber, pulp fiber and specialty chemicals from trees; utilizing a greater percentage of the tree through improved techniques of production, for the creation of new or improved reconstituted products; developing better methods for manufacturing wood-based products and testing products for performance and durability; and developing improved methods for the production of paper.

3. Reducing Ecological Damage by Forest Operations

Research to reduce soil erosion, compaction, water degradation or other alterations caused by harvesting and/or other forest operations, provisions for the economic recovery of resources from forests while raising potential productivity and reducing impacts to the ecological structure of the area of operation.

4. Urban Forestry

Research to promote the growth of forested land in urban areas, such as greenways, parks, and strategically planted urban trees, to address problems of forest fragmentation, the introduction of invasive species, and the impact of urban forested land on air and water quality and quality of life improvements.

5. Climate Change

Research to address the issue of ecosystem adaptation to climate change, ways to enhance carbon sequestration and reduction in greenhouse gas emissions, development of decision support tools for forest managers and markets for forest ecosystem services.

6. Developing Technology that Facilitates the Management of Wildfires on Forest Lands

Research that provides systems for detecting and managing wildfires; systems for reducing fuel loads in forests; tools and equipment for improving the efficacy and safety of fire fighters on the ground and in the air; and communication and navigation systems for improving the coordination of fire management activities.

7. Sustainable Bioenergy and Development of Value-Added Products From Forest Resources

Research for development of improved methods for the conversion of forest biomass into cellulosic biofuels (e.g. ethanol, biobutanol, jet aviation) and biobased products, including intermediate chemicals; development of new wood-based composite materials; development of local scale energy conversion projects that generate electricity and/or useful heat; and development of technologies that will mitigate carbon release from combustion.

Other Key Information

- All Phase I applications should give the reviewing community a brief vision of where the PD expects the project to be at the end of Phase II (entering Phase III commercialization).
- The applicants are strongly encouraged to contact the NPL regarding the suitability of research topics.
- Applications that deal with the development of biofuels derived from non-woody agricultural crops should be submitted under topic area 8.8 Biofuels and Biobased Products.

- Applications that deal with post-harvest technologies for products derived from animals will not be accepted for review under this program area. Applications that deal with post-harvest technologies for foods derived from animals may be submitted under topic area 8.5 Food Science and Nutrition.
- Applications should explain how the proposed work will contribute to the National Challenge Areas (Food Security, Climate Variability and Change, Food Safety).
- All Phase I applications should give the reviewers a brief vision of where the PD expects the project to be at the end of Phase II (entering Phase III commercialization).
- Applications dealing with aquacultured species should be submitted under topic area 8.7 Aquaculture.

8.4 Air, Water and Soils

Contact Dr. Charles Cleland, NPL for SBIR Forests and Related Resources at ccleland@nifa.usda.gov or (202) 401-6852 regarding questions about the topic area or to arrange a telephone consultation.

Background

The Air, Water and Soils topic area aims to develop technologies for conserving and protecting air, water and soil resources while sustaining optimal farm and forest productivity. Climate variability and food security are major focal points of this topic area. Efforts are needed to reduce the production of greenhouse gases that result from agricultural activities and to increase carbon sequestration in soils. Climate change is likely to alter temperature and precipitation patterns and new technologies are needed that will better enable plant and animal production systems to adapt to changing climatic conditions. As population continues to increase food security will be critical as efforts for food production to keep pace will increasingly become a challenge. Soil and water are critical resources that impact food production. New technologies are needed that will improve water quality and conservation and use water more efficiently. We also need new technologies that will improve soil quality and fertility and reduce soil erosion.

To meet these identified needs of agriculture, the program's long-term goals (10 years) are to achieve improved air quality and improved utilization of water resources that are better able to sustain production agriculture; better use of limited water resources for agriculture through improved irrigation technologies; a more sustained soil resource through reduced soil erosion and thereby lead to more productive agriculture; and improved soil quality that will permit a more sustainable and productive agriculture.

FY 2017 Research Priorities:

Examples of appropriate subtopics for research applications from small businesses include, **but are not limited to, the following:**

1. Water Quality and Conservation

Develop new and improved technologies to optimize water management conservation at both the farm level and at a watershed scale, monitor the quality of surface water and groundwater resources for biotic and abiotic pollutants, including animal manure and pharmaceuticals, develop improved methods for the reuse of waste water, including the remediation and restoration of water resources that impact agriculture and forestry operations, and promote watershed restoration.

2. Irrigation

Develop improved irrigation technologies for both farming and landscaping applications that will provide more efficient and cost-effective delivery of water and chemicals. Develop new irrigation methods that allow for more efficient use of water including accurate delivery of water to where it is needed.

3. Soil Erosion

Develop better methods for preventing soil erosion by wind and surface water runoff and for monitoring wind erosion and sediment transport.

4. Soil Quality

Develop new technologies for measuring soil properties, soil nutrient content, and the physical and chemical nature of soil. Research new technologies that enhance soil properties while restricting adverse environmental impact and develop improved methods to remediate degraded soils.

5. Air Resources

Develop new and improved technologies to monitor air quality and reduce air pollution stemming from agricultural enterprises, including manures from livestock and poultry production systems.

Other Key Information

- All Phase I applications should give the reviewing community a brief vision of where the PD expects the project to be at the end of Phase II (entering Phase III commercialization).
- The applicants are strongly encouraged to contact the NPL regarding the suitability of research topics.

8.5 Food Science and Nutrition

Contact Dr. Jodi Williams, NPL for SBIR Food Science and Nutrition at jwilliams@nifa.usda.gov or (202) 720-6145 regarding questions about the topic area or to arrange a telephone consultation.

Background

The Food Science and Nutrition topic area aims to fund projects that support research focusing on developing new and improved processes, technologies, or services that address emerging food safety, food processing and nutrition issues. The program will fund projects to: 1) increase the understanding of the physical, chemical, and biological characteristics of food; 2) improve methods for the processing and packaging of food products to improve the quality and nutritional value of foods; and 3) develop programs or products that increase the consumption of healthy foods and reduce childhood obesity. The outcome of a successful project is a proof of concept for a marketable item or patented process.

The long term goals (10 years) of the program are to commercialize the production of useful new food products, processes, materials, and systems that reduce food-borne illness, obesity and enhance the nutritional quality and value of foods.

FY 2017 Research Priorities:

Examples of appropriate subtopics for research applications from small businesses include, **but are not limited to, the following:**

- 1. Food Safety**
Developing technologies for the rapid detection of food borne hazards (microorganisms, chemicals, toxins) during pre- and post-harvest processing and distribution.
- 2. Food Quality-Engineering**
Developing innovative food processing and packaging technologies and materials that reduce post-harvest losses in produce while maintaining safety and quality.
- 3. Food Quality-Science**
Understanding the physical, biological, and chemical interactions and functionality of food in order to develop affordable food ingredients and/or food formulations that contribute to the development of high quality foods.
- 4. Nutrition-Education**
Developing and implementing interactive programs for nutrition educators and teachers to increase nutrition awareness and improve health to address obesity among children.
- 5. Nutrition-Science**
Improve functionality and efficacy of foods, nutrients and/or dietary bioactive components in promoting health.

Other Key Information

- All Phase I applications should give the reviewing community a brief vision of where the PD

expects the project to be at the end of Phase II (entering Phase III commercialization).

- The applicants are strongly encouraged to contact the NPL regarding the suitability of research topics.
- Improvements of current commercial methods should address high false positive and high false negative rates associated with PCR based methods for detection of food borne bacteria in produce and high false negative rates associated with immunoassays for detection of Salmonella.
- New rapid detect tests should be designed to detect at least 1 cfu/25g of food using approaches that reduce or eliminate enrichment and should be designed to allow for sampling of large volumes of food.
- Projects that promote value-added products and processes are encouraged.
- Projects that address functional foods to promote health are encouraged.
- Projects on novel screening methods for threat agents need strong letters of support from the appropriate Federal agency that will be the end user of the technology.
- Projects that focus on technologies for improving cost benefit and model-based analyses, including distribution, warehousing, and retailing systems as they relate to the economy are acceptable.
- Applicants who have received previous SBIR funding should address outcomes for those projects.
- Projects should include appropriate collaborations with experts in the field of investigation (i.e, a Food Scientist or Nutritionist as a part of the development team for the project).

8.6 Rural and Community Development

Contact Dr. Beth Honadle, NPL for SBIR Rural Development at Beth.Honadle@nifa.usda.gov or (202) 720-4570 regarding questions about the topic area or to arrange a telephone consultation.

Background

During the last 30 years, dramatic social, economic and technological changes have occurred in many rural areas in the United States. Although farming continues to be an important source of income, most of rural America is moving from an agrarian to a post-agrarian economy. The results of this transformation have been uneven across the rural landscape. Some communities are facing economic decline and rural exodus, while in other communities, especially those in areas near large urban centers or rich in natural amenities, economic and population growth have accelerated. Even in rural communities where economic growth and population have grown, some have become more vulnerable to disasters caused by human action and/or climate variability. Many other communities are plagued by limited access to good schools, food, and health services. As a result, despite decades of intervention and billions of dollars in public investment, many rural residents are unable to access important government services and new scientific information that can help improve their overall quality of life in areas that include food security and obesity reduction/prevention; entrepreneurship and workforce skills development aligned with emerging economic opportunities (e.g., climate change mitigation, safe food processing and marketing, etc.); and improved, modernized infrastructure and technologies that can attract public and private sector investment.

Applications may be submitted for the development of new technology, or for the utilization of existing technology, that address important economic and social development issues or challenges in rural America. The applications need not be centered on agriculture, but may be focused on any area that has the potential to provide significant benefit to rural Americans. All applications should explicitly discuss the specific rural problem or opportunity that will be examined and how the proposed technology will successfully address the problem or opportunity. Applications must also include an objective to assess the impacts of the proposed project on the environment or the socio-economic development of rural areas.

To meet these identified problems and opportunities of rural development, the long-term (10 year) goal for this program is to develop and commercialize new technology, products, processes and services that will: (i) enhance the efficiency and equity of public and private investment in rural communities; (ii) build a diversified workforce to meet present and future needs; (iii) enhance resilience to both natural and human disasters; and (iv) enhance economic vitality of rural communities and, in turn, reduce rural poverty.

FY 2017 Research Priorities:

Examples of appropriate subtopics for research applications from small businesses include, **but are not limited to, the following:**

1. Development of services and information and managerial systems that improve the efficiency and effectiveness of Local Governments and Public and Private Institutions

Topics may include educational programs, including gaming, which address the specific needs of people in rural areas (e.g., development of entrepreneurship and workforce skills); new housing designs; improved health care delivery; appropriate educational, transportation and communication technologies and services; and marketing of new information and technologies.

2. **Development of technologies and services that protect or enhance the environment while promoting economic development**
Topics may include technologies and services that protect the ecosystem, promote sustainability, reduce food loss and waste, conserve energy, and develop alternative energy sources such as wind and solar energy (excluding biofuels).
3. **Reducing the vulnerabilities of rural communities from hazards (excluding intentional acts such as terrorism)**
Procedures are needed to make rural communities more sustainable to natural or unintentional hazards such as food-borne illnesses, food contamination, droughts, hurricanes, climate variability, through better preparation, forecast and warning, response and rebuilding phases of hazard mitigation, including communication.
4. **Development of technologies and services that specifically address the needs of youth, the elderly, disabled persons, military veterans, and the low-income sector of the rural population**
5. Efforts are needed that will enhance human capital development, build earnings capacity, promote food security, including issues of access to adequate amounts and quality of foods, increase labor force participation and/or promote job creation to the most vulnerable populations in rural communities.
6. **Increasing opportunities for employment and income generation in rural communities**
Topics may include, but are not limited to, creative place making, recreational economies, rural tourism, agri-tourism, and off-farm value-added agricultural development.

Other Key Information

- All Phase I applications should give the reviewing community a brief vision of where the PD expects the project to be at the end of Phase II (entering Phase III commercialization).
- The applicants are strongly encouraged to contact the NPL regarding the suitability of research topics.
- If funded, projects are expected to enhance the environmental and economic vitality of rural communities. Therefore, applications must contain an objective to assess the impacts of the proposed project on the environment or the socio-economic development of rural areas.
- Applications dealing with on-farm production agriculture research should be submitted to topic area 8.12 Small and Medium Sized Farms.
- Applications dealing with the development of biofuels and biobased products should be submitted to topic area 8.8 Biofuels and Biobased Products.

8.7 Aquaculture

Contact Dr. Gene Kim, NPL for SBIR Aquaculture at Gene.W.Kim@nifa.usda.gov, (202) 401-1108 regarding questions about the topic area or to arrange a telephone consultation.

Background

The Aquaculture topic area aims to develop new technologies that will enhance the knowledge and technology base necessary for the expansion of the domestic aquaculture industry as a form of production agriculture. Seafood production from the wild is under increased pressure due to overfishing, and therefore aquaculture is increasingly an important source of farmed seafood and an important contributor to food security. Emphasis is placed on research leading to improved production efficiency and increased competitiveness of private sector, commercial aquaculture in the United States. Studies on commercially important, or potentially important, species of fish, shellfish and aquatic plants from both freshwater and marine environments are included. In this context, new technologies are needed to improve production efficiency, protect aquaculture species against disease, and ensure the safety of farmed seafood.

To meet these identified needs in aquaculture, the program priorities include: improved aquaculture production resulting from improved reproductive efficiency in fish and shellfish; improved aquaculture production resulting from genetic improvement in fish and shellfish; improved aquaculture production resulting from improved animal health; improved aquaculture production with reduced water usage and improved production efficiencies; and cost-effective production of algae for use as aquaculture feed and as a source of valuable human food supplements.

FY 2017 Research Priorities:

Examples of appropriate subtopics for research applications from small businesses include, **but are not limited to, the following:**

1. Reproductive Efficiency

Novel or innovative approaches to improve reproductive efficiency in aquaculture species including: greater control of maturation, ovulation and fertilization; improved gamete and embryo storage; improved larval rearing techniques; enhanced reproductive performance of broodstock; improved methods for cryopreservation of sperm and embryos; and methods to control sex determination.

2. Genetic Improvement

Novel or innovative approaches to improve production efficiency through genetic improvement of aquacultural stocks including: genetic mechanisms of sex determination; genetic basis for inheritance of commercially important traits, such as growth, cold tolerance, and pathogen susceptibility; identification of major genes affecting performance; application of molecular biology and genomics and the integration of this technology into breeding programs; and performance evaluation of aquacultural stocks and utilization of crossbreeding and hybridization.

3. Integrated Aquatic Animal Health Management

Novel or innovative approaches to reducing acute and chronic losses related to aquatic animal

health in aquaculture production systems through an integrated holistic approach including: physiological stress related to the quality of the aquatic production system; genetic, environmental, and nutritional components of aquatic health management; control of predation in aquaculture production systems; development of new vaccines or immunization procedures to enhance resistance to infectious diseases and parasites; development of diagnostic tests for specific diseases that pose a health hazard; and development of improved treatment methods for acute or chronic health problems caused by specific infectious or non-infectious agents, parasites, injuries and chemical and toxic agents.

4. Improved Production Systems and Management Strategies

Novel or innovative approaches to improve existing or alternative production system design and management strategies including: development of biological, engineering and economic design criteria and models; enhancement of water quality in existing production systems through aeration, flow patterns, etc.; characterization, handling and treatment of effluent from aquacultural production systems; improved harvesting methods and strategies; and improved operating efficiencies for recirculation systems.

5. Algal Production Systems

Novel or innovative approaches to improve the efficiency of algal production systems including: identification of new species with improved nutritional profile for use in feeding to other aquacultural species or as a source of valuable human food supplements; development of improved bioreactor technology; and development of better methods for harvesting algal biomass.

Other Key Information

- All Phase I applications should give the reviewing community a brief vision of where the PD expects the project to be at the end of Phase II (entering Phase III commercialization).
- The applicants are strongly encouraged to contact the NPL regarding the suitability of research topics.
- For aquaponics, unless the focus is on developing significant technological improvements, proposals that deal with applying current aquaponics technology should be submitted to 8.12 Small and Mid-Size Farms
- Applications that deal with the development of new food products derived from aquaculture species should be submitted under topic area 8.5 Food Science and Nutrition.

8.8 Biofuels and Biobased Products

Contact Dr. Charles Cleland, NPL for SBIR Biofuels and Biobased Products at ccleland@nifa.usda.gov or (202) 401-6852 regarding questions about the suitability of research topics or to arrange a telephone consultation.

Background

The objective of this topic area is to promote the use of biofuels and non-food biobased products by developing new or improved technologies that will lead to increased production of biofuels, industrial chemicals, and other value-added products from agricultural materials. This research will lead to new opportunities to diversify agriculture and enhance agriculture's role as a reliable supplier of raw materials to industry. This topic area supports the Bioenergy National Challenge Area and the Climate Variability and Change National Challenge Area. Historically, appropriate research areas have included: development of procedures for enhanced recovery of critical raw materials from agricultural commodities; development of improved technology for converting agriculturally derived raw materials into useful industrial products; development of new products from new industrial crops; and development of industrial products derived from agricultural materials to make them more effective and/or more cost competitive with non-agriculturally derived industrial products. In order to enhance the impact of the program, acceptance of applications will be limited to select Research Priority Areas.

FY2017 Priority Research Areas

Acceptance of applications for the FY2017 solicitation will be **strictly limited** to:

1. Advanced "Drop-in" Biofuels

New and improved technology for the **economical and environmentally sustainable** production and conversion of agricultural biomass material **energy crops and residues** into non-ethanol biofuels (e. g. biobutanol, green gasoline, green diesel, aviation fuel), fuel additives, and other products to be used as fuel; development of improved biocatalysts and thermochemical processes for advanced biofuel production, and byproducts from the advanced biofuel production stream that will optimize the economic feasibility of the production of biofuels. This solicitation seeks to support innovative technologies that will minimize adverse environmental impacts during conversion (for example: reduction of energy use and water use during conversion; reduction of harmful byproducts from conversion) and have carbon reduction benefits. Applications developing technology for ethanol production (grain or cellulosic) or co-products from ethanol production will not be accepted in this topic area, but may be submitted to other topic areas if appropriate (see Other Key Information below). Applications not addressing economic and environmental sustainability may be returned to the applicant without review.

2. Advanced biofuels and biobased products from animal manure or carcass waste.

3. New Non-food Biobased Products from New Industrial Crops

Identification of markets and development of new biobased products and processes for making products from **new industrial crops (including algae)**. These products should be economically competitive and have carbon reduction benefits.

4. New processes for the manufacture of biobased plastics, lubricants, coatings, paints, and packaging.

New processes that develop *biobased industrial chemicals that will be competitive with equivalent petroleum-based products as to cost and performance.*

Other Key Information

- All Phase I applications should give the reviewing community a brief vision of where the PD expects the project to be at the end of Phase II (entering Phase III commercialization).
- Applications that deal with developing value-added biofuels (including ethanol) and biobased products from forest biomass should be sent to the 8.1 Forest and Related Resources topic area.
- Applications that deal with developing biofuels (including ethanol) and bioenergy that will improve the sustainability of small and mid-size farms should be sent to the 8.12 Small and Mid-Size Farms topic area.
- Applications that deal with the genetic improvement or production of biomass feedstock crops except for woody biomass and algae should be submitted to the 8.2 Plant Production and Protection – Biology topic area.
- Applications that deal with the genetic improvement, production, or feedstock logistics of woody biomass feedstock crops should be submitted to the 8.1 Forest and Related Resources topic area.
- Applications that deal with the genetic improvement, production, or feedstock logistics of algae for biofuel production should be submitted to the 8.7 Aquaculture topic area.
- Applications that deal with the engineering aspects of the planting, production or post-harvest handling of biomass feedstock crops should be submitted to the 8.13 Plant Production and Protection – Engineering topic area.
- Applications submitted to this topic area that do not specifically address the FY2017 Priority Research Areas will not be reviewed.
- Applications exceeding the budget limitation or exceeding the page limit or not meeting the formatting requirements will be excluded from NIFA review.

8.9 through 8.11 Reserved.

8.12 Small and Mid-Size Farms

Contact Dr. Denis Ebodaghe, National Program Leader for SBIR Small and Mid-Size Farms at debodaghe@nifa.usda.gov or (202) 401-4385 regarding questions about the topic area or to arrange a telephone consultation.

Background

The Small and Mid-Size Farms topic area aims to promote and improve the sustainability and profitability of small and mid-size farms and ranches (where annual sales of agricultural products are less than \$250,000 for small farms and \$500,000 for mid-size farms - hereafter referred to as small farms). The vast majority of farms in this country are small and they play an important role in the agricultural sector. The viability and sustainability of small farms is important to the Nation's economy and to the stewardship of our biological and natural resources. While some small farms are located in urban areas, most small farms are located in rural areas, and these farms are critical to sustaining and strengthening the leadership and social fabric of rural communities. Applicants are strongly encouraged to emphasize how their project would contribute to the well-being of rural communities and institutions. In particular, applicants should emphasize how the results of their project would be disseminated to other small farmers and provide benefit to the small farm community.

Food safety, climate change, food security and sustainable bioenergy diversification of agricultural production systems and increased efficiency of farm operations and economies of scale are all important program priorities in this topic area. Proposals are encouraged that focus on one or more of these priorities and are appropriately scaled so as to apply to the needs and capabilities of small farmers.

To meet these identified needs in the small and mid-size farm sector, the program's long-term goals (10 years) are to achieve improvements in sustainability and profitability of small farms with increased production of specialty crops and specialty animals; improved farm management skills in small farmers that leads to more sustainable and profitable small farms; better stewardship of natural resources through adoption of more sustainable farming practices; enhanced utilization of renewable energy sources and more focus on energy efficiency and energy conservation; and better educated small farmers who are better able to operate their farms on a sustainable and profitable basis.

FY 2017 Research Priorities:

Examples of appropriate subtopics for research applications from small businesses include, **but are not limited to, the following:**

1. New Agricultural Enterprises

Efforts are needed to develop new agricultural enterprises that are small scale and focused on specialty farm products, both plant and animal, and on innovative ways to market these farm products through direct marketing, such as farmers markets or cooperatives where the financial return to the farmer is optimized or through specialty market outlets that offer a higher financial return. Emphasis is encouraged for organic and natural foods, specialty animal products, such as free-range poultry or natural beef, non-food specialty crops, such as medicinal herbs and value-added food, and non-food products.

2. Development of New Marketing Strategies

Efforts are needed to develop appropriate new strategies for marketing agricultural, forestry and aqua cultural commodities and value-added products produced by small farms in local, regional, national and international markets, including the assessment of consumer demand; identification of desired product characteristics, including packaging and processing methods; development of new and innovative utilization of existing production and processing technologies; and the promotion of efficient assembling, packing, processing, advertising and shipping methods.

3. Farm Management

Efforts are needed to develop tools and skills that are appropriate for small farms that will enhance the efficiency and profitability of small farms. New tools are also needed that will enhance farm safety. Development of new risk management tools to facilitate better planning is needed.

Development of improved farm level life-cycle assessment tools that help small to mid-sized farms 1) improve operations through resource efficiency and 2) quantify ecosystem services provided is needed. Innovative ways to promote agro-tourism as a way to enhance farm profitability is encouraged.

4. Natural Resources and Renewable Energy

Efforts are needed to develop farming methods scaled appropriately for small farms that are directed at more efficient use of natural resources. Particular emphasis is needed to develop better ways to utilize renewable energy sources, such as wind, solar, and geothermal energy, and to promote improved energy efficiency and conservation in farming operations.

5. Educational Outreach

Efforts are needed to develop new tools to ensure that the next generation of small farmers has access to the information and resources they need to operate their small farms on a sustainable and profitable basis.

6. Urban Farming

In recent years there has been increasing interest in the establishment of small farms in urban areas on roof tops, in abandoned building and in vacant lots. Efforts are needed to explore ways to make urban farming more energy efficient, environmentally sustainable and profitable. The most appropriate crops for urban farms need to be determined. Procedures that would increase the establishment of new urban farms need to be developed.

Other Key Information

- All Phase I applications should give the reviewing community a brief vision of where the PD expects the project to be at the end of Phase II (entering Phase III commercialization).
- For aquaponics, unless the focus is applying current aquaponics technology, proposals that deal with developing significant technological improvements should be submitted to 8.7 Aquaculture.
- The applicants are strongly encouraged to contact the NPL regarding the suitability of research topic.

8.13 Plant Production and Protection - Engineering

Contact Dr. Rachel Melnick, National Program Leader for SBIR Plant Production and Protection Engineering at rmelnick@nifa.usda.gov or (202) 401-4980 regarding questions about the suitability of research topics or to arrange a telephone consultation.

Background

The objective of this topic area is to enhance crop production by creating and commercializing engineering technologies that enhance system efficiency and profitability and that protect crops from pests and pathogens in economically and environmentally sound ways. Projects that promote energy conservation or efficiency are strongly encouraged. Engineering projects will describe the system need; design specifications, functionality and reliability; and cost of change analysis. Where feasible, describe the testing metrics, experimental design, materials and methods to collect and analyze data on the metrics. Examples of appropriate subtopics for research applications from small businesses include, **but are not limited to, the following:**

1. Improved crop production methods or strategies

Enhance the efficiency of crop production by utilizing innovative methods and equipment for planting, growing and harvesting crop plants, including optimization of inputs and reduction of operation costs by implementing the use of precision farming technology, robotics, sensors, information technology, and remote sensing, etc.

2. Plant protection

Reduce the impact of plant pathogens, insect pests and competing vegetation on crop plants by developing efficient and environmentally safe pesticide and herbicide application equipment, and by developing needed technologies to monitor and manage plant disease, insect pests, or abiotic stress at the earliest stages of their manifestations.

3. Energy conservation

Develop crop management systems, farm and greenhouse structures, and waste utilization strategies that promote energy conservation and efficiency, including the development of technology for the economic use of alternative/renewable energy resources.

Special Priority Research Areas for FY 2017: SBIR is strongly encouraging the submission of applications focusing on the following problem areas. Additional consideration will be given to applications addressing the development of products, processes, and services for US production of specialty crops (fruits, nuts, vegetables, nursery, and greenhouse crops):

1. Improved chemical application technology

Technologies that increases product efficacy, worker safety, and reduces off-target drift of applied chemicals. Pollinator Health is a Presidential priority area, so systems and technologies to avoid risk of pesticide exposure to bees are sought.

2. High resolution spatial and temporal monitoring of specialty crops

Technologies using sensors and sensor networks (for example, temperature, humidity, drought stress, pest damage, and disease). Description of the sensor and the anticipated data interrogator system will need to be explained.

3. Post-harvest handling (including transportation and storage) of specialty crops

Projects that include handling to maintain quality and reduce food safety issues, reducing waste streams from post- harvest handling, selection for quality and consumer preference.

4. Reduction of manual labor in specialty crop production, harvesting, and post-harvest handling

Projects that include technologies to improve the competitiveness of US specialty crop production.

5. Technologies that enhance commercial horticulture production

Projects that improve the competitiveness of U.S. commercial horticulture production including flowering potted plant, bedding plant, cut flower production, seasonal crops, annuals, and perennials.

6. Planting, production, harvesting, and post-harvest handling technology

Projects that focus on targeting the sustainable production of the following biomass feedstock crop groups: perennial grasses, energycane, sorghum, and oil seed crops (not including algae, for algae see Other Key Information below).

7. Engineering technology to enhance the competitiveness of U.S. organic agriculture and horticulture.

Other Key Information

- All Phase I applications should give the reviewing community a brief vision of where the PD expects the project to be at the end of Phase II (entering Phase III commercialization).
- Applications that deal with irrigation and related technology should be sent to the 8.4 Air, Water and Soils topic area.
- Applications that deal with the feedstock logistics of woody biomass (including short rotation crops like willow and poplar) should be submitted to the 8.1 Forest and Related Resources topic area.
- Applications that deal with the production of algae for biofuel production should be submitted to the 8.7 Aquaculture topic area.

9.0 DEFINITIONS

The following definitions apply for purposes of this solicitation:

9.1 Ad hoc Reviewers

Experts or consultants, qualified by training and experience in particular scientific or technical fields to render expert advice on the scientific technical merit of the grant applications in those fields, who review on an individual basis one or several of the eligible proposals submitted to this program in their area of expertise and who submit to the Department written evaluations of such proposals.

9.2 Affiliate

This term has the same meaning as set forth in 13 CFR part 121—Small Business Size Regulations, §121.103, What is affiliation? (available at <http://ecfr.gpoaccess.gov/cgi/t/text/text-idx?c=ecfr;sid=03878acee7c064a02cac0d870e00ef43;rgn=div6;view=text;node=13%3A1.0.1.1.17.1;idno=13;cc=ecfr>). Further information about SBA's affiliation rules and a guide on affiliation is available at www.SBIR.gov and www.SBA.gov/size.

9.3 Applicant

The organizational entity that, at the time of award, will qualify as a small business concern and that submits a grant application for a funding agreement under the SBIR Program.

9.4 Authorized Departmental Officer (ADO)

The Secretary or any employee of the Department who has the authority to issue or modify grant instruments on behalf of the Secretary.

9.5 Authorized Organizational Representative (AOR)

The president, director, chief executive officer or other designated official of the applicant organization who has the authority to commit the resources of the organization. Also referred to as the Authorized Representative (AR).

9.6 Budget Period

Interval of time into which the project period is divided for budgetary and reporting purposes.

9.7 Commercialization

The process of developing marketable products, processes, technologies, or services and the production and delivery (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.

9.8 Department

The United States Department of Agriculture.

9.9 Direct Costs

Costs that occur in direct support of a single project or that can be clearly identified, segregated and billed directly to the project via the companies' accounting system.

9.10 Essentially Equivalent Work

Occurs when (1) substantially the same research is proposed for funding in more than one grant application submitted to the same Federal agency; (2) substantially the same research is submitted to two or more different Federal agencies for review and funding consideration; or (3) a specific research objective and the research design for accomplishing an objective are the same or closely related in two or more applications or awards, regardless of the funding source.

9.11 Fee

The amount of profit a company will receive from the grant.

9.12 Funding Agreement

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

9.13 Grant

A financial assistance mechanism that provides money, property, or both to an eligible entity to carry out the approved project or activity. A grant is used whenever the Federal agency anticipates no substantial programmatic involvement with the awardee during the period of performance.

9.14 Grantee

The small business concern designated in the grant award document as the responsible legal entity to whom the grant is awarded under this part. Also referred to as an "awardee."

9.15 Historically Underutilized Business Zone (HUBZone)

A small business concern meeting the following criteria:

- (A) Located in a "historically underutilized business zone" or HUBZone area located in one or more of the following:
 - (1) A **qualified census tract** (as defined in section 42(d)(5)(C)(i)(1) of the Internal Revenue Code of 1986); or
 - (2) A **qualified "non-metropolitan county"** (as defined in section 143(k)(2)(B) of the Internal Revenue Code of 1986); or
 - (3) **On an Indian Reservation**- Land within the boundaries of a federally recognized Indian Reservation.

(B) Owned and controlled by one or more U.S. Citizens; and

(C) At least 35 percent of its employees **must** reside in a HUBZone.

9.16 Indirect Costs

Costs which occur in support of more than one objective and therefore cannot be identified readily and specifically with a particular project, often called overhead or General & Administrative (G&A).

9.17 Innovation

A new or improved item having marketable potential including (1) development of new technologies; (2) refinement of existing technologies; or (3) development of new applications for existing technologies.

9.18 Intellectual Property

The separate and distinct types of intangible property that are referred to collectively as “intellectual property,” including but not limited to: patents, trademarks, copyrights, trade secrets, SBIR technical data (as defined in this section), ideas, designs, know-how, business, technical and research methods, other types of intangible business assets, and all types of intangible assets either proposed or generated by a small business concern as a result of its participation in the SBIR program.

9.19 Joint Venture

An association of concerns with interests in any degree or proportion by way of contract, express or implied, consorting to engage in and carry out a single specific business venture for joint profit, for which purpose they combine their efforts, property, money, skill or knowledge, but not on a continuing or permanent basis for conducting business generally. A joint venture is viewed as a business entity in determining power to control its management.

9.20 Manufacturing Related

Encompasses improvements in existing methods or processes as well as wholly new processes, machines, or systems. Four main areas include:

(A) Unit process level technologies that create or improve manufacturing processes, including:

1. Fundamental improvements in existing manufacturing processes that deliver substantial productivity, quality, or environmental benefits; or
2. Development of new manufacturing processes, including new materials, coatings, methods, and associated practices.

(B) Machine level technologies that create or improve manufacturing equipment, including:

1. Improvements in capital equipment that create increased capability, such as accuracy or repeatability, increased capacity through productivity improvements or cost reduction or increased environmental efficiency, such as safety, energy efficiency and, environmental impact; or

2. New apparatus and equipment for manufacturing, including additive and subtractive manufacturing, deformation and molding, assembly and test, semiconductor fabrication, and nanotechnology.

(C) Systems level technologies for innovation in the manufacturing enterprise, including:

1. Advances in controls, sensors, networks, and other information technologies that improve the quality and productivity of manufacturing cells, lines, systems, and facilities;
2. Innovation in extended enterprise functions critical to manufacturing, such as quality systems, resource management, supply change integration and distribution, scheduling, and tracking; or
3. Technologies that enable integrated and collaborative product and process development, including computer-aided and expert systems for design, tolerancing, process and materials selection, life-cycle cost estimation, rapid prototyping, and tooling.

(D) Environment or societal level technologies that improve workforce abilities, productivity, and manufacturing competitiveness, including:

1. Technologies for improved workforce health and safety, such as human factors and ergonomics; or
2. Technologies that aid and improve workforce manufacturing skill and technical excellence, such as educational systems incorporating improved manufacturing knowledge and instructional methods.

9.21 NIFA

The National Institute of Food and Agriculture.

9.22 Outcomes

The measure of long-term, eventual, program impact.

9.23 Outputs

The measures of near-term program impact.

9.24 Peer Review Group

Experts or consultants, qualified by training and experience in particular scientific or technical fields to give expert advice on the scientific and technical merit of grant applications to those fields, who assemble as a group to discuss and evaluate all of the eligible applications submitted to this program in their area of expertise.

9.25 Program Solicitation

A formal request for applications whereby a Federal agency notifies the small business community of its Research or Research and Development (R/R&D) needs and interests in broad and selected areas, as appropriate to the agency, and requests applications from small business concerns in response to these needs and interests.

9.26 Project Director / Principal Investigator (PD/PI)

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

9.27 Prototype

A model of something to be further developed, which includes designs, protocols, questionnaires, software, and devices.

9.28 Project Period

The total length of time approved by the Department for conducting the research project as outlined in an approved grant award. Also referred to as the period of performance.

9.29 Research or Research and Development (R/R&D)

Any activity that is:

- (1) A systematic, intensive study directed toward greater knowledge or understanding of the subject studied;
- (2) A systematic study directed at applying new knowledge to meet a recognized need; or
- (3) A systematic application of knowledge toward the production of useful materials, devices and systems or methods, including design, development and improvement of prototypes, and new processes to meet specific requirements.

9.30 Research Project Grant

The award by the Department of funds to a grantee to assist in meeting the costs of conducting for the benefit of the public an identified project, which is intended and designed to establish, discover, elucidate, or confirm information or the underlying mechanisms relating to a research topic area identified in the annual solicitation of applications.

9.31 SBIR Participants

Business concerns that have received SBIR awards or that have submitted SBIR applications.

9.32 SBIR Technical Data

All data generated during the performance of an SBIR award.

9.33 SBIR Technical Data Rights

The rights a small business concern obtains in data generated during the performance of any SBIR 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.

9.34 Small Business Concern (SBC)

To be eligible for award of funding agreements in SBA's SBIR programs, a business concern must meet the requirements below at the time of award of an SBIR Phase I or Phase II funding agreement:

(a) *Ownership and control for the SBIR program.*

(1) An SBIR awardee must:

(i) Be a concern which is more than 50% directly owned and controlled by one or more individuals (who are citizens or permanent resident aliens of the United States), other small business concerns (each of which is more than 50% directly owned and controlled by individuals who are citizens or permanent resident aliens of the United States), or any combination of these;

(ii) Be a concern which is more than 50% owned by multiple venture capital operating companies, hedge funds, private equity firms, or any combination of these (for agencies electing to use the authority in 15 U.S.C. 638(dd)(1)); or

(iii) Be a joint venture in which each entity to the joint venture must meet the requirements set forth in paragraph (a)(1)(i) or (a)(1)(ii) of this section. A joint venture that includes one or more concerns that meet the requirements of paragraph (a)(1)(ii) of this section must comply with § 121.705(b) concerning registration and proposal requirements.

(2) No single venture capital operating company, hedge fund, or private equity firm may own more than 50% of the concern.

(3) If an Employee Stock Ownership Plan owns all or part of the concern, each stock trustee and plan member is considered an owner.

(4) If a trust owns all or part of the concern, each trustee and trust beneficiary is considered an owner.

For a complete definition of a concern that meets the requirements set forth in 13 C.F.R. §121.702 is available at <http://www.ecfr.gov/cgi-bin/retrieveECFR?gp=&SID=ed6f63f5ac608f6a2a4eca3c17eda4a1&n=13y1.0.1.1.17&r=PART&ty=HTML#13:1.0.1.1.17.1.273.46>.

9.35 Small and Mid-Size Farms

Small Farms are defined as farms or ranches with less than \$250,000 in annual agricultural sales. Mid-Size Farms are defined as farms or ranches with less than \$500,000 in annual agricultural sales.

9.36 Socially and Economically Disadvantaged

See 13 CFR part 124, Subpart B (<http://www.ecfr.gov/cgi-bin/retrieveECFR?gp=1&SID=5b38876de036171b35fa9d45ddb515d1&ty=HTML&h=L&n=13y1.0.1.1.19&r=PART#13:1.0.1.1.19.2>).

Note: The certification of socially and economically disadvantaged small business is for statistical purposes only.

9.37 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.

9.38 United States

The 50 states, the territories and possessions of the Federal Government; 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.

9.39 Women-owned Small Business Concern (WOSB)

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

Note: Certification of women-owned small business is for statistical purposes only.