

***TRANSPORTATION CONSORTIUM OF
SOUTH-CENTRAL STATES***



UNIVERSITY TRANSPORTATION CENTER

**2022 REQUEST FOR PROPOSAL (RFP)
PROJECT 22PLSU23**

**Evaluating the Applicability of Using Deep Learning and LiDAR-based Unmanned Aerial
Systems for Pavement Condition Assessment**

**APPLICATION DEADLINE: MARCH 11TH, 2022
TARGET AWARDS NOTIFICATION DATE: APRIL 30TH, 2022**

**LOUISIANA STATE UNIVERSITY
BATON ROUGE, LA 70803**

FEBRUARY 11TH, 2022



Request for Proposal

TABLE OF CONTENTS

1. Title and Overview	2
2. Project Objective and Description	2
3. Project Scope	3
4. Eligibility and Team Qualifications.....	5
5. Due Date and Project Timeline.....	5
6. Technical Proposal Guidelines	6
7. Budget.....	6
8. Cost Sharing.....	7
9. Schedule and Reporting Requirements.....	7
10. Submission Requirements.....	8
11. Proposal Evaluation Criteria.....	9
12. Review Process	9
13. Certifications and Assurances.....	10
14. Resources	10
Appendix A: U.S. DOT Project Information Form	i
Appendix B: Certifications and Assurances	ii
Appendix C: Project Schedule	xii
Appendix D: Budget Forms	xiii
Appendix E: Project-Specific Technology Transfer (T2) Plan.....	xiv

1. TITLE AND OVERVIEW

The Transportation Consortium of South-Central States ([Tran-SET](#)) is a University Transportation Center located in Region 6 (AR, LA, NM, OK, and TX). Tran-SET's scope falls within FAST Act Research Priority Area 4: Improving the Durability and Extending the Life of Transportation Infrastructure with a focus on the following non-exclusive topic areas: application of new materials and technologies, construction methodologies and management, and corrosion and aging infrastructure. The theme of the Center is "*Solving Emerging Transportation Resiliency, Sustainability and Economic Challenges through the Use of Innovative Materials and Construction Methods: From Research to Implementation.*" Tran-SET's Mission is to "conduct all phases of research, technology transfer, education, workforce development, and outreach activities as to solve transportation challenges in Region 6 support implementation". While the focus of Tran-SET will be on FAST Act Research Priority Area 4, the Center will address all transportation challenges throughout Region 6 in regard to transportation research, education, workforce development, and technology transfer. Tran-SET is currently accepting proposals for problem statement **No. 21-023-P**, titled "Evaluating the applicability of using deep learning and LiDAR-based Unmanned Aerial Systems for pavement condition assessment." The purpose of this Request For Proposal (RFP) is for Tran-SET to solicit research proposals to perform the study noted above by conducting a fair and extensive evaluation based on criteria listed herein, and selecting the project team based on the quality of the proposal and the adherence of the project to the overall [Vision, Mission, and Objectives of Tran-SET](#).

2. PROJECT OBJECTIVE AND DESCRIPTION

Project Objective:

The objective of this research project is to develop a hybrid LiDAR-based Unmanned Aerial system (LiDAR UAS) remote sensing system that can collect data related to pavement condition.

Project Description:

Providing an efficient and inexpensive evaluation tool for pavement condition assessment and the need for maintenance is an important aspect of pavement management system (PMS). However, the current traditional automated and manual methods for pavement evaluation are expensive and time consuming. According to a recent report published by Massachusetts Department of Transportation in December 2019, the use of Unmanned Aerial Systems (UAS) for pavement condition surveys is in its early stages with very little experience and information available. Currently, no UAS platform can provide pavement condition data like the data obtained by traditional automated and manual methods. Photogrammetry appears to be the front runner of UAS pavement condition assessment technology, but the use of multi- or hyperspectral imaging is garnering attention in this field of study as it presents more and more benefits when used in conjunction with photogrammetry. LiDAR usage in drones has not been thoroughly explored yet, although it does propose some potential advantages that may be seen at a later time. Clearly, additional research is needed to understand how to determine pavement condition index (PCI) values from the pixel-level crack detection results obtained from UAS. To address these issues, the main goals of this research are to: 1. conduct a comprehensive review of existing UAS technologies for pavement condition assessment; 2. introduce and

Request for Proposal

prototype a hybrid LiDAR-based Unmanned Aerial system (LiDAR UAS) remote sensing system that can collect data related to pavement condition; and 3. evaluate the applicability of using deep learning and LiDAR UAS for pavement condition assessment. In this regard, a deep learning-based algorithm shall be developed to better analyze images collected from LiDAR UAS and identify pavement condition/assessment. It is expected that the results of this research will provide transportation authorities in Louisiana and Region 6 with an inexpensive tool for pavement condition assessment.

3. PROJECT SCOPE

The scope of this project includes two phases: **Technical and Implementation**. The **Technical Phase** involves the technical aspects of the project to achieve the project's objective(s). The **Implementation Phase** requires tasks that address technology transfer, education, workforce development, and outreach activities. Each proposal submittal must detail tasks for each phase.

Technical Phase

The proposed study aims to develop a hybrid LiDAR-based Unmanned Aerial system (LiDAR UAS) remote sensing system that can collect data related to pavement condition. Accomplishment of the project objective(s) in the **Research Phase** will require at least the following tasks:

Task descriptions are intended to provide a framework for conducting the research. Tran-SET is seeking the insights of proposers on how best to achieve the project objective(s). Proposers are expected to describe research plans that can realistically be accomplished within the constraints of available funds and contract time. Proposals must present the proposers' current approach in sufficient detail to demonstrate their understanding of the issues and the soundness of their methodology in achieving the project objective(s).

Task 1: Literature Review

Conduct a comprehensive review of existing Unmanned Aerial System (UAS) technologies for pavement condition survey. The literature review shall focus on both sensors that can be integrated with UAS and advanced algorithms for analyzing pavement distress data. The review of algorithms shall be concentrated on recent pavement image processing methods such as those based on deep learning.

Task 2: Develop Pilot Study

Develop a pilot study to evaluate the applicability of using LiDAR-based UAS for assessing pavement condition. Light Detection and Ranging (LiDAR) sensors use light energy, emitted from a laser, to scan the ground and measure variable distances. The result is a rich set of elevation data that can be used to produce high-resolution maps and 3D models of natural and man-made objects. In this study, LiDAR UAV data shall collect the point cloud data of road network and feed the data to a deep learning network to better perform pavement condition assessment (e.g., classify/identify pavements' cracks, identify a pavement condition index).

Request for Proposal

Task 3: Develop a Deep-Learning Algorithm

Develop a deep learning-based algorithm to better analyze images collected from LiDAR UAS and assess pavement conditions accordingly.

Task 4: Final Report

Develop the final report, to include a complete description of the problem, approach, methodology, findings, conclusions, and recommendations developed because of Tasks 1–3.

Implementation Phase

Tran-SET's goal is to ensure that the findings of projects funded will have a long-term research value and significantly impact the transportation industry. Equally important is Tran-SET's mission to promote educational and workforce development activities in parallel with funded research projects funded, the submitted proposal must include a Project-Specific Technology Transfer (T2) Plan. The Project-Specific T2 Plan will specify the proposer's own unique set of key stakeholders and unique methods to engage these stakeholders. The Project-Specific T2 Plan is to serve as a guide to successfully plan and execute activities during the **Implementation Phase** of the project.

Technology Transfer (T2)

The knowledge generated from the research study is to be disseminated and transferred to stakeholders who are (or might be) interested in the study outcomes. Stakeholders can be state departments of transportation (DOTs), local government entities, non-profit organizations, research communities, as well as transportation and construction industries. Examples of implementation tasks or T2 activities include but are not limited to: presentations, journal articles, technical reports, design specifications, professional events, or any other medium that the authors find suitable.

Education and Workforce Development

Knowledge generated from the research study is to be incorporated into educational and training activities. Examples include:

- Preparation of educational materials to train students and to prepare them for the use of the developed technologies in their academic studies and professional career;
- Development of new courses to meet the identified training/education needs, considering the diversity of the student educational level and learning ability; and
- Delivery of seminars/webinars and workshops for workforce development initiatives.

Outreach Activities

The proposed research study should aim to engage future researchers and engineers to careers in transportation, by developing activities that would encourage a higher participation from students in under-represented groups. Research opportunities may also be provided to high school students or undergraduate students in community colleges to educate future leaders on transportation-related concepts.

Proposers are required to utilize the template shown in Appendix E to develop their Project-Specific T2 Plan and submit it with the proposal. The developed Plan must include specific

Request for Proposal

tasks (activities) in the implementation phase. Tran-SET may return proposals that don't include the Plan, without review.

Accomplishment of the project objective(s) in the **Implementation Phase** will require at least the following tasks:

Task 5: Implementation Phase

Prepare an implementation plan that describes a strategy to introduce the results into the state-of-the-practice and specifications of the DOTs.

4. ELIGIBILITY AND TEAM QUALIFICATIONS

- Only universities located within Region 6 (AR, LA, NM, OK, and TX) can submit a proposal for this project, and all Principal Investigators (PIs) must be associated with an institution within Region 6. This includes universities not part of the Tran-SET consortium. Preference will be given to universities located within Louisiana.
- The proposing research team should provide the following items as part of their proposal for consideration:
 - A letter from the chair or dean as evidence that the PI is an individual associated with an institution located within Region 6.
 - ORCID information for each project team member. Each member in the project team must obtain and submit an Open Researcher and Contributor Identification (ORCID) as part of the proposal. The ORCID website (<https://ORCID.org>) provides a registry of persistent unique identifiers for researchers and scholars, and automated linkages to research objects such as publications, grants, and patents. Registration is free and takes about five minutes to complete. If the project team adds new members after beginning the project, they will need to obtain and provide their ORCID.
 - Two-page resume for senior personnel (PI and Co-PI).

5. DUE DATE AND PROJECT TIMELINE

- All proposals in response to this RFP are due **no later than March 11th, 2022 at 4:30 pm CST**. All proposals must be submitted through the appropriate institution's proposal routing process so that the application, including cost sharing, can be reviewed and approved by the institution. All materials must be submitted as a single PDF file electronically to transet@lsu.edu. Tran-SET will not accept any proposals received after this deadline.
- The Tran-SET review committee will start the proposal evaluations on January 11th, 2022. If the PRC requires additional information or discussions with any proposing team(s) during this evaluation period, the proposing team(s) will be notified. It is anticipated that the decision to fund the proposal will be made **by April 30th, 2022**.
- Project Timeline:
 - The project duration is 18 months and consists of two phases: **Technical and Implementation**. The **Technical Phase** must be completed in twelve months and the **Implementation Phase** must start after the completion of the

Request for Proposal

Technical Phase and be completed in six months. At least 10% of the budget should be allocated for the **Implementation Phase**.

6. TECHNICAL PROPOSAL GUIDELINES

The following information describes the requirements and guidance for developing the technical proposal:

- Each proposal will need to include a Project Description that can be used for submission to the Transportation Research Board's (TRB) Research in Progress (RiP) database. The project description for RiP needs to include the project title, brief abstract, project start and completion dates, project status, and funding amount. The project description will also require details for all sponsoring organizations and research programs that will contribute to the project.
- In addition to the project description for RiP, each proposal must include a completed UTC Project Information Form (Appendix A).
- At least 10% of the project budget must be allocated for activities conducted during the **Implementation Phase** (which must include the costs associated with attendance of the annual Tran-SET Conference). Therefore, the proposal must describe the funds needed for the **Implementation Phase** and indicate that these funds will only be used for **Implementation Phase** activities.
- It is required that proposals include a Project-Specific Technology Transfer (T2) Plan (Appendix E) to help guide the development and potential adoption of the proposed research's final product. More information regarding the Project-Specific T2 Plan is located in Section 3.
- If the university submitting a proposal will subcontract with other organizations, this must be clearly stated in the proposal. Any proposals that call for subcontracting work must include a name and description of the subcontracted organizations, and the scope of work for the subcontracted organization. Subcontracting to other organizations is not encouraged under this solicitation.

7. BUDGET

This proposal can request up to **\$40,000** from UTC funds. All requested UTC funds must be matched **1:2** in accordance with the Cost Sharing section below. If the PIs have Tran-SET administration duties and is unable to meet the cost sharing requirements, reduction or waiver of the cost sharing requirements may be requested for consideration and approval.

All proposals must include proposed costs to complete the tasks described in the technical proposal. All costs must be clearly itemized using the attached budget template and justified in the explanatory notes column of the budget form as well as in a budget justification section. A template of the budget form can be found in Appendix D. In case of collaborative proposals, please fill the budget template for each partner institution and provide a total budget template as well.

If an applicant includes fringe benefits and/or indirect cost in its budget, a federally negotiated rate agreement is required to be included in the proposal.

Request for Proposal

If the university submitting a proposal will subcontract with other organizations, the proposal budget must include any subcontractor costs on the “Consultant and Subcontract” line. In addition, each subcontractor must use the same budget template found in Appendix D to detail its costs accompanied by explanatory notes. All subcontracts must be awarded only to institutions located in Region 6.

8. COST SHARING

All requested UTC funds must be matched **1:2**. Matching funds may be cash or in-kind, and must be used to accomplish project objectives. If the PIs have Tran-SET administration duties and is unable to meet the cost sharing requirements, reduction or waiver of the cost sharing requirements may be requested for consideration and approval. Matching funds can be used for the **Technical and Implementation Phases** of the project, and must be fully documented in the applicant’s records. Applicants will have the length of the award period to provide the full amount of required matching funds.

Applicants are required to provide written assurance by an authorized representative of their proposed cost share commitment in their full applications through the signing of the Cover Page. Upon selection for award negotiations, applicants may be required to provide additional information and documentation regarding their cost share commitment.

Federal funds provided to a recipient under 23 U.S.C. § 504(b) or 505 (local technical assistance and state planning and research programs managed by the Federal Highway Administration) may be used as matching funds. No other sources of Federal funds may be counted towards the match requirement. Non-federal cost share from state or private sources, whether in-cash or in-kind, is also acceptable.

9. Schedule and Reporting Requirements

All proposals will need to contain a project schedule (Appendix C) showing each of the proposed tasks, completion dates of tasks, milestones in terms of project completion, and the implementation phase.

The Project Final Report is due at the end of the **Technical Phase** (after 12 month). A final research report must provide a complete description of the problem, objective(s), scope, methodology, results, conclusions, and recommendations developed as a result of the project. Furthermore, the report has to include documentation of all data gathered, analyses performed, and the achieved results. The Final Report template will be accessible on [Tran-SET's website](#).

In addition, an Implementation Report is required at the end of the **Implementation Phase** (i.e., 18 months after the starting date of the project). The Implementation Report shall give a complete description of and developed products from the education, T2, and workforce development activities that were executed during the **Implementation Phase**. The Final Implementation Report template will be accessible on [Tran-SET's website](#).

Request for Proposal

In the event that this project results in a new invention, the invention must be reported in accordance with Tran-SET's defined processes, defined in the "[Guidance on Invention Reporting](#)" document.

Tran-SET reserves the right to request any other reports that may be required to satisfy its reporting obligations under the prime award.

10. SUBMISSION REQUIREMENTS

All proposal materials must be submitted as **a single PDF file** electronically to transet@lsu.edu **no later than March 11th, 2022 at 4:30 pm CST.**

Proposal Materials

The solicitation with editable forms are available online at [Tran-SET's website](#). No supplemental material related to the proposal will be accepted after the deadline except at the request of Tran-SET. Tran-SET may return proposals that are judged to be incomplete or inappropriately completed, without review. There is no limit on the number of proposals that may be submitted by an individual either as PI or as a Co-PI. Tran-SET recommends the proposal be submitted several days prior to the deadline.

Preparation Instructions

The instructions below must be carefully followed. Proposals that are difficult to read, exceed page limits, violate format requirements, or omit required sections may be returned to proposers without review.

- All proposal materials must be prepared on 8½ x 11-inch sheets with 1.0 inch margins on all four sides.
- The font should be Arial in 11-point size or larger with single line spacing. The font size for inserted symbols or equations must be selected to best match the text of the proposal.
- Material must not be appended to circumvent the page limitations.
- Number all pages in a continuing sequence beginning with Section 1 (below).

Required Proposal Sections

Each proposal must include the following sections in the order indicated. If a section is not applicable, the heading must still be included, followed by the text "Not Applicable."

1. Cover Page Form signed by an authorized institutional representative
2. Summary (One-page maximum)
3. Table of Contents
4. Project Description (include prospects for future funding) (Ten-page maximum)
5. Project Schedule (Appendix C)
6. References
7. Project Data Management Plan
8. Project-Specific T2 Plan (Appendix E)

Request for Proposal

9. Senior Personnel Resume (Two-page maximum for each PI and Co-PI)
10. Budget and Justification (Appendix D)
11. Project Information Form (Appendix A)

11. PROPOSAL EVALUATION CRITERIA

The Tran-SET review committee will evaluate all proposals based on the following criteria. To ensure consideration for this RFP, your proposal should be fully complete and include all of the following criteria:

Merit of the Project (40%)

- The proposed project, associated tasks, and final product support Tran-SET's Vision, Mission, and Objectives.
- Compliance of the proposal with the [DOT Public Access Plan](#) and the [Tran-SET Data Management Plan](#).

Ability to Perform the Project (30%)

- Specialized expertise, capabilities, and technical competence as demonstrated by the proposed approach and methodology to meet the project requirements.
- Resources available to perform the work, including any specialized services, within the specified duration for the project.
- Record of past performance, including price and cost data from previous research projects, quality of work, ability to meet schedules, cost control, and contract administration.
- Availability of the project research team.
- Ability and proven history in handling special project constraints.
- Collaboration with at least two institutions within Region 6.

Potential for Short- and Long-Term Impact (30%)

- Potential benefits and eventual impacts of the project on workforce training and development, and educational activities that focus on the evaluation and implementation of advanced technologies in the transportation industry.
- Compliance of the proposal with [Tran-SET's Tech Transfer \(T2\) plan](#).

12. REVIEW PROCESS

Proposals submitted in response to this solicitation will be checked for compliance (format, budget, cost share, proposal sections, etc.). Non-compliant proposals may be returned without review. Each proposal will be reviewed by the Tran-SET review committee. The Committee will constitute of members from regional DOTs, academia and/or private sector. These reviews, along with other factors such as the Tran-SET Strategic Plan, the DOT needs and priorities, and the expected impact will be considered in making funding decisions.

It is the intent of Tran-SET leadership to select the best projects for funding in this topic. It is expected that researchers of funded projects shall strive to develop solutions that are not only

Request for Proposal

feasible, but innovative, economical, and implementable. The lead PI will receive a copy of the written review comments.

All issues related to intellectual property rights will be the responsibility of the submitting organization(s) and will be subject to applicable state and federal laws and *The General Provisions of Grants for 2016 University Transportation Centers*.

Tran-SET reserves the right to not fund any proposals that fails its evaluation criteria.

13. CERTIFICATIONS AND ASSURANCES

All awarded proposals must comply with DOT Order No.: 1050.2A, DOT Standard Title VI Assurances and Non-Discrimination Provisions. The DOT Standard Title VI Assurances and Non-Discrimination Provisions form is included in Appendix B of this RFP. This form must be completed and signed within 30 days of receiving notification of award.

14. RESOURCES

Proposing teams may want to consider reviewing the following documents for more information on requirements of research projects funded through Tran-SET:

- [Tran-SET Data Management Plan](#);
- [Tran-SET Technology Transfer \(T2\) Plan](#);
- [General Provisions of Grants for 2016 University Transportation Centers](#); and
- [Grant Deliverables and Reporting Requirements for 2016 University Transportation Centers](#).

Request for Proposal

APPENDIX A: U.S. DOT PROJECT INFORMATION FORM

UTC Project Information	
Project Title	
University	
Principal Investigator	
PI Contact Information	
Funds Requested	
Funding Source(s) and Amount Provided (by each agency or organization) as cost sharing	
Total Project Cost	
Agency ID or Contract Number	
Start and End Dates	
Brief Description of Research Project	
Describe Implementation of Research Outcomes (or why not implemented) Place Any Photos Here	
Impacts/Benefits of Implementation (actual, not anticipated)	
Weblinks <ul style="list-style-type: none"> • Reports • Project Website 	

APPENDIX B: CERTIFICATIONS AND ASSURANCES**STANDARD TITLE VI/NONDISCRIMINATION ASSURANCES
DOT Order No. 1050.2A**

The (*Title of Recipient*) (herein referred to as the “Recipient”), **HEREBY AGREES THAT**, as a condition to receiving any Federal financial assistance from the U.S. Department of Transportation (DOT), through the Office of the Assistant Secretary for Research and Technology (OST-R), is subject to and will comply with the following:

Statutory/Regulatory Authorities

- Title VI of the Civil Rights Act of 1964 (42 U.S.C. § 2000d *et seq.*, 78 stat. 252), (prohibits discrimination on the basis of race, color, national origin);
- 49 C.F.R. Part 21 (entitled *Nondiscrimination In Federally-Assisted Programs Of The Department Of Transportation—Effectuation Of Title VI Of The Civil Rights Act Of 1964*);
- 28 C.F.R. § 50.3 (U.S. Department of Justice Guidelines for Enforcement of Title VI of the Civil Rights Act of 1964);
- The Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970, (42 U.S.C. § 4601), prohibits unfair treatment of persons displaced or whose property has been acquired because of Federal or Federal-aid programs and projects;
- Section 504 of the Rehabilitation Act of 1973, (29 U.S.C. § 794 *et seq.*), as amended, prohibits discrimination on the basis of disability); and 49 CFR Part 27;
- The Age Discrimination Act of 1975, as amended, (42 U.S.C. § 6101 *et seq.*), prohibits discrimination on the basis of age);
- The Civil Rights Restoration Act of 1987, (PL 100-209, (Broadened the scope, coverage and applicability of Title VI of the Civil Rights Act of 1964, The Age Discrimination Act of 1975 and Section 504 of the Rehabilitation Act of 1973, by expanding the definition of the terms “programs or activities” to include all of the programs or activities of the Federal-aid Recipients, sub-recipients and contractors, whether such programs or activities are Federally funded or not);
- Title II and III of the Americans with Disabilities Act, which prohibit discrimination on the basis of disability in the operation of public entities, public and private transportation systems, places of public accommodation, and certain testing entities (42 U.S.C. §§ 12131 – 12189) as implemented by Department of Transportation regulations 49 C.F.R. parts 37 and 38;
- Title IX of the Education Amendments of 1972, as amended, which prohibits you from discriminating because of sex in education programs or activities (20 U.S.C. 1681 *et seq.*).

The preceding statutory and regulatory cites hereinafter are referred to as the “Acts” and “Regulations,” respectively.

Request for Proposal

General Assurances

In accordance with the Acts, the Regulations, and other pertinent directives, circulars, policy, memoranda, and/or guidance, the Recipient hereby gives assurance that it will promptly take any measures necessary to ensure that:

“No person in the United States shall, on the grounds of race, color, or national origin, be excluded from participation in, be denied the benefits of, or be otherwise subjected to discrimination under any program or activity,” for which the Recipient receives Federal financial assistance from DOT, including the OST-R.

The Civil Rights Restoration Act of 1987 clarified the original intent of Congress, with respect to Title VI and other Nondiscrimination requirements (The Age Discrimination Act of 1975, and Section 504 of the Rehabilitation Act of 1973), by restoring the broad, institutional-wide scope and coverage of these nondiscrimination statutes and requirements to include all programs and activities of the Recipient, so long as any portion of the program is Federally assisted.

Specific Assurances

More specifically, and without limiting the above general Assurance, the Recipient agrees with and gives the following Assurances with respect to its Federally assisted University Transportation Centers Program:

1. The Recipient agrees that each “activity,” “facility,” or “program,” as defined in §§ 21.23 (b) and 21.23 (e) of 49 C.F.R. § 21 will be (with regard to an “activity”) facilitated, or will be (with regard to a “facility”) operated, or will be (with regard to a “program”) conducted in compliance with all requirements imposed by, or pursuant to the Acts and the Regulations.
2. The Recipient will insert the following notification in all solicitations for bids, Requests For Proposals for work, or material subject to the Acts and the Regulations made in connection with all University Transportation Centers Program and, in adapted form, in all proposals for negotiated agreements regardless of funding source:

“The (Title of Recipient), in accordance with the provisions of Title VI of the Civil Rights Act of 1964 (78 Stat. 252, 42 U.S.C. §§ 2000d to 2000d-4) and the Regulations, hereby notifies all bidders that it will affirmatively insure that any contract entered into pursuant to this advertisement, disadvantaged business enterprises will be afforded full opportunity to submit bids in response to this invitation and will not be discriminated against on the grounds of race, color, or national origin in consideration for an award.”

3. The Recipient will insert the clauses of Appendix A and E of this Assurance in every contract or agreement subject to the Acts and the Regulations.

Request for Proposal

4. The Recipient will insert the clauses of Appendix B of this Assurance, as a covenant running with the land, in any deed from the United States effecting or recording a transfer of real property, structures, use, or improvements thereon or interest therein to a Recipient.
5. That where the Recipient receives Federal financial assistance to construct a facility, or part of a facility, the Assurance will extend to the entire facility and facilities operated in connection therewith.
6. That where the Recipient receives Federal financial assistance in the form, or for the acquisition of real property or an interest in real property, the Assurance will extend to rights to space on, over, or under such property.
7. That the Recipient will include the clauses set forth in Appendix C and Appendix D of this Assurance, as a covenant running with the land, in any future deeds, leases, licenses, permits, or similar instruments entered into by the Recipient with other parties:
 - a. for the subsequent transfer of real property acquired or improved under the applicable activity, project, or program; and
 - b. for the construction or use of, or access to, space on, over, or under real property acquired or improved under the applicable activity, project, or program.
8. That this Assurance obligates the Recipient for the period during which Federal financial assistance is extended to the program, except where the Federal financial assistance is to provide, or is in the form of, personal property, or real property, or interest therein, or structures or improvements thereon, in which case the Assurance obligates the Recipient, or any transferee for the longer of the following periods:
 - a. the period during which the property is used for a purpose for which the Federal financial assistance is extended, or for another purpose involving the provision of similar services or benefits; or
 - b. the period during which the Recipient retains ownership or possession of the property.
9. The Recipient will provide for such methods of administration for the program as are found by the Secretary of Transportation or the official to whom he/she delegates specific authority to give reasonable guarantee that it, other Recipients, sub-recipients, subgrantees, contractors, subcontractors, consultants, transferees, successors in interest, and other participants of Federal financial assistance under such program will comply with all requirements imposed or pursuant to the Acts, the Regulations, and this Assurance.
10. The Recipient agrees that the United States has a right to seek judicial enforcement with regard to any matter arising under the Acts, the Regulations, and this Assurance.

By signing this ASSURANCE, (*Name of Recipient*) also agrees to comply (and require any sub-recipients, subgrantees, contractors, successors, transferees, and/or assignees to comply) with all applicable provisions governing the OST-R access to records, accounts, documents, information,

Request for Proposal

facilities, and staff. You also recognize that you must comply with any program or compliance reviews, and/or complaint investigations conducted by OST-R. You must keep records, reports, and submit the material for review upon request to OST-R, or its designee in a timely, complete, and accurate way. Additionally, you must comply with all other reporting, data collection, and evaluation requirements, as prescribed by law or detailed in program guidance.

(Name of Recipient) gives this ASSURANCE in consideration of and for obtaining any Federal grants, loans, contracts, agreements, property, and/or discounts, or other Federal-aid and Federal financial assistance extended after the date hereof to the Recipients by the U.S. Department of Transportation under the University Transportation Centers Program. This ASSURANCE is binding on *(Name of Recipient)*, other Recipients, sub-recipients, subgrantees, contractors, subcontractors and their subcontractors', transferees, successors in interest, and any other participants in the University Transportation Centers Program. The person(s) signing below is authorized to sign this ASSURANCE on behalf of the Recipient.

(Name of Recipient)

by

(Signature of Authorized Official)

DATED _____

Request for Proposal

EXHIBIT A

During the performance of this grant, the Recipient, for itself, its assignees, and successors in interest (hereinafter referred to as the “Recipient”) agrees as follows:

1. **Compliance with Regulations:** The Recipient (hereinafter includes consultants) will comply with the Acts and the Regulations relative to Non-discrimination in Federally-assisted programs of the U.S. Department of Transportation, Office of the Secretary for Research and Technology (OST-R), as they may be amended from time to time, which are herein incorporated by reference and made a part of this grant.
2. **Non-discrimination:** The Recipient, with regard to the work performed by it during the grant, will not discriminate on the grounds of race, color, national origin, sex, age, or disability in the selection and retention of subcontractors, including procurements of materials and leases of equipment. The recipient will not participate directly or indirectly in the discrimination prohibited by the Acts and the Regulations, including employment practices when the grant covers any activity, project, or program set forth in Appendix B of 49 CFR Part 21.
3. **Solicitations for Subcontracts, Including Procurements of Materials and Equipment:** In all solicitations, either by competitive bidding, or negotiation made by the recipient for work to be performed under a subcontract, including procurements of materials, or leases of equipment, each potential subcontractor or supplier will be notified by the recipient of the recipient’s obligations under this contract and the Acts and the Regulations relative to Non-discrimination on the grounds of race, color, or national origin.
4. **Information and Reports:** Any subcontractor will provide all information and reports required by the Acts, the Regulations, and directives issued pursuant thereto and will permit access to its books, records, accounts, other sources of information, and its facilities as may be determined by the Recipient or the OST-R to be pertinent to ascertain compliance with such Acts, Regulations, and instructions. Where any information required of a subcontractor is in the exclusive possession of another who fails or refuses to furnish the information, the subcontractor will so certify to the Recipient or the OST-R, as appropriate, and will set forth what efforts it has made to obtain the information.
5. **Sanctions for Noncompliance:** In the event of a subcontractor’s noncompliance with the Non-discrimination provisions of this grant, the Recipient will impose such contract sanctions as it or the OST-R may determine to be appropriate, including, but not limited to:
 - a. withholding payments to the subcontractor under any contract until the subcontractor complies; and/or
 - b. cancelling, terminating, or suspending a contract, in whole or in part.
6. **Incorporation of Provisions:** The Recipient will include the provisions of paragraphs one through six in every subcontract, including procurements of materials and leases of equipment, unless exempt by the Acts, the Regulations and directives issued pursuant

Request for Proposal

thereto. Any subcontractor will take action with respect to any subcontract or procurement as the Recipient or the OST-R may direct as a means of enforcing such provisions including sanctions for noncompliance. Provided, that if the subcontractor becomes involved in, or threatened with litigation by a supplier or other third party because of such direction, the subcontractor may request the Recipient to enter into any litigation to protect the interests of the Recipient. In addition, the Recipient or subcontractor may request the United States to enter into the litigation to protect the interests of the United States.

Request for Proposal

EXHIBIT B

CLAUSES FOR DEEDS TRANSFERRING UNITED STATES PROPERTY

The following clauses will be included in deeds effecting or recording the transfer of real property, structures, or improvements thereon, or granting interest therein from the United States pursuant to the provisions of Assurance 4:

NOW THEREFORE, the U.S. Department of Transportation as authorized by law and upon the condition that the (*Title of Recipient*) will accept title to the lands and maintain the project constructed thereon in accordance with the Uniform Administrative Requirement, Cost Principles, and Audit Requirements for Federal Awards (2 C.F.R. Part 200), the regulations for the administration of the University Transportation Centers Program, and the policies and procedures prescribed by the Office of the Secretary of the U.S. Department of Transportation in accordance and in compliance with all requirements imposed by Title 49, Code of Federal Regulations, U.S. Department of Transportation, Subtitle A, Office of the Secretary, Part 21, Non-discrimination in Federally-assisted programs of the U.S. Department of Transportation pertaining to and effectuating the provisions of Title VI of the Civil Rights Act of 1964 (78 Stat. 252; 42 U.S.C. § 2000d to 2000d-4), does hereby remise, release, quitclaim, and convey unto the (*Title of Recipient*) all the right, title and interest of the U.S. Department of Transportation in and to said lands described in Exhibit A attached hereto and made a part hereof.

(HABENDUM CLAUSE)

TO HAVE AND TO HOLD said lands and interests therein unto (*Title of Recipient*) and its successors forever, subject, however, to the covenants, conditions, restrictions and reservations herein contained as follows, which will remain in effect for the period during which the real property or structures are used for a purpose for which Federal financial assistance is extended or for another purpose involving the provision of similar services or benefits and will be binding on the (*Title of Recipient*), its successors and assigns.

The (*Title of Recipient*), in consideration of the conveyance of said lands and interest in lands, does hereby covenant and agree as a covenant running with the land for itself, its successors and assigns, that (1) no person will on the grounds of race, color, or national origin, be excluded from participation in, be denied the benefits of, or be otherwise subjected to discrimination with regard to any facility located wholly or in part on, over, or under such lands hereby conveyed [,] [and]* (2) that the (*Title of Recipient*) will use the lands and interests in lands and interest in lands so conveyed, in compliance with all requirements imposed by or pursuant to Title 49, Code of Federal Regulations, U.S. Department of Transportation, Subtitle A, Office of the Secretary, Part 21, Non-discrimination in Federally-assisted programs of the U.S. Department of Transportation, Effectuation of Title VI of the Civil Rights Act of 1964, and as said Regulations and Acts may be amended[, and (3) that in the event of breach of any of the above-mentioned non-discrimination conditions, the Department will have a right to enter or re-enter said lands and facilities on said land, and that above described land and facilities will thereon revert to and vest in and become the absolute property of the U.S. Department of Transportation and its assigns as such interest existed prior to this instruction].*

(*Reverter clause and related language to be used only when it is determined that such a clause is necessary in order to make clear the purpose of Title VI.)

Request for Proposal

EXHIBIT C

CLAUSES FOR TRANSFER OF REAL PROPERTY ACQUIRED OR IMPROVED UNDER THE ACTIVITY, FACILITY, OR PROGRAM

The following clauses will be included in deeds, licenses, leases, permits, or similar instruments entered into by the (*Title of Recipient*) pursuant to the provisions of Assurance 7(a):

- A. The (grantee, lessee, permittee, etc. as appropriate) for himself/herself, his/her heirs, personal representatives, successors in interest, and assigns, as a part of the consideration hereof, does hereby covenant and agree [in the case of deeds and leases add “as a covenant running with the land”] that:
 1. In the event facilities are constructed, maintained, or otherwise operated on the property described in this (deed, license, lease, permit, etc.) for a purpose for which a U.S. Department of Transportation activity, facility, or program is extended or for another purpose involving the provision of similar services or benefits, the (grantee, licensee, lessee, permittee, etc.) will maintain and operate such facilities and services in compliance with all requirements imposed by the Acts and Regulations (as may be amended) such that no person on the grounds of race, color, or national origin, will be excluded from participation in, denied the benefits of, or be otherwise subjected to discrimination in the use of said facilities.
- B. With respect to licenses, leases, permits, etc., in the event of breach of any of the above Non-discrimination covenants, (*Title of Recipient*) will have the right to terminate the (lease, license, permit, etc.) and to enter, re-enter, and repossess said lands and facilities thereon, and hold the same as if the (lease, license, permit, etc.) had never been made or issued.*
- C. With respect to a deed, in the event of breach of any of the above Non-discrimination covenants, the (*Title of Recipient*) will have the right to enter or re-enter the lands and facilities thereon, and the above described lands and facilities will there upon revert to and vest in and become the absolute property of the (*Title of Recipient*) and its assigns.*

(*Reverter clause and related language to be used only when it is determined that such a clause is necessary to make clear the purpose of Title VI.)

Request for Proposal

EXHIBIT D

CLAUSES FOR CONSTRUCTION/USE.ACCESS TO REAL PROPERTY ACQUIRED UNDER THE ACTIVITY, FACILITY OR PROGRAM

The following clauses will be included in deeds, licenses, permits, or similar instruments/agreements entered into by (Title of Recipient) pursuant to the provisions of Assurance 7(b):

- A. The (grantee, licensee, permittee, etc., as appropriate) for himself/herself, his/her heirs, personal representatives, successors in interest, and assigns, as a part of the consideration hereof, does hereby covenant and agree (in the case of deeds and leases add, “as a covenant running with the land”) that (1) no person on the ground of race, color, or national origin, will be excluded from participation in, denied the benefits of, or be otherwise subjected to discrimination in the use of said facilities, (2) that in the construction of any improvements on, over, or under such land, and the furnishing of services thereon, no person on the ground of race, color, or national origin, will be excluded from participation in, denied the benefits or, or otherwise be subjected to discrimination, (3) that the (grantee, licensee, lessee, permittee, etc.) will use the premises in compliance with all other requirements imposed by or pursuant to the Acts and Regulations, as amended, set forth in this Assurance.
- B. With respect to (licenses, leases, permits, etc.), in the event of breach of any of the above of the above Non-discrimination covenants, (*Title of Recipient*) will have the right to terminate the (license, permits, etc., as appropriate) and to enter or re-enter and repossess said land and the facilities thereon, and hold the same as if said (license, permit, etc., as appropriate) had never been made or issued.*
- C. With respect to deeds, in the event of breach of any of the above Non-discrimination covenants, (*Title of Recipient*) will there upon revert to and vest in and become the absolute property of (*Title of Recipient*) and its assigns.*

(*Reverter clause and related language to be used only when it is determined that such a clause is necessary to make clear the purpose of Title VI.)

Request for Proposal

EXHIBIT E

During the performance of this contract, the contractor, for itself, its assignees, and successors in interest (hereinafter referred to as the “contractor”) agrees to comply with the following non-discrimination statutes and authorities, including, but not limited to:

Pertinent Non-Discrimination Authorities:

- Title VI of the Civil Rights Act of 1964 (42 U.S.C. § 2000d *et seq.*, 78 stat.252), prohibits discrimination on the basis of race, color, national origin); and 49 CFR Part 21.
- The Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970, (42 U.S.C. § 4601), (prohibits unfair treatment of persons displaced or whose property has been acquired because of Federal or Federal-aid programs and projects);
- Federal-Aid Highway Act of 1973, (23 U.S.C. § 324 *et seq.*), prohibits discrimination on the basis of sex);
- Section 504 of the Rehabilitation Act of 1973, (29 U.S.C. § 794 *et seq.*), as amended, prohibits discrimination on the basis of disability; and 49 CFR Part 27;
- The Age Discrimination Act of 1975, as amended, (42 U.S.C. § 6101 *et seq.*), prohibits discrimination on the basis of age);
- Airport and Airway Improvement Act of 1982, (49 U.S.C. § 471, Section 47123, as amended, (prohibits discrimination based on race, creed, color, national origin, or sex);
- The Civil Rights Restoration Act of 1987, (PL 100-209), Broadened the scope, coverage and applicability of Title VI of the Civil Rights Act of 1964, The Age Discrimination Act of 1975 and Section 504 of the Rehabilitation Act of 1973, by expanding the definition of the terms “programs or activities” to include all of the programs or activities of the Federal-aid Recipients, sub-recipients and contractors, whether such programs or activities are Federally funded or not);
- Titles II and III of the Americans with Disabilities Act, which prohibit discrimination on the basis of disability in the operation of public entities, public and private transportation systems, places of public accommodation, and certain testing entities (42 U.S.C. §§ 12131 – 12189) as implemented by Department of Transportation regulations 49 C.F.R. parts 37 and 38.
- The Federal Aviation Administration’s Non-discrimination statute (49 U.S.C. § 47123) (prohibits discrimination on the basis of race, color, national origin, and sex);
- Executive Order 12898, Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations, which ensures discrimination against minority populations by discouraging programs, policies, and activities with disproportionately high and adverse human health or environmental effects on minority and low-income populations;
- Executive Order 13166, Improving Access to Services for Persons with Limited English Proficiency, and resulting agency guidance, national origin discrimination includes discrimination because of limited English Proficiency (LEP). To ensure compliance with Title VI, you must take reasonable steps to ensure that LEP persons have meaningful access to your programs (70 Fed. Reg. at 74087 to 74100);
- Title IX of the Education Amendments of 1972, as amended, which prohibits you from discriminating because of sex in education programs or activities (20 U.S.C. 1681 *et seq.*).

APPENDIX C: PROJECT SCHEDULE

Project Tasks	Technical Phase												Implementation Phase					
	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Technical Tasks																		
1																		
2																		
3																		
4																		
5																		
Implementation Tasks																		
1																		
2																		

Request for Proposal

APPENDIX D: BUDGET FORMS

University:

Performance period:

CATEGORY	Budget requested from UTC	University Matching Funds (Cost share)	External Matching Funds (Cost share)	Explanatory Notes
Faculty Salaries				
Administrative Staff Salaries				
Student Salaries				
Staff Benefits				
Total Salaries and Benefits				
Student Tuition				
Permanent Equipment [1]				
Expendable Property, Supplies, and Services [2]				
Domestic Travel				
Foreign Travel [3]				
Other Direct Costs [4]				
Total Direct Costs				
F&A (Indirect) Costs				
TOTAL COSTS				

[1] Permanent Equipment includes any item of equipment having a unit acquisition cost of \$5,000 or more. Per the grant's *General Provisions* document, written permission must be obtained from OST-R prior to the purchase of such equipment.

[2] Expendable Property, Supplies, and Services include such tangible items as laboratory supplies and such intangible services as telecommunications.

[3] Foreign Travel includes travel to or from any destination outside of the United States and its territories. Per the grant's *General Provisions* document, written permission must be obtained from OST-R prior to the initiation of such travel, or such travel may not be funded under the grant.

[4] Itemize other anticipated direct costs not mentioned above.

APPENDIX E: PROJECT-SPECIFIC TECHNOLOGY TRANSFER (T2) PLAN**Project-Specific Technology Transfer (T2) Plan**

Context

As of July 2018, the [Grant Deliverables and Reporting Requirements for 2016 UTCs](#) mandated a Center-wide Technology Transfer (T2) Plan and an annual T2 Report. Operating within the content requirements of the plan and other provided instructions/guides supplied by OST-R, Tran-SET developed its [T2 Plan](#) on May 2018.

Recognizing that Tran-SET administers research in diverse transportation topical areas with varying technology maturity, the *T2 Plan* requires each funded project to have an individual, project-specific T2 Plan. The project-specific T2 Plans will specify their own unique set of key stakeholders and unique methods to engage these stakeholders. ***Project-specific T2 Plans are a guide to successfully plan and execute activities during the implementation phase of the project.***

Instructions

Principal Investigators (PIs) are required to utilize the following template (and provide the requested information) to develop their project-specific T2 Plan. General requirements and a basic timeline are as follows:

- PIs submit an initial, project-specific T2 Plan (utilizing this template) with their proposal.
- The T2 Plan will be reviewed during the proposal review process.
- If awarded, the initial, project-specific T2 Plan will be further reviewed by the respective Project Review Committee (PRC) at the end of the second quarter¹. Based on comments received, the PIs will revise the T2 Plan within two weeks.
- At the end of the technical (research) phase, the PRC will assess the technology readiness level (TRL) of the developed products/technology. Based on the TRL assessment and further comments from the PRC, the PIs will revise the T2 Plan within two weeks.
- The T2 Plan will act as the PIs' main roadmap during the implementation phase, documenting and guiding its outreach activities.
- The Final Implementation Report template will be based on the T2 Plan template (and its required sections). The Final Implementation Report template will be accessible on Tran-SET's [website](#).
- ¹*Note:* the PIs are encouraged to revisit the T2 Plan on a consistent basis (quarterly basis is recommended), as the products/technology continually develop and mature.

Please review Tran-SET's [T2 Plan](#) for additional information.

Contact

Please contact Dr. Momen Mousa (at transet@lsu.edu) if you have any questions or would like additional information.

Request for Proposal

Technology Transfer (T2) Plan

Step 0. Project Information

Element	Information
Project Title	
Project Number	
Principal Investigator(s)	
Participating University/Institutions	
Date	

Step 1. Describe the Problem

Please succinctly describe the problem the proposed products/technology aims to solve. This can be summarized from the RFP and the proposal. However, it must showcase awareness of the problem, awareness of available solutions, and factors needed for decision-makers to decide positively to invest in the proposed solution (Step 2). Please think of this section as defining the appropriate context if having a meeting/discussion with various project stakeholders; placing everyone “on the same page”. Suggested length: no longer than 4 paragraphs.

Request for Proposal

Step 2. Describe the Proposed Solution

Please succinctly describe how the technology solves the problem stated in Step 1, its feasibility of use, and its **value**. Please emphasize and communicate the latter element (its **value**), such as describing its improved accuracy, effectiveness, cost-effectiveness, speed, quality, etc. This can be summarized from the proposal (and later, the final research report). However, please think of this section as defining the **value** of the solution to various project stakeholders in non-technical, easy to understand language. Suggested length: no longer than 4 paragraphs.

Step 3. Identify Stakeholder Groups by Name and Role

The stakeholder is the entity who is (or might be) interested in your research project and its outcomes. A wide range of stakeholder types can be involved in Tran-SET's research program. Stakeholders can be:

- State DOTs;
- Local Government Entities;
- Non-Profit Organizations;
- Industry Partners; and
- Others: federal governmental agencies, trade associations, research institutions, and tribal organizations.

Please create a list of key stakeholders, describe their roles relative to the adoption of the technology, and assess the level of authority they have. Specifically, please identify the stakeholders' role according to the following six fundamental categories:

- Sponsors of research and T2;
- Researchers and developers;
- Deployment team;

Request for Proposal

- Early potential adopters and problem owners;
- Late potential adopters that follow the technology's development; and
- Others: allies and foes, such as trade organizations, regulators, suppliers, etc.

Please add or delete rows as necessary.

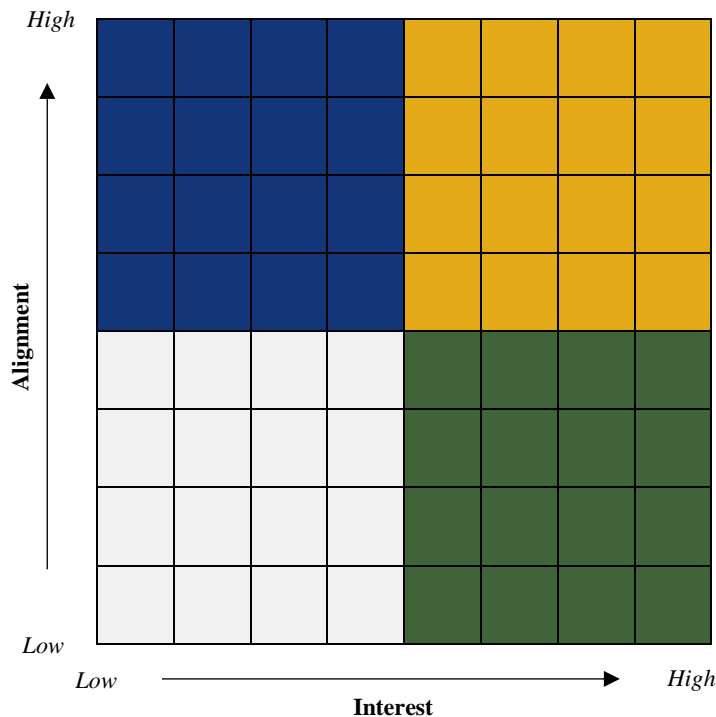
ID	Stakeholder Name	Stakeholder Type	Category(ies)

Please note that Steps 3, 4, and 5/6/7 must describe industry's proposed involvement in the T2 activities. If industry is proposed to be involved, please **demarcate** the industry stakeholder to distinguish from other stakeholders. For example, utilizing a colored background or superscript (e.g., **Barriere Construction**,^a**HVJ Associates**, etc.). Please do this every time the industry stakeholder is mentioned in the T2 Plan (in Steps 3, 4, 5/6/7, 8, and 9).

If industry is not proposed to be involved, please **provide a brief reason** below (e.g., if the project is solely focused on public sector policy, etc.).

Step 4. Analyze Stakeholder Alignment

For each stakeholder identified in Step 3, assess their: (1) interest in the technology's adoption and (2) own support and alignment of the technology. Map stakeholders by their alignment and interest in the sections/quadrants below. Please map the stakeholder by inputting their letter ID in the appropriate cell.



Request for Proposal

Steps 5/6/7. Organize Communication Tracking for Stakeholder Groups, Develop Engagement Plans, and Identify Resources to Engage all Stakeholders

Please specify a unique set of engagement activities (that will be conducted during the implementation phase) for each stakeholder identified in Step 3. Engagement activities includes but are not limited to:

- Peer-reviewed publications and presentations;
- Educational and training materials;
- Webinars, short courses or workshops;
- Product demonstration fairs;
- Field testing; and
- Meetings (in-person or online) with potential adopters.

Determine which stakeholders to engage earlier versus later, whom you will engage, how you will engage them, and what information you'll receive back. Please base the activities on the general recommendations below.

<i>High Alignment</i>	Inform and raise interest	Engage closely and ally
<i>Low Alignment</i>	Minor (minimal effort)	Negotiate, lobby, or neutralize
	<i>Low Interest</i>	<i>High Interest</i>

Please also specify the required resources to support each activity (e.g., this could include presenting at a technical conference (requiring being on the agenda and travel funds), resources for organizing demonstrations, etc.)

This Step should comprise all the activities planned for the implementation phase. Please add or remove rows as necessary.

Request for Proposal

ID	Engagement Activity [Approx. Date]	Stakeholder(s) Involved	Info Communicated <u>to</u> Stakeholder	Info Gathered <u>from</u> Stakeholder	Resources Required

Request for Proposal

Step 8. Identify and Address Barriers to Adoption

Note: This section should be completed during (and at the end) of the implementation phase; it will be a required section in the Final Implementation Report.

As engagement activities are executed, please identify stakeholder barriers to adopting the technology. Please communicate these barriers to your respective Associate Director, Tran-SET's Program Manager, and Tran-SET's Research and T2 Program Coordinator, who will assist you in identifying solutions to address the barriers. Please summarize the barriers in the table below.

ID	Stakeholder Name	Barriers to Technology Adoption	Potential (or Actual) Actions to Address the Barriers
a			
b			
b			
d			
e			

Step 9. Establish an MOU between Early Adopter and Research Sponsor

Note: This section should be completed during (and at the end) of the implementation phase; it will be a required section in the Final Implementation Report.

After the implementation phase is completed, Tran-SET's Research and T2 Program Coordinator with assistance from Tran-SET's Program Manager and Associate Directors will informally and formally assess the effectiveness of engagement activities that occurred during the respective project cycle. This assessment will include identifying products/technology suitable for further studies via MOUs with established stakeholders.

In regards to T2, MOUs are typically entered into with early adopters to collect data on the technology's performance in the working environment when it is implemented. Please provide any information that may inform and be useful for Tran-SET in deciding to pursue MOUs related to the developed products/technology. For example:

- *Would the products/technology benefit from an MOU with an established stakeholder? Are the products/technology at the state where stakeholders can provide insightful feedback or provide supplemental performance data?*
- *What would the MOU look like? Who would be the stakeholder and what would their role and contributions be?*

*It is OK if the products/technology are not in an appropriate state or form to pursue MOUs; but if so, please state so with a **brief reason why.***

Step 10. Performance Metrics

Note: This Step will be conducted at the programmatic level through existing methods (quarterly progress tracker and reports). No input is required. If you would like additional information, please see Tran-SET's T2 Plan.

Request for Proposal

Emphasis Areas

OST-R has identified the “commercialization and licensing of research outputs” as an emphasis area that the T2 Plan needs to fully address.

Please describe the commerciality of the developed products/technology and if there are any plans to pursue commercialization, a patent, or a license. This may (but isn't required to) include:

- *Market need/value proposition, highlighting the unique value proposition and market research evidence;*
- *Market size and societal need presenting the size of the market and the societal need it addresses; and*
- *Competition and competitive advantage presenting the existing competitors and market leaders.*

*Tran-SET realizes that a minority of products/technology will pursue commercialization. If this section is not applicable, please state so with **a brief reason why**.*