

PROGRAM SOLICITATION

**Small Business Innovation
Research Program**

Closing Date: May 1, 2000

**DOT SBIR Program Office, DTS-22
U.S. Department of Transportation
Research and Special Programs Administration
John A. Volpe National Transportation Systems Center
55 Broadway, Kendall Square
Cambridge, MA 02142-1093**

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DOT PROGRAM SOLICITATION FOR SMALL BUSINESS INNOVATION RESEARCH

I. PROGRAM DESCRIPTION

A. Introduction

This solicitation for research proposals is issued by the Department of Transportation (DOT) pursuant to the Small Business Innovation Development Act of 1982, P.L. 97-219, as amended by P.L. 99-443, and P.L. 102-564, Small Business Research and Development Act of 1992, signed October 28, 1992. The law seeks to encourage the initiative of the private sector and to use small business as effectively as possible in meeting Federal research and development objectives.

The purposes of the Act are:

- (1) To stimulate technological innovation;
- (2) To use small business to meet Federal research and development needs;
- (3) To increase private sector commercialization of innovations derived from Federal research and development; and
- (4) To foster and encourage minority and disadvantaged participation in technological innovation.

In consonance with the statutory obligations of the Act, the U.S. Department of Transportation has established a Small Business Innovation Research Program - hereinafter referred to as the DOT 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 Department.

B. Three-Phase Program

The DOT SBIR Program is a three-phase process. **THIS SOLICITATION IS FOR PHASE I PROPOSALS ONLY.**

Phase I. Phase I is for the conduct of feasibility-related experimental or theoretical research or Research & Development efforts on research topics as described herein. The dollar value of the proposal

may be up to \$100,000 unless otherwise noted and the period of performance may be up to six months. The primary basis for award will be the scientific and technical merit of the proposal and its relevance to DOT requirements. **Only awardees in Phase I are eligible to participate in Phase II (by invitation only).**

Phase II. Phase II is the principal research or R&D effort having a period of performance of approximately two years with a dollar value of up to \$750,000 unless otherwise noted. Phase II proposals must be prepared in accordance with guidelines provided by DOT to all Phase I awardees. DOT will accept Phase II proposals under the DOT SBIR Program only from firms which have previously received a DOT Phase I award. Phase II awards will be based on results of Phase I efforts, technical merit, Agency priority and commercial applications, and the availability of appropriated funds to support the Phase II effort. Special consideration may be given to proposals that have obtained commitments for follow-on funding from non-Federal sources for Phase III.

Phase III. Phase III is to be conducted by the small business with either non-Federal funds to pursue commercial applications of research or R&D funded in Phases I and II, or non-SBIR government funded contracts for continued research or products or processes intended for use by the United States Government.

C. Eligibility

Each concern submitting a proposal must qualify as a small business at the time of award of Phase I and Phase II funding agreements. In addition, **the primary employment of the principal investigator must be with the small business firm at the time of award and during the conduct of the proposed research** unless otherwise approved by the contracting officer. Primary employment means that more than one-half of the principal investigator's time is spent with the small business. Also for both Phase I and Phase II, the research or 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, the Commonwealth of the Northern Mariana Islands, the Trust Territory of the Pacific Islands, and the District of Columbia.

All types of small business organizations may submit proposals, including high technology, R&D, manufacturing and service firms. Companies with outstanding scientific or engineering competence in highly specialized product, process or service areas may wish to apply their expertise to the research topics in this solicitation through a laboratory prototype. Ideally, the research should make a significant contribution to the solution of an important transportation problem and provide the small business concern with the basis for new products, processes, or services.

D. General Information

This is a solicitation for Phase I research proposals on advanced, innovative concepts from small business firms having strong capabilities in applied science or engineering.

The Phase I research proposals should demonstrate a sound approach to the investigation of an important transportation-related scientific or engineering problem categorized under one of the topics listed in Section VIII.

A proposal may respond to any of the research topics listed in Section VIII, but must be limited to one topic. The same proposal may not be submitted under more than one topic. An organization 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 proposer should choose that topic which appears to be most relevant to the proposer'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 DOT to perform its mission.

Proposals should be confined principally to scientific or engineering research which may be carried out through construction and evaluation. Proposals must be for research or R&D, particularly on advanced or innovative concepts, and should 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 should not be submitted. Commercialization is the objective of Phase III, in which private capital or non-SBIR funds are to be used to continue the innovative research supported by DOT under Phase I and Phase II.

The proposal should be self-contained and checked carefully by the applicant to ensure that all preparation instructions have been followed. (See proposal checklist)

Requests for additional information or questions relating to the DOT SBIR Program may be addressed to:

Joseph Henebury
DOT SBIR Program Director, DTS-22
U.S. Department of Transportation
Research and Special Programs Administration
John A. Volpe National
Transportation Systems Center
55 Broadway, Kendall Square
Cambridge, MA 02142-1093

Telephone: (617) 494-2051
Fax: (617) 494-2370
E-Mail Address: henebury@volpe.dot.gov
Volpe Center Web Site:
<http://www.volpe.dot.gov/SBIR>

II. DEFINITIONS

A. Research or Research and Development

Research or research and development (R or R&D) means any activity which is:

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

B. Small Business Concern

A small business concern is one that at the time of award of Phase I and Phase II funding agreements meets the following criteria:

- (1) Is independently owned and operated, is not dominant in the field of operation in which it is proposing, and has its principal place of business located in the United States and is organized for profit;
- (2) Is at least 51 percent owned, or in the case of a publicly owned business, at least 51 percent of its voting stock is owned by United States citizens or lawfully admitted permanent resident aliens;
- (3) Has, including its affiliates, a number of employees not exceeding 500, and meets the other regulatory requirements found in 13 CFR Part 121. Business concerns, other than investment companies licensed, or state development companies qualifying under the Small Business Investment Act of 1958, 15 U.S.C. 661, *et seq.*, are affiliates of one another when either directly or indirectly (A) one concern controls or has the power to control the other; or (B) a third party or parties controls or has the power to control

both. Control can be exercised through common ownership, common management, and contractual relationships. The term "affiliation" is defined in greater detail in 13 CFR 121.401. The term "number of employees" is defined in 13 CFR 121.407. Business concerns include, but are not limited to, any individual, partnership, corporation, joint venture, association or cooperative.

C. Minority and Disadvantaged Small Business Concern

A minority and disadvantaged small business concern is one that is:

- (1) At least 51 percent owned by one or more minority and disadvantaged individuals; or in the case of a publicly owned business, at least 51 percent of the voting stock of which is owned by minority and disadvantaged individuals; and
- (2) Whose management and daily business operations are controlled by one or more such individuals.

A minority and disadvantaged individual is defined as a member of any of the following groups:

- (1) Black Americans.
- (2) Hispanic Americans.
- (3) Native Americans.
- (4) Asian-Pacific Americans.
- (5) Subcontinent Asian Americans.

D. Women-Owned Small Business Concern

A women-owned small business concern is one that is a small business that is at least 51 percent owned by a woman or women who also control and operate it. "Control" in this context means exercising the power to make policy decisions. "Operate" in this context means being actively involved in the day-to-day management.

E. Subcontract

Subcontract means any agreement, other than one involving an employer-employee relationship, entered into by a Federal Government funding agreement awardee calling for supplies or services required solely for the performance of the original funding agreement.

III. PROPOSAL PREPARATION INSTRUCTIONS AND REQUIREMENTS

A. Limitation on Length of Proposal

***¹ In the Program Year 2000, proposals may be submitted either electronically or in hard copy format.**

Please note that:

- (1) SBIR Phase I proposals should not exceed a total of 25 pages (regular size type - no smaller than 10-point font size - single or double spaced, standard 8 1/2" X 11" pages) including proposal cover sheet, budget and all enclosures or attachments.
- (2) Attachments, appendices and references are included in the 25-page limitation.
Proposals in excess of 25 pages shall not be considered for review or award.

Electronic Submission Requirements:

- Each proposal should not exceed 25 pages
- All proposals must be in all text, ie...no graphics, tables, etc.
- All proposals must be a PDF file attached to e-mail
- No duplicate proposals should be sent by any other means
- Proposals must be sent via e-mail to: henebury@volpe.dot.gov
- Proposals must be received by 5:00 p.m. on May 1, 2000
- You must submit a completed and signed hardcopy of Appendices A, B, and C postmarked no later than May 1st to: Joseph Henebury, DOT SBIR Program Director, DTS-22, U.S. Department of Transportation, Research and Special Programs Administration, John A. Volpe National Transportation Systems Center, 55 Broadway, Kendall Square, Cambridge, MA 02142-1093
- The proposal file name should contain eight (8) characters – the first three should be the topic # you are proposing to, ie...FH3, and the remaining five characters should be a unique abbreviation of your company's name.

Your proposal will have the same protection/security as DOT e-mail. It will be available to only the team of DOT engineers and/or scientist who is responsible for evaluating your proposal.

If you intend to submit your proposal electronically, you must register at our website: www.volpe.dot.gov/sbir by April 15, 2000.

B. Proposal Cover Sheet

Complete the proposal cover sheet in Appendix A as Page 1 of each copy of each proposal. All pages should be numbered consecutively, beginning with the proposal cover sheet. Do not add an overlay on the cover sheet.

C. Project Summary

Complete the form in Appendix B as Page 2 of your proposal. The Project Summary should include a technical abstract with a brief statement of the problem or opportunity, project objectives, and description of the effort. Anticipated results and potential applications of the proposed research should also be summarized in the space provided. The Project Summary of successful proposals may be published by the DOT and, therefore, should not contain classified or proprietary information. The technical abstract must be limited to two hundred words in the space provided on the Project Summary form.

D. Technical Content

Submitted proposals must include the following:

- (1) **Identification and Significance of the Problem or Opportunity.** The specific technical problem or innovative research opportunity addressed and its potential benefit to the national transportation system should be clearly stated.
- (2) **Phase I Technical Objectives.** State the specific objectives of the Phase I R or R&D effort, including the technical questions it will try to answer to determine the feasibility of the proposed approach.

¹ (See section VI for further details.)

- (3) **Phase I Work Plan.** Describe the Phase I R or R&D plan. The plan should indicate what will be done, where it will be done, and how the R or R&D will be managed or directed and carried out. Phase I R or R&D should address the objectives and the questions cited in (2) above. The methods planned to achieve each objective or task should be discussed in detail, including the level of effort associated with each task.
- (4) **Related R or R&D.** Describe significant R or 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 proposer must persuade reviewers of his or her awareness of key recent R or 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 limitation.
- (6) **Relationship with Future Research and Development.**
- (a) State the anticipated results of the proposed approach if the project is successful (Phase I and Phase II).
- (b) Discuss the significance of the Phase I effort in providing a foundation for Phase II research or research and development effort.
- (7) **Facilities.** A detailed description, availability and location of instrumentation and physical facilities proposed for Phase I should be provided.
- (8) **Consultants.** Involvement of consultants in the planning and research stages of the project is permitted. If such involvement is intended, it should be described in detail.

- (9) **Potential Applications.** Briefly describe:
- (a) Whether and by what means the proposed project appears to have potential commercial application.
- (b) Whether and by what means the proposed project appears to have potential use by the Federal Government.
- (10) **Similar Proposals or Awards.** Warning - while it is permissible, with proposal notification, to submit identical proposals or proposals containing a significant amount of essentially equivalent work for consideration under numerous federal program solicitations, it is unlawful to enter into 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 identical proposals or proposals containing a significant amount of essentially equivalent work under other federal program solicitations, a statement must be included in each such proposal indicating:
- (a) The name and address of the agencies to which proposals were submitted or from which awards were received;
- (b) Date of proposal submission or date of award;
- (c) Title, number, and date of SBIR Program solicitations under which proposals were submitted or awards received;
- (d) The applicable research topics for each SBIR proposal submitted or award received;
- (e) Titles of research projects; and
- (f) Name and title of Project Manager or Principal Investigator for each proposal submitted or award received.

E. Contract Pricing Proposal

A firm fixed price Phase I Contract Pricing Proposal (Schedule 1) must be submitted in detail as shown in Appendix C. Note: Firm Fixed Price (FFP) 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 DOT to understand how the proposer plans to use the requested funds if the contract is awarded. Phase I contract awards may include profit.

F. DUNS Identification Number

If available, a firm should note its Data Universal Numbering System (DUNS) identification number on Appendix C, Contract Pricing Proposal, (Schedule 1). This number is assigned by Dun & Bradstreet, Inc., and is contained in that Company's DUNS.

G. Acknowledgement of Proposal Receipt

Proposers should fill out the proposal acknowledgement form and include it with the proposal to DOT.

H. Prior SBIR Phase II Awards

If the small business concern has received more than 15 Phase II awards in the prior 5 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. (This required proposal information shall not be counted toward the proposal 25-page count limitation.)

IV. METHOD OF SELECTION AND EVALUATION CRITERIA

A. General

All Phase I and Phase II proposals will be evaluated and judged on a competitive basis. Initially, all proposals will be screened to determine responsiveness to the solicitation. Proposals passing this screening will be evaluated to determine the most promising technical and scientific approaches. Each proposal will be judged on its own merit. The DOT is under no obligation to fund any proposal or any specific number of proposals on a given topic or subtopic. It may elect to fund several or none of the proposed approaches to the same topic or subtopic.

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 second phase funding commitments from private sector or non-SBIR funding sources;
 - c) Existence of third phase, follow-on commitments; and
 - d) Presence of other indicators of the commercial potential of the idea.
- (2) The adequacy of the work plan and approach to achieve specified work tasks and stated objectives of the proposed effort 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 or R&D topic that is proposed for investigation.

- (4) Adequacy of supporting staff and facilities, equipment, and data for the successful completion of the proposed R or R&D.

C. Prescreening

Each proposal submission will be examined to determine if it is complete and contains an adequate amount of technical and financial data. Proposals that do not meet the basic requirements of the solicitation will be excluded from further consideration. Each organization will be notified promptly by letter of such action.

D. Schedule

All DOT reviews should be completed and awards made within 5 months of the closing date for Phase I proposals.

E. Program Selection

A Proposal Review Panel, chaired by the Department's SBIR Program Director and comprising senior management officials representing the Department's Operating Administrations and the Office of the Secretary, will arrange for review and evaluation by professionals, in their respective organizations, of all Phase I proposals that meet the requirements of this solicitation. The Proposal Review Panel will review the technical evaluations by the specialists and recommend to the Program Director the proposals for awards. The Program Director will announce the awards.

F. Contact with DOT

Contact with DOT relative to this solicitation during the Phase I proposal preparation and evaluation period is restricted for reasons of competitive fairness. Technical questions pertaining to 2000 SBIR solicitation research topics may be submitted to the SBIR Program Office by e-mail: henebury@volpe.dot.gov. Technical questions will be researched and answers provided in as timely a manner as possible. Technical questions submitted to the SBIR Program Office during the few weeks prior to the closing date for receipt of Phase I proposals may not be able to be answered before the closing date.

No information on proposal status will be available until the complete list of 2000 Phase I Award Recommendations to receive funding is posted on the DOT SBIR Program Web Page: www.volpe.dot.gov (click on SBIR). For planning purposes the notification of 2000 Phase I Award Recommendations is expected to be posted on the DOT SBIR Program Web Page by October 2, 2000.

Phase I proposals which are not included in the October 2nd list of 2000 Phase I Award Recommendations will not receive funding. NO WRITTEN CORRESPONDENCE REGARDING PROPOSAL STATUS WILL BE MADE.

After the 2000 Phase I Award Recommendations are posted on the DOT SBIR Program Web Page, a debriefing comprised of the overall comments on the

proposal may be provided to the proposer upon request. Debriefing requests should be submitted by e-mail to: henebury@volpe.dot.gov, and must include the proposer's name, address, research topic number, and the proposal identification number assigned on the acknowledgement of receipt card. The identity of the evaluators shall not be disclosed.

V. CONSIDERATIONS

A. Awards

It is estimated that during fiscal year 2000, DOT will award approximately 18 Phase I contracts with an anticipated potential maximum of 23 awards, depending on actual funding available and the responses from small business firms to the solicited research topics in Section VIII.

All Phase I awards will be firm fixed-price contracts and may be up to \$100,000 each unless otherwise noted. Phase II awards anticipate cost-plus-fixed-fee contracts with a value of up to \$750,000 each unless otherwise noted. Phase II awardees will be required to have acceptable accounting systems to receive a cost-plus-fixed-fee contract.

Only recipients of Phase I contracts will be eligible to compete for Phase II awards.

DOT's Operating Administrations contribute to SBIR funding. Each Operating Administration's contribution may be used only to support research of concern to that Operating Administration. For example, funds furnished by the Federal Highway Administration may not support research solely of concern to the National Highway Traffic Safety Administration. Based on anticipated funding levels, there may not be adequate funding within the SBIR program to support Phase I and/or Phase II awards for research which is solely of concern to the following Operating Administrations: Federal Aviation Administration, Federal Highway Administration, Federal Railroad Administration, Federal Transit Administration, National Highway Traffic Safety Administration, Research and Special Programs Administration, and/or the U.S. Coast Guard. Phase I and Phase II awards for such research will depend on the actual funding available.

B. Reports

Under Phase I SBIR contracts, three reports will be required, consisting of two interim letter reports, and a comprehensive final report.

C. Payment Schedule

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

D. Innovations, Inventions, and Patents

1. **Proprietary Information.** Information contained in unsuccessful proposals will remain the property of the proposer. 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 proposer in a proposal which constitutes a trade secret, proprietary commercial or financial information, confidential personal information or data affecting the national security, it will be treated in confidence, to the extent permitted by law, provided this information is clearly marked by the proposer with the term "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, these data 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 proposer as a result of or in connection with the submission of these data, the Government shall have the right to duplicate, use, or disclose the data to the extent provided in the contract. This restriction does not limit the Government's right to use information contained in the data if it is obtained from another source without restriction. The data subject to this restriction is contained in pages _____ 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.

The DOT prefers that proposers 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.

2. **Rights in Data Developed under SBIR Funding Agreements.** 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 were 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.
3. **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 DOT support. The DOT receives a royalty-free license for the Federal Government and requires that each publication contain an appropriate acknowledgement and disclaimer statement.
4. **Patents.** 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.

E. Cost-Sharing

Cost-sharing is permitted for proposals under 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 awards to small business concerns under the DOT 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, 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. Contractor Commitments

Upon award of a contract, the awardee will be required to make certain legal commitments through acceptance of numerous contract clauses. The outline that follows is illustrative of the types of clauses to which the contractor would be committed. This list should not be understood to represent a complete list of clauses to be included in Phase I contracts, nor to be the specific wording of such clauses. Copies of complete terms and conditions are available upon request.

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 Controller 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 perform the work contracted.
 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 forty 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.
 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 CFR) §3.104, prescribes the following conduct by competing contractors 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; soliciting or obtaining proprietary or source selection information regarding the procurement. Violations of the statute may result in criminal and/or civil penalties, disqualification of an offeror, cancellation of the procurement, or other appropriate remedy.
- J. Additional Information**
1. This solicitation is intended for informational purposes and reflects current planning. If there is any inconsistency between the information contained herein and the terms of any resulting SBIR contract, the terms of the contract are controlling.
 2. Before award of an SBIR contract, the Government may request the proposer to submit certain organizational, management, personnel, and financial information to assure responsibility of the proposer.
 3. The government is not responsible for any monies expended by the proposer before award of any contract.
 4. 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.
5. The DOT SBIR Program is not a substitute for existing unsolicited proposal mechanisms. Unsolicited proposals shall not be accepted under the DOT SBIR Program in either Phase I or Phase II. Refer to **www.volpe.dot.gov/procure/unsolguide.html** for specifics on unsolicited proposal submission requirements.
 6. If an award is made pursuant to a proposal submitted under this solicitation, the contractor will be required to certify that he or she has not previously been, nor is currently being paid for essentially equivalent work by any agency of the Federal Government.
 7. When purchasing equipment or a product with funds provided under the DOT SBIR Program, purchase only American made equipment and products, to the extent possible in keeping with the overall purposes of the program.
 8. In accordance with FAR 52.233-2, Service of Protest, the following Service of Protest procedures shall be followed. Protests, as defined in Section 33.101 of the Federal Acquisition Regulation that are filed directly with an agency, and copies of any protests that are filed with the General Accounting Office (GAO), shall be served on the Contracting Officer (addressed as follows) by obtaining written and dated acknowledgement of receipt from: Mary E. Doherty, DOT/RSPA/Volpe Center, 55 Broadway, Kendall Square, DTS-852, Cambridge, MA 02142-1093.

VI. SUBMISSION OF PROPOSALS

A. Submittal Instructions

For hard copy submissions:

An original and four copies of each proposal submitted under the DOT SBIR Program should be sent to:

Joseph Henebury
DOT SBIR Program Director, DTS-22
U.S. Department of Transportation
Research and Special Programs Administration
John A. Volpe National
Transportation Systems Center
55 Broadway, Kendall Square
Cambridge, MA 02142-1093
Telephone: (617) 494-2051

Proposals must be postmarked **NO LATER** than May 1, 2000 to qualify for acceptance and consideration under the current DOT SBIR Program. Proposals delivered or received via e-mail later than May 1, 2000, 5:00 p.m. will not be accepted.

Proposals delivered to the DOT SBIR Program Office by any means other than the U.S. Postal Service, must be received at the above address on or before May 1, 2000, 5:00 p.m.

Electronic Submission Requirements:

- Each proposal should not exceed 25 pages
- All proposals must be in all text, ie...no graphics, tables, etc.
- All proposals must be a PDF file attached to e-mail
- No duplicate proposals should be sent by any other means
- Proposals must be sent via email to: henebury@volpe.dot.gov
- Proposals must be received by 5:00 p.m. on May 1, 2000
- You must submit a completed and signed hardcopy of Appendices A, B, and C postmarked no later than May 1st to: Joseph Henebury, DOT SBIR Program Director, DTS-22, U.S. Department of Transportation, Research and Special Programs Administration, John A. Volpe National Transportation Systems Center, 55 Broadway, Kendall Square, Cambridge, MA 02142-1093
- The proposal file name should contain eight (8) characters – the first three should be the topic # you

are proposing to, ie...FH3, and the remaining five characters should be a unique abbreviation of your company's name.

Your proposal will have the same protection/security as DOT e-mail. It will be available to only the team of DOT engineers and/or scientist who is responsible for evaluating your proposal.

If you intend to submit your proposal electronically, you must register at our website:

www.volpe.dot.gov/sbir by April 15, 2000

B. Additional Information

1. **Bindings.** Please do not use special bindings or covers. Staple the pages in the upper left corner of the cover sheet of the proposal with a single staple.
2. **Packaging.** All copies of the proposal should be sent in one package together with the acknowledgement of receipt card which appears on the back cover of this document.
3. **Confirmation.** The DOT SBIR Program Office will assign an identification number to each proposal received at the above address by May 10, 2000 or postmarked no later than May 10, 2000. This number will appear on the proposal acknowledgement form which will be sent to the proposer by return mail confirming receipt of the proposal.

Proposers who submitted their proposals electronically will receive their proposal number via e-mail no later than May 10, 2000.

VII. SCIENTIFIC AND TECHNICAL INFORMATION SOURCES

The following organizations may be sources for providing technology search and/or document services and may be contacted directly for service and cost information:

Center for Technology Commercialization
1400 Computer Drive
Westborough, MA 01581
(508) 870-0042

Great Lakes Industrial Technology Center
25000 Great Northern Corporation Center
Suite 260
Cleveland, OH 44070-5320
(440) 734-0094

Federal Information Exchange, Inc.
555 Quince Orchard Road, Suite 360
Gaithersburg, MD 20878
(301) 975-0103

Southern Technology Applications Center
University of Florida
1900 SW 34th Street, Suite 206
Gainesville, FL 32608
(352) 294-7822

Midcontinent Technology Transfer Center
Texas Engineering Extension Service
The Texas A&M University System
301 Tarrow Street, Suite 119
College Station, TX 77840-7896
(409) 845-8762

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

MidAtlantic Technology Applications Center
University of Pittsburgh
3400 Forbes Avenue, 5th Floor
Pittsburgh, PA 15260
(412) 383-2500

Technology Transfer Center
University of Southern California
3716 South Hope Street, Suite 200
Los Angeles, CA 90007-4344
(213) 743-2353

VIII. RESEARCH TOPICS

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

DOT OPERATING ADMINISTRATION/TOPICS..... POTENTIAL MAXIMUM FY00 PHASE I AWARDS

FEDERAL HIGHWAY ADMINISTRATION (FHWA)..... .15 Awards

- | | |
|----------------------|---|
| 00-FH1 | A Driver Early Warning Alert of Pedestrian Presence |
| 00-FH2 | Development and Implementation of Compact Disk Read Only Memory (CDROM) Training Program |
| 00-FH3 | Analysis of Urban and Rural Transportation Corridor Development Conflicts |
| 00-FH4 | Development and Implementation of Automated Management of Additions/Deletions of Highway Driveways |
| 00-FH5 | Development of an Educational Program Aimed at Increasing the Public's Understanding of, and Appreciation for the Nation's Highway System |
| ¹ 00-FH6 | Development of an Ultra Violet (UV) Bulb for Use in Automotive Headlamps |
| ¹ 00-FH7 | Software Package for Fitting and Evaluating Material Models for the Finite Element Code DYNA3D |
| 00-FH8 | Recycling of Portland Cement Concrete Pavement |
| ¹ 00-FH9 | Development of a Sidewalk Assessment Process |
| ¹ 00-FH10 | Development of Predictive Tools for Cultural Resources |
| 00-FH11 | Development of Outdoor Advertising Control Toolbox |
| 00-FH12 | Development of Technology to Increase Native Seed Source |
| 00-FH13 | Development of an Enforceable Handicapped Parking Placard |
| ² 00-FH14 | Non-intrusive Wind Field Mapper |
| ⁴ 00-FH15 | Computer Design System for Pavement Repair |

**DOT OPERATING ADMINISTRATION/TOPICS..... POTENTIAL MAXIMUM
FY00 PHASE I AWARDS**

FEDERAL TRANSIT ADMINISTRATION (FTA) 4 Awards

- ¹ 00-FT1 Innovative Pedestrian Signals to Avoid Fatalities at Light Rail and Commuter Rail Pedestrian Crossings
- ¹ 00-FT2 Multi-Port Rapid Chargers for Electric Vehicles
- ¹ 00-FT3 Innovative Methods for Communicating Transportation Impacts to Targeted Populations
- ¹ 00-FT4 Satellite Sensing and Geographic Information System Technology to Measure Impact of Transit Investment on Land Use

NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION (NHTSA) .. 3 Awards

- ³ 00-NH1 Video Detection and Image Processing Systems for Traffic Law Enforcement
- ³ 00-NH2 Dynamic Occupant Position Sensing System
- ³ 00-NH3 Development of Temperature-Independent and Tunable MultiDirectional Thorax Structures for Application to Advanced Anthropomorphic Test Devices

UNITED STATES COAST GUARD (USCG) 2 Awards

- ³ 00-CG1 Development of Unique Technological Alternatives to Ballast Water Exchange
- ³ 00-CG2 Development of Unique Technological Protocols and Instrumentation for the Verification of Ballast Water Exchange

¹ Phase I may be up to \$100,000 and Phase II may be up to \$500,000

² Phase I may be up to \$75,000 and Phase II may be up to \$500,000

³ Phase I may be up to \$100,000 and Phase II may be up to \$300,000

⁴ Phase I may be up to \$75,000 and Phase II may be up to \$250,000

FEDERAL HIGHWAY ADMINISTRATION

00-FH1 A DRIVER EARLY WARNING ALERT OF PEDESTRIAN PRESENCE

Approximately 5,500 pedestrians per year are killed and 78,000 per year are injured by motor vehicle traffic. Many of these pedestrians are hit because the drivers have not detected them in time to avoid the crash. Both young and older pedestrians are particularly vulnerable to injury by motor vehicles. This project involves the development of an early warning system that will alert drivers of pedestrians in or near the road. The system would consist of a small transmitter that would be worn by a pedestrian. A receiver in the vehicle would, when activated by the pedestrian transmitter, provide a visual or auditory display (or both) indicating the immediate presence of a pedestrian in or near the roadway. The project involves the design and testing of a prototype system, the review of the practicality of implementing the system, an estimate of how much the system would cost to implement, and the likelihood of public acceptance and use of the system.

The Phase I research effort will consist of a feasibility study and the investigation of possible techniques for the development of an early warning system to detect pedestrians. Upon successful completion of Phase I, the actual development of the pedestrian detection system may be undertaken.

00-FH2 DEVELOPMENT AND IMPLEMENTATION OF COMPACT DISK READ ONLY MEMORY (CDROM) TRAINING PROGRAM

Research is needed in Phase I to develop a prototype training module which includes specific automated inventory system explanations. It should also provide an in-depth explanation of "best" methodology, and ensure learning progress through pre- and post- techniques. Results of the effort should establish attendance and completion of a confirmation procedure.

Based on the successful results in Phase I there may be a Phase II effort to prepare training CDROMS for automated inventory of Outdoor Advertising, and to test learning effectiveness in selected student communities. This would be followed by completion of final training CDROMS and distribution nationally.

The main work in the Phase I research effort would consist of a feasibility study and the investigation of possible techniques for the development of a prototype training module. Upon successful completion of Phase I, the actual development of the training module may be undertaken.

00-FH3 ANALYSIS OF URBAN AND RURAL TRANSPORTATION CORRIDOR DEVELOPMENT CONFLICTS

Research is needed in Phase I to develop a plan for software systems to integrate diverse information on transportation corridors to include: zoning, legislation, growth options, and agricultural mitigation requirements (baseline legislative information is a component of current research). Geographic Information System, multi-media databases, information databases may be incorporated into such plans. Based on successful results in Phase I, Phase II may be undertaken to prepare a prototype integrated software system. This would be followed by test application in urban and rural areas, and preparation of a software system, and then be presented at six localities in the U.S. Distribution system nationally.

The Phase I research is the main effort to study the feasibility and investigate innovative techniques for the development of a plan for a software system to integrate diverse information on transportation corridors. Upon successful completion of Phase I, the actual development of software systems may be undertaken.

00-FH4 DEVELOPMENT AND IMPLEMENTATION OF AUTOMATED

MANAGEMENT OF ADDITIONS/DELETIONS OF HIGHWAY DRIVEWAYS

Research is needed in Phase I to explore methodologies for automated management of additions/deletions of driveways to highway systems. Following successful completion of Phase I, a follow-up effort in Phase II may be undertaken to develop prototype software systems for use by various state highway departments to evaluate, and monitor additions and deletions of driveways to highway systems, including fee structure, development changes, plus owner and highway agency compensation issues.

00-FH5 DEVELOPMENT OF AN EDUCATIONAL PROGRAM AIMED AT INCREASING THE PUBLIC'S UNDERSTANDING OF AND APPRECIATION FOR THE NATION'S HIGHWAY SYSTEM

The Federal Highway Administration's FY2000 Performance Plan outlines five specific, strategic goals: Safety, Mobility, Economic Growth and Trade, Human and Natural Environment, and National Security. Of those, perhaps none describes more succinctly what the agency does, at least in terms the general public understands, than "mobility." An even more mundane term would be "traffic." And "traffic" has been so much on the public's collective mind of late that many large daily newspapers have initiated weekly columns dedicated solely to traffic and the commuter.

Thus, it becomes quite important to meet the goal of "mobility." The Performance Plan outlines several key performance measures and targets, such as the percentage of the National Highway System that meets acceptable ride quality standards, and the percentage of bridges on the National Highway System that are classified as deficient. These are relatively easy to measure. Another key performance measure is not as easily defined, however. It is listed as "Percent user satisfaction with the nation's highway system." The document states: "FHWA is committed to excellence in service to its customers and partners. It is important to understand highway users' perception of how well highways – as part of the Nation's intermodal transportation system – serve their needs when traveling to work, school, community services markets, and to visit other people. FHWA is deciding how best to establish a baseline and targets and collect data for assessing overall user satisfaction with the highway system."

The plan lists strategies for attaining the goal such as, "Increased user satisfaction should be one of the cumulative results of FHWA's programs, services, and activities."

While relying on one's good works to increase customer satisfaction might be admirable, it will probably not result in an increase in customer satisfaction. The National Highway Users Survey completed for FHWA by Coopers & Lybrand in 1996 showed what such an approach has gained thus far: They remarked that "the 50% level of satisfaction is lower than would be expected in measuring products or services in a competitive market." Perhaps the primary difference between products and services in a competitive market and "products" such as a highway system is that those in a competitive market are driven to tell their story; to educate their customers. It is not sufficient to have a good product; one must publicize it.

Therefore, it would seem appropriate to determine if, based on the various social, political, economic, and legal aspects, a national educational program should be undertaken. And, if so, what form it should take.

While there are disjointed programs aimed at educating specific aspects of the general public, such as the "Stay Out of the No Zone," "Read Your Road," and work zone safety programs, there is not now a single, unified program which focuses on the highway system as a vital aspect of today's society. Much as clean water and garbage collection are taken for granted, the highway system is virtually ignored as long as it operates smoothly. Once there is a breakdown in the system, however, the outcry is great.

What is proposed is a two-phased study/plan. Phase I research would include in-depth analysis of the positives and negatives of undertaking a national education program. It would include depth interviews of opinion leaders, surveys, and focus groups, all in an effort to determine if such a program should be undertaken. Based on success in Phase I, follow-on research and development may take place in Phase II only if Phase I determines that a national education program should be undertaken. Phase II would outline a specific plan of action for educating the public through a diversity of communication tools, perhaps including public service announcements, transportation curricula for public schools, sponsorship of media events, tours of editorial boards across the country, and signage along the nation's highways. It would include detailed schedules, budgets, and educational campaign themes. A key

aspect will be the development of a measuring instrument for determining – before and after initiation of the educational program – the public’s satisfaction with its highway system.

**¹00-FH6 DEVELOPMENT OF AN ULTRA VIOLET (UV) BULB FOR USE
IN AUTOMOTIVE HEADLAMPS**

The use of ultraviolet lights with the combination of fluorescent materials in pavement markings, signs, or paint offers an excellent opportunity for improving driver visibility. Fluorescent materials are available at a reasonable cost; however, a cost efficient light source has not been developed, as yet. Once the light source is available, the development and implementation of the technology can proceed.

The proposed Phase I research will look into the technical feasibility and practicality of developing a lamp (bulb) that could be used in a vehicle headlamp application similar to the metal halide Xenon (bulbs) currently being introduced in automotive headlamps.

The research would include:

- a. Assess the technical feasibility of developing an HID lamp (bulb) with high UV-A emission as a source for motor vehicle application.
- b. Identify the technical issues that would have to be solved before large scale production could be expected.
- c. Determine the manufacturing complications and practicality of making the UV-lamp (bulb).
- d. Estimate the time required before UV-A lamps could be mass produced.
- e. Identify what would have to be done in a Phase II project if it were undertaken to permit development of sufficient lamps (bulbs) and proper ballasts for lamp operation from a 12 VDC system and to proceed with field test and evaluation of their technology.

**¹00-FH7 SOFTWARE PACKAGE FOR FITTING AND EVALUATING
MATERIAL MODELS FOR THE FINITE ELEMENT CODE
DYNA3D**

LS-DYNA finite element simulations of vehicle collisions into roadside safety structures are a cost-effective means of supplementing vehicle impact tests. The accuracy of such simulations depends, to a large extent, on the ability of the analyst to accurately fit the appropriate material models (wood, soil, concrete, steel, composites, glass, laminated glass, rubber, etc.) to basic material property data. Fitting material models is a time consuming process. The accuracy of each fit depends largely on the analysts experience and judgement. An automated software package is needed to consolidate available data and material models, and to automate the fitting procedure, so that optimized and consistent sets of material parameters are readily generated and available to all roadside safety analysts, regardless of experience. Such a user-friendly software package is not currently available.

The Phase I research effort is needed to demonstrate the feasibility of the proposed approach for a material model and data set applicable to roadside safety applications. The proposed software package must graphically compare the fit of the model to data for a variety of load conditions (uniaxial stress and strain, triaxial compression and extension, etc.). It should also be simple to use (even for beginning analysts), run-time efficient, and cost effective. Contacts with software companies capable of marketing this product on a Nationwide or Worldwide basis would have to be explored.

Based on successful results in Phase I, a Phase II effort may be undertaken to automate the fitting procedure, expand the number of material models and the material properties database and provide a means for including user-supplied material models (for analysts developing their own material models). The Phase II team should include a software company capable of marketing this product on a Nationwide or Worldwide basis. A business plan would need to be developed during this phase.

**00-FH8 RECYCLING OF PORTLAND CEMENT CONCRETE
PAVEMENT**

Removal and recycling of Portland Cement Concrete Pavement is currently a somewhat slow and expensive operation. Reuse of this resource would be enhanced if a cheaper, quicker, more effective way could be developed and if it would address a number of environmental concerns.

Research is needed to develop a machine that would, in 8 to 10 hours, process a lane mile of concrete, separate the steel and not disturb the existing base. With success in this effort, pavement removal costs could be reduced 2/3's from present-day costs.

Development of this technology would contribute to the five goals listed in the DOT strategic plan which are: Safety; Mobility; Economic Growth and Trade; Human and Natural Environment; and National Security.

¹ 00-FH9 DEVELOPMENT OF A SIDEWALK ASSESSMENT PROCESS

The Americans with Disabilities Act (ADA) of 1990 is a Federal Civil Rights Law which prohibits discrimination on the basis of disability. On July 26, 1999, Secretary Rodney Slater issued a U.S. Department of Transportation Accessibility Policy to make accessibility a guiding principle in the development of transportation systems, including pedestrian networks. Sidewalks and other pedestrian walkways provide transportation routes to public areas and services. DOT is partnering with the U.S. Access Board to develop guidance on accessibility in pedestrian public rights-of-way.

At present, there is no standard method to assess the accessibility of sidewalks and other public rights-of-way. A reliable sidewalk assessment process would be a valuable tool to help transportation agencies and departments of public works meet the goals of the ADA. A sidewalk assessment process will assist communities in evaluating pedestrian facility conditions to target pedestrian improvements, and will help the U.S. DOT and FHWA meet their Performance Plan mobility goals for improving accessibility.

Research is needed in Phase I of the sidewalk assessment process and it should compile and test objective measures and tools to assess and describe the accessibility of sidewalks and other pedestrian walkways in a manner usable by planners and designers. Phase I should include a prototype database to compile data which can be generated into usable information about pedestrian facility conditions. The database should permit application in Geographic Information Systems (G.I.S.) so that planners and designers can use its information for sidewalk construction, reconstruction, and maintenance programs. Phase I also should result in a prototype information system that provides pedestrians with accessibility information through maps, signage, computer kiosks, web sites, etc.

Based upon success in Phase I, follow-on work in Phase II may be undertaken of the sidewalk assessment process to finalize the sidewalk assessment database for use by planners and designers, and finalize the accessibility information system for pedestrians. Phase II also should develop a marketable training course and presentation materials to teach the sidewalk assessment process to communities so they can implement the process quickly and effectively.

¹ 00-FH10 DEVELOPMENT OF PREDICTIVE TOOLS FOR CULTURAL RESOURCES

Transportation project sponsors have a continuing responsibility to identify, evaluate, and consider project effects on cultural, historic, and archaeological resources. These resources include archaeological sites, historic structures, historic and cultural landscapes, architectural and engineering properties, and traditional cultural properties and places historically important to native Americans, Hawaiians, and Alaskans. Transportation agencies, or their representatives, investigate these resources in compliance with Section 106 of the National Historic Preservation Act of 1966, as well as other federal and state laws and regulations.

Research is needed to develop a software application that will identify and allow users to assess cultural, historic, and archaeological resources delimited in existing GIS systems as well as provide system users the opportunity to add information on these resources to GIS systems. The software should allow users to review these resources at a broader, geographical scale so that the users may ultimately develop more cost-effective approaches to preserve, rehabilitate, restore, and reconstruct these resources.

The application must be able to access and be interchangeable among industry standard GIS applications. Resulting data sets must be able to be accessed by and be interchangeable among industry standard relational database software packages.

As State DOTs and other agencies assume more leadership in this area, there is an increasing need to advance the state-of-the-art. The availability of new technologies, including remote sensing, geographic information systems, and advanced relational databases provide new opportunities for cost-effective analysis. This research directly supports the FHWA Strategic Objective under the Human and Natural Environment Strategic Goal, to “Enhance community and social benefits of highway transportation.”

00-FH11 DEVELOPMENT OF OUTDOOR ADVERTISING CONTROL TOOLBOX

Research is needed to develop CDROM interactive program to inform state highway agencies of electronic automated inventory systems to control Outdoor Advertising signs.

Major focus under this Phase I project is to develop CDROM presentations to explain automated methodologies practiced in five States.

- a. Provide overview of five State automated systems.
- b. Provide assessment of each State automated system; such as nature of proprietary software; ease of software use; potential for adoption by other states; and costs for development and maintenance of electronic systems.
- c. Include examples of each State’s system, including visual and interactive representations.
- d. Provide explanation of how each State system provides needed information for State and national inventory
- e. Include specific automated inventory system explanations, provide in-depth explanation of “best” methodology.
- f. Provide protocol for a unified automated inventory system.

Phase I is a valuable stand-alone product and will provide feasibility and procedural information. The value of Phase I is three fold:

1. Our customers and partners will benefit as principal users and implementers of the materials to be contained in the deliverable.
2. FHWA will benefit because the deliverable will save travel and personnel resources for us.
3. The successful contractor will enhance their expertise and potentially qualify for awards with other partners.

Based on the results of Phase I, Phase II may be undertaken to develop CDROM interactive programs to train state highway agencies in “best” methodology for Outdoor Advertising inventory control and reporting. It would also include preparation of training CDROMs for automated inventory of Outdoor Advertising.

- a1. Use best methodology obtained from five State systems /or/a2. Use new design protocol for unified automated inventory system.
- b. Provide explanation of how selected methodology can be incorporated into State inventory practice.
- c. Give module examples of how system is used within a State.
- d. Give module examples of how system can be used to prepare national reports.
- e. Test learning effectiveness in selected student communities.
- f. Provide for learning progress assurance through pre- and post- test techniques.
- g. Establish attendance and completion confirmation procedure.
- h. Complete final training CDROMs and distribute nationally.

00-FH12 DEVELOPMENT OF TECHNOLOGY TO INCREASE NATIVE SEED SOURCE

Mandates to use native wildflower and grass seed began in 1987 with Surface Transportation and Uniform Relocation Assistance Act (STURAA) and have been reinforced with the 1994 Executive Memorandum on Beneficial landscaping and the 1999 Executive Order on Invasive Species....all calling for the use of native seed on projects.

The demand far exceeds the supply. Some incentive is necessary to expand the seed supply especially in the Northeast, Southeast, and Southwest regions of the country. Encouraging farmers to try these alternative crops could add to the seed supply and diversify small farmers.

The key problems to this small business are 1) the cost of machinery to handle this specialized crop (farmers already have much of it); 2) the 5 years of establishment before harvests are profitable (grasses now selling for \$30+/pound and forbs for \$350+/pound); 3) and the lack of banks willing to loan money to a new crop. Market studies in Minnesota and Alberta, Canada have proven the market need and the potential profits on native seed. All Federal land managers in the Forest Service, Bureau of Land management, and the National Park Service use as much available seed as they can find, leaving State Departments of Transportation who are required to use native forbs and grasses little seed supply to buy.

Because we, as one of many Federal agencies, require native seed for use in erosion control, landscape and maintenance projects, we need to research the subject and help develop the technology that will yield seed sources in at least 3 regions of the country. This will help DOT/FHWA lead the way for this environmental solution to roadside disturbances and encourage an alternative crop to small farmers in need of diversification. Users of seed are seeking source-identified or regional seed for projects within those regions.

00-FH13 DEVELOPMENT OF AN ENFORCEABLE HANDICAPPED PARKING PLACARD

This project would develop an enforceable handicapped parking placard. Current handicapped parking placards are easy to forge. This makes it difficult for the police to verify their validity.

This project is needed to create a handicapped parking placard which is difficult to forge and easy to verify. The project should use technology and concepts which maximize the ability of police to enforce and for Divisions of Motor vehicles to distribute. The technology should incorporate the ability to time limit the usefulness of the handicapped parking placards for people whose handicaps will be of limited duration.

The proposer should have experience in police enforcement of handicapped parking, experience with how DMVs deal with handicapped parking placards, experience with a wide variety of state and local handicapped parking and experience with DSRC and other communications technologies.

² 00-FH14 NON-INTRUSIVE WIND FIELD MAPPER

Wind forces can have large and potentially deleterious effects on highway structures such as bridges. Better understanding is needed to ensure the safety of these structures against failure of major components or full collapse of the structure and to minimize risk of injury to the public. Furthermore, this is needed to enhance the performance of major structures in wind storms so that the highway system may function in a more productive and efficient manner. Testing of structures to assess the effects of wind is essential to benchmarking models and to developing reliable design criteria. At present, such tests are constrained by the accuracy with which the wind around a model of a complex structure can be mapped. Physical probes such as hot wires and pitot tubes have limited accuracy and also perturb the flow being measured. Optical techniques such as LDV's are expensive and usually require seeding of the flow, which is impractical in a large test facility.

What is needed is a nonperturbing method of mapping wind velocities in the range of 5-30 mph with 1% accuracy to within a few millimeters of a structure. The best solution would be a sensor that could measure the flow at many points simultaneously. However, a method to map wind at different points sequentially would also be of value, provided that this could be done rapidly (e.g. a measurement every few seconds).

The Phase I research would include demonstration of concept, a survey of alternative techniques and assessment of the cost of an instrument and the accuracy that could be achieved. Phase II would develop, demonstrate, and deliver a prototype wind field mapper instrument.

⁴ 00-FH15 COMPUTER-DESIGN SYSTEM FOR PAVEMENT REPAIR

Every year the FHWA spends billions of dollars repairing highway pavements that have failed well before their design lifetime is reached. The repaired pavements often need attention again too soon. A big reason for these premature failures is the limited knowledge of how to quantify the damaging effects of the size and weight of trucks,

particularly for pavements that are already damaged, and the lack of a practical method of utilizing the knowledge we do have.

There is a need for tools to better design pavements for new construction and also for pavement repair. These tools would be part of a computer-based design system that would consider the many factors that influence pavement damage response as well as the current state of damage of the pavement section. Although pavement roughness generally used by State Highway Departments to trigger pavement overlay and repair it is the internal damage to the pavement in terms of permanent deformations and cracks that lead to premature pavement failure. Once cracking damage has occurred it cannot be healed and further damage progresses at an alarming rate. It is therefore most prudent to be able to estimate when cracking damage will be initiated and to design the pavement to the longest damage free life possible.

The Phase I research will use the latest pavement damage crack prediction algorithms available and develop a user friendly interface to demonstrate the feasibility for the application of this system for use in an overall computer design system for pavement repair. Upon successful completion of Phase I, the development of the design system together with the development of other damage mechanisms including pavement layer rutting for inclusion in this system would be undertaken.

FEDERAL TRANSIT ADMINISTRATION

¹ 00-FT1 INNOVATIVE PEDESTRIAN SIGNALS TO AVOID FATALITIES AT LIGHT RAIL AND COMMUTER RAIL PEDESTRIAN CROSSINGS

The increased adoption of light rail systems in the United States is a major benefit to cities, improving mobility and accessibility, while reducing congestion and air quality. However, in many cities it is a relatively new mode of transportation and patrons are not familiar with the appropriate safety behaviors required. Also, the design of systems to facilitate passenger transfers in some cases were not well planned and thus ideal solutions are now costly to implement.

The problem of pedestrian safety in getting to rail transit facilities is receiving increased attention. However, the solutions overlook both the utilization of available technologies as well as their human factors components necessary to garner the attention of patrons and command respect. Research is needed to (1) provide in-depth analysis of signage systems effective in similar environments, (2) assess their materials and life-cycle cost, and (3) review and determine pedestrian geometric improvements. These improvements should be designed to discourage inappropriate behavior with signage reinforcement. The proposal should also include research in the form of focus group studies of sign content, color, and message to determine potential effectiveness, and compare to secondary research in the same subject area from highway and traffic engineering.

This topic addresses the “upfront” research necessary to move into the product development cycle. An important aspect of undertaking this research is the degree users and patrons are involved to identify issues and deficiencies in current signage, as well as identify behaviors and infrastructure deficiencies that directly or indirectly encourage unsafe acts.

¹ 00-FT2 MULTI-PORT RAPID CHARGERS FOR ELECTRIC VEHICLES

Rapid charging is highly desirable if the inherent range limitations of electric vehicles are to be eliminated. In such cases, it is required that charging be accomplished in minutes rather than hours, which would require a high level power charging system. Presently available electric vehicles (EVs) are equipped with battery packs having different chemistries, and different amp-hour capacities. In order to overcome the cost impacts of discrete chargers for the variable battery chemistries and the variable amp-hour capacities, a universal rapid charging station would be quite beneficial. Such a system would offer high and variable power charging capabilities, programmable charging algorithms for different battery chemistries, reduced charging times, and reduced maintenance.

Research into the feasibility of multi-port charging capability is needed for the efficient utilization of the charging infrastructure as well as simultaneous charging of several vehicles. The benefits of a multi-port charger include

better utilization of the power capabilities of the charger, simultaneous charging of several vehicles, reduced capital costs, improved system performance, and a centralized utility interface.

¹ 00-FT3 INNOVATIVE METHODS FOR COMMUNICATING TRANSPORTATION IMPACTS TO TARGETED POPULATIONS

There is a growing need identified in metropolitan and statewide planning processes nationwide to ensure that transportation plans and programs comply with provisions of Title VI of the Civil Rights Act. Lawsuits have been proposed in several areas of the country by communities concerned that their civil rights have been violated because they were not allowed to participate in the transportation planning and decision-making process. The single most important cause is the inability for the planning process to reach-out to and involve minority and low income communities in their work.

Research is needed to examine the feasibility of developing and testing innovative, technology-supported approaches to communicating potential impacts of transportation alternatives to the general public. The techniques should particularly address the unique challenges associated with engaging members of low income and minority communities in meaningful dialogue on policy, program, and project development. These communities typically are least informed and generally not active in the public dialogue on transportation issues.

Interest in this type of community involvement tool has been expressed by public agencies, communities, and professional practitioners, alike. Furthermore, development of this tool responds to important public involvement requirements set forth in the Transportation Equity Act for the 21st Century (TEA-21), as well as long-standing requirements of the Civil Rights Act and principles of Environmental Justice.

It is envisioned that the research would be carried out with the involvement of a working group comprised of DOT staff, States/MPOs, and representatives of grassroots community organizations.

¹ 00-FT4 SATELLITE SENSING AND GIS TECHNOLOGY TO MEASURE IMPACT OF TRANSIT INVESTMENT ON LAND USE

Two major changes have occurred in the nation's remote sensing programs that will change the way transit professionals can measure the effectiveness of transit investments. First, the Federal government has taken back the management of the LandSat 7 satellite making the cost of this low-resolution multispectral imagery affordable for State and regional planning and research organizations to use in land use analysis. The imagery from the ERTS/LandSat satellites provide more than twenty years of data collection over the nation's rail transit systems funded by FTA. Secondly, since September 25, 1999, intelligence-quality 1-meter resolution imagery is now available with daily coverage to transit agencies and Metropolitan Planning Organizations (MPOs) for detailed analysis of land use and transportation changes. Lastly, off-the-shelf geographic information systems (GIS) software now can readily import both LandSat imagery and hi-resolution digital orthophotos so that they can be integrated with vector-based transportation GIS (GIS-T) programs. The integration of comparative coverage of both low-and hi-resolution imagery into the spatial analysis of "new start" transit systems over the past two decades can provide valuable new data on the importance and efficacy of transit in influencing positive changes in land use in our communities.

With the increased resolution of multispectral imagery from the LandSat 7 satellite, there is an opportunity to use pattern recognition techniques and change detection algorithms to identify changes in land use over time. Now, with the introduction of commercial high-resolution satellite imagery, verification of land use categorization can be greatly improved. The FTA has developed GIS databases of all rail transit systems. By integrating land use analysis from satellite imagery with GIS-based spatial analysis techniques using assessed valuation GIS databases around rail transit stations and stops, the transit industry can revolutionize methods of measuring the benefits of transit capital investments in metropolitan areas.

This Phase I Research will address feasibility studies on selected metropolitan areas where rapid transit systems have been built since the availability of civilian satellite imagery (ERTS-1 1972). The feasibility study will select sites where multi-spectral imagery, aerial photography, and land use analysis are available in archives and are readily adapted to spatial analysis. Secondly, the transit improvements should have been completed for at least ten years so that significant changes in land uses and land value could have occurred within the study period. The feasibility

study will determine the ability of the current pattern recognition software to identify land use categories in sufficient detail to be useful for transit benefits evaluation using multispectral imagery from several generation of earth observing satellites. The study will determine the utility of change detection software to monitor changes in land usage over time. The Phase I effort will determine the feasibility of integrating land use analysis software based on raster imagery with vector-based GIS software common in transportation analysis. The feasibility study will determine the availability of GIS-based assessed valuation parcel databases for transit capital investment analysis. Finally, if the feasibility study indicates that using remote sensing and GIS technologies to measure the impact of transit investments on land use is worth further study, a study design may be sought in a Phase II application of the technologies at two or more metropolitan areas.

NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION

³ 00-NH1 VIDEO DETECTION AND IMAGE PROCESSING SYSTEMS FOR TRAFFIC LAW ENFORCEMENT

Over the last several years, there has been a growing concern about aggressive high risk driving and an increased level of apprehension among the motoring public about this traffic safety problem, as evidenced by self-report surveys and national media attention. Drivers engaging in dangerous, high risk and aggressive driving (e.g., excessive speeding, running red lights, unsafe lane changes, following too closely, traffic weaving, driving outside of the traffic lanes) is a contributing factor in many fatal crashes. Due to limited traffic law enforcement resources, the application of technology to address many of these illegal driving behaviors offers considerable promise in reducing the incidence of these behaviors and resulting crashes.

Recently, there has been growing interest in, and use of, red light camera systems, and photo radar speed enforcement systems. Many other illegal driving behaviors could be detected through the use of state-of-the-art technology. Many major metropolitan areas have installed video surveillance systems on the interstate and highway systems. The development of reliable video detection and image processing systems for illegal driving behaviors offers the potential to aid traffic enforcement efforts in the future.

Thus, some form of real-time video image processing system designed to detect and record illegal driving behaviors (e.g., speeding, following too closely or distance between cars, driving on the shoulder, unsafe lane changes, etc.) is sought.

Proposals for the phase I research effort should be based on concepts for utilization of specific hardware and software. The proposal should suggest a viable feasibility study of any proposed concepts and should describe how the concept would provide real-time identification of vehicles operating illegally. Upon successful completion of Phase I, the actual development of the chosen concept may be undertaken.

³ 00-NH2 DYNAMIC OCCUPANT POSITION SENSING SYSTEM

Air bags are proven as effective safety devices. From their introduction in the late 1980's through September 1, 1999, air bags have saved approximately 4,651 lives. However, they have also been attributed to fatal and serious injuries to a small number of occupants in low-to-moderate severity crashes. The one fact that is common to 145 fatally injured occupants is the fact that they were too close to the air bag when it started to deploy.

NHTSA has been conducting research to develop performance specifications for advanced air bag systems that will minimize the risks posed by air bags to infants, children, and other occupants. This research has revealed that many advanced sensing systems under development make use of quasi-static measurements of occupant weight, size, belt use, or position to make air bag deployment decisions in a crash event. However, these systems may not always provide the optimum level of occupant protection in all crash circumstances. For example, teenagers or adults forced out-of-position due to pre-crash braking events may receive the most powerful air bag inflation level due to their pre-recorded seating weight. Similarly, unconscious, slumped-over drivers who normally sit fully-rear could be subject to the most powerful air bag inflation level due to their pre-recorded seat track location. Additionally, children

sitting on the laps of right front passengers may also receive the most powerful level of air bag inflation due to the pre-recorded weight of the right front passenger.

Proposals for Phase I research efforts should focus on concepts for the development of low-cost dynamic occupant position sensing hardware and software which will demonstrate significant improvements over quasi-static occupant sensing technologies and should provide a reliable basis for estimating the production cost to achieve them. The actual development of the chosen concept may be pursued in a Phase II effort upon successful completion of Phase I.

³ 00-NH3

DEVELOPMENT OF TEMPERATURE-INDEPENDENT AND TUNABLE MULTIDIRECTIONAL THORAX STRUCTURES FOR APPLICATION TO ADVANCED ANTHROPOMORPHIC TEST DEVICES

Current thorax structures of Anthropomorphic Test Devices (ATDs), otherwise known as crash test dummies, are typically constructed of assemblies of individual “ribs,” which themselves are constructed of layered steel strip bonded to viscoelastic “damping” material. Such thorax structures exhibit two major deficiencies: a) high sensitivity of impact response to ambient temperature, and b) difficulty in adjustment or “tuning” impact performance at initial assembly or as the structure ages in service.

Concepts and demonstration hardware are sought which can address these performance limitations, which will become more important as future efforts are made to realize multidirectional impact performance (e.g., frontal/side) in advanced crash test dummy designs.

Research is needed which can simultaneously address several or all of the following general requirements:

- 1) Low sensitivity of impact performance to ambient temperature;
- 2) Capability for adjustment (tuning) of impact response to facilitate initial thorax certification, and to extend service life;
- 3) Adaptability of concept to multidirectional application;
- 4) Compatibility with multi-directional thoracic deflection/shape measurement concepts; and
- 5) Maintenance of hysteresis characteristics common to existing thorax constructions.

Both passive and active control concepts should be considered in the effort to meet the above requirements.

It is desired that the efforts of a successful Phase I provide clear proof of concept, and some form of working prototype assemblies, so that full development may be justified and pursued in a Phase II effort.

The Phase I research effort will consist of a feasibility study and the investigation of possible techniques for the development of working prototype assemblies. Upon successful completion of Phase I, the actual full development of the chosen concept may be undertaken.

UNITED STATES COAST GUARD

³ 00-CG1

DEVELOPMENT OF UNIQUE TECHNOLOGICAL ALTERNATIVES TO BALLAST WATER EXCHANGE

Bioinvasion of American harbors by aquatic nuisance species (ANS) is a major marine environmental concern. Successful invasions of ANS increased at a significant rate over the last decades resulting in unexpected harmful impacts. The discharge of contaminated ballast water and sediment from vessels operating outside the exclusive economic zone (EEZ) and entering U.S. waters has played a major role in the introduction and dispersal of ANS.

Once established, ANS can cause substantial, negative economic and environmental impacts resulting in the loss of billions of dollars in this country alone. Exchanging ballast water outside the 200 mile-wide EEZ in ocean depths greater than 2000 meters during transoceanic voyages effectively eliminates some ANS. However, the U.S. Coast Guard (USCG) considers ballast exchange an interim process and supports the fact that alternatives to this method must be identified and eventually replace ballast exchange when possible in the near future.

Preliminary investigations have determined several unique technologies or methods, which have the potential to replace ballast exchange as a method to reduce the invasions of aquatic nuisance species from entering navigable waters in the U.S. Some of the unique methods such as acoustic, electromagnetic, electric pulse, plasma, or wastewater treatment may show some promise to develop into a viable solution. It is therefore the desire of the CG to design, model, and develop techniques such as these so that they may be commercially feasible to use by ships or other facilities to reduce the invasions of ANS by treating ballast water instead of exchanging it at sea. Specific factors should be taken into account during any consideration of development. These include ship size, power, pumping capacity, and space available to utilize a new technique aboard a vessel or possibly a harbor-based facility.

The Phase I research effort would consist of a feasibility study and the in-depth investigation of the techniques described above for the development of alternative methods capable of replacing ballast exchange. However, the investigator is not limited to the methods described and may include other unique ideas. Upon the successful completion of Phase I, the actual development of the alternative selected to replace ballast exchange may be undertaken.

³00-CG2 **DEVELOPMENT OF UNIQUE TECHNOLOGICAL PROTOCOLS AND INSTRUMENTATION FOR THE VERIFICATION OF BALLAST WATER EXCHANGE**

Bioinvasion of American harbors by aquatic nuisance species (ANS) is a major marine environmental concern. Successful invasions of ANS increased at a significant rate over the last several decades resulting in unexpected harmful impacts. The discharge of contaminated ballast water and sediment from vessels operating outside the exclusive economic zone (EEZ) and entering U.S. waters has played a major role in the introduction and dispersal of ANS. Once established, ANS can cause substantial, negative economic and environmental impacts resulting in the loss of billions of dollars in this country alone. Exchanging ballast water outside the 200 mile-wide EEZ in ocean depths greater than 2000 meters during transoceanic voyages effectively eliminates some ANS. Therefore, the USCG has developed voluntary guidelines that recommend at-sea exchange as the preferred ballast management practice. To evaluate the success of this program, the USCG must determine the rate of voluntary compliance by foreign vessels. During routine boarding of incoming vessels, USCG personnel obtain random samples of ballast water and measure the levels of salinity using optical refractometry. Although this method is relatively simple and cost-effective, it lacks the reliability needed to definitively verify ballast water exchange in all cases.

Preliminary investigations determined the existence of technologies, which have the potential to supplement or replace salinity testing to verify an at-sea exchange. Various studies revealed several unique candidate methods, which include Acoustics, Epipelagic Bioluminescence, Radium 226/228, Carbon Isotope Ratios, and DNA Biosensors. It is therefore the desire of the USCG to design, model, and develop a light-weight instrument/sensor and a standard test protocol for the instrument/sensor that is capable of distinguishing ocean water from coastal water. The instrument must possess a high discriminatory ability and a low potential for providing ambiguous results. Specific factors should be taken into consideration that determine what physical, chemical, or biological properties give open-ocean water its unique signature as well as criteria that directly or indirectly affect the test results.

The Phase I research effort would consist of a feasibility study and the in-depth investigation of the techniques described above for the development of an instrument and test protocol capable of verifying an at-sea exchange; however, the investigator is not limited to the methods described and may include other unique ideas. Upon the successful completion of Phase I, the actual development of the instrument and protocols for the verification of at-sea exchange may be undertaken.

- ¹ Phase I may be up to \$100,000 and Phase II may be up to \$500,000
- ² Phase I may be up to \$75,000 and Phase II may be up to \$500,000
- ³ Phase I may be up to \$100,000 and Phase II may be up to \$300,000
- ⁴ Phase I may be up to \$75,000 and Phase II may be up to \$250,000

IX. SUBMISSION FORMS AND CERTIFICATIONS

- | | | |
|----|-------------------------------|------------|
| 1. | PROPOSAL COVER SHEET | Appendix A |
| 2. | PROJECT SUMMARY | Appendix B |
| 3. | CONTRACT PRICING PROPOSAL | Appendix C |
| 4. | PROPOSAL CHECKLIST | |
| 5. | PROPOSAL ACKNOWLEDGEMENT FORM | |

APPENDIX A

**U.S. DEPARTMENT OF TRANSPORTATION
SMALL BUSINESS INNOVATION RESEARCH PROGRAM
SOLICITATION NO. 00-1**

PROPOSAL COVER SHEET

Project Title _____

Research Topic No. _____ Research Topic Title _____

Submitted by: Name _____

Address _____

City _____ State _____ Zip + _____

Amount Requested (Phase I) \$ _____ Proposed Duration _____
(May be up to \$100,000 unless otherwise indicated) (in months) (Not to exceed six months)

1. The above concern certifies it is a small business firm and meets the definition stated in section 11B; and that it Yes _____ No _____ meets the eligibility requirement in Section 1C.
2. The above concern certifies it _____ does _____ does not qualify as a minority and disadvantaged small business as defined in IIC. (For statistical purposes only.)
3. The above concern certifies it _____ does _____ does not qualify as a women-owned small business as defined in IID. (For statistical purposes only.)
4. This firm and/or Principal Investigator has submitted proposals containing a significant amount of essentially equivalent work under other federal program solicitations, or has received other federal awards containing a significant amount of essentially equivalent work. (If yes, identify proposals in the section III. D. 10. "Similar Proposals or Awards".) Yes _____ No _____
5. Will you permit the Government to disclose the title and technical abstract of your proposed project, plus the name, address, and telephone number of the Corporate Official and Principal Investigator of your firm, if your proposal does not result in an award, to any party that may be interested in contacting you for further information? Yes _____ No _____

Principal Investigator
Name _____
Title _____
Signature _____ Date _____
Telephone No. _____

Corporate/Business Official
Name _____
Title _____
Signature _____ Date _____
Telephone No. _____

PROPRIETARY NOTICE (IF APPLICABLE, SEE SECTION V.D.1)

**U.S. DEPARTMENT OF TRANSPORTATION
SMALL BUSINESS INNOVATION RESEARCH PROGRAM
SOLICITATION NO. 00-1**

PROJECT SUMMARY

Name and Address of Proposer	FOR DOT USE ONLY
	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 words (8 maximum) description of the project useful in identifying the technology, research thrust and/or potential commercial application.

**SMALL BUSINESS INNOVATION RESEARCH PROGRAM
SOLICITATION NO. 00-1
CONTRACT PRICING PROPOSAL**

(SCHEDULE 1)

PROPOSAL COVER SHEET			1. SOLICITATION/CONTRACT/MODIFICATION NUMBER			
2a. NAME OF OFFEROR			3a. NAME OF OFFEROR'S POINT OF CONTACT			
2b. FIRST LINE ADDRESS			3b. TITLE OF OFFEROR'S POINT OF CONTACT			
2c. STREET ADDRESS			3c. TELEPHONE		3c. FACSIMILIE	
2d. CITY	2e. STATE	2f. ZIP CODE	AREA CODE	NUMBER	AREA CODE	NUMBER
4. TYPE OF CONTRACT OR SUBCONTRACT (<i>Check</i>) <input type="checkbox"/> FFP <input type="checkbox"/> CPFF <input type="checkbox"/> CPIF <input type="checkbox"/> CPAF <input type="checkbox"/> FPI <input type="checkbox"/> OTHER (<i>Specify</i>)			5. <input type="checkbox"/> PRIME OFFEROR <input type="checkbox"/> SUBCONTRACTOR _____ <div style="text-align:right; margin-right: 50px;">PRIME OFFEROR'S NAME</div>			
6. ESTIMATED COST, FEE AND PROFIT INFORMATION						
A. ESTIMATED COST						
B. FIXED FEE						
C. AWARD FEE						
D. PROFIT						
E. TOTAL PRICE						
7. PROVIDE THE FOLLOWING						
NAME OF COGNIZANT CONTRACT ADMINISTRATIVE AGENCY			NAME OF COGNIZANT GOVERNMENT AUDIT AGENCY			
STREET ADDRESS			STREET ADDRESS			
CITY	STATE	ZIP CODE	CITY	STATE	ZIP CODE	
TELEPHONE	AREA CODE	NUMBER	TELEPHONE	AREA CODE	NUMBER	
FACSIMILE	AREA CODE	NUMBER	FACSIMILE	AREA CODE	NUMBER	
NAME OF CONTACT			NAME OF CONTACT			
PROPERTY SYSTEM	<input type="checkbox"/> Reviewed by cognizant contract administrative agency and determined acceptable <input type="checkbox"/> Reviewed by cognizant contract administrative agency and determined not acceptable <input type="checkbox"/> Never reviewed		APPROXIMATE DATE OF LAST AUDIT			
PURCHASING SYSTEM	<input type="checkbox"/> Reviewed by cognizant contract administrative agency and determined acceptable <input type="checkbox"/> Reviewed by cognizant contract administrative agency and determined not acceptable <input type="checkbox"/> Never reviewed		PURPOSE OF AUDIT (e.g. proposal review, establishment of billing rates, finalize indirect rates, etc.)			
			ACCOUNTING SYSTEM <input type="checkbox"/> Audited and determined acceptable <input type="checkbox"/> Audited and determined not acceptable <input type="checkbox"/> Never audited			
			OFFEROR'S FISCAL YEAR			
8a. NAME OF OFFEROR (<i>Typed</i>)			9. NAME OF FIRM			
8b. TITLE OF OFFEROR (<i>Typed</i>)						
10. SIGNATURE				11. DATE OF SUBMISSION		

APPENDIX C Continued

**U.S. DEPARTMENT OF TRANSPORTATION
SMALL BUSINESS INNOVATION RESEARCH PROGRAM
CONTRACT PRICING PROPOSAL**

Background

The following items, as appropriate, should be included in proposals responsive to this Solicitation.

Cost Breakdown Items (in this order, as appropriate); (See Section III.E)

1. Name of proposer
2. Address of proposer
3. Location where work will be performed
4. Proposer's Project Title
5. Research topic number and title from DOT SBIR Program Solicitation
6. Total dollar amount of the proposal (dollars)
7. Direct material costs
 - a. Purchased parts (dollars)
 - b. Subcontracted items (dollars)
 - c. Other
 - (1) Raw materials (dollars)
 - (2) Standard commercial items (dollars)
 - d. Total direct materials (dollars)
8. Material overhead rate _____ % x total direct material = dollars
9. Direct labor (specify)
 - a. Type of labor, estimated hours, rate per hour and dollar cost for each type
 - b. Total estimated direct labor (dollars)
10. Labor overhead
 - a. Identify overhead rate, the hour base and dollar cost
 - b. Total estimated labor overhead (dollars)
11. Special testing (include field work at Government installations)
 - a. Specify each item of special testing, including estimated usage and unit cost
 - b. Estimated total special testing (dollars)
12. Other special equipment
 - a. If direct charge, specify each item of special equipment, including usage and unit cost
 - b. Estimated total other special equipment (dollars)

APPENDIX C Continued

13. Travel (if direct charge)
 - a. Transportation (detailed breakdown and dollars)
 - b. Per diem or subsistence (details and dollars)
 - c. Estimated total travel (dollars)
14. Consultants Service
 - a. Identify each consultant, including purpose and dollar rates
 - b. Total estimated consultant service costs (dollars)
15. Other direct costs (specify)
 - a. Total estimated direct cost and overhead (dollars)
16. General and administrative expense
 - a. Percentage rate applied
 - b. Total estimated cost of G&A expense (dollars)
17. Royalties (specify)
 - a. Estimated cost (dollars)
18. Fee or profit (dollars)
19. Total estimated cost and fee or profit (dollars)
20. The cost breakdown portion of a proposal must be signed by a responsible official of the firm (include typed name and title and date of signature).
21. Provide a yes or no answer to each of the following questions:
 - a. Has any executive agency of the United States Government performed any review of your accounts or records in connection with any other government prime contract or subcontract within the past twelve months? If yes, provide the name and address of the reviewing office, name of the individual and telephone/extension.
 - b. Will you require the use of any government property in the performance of this proposal? If yes, identify.
 - c. Do you require government contract financing to perform this proposed contract? If yes, specify type as advanced payments or progress payments.
22. Type of contract proposed, firm-fixed price.
23. DUNS number, if available _____
(See Section III.F)

**SMALL BUSINESS INNOVATION RESEARCH PROGRAM
SOLICITATION NO. 00-1
PROPOSAL CHECKLIST**

This is a CHECKLIST OF REQUIREMENTS for your proposal. Please review the checklist carefully to assure that your proposal meets the DOT SBIR requirements. Failure to meet these requirements may result in your proposal being returned without consideration. (See Sections III and IV.C 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.1 and V.H.2) 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 1.C).
- ___ 2. The proposal is 25 PAGES OR LESS in length. This limitation does not apply to the additional information required by Section III.H.
- ___ 3. The proposal is limited to only ONE of the research topics in Section VIII.
- ___ 4. The proposal budget may be up to \$100,000 unless otherwise indicated 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 only pages of 8 1/2" x 11" size.
- ___ 7. The proposal contains no type smaller than 10 point font size (except as legend on reduced drawings, but not tables).
- ___ 8. The COVER SHEET (Appendix A) has been completed and is PAGE 1 of the proposal.
- ___ 9. The PROJECT SUMMARY (Appendix B) has been completed and is PAGE 2 of the proposal.
- ___ 10. The TECHNICAL CONTENT of the proposal begins on PAGE 3 and includes the items identified in SECTION III.D of the Solicitation.
- ___ 11. The Contract Pricing Proposal (Appendix C) has been included as the last section of the proposal.
- ___ 12. The acknowledgement of proposal receipt card on the back cover of the solicitation has been detached, filled out and included with the proposal package.
- ___ 13. An original and four copies of the proposal are submitted.
- ___ 14. The additional information on prior Phase II awards, if required, in accordance with Section III.H.
- ___ 15. The proposal must be postmarked (or delivered to the DOT SBIR Program Office by 5:00 p.m.) no later than May 1, 2000 as required (see Section VI.A). If submitted electronically, the proposal must be received by May 1, 2000, 5:00 p.m.

**DOT SBIR PROGRAM SOLICITATION
NO. 00-1**

TO BE FILLED OUT BY THE PROPOSER:

Project Title _____

TO BE FILLED OUT BY THE DEPARTMENT OF TRANSPORTATION:

Date Received _____ Proposal No. _____

The form for acknowledging receipt of proposal appears above. Please include it in the same package with the proposal submitted to DOT and provide your address on the reverse side.