# Technology Readiness Level (TRL) - PI Questionnaire

## **Context**

As per the Tran-SET Center-wide Technology Transfer (T2) Plan, a Technology Readiness Level (TRL) Assessment should be conducted to ***evaluate the readiness of the developed output\* from each project for implementation***. In order to conduct the TRL Assessment, the Principal Investigator (PI) of each project will complete and submit the PI Questionnaire and then prepare a presentation to be delivered to the Project Review Committee (PRC) of this project during ***PRC Meeting #2***.

This Questionnaire is intended for use by the research team ***at the end of the technical phase*** of the project as a tool for identifying and organizing the specific information that PRC members need to know about the project’s output ***before PRC Meeting #2***.

## **Instructions**

Principal Investigators (PIs) are required to utilize the following questionnaire to provide the requested information that PRC members need to know about the output of the project before PRC Meeting #2 for the TRL assessment. General requirements and a basic timeline are as follows:

* PI and research team ***complete and submit the PI Questionnaire*** (utilizing this template) to Tran-SET T2 Coordinator ***before PRC Meeting #2*** and by the due date specified in the award letter (i.e., Reporting Requirements).
* A 90-minute web (or in-person) meeting (i.e., PRC Meeting #2) facilitated by the T2 Coordinator will be scheduled and conducted ***within one month of the technical phase end date***. The meeting will include:
  + A PowerPoint presentation (40 min) by the PI to present: ***the project’s objectives, methodology, and results (20 min), the Revised Project-Specific T2 Plan (10 min), and the information identified in the PI Questionnaire (10 min).***
  + The PRC members will discuss the presented information about the project, the level of readiness of the output, give feedback, and provide recommendations (40 min).
  + Wrapping-up and summarizing the main discussed points (10 min).

Please review Tran-SET’s [*T2 Plan*](http://transet.lsu.edu/center-plans/) for additional information.

## **Contact**

Please contact the Tran-SET T2 Coordinator – Dr. Husam Sadek (at [transet@lsu.edu](mailto:transet@lsu.edu) or 225-578-0131) if you have any questions or would like additional information.

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

## **Technology Readiness Level (TRL) – PI Questionnaire**

**Step 0. Project Information**

| **Element** | **Information** |
| --- | --- |
| Project Title |  |
| Project Number |  |
| Principal Investigator(s) |  |
| Participating University/Institutions |  |
| Questionnaire Date |  |

**Step 1. Describe the Output Developed in this Project**

*Please succinctly answer the following questions to describe the output developed in your project and aims to solve a specific problem.*

| A | What is the output developed from the technical phase of your project?  *(Project output can be: product, technology, guidelines, technique, approach, concept, tool, or any other kind of output from the project)* |  |
| --- | --- | --- |
| B | What are the main components of the output developed in this project? What is the status of those components? |  |
| C | Are there remaining technical challenges that may affect implementation? Please describe. |  |

**Step 2. Describe the Envisioned Deployment of this Output**

*Please concisely answer the following questions and describe where the output of your project will be deployed, what problems will it solve, in which environment it will be used, and how the end users will utilize it effectively.*

| A | Who would deploy this output? Describe the end users of it, and how they will use it. |  |
| --- | --- | --- |
| B | What problem(s) has this output been developed to solve or address? At the point of implementation, will this output address these problems sufficiently (if not, why not)? |  |
| C | If the output 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 output 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 output 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 Output**

*Please succinctly explain if the developed output has been tested and in what settings/conditions. Also, describe the results obtained from this experiment.*

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

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

*In this step, please answer the following questions and describe how has the user community been included in the output development process of this project.*

| 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 output has been received, how has the output been revised (if at all) to address this feedback? |  |
| D | What tests or trials should be performed on, with, or using the developed output, as it exists today, before the end user can confidently use/implement it? |  |

**Step 5. Other Notes**

|  |
| --- |

**Step 6. TRL Self-Assessment**

*In this step, please conduct a self-assessment by selecting the TRL score using the scale below based on the corresponding description and supplied aforementioned questions. Your TRL score will be the highest level achieved for your project’s output\* based on the questions provided below. Circle or highlight the appropriate TRL below and provide the number here.* ***The selected TRL Score is: \_\_\_\_\_\_\_***

|  |  |  |  |
| --- | --- | --- | --- |
| **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 output\*? * Has the output development methodology or approach been developed? |
|  | 2 | Application formulated | * Are potential framework applications identified? * Are output 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 output performance metrics established? * Is output feasibility fully established? * Do experiments or modeling and simulation validate performance predictions of output capability? * Does the output 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 output demonstrated in operational environment | * Are available components ready to be fully integrated in the final output? * Is the fully integrated output demonstrated in an ***operational environment*** (i.e., real-world conditions, including the user community)? * If applicable, are all output components tested individually under expected conditions? |
|  | 8 | Output proven in operational environment | * Is the output proven in an operational environment (i.e. meet target performance measures)? * Was a rigorous test and evaluation process completed successfully? * Does the output meet its stated purpose and functionality as developed? |
| Implementation | 9 | Output refined & adopted | * Is the output deployed in its intended operational environment? * Is information about the output disseminated to the user community? * Is the output adopted by the user community? |

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