

# TECHNOLOGY TRANSFER (T2) PLAN

REVISED

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SAFE-D: SAFETY THROUGH DISRUPTION UNIVERSITY TRANSPORTATION CENTER



## Introduction

Disruptive technologies are revolutionizing the transportation industry. Traditional car companies and their suppliers along with the new “Silicon Valley car companies” (e.g., Tesla, Waymo, and Uber) are racing to get the first disruptive transportation products to market. This has created considerable market “pull” for critical knowledge in the theme areas targeted for study by the Safe-D consortium. We plan to capitalize on this rare opportunity by providing knowledge through accelerated and impactful technology transfer (T2). Our T2 efforts are designed to make UTC research results available to potential users in a form that can be implemented, utilized, commercialized, or otherwise applied with minimal effort. The T2 program was devised and will be performed in accordance with USDOT recommendations.<sup>1</sup>

The structure of Safe-D includes a formal T2 Coordinator, Dr. Mike Mollenhauer. Dr. Mollenhauer has 15 years of experience fostering relationships with stakeholders, including government affiliates and industry partners, and has proven leadership experience in small startup businesses. He also founded and currently directs the Center for Technology Implementation at VTTI, a center specifically focused on T2 and helping industry overcome early-stage implementation challenges. As coordinator, Dr. Mollenhauer will 1) work with researchers to incorporate T2 into all projects; 2) compile T2 materials from all projects; 3) incorporate the new materials into T2 programs; and 4) develop and manage a T2 process for all subsequent Safe-D projects to ensure positive T2 outcomes. Dr. Mollenhauer will work with all consortium researchers with the aim of synergistically assembling and disseminating quality T2 materials and support.

This Safe-D T2 Plan is focused on describing how the Safe-D UTC Leadership Team will manage its T2 activities to facilitate the rapid implementation and commercialization of research outcomes. At the heart of our plan is a mandatory research project process that each Safe-D research team must adhere to while planning for and conducting their individual projects. This process is designed to maximize interaction with industry partners, thereby promoting the adoption of research outcomes. Herein, this Safe-D project process is first described in detail as it provides a structured framework for how each project will address T2 requirements from research topic formulation to project conclusion. Subsequently, we describe the overall Safe-D T2 process with a focus on how the Safe-D UTC will address the following aspects:

- 1) Identification and involvement of stakeholders in the Safe-D research, education, and workforce development programs
- 2) Plans to assist research partners in implementing and deploying research outputs
- 3) The commercialization process for research outputs
- 4) Collection and use of licensing revenues to provide further support for research and T2
- 5) Dissemination of our research results
- 6) How research outputs, outcomes, and impacts will be tracked and reported
- 7) How corporate research support will be increased
- 8) T2 goals and T2 performance measures

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<sup>1</sup> Volpe (2016). Building a Foundation for Effective Technology Transfer through Integration with the Research Process. DOT-VNTSC-OSTR-16-02. Volpe.

# Safe-D Stakeholder Advisory Board

Safe-D Leadership Team and Industry Partners

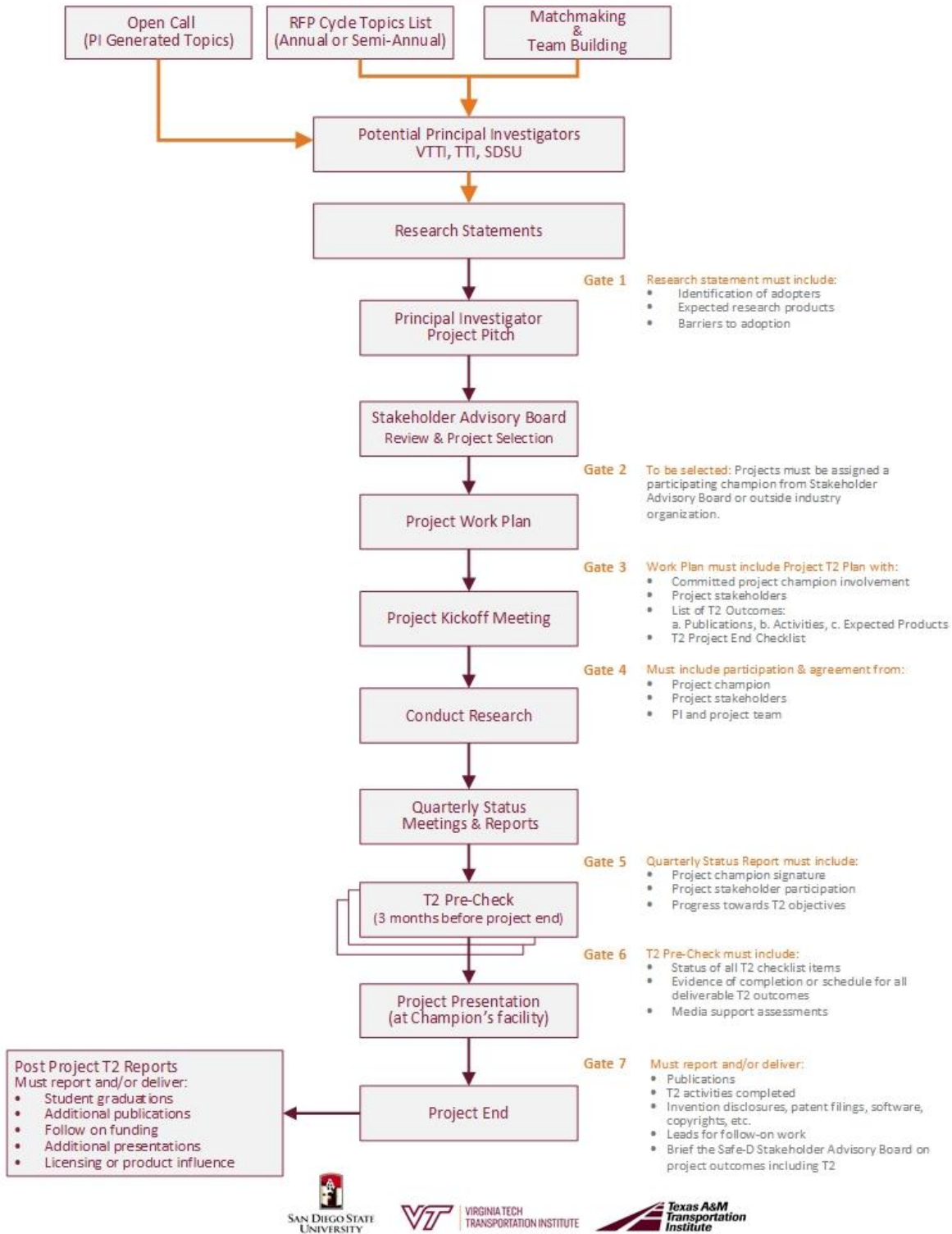


Figure 1. The Safe-D T2 Process

## The Safe-D T2 Process

To maximize the impact of Safe-D research outcomes, each new Safe-D research project will include a mandatory T2 process (See Figure 1). The Safe-D T2 process was created to set clear expectations with each project team about how and when stakeholders will be engaged along with the roles and responsibilities of all project participants. The required Safe-D T2 process includes specific checkpoints (“gates”) during the project lifecycle that will ensure adherence to Safe-D T2 activity expectations and follow-through. Thus, to receive funding, a Safe-D project must have a T2 plan that details (a) how stakeholders will be engaged to increase the likelihood of implementing research outcomes, (b) what T2 materials will be produced by the project, (c) the responsibilities of the Safe-D researchers with respect to T2, and (d) which specific programs, either existing or new, will be targeted for T2.

## Stakeholder Advisory Board

The success of technology transfer activities is paramount to the success of the Safe-D UTC. Therefore, the responsibility for T2 lies with the Safe-D Leadership Team, including the Stakeholder Advisory Board and the T2 Coordinator. The Safe-D Stakeholder Advisory Board consists of the Safe-D Director and Associate Directors at each consortium university, the Safe-D Program Manager, the Safe-D Education and Workforce Development (EWD) Coordinator, the Safe-D T2 Coordinator, and at least four representatives from our industry partners. The industry representatives on the board include those with interests in each of the four Safe-D focus areas (automated vehicles, connected vehicles, big data, and transportation as a service). These four core board seats are expected to be occupied by industrial partners making significant contributions to the Safe-D research program through active participation in Safe-D projects and recurring support through an ongoing research agenda.

Supplemental to the four core industry partner board members, additional members may also be added when additional industry partners engage in significant projects with the Safe-D UTC. These industry partners participate in Safe-D Stakeholder Advisory Board activities while they are contributing to and engaging with specific projects but they are not expected to remain as permanent core board members.

The following requirements apply to all industry partners:

- 1) Participate in at least one active Safe-D project to retain membership
- 2) Serve as a project champion (or designating a champion from their organization) plus any combination of in-kind labor, materials, equipment, and/or cash with an expectation of a 1:1 match contribution
- 3) Help develop Safe-D research topics of interest for their industry and area of interest on an annual or semi-annual basis with a focus on high potential for T2
- 4) Participate in research proposal reviews and help select research statements during annual or semi-annual project selection processes

## Targeted Research Topic Generation

Stakeholder Advisory Board members will convene either annually or semi-annually (depending on program needs) to define research topics of interest within their areas of expertise that have a high likelihood of positive T2 outcomes. Stakeholder Advisory Board member input is critical to align the Safe-D research agenda with industry needs and provides opportunity for matchmaking and alignment of board members with specific project topics. Early involvement from board members also increases the likelihood of investment and participation in projects during subsequent stages of research. These topics are expected to be specific enough to express a real gap in industry needs while leaving open the opportunity for researchers develop

creative approaches to solve the stated problems. Topics of interest are then discussed and refined by the entire Stakeholder Advisory Board, prioritized, and distributed to potential Safe-D researchers during a general call for research statements. After distributing the planned research topics to potential researchers, board members field questions from researchers about the topics as they formulate their responses. During this formative period, the Safe-D Leadership Team may actively recruit researchers appropriate for topics as board members may suggest that multiple researchers from different consortium institutions team up to create stronger and more diverse research teams. In addition to the board-generated topics, researchers may also submit research statements that do not directly address the topics list but are within the scope of the Safe-D core areas. The likelihood of these unsolicited projects being funded may diminish depending on the value of the research objective and resources available.

### Research Statement Generation

After reviewing the research topics, interested research teams then develop research statements that include the following T2 content (at a minimum):

- 1) What tangible research products will be generated by the research?
- 2) Who are the likely adopters of the technology? Who is interested in consuming the research products and what is the magnitude of this group?
- 3) What are the barriers to adoption for the research products? What challenges are involved in getting users to adopt the research products?
- 4) Are there competing technologies that already exist or are significantly entrenched?

During this formative period of research statement generation, Safe-D board members may suggest potential collaborations between researchers within the consortium with the goal of providing the most effective teams to maximize the potential for T2. Research statements are gathered from researchers prior to the call for statements deadline and will be reviewed to make sure they meet the minimum requirements above and provide a reasonable explanation of the research plan. Stakeholder Advisory Board members review all research statements and provide initial feedback so that the research statements can be refined for the next phase review.

### Principal Investigator Project Pitch

During the next phase of project evaluation, the PIs of each project team will create a short (~ 7 minutes) presentation or “pitch” that highlights the proposed research, including expected tangible outcomes. Multiple research teams may pitch their project concept to address each topic. Each PI will deliver their pitch to the Stakeholder Advisory Board and industry partners during a one-day session where all competing projects are presented. The pitch must adequately present the team’s approach, high-level research plan, EWD and T2 outcomes, and how this project is disruptive to the theme area. The pitch is followed by a brief question-and-answer period that allows the reviewers to ask questions for clarification. In addition to helping reviewers get a better sense of each project, this part of the Safe-D project process allows researchers to sharpen their entrepreneurial skills.

After hearing all pitches, the reviewers grade each research statement based on the project’s potential to be disruptive, improve safety, addresses the Safe-D theme areas, positively affect EWD, and generate positive T2 outcomes. The Stakeholder Advisory Board and industry partners will have additional influence over project selection if they choose to participate in projects they deem important to their industry sector and are willing to provide project funding and / or in-kind contributions. The PIs of the highest rated projects are notified of their selection and asked to create a full project work plan, as outlined in the next section. Each project is also assigned a project champion selected from the Stakeholder Advisory Board or their designated

representative. This project champion will participate in the project at an advisory level to provide and industry and customer perspective and ensure effective T2.

### Project Work Plans

The research project teams selected for funding develop full project proposal, including a T2 plan, with input from their assigned project champion. The research project teams selected for funding develop a full project proposal, including a T2 plan, with input from their assigned project champion. To assure that all T2 objectives are adequately addressed, each project work plan is required to include the following:

- 1) Final commitment of the project champion
- 2) Identification of additional stakeholders who can help define and achieve T2 objectives
- 3) A plan for anticipated T2 activities, including expected T2 products and outcomes
- 4) A T2 project-end checklist

The project champion will serve as an industry consultant to the project and guide project towards implementable T2 outcomes that address industry needs. The project champion will also provide a customer-type perspective that is intended help the team on real industry needs. Additional stakeholders may be identified by the project team that can provide broader perspectives and facilitate the implementation of results. Anticipated research products and outcomes may include publications, prototypes, software, algorithms, methods, patents and/or intellectual property (IP) disclosures.

As part of the T2 plan within the overall project work plan, researchers are requested to provide the following content:

- 1) Expected product(s) of the project, the reasons for developing them, and the benefits they will have
- 2) Assessment of the market for the research product, including who will want it and why
- 3) Confirmation that the research team has explored publicly available information sources to verify that the research product or something similar does not already exist
- 4) Explanation of desired stakeholders and how they will contribute to the project
- 5) Barriers to adoption and how the research team plans to address and overcome them

Each project team develops their own T2 checklist for use by the project champion and the Safe-D Leadership Team to verify that the team follows through with their proposed T2 plan. Each checklist includes project goals for T2 activities, products, and outcomes. Project PIs are encouraged to track their progress towards items on their T2 checklist during each quarterly status report.

Completed work plans are submitted to the Safe-D Leadership Team for final revisions, review, and acceptance.

### Project Kickoff Meeting

Following award, the research team holds a kickoff meeting to align their responsibilities and commence work. Each kickoff meeting, which is expected to include the project champion, involves a brief presentation outlining the project plan, specific work tasks, project schedule, and project budget. Any additional project stakeholders identified during work plan development should also be invited to the kickoff meeting. To facilitate attendance and accommodate industry partner schedules, kickoff meetings may be held virtually via webinar or similar technologies.

### Quarterly Status Meetings

Each project team is encouraged to conduct regular quarterly (or more frequent) status meetings with their project champion in attendance. The status updates should be presented to

the project champion as though they are the customer for the research project. At a minimum, the project team should report progress on tasks, EWD, and T2 activities during the reporting period along with work expected to be completed during the next reporting period. Any barriers towards achieving project goals and T2 checklist items should also be noted. Any additional industry stakeholders that have been recruited to advise on the project will also be invited to participate in status meetings.

### End of Project Pre-Check

Approximately three months prior to the end of the project, each project team meets with the Safe-D T2 Coordinator to review their T2 progress based on the T2 checklist. This T2 status check is imperative prior to the end of the project so that necessary corrective actions can be taken if any T2 items are unaddressed. At this point, the Safe-D T2 Coordinator works with the project team to create an inventory of all T2 products and outcomes to facilitate additional planning. The T2 coordinator assists the project team in identifying the optimal way to promote their research products. Promotion strategies may include publication, webinar series that address targeted audiences, Safe-D product websites, and presentation at industry conferences. Certain high-value research products may be selected for additional promotion at the discretion of the Safe-D Leadership Team. In these cases, additional resources may be provided to the research team to create professional promotional videos or to support high-profile demonstrations. The result of the End of Project Pre-Check is a clear mutually agreed-upon plan for how the project team will complete the T2 activities they set out to accomplish.

### End of Project

Finally, at the end of the project, each project team delivers a project summary presentation to the project champion, stakeholders, and the Safe-D Leadership Team. The presentation should cover the work performed during the project, EWD results, and T2 products/outcomes. With respect to the T2 products and outcomes, the research team should report the following:

- 1) Publications
- 2) All T2 activities completed
- 3) Invention disclosures, patents filed, and software copyrights
- 4) Leads for follow-on research work
- 5) Any other T2 products or outcomes developed

### Post-Project

Beyond the end of the project timeline, the Safe-D Leadership Team may occasionally check in with project teams to identify any additional T2 outcomes that occurred after project end.

Examples of such project outcomes include the following:

- 1) Additional publications occurring after the project ended
- 2) Any follow-on research work obtained as a result of the original project or its outcomes
- 3) Any licensing revenues generated, software delivered and in use, demonstrations completed, etc.
- 4) Any additional public presentations on the work completed

Each research project team is expected to compile any additional information available from completed projects to accurately track its T2 impact, even after the project is completed.

## Involvement of Stakeholders

As demonstrated in the above Safe-D project process, stakeholders are closely involved in many aspects of the research program. First, Safe-D includes four core industry members on its

Stakeholder Advisory Board. The four industry members represent each of the Safe-D theme areas and will be invited to participate on the board. Safe-D will seek out these important industry partners through an engagement and pursuit of individuals who have an active research agenda within their own organizations and would benefit from leveraging Safe-D funding on cooperative projects. Each industry partner on the board represents their own areas of interest while assisting the Safe-D Leadership Team in developing and executing the Safe-D research agenda. As mentioned above, to be eligible for board membership, the industry partner must co-sponsor at least one Safe-D research project with an expectation of direct or in-kind 1:1 matching. The industry board members work with the Safe-D Leadership Team to ensure that Safe-D research addresses current needs and technological shortcomings relevant to industry. In this way, the industry partners provide direct input into the Safe-D research agenda. To remain a core board member, each industry partner must continue to fund additional research projects.

In addition to directly participating on the Stakeholder Advisory Board, industry partners may also advocate for particular projects and serve as project champion. A project champion is an external industry partner that has committed to serve in an advisory capacity for a research project. Project champions are assigned during the generation of research statements to help project teams solve real-world problems within their areas of expertise. This engagement model benefits the research project by ensuring that it addresses real industry needs and allows the research team to interact with the project champion throughout the project. Project champions are expected to steer the project teams towards practical and implementable solutions and are likely adopters of the eventual research products. Embedding the industry partner directly into the research project also provides the research team with a built-in customer, which will facilitate the development of meaningful T2 products. Project champions are also expected to provide resource match to the project at a reasonable level with a 1:1 goal.

Safe-D also incorporates industry partners as stakeholders in its research projects. Stakeholders in Safe-D projects provide guidance through subject matter expertise, although their level of engagement is lower than that of the project champion, and the stakeholder is not directly embedded with the research team. This stakeholder involvement encourages research teams to interact directly with industry subject matter experts while not requiring their participation as a funding partner.

We believe this model will be attractive to potential industry partners as a way to stretch their research dollars, gain access to University facilities and expertise, and interact with students to create an employee recruitment pipeline.

## Stakeholder Assistance

Safe-D prioritizes projects that result in tangible research outcomes during the project selection process and encourages prototype development and demonstration during project execution. Therefore, each project should result in research products that are ready to be implemented/deployed or demonstrable to help acquire more resources to support implementation. The Safe-D project process detailed earlier is also designed to assist stakeholders in implementing and deploying research outputs by embedding the project champions directly with the research team, starting with the development of the work statement. This close association supports the close alignment of project deliverables with the solutions that industry will want to immediately deploy into production systems.

Implementation and deployment can be facilitated by building prototype development and demonstration tasks into each work statement. During the project, the project champion can guide implementation and deployment activities based on the interests and needs of their



organization. These interactions simplify the process of integrating the research product into the champion's own organization and systems. Having a functional prototype or demonstration of the research product also helps the project champion socialize the technology internally and generate additional resources and momentum for implementation within their own organization, enhancing the probability for adoption.

Finally, Safe-D prioritizes the funding of follow-on projects expected to lead to implementation and deployment. If a Safe-D project results in IP that is close to implementation but needs some additional work, the Safe-D Leadership Team will prioritize follow-on research projects that will close the gap between a prototype and an implementable solution.

## Commercialization Process for Research Outputs

Safe-D research projects are awarded based on their potential to generate tangible research products. Ultimately, all Safe-D projects aim to translate IP into commercial application. However, the path to commercialization is often confusing and full of barriers that must be overcome. As T2 is an important mission for Virginia Tech, San Diego State University (SDSU), and the Texas A&M University System (TAMUS) of which Texas A&M Transportation Institute (TTI) is a member institution, Safe-D researchers have access to an experienced pool of IP management resources through their respective universities, including:

- 1) Virginia Tech Intellectual Properties (VTIP), an affiliated corporation of VT dedicated to technology commercialization, is passionate about creating market opportunities from scientific innovation. VTIP ensures that research results make positive contributions to society by protecting, marketing, and commercializing technology and innovation.
- 2) TAMU's Technology Commercialization Agency and SDSU's Technology Transfer Office work with researchers at these universities to identify research projects with commercial value; find partners for commercialization; and protect, market, and license the IP rights.
- 3) The Communications Programs at TTI and VTTI offer a full suite of T2 resources, including print and video production; Internet publishing; customized public/media relations campaigns; technical writing and editing; presentation and exhibit design; website development; and social media promotion.

As the lead organization of the Safe-D program, Virginia Tech facilitates the commercialization process among the consortium universities through engagement of the T2 Coordinator and support from VTIP. When a particular project results in the generation of IP with commercial potential, the project PI initiates the commercialization process through the PI's local university IP management resource. Safe-D PIs follow the process and policy of their local IP management office and report progress to the Safe-D T2 Coordinator. The T2 Coordinator assists Safe-D PIs in navigating the commercialization process as needed. When a project involves multiple universities, the PI's local IP management office leads commercialization activities, and the T2 Coordinator ensures that cross-university ownership is acknowledged and equitably distributed.

If interested parties are identified, the local IP management office negotiates the licensing, sale, or other means of transfer of rights to commercialize the IP product to the adopter. Other commercial engagement options include soliciting additional funding to further develop the IP product or promoting the formation of a start-up company to advance the product if there are sufficient resources available and no suitable existing company is identified. While each local university IP management office takes direct responsibility for the commercialization steps noted above, inventor participation is a key component to successful IP transition. The PIs and research team should remain engaged with the local IP management office throughout the commercialization process to help facilitate the transition.

## Collection/Use of Licensing Revenues

The collection and use of licensing fees can be considered as a final step in the commercialization process noted in the previous section. At the conclusion of the research project, ownership of IP products is typically assigned to the local university. The responsibility to negotiate the final license agreement and revenue terms lies with the local university's IP management office. The transfer of technology may result in ongoing royalty payments, a one-time license fee, or outright sale of the technology. As a steward of the IP, the local IP management office will negotiate the terms of transfer and monitor the use of the technology to verify that the adopting organization is adhering to the terms of the license agreement. They also have the authority to collect and distribute fees resulting from the transfer of technology on behalf of the university and IP inventors. Each local IP management office has its own terms for how to distribute the fees collected and they will be applied to any IP products generated by Safe-D research projects.

The Safe-D T2 Coordinator, Dr. Mike Mollenhauer, tracks the development of commercial licenses and revenues collected as a result of T2 and will reports the results to the Safe-D Leadership Team.

## Dissemination of Products

Safe-D T2 activities extend beyond the existing services with dedicated programs facilitated by the T2 Coordinator. These programs are available to UTC researchers as options to fulfill their T2 obligations within each research project. New programs will also be designed to expose students in each of the consortium universities to the T2 and research dissemination process. These additional activities/programs include:

- 1) **Project Champions:** As discussed earlier, Safe-D projects include embedded industry partners known as project champions. The project champion funds the project at a goal rate of 1:1 funding match and acts as an industry advisor and de facto customer for the research outputs. The project champion provides at least one built-in means to engage an industry partner. Project teams present a research summary to the project champion's organization at the end of each project.
- 2) **T2 Technical Briefs and Videos:** Safe-D will develop a dedicated T2 publication and associated online repository including project briefs tailored to practical technological application. These briefs will be distributed to stakeholders and beyond to our large collective lists of public and private contacts.
- 3) **Workshops and Conferences:** As part of the T2 plan, all funded Safe-D projects are required to produce at least one nationally recognized conference or workshop presentation. These presentations will be made public on the website.
- 4) **Journals and Other Publications:** Every funded Safe-D project will also be required to publish at least one journal article. Peer-reviewed conference proceedings will be accepted, although researchers will be encouraged to target prestigious journals to reach more diverse audiences and help students build credibility.
- 5) **T2 Promotion Events:** For projects with commercialization potential, the Safe-D will convene periodic promotional events during which project teams will pitch their ideas to the stakeholder attendees to obtain feedback on how to improve the feasibility of technology adoption and strategies to mitigate barriers to implementation. We expect such events to initiate commercialization discussions.
- 6) **Web Presence and Social Networking:** The Safe-D will create a comprehensive web presence with a website that provides a full description of the UTC along with portals for education and workforce development content and T2 materials. Building on the

successes of consortium members' past social networking experience, Safe-D will leverage Facebook, LinkedIn, Google+, SlideShare, and YouTube dissemination channels, as appropriate.

- 7) Demonstrations: For projects that result in technologies that can be promoted through live demonstrations, the T2 coordinator will seek opportunities to add the project demos to recurring tours at VTTI, TTI, and SDSU facilities. These tours occur regularly throughout the year and bring a wide variety of visitors particularly from these Safe-D theme areas.
- 8) Short courses: Findings of Safe-D projects will be incorporated into short courses targeted at non-academic audiences. For example, we plan to create a course for TTI's annual Transportation Short Course, which brings together over 2,400 TxDOT employees and the TTI Transportation Safety Conference which attracts over 300 academics, researchers, and industry professionals to discuss cutting-edge ideas and strategies for implementing research results and features prominent national experts.

## Tracking and Reporting

The tracking of research outputs, outcomes, and impacts starts within the Safe-D research project process. During the development of the project work statement, each project team creates a T2 checklist that identifies the expected outputs. Within three months of the end of the project, the Safe-D T2 Coordinator meets with the project team to assess their T2 progress. The T2 Coordinator and project team then agree to a final set of deliverable outputs to be developed prior to project end. The tracking begins with the individual project T2 checklists.

At the end of the project, the project team provides evidence of the planned deliverables to the T2 Coordinator, who logs the outputs into a Safe-D T2 Tracking spreadsheet detailing the type of output developed, the date received, links to the source material (publications, datasets, IP disclosure documents, etc.), and whether follow up will be required to determine if additional outcomes or impacts have been generated after project end. If physical files are available, the T2 Coordinator uploads the delivered outputs to the Safe-D T2 repository on the Safe-D Researcher Portal.

Examples of T2 outputs that are logged and tracked by the T2 Coordinator include:

- 1) Tech Brief – a short 1-page document with a description of the research project and its relevant outcomes
- 2) Subject Matter Expert Review – a subject matter expert (usually the project champion) will review each project final report
- 3) Publications – a reference, link, or electronic copy of the published document
- 4) Conference presentations – a copy of the presentation or poster content presented at the conference or similar gathering of industry practitioners
- 5) Attendance of practitioners at T2 promotional events – a measurement of attendance and description of the types of practitioners present at events where Safe-D T2 outcomes are presented
- 6) Intellectual Property Disclosure – an electronic copy of the disclosure document that was filed with the local intellectual property management office
- 7) Patent application – an electronic copy of the full or provisional patent application if filed
- 8) Software – a copy of any software developed during project research activities
- 9) Datasets – a copy of any datasets collected or created to support the research project

- 10) Facility tours – the number of facility tours that showcase Safe-D T2 outcomes along with attendance and a description of the attendees
- 11) Technology in use at vendors – instances where outputs are used in an industry partner’s operations
- 12) Technology in use at DOTs – instances where outputs are used in a DOT agencies operations
- 13) Follow on research – instances where additional follow-on research projects have been funded by industry or agency partners

Non-proprietary T2 outputs are linked directly back to the individual project page on the Safe-D website to make them available to public viewers. Proprietary T2 outputs such as a license disclosure are also listed but are only made available to the viewer through a “Contact Us” request. Additional care including items such as non-disclosure agreements may be required to gain access to some sensitive materials.

## Increasing Corporate Research

Safe-D believes the best way to increase corporate research is to involve industry partners directly in our research program. The Safe-D project process requires that each project have a project champion from industry. The project champion provides matching funds or in-kind contributions and helps align the research agenda with real deployable outcomes that solve industry problems. This level of involvement is expected to focus Safe-D research activity, incent follow-on research and lead to the development of researcher-industry partner relationships that will increase the likelihood of additional corporate support.

## T2 Goals and Performance Metrics

In addition to the metrics reported in the Annual Performance Indicators, T2 performance of the Safe-D research portfolio will be evaluated and tracked using the metrics listed below.

### Outputs

- 1) Website traffic measures – Safe-D has developed a means to identify how many times external users view our website project pages. Safe-D will track these visibility measures based on which page/project is being viewed and how often.
  - Safe-D has set a goal to accumulate at least 2,000 visits per year to our website, increasing each year of the grant.
  - Safe-D has set a goal to attract at least an average of 150 different users to each project page per year, increasing as projects begin to be completed and products are made available via project pages.
- 2) Journal articles and conference presentations – Safe-D researchers are expected to publish their results in high profile scientific journals. They are also expected to present their results personally at conferences or similar gatherings of industry practitioners.
  - Safe-D expects each project team to publish at least one journal article based on their project results.
  - Safe-D expects each project team to present at least one conference or similar gathering of industry practitioners.
- 3) Tours of Facilities – The Safe-D university consortia members will utilize the opportunity to address the multiple industry practitioners that visit their facilities during tour events. A small display of Safe-D research highlights including demos, posters, videos and other tangible products will be developed and added to the normal tour activity at each Safe-D consortia member’s facility

- Safe-D expects to have the displays viewed by 220 visitors per year across the three member facilities
- Safe-D expects to generate follow up interest and/or industry participation in Safe-D from 5 visitors per year based on the visits to the display during tours

## Outcomes and Impacts

- 1) Practitioner attendance at events – Safe-D is hosting a variety of events that will result in disseminating research results. Examples including hosting a booth at a STEM science fair to highlight several research projects, attendance at a Virginia Department of Transportation Work Zone safety conference, planned Safe-D T2 Webinars, etc. Safe-D will also be inviting industry partners to the Principal Investigator Project Pitch webinar and will host T2 highlight webinars designed to attract practitioners to the available technologies.
  - Safe-D expects that on average, each project will participate in one event that exposes T2 outcomes to practitioners
  - Safe-D expect that each event attended will expose project T2 outcomes to 15 practitioners
- 2) Known vendors using technology developed – Safe-D will monitor how many projects results in technology being used in one form or another at industry partner organizations.
  - Safe-D expects to have 1/3 of all projects result in vendors using some form of technology developed during the project
  - Safe-D expects to receive licensing revenues from 1 industry technology licensee as a result of project T2 outcomes in the later stages of UTC operation
- 3) Known Departments of Transportation using technology developed – Safe-D will monitor how many projects results in technology being used in one form or another at Departments of Transportation
  - Safe-D expects to have 3 DOTs using some form of technology developed by its projects
  - Safe-D expects to receive follow-on project funding from 2 DOTs to further develop or implement T2 outputs as a result of project T2 outcomes