



## Transportation Consortium of South-Central States

*Solving Emerging Transportation Resiliency, Sustainability, and Economic Challenges through the Use of Innovative Materials and Construction Methods: From Research to Implementation*

Transportation Consortium of South Central States (Tran-SET)  
University Transportation Center – Region 6

## **TECHNOLOGY TRANSFER (T2) PLAN**

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# TABLE OF CONTENTS

1	Introduction .....	1
2	Stakeholder Identification and Involvement.....	1
2.1	State Departments of Transportation (DOTs).....	1
2.1.1	Target Audience and General Interests .....	1
2.1.2	Involvement in Developing Research Program .....	2
2.1.3	Engagement Strategies .....	3
2.2	Local Government Entities .....	4
2.3	Non-Profit Organizations.....	4
2.4	Industry Partners.....	4
2.5	Other Stakeholders.....	5
3	Assisting Stakeholders in Implementation and Deployment .....	5
3.1	Understanding the Research Need.....	5
3.2	Developing Engagement Plans .....	6
3.3	Engaging Stakeholders .....	6
3.4	Evaluating Engagement Activities .....	7
3.5	Aligning Research Portfolio .....	7
4	Dissemination of Research Results .....	8
5	Technology Transfer (T2) Goals, Objectives, and Performance Measures.....	8
5.1	Tran-SET’s Vision and Mission .....	8
5.2	Technology Transfer (T2) Objectives .....	9
5.3	Technology Transfer (T2) Performance Metrics.....	9
6	Tracking and Reporting of Research Outputs, Outcomes, and Impacts.....	10
7	Commercializing Research Outputs .....	11
8	Licensing Revenues.....	11
9	Increasing Corporate Support.....	12

# 1 INTRODUCTION

This document presents the Technology Transfer (T2) Plan for the Transportation Consortium of South Central States (Tran-SET). It consists of the following eight main sections:

1. Identification of stakeholders and their involvement in Tran-SET’s research program;
2. Technology Transfer Plan and its use in assisting stakeholders in implementing and deploying research outputs;
3. Dissemination of research results;
4. Technology transfer goals, objectives, and performance measures;
5. Tracking and reporting of research outputs, outcomes, and impacts;
6. Commercialization of research outputs;
7. Collection and use of licensing revenues; and
8. Increasing corporate support.

# 2 STAKEHOLDER IDENTIFICATION AND INVOLVEMENT

A wide range of stakeholders are involved in Tran-SET’s research program. Each has a distinct supporting role and specific interests. This section identifies our main stakeholders and their involvement, categorized by stakeholder institution.

## 2.1 STATE DEPARTMENTS OF TRANSPORTATION (DOTs)

Tran-SET is a partnership between five states in the South-Central region. The involved state DOTs are listed in Table 1. State DOTs are the primary targets for the use and implementation of research products. Therefore, their involvement in each phase of the research is critical to ensure effective implementation and technology transfer.

**Table 1.** State DOT Stakeholders

Arkansas Department of Transportation (ArDOT)
Louisiana Department of Transportation and Development (LaDOTD)
New Mexico Department of Transportation (NMDOT)
Oklahoma Department of Transportation (ODOT)
Texas Department of Transportation (TxDOT)

### 2.1.1 Target Audience and General Interests

The main sectoral audiences involved in Tran-SET’s research program are described below. Although specific to state DOTs, these categories can generally be applied to all stakeholders.

**Directorial:** This stakeholder group includes agency directors, secretaries, officers, and presidents. They are in-charge of high-level agency goals, initiatives, and lead multiple programs. They are interested in efforts that inform state policy, improve internal operating procedures, and improve general methods as to better manage and operate their transportation system. As detailed in this document, Tran-SET actively engages the involvement of high-level executives to ensure research products have large-scale (agency wide) support, have high-impact benefits, and address regional priorities.

**Managerial:** This stakeholder group includes program managers, division heads, and branch managers – and can be further categorized by program area:

- *Research:* Research program managers are interested in technology that can solve specific, current DOT-defined priorities related to the performance of their transportation system. They are specifically interested in supporting efforts whose research products offer high and direct implementation potential. Tran-SET can leverage their involvement to ensure each research project appropriately addresses a practical need with a feasible path towards agency implementation. Tran-SET also actively collaborates with DOT-funded research centers such as the Louisiana Transportation Research Center (LTRC).
- *Workforce development:* Human resource managers are interested in specific educational and training-related research products that can better develop and prepare their agency workforce. Tran-SET can leverage their involvement to ensure these related products are appropriate for their intended audience, directly transition to the adopter agency, and provide long-term impacts.

**Professional staff:** These stakeholders mainly consist of engineers and staff who are technical experts in a topical area. Tran-SET can leverage their involvement both technically, as well as to ensure that a practitioner-focus and implementation-focus is consistently maintained throughout the technology development process. Along with research program managers, DOT engineers are the stakeholder group most directly involved in Tran-SET’s research program.

### 2.1.2 Involvement in Developing Research Program

State DOTs are the main adopter of Tran-SET’s research products. Along with our industry partners, they are also the main providers of matching funds. They are significantly involved in Tran-SET’s research program through the following Center-defined functions:

**Center Advisory Board (CAB):** The CAB is comprised of community leaders and executives across Region 6, including directorial and managerial stakeholders from all five state DOTs. The state DOT stakeholders provide input and direction, guiding Tran-SET’s research, technology transfer, education, workforce development, and outreach activities. Input is regularly solicited from the CAB through several methods: (1) identification of regional challenges in the broad area of transportation, (2) submission of problem statements<sup>1</sup>, (3) involvement in ranking and prioritizing problem statements<sup>1</sup>, (4) participation in Tran-SET’s bi-annual business meetings, and (5) electronic surveys. During the business meeting, each Associate Director presents on their institution’s activities to the CAB. The remaining half of the meeting is then dedicated to receiving direct feedback from the CAB on these activities and possible regional challenges that may be added to the Center’s research program. An annual, electronic survey is sent to each CAB member, more formally quantifying the effectiveness of Tran-SET’s efforts.

**Program Directors:** State DOT stakeholders also serve as Program Directors of Tran-SET. They provide detailed input to the Director and Program Manager on how to improve programmatic processes – and how to better coordinate our processes with programs within their respective DOT.

**Project Review Committees (PRCs):** PRCs are established and assigned to each funded Tran-SET project. Their main duties include technical guidance and review of in-progress research<sup>1</sup>. Each PRC contains one representative from a state DOT, typically either a manager or a technical staff. The structure, main responsibilities, and basic processes of the PRC were modeled from their use in DOT’s research projects. This helped stakeholder involvement in the first funding cycle as state DOT staff are already familiar with their role and expected contribution.

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<sup>1</sup> Detailed information on these processes are provided in Section 3.1.

**Research Investigators:** State DOT stakeholders are also directly involved in developing the research products by serving as Co-PIs on individual projects that are of significant interest to the State. As with state DOT involvement through the PRCs, this ensures that a practitioner- and implementation-focus consistently shapes the development of the technology. This involvement occurs at low frequency, comprising approximately 15% of Tran-SET’s research projects.

### 2.1.3 Engagement Strategies

As shown in Table 1, our state DOT partners are diverse in many aspects, significantly ranging in organizational structure, priorities, and size. This dictates the amount of financial and human resources committed to support Tran-SET’s research program – and how to formulate engagement strategies. These strategies need to be customized to each stakeholder. However, the following are general strategies to guide Tran-SET’s overall stakeholder engagement:

**Identifying Champions<sup>2</sup>:** Identifying an agency champion is perhaps the most critical element of the Center Technology Transfer plan. Champions are able to overcome institutional resistance and package the technology in a manner that is convenient for the agency. Tran-SET has identified several champions through past interactions with state DOT staff and during the UTC proposal process. However, Tran-SET will continuously seek new champions and will maintain an internal repository<sup>3</sup> of identified champions for use by Tran-SET staff and current PIs.

**Communicating Value of Research Program:** DOTs are continually maximizing benefits of limited resources – and required to defend their expenditures, programs, and projects. Therefore, they are interested in products that have shown actual value (have been implemented and produced measurable benefits) or great potential value. Tran-SET maintains a portfolio of “success stories”<sup>4</sup>, specifically geared to engage state DOT staff. Since Tran-SET is a young research center and lacks a past portfolio of “successful” deployments, Tran-SET also maintains a “Success Stories” Program<sup>4</sup> to fund strategic implementation case studies. One example was the funding of a research project to develop innovative solutions for the daily traffic congestion on the Mississippi River Bridge on Interstate 10. One suggested solution from the study was to limit truck traffic during peak hours. This solution was drafted and presented to the legislator (House Bill 432) in Louisiana and cleared the transportation committee, though unsuccessful on the house floor.

**Technology Integration into Current Practices:** It is important to ensure research products are presented and developed in a suitable manner as to be incorporated into existing DOT procedures. This includes the technology itself (e.g., developing a tool that can integrate or that is compatible with existing tools), educational and training-related products (e.g., providing on-demand training modules in the same format as existing modules), and presenting the results (e.g., presenting commonly used metrics, etc.). The main mechanism to ensure this integration is the PRCs.

**Effective Communication:** Participation in Tran-SET’s research program is an additional, typically unrecognized, duty for many stakeholders. Therefore, it is essential to communicate using methods that are most convenient to them. This includes:

- *Direct Delivery of Information:* such as on-site, in-person meetings, ensuring each meeting has webinar capability, and direct e-mailing of project deliverables.

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<sup>2</sup> As defined in [Accelerating Implementation of Transportation Research Results](#), champions have the ability to coordinate the action of others as to overcome resistance that new technology implementation may provoke.

<sup>3</sup> Please see Section 3.4 for more details.

<sup>4</sup> Please see Sections 3.4 and 3.5 for more details.

- *Accessible Information:* such as recording meetings, webinars, and educational presentations for on-demand use, having an organized, central repository for project deliverables, and providing guidance, forms, and other information online.
- *Utilizing DOT-Sponsored Venues:* such as presenting at annual DOT-sponsored conferences, utilizing other DOT-administered outreach channels (e.g., newsletters, webinar series, or workshops), and participating in other DOT-sponsored events.

## 2.2 LOCAL GOVERNMENT ENTITIES

Tran-SET’s key stakeholders from local government entities are summarized in Table 2.

**Table 2.** Local Government Stakeholders

Capitol Regional Planning Commission	Louisiana Community and Technical College System
City of Albuquerque, NM	Louisiana Economic Development
City of Baton Rouge Planning Commission	Louisiana Workforce Commission
City of San Antonio, TX	Texas Local Technical Assistance Program

These stakeholders are mainly involved as directorial stakeholders, funding partners, and interact with Tran-SET through the CAB (see Sections 2.1.1 and 2.1.2 above).

## 2.3 NON-PROFIT ORGANIZATIONS

Tran-SET’s key stakeholders from non-profit organizations are summarized in Table 3.

**Table 3.** Non-Profit Stakeholders

Alliance Safety Council	Ports Association of Louisiana
Greater Baton Rouge Industry Alliance	Louisiana Workforce Commission

These stakeholders are mainly involved as directorial stakeholders and interact with Tran-SET through the CAB. They also hold specific interest in T2 activities, training, and workforce development – as these are highly aligned with their agencies’ vision; on a project-by-project basis, these stakeholders may also be involved as workforce development stakeholders, accordingly.

## 2.4 INDUSTRY PARTNERS

Tran-SET’s industry partners are summarized in Table 4. Tran-SET has been very successful in collaborating with industry in the first two funding cycles as research activities are timely, critically-needed, and allow companies to build their knowledge-base at a reduced cost.

**Table 4.** Industry Stakeholders

Barriere Construction Co.	Paragon Technical Services, Inc.
Carmeuse Lime and Stone	PPG Industries, Inc.
HVJ Associates	Riceland Foods
Norchem, Inc.	Sewer Shield Composites

Along with our state DOT partners, industry partners are the main providers of matching funds – monetary and soft matching by supplying knowledge-base, laboratory support, and infrastructure materials. Therefore, these stakeholders are involved as both directorial and research stakeholders and interact with Tran-SET through the CAB and PRC, accordingly.

## 2.5 OTHER STAKEHOLDERS

Other stakeholders include indirect beneficiaries of specific activities supported by Tran-SET and vary project-by-project. These may include federal government agencies, trade associations, research institutions, and tribal organizations. Table 5 lists example of stakeholders in this category.

**Table 5.** Other Stakeholders

Turner-Fairbank Highway Research Center	Associated General Contractors of America
Veteran & Military Student Services Center	American Road and Transportation Builders
Navajo Technical University	Community Colleges in Region 6
American Indian Higher Education Consortium	Navajo Nation Department of Workforce Development

## 3 ASSISTING STAKEHOLDERS IN IMPLEMENTATION AND DEPLOYMENT

This section describes each element of Tran-SET’s T2 Plan in detail – and is organized by key principles of a T2 plan<sup>5</sup>: (1) understanding the research need, (2) developing engagement plans, (3) engaging stakeholders, and (4) evaluation. The T2 Plan defines the programmatic processes, programs, and products that assist stakeholders in implementing and deploying research outputs.

### 3.1 UNDERSTANDING THE RESEARCH NEED

For each research cycle, Tran-SET solicits problem statements from regional collaborators: from state DOTs, local government agencies, industry, and academia. Two methods are provided to submit problem statements: (1) a simplified form for directorial stakeholders – encouraging submissions by precluding technical aspects that may be cumbersome or unnecessary to the applicant and (2) a more detailed form for research applicants. Relevant to the T2 process, the forms include dedicated sections to address: (1) how the problem statement impacts regional priorities, (2) how results will be implemented, and (3) expected benefits regarding the education and development of the transportation workforce.

A diverse research committee reviews, discusses, ranks the problem statements, and determines the most critical research projects in addressing regional transportation needs. The committee includes members of the CAB. Relevant to the T2 process, the scoring criteria include: (1) how well it solves regional transportation challenges (20%), (2) the implementation potential (20%), and (3) potential impact on transportation workforce development, training, and education (20%). A request for proposal is then developed to address the highest ranked problem statements with high potential for implementation and addressing regional transportation challenges.

**Implementation (T2) Phase:** Each Tran-SET project consists of a 12-month technical (research) phase, followed by a 6-month implementation (T2) phase. The implementation (T2) phase, which is allocated at least 10% of the overall project budget supports the *dissemination* of research results and activities that move the research results *towards implementation*. As with the technical (research) tasks, the implementation activities are also structured by tasks and with project deliverables. These tasks are

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<sup>5</sup> As defined in [Building a Foundation for Effective Technology Transfer through Integration with the Research Process](#).



monitored via Tran-SET's project management system. The PIs are also evaluated on the quality, schedule, cost control, and management of these tasks, contributing to their overall G-PAS<sup>6</sup> rating.

**Project-Level T2 Plan:** Each Tran-SET proposal is required to include an initial, project-specific T2 Plan to guide the proposed activities in the implementation phase. The standard Tran-SET template forms the basis of the initial T2 Plan and is based on the 10-point checklist developed by the US DOT<sup>7</sup>. For reference, the template is located on Tran-SET's [website](#).

Proposals are reviewed by multiple, independent subject matter experts, revised based on the reviews, and awarded. The tasks in the implementation (T2) phase, the accompanying project-specific T2 plan, and previous G-PAS rating are critical factors in proposal review and acceptance.

### 3.2 DEVELOPING ENGAGEMENT PLANS

After the award, a PRC is established for each funded Tran-SET project by the respective Associate Director. The PRC must include a member from an institution considered to be the main adopter of the technology. This is typically a stakeholder from a state DOT or governmental agencies.

**T2 Coordinator:** Tran-SET will establish and staff a T2 Coordinator – with 50% of his/her duties dedicated to assisting, leading, and supporting<sup>8</sup> T2 efforts. After the award, the T2 Coordinator will review each project-specific T2 Plan, provide input to the PI, and work with the PI to develop a more informed engagement plan.

Midway through the technical (research) phase, the PI will be required to revisit/revise the project-specific T2 Plan and submit it to the PRC and T2 Coordinator for review. As with the initial review, the T2 Coordinator will work with the PI to revise the project-specific T2 Plan based on comments from the PRC. As stated previously, the initial and revised project-specific T2 Plan will be treated as a project deliverable and assessed accordingly.

**Technology Readiness Level (TRL) Assessment:** Within one month of the technical (research) phase ending, the T2 Coordinator will organize and conduct TRL assessments for each project. This will include working with the PI to define a panel comprised of the PRC and at least one other member considered to be a potential adopter. The T2 Coordinator will work with the PI to develop a framing document and PI questionnaire<sup>9</sup> to better prepare the panel for the assessment. The assessment will involve a webinar (or in-person) meeting facilitated by the T2 Coordinator, where the panel will assess: (1) the level in which the research product (technology) is ready for implementation, (2) which elements of the technology currently lacks regarding implementation, and (3) the next step(s) required to further ready the technology for implementation. The T2 Coordinator will prepare a TRL assessment report documenting the results and main discussion points. Each report will be posted to Tran-SET's website.

### 3.3 ENGAGING STAKEHOLDERS

The T2 Coordinator will review the TRL assessments and project-specific T2 Plans for the entire funding cycle. With the aid of the PIs, Associate Directors, Program Directors, Program Manager, and invited T2 specialists from stakeholder institutions (partnering universities, state DOTs, and LTAPs), the T2 Coordinator will develop a "T2 portfolio of activities." This may include identifying

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<sup>6</sup> [G-PAS](#) is a defined set of criteria in which the performance of each Tran-SET project team is evaluated upon.

<sup>7</sup> [Developing and Executing Your Technology Transfer Plan: A 10-Point Checklist](#)

<sup>8</sup> "Assisting, leading, and supporting" define specific roles of the T2 Coordinator and are defined in Section 3.3.

<sup>9</sup> Developed from and as suggested by [Technology Readiness Level: Guidebook](#).



programmatic T2 activities. For example, organizing multi-team, multi-university webinars, workshops, or meetings with common stakeholders. This will maximize efficiency of T2 activities by taking advantage of common needs, research, and stakeholder interactions. Specifically, the T2 Coordinator will categorize T2 activities by the following:

- *Assist* – these activities are short term, where the PI can successfully conduct the activity with minimal assistance from the T2 Coordinator. These activities may include: conducting conference presentations, one-time meetings, webinar presentations, etc.
- *Lead* – these activities are short to long term, in which it is more appropriate for the T2 Coordinator to lead with minimal assistance from the PI. This may include packaging the research products in a more suitable manner or interacting with stakeholders for a longer timeline than the implementation (T2) phase permits.
- *Support* – these activities are long term, in which T2 activities require continued support and the use of future (potentially financial) resources. These activities may include: a small-scale research project to correct shortcomings identified in the TRL assessment, a small-scale field demonstration to instill stakeholder confidence in the performance of the research product, a series of workshops to educate stakeholders on the use and benefits of the research product, etc. These activities will be the main source of efforts to pursue under the “Success Stories” Program. Please see Section 3.5 for more information.

The T2 Coordinator and PIs will execute the T2 activities during the implementation (T2) phase accordingly.

### 3.4 EVALUATING ENGAGEMENT ACTIVITIES

**Implementation Report:** Implementation reports are due 10 days after the implementation (T2) phase is completed. Implementation reports are prepared by the PIs and shall give a complete description of all activities conducted and any education, T2, and workforce development products developed during the implementation (T2) phase. The implementation report will closely align in format to the project-specific T2 Plan – and shall estimate the relative “success” of the T2 activities and identify any barriers to adoption that were encountered.

**T2 Assessment:** The T2 Coordinator with assistance from the Associate Directors and Program Manager will informally and formally (with the defined T2 metrics in Table 7) assess the effectiveness of engagement activities that occurred during the respective project cycle. The T2 Coordinator will prepare an internal report documenting:

- *Successful strategies* – these suggestions will inform engagement strategies in the next project cycle.
- *“Success stories”* – an internal database of successful implementation and deployment case studies will be maintained and utilized to attract additional stakeholders (and communicate the overall value of Tran-SET’s research program). Please see Section 3.5 for more details.
- *Champions*– influential champions will be identified; an internal database of stakeholder champions will be maintained and utilized in the next project cycle.
- *Barriers to adoption* – consistent, common barriers will be identified and solutions to address these barriers proposed.

### 3.5 ALIGNING RESEARCH PORTFOLIO

Alongside the processes, programs, and products defined in the T2 Plan, Tran-SET will establish:



**The “Success Stories” Program:** Tran-SET will dedicate funding to pursue strategic case studies, specifically geared toward semi-immediate implementations and deployments. These case studies will be identified and recommended by the T2 Coordinator (through the process described in Section 3.3 – the T2 activities requiring further support) and chosen by the Director with input from the Program Manager, Associate Directors, and Program Directors. Tran-SET was established in late-November 2016; it is a young research center with limited history. The purpose of this program is to fund “quick” or “low-hanging” efforts in order to build a portfolio of “success stories”. These “success stories” will greatly aid in strengthening existing stakeholders relationships – and in attracting new stakeholders to the Center.

## 4 DISSEMINATION OF RESEARCH RESULTS

Tran-SET focuses on research projects in diverse transportation topical areas with varying technology maturity; each project-specific T2 Plan will require its own unique set of methods to disseminate research. However, the following list contains anticipated methods to be adopted by the various projects:

- Short courses or workshops jointly sponsored by key stakeholders;
- Training and education courses to facilitate the transfer of new technologies to industry;
- Commercialization and licensing of discoveries emerging from sponsored research;
- Presentations at national and international conferences;
- Publications in peer-reviewed journals;
- Publications and reports disseminated through open-access websites (e.g., Research Gate);
- Presentations at TRB annual meetings (sessions and committee meetings);
- Product demonstration fairs such as Build Expo USA; and
- Educational materials to prepare students for the use of new technologies in their academic studies and professional career.

To supplement project-specific dissemination methods above, Tran-SET utilizes several programmatic methods to further engage and communicate value of its research to stakeholders:

- *Quarterly newsletters* (disseminated to local, regional, and national stakeholders. Posted on website and advertised through social media);
- *Quarterly webinar series* (jointly hosted with rotating UTCs. Presentation schedule and format designed to coordinate T2 activities with external research centers conducting similar research. Posted on website and advertised through social media);
- *Annual Tran-SET Conference* (presentation sessions to educate invited local, regional, and national stakeholders, including the CAB, on current research activities. Presentations recorded, posted on website, and advertised through social media);
- *Organization and sponsorship of national and international research conferences;*
- *Various outreach materials* (includes marketable project fact sheets, *Project Description* and *Project Highlights*, for each project); and
- *Consistent and effective use of website and social media.*

## 5 TECHNOLOGY TRANSFER (T2) GOALS, OBJECTIVES, AND PERFORMANCE MEASURES

### 5.1 TRAN-SET’S VISION AND MISSION

**Context:** With limited funding and the reduction of transportation agency resources, the backlog of transportation projects has reached alarming levels and has continued to grow. Limited funding conditions have contributed to the American Society of Civil Engineers grading America’s infrastructure at a D+ in 2013, assessing that \$3.6 trillion dollars would be needed to fix the aging and crumbling infrastructure. In the document titled *Beyond Traffic 2045: Trends and Choices*, ports, airports, and pipelines have been noted as a major challenge in Region 6 as they are vulnerable to rising sea levels, storm surges, and hurricanes damage. Furthermore, population shift towards the South has increased demand and congestion for transportation infrastructure.

**Vision:** Address the accelerated deterioration of the transportation infrastructure in the South Central Region through the development, evaluation, and implementation of cutting-edge technologies, novel materials, and innovative construction management processes.

**Mission:** Conduct all phases of research, technology transfer, education, workforce development, and outreach activities as to solve transportation challenges in Region 6 and to support implementation.

### 5.2 TECHNOLOGY TRANSFER (T2) OBJECTIVES

T2 activities are critically important in accomplishing Tran-SET’s Vision and Mission. In this context, Tran-SET has established two main Objectives that are at the heart of *all* its T2 activities (see Table 6).

**Table 6.** T2 Objectives

ID	Objective
TT1	Ensure that scientific and technological developments are accessible, disseminated, and transferred to a wide range of users including state agencies, universities, and industries
TT2	Ensure that scientific and technological developments have a long-term research value and significant impact to the transportation industry by direct collaboration with all levels of government and not-for-profit organizations

### 5.3 TECHNOLOGY TRANSFER (T2) PERFORMANCE METRICS

To assess the progress of Tran-SET’s T2 Objectives, Table 7 lists the proposed T2-related performance metrics that will be collected, reviewed, and monitored.

**Table 7.** T2 Performance Metrics and (Annual, Per Funding Cycle) Targets

ID	Objective ID	Metric	2018 - 2019 Target
<b>Outputs</b>			
	TT1, TT2	Number of stakeholders identified, specifically:	
O1-1		Early potential adopters	30
O1-2		Late potential adopters	30
	TT1, TT2	Number of times research products (technology) are disseminated via the following channels:	
O2-1		Featured in Tran-SET quarterly newsletter	25
O2-2		Featured on Tran-SET social media	50
O2-3		Peer-reviewed publications and presentations	130
O2-4		Webinars	5
	TT1	Tran-SET website traffic	

ID	Objective ID	Metric	2018 - 2019 Target
O3-1		Number of visitors to Tran-SET website	30,000
O3-2		Number of visits to Tran-SET website	250,000
	TT1, TT2	Number of times disseminated research products (technology) have informed or been viewed by stakeholders via the following channels:	
O4-1		Engagement level(s) of Tran-SET social media	4.5 <sup>1</sup> /2.5 <sup>2</sup>
O4-2		Number of times reports (or related research products) are downloaded from Tran-SET website	30
O4-3		Number of citations from publications	120
O4-4		Number of presentation attendees or views	250
	TT1, TT2	External funds:	
O5-1		Number of industrial partners providing funds	4
O5-2		Number of public agency partners providing funds	10
O5-3		Total funds from industrial partners	\$200,000
O5-4		Total funds from public agency partners	\$300,000
<b>Outcomes</b>			
	TT1, TT2	External, derivative initiatives spurred by research products (technology) <sup>3</sup> :	
OC1-1		Number of additional research projects	1
OC1-2		Total funding of additional research projects	\$100,000
OC2	TT1, TT2	Number of commercialized/patented/licensed research products	1
OC4	TT1, TT2	Number of stakeholder MOUs	1
	TT1, TT2	Number of stakeholders who have:	
OC5-1		Committed to adopt research products (technology)	3
OC5-2		Adopted research products (technology)	1
<b>Impacts</b>			
I1	TT1, TT2	Improve the durability and service life of the transportation infrastructure in Region 6 (% increase in service life) <sup>4</sup>	20%
I2	TT1, TT2	Reduce the costs associated with repair and upgrade of the transportation infrastructure (per lane-mile) <sup>4</sup>	\$10,000

<sup>1</sup>Average “calculated as clicks/impressions” (LinkedIn); <sup>2</sup>Average “engagement rate” (Twitter); <sup>3</sup>Sponsored research projects (external to Tran-SET) initiated as a direct result of developed products; <sup>4</sup>Based on Tran-SET research objectives

## 6 TRACKING AND REPORTING OF RESEARCH OUTPUTS, OUTCOMES, AND IMPACTS

**Outputs:** O1-1 and O1-2 will be identified and reported by each PI via the project-specific T2 plans. O2-3 and O2-4 will be tracked on a quarterly basis through Tran-SET’s project management system.

**Outcomes:** OC-1 and OC-2 will be tracked on a bi-annual basis via standard analytical tools provided by WordPress. OC2-1 will be tracked on a bi-annual basis via analytical tools provided by Facebook



and Twitter, respectively. OC2-2 will be tracked on a bi-annual basis using website plugins. OC2-3 will be tracked on a bi-annual basis using “Google Scholar Citations”. OC2-4 and OC2-5 will be tracked when corresponding events are held. OC3-1, OC3-2, OC3-3, and OC3-4 will be tracked by the Program Manager, for each award cycle. OC4-1 and OC4-2 will occur during the annual assessment of the effectiveness of engagement activities that occurred during the respective project cycle.

**Impacts:** Impacts will be measured through solicited surveys or in-person/phone interviews with adopters on a case-by-case basis (conducted at an appropriate time, sufficient to determine the performance of the implementation).

T2 metrics will be reported bi-annually in the PPPR/T2 report. They will also be reported and discussed in the “Technology Transfer Performance Metrics” section of Tran-SET’s [website](#).

## 7 COMMERCIALIZING RESEARCH OUTPUTS

The majority of Tran-SET’s research outputs are envisioned to be publicly available. Yet, Tran-SET will encourage commercialization of select, emerging technology. Tran-SET’s main partnering universities have well-established processes for commercializing research products. The T2 Coordinator, Associate Directors, and PI will work with their respective institution’s technology transfer office (or equivalent) and adopt their commercialization processes. The basic structure of a university-based commercialization process is as follows<sup>10</sup>:

1. *Technology Disclosure:* A formal document provided to the university with details on the developed innovation.
2. *Evaluation:* An evaluation process is conducted to determine whether or not commercialization efforts should be pursued.
3. *Protection:* Technical details, data, and substantiation is provided to university-based Patent Attorneys who will assist in the process of securing a patent.
4. *Marketing:* With researcher assistance, the university will identify companies that have resources and business networks to bring the technology to market.
5. *Negotiation:* Begins when a company expresses interest in the marketed invention. The university will lead the negotiation while seeking input from the inventor(s).
6. *License:* The product is commercialized through licenses. Specific rights to the technology are granted to the licensee, under specific terms and conditions.

Research proposals, project-specific T2 plans, and final reports will be required to include a commercialization plan in a standalone section. The plan will be considered in the ranking of the proposals and includes the following key points: (1) market need/value proposition, (2) market size and societal need, and (3) competition and competitive advantage.

To maintain complete invention records for the project, the T2 Coordinator, Associate Directors, and PIs will work with their respective institutions and Tran-SET to implement the process for federal invention reporting specified in Tran-SET’s “[Guidance on Invention Reporting](#)”.

## 8 LICENSING REVENUES

Tran-SET’s main partnering universities have well-established processes for collecting and distributing license revenues. For example, Louisiana State University (LSU) has a series of policies specifying how net revenue (royalties) will be distributed: 40% Inventor(s), 17% Inventor(s)’

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<sup>10</sup> Based off of Louisiana State University’s commercialization process. More details can be found on their [website](#).

Department(s), 5% Office of the President, 5% LIFT<sup>2</sup> Fund, 5% Inventor(s)' College(s), 3% Inventor(s)' Campus, and 25% Office of Research and Economic Development<sup>11</sup>. In many cases, there are also College- and Department-level policies designating how these funds are utilized. These policies vary by institution; therefore, the T2 Coordinator, Associate Directors, and PI will work with their respective institution's technology transfer office (or equivalent) and adopt their established licensing processes.

As with commercialization, research proposals, project-specific T2 plans, and final reports will be required to include a proposed licensing plan in a standalone section and assess the research product in terms of the possibility of licensing the product and generating revenue.

## 9 INCREASING CORPORATE SUPPORT

Industry is a critically important stakeholder in accomplishing Tran-SET's Vision, Mission, and Objectives. As previously noted, Tran-SET has been successful in collaborating with industry in the first two funding cycles. To continue encouraging corporate research support, Tran-SET will:

**Leverage University Programs:** This includes services such as:

- *Innovation Parks:* Offer specialized facilities and assistance to help researchers further develop and formulate technological products. They assist with strategic planning, raising capital, and improving business relations. All major partnering universities within Tran-SET have such programs (e.g., LSU established their "Innovation Park" in 1988). Key regional companies are typically directly involved or otherwise support these facilities.
- *Incubators:* Offer creative environments where researchers leverage university-based client companies, staff consultants, and experienced mentors who help develop their innovations into profitable businesses.
- *Office of Corporate Relations:* these university offices work to build strategic partnerships between faculty members and companies for academic advancement, research, recruitment, and outreach. They are interested in aligning private-sector support to high-level university goals/initiatives, but can be leveraged to identify and build relationships between individual PIs and respective businesses.
- *Office of Technology Transfer:* Some partnering universities within Tran-SET (such as LSU) also have a dedicated technology transfer office which facilitates collaborative partnerships between businesses, federal laboratories, and external research institutions in order to "pair" research products with commercial developers.

**Establish Tran-SET-Specific Strategies:** Such as:

- Integrating industry members into its CAB and PRCs;
- Requiring a specific section in all project-level T2 plans describing industry's proposed involvement in the implementation (T2) activities;
- Continuing to engage industrial firms through its programmatic dissemination methods; and
- Including the number of industrial firms providing external matching funds and the total amount of funds as T2 performance metrics.

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<sup>11</sup> Specified in [PS-77](#), "Distributable" Royalties.