Tran-SET

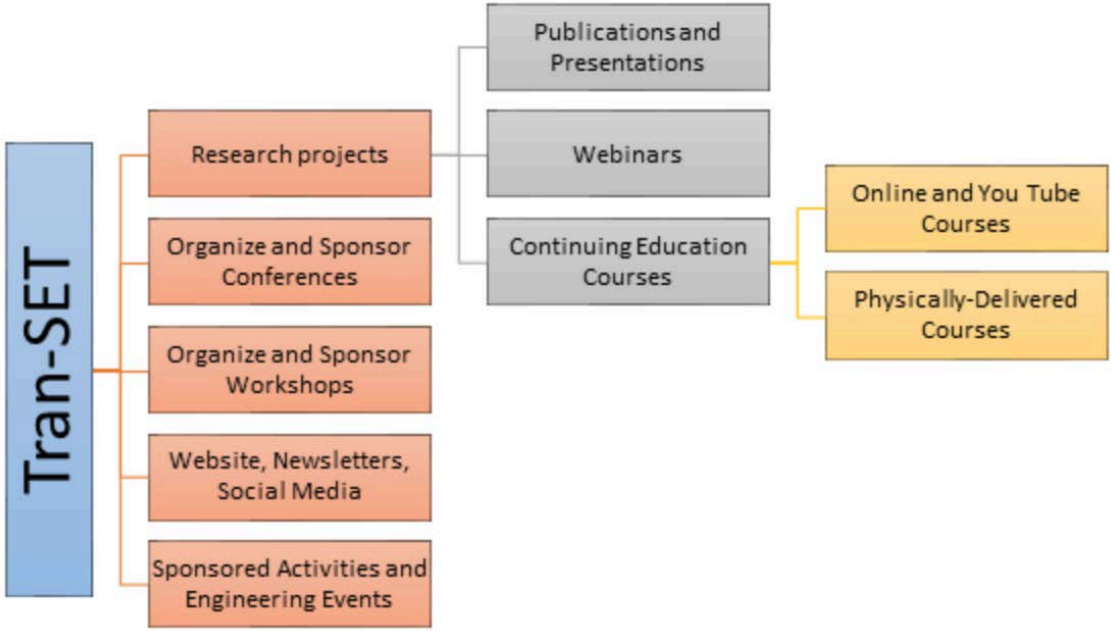
Solving Emerging Transportation Resiliency, Sustainability, and Economic Challenges through the Use of Innovative Materials and Construction Methods: From Research to Implementation

Tran-SET Plan & Requirements for Technology Transfer

March 2019

Overview

- 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.
- Tran-SET developed its **Center-wide T2 Plan** on May 2018.
- Tran-SET team has the ultimate goal of ensuring that the findings of projects funded through the Center will have a *long-term research value and significantly impact the transportation industry*.
- The knowledge generated from the Center will be disseminated and transferred to the research community, state agencies, and to the transportation and construction industries through the following planned activities:



Overview (Cont.)

- To assess the progress of Tran-SET's T2 Objectives, the following T2-related performance metrics should be collected, reviewed, and monitored:

Review the Center T2 Plan on:
http://transet.lsu.edu/center-plans/

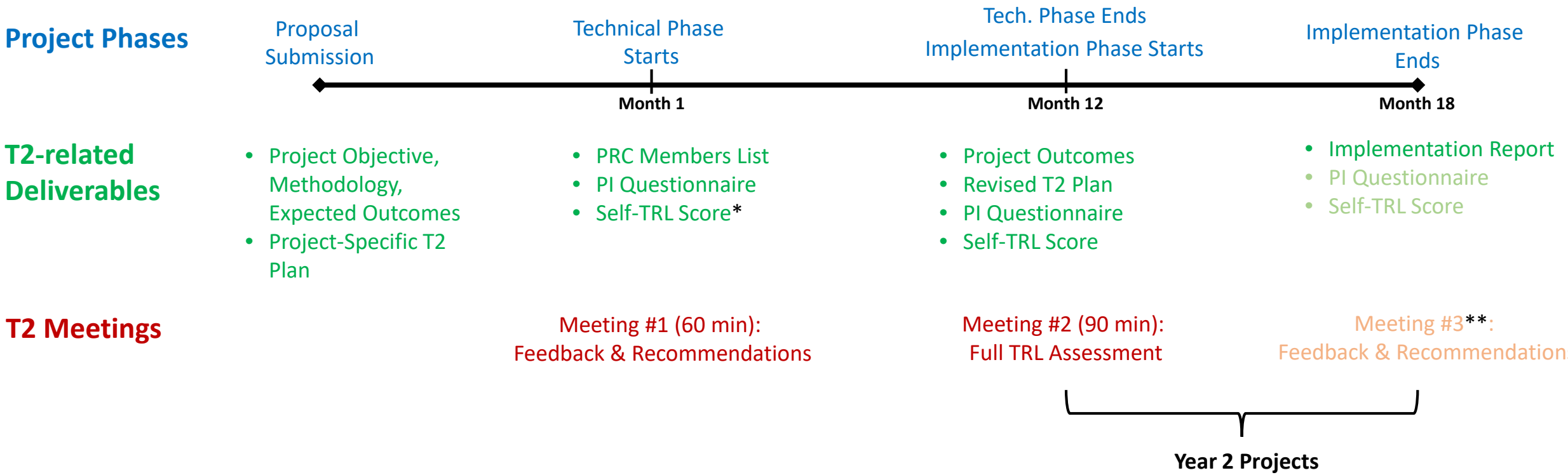
ID	Objective ID	T2-Related Performance Metric	2018 - 2019 Target	T2-Related Tools/Deliverables
Outputs				
	TT1, TT2	Number of stakeholders identified, specifically:		
O1-1		Early potential adopters	30	T2 Plan & Implementation Report
O1-2		Late potential adopters	30	T2 Plan & Implementation Report
	TT1, 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	T2 Plan & Implementation Report
O2-4		Webinars	5	T2 Plan & Implementation Report
	TT1	Tran-SET website traffic		
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	9[1]/2.5%[2]	
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	T2 Plan & Implementation Report
O4-4		Number of presentation attendees or views	250	T2 Plan & Implementation Report
	TT1, TT2	External funds:		
O5-1		Number of industrial partners providing funds	4	T2 Plan & Implementation Report
O5-2		Number of public agency partners providing funds	10	T2 Plan & Implementation Report
O5-3		Total funds from industrial partners	$200,000	T2 Plan & Implementation Report
O5-4		Total funds from public agency partners	$300,000	T2 Plan & Implementation Report
Outcomes				
	TT1, TT2	External, derivative initiatives spurred by research products (technology)[3]:		
OC1-1		Number of additional research projects	1	T2 Plan & Implementation Report
OC1-2		Total funding of additional research projects	$100,000	T2 Plan & Implementation Report
OC2	TT1, TT2	Number of commercialized/patented/licensed research products	1	T2 Plan, Implementation Report & TRL Assessment
OC4	TT1, TT2	Number of stakeholder MOUs	1	T2 Plan, Implementation Report & TRL Assessment
	TT1, TT2	Number of stakeholders who have:		
OC5-1		Committed to adopt research products (technology	3	T2 Plan, Implementation Report & TRL Assessment
OC5-2		Adopted research products (technology)	1	T2 Plan, Implementation Report & TRL Assessment
Impacts				
I1	TT1, TT2	Improve the durability and service life of the transportation infrastructure in Region 6 (% increase in service life)[4]	20%	T2 Plan, Implementation Report & TRL Assessment
I2	TT1, TT2	Reduce the costs associated with repair and upgrade of the transportation infrastructure (per lane-mile)[4]	$10,000	T2 Plan, Implementation Report & TRL Assessment

T2 Deliverables

- The following are the deliverables required from each project to fulfill the Center's T2 Plan:
  - **Project-Specific T2 Plan:** is a guide to successfully *plan and execute activities* during the implementation phase of the project.
  - **Implementation Report:** is a companion document to the Project-Specific T2 plan. The implementation report is *a report out of the activities executed* during the implementation phase.
  - **PI Questionnaire:** is a tool for identifying and organizing the specific information that panelists need *to know about the product/outcome of the project* before conducting a Technology Readiness Level (TRL) Assessment.
  - **TRL Assessment:** is a tool/exercise to *assess the readiness of and identify gaps in* the project outcome for implementation.

Tran-SET Technology Transfer Timeline

- From a Technology Transfer perspective, the diagram below shows the project phases, corresponding deliverables, and the meetings with the Project Research Committee (PRC).
- The objective is to help the PIs at each stage in planning/performing the implementation activities and assessing the readiness of the project outcome for implementation.



*The PI will give a score that indicates the current level of readiness of the existing product (as a baseline).
**The 3rd meeting is not mandatory and based on the outcomes of the 2nd meeting.

Project-Specific T2 Plan

Instructions

Step 0. Project Information

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

Instructions:

- All project information in Step 0 are required in the T2 plan.
- Information should be consistent with the funded project details.
- Don’t change the style or the format of this table.

Step 1. Describe the Problem

Paragraph 1 Paragraph 2 Paragraph 3 Paragraph 4

Instructions:

- Briefly describe the problem the proposed products/technology aims to solve (max. 4 paragraphs).
- 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”.
- Don’t change the style or the format of this table.

Step 2. Describe the Proposed Solution

Paragraph 1 Paragraph 2 Paragraph 3 Paragraph 4

Instructions:

- Briefly describe how the technology that this project will develop can solve the problem stated in Step 1, its feasibility of use, and its **value** (max. 4 paragraphs).
- Please think of this section as defining the value of the solution to various project stakeholders in non-technical, easy to understand language.
- Don’t change the style or the format of this table.

Step 3. Identify Stakeholder Groups by Name and Role

ID	Stakeholder Name	Stakeholder Type	Category (ies)
a			
b			
c			
d			
e			
f			
g			

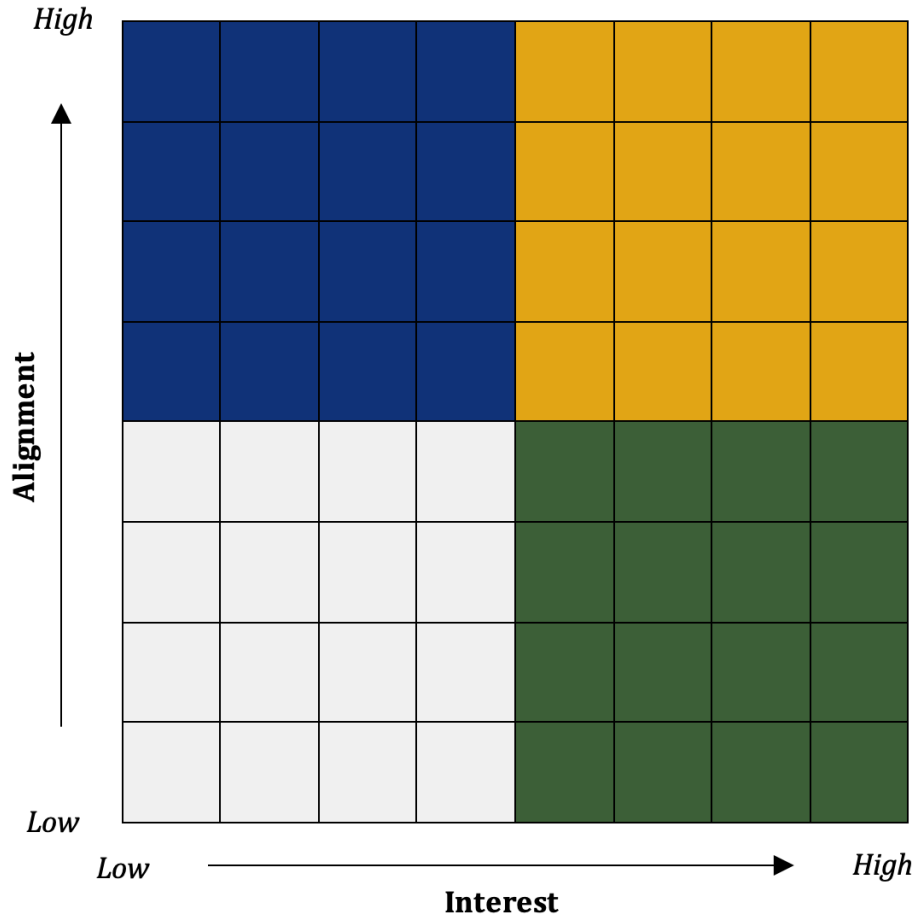
Instructions:

- In the 1st column (Stakeholder Name):
  - *Provide a specific stakeholder name (e.g. LaDOTD, or a specific division within LaDOTD, not generically "DOTs"),*
  - *Tran-SET and project researchers are not target stakeholders for your project,*
  - *Include (if possible) industry partners and/or non-profit organizations,*
  - *If an industry partner is included, please demarcate/highlight it throughout the plan. If not included, please explain why.*
- In the 2nd column (Stakeholder Type):
  - *Stakeholders can be: State DOTs, Local Gov. Entity, Non-profit Organization, Industry Partner, Others (federal governmental agencies, trade associations, research institutions, and tribal organizations, etc.),*
  - *Stakeholder "Types" is different than "Category(ies)",*
- In the 3rd column (Category(ies)):
  - *Stakeholders categories can be: Sponsors of research and T2, Researchers & developers, Deployment team, Early (or late) potential adopters, Others (ally, supplier, etc.),*
  - *More than one category can be used for each stakeholder*
- Don't change the style or the format of this table.

Step 4. Analyze Stakeholder Alignment

Instructions:

- For each stakeholder identified in Step 3, assess their:
  - (1) interest in the technology's adoption
  - (2) own support and alignment of the technology.
- Map stakeholders by their alignment and interest in the quadrants.
- Please map the stakeholder by inputting their letter ID.
- Don't change the style or the format of this table.



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

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

Instructions:

- In the 1st column (Engagement Activity):
  - *Provide specific activities (and approx. dates) to engage the stakeholders,*
  - *Engagement activities include but not limited to: publications, training materials, webinars, field testing, meetings, etc.*
  - *Project deliverables to Tran-SET are not engagement activities,*
  - *Publication and Poster in Tran-SET Annual Conference must be one of the activities.*
- In the 3rd and 4th columns (Info Communicated to "Gathered from" Stakeholder):
  - *Details are needed in these two columns.*
- Don't change the style or the format of this table.

Step 8. Identify and Address Barriers to Adoption

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

Instructions:

- 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.
- If no barriers are mentioned in this step, it is assumed that no issues will raise during the implementation phase.
- Propose detailed actions to address any barrier mentioned.
- Don’t change the style or the format of this table.

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

Paragraph 1

Instructions:

- 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.
- Its important to think about pursuing MOU in this stage of your project. Try to think of one for your plan.
- If the products/technology are not in an appropriate state or form to pursue MOUs, ***please state so with a brief reason why***.
- Don't change the style or the format of this table.

Step 10. Performance Metrics

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.

Emphasis Areas

Paragraph 1

Instructions:

- Describe the commerciality of the developed products/technology and if there are any plans to pursue commercialization, a patent, or a license.
- If this section is not applicable, ***please state so with a brief reason why***.
- Don’t change the style or the format of this table.

Technology Readiness Level (TRL) - PI Questionnaire

Instructions

Step 0. Project Information (TRL)

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

Instructions:

- All project information in Step 0 are required in the PI Questionnaire.
- Information should be consistent with the funded project details.
- Don’t change the style or the format of this table.

Step 1. Describe the Outcome Developed in this Project

A	What is the outcome proposed/developed in your project?	
B	What are the main components of the outcome developed in this project? What is the status of those components?	
C	Have guidelines, outlines, procedures, or other conceptual aids been prepared in this project?	
D	Are there remaining technical challenges? Please describe.	

**The project outcome can be: product, technology, guidelines, technique, approach, concept, tool, or any other kind of output from the project.*

Step 2. Describe the Envisioned Deployment of this Outcome

A	Who would deploy this outcome? Describe the end users of it, and how they will use it.	
B	What problem(s) has this outcome been developed to solve or address? At the point of implementation, will this outcome address these problems sufficiently (if not, why not)?	
C	If the outcome of this project is deployed/implemented, what is the expected/calculated percentage of improvement in durability and service life of the transportation infrastructure? Specify % increase in service life.	
D	If the outcome of this project is deployed/implemented, what is the expected/calculated cost reduction associated with repair and upgrade of the transportation infrastructure in Region 6? Specify $ amount reduction per lane-mile.	
E	What needs to be done to or with the outcome of your project, as it exists today, before it can be deployed in the manner envisioned?	

Step 3. Describe the Experiments/Trials/Tests Conducted on the Project Outcome

A	Has an experiment/test on the outcome been conducted? What was the scale and setting of the experiment, compared to the envisioned deployment of this outcome? Was this experiment indicative of how the final outcome may be expected to perform in the field/real-life?	
B	If experiments/trials/tests on the outcome have not been conducted, how will the expected functionality/applicability of outcome be confirmed?	
C	Have computer simulations/modeling for design, construction, or operations been conducted? Have case studies been conducted for the project outcome? Please describe the results.	
D	What metrics exist for defining the development's progress for outcome of this project?	

Step 4. Describe the Involvement of the User Community in the Outcome Development Process

A	Have usability/practicality experiments been conducted or samples deployed to intended users?	
B	If trials/samples have been produced and field tested with the intended end users, do those users use the produced trials/samples as intended? If not, how has it been adapted?	
C	If feedback from these users about the research outcome has been received, how has the outcome been revised (if at all) to address this feedback?	
D	What tests or trials should be performed on, with, or using the developed outcome, as it exists today, before the end user can confidently use/implement it?	

Step 5. Other Notes

Step 6. TRL Self-Assessment

Categories	TRL Score	Description	To achieve the given TRL score, you must answer "Yes" to EVERY question at that level.
Basic Research	1	Basic principles & research	• Do basic scientific principles support the concept of the project outcome? • Has the outcome development methodology or approach been developed?
	2	Application formulated	• Are potential framework applications identified? • Are outcome components and the user at least partly described? • Do preliminary analyses or experiments confirm that the application might meet the user need?
	3	Proof of concept	• Are outcome performance metrics established? • Is outcome feasibility fully established? • Do experiments or modeling and simulation validate performance predictions of outcome capability? • Does the outcome address a need or introduce an innovation in the field of transportation?
Applied Research	4	Components validated in laboratory environment	• Are end user requirements documented? • Were individual components (if any) successfully tested in a ***laboratory environment*** (a fully controlled test environment)?
	5	Integrated components demonstrated in a laboratory environment	• Are target and minimum operational/functional requirements developed? • Is component integration demonstrated in a laboratory environment (i.e. fully controlled setting)?
Development	6	Field or full-scale test demonstrated in relevant environment	• Is the operational/functional environment fully known (i.e. user community, physical environment, and input data characteristics as appropriate)? • Was the field or the full-scale experiment tested in a realistic environment outside the laboratory (i.e. ***relevant environment***)? • Does the field or full-scale experiment satisfy all operational/functional requirements when confronted with realistic problems?
	7	Fully integrated outcome demonstrated in operational environment	• Are available components ready to be fully integrated in the final outcome? • Is the fully integrated outcome demonstrated in an ***operational environment*** (i.e. real-world conditions, including the user community)? • If applicable, are all outcome components tested individually under expected conditions?
	8	Outcome proven in operational environment	• Is the outcome proven in an operational environment (i.e. meet target performance measures)? • Was a rigorous test and evaluation process completed successfully? • Does the outcome meet its stated purpose and functionality as developed?
Implementation	9	Outcome refined & adopted	• Is the outcome deployed in its intended operational environment? • Is information about the outcome disseminated to the user community? • Is the outcome adopted by the user community?

Tran-SET

For Questions or more details Contact:

transet.lsu.edu

Dr. Husam Sadek
(hsadek1@lsu.edu or 225-578-0131)

Mr. Christopher Melson
(cmelson1@lsu.edu or 225-578-3805)