DTRT57-13-R-SBIR2

FY13.2

U.S. Department of Transportation

PROGRAM SOLICITATION

Small Business Innovation Research (SBIR) Program

NAICS CODE: 541712

Issue Date: July 25, 2013

Closing Date: September 23, 2013

Small Business Innovation Research (SBIR) Program Office, RVT-91
U.S. Department of Transportation (USDOT)
Research and Innovative Technology Administration (RITA)
John A. Volpe National Transportation Systems Center (Volpe Center)
55 Broadway
Cambridge, MA 02142-1093

TECHNICAL QUESTIONS

Technical questions pertaining to the FY13.2 USDOT SBIR solicitation research topics must be submitted to the USDOT SBIR Program Office Point of Contact, Linda Duck, Linda.Duck@dot.gov. All questions must be submitted by email.

Please note technical questions will be accepted through September 16, 2013. Questions received after September 16, 2013 but before the solicitation close date and time, may not be answered before the solicitation closes. The USDOT SBIR Program Office will submit all technical questions to the research topic authors for response. Answers will be posted in the Current Solicitation section of the USDOT SBIR Program website: http://www.volpe.dot.gov/sbir/current.html.

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I. PROGRAM DESCRIPTION

A. Introduction

The U.S. Department of Transportation (USDOT) invites small businesses to participate in the USDOT's Small Business Innovation Research (SBIR) program. The purpose of this solicitation is to invite small businesses with their valuable resources and creative capabilities to submit innovative research proposals that address high priority requirements of the USDOT as described in Section IX herein. Under the SBIR Program, the USDOT will not accept unsolicited proposals.

The goals and objectives of the SBIR Program are:

- Stimulate technological innovation;
- Meet Federal research and development needs;
- Foster and encourage participation in innovation and entrepreneurship by socially and economically disadvantaged persons; and
- Increase private sector commercialization of innovations derived from Federal research and development funding.

The SBIR Program encourages small businesses to engage in research or research and development (R/R&D) that has the potential for commercialization and meets Federal research or research and development objectives. The SBIR program was established by the Small Business Innovation Development Act of 1982 (P.L. 97-219). In 1986, under Public Law 99-443, the SBIR program was extended until October 1, 1993. The Small Business R&D Enhancement Act of 1992 (P.L. 102-564), repealed the SBIR Program under the Small Business Innovation Development Act of 1982 and extended the SBIR Program under the Small Business Act through September 30, 2000. The Small Business Reauthorization Act of 2000 (P.L. 106-554) extended the SBIR Program through September 30, 2008. After a series of continuing resolutions, the SBIR/Small Business Technical Transfer (STTR) Reauthorization Act of 2011 under Public Law 112-81, Section E extended the SBIR Program through September 30, 2017.

The SBIR/STTR Reauthorization Act of 2011 required the U.S. Small Business Administration (SBA) to amend the SBIR Program Policy Directive and related regulations. A summary of the key changes can be viewed on the SBA website, http://www.sba.gov/about-sba-info/174308 .

B. Three Phase Program

The USDOT SBIR Program is generally a three phase process.

THIS SOLICITATION IS FOR PHASE I PROPOSALS ONLY.

Phase I. Phase I provides support for the conduct of feasibility-related experimental or theoretical research or R/R&D efforts on research topics as described herein. The dollar value of the proposal may be up to $150,000 unless otherwise noted and is subject to the availability of funding. The period of performance is six months. The award will be a firm fixed price type contract. The basis for award is the scientific and technical merit of the proposal and its relevance to USDOT requirements and current research priorities. **Only USDOT SBIR Phase I awardees will be eligible to submit a Phase II proposal.**

Phase II. The objective of Phase II is to continue the R/R&D effort from the completed Phase I. Funding of a Phase II is based upon the results of Phase I and the scientific and technical merit and commercial potential of the Phase II proposal. Commercial potential includes the potential to transition the technology to private sector applications, Government applications, or Government contractor applications.

Phase II proposals may be funded up to $1,000,000 (except where a lower ceiling is specifically identified) and have a period of performance of up to 24 months. The Government is not obligated to fund any specific Phase II proposal.

Effective October 1, 2012, **all USDOT SBIR Phase I awardees are eligible to submit a Phase II proposal.** Federal SBIR agencies may no longer use an invitation, pre-screening, or pre-selection process for determining eligibility for a Phase II award. The USDOT will only review Phase II proposals when funding is available. Further information on the status of funding availability and the Phase II proposal process will be made available to Phase I awardees from the SBIR Program Office and Contracting Officer.

Sequential Phase II Awards. A Phase II awardee may receive one additional, sequential Phase II award to continue the work of an initial Phase II award. These awards will be referred to as Phase IIB awards, are by invitation only, and can be funded up to $1,000,000. The intent of the Phase IIB award is to advance and/or accelerate Phase II SBIR funded technologies towards commercialization.

Phase III. SBIR Phase III refers to work that derives from, extends, or logically concludes effort(s) performed under a USDOT or another Department's Phase I and/or Phase II funding agreement. Phase III is funded by sources other than the set-aside funds dedicated to the SBIR Program. Phase III work is typically oriented towards commercialization of SBIR research or technology and may be for products, production, services, R/R&D or a combination thereof. Each of the following types of activities constitutes SBIR Phase III work:

- Commercial application of SBIR-funded R/R&D financed by non-Federal sources of capital. (Note: this pertains to any non-SBIR Federally-funded work described in the following bullets.)
- SBIR-derived products or services intended for use by the Federal Government, funded by non-SBIR sources of funding.
- Continuation of R/R&D that has been competitively selected using peer review or scientific review criteria, supported by non-SBIR funding.

A Phase III award is by its nature an SBIR award and must be accorded SBIR data rights. The requirements of the Federal Property and Administrative Services Act of 1949, [as amended through P.L. 106–580, Dec. 29, 2000] and the Competition in Contracting Act are satisfied by the competition of the Phase I award. There is no limit on the number, duration, type, or dollar value of Phase III awards made to a small business concern. The small business size limits for Phase I, Phase II and Phase IIB awards do not apply to Phase III awards.

C. Eligibility

Size Rule. On December 27, 2012, SBA amended its regulations governing size and eligibility requirements for the SBIR and STTR programs. The rule implemented provisions of the National Defense Authorization Act for Fiscal Year 2012 by revising elements of 13 C.F.R. Part 121 that addresses ownership, control, and affiliation for participants in the SBIR program. A summary and explanation of the size rule and changes to program eligibility can be found in the Federal Register, 77 Fed. Reg. 248 (December 27, 2012) pp. 72215-76227 at http://www.sbir.gov/sites/default/files/2012-30809.pdf and SBA's *Guide to SBIR/STTR Program Eligibility* at http://sbir.gov/sites/default/files/elig_size_compliance_guide.pdf.

The rule includes a new provision regarding an agency's option to allow participation by firms that are majority-owned by multiple venture capital operating companies, private equity firms or hedge funds. **The USDOT elects at this time to not use the authority that would allow venture capital operating companies (VCOCs), hedge funds or private equity firms to participate in the SBIR Program.** All proposals submitted from these parties will not be considered for award.

Each small business concern submitting a proposal must qualify as a small business at the time of award of Phase I, Phase II and IIB contracts (see Section I. E.). In addition, the primary employment of the principal investigator must be with the small business firm at the time of contract award and during the conduct of the proposed research. Primary employment means that more than one-half of the principal investigator's time is spent with the small business. Additionally, for Phase I, Phase II and IIB, the R/R&D work must be performed in the United States. "United States" means the 50 states, the Territories and possessions of the United States, the

Commonwealth of Puerto Rico, and the Commonwealth of the Northern Mariana Islands, the Trust Territory of the Pacific Islands, and the District of Columbia.

Phase I to Phase II Transition Benchmark. Section 4(a) of the SBIR Policy Directive calls for each Federal agency participating in SBIR to set a Phase I to Phase II transition rate benchmark in response to Section 5165 of the SBIR/STTR Reauthorization Act of 2011. The rate is the minimum required ratio of past Phase II/Phase I awards that an awardee firm must maintain to be eligible for a new Phase I award from a particular agency. On June 23, 2013, the updated USDOT Phase I to Phase II Transition Benchmark was published in the Federal Register for a 60-day public comment period; SBA received no adverse comments. The updated benchmark became effective on July 25, 2013. Any subsequent changes in the agency benchmarks must be approved by the SBA. The benchmarks will apply to those Phase I applicants that have received 20 or more Phase I awards Program-wide. Small businesses can view their transition rate on www.sbir.gov upon completion of registration. When logging in, the Phase I to Phase II transition rate will be displayed in the welcome screen.

The USDOT's benchmark uses a five-year period and counts an applicant's total number of Phase I awards over the last five fiscal years, excluding the most recently completed fiscal year; and the total number of Phase II awards over the last five fiscal years, including the most recently completed year. The USDOT SBIR Phase I to II Transition Benchmark as published in the Federal Register is:

Effective July 25, 2013, for all USDOT SBIR Program Phase I applicants that have received 20 or more Phase I awards over the 5-year period, the ratio of Phase II awards received to Phase I awards received must be at least 0.25.

D. Contact Information

In order to ensure full and open competition and comply with Procurement Integrity Act, 41 U.S.C. Section 423 concerns, contact with USDOT relative to this solicitation during the Phase I proposal preparation and evaluation period is restricted to the officials stated in this solicitation.

Technical questions pertaining to the FY13.2 USDOT SBIR solicitation research topics must be submitted by email to the USDOT SBIR Program Office Point of Contact, Linda Duck, Linda.Duck@dot.gov. Technical questions will be accepted through September 16, 2013. Questions received after September 16, 2013 but before the solicitation close date and time, may not be answered before the solicitation closes. However, all answers will be posted to the website.

The USDOT SBIR Program Office will submit all questions to the research topic authors for response. Answers will be posted on the USDOT SBIR Program website, http://www.volpe.dot.gov/sbir/current.html, under Technical Questions and Answers for 13.2 Solicitation.

Contact with USDOT officials from any USDOT agency, other than those identified above, relative to this solicitation during the period this solicitation is open for proposal may result in the rejection of the proposal.

INQUIRIES REGARDING PROPOSAL STATUS WILL NOT BE ANSWERED. INFORMATION PERTAINING TO PROPOSAL STATUS WILL NOT BE PROVIDED.

For general SBIR Program inquiries not pertaining to this solicitation please contact Linda Duck at linda.duck@dot.gov or contact the SBIR Program Office at:

USDOT SBIR Program Office, RVT-91
US Department of Transportation (USDOT)
Research and Innovative Technology Administration (RITA)
John A. Volpe National Transportation Systems Center (Volpe Center)
55 Broadway
Cambridge, MA 02142-1093
Telephone: (617) 494-2051
USDOT SBIR Program Website: http://www.volpe.dot.gov/sbir

E. Definitions

1. Research or Research and Development (R/R&D) - R/R&D means any activity which is:

   - A systematic, intensive study directed toward greater knowledge or understanding of the subject studied;
   - A systematic study directed specifically toward applying new knowledge to meet a recognized need; or
   - 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.

2. Small Business Concern

   SBA has amended the definition for the term “small business concern” by simply referencing its size regulations at 13 C.F.R. § 121.701-705. To view the definition of small business concern, click on the following link: http://www.gpo.gov/fdsys/search/pagedetails.action?browsePath=Title+13%2FChapter+I%2FPart+121%2FSubpart+A%2FSubjgrp%2FSection+121.702&granuleId=CFR-2011-title13-vol1-sec121-702&packageId=CFR-2011-title13-vol1.

The size regulations define the ownership and size requirements for the SBIR and STTR Programs. SBA has recently finalized a rule amending those regulations and the definition of "small business concern" for purposes of the SBIR and STTR Programs as a result of certain provisions of the Reauthorization Act (see *Federal Register* Vol.77, No. 248, page 76215 http://www.sbir.gov/sites/default/files/2012-30809.pdf). The changes made to the definition of "small business concern," became effective on January 28, 2013.

3. Socially and Economically Disadvantaged Small Business Concern

A Socially and Economically Disadvantaged Small Business Concern is one that is at least 51% owned and controlled by one or more socially and economically disadvantaged individuals, or an Indian tribe, including Alaska Native Corporations (ANCs), a Native Hawaiian Organization (NHO), or a Community Development Corporation (CDC). Control includes both strategic planning (as that exercised by boards of directors) and the day-to-day management and administration of business operations. See 13 C.F.R. 124.109, 124.110, and 124.111 for special rules pertaining to concerns owned by Indian Tribes (including ANCs), NHOs, or CDCs, respectively.

4. Women-Owned Small Business Concern

A Woman-Owned Small Business Concern is at least 51 percent owned by one or more women; or, in the case of any publicly owned business, at least 51 percent of the stock of which is owned by one or more women; and whose management and daily business operations are controlled by one or more women; or a small business concern eligible under the Women-Owned Small Business Program in accordance with 13 C.F.R. Part 127 (see FAR subpart 19.15)

5. Veteran-Owned Small Business

A Veteran-Owned Small Business Concern is one that is at least 51% owned by one or more veterans (as defined at 38 U.S.C. 101(2)) or, in the case of any publicly owned business, not less than 51% of the stock of which is owned by one or more veterans, and the management and daily business operations of which are controlled by one or more veterans.

6. Subcontract

Subcontract means any agreement, except a grant or cooperative agreement, entered into by a Federal Government funding agreement awardee calling for supplies or services required solely for the performance of the original funding agreement.

7. Historically Underutilized Business Zone (HUB Zone)

The criteria to be a HUB Zone Small Business Concern can be found at: http://www.ecfr.gov/cgi-bin/retrieveECFR?gp=&SID=9096292d442b42246cbecf21f04833bd&r=PART&n=13y1.0.1.1.21#13;1.0.1.1.21.1.295.4

8. Service Disabled Veteran-Owned Concern

A Service Disabled Veteran-Owned Small Business Concern is not less than 51 percent owned by one or more service-disabled veterans or, in the case of any publicly owned business, not less than 51 percent of the stock of which is owned by one or more service-disabled veterans; and the management and daily business operations are controlled by one or more service-disabled veterans with permanent and severe disability, the spouse or permanent caregiver of such veteran.

9. Economically Disadvantaged Women-Owned Small Business (EDWOSB)

A Economically Disadvantaged Women-Owned Small Business Concern is at least 51 percent directly and unconditionally owned and controlled by one or more women who are citizens (born or naturalized) of the United States and who are economically disadvantaged. The EDWOSB automatically qualifies as a women-owned small business eligible for the Women-Owned Small Business (WOSB) Program.

F. Report SBIR Fraud, Waste and Abuse

The Office of Inspector General Hotline (Phone: 800.424.9071, Email: hotline@oig.dot.gov) accepts tips from all sources about potential fraud, waste, abuse and mismanagement in USDOT programs. The reporting individual should indicate that the fraud, waste and/or abuse pertain to an SBIR contract. Additionally, the USDOT SBIR Program website contains information and links to report potential fraud, waste, and abuse http://www.volpe.dot.gov/sbir/fraud.html.

G. Other Information

Executive Order (EO) 13329, Encouraging Innovation in Manufacturing, February 26, 2004

"Encouraging Innovation in Manufacturing" requires SBIR agencies, to the extent permitted by law and in a manner consistent with the mission of that department or agency, to give high priority within the SBIR Programs to manufacturing-related R&D. "Manufacturing-related" is defined as "relating to manufacturing processes, equipment and systems; or manufacturing workforce skills and protection."

The USDOT SBIR Program solicits manufacturing-related projects through the call for topics distributed to each of the Department's SBIR participating agencies.

Additionally, the SBA requires each agency with an SBIR program to develop a written policy on the implementation of E.O. 13329 and publish an annual report. The USDOT SBIR Program Office Implementation Plan and Annual Report are posted on the Program website, http://www.volpe.dot.gov/sbir/about.html.

Energy Independence and Security Act of 2007, December 19, 2007

The Energy Independence and Security Act of 2007 (P.L. 110-140) amends the Small Business Act (15 U.S.C. Section 636(a)) to instruct the SBA Administrator to ensure that certain Federal Departments and agencies give high priority to small business concerns that participate in or conduct energy efficiency or renewable energy system research and development projects.

The USDOT SBIR Program Office solicits energy efficiency or renewable energy system R/R&D projects through the call for SBIR research topics distributed twice annually to each of the Department's SBIR participating agencies. USDOT SBIR projects that focus on conducting R/R&D in energy efficiency and/or renewable energy are reported annually to SBA.

II. CERTIFICATIONS

All SBIR applicants are required to certify size and ownership and meet other SBIR Program requirements with the submission of their SBIR proposal, at the time of award, and during the funding agreement life cycle. A copy of the certification to be included with the proposal submission is provided in Section VIII.D herein.

III. PROPOSAL PREPARATION INSTRUCTIONS AND REQUIREMENTS

A. Overview

This is a solicitation for Phase I R/R&D proposals on advanced, innovative concepts from small business firms having strong capabilities in applied science or engineering. The Phase I R/R&D proposals shall demonstrate a sound approach to the investigation of an important transportation related scientific or engineering problem categorized under one of the research topics listed in Section IX.

A proposal may respond to any of the research topics listed in Section IX herein, but must be limited to one topic. The same proposal may not be accepted under more than one topic. A small business may, however, submit separate proposals on different topics, or different proposals on the same topic, under this solicitation. Where similar research is discussed under more than one topic, the offeror shall choose that topic which appears to be most relevant to the offeror's technical concept.

The proposed research must have relevance to the improvement of some aspect of the national transportation system or to the enhancement of the ability of an operating element of the USDOT to perform its mission.

Proposals shall be confined principally to scientific or engineering research, which may be carried out through construction and evaluation. Proposals must be for R/R&D, particularly on advanced or innovative concepts. Proposals shall not be for incremental or scaled up versions of existing equipment or the development of technically proven ideas. Proposals for the development of already proven concepts toward commercialization, or which offer approaches already developed to an advanced prototype stage or for market research will not be considered.

The proposal shall be self-contained and checked carefully by the offeror to ensure that all preparation instructions were followed (see Proposal Checklist, Appendix E). An automated notice will be sent via email when the proposal has been received through the SBIR Program’s electronic submission process.

B. Proposal Submission Requirements

The following requirements must be met for the proposal to be evaluated for award:

1. SBA Company Registry Database - All applicants to the program are required to complete their registration in SBA's Company Registry (http://sbir.gov/registration) prior to submitting

an application. At least a Data Universal Numbering System (DUNS) number or Employer Identification Number (EIN) is required to register. Completed registrations will receive a unique Small Business Concern (SBC) Control ID and .pdf file to be submitted with the proposal.

2. Proposal Layout
    a. Each proposal shall not exceed 25 single-sided pages, including all Appendices and enclosures or attachments. Certain exclusions apply as noted below.
    b. Font type should be no smaller than 10 point font size – single or double spaced, standard 8 ½" by 11" pages with 1" margins.
    c. Each proposal must include the following sections, organized in the order listed below. **All sections should be labeled using the bold headings as follows.** Additional guidelines for each section are provided below.

Required Proposal Sections	
Proposal Cover Sheet (Appendix A)	Complete the Proposal Cover Sheet in Appendix A as Pages 1 and 2 of, the maximum of, 25 of your proposal. All pages shall be numbered consecutively beginning with the Proposal Cover Sheet.
Project Summary (Appendix B)	Complete the Project Summary Sheet in Appendix B as Page 3 of your proposal. The Project Summary of successful proposals may be published by the USDOT and, therefore, shall not contain classified or proprietary information. The Project Summary shall include: 1. A technical abstract with a brief statement of the problem or opportunity, project objectives, and description of the effort. o <u>The technical abstract must be limited to 200 words in the space provided on the Project Summary sheet</u>. Any statements beyond the 200-word limit will not be considered for award purposes. Please note the word count at the end of the abstract in parentheses. 2. Anticipated results and potential applications of the proposed research
Technical Content	Submitted proposals must include the following headings in bold. In cases where a section does not apply, please state "Not Applicable." 1. **Identification and Significance of the Problem or Opportunity**. State the specific technical problem or innovative research opportunity addressed and its potential benefit to the national transportation system. 2. **Phase I Technical Objectives.** State the specific objectives of the Phase I R/R&D effort; including the technical questions it will try

	to answer to determine the feasibility of the proposed approach. 3. **Phase I Work Plan.** Describe the Phase I R/R&D plan. The plan shall indicate what will be done, where it will be done, and how the R/R&D will be managed or directed and carried out. Phase I R/R&D shall address the objectives and the questions cited in (b) above. The methods planned to achieve each objective or task shall be discussed in detail, including the level of effort associated with each task. 4. **Related Research or R&D.** Describe significant R/R&D that is directly related to the proposal including any conducted by the Project Manager/Principal Investigator or by the proposing firm. Describe how it relates to the proposed effort, and any planned coordination with outside sources. The offeror must persuade reviewers of its awareness of key recent R/R&D conducted by others in the specific topic area. 5. **Key Personnel and Bibliography of Directly Related Work.** Identify key personnel involved in Phase I including their directly related education, experience, and bibliographic information. Where vitae are extensive, summaries that focus on the most relevant experience or publications are desired and may be necessary to meet proposal page limitations. 6. **Relationship with Future Research and Development.** State the anticipated results of the proposed approach if the project is successful (Phase I and Phase II). Discuss the significance of the Phase I effort in providing a foundation for a Phase II R/R&D effort. 7. **Facilities.** Provide a detailed description of the availability and location of instrumentation and physical facilities proposed for Phase I. 8. **Consultants.** Involvement of consultants in the planning and research stages of the project is permitted. If such involvement is intended, it shall be described in detail within the proposal. Consultants are permitted to conduct no more than one-third of the work. 9. **Potential Post Applications.** Briefly describe whether and by what means the proposed project appears to have (a) potential commercial application and (b) potential use by the Federal Government. 10. **Similar Proposals or Awards.** While it is permissible, with

	proposal notification, to submit identical proposals or proposals containing a significant amount of essentially equivalent work for consideration under numerous Federal program solicitations, it is unlawful to enter into contracts or grants requiring essentially equivalent effort. If there is any question concerning this, it must be disclosed to the soliciting agency or agencies before award. If a firm elects to submit similar or identical proposals or proposals containing equivalent work under other Federal program solicitations, a statement must be included in each such proposal indicating: • The name and address of the agencies to which proposals were submitted or from which awards were received; • Date of proposal submission or date of award; • Title, number, and date of SBIR Program solicitations under which proposals were submitted or awards received; • The applicable research topics for each SBIR proposal submitted or award received; and • Titles of research projects. 11. **Prior SBIR Phase II Awards.** If the SBC has received more than a total of 15 Phase II awards in the prior five fiscal years, submit name of 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. Provide name and title of Project Manager or Principal Investigator for each proposal submitted or award received. **Required proposal information in item #11 shall not be counted towards the page limitation.**
Sustainable Acquisition Requirement	Consistent with FAR Part 23, each offeror is expected to include the following provision in their technical proposal which will constitute the Statement of Work (SOW) under any contract award resulting from this solicitation, under Phase I or II. Inclusion of this general requirement does not relieve the offeror from including in their technical proposal explicit sustainability requirements applicable to the required services being offered (see Biobased website). **Sustainable Acquisition Requirement:** To the maximum extent possible and consistent with Federal Acquisition Regulations Part 23, during the performance of the work required under this technical proposal, the Contractor will provide or use products that are: energy efficient

	(ENERGY STAR® or Federal Energy Management Program (FEMA)-designated); water-efficient; biobased; environmentally preferable (e.g., EPEAT-registered, or non-toxic or less toxic alternatives); non-ozone depleting; or made with recovered materials. Unless otherwise identified in this technical proposal, each recovered materials or biobased product provided and delivered must meet, but may exceed, the minimum recovered materials or biobased content of an EPA- or USDA-designated product. The sustainable acquisition requirements specified herein apply only to products that are required to be: (1) delivered to the Government during performance; (2) acquired by the contractor for use in performing services (including construction) at Federally-controlled facility; (3) furnished by the contractor for use by the Government; or (4) specified in the design of work, or incorporated during its construction, renovation, or maintenance.
Cost Breakdown/ Proposed Budget (Appendix C)	A firm fixed price Phase I Contract Pricing Proposal (Schedule 1) must be submitted in detail using the template provided in Appendix C. Note: Firm fixed price is the type of contract to be used for Phase I SBIR awards. Some cost breakdown items of Appendix C **may not apply** to the proposed project. If such is the case, there is no need to provide information for each and every item. It is important, however, to provide enough information to allow the USDOT to understand how the offeror plans to use the requested funds if the contract is awarded. Phase I contract awards may include profit. A firm must note its Tax Identification number and DUNS identification number on Appendix C, Contract Pricing Proposal, and Schedule 1. The DUNS number is assigned by Dun & Bradstreet, Inc. (See III (C) below) **This required proposal information shall not be counted towards the page limitation.**
SBIR Funding Agreement Certification (Appendix D)	**This required proposal information shall not be counted towards the page limitation.**
SBA Company Registry Confirmation	The confirmation from registering in the database should be included at the end as a .pdf document. **This required proposal information shall not be counted towards the page limitation.**

C. Other Proposal Information

1. Proposals will be available only to the USDOT team of engineers and/or scientists responsible for evaluating your proposal, the USDOT SBIR Program Office, and Volpe Center staff pertinent to the SBIR program, such as the Volpe Center's Office of Acquisition.
2. **Fraudulent Information.** Submitting plagiarized information and/or false proposal information pertaining to the company, the Principal Investigator and/or work to be performed may result in:
    a. the cancellation of the topic within a solicitation,
    b. a proposal being deemed non-responsive,
    c. a recommendation for Phase I award being rescinded, or
    d. the termination of an award.
3. **Discretionary Technical Assistance.** The SBIR Program Policy Directive permits an agency to provide technical assistance to an SBIR awardee in an amount not more than $5,000 per year. This amount is in addition to the award amount. The SBC can acquire the technical assistance services itself. The SBC must demonstrate that the individual or entity selected can provide the specific technical services needed and provide the details in the proposal. If the SBC demonstrates this requirement sufficiently, the USDOT must allow the SBC to acquire the needed technical assistance itself, as an allowable cost.
4. **NIST/Hollings Manufacturing Extension Partnership.** SBCs may wish to contact their local National Institute of Standards and Technology (NIST) Hollings Manufacturing Extension Partnership (MEP) for manufacturing and other business-related support services. The MEP works with small and mid-sized companies to help them create and retain jobs, increase profits, and save time and money. The nationwide network provides a variety of services, from business development assistance to innovation strategies to process improvements and the identification of commercialization opportunities. MEP is a nationwide network of locally managed extension centers with over 1,400 technical experts, located in every state. To contact an MEP center, call 1-800-MEP-4-MFG (1-800-637-4634) or visit MEP's website, at http://www.nist.gov/mep.

D. System for Award Management (SAM) and Data Universal Numbering System (DUNS) Identification Number

It is federally mandated that any business wishing to do business with the Federal Government under a Federal Acquisition Regulation (FAR)-based contract **must be registered in SAM before being awarded a contract**. You can find more information on SAM and the registration process on the website, https://www.sam.gov. You can register online at https://www.sam.gov by following the prompts if you already have a DUNS number. If you need a DUNS number, you can find instructions at http://fedgov.dnb.com/webform/displayHomePage.do.

IV. METHOD OF SELECTION AND EVALUATION CRITERIA

A. General

All Phase I proposals will be evaluated and judged on a competitive basis. Initially, all proposals will be screened to determine responsiveness to the solicitation. Proposals that meet the solicitation requirements will be evaluated to determine the most promising technical and scientific approaches. Each proposal will be judged on its own merit. A Phase I award will be made to the responsive and responsible Offerors whose proposal provides the best value to the Government, based on the Technical and Scientific Merit of the proposal. **The USDOT is under no obligation to fund any proposal or any specific number of proposals on a given topic. For any given topic, USDOT may elect to award more or less than the anticipated quantity of awards stated in Section IX.**

A Phase II award will be made to the responsive and responsible Offerors whose offers provide the best value to the Government, based on the Technical Proposal and Cost Proposal. Phase II awards will be made to those offerors with the greatest commercialization potential and will be subject to the availability of funding.

B. Evaluation Criteria

The evaluation process involves the following factors:

1. Scientific and technical merit and the feasibility of the proposal's commercial potential, as evidenced by:
    a. Past record of successful commercialization of SBIR or other research;
    b. Existence of Phase III funding commitments from private sector or non SBIR funding sources; and
    c. Presence of other indicators of the commercial potential of the idea.
2. The work plan and approach to achieving specified work tasks and stated objectives of the proposed effort are well defined and within budgetary constraints and on a timely schedule.
3. Qualifications of the proposed principal/key investigator(s) including demonstrated expertise in a disciplinary field related to the particular R/R&D topic that is proposed for investigation.
4. The supporting staff, facilities and equipment will provide the necessary support to conduct the proposed R/R&D.

C. Prescreening

Each proposal submission will be examined to determine if it is complete and contains adequate technical and pricing data. **Proposals that do not meet the requirements of the solicitation as described in Section III.B. will be excluded from evaluation and offerors will receive an email notifying them of the rejection.**

D. Schedule

All USDOT evaluations shall be completed and recommendations for award will be submitted to the USDOT SBIR Program Office within six weeks of the closing date for Phase I proposals.

E. USDOT Technical Evaluation Process

Each of the Department's Operating Administrations will establish technical evaluation teams comprised of Federal staff, including engineers and/or scientists and provide written evaluations and recommendations for award to the USDOT SBIR Program Director.

F. Selection of Awardees

Effective October 1, 2012, the USDOT SBIR Program Office will issue a notice to each applicant as to whether it has been selected for an award no later than 90 calendar days after the closing date of the solicitation.

G. Time to Award Requirements

Effective October 1, 2012, the new SBIR Program Policy Directive requires all SBIR agencies to make award decisions within 180 days after the close of the solicitation. The purpose of this requirement is to reduce the gap in time between submission of application and time of award, which is an important issue for many small businesses. USDOT will be required to issue a Phase I contract award in accordance with the timeframes set forth in the National Defense Authorization Act for FY2012 and SBIR Program Policy Directive. The USDOT SBIR Program Office will also post a listing of Phase I proposals recommended for contract award on the USDOT SBIR Program webpage: http://www.volpe.dot.gov/sbir.

H. Debriefing Requests

Debriefing requests should be submitted by e-mail to the SBIR Program Contracting Officer: **Jeanne.Rossetsky@dot.gov**, and must include the offeror's name, address, research topic number, and the proposal identification number assigned and provided through an automated email notification sent to you upon receipt of your proposal. The identity of the evaluators will not be

disclosed. Debriefings may be conducted through the issuance of a letter by the SBIR Program Contracting Officer and will summarize the comments received from the technical evaluation team.

V. CONSIDERATIONS

A. Awards

The Government anticipates awarding approximately **eight** Phase I contracts with the possibility for additional or fewer awards. The actual number of contract awards is subject to the availability of funding and the responses from small business firms to the solicited research topics described in Section IX.

1. **Dollar Value of Awards.** The SBIR Program Policy Directive sets the maximum thresholds for Phase I and Phase II awards at $150,000 and $1,000,000, respectively. SBA will adjust these amounts every year for inflation and will post the adjusted numbers on www.sbir.gov. Additionally, the Policy Directive states that agencies may exceed these thresholds by no more than 50%, unless the agency requests and is granted a waiver from SBA.
    a. **Phase I contract awards**. All Phase I awards will be firm fixed price contracts and **may be** funded up to $150,000. The period of performance for a Phase I contract is 6 months. Funding levels for each topic are determined by the agency sponsoring the research and are provided in Section IX.
    b. **Phase II contract awards**. Phase II contracts can be funded up to $1,000,000. Funding estimates are determined by the agency sponsoring the research. The period of performance for a Phase II contract is up to two years. Phase II funding estimates are provided in Section IX. Phase II awards may be Firm-Fixed Price or Cost-Plus-Fixed-Fee contracts.
    c. **Sequential Phase II awards.** The SBIR Program Policy Directive permits agencies to issue one additional, sequential Phase II award to continue the work of an initial Phase II award. These awards will be referred to as Phase IIB awards and can be funded up to $1,000,000 for a period not to exceed 2 years. Therefore, a small business may receive no more than two SBIR Phase II awards for the same R&D project, and the awards must be made sequentially.

2. **Accounting System Audits.** Phase II awardees will be required to have an acceptable accounting system in place to receive a cost reimbursement type contract. If a small business has not had an audit of its accounting system, Defense Contract Audit Agency (DCAA) may conduct an on-site pre-award audit prior to contract award. This process can take several months in addition to the time for processing an award. For information pertaining to DCAA accounting system requirements and audits, please go to the DCAA webpage, http://www.dcaa.mil. The Contracting Officer may consider a fixed-price type contract if a cost reimbursement type contract is not feasible.

3. **USDOT SBIR Program Set-aside Budget**. Beginning in FY 2013, USDOT's Operating Administrations will contribute 2.7% of their agency's Extramural Research Budget for SBIR Program funding. Each USDOT Operating Administration's SBIR contribution may only be used to support research of concern to that Operating Administration. For example, funds furnished by the Federal Highway Administration (FHWA) may not support research solely of concern to the National Highway Traffic Safety Administration (NHTSA). Based on anticipated funding levels, there may not be adequate funding within the USDOT SBIR Program to support Phase I and/or Phase II awards for research which is solely of concern to the following Operating Administrations: Federal Highway Administration (FHWA), Federal Motor Carrier Safety Administration (FMCSA), Federal Railroad Administration (FRA), Federal Transit Administration (FTA), National Highway Traffic Safety Administration (NHTSA), Research and Innovative Technology Administration (RITA), and Pipeline Hazardous Materials Safety Administration (PHMSA). The Phase I and Phase II awards for such research will be subject to the availability of funding.

B. Reports

1. Under Phase I SBIR contracts, three reports will be required, consisting of two interim narrative reports, and a comprehensive final report. These reports are spaced at two month intervals starting at the end of month two.
2. Under Phase II, IIB and Phase III SBIR contracts, monthly progress reports, monthly cost reports (if required), commercialization reports (due every six months), and a summary of results will be required.

C. Payment Schedule

Payments for Phase I contracts will be made in three equal installments upon submission of invoices by the contractor in conjunction with or after the submission of acceptable reports as described in above Paragraph B.

The specific payment schedule (including payment amounts) for each contract will be incorporated into the contract upon completion of negotiations between the USDOT and the successful Phase II, Phase IIB and Phase III offeror. Successful offerors may be paid periodically as work progresses in accordance with the negotiated price and payment schedule.

In all phases, USDOT must make payment to recipients under SBIR funding agreements in full, subject to audit, or on or before the last day of the 12 month period beginning on the date after the completion of award.

D. Innovations, Inventions, and Patents

1. Proprietary Information. Information contained in the proposals will remain the property of the offeror. The Government may, however, retain copies of all proposals. Public release of information in any proposal submitted will be subject to existing statutory and regulatory requirements.

   If proprietary information is provided by a offeror in a proposal which constitutes a trade secret, proprietary commercial or financial information, confidential personal information or information effecting national security, it will be treated in confidence, to the extent permitted by law, provided this information is clearly marked by the offeror with the terms "confidential proprietary information" and provided the following legend appears on the title page of the proposal:

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

   Any other legend may be unacceptable to the Government and may constitute grounds for return of the proposal without further consideration and without assuming any liability for inadvertent disclosure. The Government will limit dissemination of such information to within official channels.

2. USDOT prefers that offerors avoid inclusion of proprietary data in their proposals. If the inclusion of proprietary data is considered essential for meaningful evaluation of a proposal submission, then such data should be provided on a separate page with a numbering system to key it to the appropriate place in the proposal.

3. Rights in Data Developed under SBIR Contracts. Rights in technical data, including software developed under any contract resulting from this solicitation, shall remain with the contractor except that the Government shall have the limited right to use such data for Government purposes and shall not release such data outside the Government without permission of the contractor for a period of four years from completion of the project from which the data was generated. However, effective at the conclusion of the four-year

period, the Government shall retain a royalty free license for Federal Government use of any technical data delivered under an SBIR contract whether patented or not.

4. Copyrights. With prior written permission of the Contracting Officer, the contractor normally may copyright and publish (consistent with appropriate national security considerations, if any) material developed with USDOT support. The USDOT receives a royalty free license for the Federal Government and requires that each publication contain an appropriate acknowledgement and disclaimer statement.

5. Patents/Invention Reporting. Small business firms normally may retain the principal worldwide patent rights to any invention developed with Government support. The Government receives a royalty free license for Federal Government use, reserves the right to require the patent holder to license others in certain circumstances, and requires that anyone exclusively licensed to sell the invention in the United States must normally manufacture it domestically. To the extent authorized by 35 U.S.C. 205, the Government will not make public any information disclosing a Government-supported invention for a two-year period to allow the contractor a reasonable time to pursue a patent.

6. Invention Reporting Process. Awardees shall report SBIR inventions to the USDOT through the iEdison Invention Reporting System, http://www.iedison.gov. Use of the iEdison System satisfies all invention reporting requirements mandated by any award.

E. Cost Sharing

Cost sharing is permitted for Phase II, IIB proposals under the topic areas identified in this solicitation; however, cost sharing is not required nor will it be a factor in proposal evaluations.

F. Profit or Fee

A profit is allowed on firm fixed price awards to small business concerns under the USDOT SBIR Program.

A fee is allowed on Cost-Plus-Fixed-Fee (Phase II and Phase IIB only) awards to small business concerns under the USDOT SBIR Program.

G. Joint Ventures or Limited Partnerships

Joint ventures and limited partnerships are permitted provided the entity created qualifies as a small business concern in accordance with the Small Business Act, 15 U.S.C. 631, and the definition included in this solicitation.

H. Research and Analytical Work

1. For Phase I, a minimum of two-thirds of the research and/or analytical effort must be performed by the proposing firm unless otherwise approved in writing by the Contracting Officer.

2. For Phase II and IIB, a minimum of one-half of the research and/or analytical effort must be performed by the proposing firm unless otherwise approved in writing by the Contracting Officer.

I. Awardee Commitments

Upon award of a contract, the awardee will be required to make certain legal commitments through acceptance of numerous Federal Acquisition Regulation (FAR) and Transportation Acquisition Regulation (TAR) contract clauses. The FAR and TAR can be found at the following links:

FAR: https://www.acquisition.gov/far/index.html

TAR: http://www.dot.gov/administrations/assistant-secretary-administration/transportation-acquisition-regulation-tar

The Summary Statements that follow are illustrative of the types of clauses to which the contractor would be committed. This list does not represent a complete list of clauses to be included in Phase I contracts, nor does it provide the specific wording of such clauses. A complete copy of the terms and conditions will be provided upon issuance of the contract for signature prior to award.

J. Summary Statements

1. **Standards of Work.** Work performed under the contract must conform to high professional standards.

2. **Inspection.** Work performed under the contract is subject to Government inspection and evaluation at all times.

3. **Examination of Records.** The Comptroller General (or a duly authorized representative) shall have the right to examine any directly pertinent records of the contractor involving transactions related to this contract.

4. **Default.** The Government may terminate the contract if the contractor fails to adhere to the terms of the contract.

5. **Termination for Convenience.** The contract may be terminated at any time by the Government if it deems termination to be in its best interest, in which case the contractor will be compensated for work performed and for reasonable termination costs.

6. **Disputes.** Any dispute concerning the contract which cannot be resolved by agreement shall be decided by the Contracting Officer with right of appeal.

7. **Contract Work Hours.** The contractor may not require an employee to work more than eight hours a day or 40 hours a week unless the employee is compensated accordingly (i.e., overtime pay).

8. **Equal Opportunity.** The contractor will not discriminate against any employee or applicant for employment because of race, color, religion, sex, or national origin.

9. **Affirmative Action for Veterans.** The contractor will not discriminate against any employee or applicant for employment because he or she is a disabled veteran or veteran of the Vietnam era.

10. **Affirmative Action for Handicapped.** The contractor will not discriminate against any employee or applicant for employment because he or she is physically or mentally handicapped.

11. **Officials Not to Benefit.** No member of or delegate to Congress shall benefit from the contract.

12. **Covenant Against Contingent Fees.** No person or agency has been employed to solicit or secure the contract upon an understanding for compensation except bonafide employees or commercial agencies maintained by the contractor for the purpose of securing business.

13. **Gratuities.** The contract may be terminated by the Government if any gratuities have been offered to any representative of the Government to secure the contract.

14. **Patent Infringement.** The contractor shall report each notice or claim of patent infringement based on the performance of the contract to the SBIR Program Contracting Officer.

15. **Procurement Integrity.** Submission of a proposal under this solicitation subjects the offeror to the procurement integrity provision (§27) of the Office of Federal Procurement Policy Act (41 U.S.C. 423). This statute, as implemented by Federal Acquisition Regulation (FAR, 48 C.F.R.) §3.104, prohibits the following conduct by competing vendors during an agency procurement: offering or discussing future employment or business opportunities with an agency procurement official; promising or offering a gratuity to an agency procurement official; and/or soliciting or obtaining proprietary or source selection information regarding the procurement. Violations of the statute may result in criminal and/or civil penalties, suspension and debarment, cancellation of the procurement, or other appropriate remedy.

16. **Section 508 Access Board Standards.** All electronic and information technology deliverables rendered must comply with Section 508 of the Rehabilitation Act and the Access Board Standards available for viewing at http://www.section508.gov. Unless otherwise indicated, the contractor represents by signature on a contract that all deliverables will comply with the Access Board Standards.

17. **Government Property.** Equipment either furnished or acquired under this contract is subject to FAR Clause 52.245-1 Government Property (August 2010) and SBIR Program Policy Directive, Section 8 (c).

    FAR: https://www.acquisition.gov/far/index.html

    SBIR Policy Directive: http://www.sbir.gov/about/about-sbir

K. SBIR Program Contractor Requirements

Upon contract award and for the duration of the contract the awardee will be required to adhere to SBIR Program Requirements. The following list is illustrative of the requirements to which the contractor will be committed. A complete copy of the terms and conditions will be provided upon issuance of the Phase l contract for signature prior to award.

1. The company must meet the SBA requirements for a small business, including being majority American owned and have 500 employees or fewer (see Section I.C.).

2. The Principal Investigators primary employment must be with the company during the contract period. The Principal Investigator may not be employed full time elsewhere (see Section I.C.).

3. For Phase I, a minimum of two thirds of the research effort must be performed by the contract awardee. For Phase II a minimum of one-half of the research must be performed by the contract awardee.

   Work performed by a subcontractor or university research lab is NOT work completed by the contract awardee.

4. **Disclosures**. Duplicate or overlapping work previously submitted to other agencies may not be submitted without full disclosure to all agencies. See Section III. B.

   University employees participating on a SBIR award shall disclose their involvement and the use of university facilities to the Government. Disclosure should be provided to the university as well as their use of university facilities.

5. **Commercialization Databases.** A Commercialization Database is being established by SBA that will store commercialization information for SBCs that have received SBIR awards. This includes information relating to revenue from the sale of new products or services resulting from the R&D conducted under a Phase II award and any business or subsidiary established for the commercial application of a product or services for which an SBIR award is made, among other things. The information contained in this database will be used by SBCs and agencies to determine whether the SBC meets the agency's commercialization benchmarks, discussed above, and for program evaluation purposes. The effective date for implementation of this database will be announced at a later date.

   USDOT will require that the SBCs provide the information to the SBA's database directly at http://www.sbir.gov/registration. USDOT will use the information to determine if the SBC meets the established commercialization benchmark.

L. Corrective Actions

Fraudulent reports or other deliverables knowingly submitted under an awarded contract may result in termination of an active award. If the contract is terminated for fraud or any other illegal or improper activity the Government is entitled to recover, in addition to any penalty prescribed by law, the amount expended under the contract.

M. Additional Information

1. This solicitation is intended for informational purposes and reflects current planning. Although not expected there may be inconsistencies between the information contained

in the 13.2 solicitation and the terms and conditions of any resulting SBIR contract. The terms of the contract once executed are controlling.

2. Before award of an SBIR contract, the offeror shall complete an Online Representations and Certifications Application at https://www.sam.gov. The offeror shall be certified in the appropriate NAICS code (541712).

3. The Government may request the offeror to submit additional management, personnel, and financial information to assure responsibility of the offeror.

4. The Government is not responsible for any monies expended by the offeror before award of any contract.

5. This solicitation is not an offer by the Government and does not obligate the Government to make any specific number of awards. Also, awards under this program are contingent upon the availability of funds.

6. The USDOT SBIR Program is not a substitute for existing unsolicited proposal mechanisms. Unsolicited proposals shall not be accepted under the USDOT SBIR Program in either Phase I or Phase II. For information pertaining to submission requirements for unsolicited proposals please go to the following web page: http://www.volpe.dot.gov/procure/unsolguide.html.

7. If an award is made pursuant to a proposal submitted under this solicitation, the contractor will be required to certify that they have not previously been, nor are currently being paid for essentially equivalent work by any agency of the Federal Government.

8. When purchasing equipment or a product with funds provided under the USDOT SBIR Program, purchase only American made equipment and products, to the extent possible in keeping with the overall purposes of the program.

9. In accordance with FAR 52.233-2, Service of Protest:
   a. Protests, as defined in section 33.101 of the Federal Acquisition Regulation, that is filed directly with an agency, and copies of any protests that are filed with the Government Accountability Office (GAO), shall be served on the Contracting Officer (addressed as follows) by obtaining written and dated acknowledgement of receipt from:

      Jeanne Rossetsky, Contracting Officer
      Volpe Center, RVP-32

55 Broadway
Cambridge, MA 02142-1001
(617) 494-3853

b. The copy of any protest shall be received in the office designated above within one day of filing a protest with the GAO.

VI. SUBMISSION OF PROPOSALS

A. Closing Date

Proposals must be received no later than 11:59 P.M. EDT on September 23, 2013. Proposals received after that time will be automatically rejected, no exception will be permitted.

B. Submission Details

Only one proposal shall be submitted. No duplicate proposals shall be sent by any other means. Proposals must be in a PDF file. The proposal file name shall contain eight (8) characters; the first three shall be the topic number you are proposing to (i.e., FH3), and the remaining five characters shall be a unique abbreviation of your company's name that you create.

C. Submission Address

Proposals may only be submitted online at: http://www.volpe.dot.gov/sbir/current.html. Instructions are provided on the "Submission" page.

VII. SCIENTIFIC AND TECHNICAL INFORMATION SOURCES

The following publications are referenced in the research topics found in Section IX.

Federal Highway Administration

Topic 13.2 – FH2

National Highway Traffic Safety Administration, 2012. Fatality Analysis Reporting System (FARS). Downloaded on 24 July 2012 at http://www.nhtsa.gov/FARS.

Kochanek, K.D., Xu, J, Murphy, S.L., Miniño, A.M., and Kung, H-C, 2011. Deaths: Preliminary Data for 2009. National Vital Statistics Reports 59(4), National Center for Health Statistics, Washington, DC.

Horswilla, M.S., Taylora, K., Newnamb, S., Wettona, W., Hill, A. Even highly experienced drivers benefit from a brief hazard perception training intervention. *Accident Analysis and Prevention* 52 (2013) 100-110.

Federal Motor Carrier Safety Administration (FMCSA)

Topic 13.2 – FM1

Application for Motor Passenger Carrier Authority
http://www.fmcsa.dot.gov/documents/forms/r-l/OP-1(P)-Instructions-and-Form.pdf

Application for Motor Property Carrier and Broker Authority
http://www.fmcsa.dot.gov/documents/forms/r-l/op-1-Instructions-and-Form.pdf

Pipeline and Hazardous Materials Safety Administration (PHMSA)

Topic 13.2 – PH2

For complete details on the USDOT pipeline safety regulations, visit the following website: http://www.gpo.gov/fdsys/pkg/CFR-2012-title49-vol3/pdf/CFR-2012-title49-vol3-subtitleB-chapI-subchapD.pdf.

The National Association of Corrosion Engineers (NACE) has published an industry accepted practice—NACE SP 0169 (which is also incorporated by reference see § 195.3).
http://www.nace.org/cstm/Store/Product.aspx?id=7f66c2c2-0a8b-442c-8cfb-3dd0b7cdd8b4

VIII. SUBMISSION FORMS AND CERTIFICATION (Appendices)

A. Proposal Cover Sheet (Appendix A)

B. Project Summary (Appendix B)

C. Contract Pricing Proposal (Appendix C)

D. SBIR Funding Agreement Certification (Appendix D)

E. Proposal Checklist (Appendix E)
(Do not include with your proposal – for your use only)

A. PROPOSAL COVER SHEET (Appendix A)

U.S. DEPARTMENT OF TRANSPORTATION
SMALL BUSINESS INNOVATION RESEARCH PROGRAM
SOLICITATION NO. DTRT57-13-R-SBIR2
FY13.2
PROPOSAL COVER SHEET

Project Title:	
Research Topic No.:	
Research Topic Title:	
Submitted by:	Company Name
	Address
	City, State, Zip
Representations & Certifications	System for Award Management Valid Until _____(Date) https://www.sam.gov
	Online Representations and Certifications Valid Until _____(Date) https://www.sam.gov
Amount Requested $ (May be up to $150, 000 unless otherwise indicated)	
Proposed Duration (in months) (Not to exceed 6 months)	

Congressional District No.*: _____
*To locate your congressional district number, proceed to the link: http://www.govtrack.us/congress/members

By signing and submitting this coversheet under Solicitation No. DTRT57-13-R-SBIR2, Topic No. _____, this form certifies that:

1. The above firm, together with its affiliate's ____is ____ is not a small business firm and meets the definition stated in Section I.E; and that it meets the eligibility requirement in Section I.C.

2. The SBIR Applicant is (check one):
   a. □ at least 51% owned and controlled by one or more individuals who are citizens of the United States, or permanent resident aliens in the United States; or
   b. □ at least 51% owned and controlled by another business concern that is itself at least 51% owned and controlled by individuals who are citizens of, or permanent resident aliens in the United States; or
   c. □ a joint venture in which each entity to the venture meets the requirements set forth in 2.a or 2.b above.

3. The above firm, _____will _____ will not primarily employ the Principal Investigator at the time of award and during the conduct of research.

4. The above firm _____does_____does not qualify as a socially or economically disadvantaged small business as defined in Section I. E. (The information is for statistical purposes only.)

5. The above firm_____does_____does not qualify as a women-owned small business as defined in Section I. E. (The information is for statistical purposes only.)

6 The above firm_____does_____does not qualify as a HUB Zone-owned small business and meet the definition as stated in this Section I.E.

7. The above firm and/or Principal Investigator _____has, ____ has not submitted proposals containing the same, or a significant portion of equivalent or overlapping work to other Federal agencies. (If yes, identify proposals. See Section III. B.)

8. The above firm and/or Principal Investigator _____has, ____has not been funded under any other Federal grant, contract or subcontract program solicitations, or has received other Federal awards to conduct essentially equivalent work or overlapping work. (If yes, identify proposals in Section III. B.)

9. The Principal Investigator's primary employment _____is, _____is not with the above firm.

10. The above firm ____will, _____will not permit the Government to disclose the title and technical abstract of your proposed project, plus the name, address, and telephone number of the Corporate/Business Official and Principal Investigator of your firm, if your proposal is recommended for award, to any party that may be interested in contacting you for further information?

11. By signing and submitting this proposal, you are authorizing the USDOT SBIR Program permission to disclose the title and abstract of the proposed project, as well as the name and other information of the corporate official to appropriate local and state economic development organizations, if the proposal does not result in an SBIR award.

By signing and submitting this proposal in response to Solicitation No. DTRT57-13-R-SBIR2, Topic No. _____, I am representing on my own behalf, and on behalf of the SBIR applicant, that the information provided in this certification, the application, and all other information submitted in connection with this application, is true and correct as the date of the submission. I acknowledge that any intentional or negligent misrepresentation of the information contained in this certification may result in criminal, civil or administrative sanctions, including but not limited to: (1) fines, restitution and/or imprisonment under 18 U.S.C. § 1001; (2) treble damages and civil penalties under the False Claims Act (31 U.S.C. § 3729 *et seq.*); (3) double damages and civil penalties under the Program Fraud Civil Remedies Act (31 U.S.C. § 3801 *et seq.*); (4) civil recovery of award funds, (5) suspension and/or debarment from all Federal procurement and non-procurement transactions (FAR Subpart 9.4 or 2 C.F.R. part 180); and (5) other administrative penalties including termination of SBIR awards.

Principal Investigator	Corporate/Business Official
Name _____	Name_____
Title _____	Title _____
Address_____	Address_____
Address_____	Address_____
Telephone No._____	Telephone No._____
E-mail_____	E-mail_____
Signature_____Date_____	Signature_____Date_____

PROPRIETARY NOTICE (IF APPLICABLE, SEE SECTION V.D.)

B. PROJECT SUMMARY (Appendix B)

U.S. DEPARTMENT OF TRANSPORTATION
SMALL BUSINESS INNOVATION RESEARCH PROGRAM
SOLICITATION NO. DTRT57-13-R-SBIR2
FY13.2
PROJECT SUMMARY

Name and Address of Offeror	
	Proposal No.

Name and Title of Principal Investigator

Project Title

Research Topic No.	Research Topic Title

Technical Abstract (Limited to two hundred words in this space only with no classified or proprietary information/data).

Anticipated Results/Potential Commercial Applications of Results.

Provide key word (eight maximum) description of the project useful in identifying the technology, research thrust, and/or potential commercial application.

C. CONTRACT PRICING PROPOSAL (Appendix C)

U.S. DEPARTMENT OF TRANSPORTATION
SMALL BUSINESS INNOVATION RESEARCH PROGRAM
SOLICITATION NO. DTRT57-13-R-SBIR2
FY13.2
CONTRACT PRICING PROPOSAL

Topic No:		
Offerors Project Title:		
Name of Offeror:		
Address:		
City, State, Zip:		
Offerors Point of Contact:		
Title of Offerors Point of Contact:		
Telephone:		
E-mail:		
DUNS No. :		
Tax Identification No.:		
To best of my knowledge and belief, cost and pricing data are true and complete, and current as of the date of signature below. I understand that the willful provision of false information or concealing a material fact in this report or any other communication submitted to USDOT is a criminal offense (U.S. Code, Title 18, Section 1001).		
THE COST PROPOSAL MUST BE SIGNED BY A RESPONSIBLE OFFICIAL OF THE FIRM. Authorized Company Officer: Printed Name_____ Title_____ Signature_____Date:		
1	**Total Firm Fixed Price Proposal Amount**	
2.	**Direct Material Costs**	
	a. Purchased Parts & Subcontracted Items	

Description	Unit Price	Qty	Total

Topic No:					
Offerors Project Title:					
Name of Offeror:					
	b. Raw Materials				$_____
	Description	Unit Price	Qty	Total	
	c. Standard Commercial Items				$_____
	Description	Unit Price	Qty	Total	
	Total Direct Materials (TDM)				$_____
3	**Materials Overhead**				
		Rate			Amount
	Total Material Overhead (TMO)	_____ %			$_____
4	**Total Materials (TDM + TMO)**				$_____
5	**Direct Labor**				
	Type / Personnel	Hours	Rate ($ / Hr)		Cost
					$_____
					$_____
					$_____
	Total Direct Labor (TDL)				$_____
6	**Labor Overhead** (TDL x Overhead Rate)				
		Rate			Amount
	Total Labor Overhead (TLO)	_____ %			$_____
7	**Labor: Fringe Benefits** (TDL x Benefit Rate)				
		Rate (% or $ / Hr)			Amount
	Fringe Benefits	_____ ___			$_____
8	**Total Labor** (TDL + TLO + Fringe)				Amount

Topic No:					
Offerors Project Title:					
Name of Offeror:					
					$_____
9	**Direct Costs: Special Testing** (Include field work at Government installations)				
	Item and Anticipated Use			Unit Cost	Estimated Cost
					$_____
					$_____
					$_____
					$_____
	Estimated Total Special Testing				$_____
10	**Direct Costs: Special Equipment**				
	Item and Anticipated Use			Unit Cost	Amount
					$_____
					$_____
					$_____
	Estimated Total Special Equipment				$_____
11	**Direct Costs: Travel**				
	Travel Location	Mode of Travel	Number of Trips	Per Diem	Amount
					$_____
					$_____
	Travel				$_____
12	**Direct Costs: Consultant Services**				
	Description of Service				Amount
					$_____
					$_____
	Total Consultant Services				$_____
13	**Direct Costs: Other Direct Costs (ODC)**				
	Item & Anticipated Use			Unit Cost if applicable	Amount
					$_____
					$_____
					$_____
	Total ODCs				$_____
14	**Total Direct Costs** (TDC) (Sums of Line No. 9 – 13)				Amount
					$_____

15	**General & Administrative Expense** (Total Materials + Total Labor + Total ODC) x Rate)		
		Rate %	Amount
		_____	$_____
16	**Royalties**		
	Description		Amount
	Total		$_____
17	**Total Cost** (Sums of lines 4, 8, 14, 15 & 16)		Amount
			$_____
18	**Profit** (Total Cost x Profit Rate)		
		Rate %	Calculated Amount
		_____	$_____
19	**Total Firm Fixed Price Amount** (Total Cost + Profit)	$_____	
20	An executive agency of the United States Government ____has _____ has not performed any review of your accounts or records in connection with any other Government prime contract or subcontract within the past twelve months? If one has, then provide a copy of the audit report and the name and address of the reviewing office, name of the individual and telephone/extension below _____ _____ _____		
21	Government property ____is _____is not required in the performance of this proposal? If yes, identify. _____ _____ _____ _____		
22	Government contract financing _____is, _____ is not required to perform this proposed contract? If yes, specify type as advanced payments or progress payments.		

D. SBIR FUNDING AGREEMENT CERTIFICATION (Appendix D)

U.S. DEPARTMENT OF TRANSPORTATION
SMALL BUSINESS INNOVATION RESEARCH PROGRAM
SOLICITATION NO. DTRT57-13-R-SBIR2
FY13.2
SBIR FUNDING AGREEMENT CERTIFICATION

Complete the funding agreement certification on the following pages.

SBIR Funding Agreement Certification – Time of Award

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

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

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

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

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

1. The business concern meets the ownership and control requirements set forth in 13 C.F.R. §121.702.
   ☐ Yes ☐No

2. If a corporation, all corporate documents (articles of incorporation and any amendments, articles of conversion, by-laws and amendments, shareholder meeting minutes showing director elections, shareholder meeting minutes showing officer elections, organizational meeting minutes, all issued stock certificates, stock ledger, buy-sell agreements, stock transfer agreements, voting agreements, and documents relating to stock options, including the right to convert non-voting stock or debentures into voting stock) evidence that it meets the ownership and control requirements set forth in 13 C.F.R. §121.702.
   ☐ Yes ☐No ☐N/A Explain why N/A:_____

3. If a partnership, the partnership agreement evidences that it meets the ownership and control requirements set forth in 13 C.F.R. §121.702.
   ☐ Yes ☐No ☐N/A Explain why N/A:_____

4. If a limited liability company, the articles of organization and any amendments, and operating agreement and amendments, evidence that it meets the ownership and control requirements set forth in 13 C.F.R. §121.702.
   ☐ Yes ☐No ☐N/A Explain why N/A:_____

5. The birth certificates, naturalization papers, or passports show that any individuals it relies upon to meet the eligibility requirements are U.S. citizens or permanent resident aliens in the United States.
   ☐ Yes ☐No ☐N/A Explain why N/A:_____

6. It has no more than 500 employees, including the employees of its affiliates.
   ☐ Yes ☐No

7. SBA has not issued a size determination currently in effect finding that this business concern exceeds the 500 employee size standard.
   ☐ Yes ☐No

8. During the performance of the award, the principal investigator will spend more than one half of his/her time as an employee of the awardee or has requested and received a written deviation from this requirement from the funding agreement officer.
   ☐ Yes ☐No ☐Deviation approved in writing by funding agreement officer: _____%

9. All, essentially equivalent work, or a portion of the work proposed under this project (check the applicable line):
   ☐ Has not been submitted for funding by another Federal agency.
   ☐ Has been submitted for funding by another Federal agency but has not been funded under any other Federal grant, contract, subcontract or other transaction.
   ☐ A portion has been funded by another grant, contract, or subcontract as described in detail in the proposal and approved in writing by the funding agreement officer.

10. During the performance of award, it will perform the applicable percentage of work unless a deviation from this requirement is approved in writing by the funding agreement officer (check the applicable box and fill in if needed):
    ☐ SBIR Phase I: at least two-thirds (66 2/3%) of the research.
    ☐ SBIR Phase II: at least half (50%) of the research.
    ☐ Deviation approved in writing by the funding agreement officer: _____%

11. During performance of award, the research/research and development will be performed in the United States unless a deviation is approved in writing by the funding agreement officer.
    ☐ Yes ☐No ☐Waiver has been granted

12. During performance of award, the research/research and development will be performed at my facilities with my employees, except as otherwise indicated in the SBIR application and approved in the funding agreement.
    ☐ Yes ☐No

13. It has registered itself on SBA's database as majority-owned by venture capital operating companies, hedge funds, or private equity firms.
☐Yes ☐No ☐N/A Explain why N/A:_____

14. It is a Covered Small Business Concern (a small business concern that:
(a) was not majority-owned by multiple venture capital operating companies (VCOCs), hedge funds, or private equity firms on the date on which it submitted an application in response to an SBIR solicitation; and (b) on the date of the SBIR award, which is made more than 9 months after the closing date of the solicitation, is majority-owned by multiple venture capital operating companies, hedge funds, or private equity firms).
☐ Yes ☐No

☐ It will notify the Federal agency immediately if all or a portion of the work proposed is subsequently funded by another Federal agency.

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

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

Signature	***Date__/__/__***
Print Name (First, Middle, Last)	
Title	
Business Name	

E. PROPOSAL CHECKLIST (Appendix E)

U.S. DEPARTMENT OF TRANSPORTATION
SMALL BUSINESS INNOVATION RESEARCH PROGRAM
SOLICITATION NO. DTRT57-13-R-SBIR2
FY13.2
PROPOSAL CHECKLIST

This is a CHECKLIST OF REQUIREMENTS for your proposal. Please review the checklist carefully to assure that your proposal meets the USDOT SBIR requirements. Failure to meet these requirements may result in your proposal being returned without consideration. (See Section III.B. of this Solicitation). **Do not include this checklist with your proposal.**

____ 1. The proposal reflects the fact that for Phase I a minimum of two-thirds (and for Phase II a minimum of one-half) of the research and/or analytical effort will be performed by the proposing firm as required (see Sections V.H.) and the primary employment of the principal investigator (for both Phase I and Phase II) must be with the small business firm at the time of award and during the conduct of the proposed research as required (see Section I.C).

____ 2. The proposal is submitted according to the requirements described in Section III.

____ 3. The proposal is limited to only ONE of the research topics in Section IX.

____ 4. The proposal budget **may be up to $150,000 unless otherwise indicated in the solicitation** and duration does not exceed six months.

____ 5. The technical abstract contains no proprietary information, does not exceed 200 words, and is limited to the space provided on the Project Summary sheet (Appendix B).

____ 6. The proposal contains no type smaller than ten point font size.

____ 7. The COVER SHEET (Appendix A) has been completed and is PAGE one and two of the proposal.

____ 8. The PROJECT SUMMARY (Appendix B) has been completed and is PAGE three of the proposal.

____ 9. The TECHNICAL CONTENT of the proposal begins on PAGE four and includes the items identified in Section III.B of the Solicitation.

____ 10. The technical proposal includes the Sustainable Acquisition Requirement provision (Section III.B.)

____ 11. The Contract Pricing Proposal (Appendix C) has been signed and is included as the last section of the proposal.

____ 12. The additional information on prior Phase II awards, if required, in accordance with Section III.B is included.

____ 13. The Funding Agreement Certification (Appendix D) has been completed and signed.

____ 14. The SBA Company Register Confirmation is included (Section III.B).

____ 15. The proposal must be a PDF file and submitted online by 11:59 p.m., September 23, 2013. **Proposals may only be submitted online, a link to the web form can be found here: http://www.volpe.dot.gov/sbir/current.html**. **Proposals received via email or any other means will not be accepted. Do not send duplicate proposals via email or by any other means.** Instructions for online submission are included on the submission page.

IX. RESEARCH TOPICS

Solicitation 13.2 Phase I research topics for USDOT Operating Administrations are listed below. These topics indicate the specific areas for which proposals are to be considered for acceptance by USDOT. The topics are not listed in any order of priority. Each proposal submitted must respond to one (and only one) topic and/or focus area as described in this section. A proposal may, however, indicate and describe its relevance to other topics.

USDOT Operating Administration	Topic number & Title	Maximum Number of Anticipated Awards	Estimated Award Amount Phase I	Estimated Award Amount Phase II*
Federal Highway Administration	13.2 – FH1 Development of Innovative Welding for High Performance Bridge Steel	2	$150,000	$500,000
	13.2 – FH2 Game-based technology and Database to Train Pre-Drivers, Young Drivers, and Older Drivers to Detect Traffic Hazards and Respond Appropriately	2	$100,000	$750,000
Federal Motor Carrier Safety Administration	13.2-FM1 Affiliation Strength/Risk Model Development for Motor Carrier Succession	1	$150,000	$350,000
Pipeline and Hazardous Material Safety Administration	13.2-PH1 Pipeline Integrity Assessment Using In-Line Inspection	1	$150,000	$1,000,000
	13.2-PH2 Modeling cathodic protection penetration on new construction pipelines incorporating all types of “foam” sack breakers and supports	1	$150,000	$1,000,000

	13.2-PH3 Develop and demonstrate new non-destructive evaluation methods to quantify remaining strength of line pipe steel and or pipeline fittings	1	$150,000	$1,000,000
*The Phase II funding level noted above is an estimate only, is subject to the availability of funds and/or the technical requirements to accelerate the development of a commercial product and/or innovation. Any changes to the Phase II estimated funding level listed above will be communicated to the small business after the completion of the Phase I project.				

A. Federal Highway Administration (FHWA)

13.2 – FH1 Development of Innovative Welding for High Performance Bridge Steel

Steel bridge fabrication has changed little since the 1950s when welding steel began to dominate over riveting. The recent 20 years has seen two innovations in steel bridge fabrication. One has been the advent of high performance steels (HPS) in the mid-1990s that provided higher yield strengths, higher fracture toughness, and most importantly, an increased weldability over conventional grades of bridge steel. Two, was the official adoption of electroslag welding into the American Welding Society (AWS) D1.5 Bridge Welding Code in 2010. Elecroslag welding is one of five welding processes recognized by AWS for steel bridge fabrication, but the majority of steel bridge fabrication still uses the submerged arc welding (SAW) process.

One of the most time consuming welds to make in bridge fabrication are butt splices between standard mill plates to create plates longer than the steel mill can deliver. Typical practice would be to use multi-pass SAW to make these joints and this becomes quite costly when the plate thickness is greater than 1 inch due to the extensive preparation, number of passes, and volume of weld metal. For instance, to butt weld a typical 3 inch thick by 30 inch wide girder flange would take 15 hours with SAW. Electroslag welding is specifically tailored for welding thick plates together in a single pass, and the same flange could be welded in 30 minutes. Additionally, electroslag welds have a much lower propensity for developing internal weld defects which can plague SAW leading to costly repairs and time delays.

Currently AWS D1.5 precludes electroslag welding of HPS grades of steel and for all fracture-critical members, because the process was never demonstrated for these applications. The specific concern with elecroslag welding HPS is the very high heat input having deleterious effects on the heat treatment of the HPS steels. The previously developed electroslag process consumables and welding conditions may have to be modified for joining HPS to ensure that welded joints have no rejectable discontinuities and will have adequate strength and toughness in both the weld metal and heat-affected zones of the welded joints.

The productivity of electroslag welding has the potential to speed up steel bridge fabrication and using HPS material can increase the reliability of new bridges. However, there has yet to be a synthesis of these two innovations to work together, and further electroslag weld process development must be performed so the process can be proven viable for joining of HPS to HPS, as well as hybrid welding of HPS to conventional bridge steel.

While electroslag is one of the methods that can be used to achieve this result, other innovative welding methods will also be considered. However, other methods should consider that standard mill widths of steel plate are 72, 96, and 120 inches wide and hence, the longest welds for the process will be this range. The lengths of plate being fused could be as long as 85 feet too, so other innovative processes should consider feasibility of handling plates of these sizes during welding. In addition, technologies beyond electroslag shall be more efficient, in regards to the total time to create a weld, than SAW at plate thicknesses over 1 inch. The finished weld should also have no rejectable discontinuities and will have adequate strength and toughness in both the weld metal (if used) and heat-affected zones of the welded joints.

The developed process will meet the FHWA National Leadership goal of advancing innovation by bringing together two existing technologies to help expand steel bridge fabrication possibilities, along with reducing fabrication costs and lead time. Once the process innovation is complete, it is expected that welding equipment manufacturers will be able to sell more machines to steel bridge fabricators, and steel bridge fabricators will become more competitive with the efficiency gains from electroslag or other innovative welding processes.

Expected Phase I Outcomes

The objective of this phase is to conduct a feasibility study to explore and identify innovative welding process variables and/or consumables for application to HPS. The two areas of concentration will be (1) research consumable chemistry requirements, if required, and the resulting weld metal chemistry to achieve (a) the correct strength level per grade and (b) a weld metal microstructure with the maximum level (at least that of meeting Zone 2 requirements) of impact toughness, and (2) identifying processes that will reduce the heat input to a minimum level that can be used consistently and practically to achieve quality welds in a production environment. This phase may include production of trial welds.

Expected Phase II Outcomes

Phase II will include the production of trial welds (if not already performed as part of the Phase I). The Phase II outcomes build upon the lessons learned in Phase I and will result in full optimization development of innovative welds between HPS and HPS, and HPS to conventional steel through a rational testing matrix of trial welds looking at the critical variables identified in Phase I.

13.2 – FH2 Game-based technology and Database to Train Pre-Drivers, Young Drivers, and Older Drivers to Detect Traffic Hazards and Respond Appropriately

Motor vehicle crashes killed an average of 40,398 people in the U.S. each year from 2000 through 2010, despite declines to 37,423 in 2008, 33,808 in 2009, and 32,885 in 2010 during harsh economic conditions from which the country is slowly recovering (National Highway Traffic Safety Administration, 2012).[1] As a cause of death in the U.S. in 2009, traffic crashes ranked first among both 5-14 and 15-24 year olds, third among 1-4 year olds, and fifth among 25-44 year olds (Kochanek et al., 2011).[2] This human tragedy is unacceptable and creative new approaches are needed. As researchers recently reported in the journal *Accident Analysis and Prevention*:[3]

> Hazard perception in driving refers to a driver's ability to anticipate potentially dangerous situations on the road ahead ... This particular ability has generated interest among the road safety community because, to our knowledge, it is the only driving-specific skill found to be associated with crash risk…
>
> We examined the proposal that hazard perception ability is suboptimal even in highly experienced mid-age drivers. First, we replicated previous findings in which police drivers significantly outperformed highly experienced drivers on a validated video-based hazard perception test, indicating that the ability of the experienced participants had not reached ceiling despite decades of driving. Second, we found that the highly experienced drivers' hazard perception test performance could be improved with a mere 20 min of video-based training, and this improvement remained evident after a delay of at least a week. One possible explanation as to why hazard perception skill may be suboptimal even in experienced drivers is a dearth of self-insight, potentially resulting in a lack of motivation to improve this ability. Consistent with this proposal, we found no significant relationships between self-ratings and objective measures of hazard perception ability in this group. We also found significant self-enhancement biases in the self-ratings and that participants who received training did not rate their performance (either in real driving or in the test) as having improved, contrary to what was indicated by their objective performance data.

Thus, current scientific findings suggest the potentially substantial safety benefits of using technology, such as PC/TV-based videogames and/or driving simulator technology, combined with a comprehensive traffic hazard-response database, to train pre-drivers, young drivers, and older drivers to detect and appropriately respond to traffic hazards.

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[1] National Highway Traffic Safety Administration, 2012. Fatality Analysis Reporting System (FARS). Downloaded on 24 July 2012 at http://www.nhtsa.gov/FARS.

[2] Kochanek, K.D., Xu, J, Murphy, S.L., Miniño, A.M., and Kung, H-C, 2011. Deaths: Preliminary Data for 2009. National Vital Statistics Reports 59(4), National Center for Health Statistics, Washington, DC.

[3] Horswilla, M.S., Taylora, K., Newnamb, S., Wettona, W., Hill, A. Even highly experienced drivers benefit from a brief hazard perception training intervention. *Accident Analysis and Prevention* 52 (2013) 100-110.

Expected Phase I Outcomes:

Outcomes expected from Phase 1 include a feasibility study, design, and outline of a game-based technology (software, hardware, or other), such as but not limited to a PC/TV-based videogame or driving simulator, and a traffic hazard-response database, to educate and train pre-drivers, young drivers, and older drivers to detect and appropriately respond to a variety of traffic hazards. The feasibility study will identify and summarize the main safety hazards for different subject groups and propose corrective measures. The study will also identify potential customers for this product, which may include insurance companies, driving schools, public school systems, safety advocacy organizations and groups, etc.

Expected Phase II Outcomes:

Outcomes expected from Phase II include the production and demonstration of a working prototype of the technology studied during Phase I, and testing, field evaluation, and substantial refinement of the prototype developed, to maximize traffic hazard detection and appropriate response rates, as well as the long-term duration of enhanced traffic hazard detection and appropriate response rates, among pre-driver, young driver, and older driver populations as demonstrated by rigorous experimental methodology, data reduction, statistical analysis, and exposition in a form suitable for refereed journal publication.

B. Federal Motor Carrier Safety Administration (FMCSA)

13.2-FM1 Affiliation Strength/Risk Model Development for Motor Carrier Succession

FMCSA is responsible for regulating the safety of interstate truck and bus travel in the United States. The primary mission of FMCSA is to reduce crashes, injuries and fatalities involving large trucks and buses. FMCSA's strategic framework is built upon three core principles:

- Raise the bar to enter the industry;
- Require operators to maintain high safety standards to remain in the industry; and
- Remove high-risk operators from our roads and highways.

The vetting process implemented within the FMCSA's Office of Registration and Safety Information supports all of these initiatives by assuring that new applicants meet FMCSA's standards for fitness, willingness, and ability to comply with all applicable federal statutes and regulations by checking for signs that a new applicant is not a reincarnated version of an existing high-risk operator. These initiatives set a high bar to obtain operating authority and close loopholes for those high risk operators to reincarnate themselves with a clean slate and, hence, keep them off public highways.

FMCSA already employs a proprietary risk-based screening process which uses a sophisticated matching algorithm to screen and assign risk to an applicant using primarily federal sources of data. This solicitation is seeking innovative approaches, alternate methods and public/private data sources to confirm or further expand robust automation methods that are part of its screening process.

The primary purpose of this topic is for the Offeror to use operating authority application information specified on the application form (See References 1 and 2) and compare it to the similar information on file for a list of motor carriers and identify the probability of potential affiliation between the applicant and each of the carriers of interest (i.e. development of a robust affiliation strength model with use of publicly available data sources).

FMCSA is primarily interested in

- Surveying of publicly available data sources (such as States' data) that can be automatically cross-checked against that can validate submitted information or hint for potential affiliations;
- Surveying of affiliation strength/risk models that may be used in other business models or by other Federal or State Agencies;
- Identification of private data that could provide incremental benefits;
- Development and use of complex matching algorithms that may take into account typos, different abbreviations, use of short names, text order differences;
- Confirmation of application data validity to the extent possible such as business address;
- Use of web-search algorithms that can be automatically assimilated into useful measures;
- Development and use of probability measures for assessing affiliation strength; and
- Development of a self-learning framework and adaptive methods to automatically update the model parameters based on application disposition decisions.

The Contractor will be required to sign a non-disclosure agreement to receive sample data which can be used to develop and test out proposed methods. There are about 50,000 applications per year, each of which would need to be automatically processed for affiliation strength assessment with respect to a list of other motor carriers of interest which may be a subset of the ~725,000 motor carriers to be specified by FMCSA. Each application would not need to be checked against all motor carriers of interest and the Offeror would have latitude to further scope down the screening methodologies intelligently based on the research conducted within this project.

The entire solution would need to be fully automated. It would need to input a set of text fields from an applicant and a set of text fields from an existing company and use the underlying company information and the identified public sources of information to output a probability measure of affiliation strength between the two companies. The algorithm must run reasonably fast such that one application can be batch processed against a large number of potential other companies and the entire automatic assessment process can be completed in reasonable time (reasonable level to be defined jointly between the Contractor and FMCSA during Phase I).

References:

1. Application for Motor Passenger Carrier Authority http://www.fmcsa.dot.gov/documents/forms/r-l/OP-1(P)-Instructions-and-Form.pdf

2. Application for Motor Property Carrier and Broker Authority http://www.fmcsa.dot.gov/documents/forms/r-l/op-1-Instructions-and-Form.pdf

Expected Phase I Outcomes:

Outcomes expected from the Phase 1 include surveying and documentation of all available public and private data sources and uses of other affiliation strength/risk models. In addition, a detailed concept that demonstrates the viability of developing complex affiliation risk model that would work within the context of FMCSA's needs is expected to be delivered. Computational needs and processing time assessments will have to be quantified. Expected ranges of effectiveness measures would need to be developed.

Expected Phase II Outcomes:

Phase 2 efforts would prototype the Contractor's approach to validate the affiliation risk model. Furthermore, a detailed experimental plan for assessing the efficacy of the solution would be formulated along with updated cost-benefit projections based on development activities.

C. Pipeline and Hazardous Material Safety Administration (PHMSA)

The two largest sources of energy consumed in the United States are oil and natural gas. Through 2.6 million miles of pipelines, U.S. operators transport almost two-thirds of the Nation's energy. According to the U.S. Energy Information Administration, oil furnishes 40 percent of our Nation's energy, natural gas 25 percent, coal 22 percent, nuclear power 8 percent, while renewables make up 5 percent.

The Nation's more than two million miles of pipelines safely deliver trillions of cubic feet of natural gas and hundreds of billions of ton/miles of liquid petroleum products each year. The volumes of energy products that pipelines move are well beyond the capacity of other forms of transportation. It would take a constant line of tanker trucks, approximately 750 per day, loading up and moving out every 2 minutes, 24 hours a day, 7 days a week, to move the volume of even a modest pipeline. The railroad-equivalent of this single pipeline would consist of a train of 75, 2,000-barrel tank rail cars traveling the length of the pipeline every day. These alternatives would require significantly more personnel, cost substantially more, produce larger volumes of pollutants, and would subject the public and environment to greater risk when considering overall safety. Pipeline systems are the safest available means to move these hazardous materials in bulk.

The Federal government rededicated itself to pipeline safety in 2012 when the Pipeline Safety, Regulatory Certainty, and Job Creation Act was signed. It raises the bar for pipeline safety and commits PHMSA to exploring technologies and methods which could increase the integrity of the U.S. pipeline network.

For pipeline safety, research is being solicited for the development of innovative technologies and methods for hazardous liquids and/or natural gas pipelines. Areas of interest include but are not limited to the following three Focus Areas:

13.2-PH1 Pipeline Integrity Assessment Using In-Line Inspection

There is a current need for better pipeline inspection technology to enable improved inspection of both oil and gas pipelines for internal corrosion, external corrosion, mechanical damage, and longitudinal and transverse cracks. A new and evolving interest across the industry is for an inspection technology that can measure longitudinal strain. This SBIR topic seeks an alternative means for enhanced in-line inspection (ILI) tools that can be easily deployed, ideally at a lower cost and with fewer personnel and infrastructure compared to existing tools. The tool must:

- Keep up with production flow rates and resolve defects with similar or improved reliability and resolution compared to existing, commercially available technologies;
- Address a substantial percentage of pipelines that are currently inspected;
- Relatively lightweight and limited in axial length to enable easy transport, launching, and retrieval;
- Low initial and operating costs to enable frequent deployment;
- Enable difference imaging to determine whether defects are growing and to eliminate dormant responses that are inconsequential and;

- Finally, include software support tools so that only minimal post inspection analysis is required to enable operators to deploy these tools at will, without incurring the high costs and burdens associated with some ILI implementations.

One goal is to enable this ILI tool can be used anywhere that cleaning tools are used, even in previously unpiggable lines. The goal is to encourage more repetitive ILI runs and wider use while ensuring safety of the hazardous liquid pipeline infrastructure.

Sub-topic challenge – Proposals are being sought to develop a prototype integrated cleaning tool/ILI tool that is easily deployable, is low-cost, and requires minimal post-inspection data analysis. The solution should not include heavy magnets, coupling, or other complexities that will increase cost. The solution should support hazardous liquid pipelines while providing sufficient resolution for all defects that can be detected with current technologies.

An ideal integrated ILI-cleaning tool would have the following attributes:

1. Safely transportable by two operators, and can be easily installed for inspection of small diameter linepipe;
2. The capability to detect internal and external defects with at least the same resolution as state-of-the-art magnetic flux leakage (MFL) ILI tools.

Expected Phase I Outcomes

A successful Phase I will demonstrate, in a laboratory environment, the ability of a proposed prototype in-line inspection tool to meet the following design objectives:

- Low initial and operating costs;
- Similar or improved detection capabilities compared to existing methods;
- Ease of handling (transport, launching, and receiving) similar to a cleaning tool;
- Ease of data interpretation;
- Incorporation of required features (odometers, pig trackers, etc.); and
- ILI capability for hazardous liquid pipelines.

Expected Phase II Outcomes

Phase II will include the fabrication and testing of a working prototype, including an ILI pull-test on representative samples with representative defects under representative conditions.

13.2-PH2 Modeling cathodic protection penetration on new construction pipelines incorporating all types of "foam" sack breakers and supports:

When a pipeline is constructed a ditch is dug to applicable depths based on federal regulation and is prepared for the pipeline that will be laid within the construction ditch. When the pipeline is placed in the ditch it requires support and padding to protect the coating and align it to the topography of the ditch in preparation for back fill. There are many types of material that can be used to provide support within the construction ditch. These supports are typically constructed with sand bags, hay bales, oak cribbing, or sprayed urethane foam. Likewise, in the event that water enters the construction ditch water breakers are used to prevent and sectionalized any flowing water. This prevents flooding, washout, soil erosion, and potential ditch collapse from happening. These water breakers are typically constructed with sand bags or sprayed urethane foam. Construction practices for ditch pipeline supports and water breaks favor products that will satisfy the design requirements at the lowest total cost over the life of the project.

With the rising cost of labor, materials, and transportation of sandbags for padding and breakers during pipeline construction, urethane foam breakers and padding have become an economical solution for many service owners and general contractors. Additionally, due to the fast pace of today's construction processes and the time constraints placed on the completion of projects by pipeline owners due to service demands, the time saved by using sprayed foam breakers and padding has made it a popular alternative to the traditional sandbag method. Time and money savings also appear in the general contractor's bottom line, since backfill crews and machinery will reduce down time due to the waiting period involved with installing sandbag breakers, padding, or pipe support.

The advantages of urethane foam over the use of sand bags include the following:

- Foam barriers do not deteriorate or degrade over time like sandbags;
- Urethane foam conforms to any shape or configuration of ditch and offers the advantage of immediate backfill;
- Urethane foam pillow pads will compress and conform to the pipe with a weight load whereas sandbags (especially frozen ones) may dent the pipe;
- Urethane foam greatly reduced transportation cost to the job site;
- Additional savings will come in the future as the cost of pipeline upkeep and maintenance will be reduced; and
- Since foam breakers are sprayed around the pipe in-place, they adhere to the pipe itself and only move if the pipe moves.

Along with the design considerations (such as length, width, the depth of foam needed to support a pipeline filled with water without denting the pipe, and the minimum clearance above rock) pipeline operators must ensure their pipelines meet Federal regulations for natural gas and hazardous liquid pipeline safety regulations

on corrosion prevention as related to cathodic protection (CP). Since urethane foams are highly dielectric the possibility of shielding CP is high. Other concerns in the use of urethane foams are structural integrity, water infiltration of the foam, and potential buoyant forces in saturated ground or rising water tables. The foam should be reviewed for durability to support the pipeline weight over the operational life of the pipeline. For reference, applicable Federal pipeline safety regulations are listed below:

§192.461 External corrosion control: Protective coating.

§192.463 External corrosion control: Cathodic protection.

§195.557 Which pipelines must have coating for external corrosion control.

§195.559 What coating material may I use for external corrosion control.

§195.563 Which pipelines must have cathodic protection.

Special note: *The National Association of Corrosion Engineers (NACE) has published an industry accepted practice—NACE SP 0169 (which is also incorporated by reference see § 195.3) — to quantify the adequacy of cathodic protection with the following statement:*

"Cathodic protection required by this Subpart must comply with one or more of the applicable criteria and other considerations for cathodic protection contained in paragraphs 6.2 and 6.3 of NACE SP 0169."

For complete details on the U.S. Department of Transportation pipeline safety regulations, go to the following website: http://www.gpo.gov/fdsys/pkg/CFR-2012-title49-vol3/pdf/CFR-2012-title49-vol3-subtitleB-chapI-subchapD.pdf

Sub-topic challenge – Proposals are being sought to develop a model that analyses and quantifies the CP penetration, as related to the Pipeline Safety CP requirements, through all types and sizes of "foam" sack breakers and supports. The model must take into consideration foam type and the length and thickness of breakers and/or supports. The model must also take into consideration the exposure to a variety of soil types and conditions, including but not limited to moisture content, temperature, and depth of cover. An ideal model would have the following attributes:

1. Dielectric leakage considerations for the foam sack breakers and supports in addition to the soil and surrounding conditions.
2. Predetermined look up tables for known resistance values of given materials.
3. A visual display of diagramed configuration with various paths of CP values.
4. Durability of the foam material to support the pipe over the operational life of the pipeline.
5. The effects of buoyancy force from the foam padding or water break structure when in saturated soil or within rising water table on the pipeline and the pipelines coating. Distinction of the buoyancy force should be made on open versus closed cell urethane foam.

Expected Phase I Outcomes:
A successful Phase I will demonstrate, in a portable computer configuration, the model's capability to quantify various CP paths and estimated values based on limited data input while meeting the following design objectives:

- Low initial and operating costs;
- Similar detection capabilities compared to existing methods;
- The ability of the model to configure and display various CP paths and values;
- Ease of data interpretation;
- Durability of the foam to support the pipe over the operational life of the pipeline;
- The amount of Buoyant force that could be applied due to saturated ground or rising water tables; and
- An operational instruction manual for the model.

Expected Phase II Outcomes:
Phase II will include:

- Data collection from in-field demonstrations of CP penetration readings of foam sack breakers and supports;
- Expansion of data in look-up tables for known resistance values of given materials.
- Recalibration/validation of the model based data findings from in-field testing. Refine update and display of viable commercial model at a public pipeline forum.

13.2-PH3 Develop and demonstrate new non-destructive evaluation methods to quantify remaining strength of line pipe steel and or pipeline fittings:

The U.S. Code of Federal Regulations (CFR) Title 49, Parts 192 and 195 stipulates that ASME B31G or RSTRENG be used to assess the remaining strength of corroded pipe. A review of existing burst test data raised some concerns that use of these methods can, in some instances, result in predicted failure pressures that are greater than the recorded burst pressures from actual tests. No burst testing data exist on steel pipeline fittings.

Industry has also researched methods for assessing the remaining strength of corroded pipelines. This has led to the development of new criteria and has extended the range of assessment methods to include numerical analysis. While there has been substantial progress, there are areas where the existing criteria require improvements, including steel pipeline fittings. Issues identified include limitations on the interaction of closely spaced defects, the effects of external loading, and cyclic pressure loading. Furthermore, as operators start to use higher strength materials, there will be an increasing need to assess the integrity of high strength steel pipeline fittings that have been corroded while further validating the application of existing criteria and models for these materials.

Past work by industry and PHMSA has funded research to address these issues in recent years on pipeline steels. The work has included a program of materials testing, finite element (FE) analyses, and full scale burst testing to develop methods for assessing corrosion damage in pipelines of strength grade up to X100. Reports from this work are available at: http://primis.phmsa.dot.gov/matrix/PrjHome.rdm?prj=171

Background:
Corrosion metal loss is one of the major damage mechanisms to transmission pipelines worldwide. A corrosion metal-loss defect further reduces the strength of the damaged pipeline sections while introducing localized stress and strain concentrations. Several methods have been developed for assessing the remaining strength of corroded pipelines, such as the ASME B31G and RSTRENG models. These models were derived from experimental tests and theoretical/numerical studies of the failure behavior of corroded pipelines. The test pipes contained either corrosion metal-loss defects or simulated metal-loss defects and featured materials with relatively high toughness properties for X65 and above and lower toughness properties for X60 and below. The early burst tests used vintage pipe with low toughness properties. Plastic deformation and collapse of the ligament or surrounding material determines the failure behavior of the corroded pipe. In principle, the existing assessment methods are only applicable to pipelines with toughness levels that are sufficient to prevent a toughness-dependent failure.

The research completed did not include analysis of burst test data on steel line pipe with real corrosion defects in strength grades above X65, as the data were not available. To address this gap, a focused program of full-scale tests is recommended on higher strength line pipe of strength grades above X65 with electro-chemically induced, simulated corrosion defects. These defects can be produced using electrochemical means to approximate real corrosion in the field, as opposed to flat-bottomed rectangular machined patches. Failure pressure predictions using ASME B31G, Modified ASME B31G, and RSTRENG should then be compared to the recorded burst test pressures to confirm that these methods are applicable for higher strength pipelines.

Mechanical properties of pipe metal help define the principal characteristics of its technical state. These properties can change (degrade) during long-term operation not as a result of an aging process but rather from exposure to cyclic pressures, extreme temperatures, excessive forces or detrimental environmental conditions. Heat input during the coating process may change these properties on the pipe surface but not necessarily throughout the thickness of the pipe wall. Developing new methods for pipeline technical diagnosis and evaluating a line pipe's actual technical state will help ensure the pipe's safe lifetime operation.

Sub-topic challenge – Proposals are being sought for the development of future guidance and consideration of the background factors described above. The descriptive physical model of impact strength change effect on the pipeline's actual technical state needs to be investigated. The objective of this sub-topic is to determine the next steps after an operator determines the mechanical properties of the steel line pipe and or pipeline fittings are insufficient. Issues to specifically be considered when developing and demonstrating new non-destructive evaluation methods can/should include:

- Is hardness (other method) a good indicator for remaining strength of steel line pipe and or pipeline fittings?
- How are variable steel properties in thickness of material and at different surface locations taken into account in determining strength?
- Are some example cut-out calibration material samples required for determining uncertainties and if so at what frequency?
- What are the recommended procedures to be used and uncertainties?
- Will hardness testing be an iterative process to be conducted at various time or distance intervals?
- How does the intended methodology assess and evaluate the threat?

Proposals may consider the following attributes:
1. The variation of mechanical properties resulting from changes in the operational parameters. Long-term operating conditions in corroded pipe may lead to the degradation of stress and strain resistance capacity of the material and an increasing sensitivity to stress concentrators and defects.
2. The material steel rolling/manufacturing processes, chemical composition, any heat treatment for fittings, and strength.
3. The magnitude of critical brittle temperature, which is the temperature where the nature of a material's fracture changes from ductile to brittle. This temperature is determined by fracture energy. It is determined by the energy used for fracture. Impact strength value is the figure of this energy. The reduction of impact strength could cause an increase of cold shortness temperature to the range of operation temperature of pipeline steels.

Expected Phase I Outcomes

A successful Phase I will demonstrate, through mathematical models and scientific analysis, a determination as to whether hardness is a valid indicator of remaining strength for pipe and or pipeline fittings.

Expected Phase II Outcomes

Phase II will include the validation and testing of potential models that predict the remaining strength of pipe and or pipeline fittings based on hardness or other properties.