[Fill in sections 4, 7, 9, 16 and 17.]

Technical Report Documentation Page

1. Report No. MN 2021-XX	2.	3. Recipients Accession No.	
4. Title and Subtitle Minnesota Department of Transportation October 2021 Research Peer Exchange		5. Report Date March 2022	
		6.	
7. Author(s) Brian Hirt, Kirsten Seeber		8. Performing Organization Report No.	
9. Performing Organization Name and Address CTC & Associates LLC 4805 Goldfinch Drive Madison, WI 53714		10. Project/Task/Work Unit No.	
		11. Contract (C) or Grant (G) No.	
12. Sponsoring Organization Name and Address Minnesota Department of Transportation Office of Research & Innovation 395 John Ireland Boulevard, MS 330 St. Paul, Minnesota 55155-1899		13. Type of Report and Period Covered	
		14. Sponsoring Agency Code	
15. Supplementary Notes https://www.mndot.gov/research/reports/2021/2021XX.pdf			
16. Abstract (Limit: 250 words) The Minnesota Department of Transportation (MnDOT) hosted a virtual peer exchange meeting on October 26-29, 2021, to discuss topics related to transportation research goals, strategies and processes among other state DOTs. The meeting and the subsequent publication of this report fulfill the agency's obligation to conduct a periodic peer exchange as part of the federal State Planning & Research program. The event centered around three main topics: messaging the value of research, transportation innovation, and equity and research. Participants of the three-and-a-half-day online event included staff from MnDOT's Research & Innovation Office, several other MnDOT offices, nine other state transportation agencies (Arizona, California, Iowa, Kansas, Massachusetts, North Dakota, Utah, Washington State, and Wisconsin), and the Federal Highway Administration. Based on presentations, open question-and-answer sessions, and roundtable discussions, participants shared what they saw as MnDOT's strengths and challenges, opportunities for MnDOT in the areas discussed, and takeaways for their home agencies. The event concluded with a report-out session to MnDOT leadership and a summary of perspectives and opportunities for MnDOT from an executive perspective.			
17. Document Analysis/Descriptors Research, innovation, value of research, communication, messaging, equity, State Planning and Research		18. Availability Statement No restrictions. Document available from: National Technical Information Services, Alexandria, Virginia 22312	
19. Security Class (this report) Unclassified	20. Security Class (this page) Unclassified	21. No. of Pages	22. Price

Minnesota Department of Transportation October 2021 Research Peer Exchange

FINAL REPORT

Prepared by:

Brian Hirt
Kirsten Seeber
CTC & Associates LLC

March 2022

Published by:

Minnesota Department of Transportation
Office of Research & Innovation
395 John Ireland Boulevard, MS 330
St. Paul, Minnesota 55155-1899

ACKNOWLEDGMENTS

The authors thank the staff of the MnDOT Office of Research and Innovation, named in Section 1.1 of this report, for their time, guidance, and insight over the course of planning and conducting the research peer exchange event.

The authors also thank all peer exchange participants and presenters from Minnesota and across the United States, also named in Section 1.1 of this report, for lending their expertise and perspectives on the topics discussed during the event.

TABLE OF CONTENTS

LIST OF FIGURES

PEER EXCHANGE AT-A-GLANCE

Host Agency: Minnesota Department of Transportation

Guest Agencies: Arizona DOT, California Department of Transportation, Iowa DOT, Kansas DOT, Massachusetts DOT, North Dakota DOT, Utah DOT, Washington State DOT, Wisconsin DOT, and Federal Highway Administration.

PEER EXCHANGE TOPICS

Messaging the Value of Research: Formal and informal messaging processes, tracking the success of messaging, project- and program-level methods for monitoring and messaging research benefits, and best practices, leading-edge approaches and challenges related to messaging the value of research.

Transportation Innovation: Formal and informal innovation programs within agencies, how research and innovation intersect, tracking innovation, and barriers and challenges to implementing innovation.

Equity and Research: How agencies define equity, steps taken to achieve equity, barriers to reaching equity, as well as the role research plays in achieving equity.

TOP FINDINGS AND TAKEAWAYS

Messaging the Value of Research

- Keep **research final reports short and streamlined** to make them accessible to more readers.
- Emphasize the **implementation of what was learned** rather than the project's raw results.
- Explore a **research liaison network** throughout the department.
- **Message and market projects across the board**, including research activities.
- Continue to communicate the **value of research externally and to MnDOT staff**. The question that is often asked is, "Why spend money on research when money is needed elsewhere?" Research helps the agency to be more efficient, safer, and save time and money.
- In particular, explore **novel and high-engagement methods** for communicating the value of research. Videos can help tell a compelling story of how implementing research project outcomes provides benefit to the state of Minnesota.

Transportation Innovation

- Identify ways to do **rapid research projects**. Finding quicker answers without doing detailed research is important. It will make MnDOT more responsive to its customers.
- Address any **gap between soliciting and responding** to innovation and research ideas. Be aware of the reputational risk of not being able to respond.

Equity and Research

- MnDOT is pleased to have made good progress in the equity space. The department is currently working on a new **draft definition of transportation equity**, and work continues.
- Include **equity when planning and conducting research projects**.
- Look at opportunities for MnDOT to **learn from other leaders in the area of equity in research**.

Additional Thoughts

- "**Don't reinvent the wheel**." MnDOT has limited dollars to apply to research and transportation infrastructure. MnDOT is always looking for tools, methods and strategies to make sure it knows what's out there so the agency doesn't duplicate the work of others.
- Using this peer exchange to **establish a peer network** would be extremely valuable.

CHAPTER 1: INTRODUCTION AND OVERVIEW

The Minnesota Department of Transportation (MnDOT) hosted a virtual peer exchange meeting on October 26-29, 2021, to discuss topics related to transportation research goals, strategies and processes among other state DOTs. The meeting and the subsequent publication of this report fulfill the agency's obligation to conduct a periodic peer exchange as part of the federal State Planning & Research (SP&R) program (per Title 23, Part 420 of the Code of Federal Regulations).

The event centered around three main topics:

- Messaging the Value of Research.
- Transportation Innovation.
- Equity and Research.

1.1 PEER EXCHANGE PARTICIPANTS

The peer exchange brought together representatives from MnDOT, nine other state DOTs, and the Federal Highway Administration (FHWA). The following individuals participated in the four-day event.

Minnesota Department of Transportation

Chief Counsel Office
Ericca Erhard, Associate Legal Counsel

Commissioner's Office
Nancy Daubenberger, Deputy Commissioner & Chief Engineer

Communications & Public Engagement Office
Renee Raduenz, Deputy Director

Connected and Automated Vehicles Office
Thomas Johnson-Kaiser, Communications and Engagement
Tara Olds, Deputy Director

Environmental Stewardship Office
Carol Zoff, Principal Landscape Architect and Environmental Planning and Design Supervisor

Metro District
Jim Henricksen, Planning and Program Management

Materials & Road Research Office
Lauren Dao, Communications
Curt Turgeon, Materials Project Certification, Pavement Section

Modal Planning & Program Management Division
Tim Henkel, Assistant Commissioner
Jean Wallace, Assistant Division Director

Research & Innovation Office

Katie Walker, Director of Research & Innovation
Marcus Bekele, LRRB Research Implementation Manager
Shannon Fiecke, Marketing and Communications Manager
Hafiz Munir, Research Strategy Manager (and Interim Research Implementation Manager)
Micaela Resh, Communications Specialist
Brent Rusco, LRRB Research Program Manager
Debbie Sinclair, Multi-State Pooled Fund Program Coordinator
Nicole Westadt, Contract & Finance Manager

Transportation System Management Office

Philip Schaffner, Program Director, Statewide Planning

State of Minnesota IT Services

Gabriella Tsurutani, IT Business Analyst

Guest State DOT Research Programs

Arizona Department of Transportation

Dianne Kresich, Research Center Manager

California Department of Transportation

La Keda Huckabay, Office Chief, Policy Planning and Programming Office
April Nitsos, iTeam Leader, Office Chief, Data Services and Technology Office
Pauline Valenzuela, Statewide Innovation Coordinator

Iowa Department of Transportation

Peggi Knight, Director, Research & Analytics Bureau
Khyle Clute, SPR Research Engineer
Vanessa Goetz, State Research Program Manager – Iowa Highway Research Board
Brian Worrel, Research Program Manager, Research & Analytics Bureau

Kansas Department of Transportation

Audrey Atkinson, NHI & Research Coordinator
Mallory Aye, Research Publications Writer
Susan Barker, Structural Materials Engineer
David Behzadpour, Research Technology Transfer Engineer
Marie Manthe, KDOT Librarian
Sally Mayer, Assistant Bureau Chief, Research Bureau
Erinn McArtor, Concrete Research Engineer
Dan Wadley, Bureau Chief, Research Bureau

Massachusetts Department of Transportation

Lily Oliver, Manager of Research
Liz Williams, Director of Data and Policy
Drew Pflaumer, Transportation Planner

North Dakota Department of Transportation

Amy Beise, Research Manager

Utah Department of Transportation

Cameron Kergaye, Director of Research and Innovation

David Stevens, Research Project Manager

Washington State DOT

Anne Freeman, Research & Library Services Program Administrator

Wisconsin State Department of Transportation

David Esse, DTSD (Division of Transportation System Development) Innovation & Technology Program Chief

Diane Gurtner, Research & Library Services Supervisor

Andy Eiter, Research Communications Coordinator

Federal Highway Administration, Minnesota Division

Joe Campbell, Transportation Engineer/Assistant Bridge Engineer

Bill Lohr, Field Operations Team Leader

Kris Riesenberg, Technical Services Team Leader

1.2 FORMAT

Due to travel restrictions related to the novel coronavirus (COVID-19) pandemic, MnDOT held the peer exchange as a virtual event over four consecutive days. Participants shared their cameras when possible (Figure 1) to facilitate face-to-face discussion in the virtual environment.

Figure 1. Meeting participants

One topic was addressed each of the first three days. The final morning was dedicated to an executive report-out session. The meeting agenda is Appendix A to this report.

Over the course of each of the first three days, MnDOT and guest participants gave prepared presentations, followed by group discussion and question-and-answer sessions.

Day 1. Messaging the Value of Research

Areas of particular interest in this topic included formal and informal messaging processes, tracking the success of messaging, project- and program-level methods for monitoring and messaging research benefits, and best practices, leading-edge approaches and challenges related to messaging the value of research.

Day 2. Transportation Innovation

Specific areas explored in this topic included formal and informal innovation programs within agencies, how research and innovation intersect, tracking innovation, and barriers and challenges to implementing innovation.

Day 3. Equity and Research

This topic addressed equity broadly within agencies, including how equity is defined, steps taken to achieve equity, barriers to reaching equity, as well as the role research plays in achieving equity. The participants in attendance provided their key takeaways from the event, including opportunities and new ideas to explore at their individual agencies.

Day 4. Executive Report-Out

The final day of the peer exchange concluded with MnDOT R&I staff and the guest participants sharing with MnDOT executives their thoughts on what MnDOT is doing well, where there are opportunities for growth and the ideas that guests will be taking back to their agencies.

CHAPTER 2: PEER EXCHANGE TOPIC 1—MESSAGING THE VALUE OF RESEARCH

2.1 PRESENTATIONS

MnDOT R&I staff members presented their perspectives on messaging the value of research in their program at the beginning and end of this topic. Representatives from Iowa, Kansas, Arizona and Utah DOTs addressed the topic in 20- to 30-minute presentations throughout the day. Complete presentation materials are reproduced in the appendices to this report.

Appendix B. Minnesota - Messaging the Value of Research, Part 1, Brent Rusco, MnDOT
Appendix C. Iowa - Messaging the Value of Research, Khyle Clute, Iowa DOT
Appendix D. Kansas DOT Research Project Implementation, Susan Barker, Kansas DOT
Appendix E. Arizona - Communicating the Value of Research, Dianne Kresich, Arizona DOT
Appendix F. Utah - Messaging the Value of Research, David Stevens, Utah DOT
Appendix G. Minnesota - Messaging the Value of Research, Part 2, Shannon Fiecke, MnDOT

2.2 FINDINGS

MnDOT R&I staff, MnDOT guests, out-of-state participants, and FHWA participants all offered perspectives on messaging of the value of research. These comments were collected during Q-and-A after each presentation, at a roundtable discussion at the end of the day, and in report-out forms that participants completed and submitted at the end of the four-day event.

Comments are grouped by themes that emerged. These include opportunities specifically tailored for MnDOT based on discussions with MnDOT staff, as well as additional best practices and ideas that others plan to take back to their home agencies.

TOP IDEAS called out by several participants, MnDOT R&I staff and MnDOT Executives on Day 4 are noted as such.

2.2.1 Identifying Value—*What* to Communicate

Opportunities for MnDOT and others

- **TOP IDEA** from Kansas: Emphasize the implementation of a project's outcome (what was learned writ large) rather than the project's raw results (especially if it didn't accomplish what it set out to do).
    - If the outcome wasn't what was expected, that doesn't mean the results aren't valuable.
    - Making an informed decision not to change practice can be the implementation of a research project.
- Conduct a periodic study (for example, every five years) of implementation of research projects.

- Conduct a periodic study on the return on investment (ROI) of research projects. Recognize that while some projects will have an ROI, other "soft" projects do not lend themselves to ROI calculation.
- Consider messaging the value of research activities ("tooting your own horn") versus messaging the value of research.
- Select a few completed MnDOT Local Road Research Board (LRRB) projects to evaluate and communicate their value or ROI, or provide guidance to the local government representatives on how to do it. Then expand to a larger set of projects if there is interest.

Additional best practices and takeaways

- **TOP IDEAS**: Tools for calculating value
    - MnDOT's User Guide: Process for Quantifying the Benefits of Research and the corresponding spreadsheet tool
    - Washington State DOT's weighted project prioritization tool
    - Kansas DOT's post-research sit-down meetings to talk through results and calculate ROI; staff provide active support to research customers to walk them through the process.
- Quality of metrics matter. Just because something can be measured, that doesn't necessarily make it significant.
- Not all projects lend themselves to quantitative measurement, so consider qualitative measurements as well.
- "Big ticket" benefit-cost estimates (e.g., benefits in excess of $1 million) may benefit from peer review.

2.2.2 Successful Channels—*How* to Communicate Value

Opportunities for MnDOT and others

- Enhance communications efforts with end-of-project presentations and/or webinars, short videos that showcase the benefits of a research project, topic or category-based newsletters, ArcGIS story boards and creating Wikipedia-like topic pages on the MnDOT R&I website.
- Create final reports and publications that are short, simple and clean.
    - **TOP IDEA**, with the example provided by Arizona: a 50-page maximum final report that uses a streamlined, graphics-rich style to communicate key concepts, findings, and recommendations to practitioners and decision-makers. Technical details are provided in the report appendices.
- Create a short, catchy video that highlights the benefits of research.
    - **TOP IDEA**, with a few examples from Utah.

Additional best practices and takeaways

- MnDOT's research project pages on its website do a great job of displaying key information and collateral.

- MnDOT has a mature process for quantifying research benefits after every project; the agency notes, however, that the process shows room for improvement due to limited outcomes.
- MnDOT has an established approach for creating and using a communication plan for every project and uses social media steps for research communication.
- Hosting an innovation expo or research symposium is a way of showcasing projects or innovations, big and small. This provides recognition of innovators and encourages employee and public engagement.
- E-newsletters, videos, quick-hit webinars, story maps and social media encourage engagement internally and externally.

2.2.3 Reporting and Tracking

Opportunities for MnDOT and others

- Be transparent in idea tracking and reporting.
    - **TOP IDEA**: The Iowa DOT Ideas website is a model for this.
- Improve research project benefits monitoring. Hold 30-minute meetings with project champions to focus on the benefits reporting.

Additional best practices and takeaways

- It is worth periodically re-examining which performance measures are collected and tracked, and asking if these are the right ones.

2.2.4 Building and Using a Peer Network

Opportunities for MnDOT and others

- **TOP IDEA:** Explore a research liaison/ambassador network of DOT staff across the state.
- Hold a research symposium with other states to showcase a variety of research projects and share information through personal interaction.

Additional best practices and takeaways

- Iowa DOT's liaison network of research champions expands and maintains communication channels throughout the department.
- Inviting stakeholders to participate from the beginning of a project and throughout its lifecycle helps catch any issues that might arise at the time of publication.
- Communication successes achieved with key audiences can be expanded to broader audiences as resources allow.

CHAPTER 3: PEER EXCHANGE TOPIC 2—TRANSPORTATION INNOVATION

3.1 PRESENTATIONS

MnDOT staff members presented their perspectives on transportation innovation at the beginning and end of this topic, including innovation efforts by the MnDOT Connected & Automated Vehicles Office. Representatives from California, North Dakota, Utah, Washington State and Wisconsin DOTs addressed the topic in 20-minute presentations throughout the day. Complete presentation materials are reproduced in the appendices to this report.

Appendix H. Minnesota - Transportation Innovation, Katie Walker, MnDOT
Appendix I. Caltrans Innovation, Pauline Valenzuela and April Nitsos, California Department of Transportation
Appendix J. North Dakota - Transportation Innovation, Amy Beise, North Dakota DOT
Appendix K. Utah - Transportation Innovation, Cameron Kergaye, Utah DOT
Appendix L. 2021-23 WSDOT Innovative Research Program, Anne Freeman, Washington State DOT
Appendix M. Incubate to Implement - A Review of WisDOT Innovation, David Esse, Wisconsin DOT
Appendix N. Fostering Innovation at MnDOT, Shannon Fiecke, MnDOT
Appendix O. Minnesota's Connected and Automated Vehicles Program, Tara Olds, MnDOT

3.2 FINDINGS

Perspectives on transportation innovation were offered by MnDOT R&I staff, MnDOT guests, out-of-state participants, and FHWA participants. These comments were collected during Q-and-A after each presentation, at a roundtable discussion at the end of the day, and in report-out forms that participants completed and submitted at the end of the four-day event.

Comments are grouped by themes that emerged. These include opportunities specifically tailored for MnDOT based on discussions with MnDOT staff, as well as additional best practices and ideas that others plan to take back to their home agencies.

TOP IDEAS called out by several participants, MnDOT R&I staff and MnDOT Executives on Day 4 are noted as such.

3.2.1 Laying the Grounding for Innovation

Opportunities for MnDOT and others

- Continue implementing MnDOT's vision, mission, goals, and research strategic priorities in funding and decision-making.
    - **TOP IDEA:** Rate project proposals on how they meet the goals/priorities of the department's vision, mission and values to make more deliberate project selections.
    - Develop an innovation strategy by creating a roadmap to answer the questions: why, what, how, who, and where?
- Review NCHRP 885: Guide to Creating and Sustaining a Culture of Innovation for Departments of Transportation. The report emphasizes bottom-up innovation, incremental innovation vs. break-throughs, and tolerating failure as part of the innovation process.

Additional best practices and takeaways

- Framing concepts for innovation:
    - **TOP IDEA** from North Dakota: "All innovation is a form of research, but not all research is innovation."
        - Research equals new knowledge, while innovation equals better business practices as an application of new knowledge.
        - While the innovation programs and research program may be separate within an agency, they work together.
    - **TOP IDEA** from North Dakota: It's not "Do more with less," but instead "Do more with *less effort*."
        - Ask: "What can we stop doing? How can we be more efficient?"
    - Innovation doesn't have to be "techy." It can be a better, more efficient, or safer process or tool.

3.2.2 Formalizing Processes

Opportunities for MnDOT and others

- Fund innovation explicitly and categorically.
    - **TOP IDEA:** Explore Washington State DOT's three-pronged funding model that addresses traditional research, innovation-focused projects, and rapid response research (four- to six-weeks between proposal and contract execution).

Additional best practices and takeaways

- Quick-response projects where small amounts of funding (less than $50,000) are set aside for smaller issues can be started quickly without going through the formal, longer review process for regular research projects.
- Caltrans has a leadership structure that supports innovation via an Executive Board subcommittee (Innovation Leadership Council) a senior-level-and-above advisory committee (Innovation Technical Advisory Committee), and innovation liaisons in all districts and divisions.
    - Executive support is key to innovating throughout any agency.

    - Leadership must be willing to take informed and calculated risks. This is important for employees to feel supported as they try (perhaps unsuccessfully) unproven technologies or practices.
- Utah and California publish annual innovation reports to highlight innovations and their impacts on the agencies.
- Wisconsin DOT establishes clear business drivers ("buoys") to aim for, weighs innovation ideas using a user value-versus-effort chart and treats all ideas with respect.
- Wisconsin DOT captures the value of an innovation by calculating savings on costs and staff time due to its implementation.

3.2.3 Engagement and Outreach

Opportunities for MnDOT and others

- **TOP IDEA:** Create and support a culture of innovation within the agency.
    - Survey staff about their work engagement rather than their work satisfaction; MnDOT currently does this.
        - Engagement is the psychological connection to work that creates ownership.
    - Middle management needs to support an innovative culture so staff feel empowered to innovate.
    - Form peer networks to avoid being blinded by internal processes.
    - Offer a physical space where MnDOT staff can meet to discuss and explore innovation.
- **TOP IDEA:** Consider the model of several DOTs that have websites where employees can submit their innovation ideas:
    - North Dakota's Transportation Innovation Program (TRIP)
    - California's Innovation Hub
    - Utah's Ideas Portal; Utah is training staff to use the Ideas Portal for ideas communication to move away from emails.
    - (Note, though, that you might get more ideas than you can handle. Canvassing ideas on specific topics or just at certain times are ways to control this.)
- Call for subject- or business-area-based innovations rather that issuing a universal call for ideas.
- Create short videos and use employee newsletters to showcase innovation successes.
    - Utah explainer video example.
- Make innovation a topic on your meeting agendas. Talk about it often.

Additional best practices and takeaways

- MnDOT strives to foster an innovative culture that adopts a creative problem-solving approach based in design-thinking principles using an "E3" mindset: empathy, experimentation and empowerment.
- Innovation happens at all levels: local, state, regional and national. It also happens at all levels and working groups across an organization.

- Caltrans has instituted several activities related to innovation, including an Innovation Expo, an Innovation Resource Center at California State University, and a centralized innovation repository.
- Utah DOT rewards staff for innovations. There are additional rewards as ideas are more widely implemented throughout the department.

3.2.4 Partnerships and Opportunities

Opportunities for MnDOT and others

- Be sure to leverage State Transportation Innovation Council funding of up to $100,000 per state.
- Engage in broader participation at the national level to become a national leader. MnDOT is currently an active member of both the AASHTO Innovation Initiative and the AASHTO Innovation Community of Practice.

CHAPTER 4: PEER EXCHANGE TOPIC 3—EQUITY AND RESEARCH

4.1 PRESENTATIONS

MnDOT staff presented their perspectives on transportation equity and research at the beginning and end of this topic, including efforts by the MnDOT Statewide Planning Office. Representatives from California, Massachusetts and Washington State DOTs addressed the topic in 20-minute presentations throughout the day. Complete presentation materials are reproduced in the appendices to this report.

Appendix P. Minnesota - Informing, Improving and Innovating Transportation, Katie Walker, MnDOT
Appendix Q. Massachusetts - Equity and Research, Lily Oliver and Liz Williams, Massachusetts DOT
Appendix R. California - Equity and Research, La Keda Huckabay, California Department of Transportation
Appendix S. Caltrans Transportation Equity in Research - Project List, La Keda Huckabay, California Department of Transportation
Appendix T. Washington State - Equity and Research, Anne Freeman, Washington State DOT
Appendix U. Minnesota - Transportation Equity Research & Planning, Philip Schaffner, MnDOT

4.2 FINDINGS

Thoughts on equity and research were offered by MnDOT R&I staff, MnDOT guests, out-of-state participants, and FHWA participants. These comments were collected during Q-and-A after each presentation, at a roundtable discussion at the end of the day, and in report-out forms that participants completed and submitted at the end of the four-day event.

Comments are grouped by themes that emerged. These include opportunities specifically tailored for MnDOT based on discussions with MnDOT staff, as well as additional best practices and ideas that others plan to take back to their home agencies.

TOP IDEAS called out by several participants, MnDOT R&I staff and MnDOT Executives on Day 4 are noted as such.

4.2.1 Learning from Advanced Equity Programs

Opportunities for MnDOT and others

- Monitor transportation equity work and research in other states and countries. MnDOT should also be sharing their projects with others.
    - **TOP IDEA** from California: Develop an Equity Toolkit and Equity Index.
    - There are many examples of research projects from California, Massachusetts and Washington State to share with MnDOT practitioners.

Additional best practices and takeaways

- **TOP IDEA:** Several peer exchange participants—particularly those with limited activity in equity research—planned to share MnDOT's presentation on this topic with their home agencies.
- Arizona DOT's recently commenced implementation study included interviews to document exemplary practices.
- Don't give up on the possibility of measuring success quantitatively but proceed carefully to identify or collect robust data.

4.2.2 Setting the Research Agenda

Opportunities for MnDOT and others

- **TOP IDEA:** Explore incorporating equity into research project design and selection. Occasionally revisit and refresh the equity research roadmap for new emerging needs or topics that no longer need research.
    - How can research assist other areas of the agency to incorporate equity?
- Conduct research to support long-range planning (for example, use statistical sampling techniques to enhance the quality of data collected through the public involvement process).
- MnDOT should continue equity funding, engagement and partnerships.

Additional best practices and takeaways

- "Research is messy because humans are."
- Equity definitions should consider benefits and burdens.
- Washington State DOT's Research Strategic Plan continued development and design around equity.

4.2.3 Making Connections

Opportunities for MnDOT and others

- Qualitative data collection is important—get out and talk to people to hear about success; the agency can't only rely on quantitative data.
- Share findings of MnDOT's equity research work with transportation policy-makers and practitioners for further discussion and to create awareness and develop buy-in. Report back to senior leadership for any necessary policy changes or implementation.
- Consider working with tribal governments to identify their needs.

Additional best practices and takeaways

- **TOP IDEA:** Inclusion is not only inviting more people to the table but leaving the table and going to those people where they are.
- Equity discussions continue to take place and evolve at the national level (TRB/AASHTO); find a seat at the table.

CHAPTER 5: EXECUTIVE REPORT-OUT AND MNDOT PERSPECTIVES

On the final morning of the peer exchange event, the following three MnDOT executive staff members joined the discussion.

- Nancy Daubenberger, Deputy Commissioner and Chief Engineer
- Tim Henkel, Assistant Commissioner, Modal Planning and Program Management Division
- Jean Wallace, Assistant Division Director, Modal Planning and Program Management Division

In a round-table format, each of the peer exchange participants shared areas where they perceived MnDOT to excel, opportunities for MnDOT to take next steps, and their own top takeaways. These observations and perspectives are captured in Chapters 2 through 4 of this report.

On behalf of the entire MnDOT R&I staff, Katie Walker summarized MnDOT's strengths and challenges, opportunities for MnDOT, and key takeaways for each of the three topics of the peer exchange. These are presented in Appendix V.

After listening to all participant comments, the MnDOT executives reflected on what they heard and commented on possible opportunities and areas of investigation for MnDOT.

5.1 MESSAGING THE VALUE OF RESEARCH

- Keep **research final reports short and streamlined** to make them accessible to more readers.
- Emphasize the **implementation of what was learned** rather than the project's raw results.
- Explore a **research liaison network** throughout the department.
- **Message and market projects across the board**, including research activities.
- Continue to communicate the **value of research externally and to MnDOT staff**. The question that is often asked is "Why spend money on research when money is needed elsewhere?" Research helps the agency to be more efficient, safer, and save time and money.

5.2 TRANSPORTATION INNOVATION

- Identify ways to do **rapid research projects**. Finding quicker answers without doing detailed research is important. It will make MnDOT more responsive to its customers.
- Address any **gap between soliciting and responding** to innovation and research ideas. Be aware of the reputational risk of not being able to respond.

5.3 EQUITY AND RESEARCH

- MnDOT is pleased to have made good progress in the equity space. The department is currently working on a new **draft definition of transportation equity**, and work continues.
- Include **equity when planning and conducting research projects**.
- Look at opportunities for MnDOT to **learn from other leaders in the area of equity in research**.

5.4 ADDITIONAL THOUGHTS

- "**Don't reinvent the wheel**." MnDOT has limited dollars to apply to research and transportation infrastructure. MnDOT is always looking for tools, methods and strategies to make sure it knows what's out there so the agency doesn't duplicate the work of others.
- Using this peer exchange to **establish a peer network** would be extremely valuable.

APPENDIX A. MNDOT OCTOBER 2021 PEER EXCHANGE AGENDA

Minnesota DOT Research Peer Exchange

Meeting Agenda — Updated October 21, 2021

Zoom Meeting ID: 850 8940 0352, **Passcode**: 229776

Direct Link: https://us06web.zoom.us/j/85089400352?pwd=Rmw4RzI5bkZDOXJsbUhKbjNid09BQT09

For audio, use your computer headset and mic, or dial 312-626-6799 and use the passcode 229776

All times are Central

Tuesday, October 26

Morning Session	
10 a.m.	**Welcome, Goals and Introductions** Katie Walker, MnDOT **Opening Remarks — Federal Perspective** Kris Riesenberg, FHWA **Meeting Format and Logistics** Brian Hirt, CTC & Associates
10:40 a.m.	**Topic 1. Messaging Value of Research** ▪ **MnDOT R&I Perspective: Need and Opportunity** (Brent Rusco - 20 minutes) ▪ **Iowa** (20 minutes) ▪ **Kansas** (20 minutes)
12 p.m.	Adjourn morning session
Afternoon Session	
1:30 p.m.	**Topic 1. Messaging Value of Research** (continued) ▪ **Arizona** (20 minutes) ▪ **Utah** (20 minutes) ▪ **Minnesota** (Shannon Fiecke, R&I, - 20 minutes) ▪ **Facilitated Q-and-A on Topic 1** (45 minutes) • Questions • Challenges/Opportunities for MnDOT and for Guests • Possible research needs
3:30 p.m.	Adjourn afternoon session

Technical issues during the meeting? *Contact* ***Katie Johnson*** *in the Zoom chat box, at katie.johnson@ctcandassociates.com, or by calling 217-721-1749.*

Minnesota DOT Research Peer Exchange

Meeting Agenda — Updated October 21, 2021

Zoom Meeting ID: 850 8940 0352, **Passcode**: 229776

Direct Link: https://us06web.zoom.us/j/85089400352?pwd=Rmw4RzI5bkZDOXJsbUhKbjNid09BQT09

For audio, use your computer headset and mic, or dial 312-626-6799 and use the passcode 229776

All times are Central

Wednesday, October 27

Morning Session

10:00 a.m. **Review of Peer Exchange to Date; Goals**

10:15 a.m. **Topic 2. Transportation Innovation**

- **MnDOT R&I Perspective: Need and Opportunity** (Katie Walker, R&I - 20 minutes)
  - MnDOT Draft Innovation Strategy — what, how and why; recommendations
- **California** (35 minutes)
- **North Dakota** (20 minutes)
- **Utah** (20 minutes)

12 p.m. Adjourn morning session

Afternoon Session

1:30 p.m. **Topic 2. Transportation Innovation** (continued)

- **Washington** (20 minutes)
- **Wisconsin** (20 minutes)
- **Minnesota**
  - Fostering Innovation: Efforts and Outcomes (Shannon Fiecke, R&I, 15 minutes)
  - CAV-X Office (Tara Olds, 20 minutes)
- **Facilitated Q-and-A on Topic 2** (45 minutes)
  - Questions
  - Challenges/Opportunities for MnDOT and for Guests
  - Possible research needs

3:30 p.m. Adjourn afternoon session

Minnesota DOT Research Peer Exchange

Meeting Agenda — Updated October 21, 2021

Zoom Meeting ID: 850 8940 0352, **Passcode**: 229776

Direct Link: https://us06web.zoom.us/j/85089400352?pwd=Rmw4RzI5bkZDOXJsbUhKbjNid09BQT09

For audio, use your computer headset and mic, or dial 312-626-6799 and use the passcode 229776

All times are Central

Thursday, October 28

Morning Session

10:00 a.m. **Review of Peer Exchange to Date; Goals**

10:15 a.m. **Topic 3. Equity and Research**

- **MnDOT Perspective: Need and Opportunity** (Katie Walker, R&I - 20 minutes)
  - Equity in research strategic plan
  - Nancy Daubenberger's and Kim Collins' presentation on September 28 at U. of Minnesota
- **Massachusetts** (20 minutes)
- **California** (20 minutes)
- **Washington** (20 minutes)

12 p.m. Adjourn morning session

Afternoon Session

1:30 p.m. **Topic 3. Equity and Research** (continued)

- **Minnesota** (Philip Schaffner and Hally Turner, Statewide Planning Office - 20 minutes)
  - Road mapping
  - Equity Research Projects
  - Where MnDOT is headed
  - Long-Range Plan for MnDOT to Include Equity
- **Facilitated Q-and-A on Topic 3** (40 minutes)
  - Questions
  - Challenges/Opportunities for MnDOT and for Guests
  - Possible research needs

2:30 p.m. **Peer Exchange Takeaways Roundtable**

3:30 p.m. Adjourn afternoon session

Minnesota DOT Research Peer Exchange

Meeting Agenda — Updated October 21, 2021

Zoom Meeting ID: 850 8940 0352, **Passcode**: 229776

Direct Link: https://us06web.zoom.us/j/85089400352?pwd=Rmw4RzI5bkZDOXJsbUhKbjNid09BQT09

For audio, use your computer headset and mic, or dial 312-626-6799 and use the passcode 229776

All times are Central

Friday, October 29

Executive Report-Out Session

10 a.m. **Restatement of Goals and Day 1-3 Recap** (15 minutes)

MnDOT R&I Staff

- What MnDOT is doing well
- Opportunities for improvements
- Great ideas from peers

Peer Agencies

- Where MnDOT excels
- Where MnDOT can grow
- "Aha moments" and ideas to take home

MnDOT Executives

- Insights and opportunities

12 p.m. Adjourn meeting

APPENDIX B. MINNESOTA - MESSAGING THE VALUE OF RESEARCH

DEPARTMENT OF TRANSPORTATION

Messaging the Value of Research
Minnesota DOT Peer Exchange

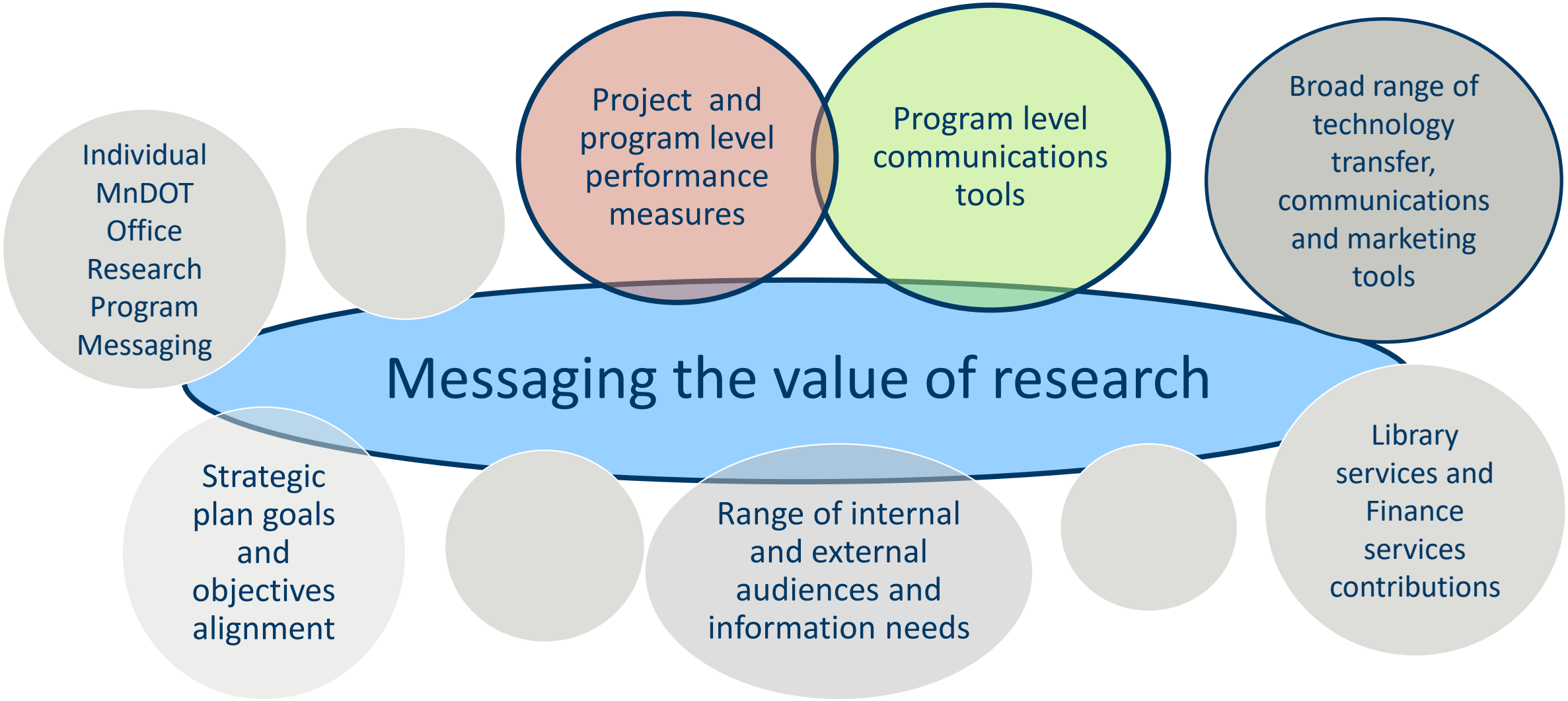
Brent Rusco | Research & Innovation

October 26, 2021

Presentation/Discussion Overview:

1. Context/ overview of current practices
2. Leadership feedback
3. Opportunity
4. Challenges

Context


Project and program level performance measures
Program level communications tools
Broad range of technology transfer, communications and marketing tools
Individual MnDOT Office Research Program Messaging
Messaging the value of research
Strategic plan goals and objectives alignment
Range of internal and external audiences and information needs
Library services and Finance services contributions

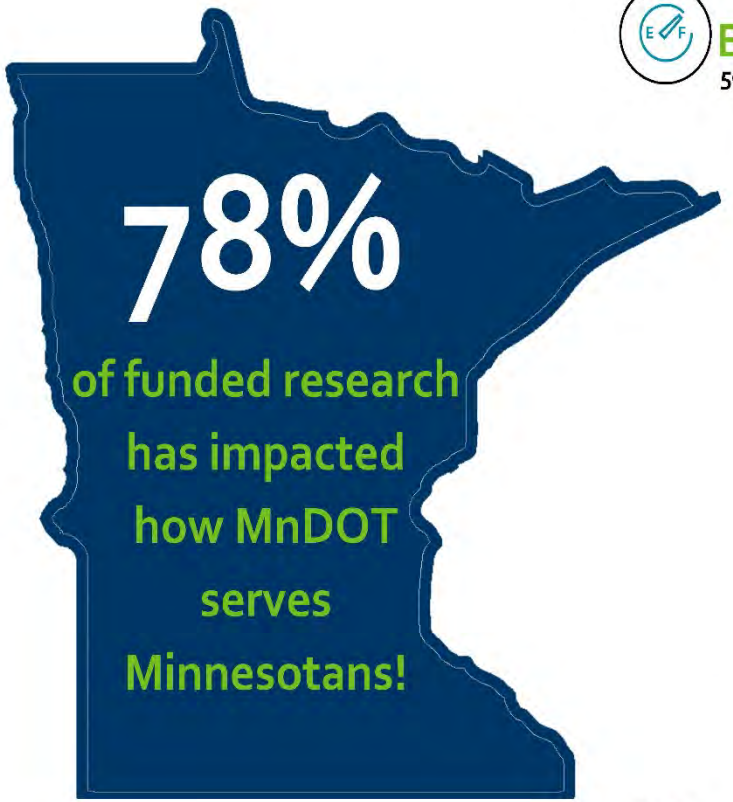
Overview of current practices

- Research Program Strategic Priorities
- Periodic surveys
- Specialty office methods
- Monitoring research benefits

Strategic Priorities

- Innovation & Future Needs
- Advancing Equity
- Asset Management
- Safety
- Climate Change & the Environment

2018 Research Implementation & Outcomes Survey



Efficiency
50% informed a process or an operation

Safety
28% resulted in new or improved tools and software

Skilled Training
21% resulted in training or knowledge-sharing tools

Effectiveness
21% informed a technical memo or construction specifications

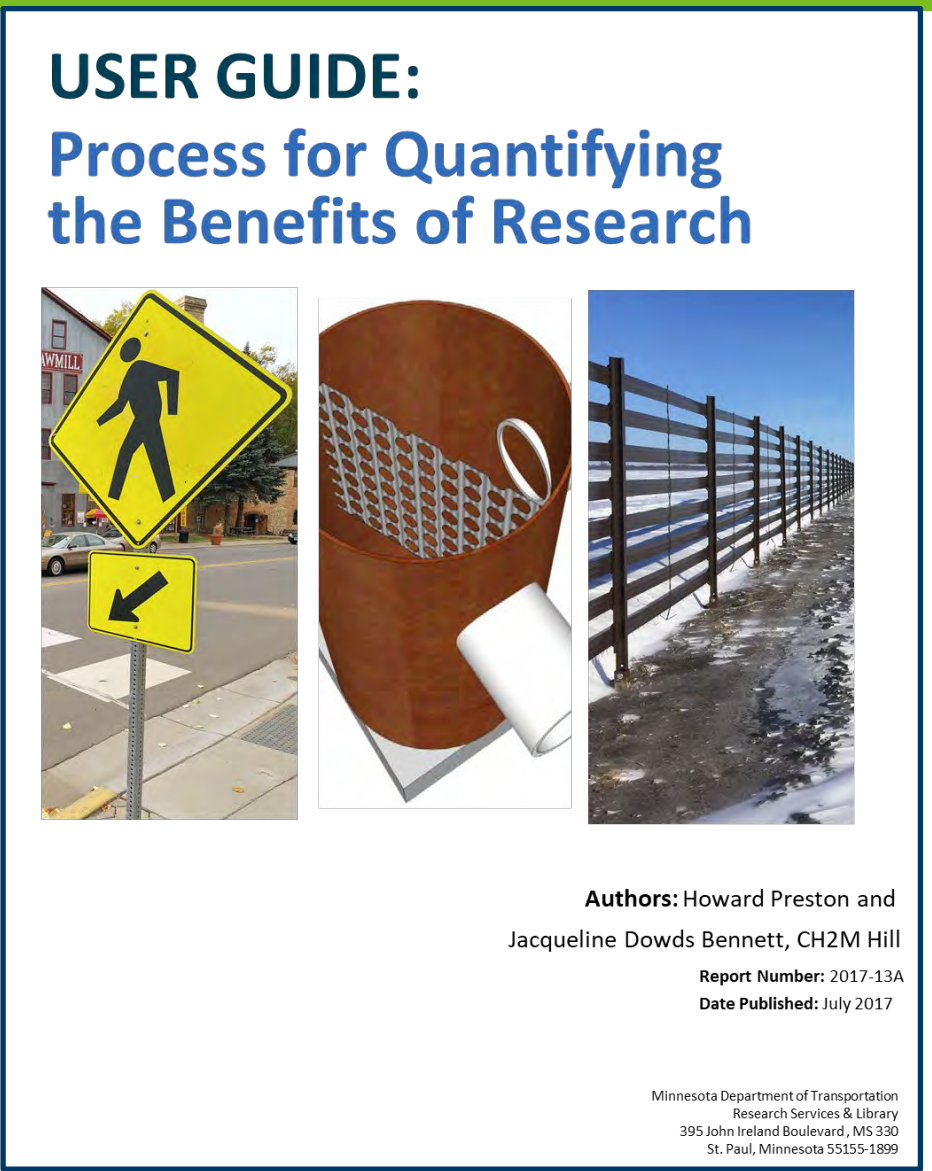
Guidance
11% resulted in a new or improved MnDOT policy

Accurate Timely Response
6% resulted in legislation or response to a legislative inquiry

MnDOT specialty office unique methods: MnROAD

- **Successes and Benefits of MnROAD**
- Results from MnROAD have made positive impacts within the state of Minnesota and the nation at large. Increases in performance and pavement life have resulted in a reduction in costs for maintenance, repairs, user delays and congestion. Of Minnesota only (granted other states and organizations have also benefited) MnROAD studies are estimated to save $33 million/year (Phase I) and 10.3 million/year (Phase II) which both outweigh our costs.

Quantifying the Benefits of Research



USER GUIDE:

Process for Quantifying the Benefits of Research

Authors: Howard Preston and Jacqueline Dowds Bennett, CH2M Hill

Report Number: 2017-13A
Date Published: July 2017

Minnesota Department of Transportation
Research Services & Library
395 John Ireland Boulevard, MS 330
St. Paul, Minnesota 55155-1899

Spreadsheet Tool:

- 10 benefit categories with quantification calculation options
- Step-by-step process to estimate research project benefits
- Justifiable means to estimate monetary benefits
- Traditional benefit-cost analysis
- Benefits are defined as cost savings achieved by implementation of research-generated recommendations

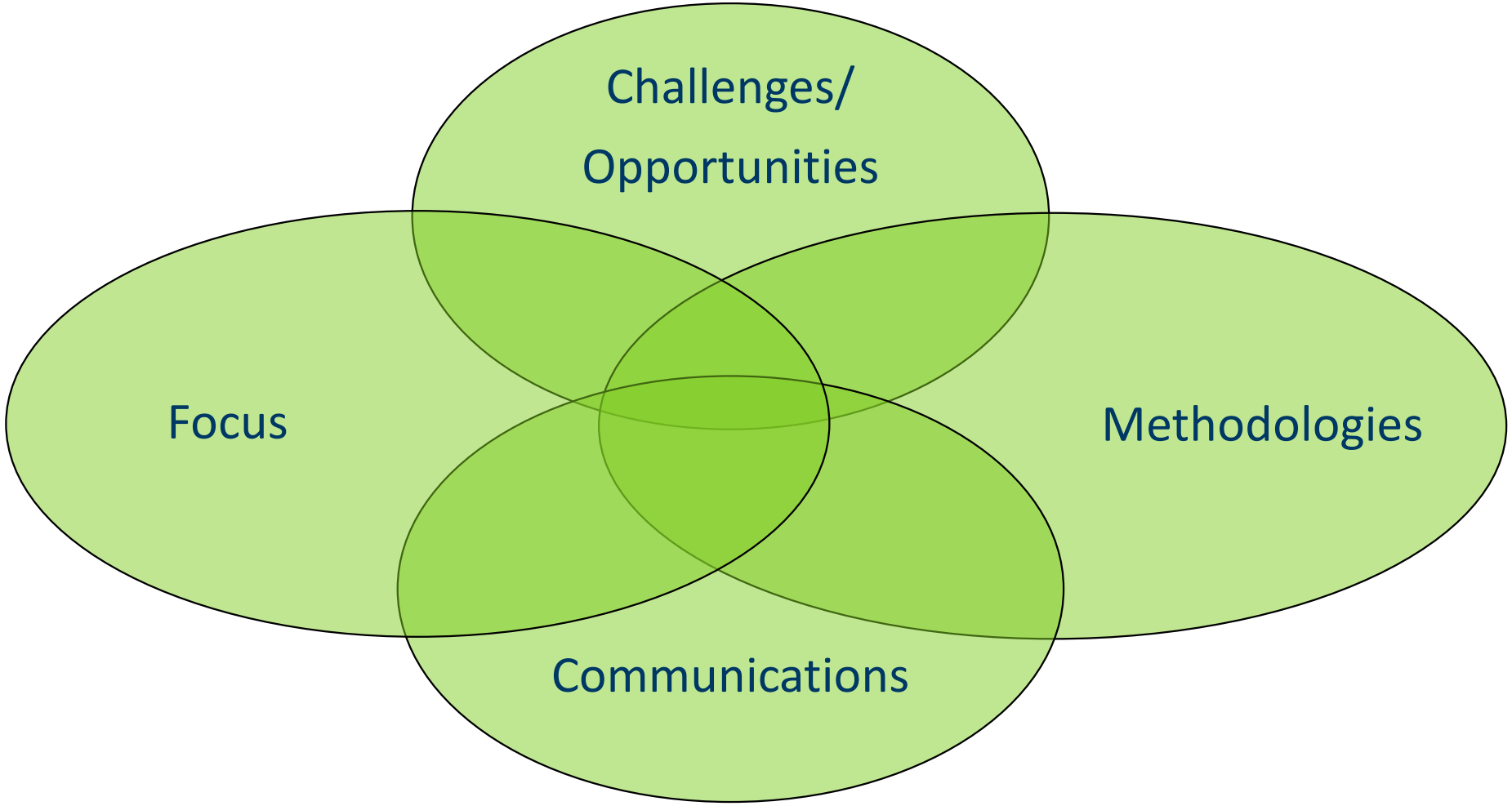
MnDOT program level messaging example

- **Research has real value and benefits.** A Return on Investment (ROI) study of 11 MnDOT research projects showed enough cost savings to fund the entire research program for seven years.

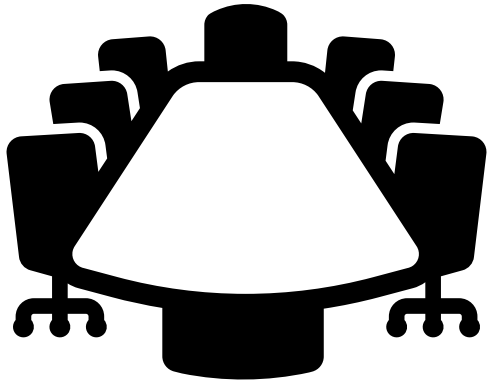
Messaging the Value of Research

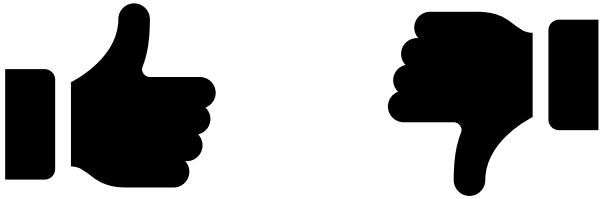
2. Leadership identified needs

Leadership Feedback



Leadership identified needs





Challenges

Leadership identified needs

Program wide vs Cherry Pick

Simplicity

Communicate Value at Program Level

Things to Avoid

Practitioners

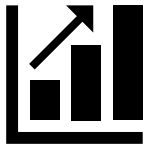
Focus

Combine communication/marketing and technical performance measures

Efficient, effective, not onerous

Leadership identified needs

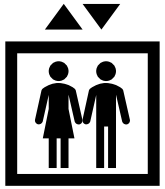
Benefits of involvement



Improvement

Compelling story

ROI

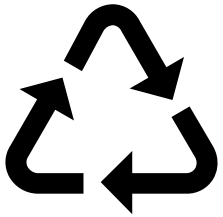


Elevator Speeches

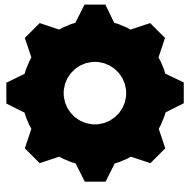
Learning/ evolution

Communications

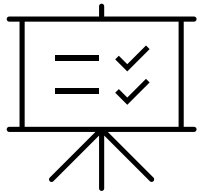
Leadership identified needs



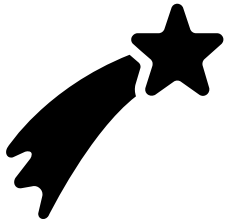
Leverage existing models



Single research portal

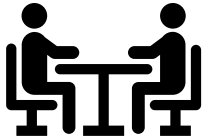


Correlation with policy inititatives



Trajectory of research

Best practices



Engage partners

Methodologies

Messaging the Value of Research

3. Opportunity

- Priority improvement initiative
- High interest by leadership
- Timely opportunity for lessons learned
- Emerging best practices and high interest in topic

Messaging the Value of Research

3. Challenges

- Multiple audiences
- Varying needs
- Resource concerns
- Responsibilities/interest
- Broad range of perspectives
- ROI/benefits calculations challenging for many research categories

DEPARTMENT OF TRANSPORTATION

Thank you!

http://www.dot.state.mn.us/research/index.html

Brent Rusco

Brent.Rusco@state.mn.us

651-366-3767

APPENDIX C. IOWA - MESSAGING THE VALUE OF RESEARCH

Iowa DOT

Khyle Clute
khyle.clute@iowadot.us
October 26, 2021

Messaging the Value of Research

Messaging Our Value

VS

Messaging Value of Research

IOWA DOT
GETTING YOU THERE

Messaging the Value of Research

RESEARCH SOLUTIONS

Messaging Value
Formal Processes

Documentation
Annual Reporting
Research News Items
Research Solutions
Intro to Research Roles

Research Symposium
Hosted every other year
Showcases wide variety of projects

Messaging Value
Informal Processes

Research community **engagement**:

- SMEs
- Research Liaisons
- DOT Bureaus
- Local Stakeholders
- RAC – R3 & National
- Peer Exchanges
- Conferences
- TRB, FHWA, AASHTO committees

Messaging Value
Tracking Success

Quantitative
vs.
Qualitative

Transparency
Engagement
Quality

Successes

Ideas Site

Consultant Assistance

Research Liaison Network

Challenges

Lack of Dedicated Staff

Lack of Experience

Multiple Audiences

Best Practices

Know why you're doing it	Make it easy to repeat	Make it public knowledge	Talk about it with others
Clarity	**Sustainability**	**Transparency**	**Engagement**

Inspiration & Other Ideas to Try

Webinars

ArcGIS story boards

Research Day

Quarterly Updates

References/Links

Iowa DOT Research
https://iowadot.gov/research/

Iowa DOT Research Ideas Site
https://ideas.iowadot.gov/

Iowa DOT Research Mission, Core Values, & Focus Areas
https://iowadot.gov/research/Mission-Values-and-Focus-Areas

Iowa DOT Research News
https://ideas.iowadot.gov/all_news?qmzn=iKFrYf

Iowa DOT Research Solutions Documents
https://iowadot.gov/research/News-and-Subscriptions

Iowa Dot Research FY2020 At A Glance Report
http://publications.iowa.gov/34441/1/Iowa%20DOT%20FY2020%20AAG%20-%20Web%20-%2011-18-2020.pdf

THANK YOU FOR YOUR TIME AND ATTENTION

Khyle Clute, P.E.
SPR Research Engineer
Iowa Department of Transportation
Iowa County Engineers Association Service Bureau
800 Lincoln Way | Ames, IA | 50010
Khyle.clute@iowadot.us
(515)-239-1646

APPENDIX D. KANSAS DOT RESEARCH PROJECT IMPLEMENTATION

Kansas DOT Research Project Implementation

Implementation is formally considered at each stage of project development

- A Research Implementation Plan (RIP) is completed for each published Research Report.
- RIP is prepared by the Project Monitor with assistance from the KDOT Technology Transfer Engineer
- Before the Tech Transfer Engineer walked the Project Monitors through the RIP paperwork, very few were completed. (30-minute Meeting!)

Suggested Benefit Categories

Assessment Category	Subjective Rating	Triennial Benefits ($)	Comments
Construction Savings (materials, Labor, equipment, time, quality)			
Operation and Maintenance Savings (materials, labor, equipment, time)			
Increase Lifecycle			
Decrease Lifecycle Costs			
Safety (Reduction of crash frequency, Reduction of crash severity)			
Decrease Engr./Admin. Costs (planning/design costs, paperwork)			
Environmental Aspects (pollution, hazardous waste reduction, recycling)			
Technology (technology transfer, new materials, new methods)			
User benefits (time, dollars)			
Impact On KDOT Policy			

All Research Results are Implemented!

- Implementation Plans are executed on all contracted Research that has published results with the exception of Pooled Fund Projects.
- The Thesis you started out with may not be Implemented but the RESULTS of the Research Project are Implemented.
- The Results may indicate that the project should not be Executed again, but you are Implementing the Results of the Research Project by not doing the proposed project.

How Benefit info is Used

- Reported to the Research Program Council (Management at KDOT, Local FHWA, Kansas Association of Counties, KU and KSU Engineering Deans.
- Current program Benefit/Cost Ratio for Projects Implemented is 12.6:1 with 62 % of the Projects Implemented. (When the program first started-1989, it was common practice to say that a lot of Research projects were not Implemented when the results of the project did not find a cost benefit. Now we look at Implementing the results of the Research not necessarily the thesis of the project.)

Actual vs Estimated Benefit Costs

- At one time we did Estimated Benefits Costs and then tried figured actual Benefit Costs three years after the Research Project was Implemented.
- **THAT DID NOT WORK WELL-Engineers had a hard time figuring '*Actual Benefits Costs*' when using assumptions like-**
  - **Reduced accidents**
  - **Saved lives**
  - **Reduced Material costs 5%**
  - **Reduced labor**
- **So, rebranding to say just 'Benefits Costs' and figuring it when the project was done and fresh on Project Monitors minds not three years later resulted in more projects that were Implemented with Benefits figured.**

EXAMPLE 1: Research to look at installing signs to turn on your hazard lights during pilot car operation in a construction Zone.

- Results showed that using Hazard Lights made no difference in safety in the construction zone.
- The results of the Research Project indicated that this action had no benefit and should not be done.
- Cost Benefit for implementation was figured on the cost of installing the signs on construction projects over a three-year period. Thus, a benefit was received by implementing the results of the Research without implementing the project idea.

EXAMPLE 2: Fiber Reinforced Polymer Confinement of Square and Slightly Rectangular Concrete Columns Originally Confined with Steel Ties

Project Result

- A computer model was developed to estimate the combined behavior of the two confinement systems, steel ties and Fiber-Reinforced Polymer (FRP) wraps on Bridge Columns.

Benefits!

(Structural Engineer Lingo)

- For existing bridges where geometric changes to the roadway below would require adherence to AASHTO extreme event loading strengthen or protection of the bridge pier.
- Analysis: The ability to analyze a column beyond the design capacity to the ultimate strength does not exist in any currently available software. To do so would require extensive knowledge of available research; and the engineering ability to link complex theories to the structure being considered. Otherwise the Engineer of Record would be required to build non-linear finite element analysis models to determine the existing capacity and added capacity for the FRP column strengthening. The above requirements are significant limit the available design consultant choices; the cost and amount of hours required would be significant.
- Design: The current approach to the problem stated above is to protect the bridge pier from the TL-5 loading. This requires an independent crashworthy 52" F-Shaped barrier to be constructed in front of the pier. Below are some of issues associated with this solution.

Benefits!

(Structural Engineer Lingo…continued)

- Existing guard fence replacement. A new guard fence would be design, detailed and constructed.
- Foundation and the barrier would be designed, detailed and constructed. This may involve shoulder reconstruction.
- Traffic control would be required for this approach.
- In many instances there is not enough room to construct the barrier in these cases a crash wall would have to be constructed between the columns.
- Safety: A barrier protection system reduces the clear zone distance and reduces the safety of the traveling public.
- The construction of a protection system may require traffic control potentially reducing the safety of the traveling public during construction.

Benefits!
(Simple Terms)

- Strengthening an existing Bridge Column and accounting for its structural benefits with this software reduces public safety concerns and greatly reduces design and construction concerns.

Benefit Calculations

(Three Year)

- **<u>Estimated possible costs without this research and software:</u>**

- Three bridges/yr effected.
- Consultant fee for Analysis/Design/Detailing plus Field Construction and Inspection of Traffic Control/Construction without the effects of user costs = $100,000. (conservative)
- Cost/Injury (see attached crash cost) = $288,000/injury assuming only one person in the vehicle is injured.

Benefit Calculations

(Three Year)

Benefits over a three-year period:

(3 bridges/yr X $100,000 + 1 accident/yr X $288,000) X 3 yrs

= $1,764,000

NOTE: Within KS, a peer review is conducted on all calculations exceeding $1M. This project started out as $2.8M benefit.

Soft Sided Research

- Designing a Bike/Ped Plan
- Study of Economic Benefits of a Highway construction Program
- Develop new Rainfall Tables for a drainage area
- Research that is done in order to establish Policies or Guidelines

Designed a KDOT Chip Seal Manual

- KDOT does an estimate of 100 miles of chip seal/year. It is estimated that 5% will be of a better quality and last at least a year longer.
- 3 years X 100 miles X 5% X $34,000/year = $510,000
- There will also be a significant savings for local roads in Kansas also.

Soft Sided Benefits

- The triennial benefits can also be figured based on having the research/study done by a university vs. done by a private consultant.

- **Developing a Gravel Roads Paving Guide**

- The triennial benefits were figured based on having this study done by KSU vs. done by a private consultant.

- 260 hours @ $200/hr + 2254 hours @ $50/hr + 400 hours @ $25/hr = $ 174,700

Tools for Cost Benefits

- KDOT has a Report- KS-03-9-Guidelines for Estimating the Triennial Benefits of Kansas Transportation Research and New Development (K-TRAN) Research Projects
- **Great Report But No One Reads It.**

  KDOT#Research.Library@ks.gov

- **All DOTs calculate Accident costs, These need to be made available to those doing the Cost/Benefits.**

APPENDIX E. ARIZONA - COMMUNICATING THE VALUE OF RESEARCH

ARIZONA DOT RESEARCH CENTER

Communicating the Value of Research

Dianne Kresich, Manager

MnDOT Peer Exchange

October 26, 2021

ADOT Research Center

- A unit of the Multimodal Planning Division (MPD)
- Funded by the Federal Highway Administration (FHWA)
- Research Center Manager -- Dianne Kresich

ADOT Research Center

- **Manage applied research** that develops practical recommendations to help ADOT customers improve processes and products

- **Evaluate construction products** for compliance with ADOT Specs; maintain the Approved Products List (APL)

How do we communicate value?

- We aim to communicate the value of research through inclusive outreach, impeccable customer service, practitioner-oriented publications, and professionalism at every step.

How do we communicate value?

- Looking at it from another angle --

  To help communicate the value of our *products*, we demonstrate the quality of our *processes* and our *service*.

How do we communicate value?

- For research to be implemented by ADOT practitioners and decision-makers, it must be valued
- Before research can be valued and considered credible, its methods and results must be understood
- Our program, its processes, and its products are squarely focused on meeting agency needs (an agency directive); clear communication is key.

How do we know our work has value?

- Attempts to acquire feedback on implementation from research customers largely fail
  - PMs contact customers 6, 12, and 18 months after study's conclusion
  - Customers slow to respond, collect little baseline or ongoing data to determine a quantitative value of research

Assessing value through implementation

- Implementation of Research at ADOT
  - Research to identify extent of implementation, determine why and why not
  - Completed in 2014
  - Update under way

Assessing value

- Study approach:
  - Identify the “state of practice” through lit search, survey and interviews with state DOTs (new for the update) on defining and measuring value

Assessing value

- Compile recommendations from past studies
- Identify current topic owners, key practitioners
    - Survey; group interviews by broad study topics
    - Determine which recommendations were implemented, value to agency
        - Qualitative evidence is helpful
    - Identify factors contributing to and preventing implementation

Assessing value

- “Soul searching” . . . gather feedback on Research Center practices that may affect implementation, and recommend changes to those practices
- Develop simple, realistic system for estimating impact of research (new for the update)

Some things we learned

- 75% of completed studies have one or more recommendations implemented
- Recommendations requiring legislative action or policy revision are the least likely to be implemented
- Management and staff turnover, new executive direction, and lack of resources are common culprits for lack of implementation
  - Lack of implementation doesn't equate to lack of value
  - Hot topics don't stay hot long, always a new fire (media or political interest) somewhere

Some things we learned

- Customers appreciate research, see far-ranging impacts on knowledge base, decision-making; for example:
  - Aiding accountability, compliance with federal expectations
  - Advancing the agency's state of knowledge
  - Expanding collaboration with agency partners
  - Making a case for environmental stewardship
  - Understanding tribal perspectives and improving outreach
  - Informing decision-making beyond the research topic
  - Providing data to support continued funding of *Arizona Highways* magazine
  - Fostering relationships between the agency and private industry
  - Helping to determine the future of quiet pavement

Some things we learned

- Research customers collect little baseline or ongoing data to determine a quantitative value of research
  - We now require most studies to identify the “state of the practice” as a baseline
- Literal implementation of recommendations is not the sole evidence of value
- Qualitative changes at the agency as the result of research are abundant

Some things we learned

- Customers strongly expressed a preference for shorter, simpler research publications
  - This finding confirmed a hunch, led directly to the creation of a streamlined final report and brief

How do research publications communicate value?

- **Final reports** and **briefs** meet customer needs for concise, clear communication of key research information
- **Technical memoranda** document in detail the research method, findings, and recommendations

How do research publications communicate value?

- What is understood is
  - non-intimidating
  - empowering
  - more likely to be *valued*
  - more likely to be *implemented*

Research final reports

- Clearly communicate what customers want and need to know
- Non-academic; 50-pages max, most much shorter
- Recommendations and findings front and center
- Method reduced to a few paragraphs
- Example -- *Women in the ADOT Workforce*
- Example -- *Economic Impact of Arizona Highways Magazine*
- All reports -- AZGeo repository

Research Briefs

- The study in a two-page nutshell
- Versatile -- audience is ADOT, elected officials, media, public
- Journalistic style -- easy to read, understand, upbeat
  - why ADOT did the research
    -- what we did
    -- how we did it
    -- how ADOT will use it

Continuing challenges

- Lack of feedback on new products (final report, briefs) beyond initial appreciation
- Lack of staff dedicated to implementation or communication
- Extensive outreach from research staff required for every new research idea
- Staff burnout and discouragement regarding agency engagement

Find us online . . .

https://azdot.gov/planning/research-center

APPENDIX F. UTAH - MESSAGING THE VALUE OF RESEARCH

Research and Innovation Division

Keeping Utah Moving

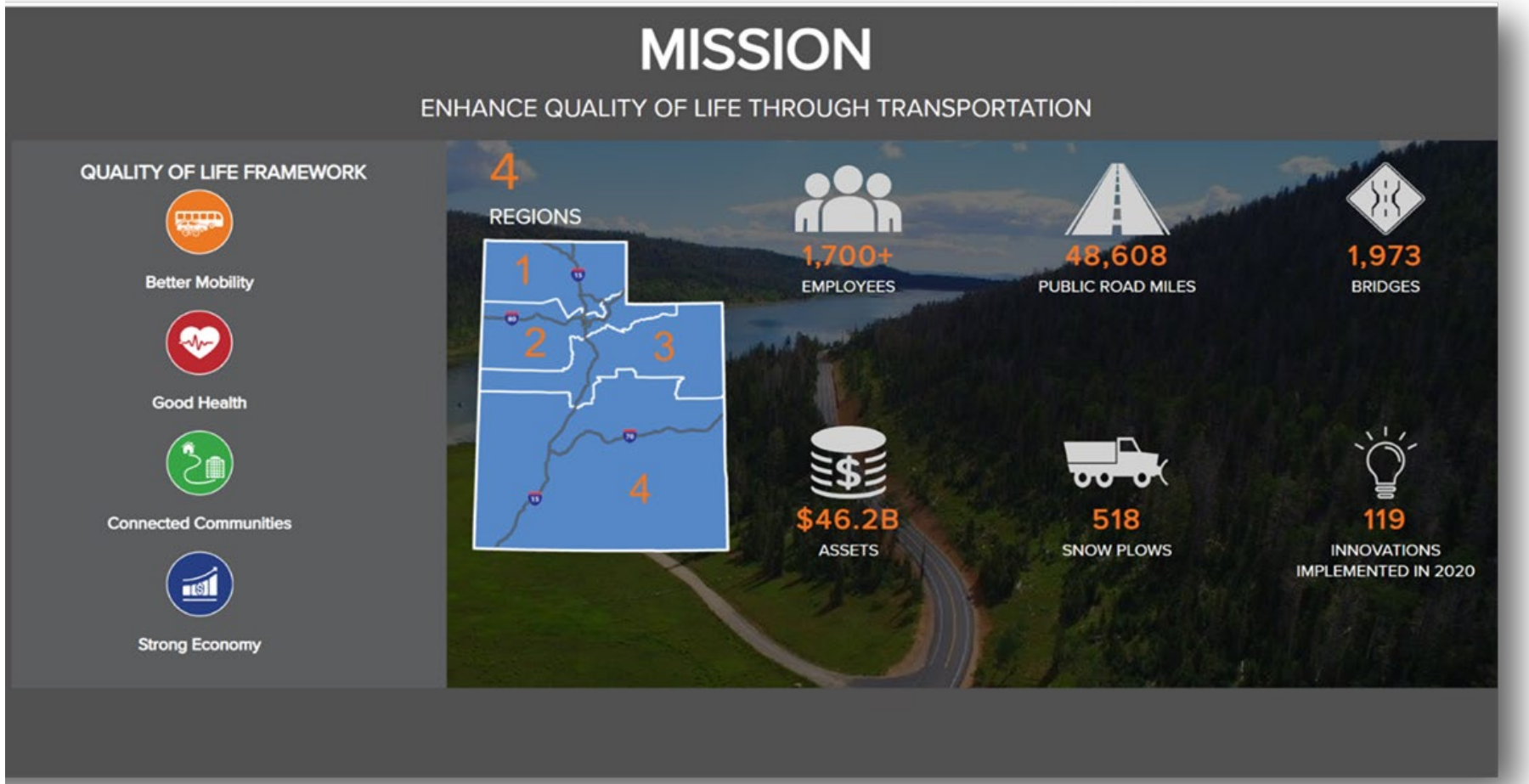
Messaging the Value of Research
MnDOT Research Peer Exchange

October 26, 2021

Presented by:
David Stevens

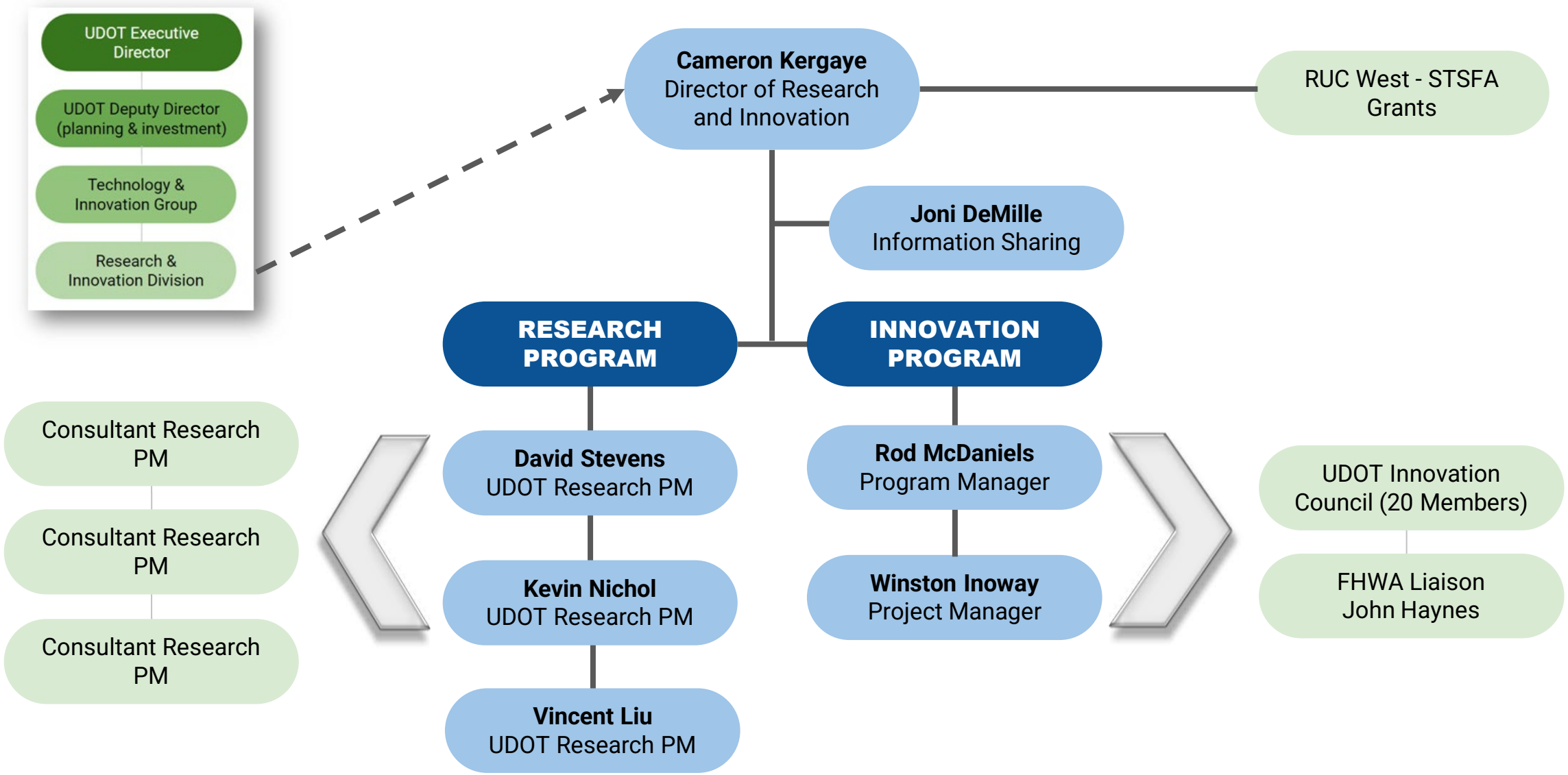
www.udot.utah.gov/go/research

UDOT CHARACTERISTICS



www.udot.utah.gov/strategic-direction/

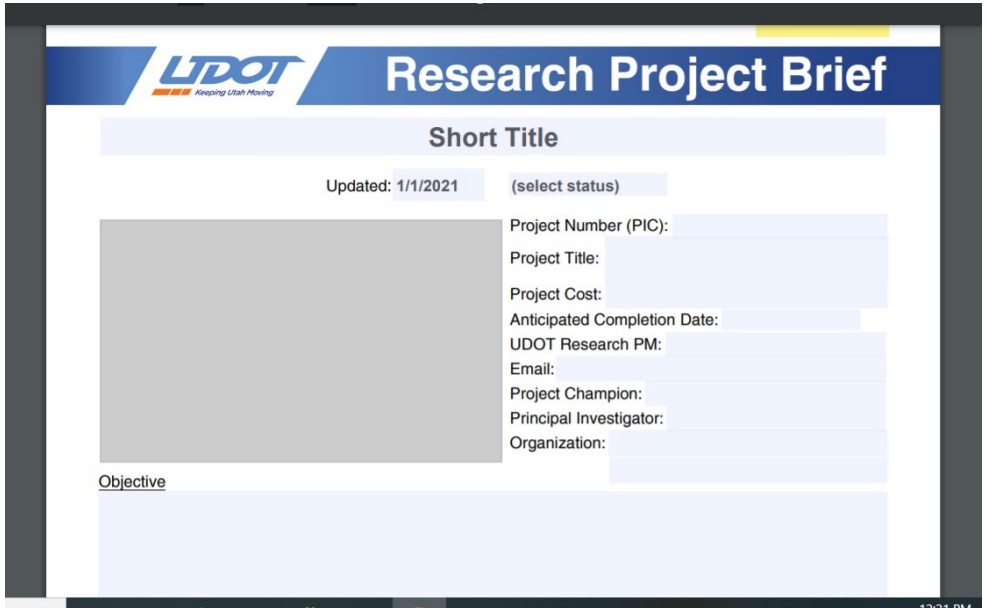
RESEARCH & INNOVATION ORG CHART



MESSAGING RESEARCH VALUE

- Main Research Results
  - Final Research Reports
  - Final Presentations (and Recordings) with PDHs available
  - Research Project Briefs
- R&I Websites
- YouDOT Employee Website
- Research Dashboard
- Research Explainer Video
- Periodic “Benefits of Research” Evaluation
- Innovation & Efficiencies Report
- UDOT Conferences & Leadership Meetings
- AASHTO RAC High Value Research

RESEARCH PROJECT BRIEFS


Research Project Brief

Short Title

Updated: 1/1/2021 (select status)

Project Number (PIC):
Project Title:
Project Cost:
Anticipated Completion Date:
UDOT Research PM:
Email:
Project Champion:
Principal Investigator:
Organization:

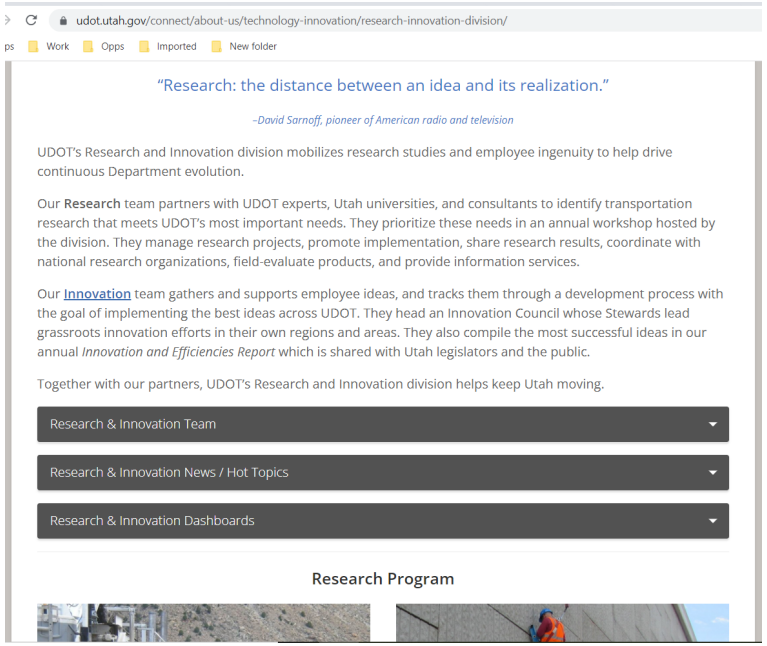
Objective

TEMPLATE LINK

NEW

- "Snack-sized" summary (1-2 pgs)
- Fill-in PDF form
- Has a project "value" focus
- Deliverable with final report; posted together on web
- National distribution via ListServe annually
- PMs, PIs, & Librarian are responsible

R&I WEBSITES

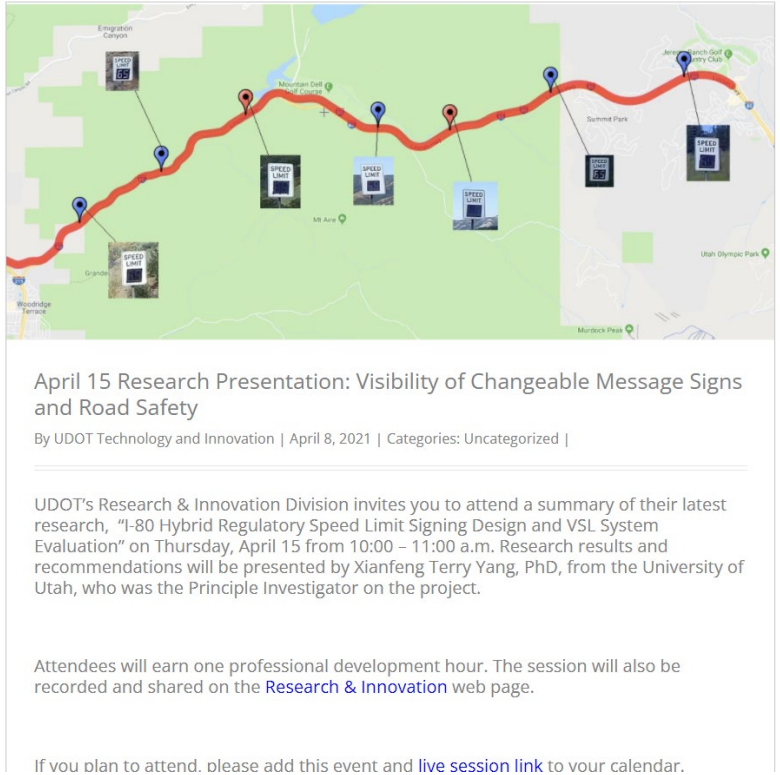


- Main R&I and Innovation sites
- Comprehensive / self-serve
- Content separated by audience (public/employees/contractors)
- Research reports, presentations, events
- Research prioritization process
- R&I team contributes content/ideas
- Librarian manages R&I website
- Innovation & Implementation Mgr manages Innovation site

udot.utah.gov/go/research

YouDOT WEBSITE

- Employee “newsletter”
- R&I contributes new research, library & innovation content (articles/video)
- Sent via UDOT-wide emails
- Allows us to piggyback on those emails



April 15 Research Presentation: Visibility of Changeable Message Signs and Road Safety

By UDOT Technology and Innovation | April 8, 2021 | Categories: Uncategorized |

UDOT’s Research & Innovation Division invites you to attend a summary of their latest research, “I-80 Hybrid Regulatory Speed Limit Signing Design and VSL System Evaluation” on Thursday, April 15 from 10:00 – 11:00 a.m. Research results and recommendations will be presented by Xianfeng Terry Yang, PhD, from the University of Utah, who was the Principle Investigator on the project.

Attendees will earn one professional development hour. The session will also be recorded and shared on the Research & Innovation web page.

If you plan to attend, please add this event and live session link to your calendar.

https://youdot.utah.gov/?s=research

1ST-GEN LIVE RESEARCH DASHBOARD

NEW

Research projects (RPMs) data will be available at the click of a button through a Power B.I. dashboard. Much of this data is presented in never-before-seen visual formats. We can now see metrics like these:

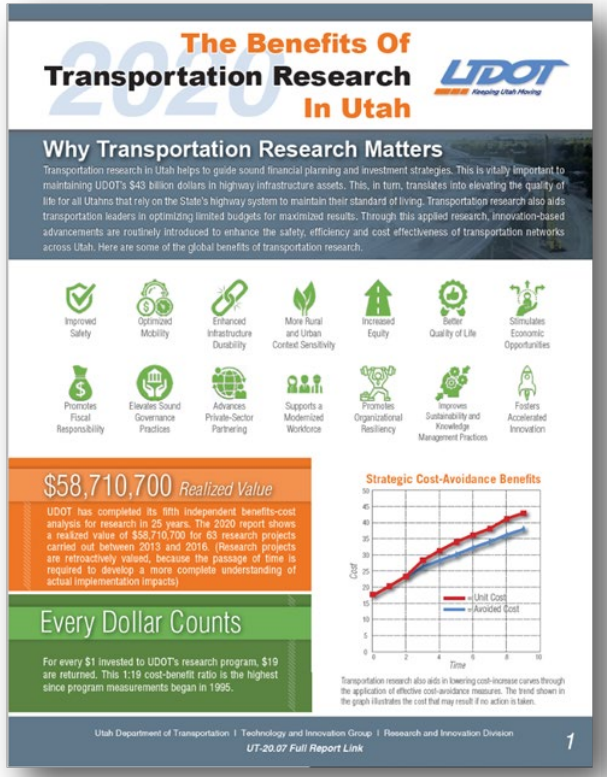
- Total Number of TAC Members
- Total Number of PI's
- Total Number of Project Champions
- Total Active Projects
- Total Active Projects per PM
- On Time Projects (versus not)
- Number of TPF Projects (lead state)
- Number of TPF Projects (non-lead state)
- Project Funding Types (State, SPR, etc.)
- Project Funding by Year
- Average Contract Durations
- Average Contract Amounts
- Projects per University
- Funding per University
- Average Contract Duration per University

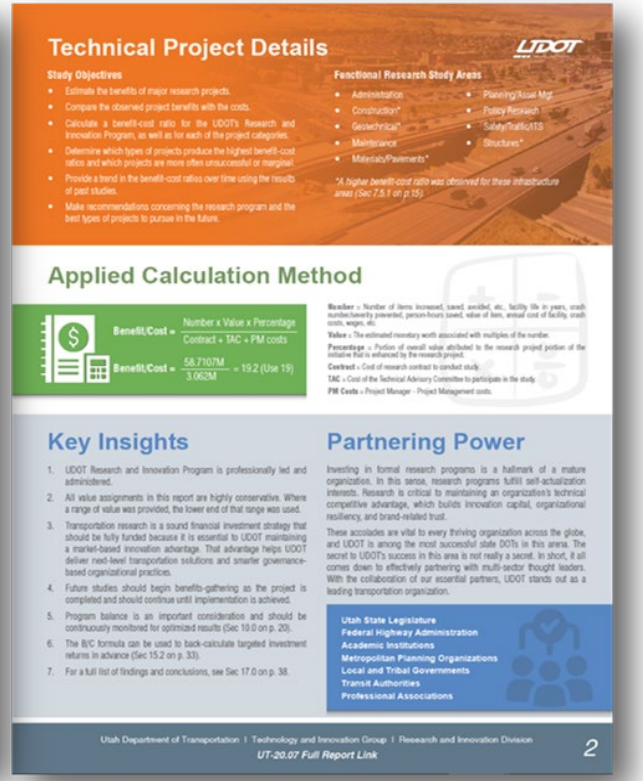
RESEARCH EXPLAINER VIDEO

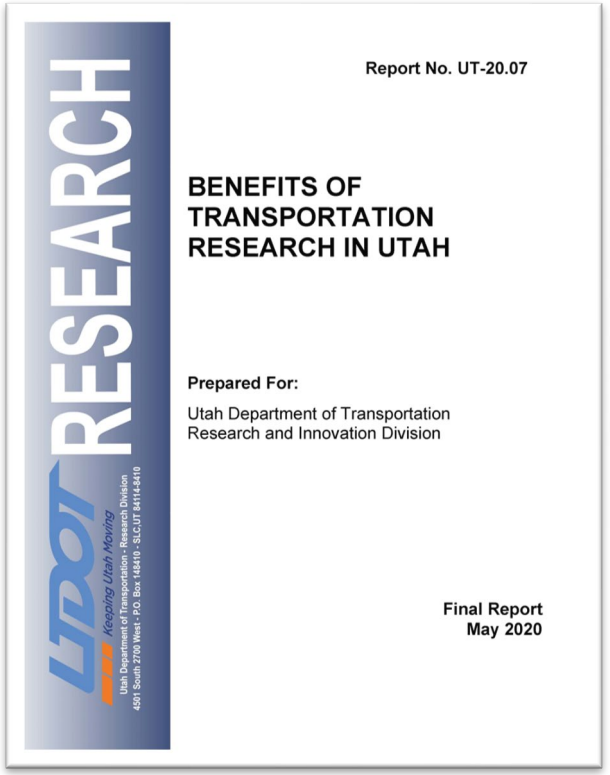
VIDEO LINK

- Short animated video made with consultants & leader support (2021)
- Showcases how research across UDOT brings value and helps us improve
- Fun overview of research B/C and two example research projects with valuable outcomes
- Future: Build on this foundation with specific project videos

BENEFITS OF RESEARCH STUDY







[2020 TWO-PAGER LINK]

[FULL REPORT LINK]

AGENCY USE OF BENEFITS

- Appreciate research contributions
- Implement specific research findings
- Utilize research capabilities as needed
- Share interesting technologies with the public and state legislature

DIVISION USE OF BENEFITS

- Assess value of research program
- Balance resources with agency priorities
- Identify successful research that needs implementation support
- Improve research project management
- Create a B/C library

BENEFITS OUTCOME

- Enhanced infrastructure
  - better designs, reduced construction costs, lower maintenance requirements, reduced materials costs
- Savings to operations
  - reduced manpower, lower bids, lower operational costs, more efficient equipment
- Benefits to the public
  - reduced congestion, improved safety, enhanced environment
- Also: understanding what doesn't work
- Input from UDOT research champions
- B/C = Observed benefits of research / Cost of research

B/C PER PROJECT TYPE (2013-2016)

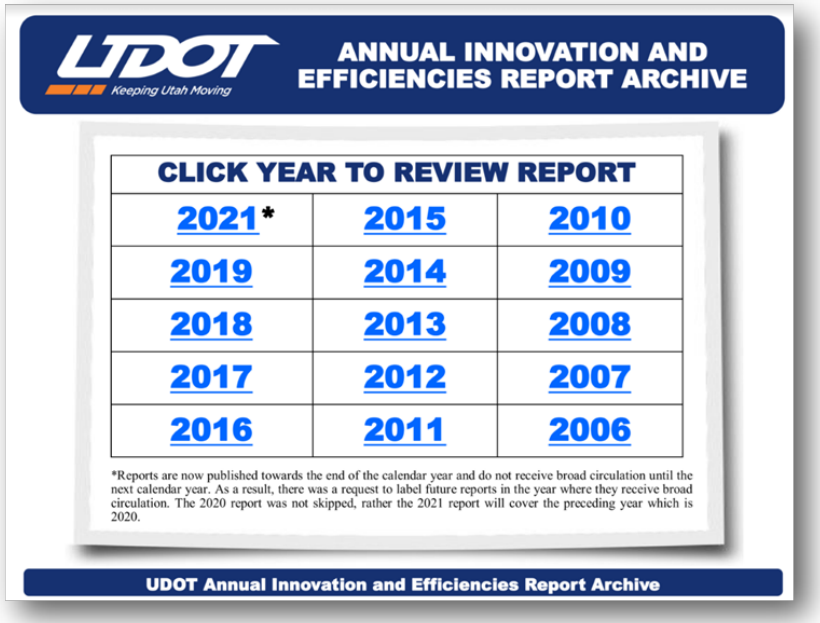
Project Type	Benefits x 1,000	Total Cost x 1,000	Benefit/Cost
Infrastructure	$37,310	$1,500	25
Operations	$19,964	$1,227	16
Policy Research	$982	$212	5
Administration	$455	$123	4
Totals	**$58,711**	**$3,062**	**19**

PAST B/C EVALUATIONS

Years Evaluated	Number of Projects	Percent of Surveys Returned	Benefit/Cost Estimates
1991-1993	18	--	13-15
1995-1997	22	77%	12
2006-2008	41	78%	17
2009-2012	66	37%	14
2013-2016 (2020 report)	63	67%	19

INNOVATION & EFFICIENCIES REPORT

Some success stories on the implementation and value of research results are included in this annual report along with other UDOT innovations.



UDOT Keeping Utah Moving

ANNUAL INNOVATION AND EFFICIENCIES REPORT ARCHIVE

CLICK YEAR TO REVIEW REPORT		
2021*	2015	2010
2019	2014	2009
2018	2013	2008
2017	2012	2007
2016	2011	2006

*Reports are now published towards the end of the calendar year and do not receive broad circulation until the next calendar year. As a result, there was a request to label future reports in the year where they receive broad circulation. The 2020 report was not skipped, rather the 2021 report will cover the preceding year which is 2020.

UDOT Annual Innovation and Efficiencies Report Archive

www.udot.utah.gov/go/innovation

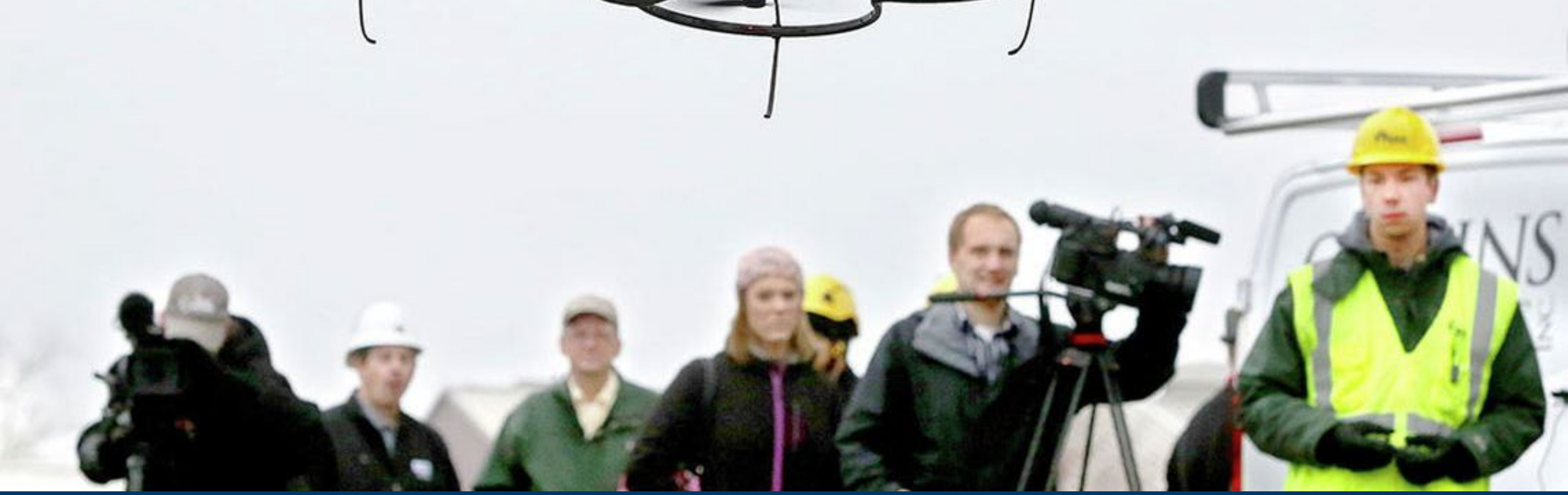
Questions for UDOT?

Please contact:

Cameron Kergaye
ckergaye@utah.gov
801-633-0359

David Stevens
davidstevens@utah.gov
801-589-8340

APPENDIX G. MINNESOTA - MESSAGING THE VALUE OF RESEARCH, PART 2



Messaging the Value of Research

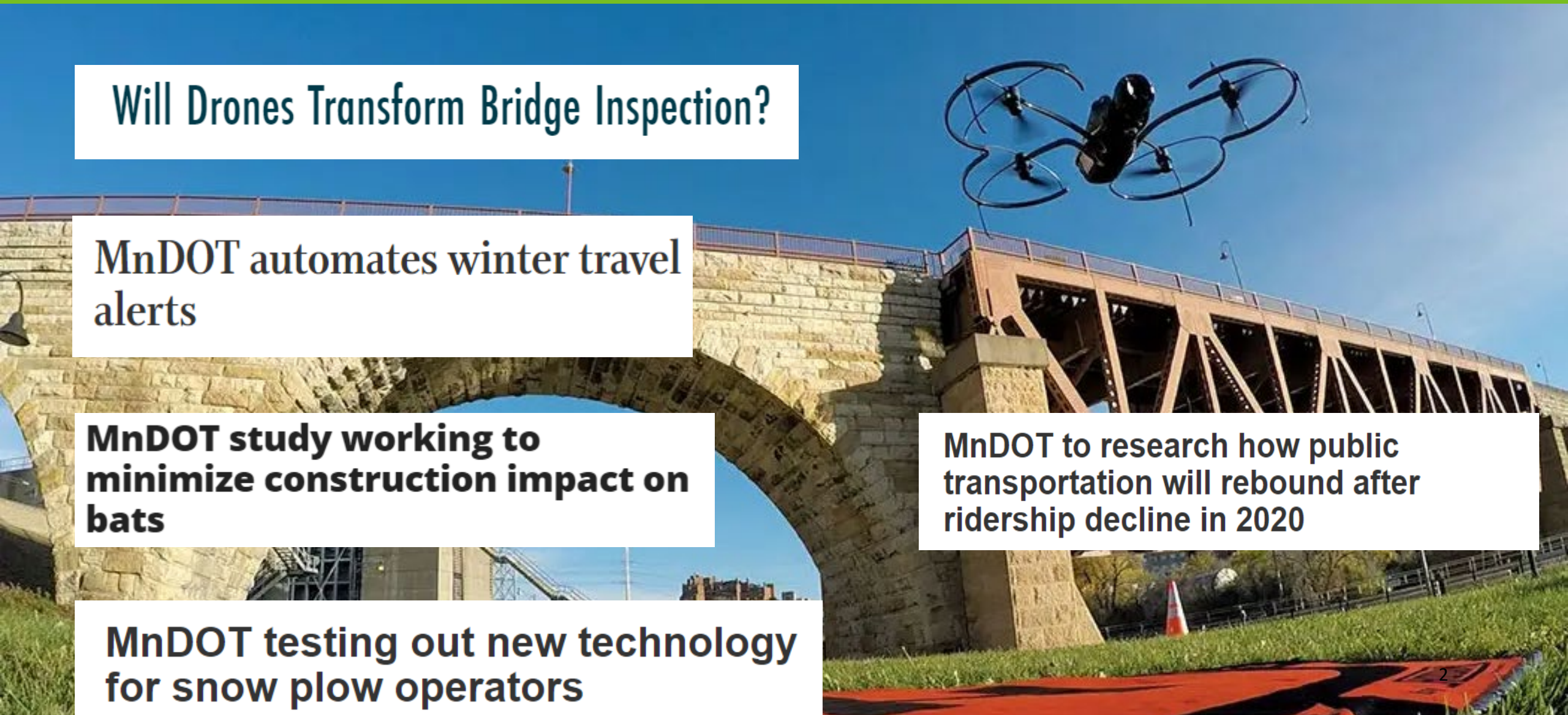
Shannon Fiecke| Marketing & Communications Manager

MnDOT Office of Research & Innovation

October 18, 2021

DEPARTMENT OF TRANSPORTATION

The Gift that Keeps On Giving



Will Drones Transform Bridge Inspection?

MnDOT automates winter travel alerts

MnDOT study working to minimize construction impact on bats

MnDOT testing out new technology for snow plow operators

MnDOT to research how public transportation will rebound after ridership decline in 2020

Overview

- Why Communication Matters
- Five Steps for Each Project
- How We Measure Success
- 22-23 Marketing Goals
- Challenges

Why Communication Matters

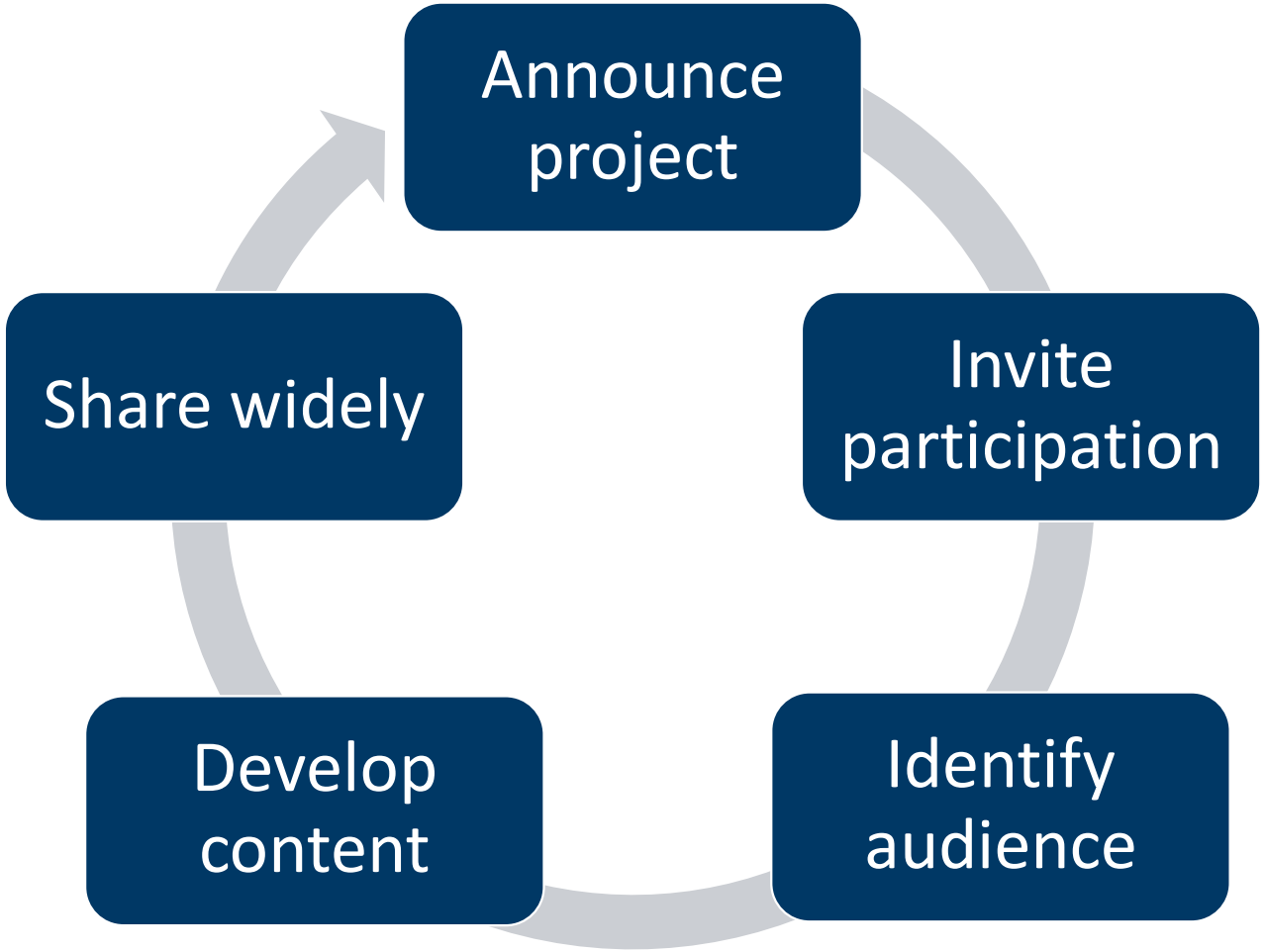
Establish Value

Gain Public Trust

Transfer Knowledge

Increase Participation

Five Communication Steps for Each Project



Step 1. Announce Projects

LRRB

Local Road Research Board News

February 2021

LRRB Announces 2021 Research Projects

In December, the LRRB met and funded 16 new research projects to address issues facing the Minnesota transportation community, including impacts of detour routes on local roads and the influence of autonomous vehicles.

City and county engineers proposed over 100 ideas for possible funding in 2021. In addition to the 16 academic research projects, the LRRB funded 10 consultant proposals through its research implementation program and two projects to address COVID-19 impacts.

"We are in great need of people to serve on the technical advisory panels for these projects," said Jim Foldesi, LRRB board chair. "The experience is highly rewarding and you will be contributing to products that help your fellow transportation engineers and practitioners. Please email research.dot@state.mn.us to volunteer."

To receive email updates about a specific project, "subscribe" to the project webpage below:

2021 LRRB Research Projects

- Benefits of Preventive Maintenance*
- BMP for Issues with Asphalt Centerline Joint and Intelligent Compaction for Local Agencies

MnDOT Research & Innovation
423 followers
1d •

Highway improvement projects in metropolitan areas can offer a variety of benefits, including greater safety for travelers and increased activity for businesses near the roadway. However, improved roads may also negatively impact long-standing businesses as new retailers and chain stores displace them.

In a new study, researchers will estimate the effects of highway improvements on nearby businesses.

The project will be led by Yingling Fan and Noah Wexler with the University of Minnesota and Jason Junge with MnDOT's Transit Team.

#transportationresearch #businessimpacts #highwayimprovements

https://lnkd.in/e5QChmmF

POLICY AND PLANNING

NEW PROJECT: ASSESSING THE EFFECTS OF HIGHWAY IMPROVEMENTS ON ADJACENT BUSINESSES

OCTOBER 20, 2021 MICAELA RESH LEAVE A COMMENT EDIT

Highway improvement projects in metropolitan areas can offer a variety of benefits, including greater safety for travelers and increased activity for businesses near the roadway. However, improved roads may also negatively impact long-standing businesses as new retailers and chain stores displace them.

A greater understanding of the effects of highway improvements on businesses in the Twin Cities' commercial corridors will help MnDOT deliver projects more successfully.

TO RECEIVE EMAIL UPDATES ABOUT THIS PROJECT, VISIT MNDOT'S OFFICE OF RESEARCH & INNOVATION TO SUBSCRIBE.

"If we can predict how a project will affect nearby businesses, we'll be in a better position to work with

Step 2. Invite Participation

LRRB Research Interest Form

Contact Information

Name: Chris LaBounty
Email: clabounty@plymouthmn.gov
Agency: City of Plymouth
Phone Number: 763-509-5541

Research Project Interest

To join a Technical Advisory Panel or learn more, check mark projects of interest below. Some projects are still under funding consideration; funded projects will begin in first half of 2022.

Environmental
- ☐ Boulevard Tree Selection - Best Practice
- ☐ Re-use of Minnesota Waste Material in Sustainably Designed Soils - Part 2
- ☒ Update of the 2009 Stormwater Management Best Practices Guide
- ☐ Tire Derived Aggregate (TDA): Light Weight Fill and as Stormwater Infiltration Media

Maintenance Operations
- ☐ Best Practices for Dust Control

Materials & Construction
- ☐ Cutting Edges – Performance User's Guide
- ☐ Pavement Design Around Utilities – Best Practice
- ☐ Evaluation of Gravel Stabilizer Used on Gravel Roads and Gravel Shoulders
- ☐ Improving and Developing Pavement Design Inputs and Performance Functions for Cold Recycled Pavement Layers in Minnesota
- ☐ Mitigation of Tenting of Transverse Cracks and Joints in Asphalt Pavement
- ☐ Asphalt Pavement Cracking Performance Data Analysis
- ☐ A Synthesis of Usage and Performance of Daylighted Bases in Comparison to Edge Drains
- ☐ Pavement Design: Performance of Base vs Subbase
- ☐ Lightly Surface Roads - Cost Benefit

Policy & Planning
- ☒ ROW Policies – Best Practices
- ☒ Residential Roadway Width - Best Practices
- ☒ Using Apps to Notify the Public of Local Road and Bridge Closure
- ☐ Haul Road and Detour Maintenance
- ☒ Understanding How Street Reconstruction Affects Property Value

Traffic & Safety
- ☐ Pedestrian Safety Around Roundabouts
- ☐ Solar Roadway Lighting
- ☐ Complete Streets Speed Impacts
- ☐ School Bus Stop-Arm Violations
- ☐ Evaluation of Static and Dynamic No Right Turn on Red Signs at Traffic Signals

General Interest
- ☐ Consider me for other future projects. Interest area: _____

Please e-mail back to: research.dot@state.mn.us

IDEASCALE

Have Minnesota's Warmer Winters Increased the Number of Freeze Thaw Cycles?

Status: Active
Project Start Date: No Date
+ Subscribe for Updates

Summary:

This study would attempt to quantify the number of freeze/thaw events daily, monthly, and annually from historical temperature records, freeze gauges, and other data. It would also attempt to collect ground/pavement temperature and study its correlation with air temperature during freeze/thaw events.

Final Deliverables:

Related Materials:

- New Project: Have Minnesota's Warmer Winters Increased the Number of Freeze Thaw Cycles? - (Blog Post)
- Research Need Statement 572 - (Other)

Project Personnel:

Principal Investigator: Halil Ceylan

Co-Principal Investigator: Eugene Takle, Sunghwan Kim, In-Ho Cho

Technical Liaison: Jeffrey Meek

Project Coordinator: Leif Halverson

Step 3. Identify Audience/Communication Channels

Communications Plan:

The Impact of Deferred Maintenance in Minnesota

Issue/Project Summary

In this research, we will use a combination of multiple methods; case studies, statistical models, and surveys to analyze patterns of maintenance expenditures across different localities (cities and counties) in Minnesota, explore how fiscal conditions affect maintenance expenditures, and to examine the negative impact of deferred maintenance on Minnesota's local road system. This research will generate information that city and county engineers can use in discussions with elected officials to maintain an appropriate and consistent level of funding for maintenance.

Timeline

Contract effective 07/14/2020 to 4/30/2022

Communications Goals

- Communicate the impact deferring maintenance has on the transportation system to local agency decision makers

Audiences

- Elected officials
- City and county finance associations
- City and county administrator associations
- City and county engineers

Contacts

- **First:** Paul Oehme, City of Lakeville
- **Second:** Jerry Zhao, University of Minnesota
- **Third:** Thomas Johnson-Kaiser, MnDOT

Project #	Contract #	Deliverable #	Title	Status	End Date
2019-005	1033238		RIC - Best Practices to Manage Effects of Settlement and Heave at Catch Basins and Manholes	Active Project	07/31/2021

Notes: 8/12, new contract, 1047617, expires 10/31.
At conclusion of project:
- Send notification to Suburban Utility Superintendents Association (SUSA) email list. Email list saved in communications folder
- LRRB update at APWA Fall Conference and MN City/County engineer conferences (Shannon has notified SRF).
- LTAP Fall Maintenance Expo (Stephane Malinoff to recommend inclusion. Verify.)
- LTAP newsletter

Step 4. Develop, Gather Content

DEPARTMENT OF TRANSPORTATION
OFFICE OF RESEARCH & INNOVATION

TECHNICAL SUMMARY

Questions?

2021-19TS
Published June 2021

Evaluating Pavement Thickness With 3D Ground-Penetrating Radar

What Was the Need?

MnDOT assesses pavement thickness as a quality assurance and quality control measure in pavement maintenance and renewal processes. Existing pavement thickness influences the type of maintenance chosen for a road segment, such as full-depth reclamation, cold in-place recycling or whitetopping.

Building on previous research, investigators developed a nondestructive method of assessing pavement thickness using 3D ground-penetrating radar (GPR). A vehicle equipped with an array of transmitting and receiving antenna pairs travels at traffic speed collecting full-width GPR data for analysis, minimizing the amount of pavement coring required.

DEPARTMENT OF TRANSPORTATION LRRB

149 The number of anonymous public agency employees who responded to the study's job satisfaction survey.

REASONS EMPLOYEES LEAVE

- More pay 47%
- Advancement potential 22%
- Greater freedom in choosing work schedule and tasks 17%
- Cultural support 9%
- Opportunity to relocate 5%

Relationship Between Engineers and Technical Workers

Engineers are considered to be the problem-solvers, while technical workers are the doers.

Both roles are essential to agencies' work and are closely intertwined, but differences in salary can appear to prioritize formal education over experience and lead to a perception of social status within the agency. This, in turn, can lead to resentment and perceived injustice.

Emphasizing teamwork and encouraging technicians to share their expertise may help alleviate these negative feelings.

WHAT CAN PUBLIC AGENCIES DO?

Accentuate the positives
Highlight the benefits of working in public agencies.

Increase awareness
Promote the work transportation agencies do, helping students visualize a career path.

Write accurate job descriptions
If long days and overtime are part of the job, say so upfront so employees know what they're agreeing to.

Cut the red tape
Make exceptions for hiring, promotions and compensation when appropriate.

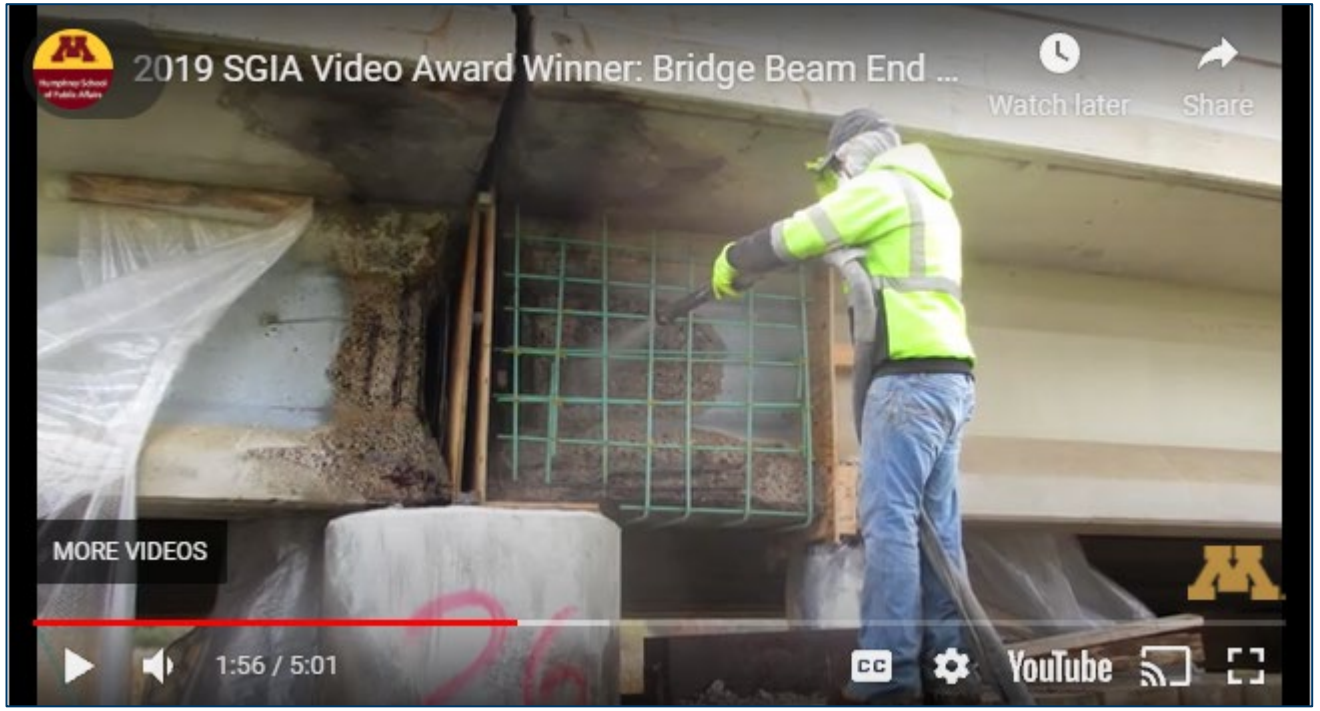
Offer mentorship
Provide opportunities for employees to learn and grow from each other.

Plan for succession
Fill vacancies quickly and don't rely on existing staff to simply absorb more work.

Encourage documentation
Invest in systems that will help ensure key information doesn't leave when employees retire.

View the full report at mndot.gov/research and lrrb.org.

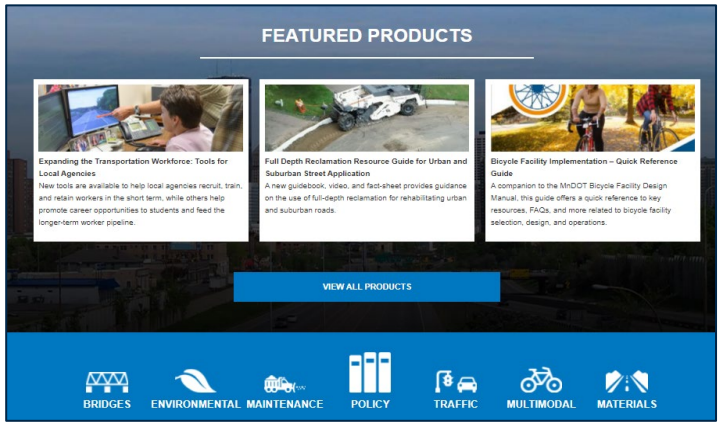
Minnesota saves **$1.3 million** on three bridges, thanks to shotcrete repair study.



Step 5. Share Widely

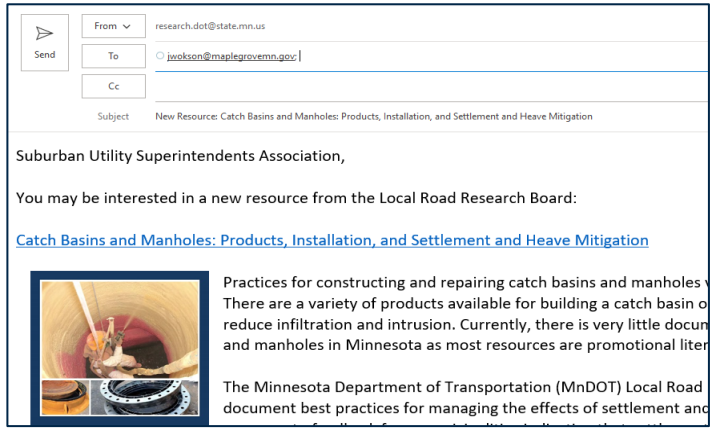
Conferences/presentations

E-newsletters



Websites/blog

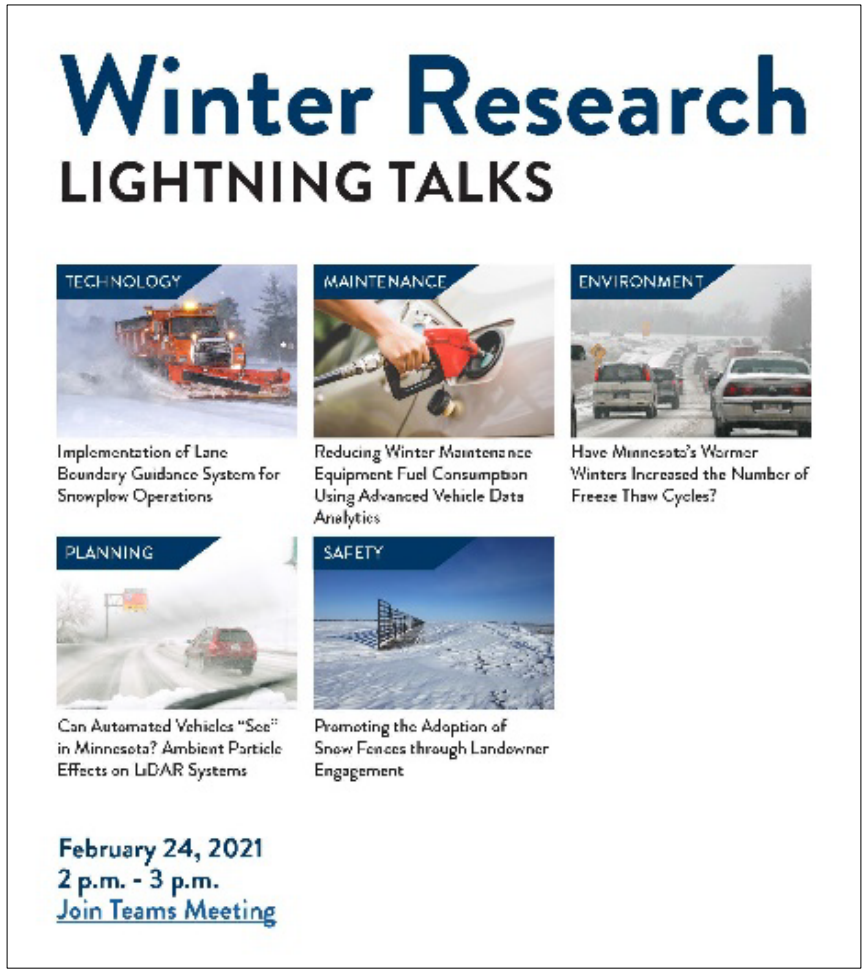
Social media



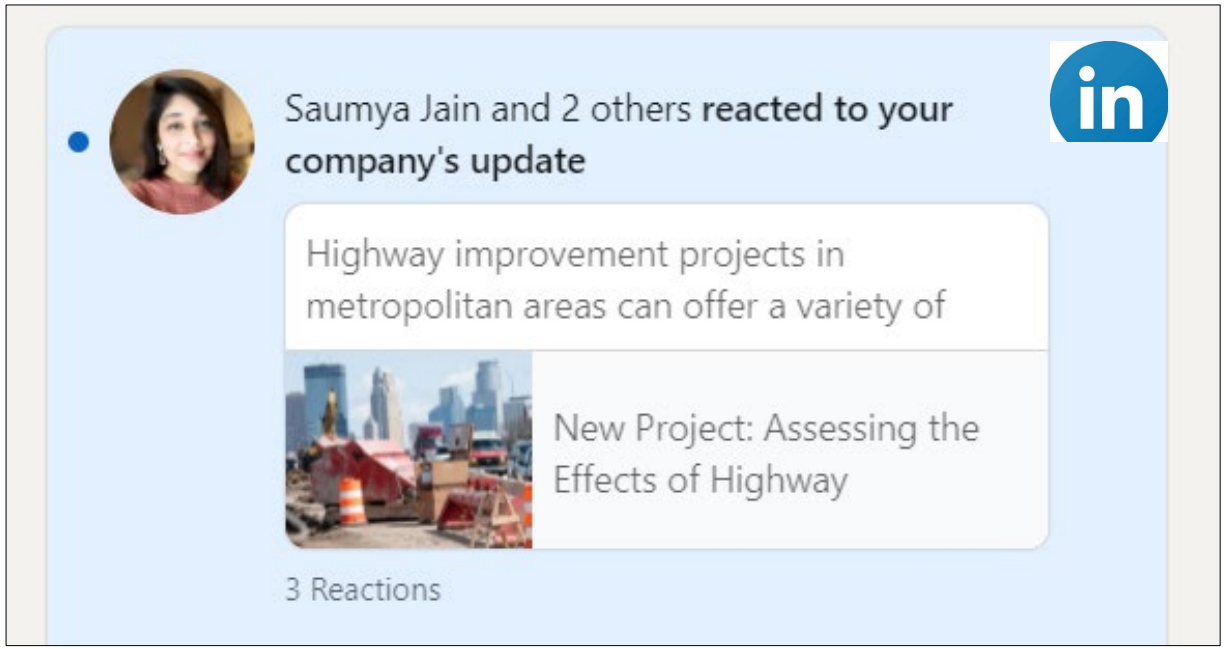
Targeted email

Webinars/short videos

Other Ideas that Are Working



Quit-hit webinars



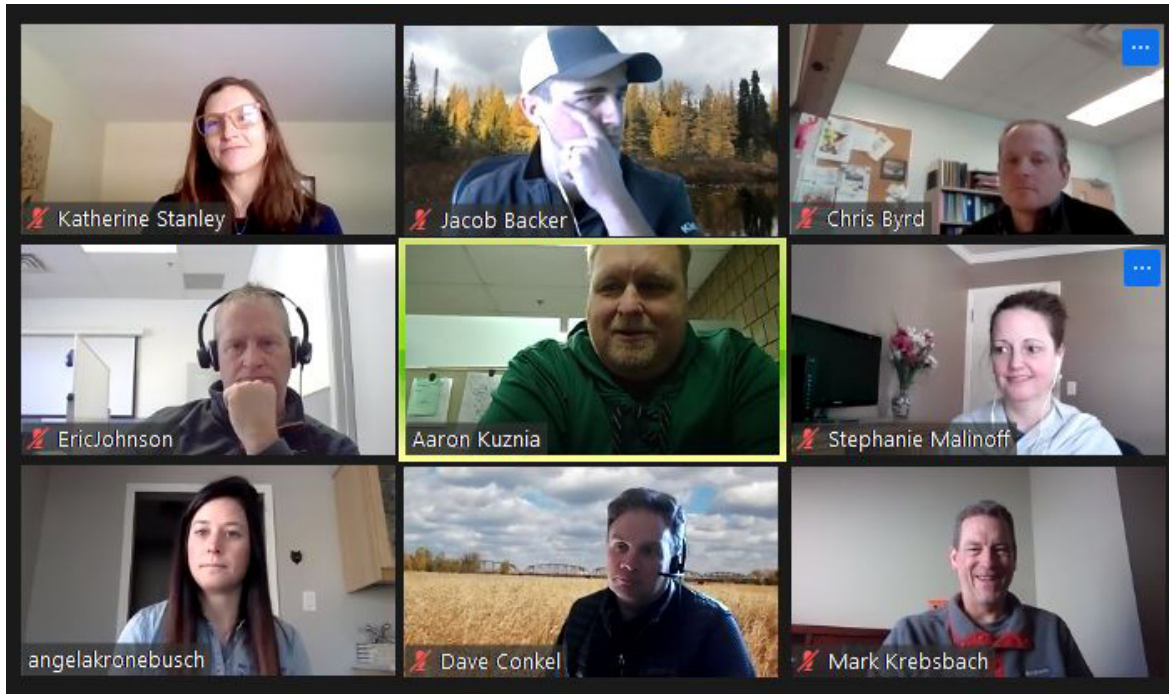
LinkedIn tagging

E-signature emblems

How We Measure Success

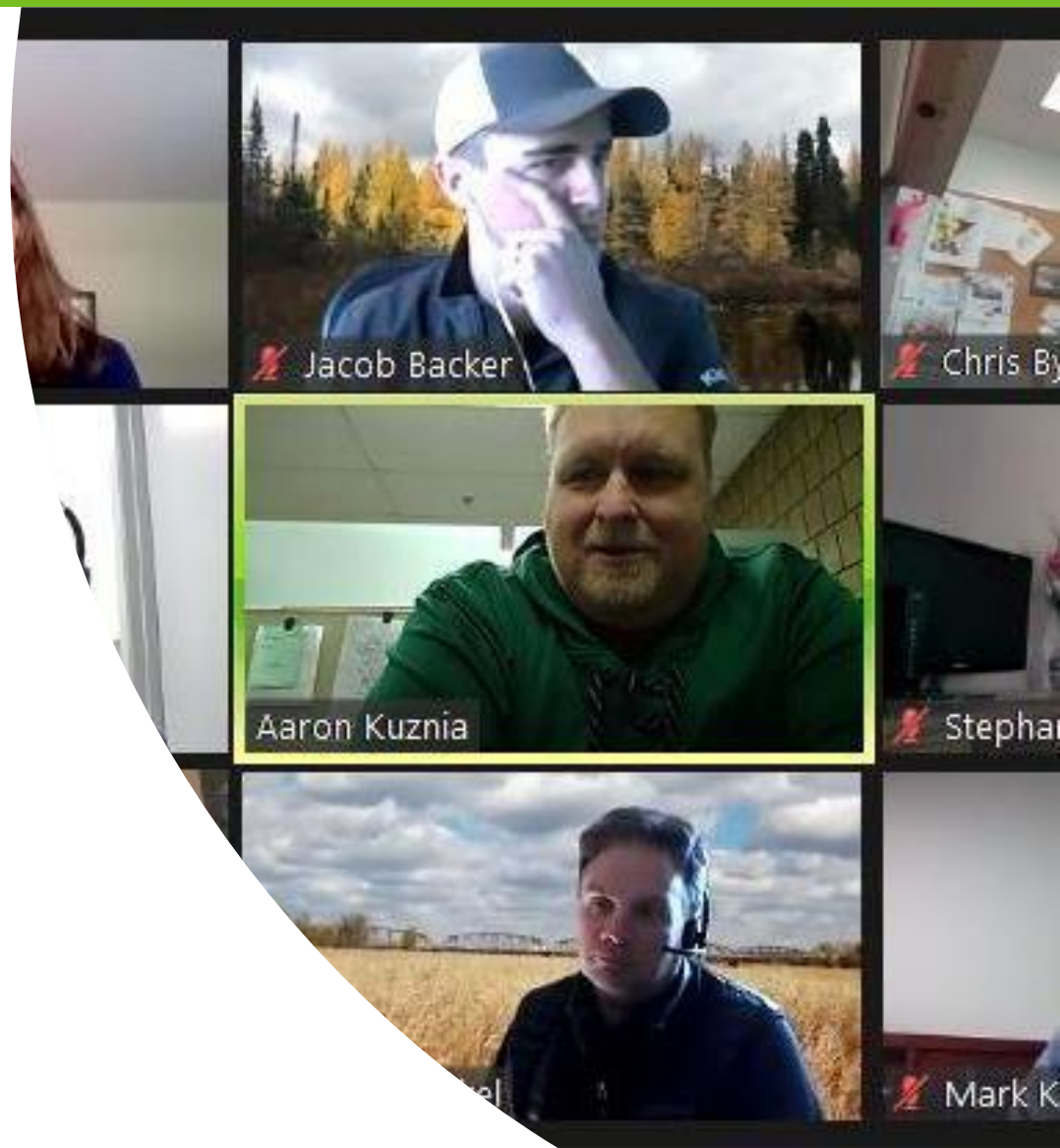
Performance Measurements:

- Idea submissions
- TAP participation
- Newsletter subscription (8,596)
- Project alerts (660)
- LinkedIn activity
- Media stories
- Open rates/clicks
- Customer survey (new)



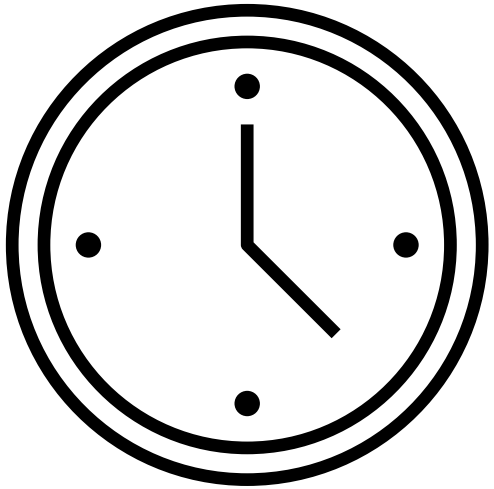
2022-2023 Marketing/Communication Goals

- Increase TAP participation
- More webinars, videos
- Wikipedia-like topic pages
- Category-level subscription
- More resources



Challenges

- Time/resources
- Lack of quantified benefits
- Unengaged TAP or Technical Liaison
- Too early



DEPARTMENT OF TRANSPORTATION

Thank you!

Shannon Fiecke

Shannon.Fiecke@state.mn.us

Websites:

mndot.gov/research, lrrb.org, mntransportationresearch.org

APPENDIX H. MINNESOTA - TRANSPORTATION INNOVATION

DEPARTMENT OF TRANSPORTATION

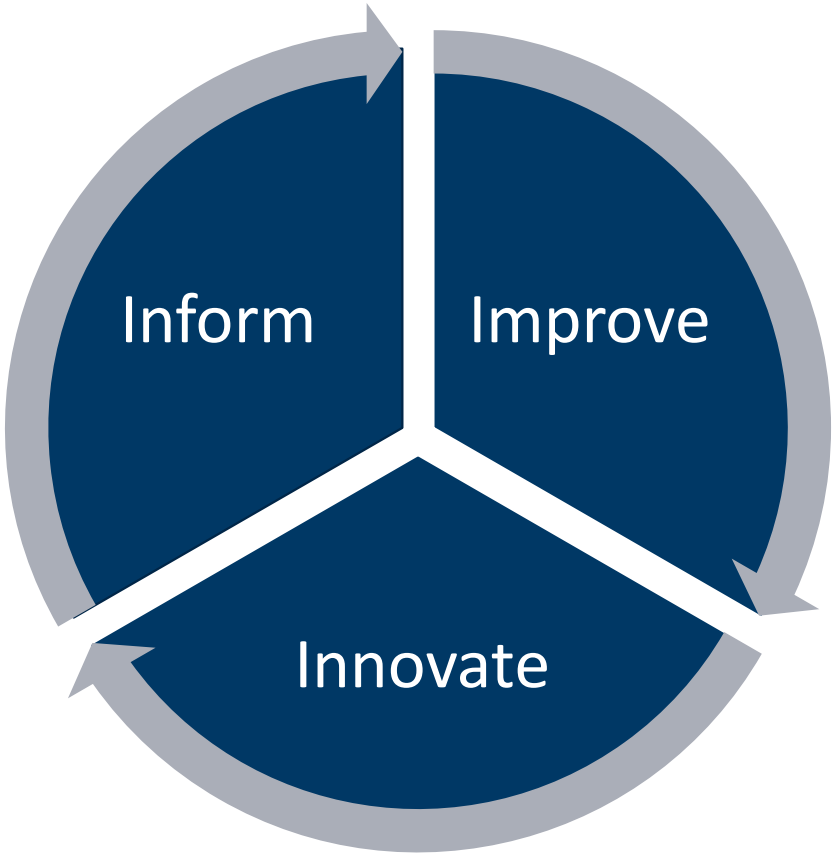
MnDOT Peer Exchange

Katie Walker | Research & Innovation

October 2021

Mission and Goals

Informing, Improving and Innovating Transportation in Minnesota



Inform to make better decisions

Improve our process, services & products to better serve our end users

Innovate to solve complex problems creating value for our organization and customers

Keys to Success

As an organization, if we are to keep pace with and shape change, we must understand the challenges, their implications and innovate to be proactive, adaptable, and effective.

Keys to Success

- **Support from the Top.** Empower employees to innovate through experimenting with new ideas.
- **Embrace Diversity**. Encourage employees from different backgrounds & organizational levels to use their skills & experience to solve problems.
- **Create a Learning Community.** Benchmark best practices, bring in outside experts & use professional networks to capture lessons learned & apply them.
- **Experiment & Share**. Share lessons learned through experimentation, no matter the outcome.
- **Evaluate & Measure.** Evaluate & measure innovations to gauge alignment with strategic objectives.
- **Celebrate Innovators.** Support, foster & grow innovation by recognizing & celebrating innovations & innovators.

Innovation Strategy

...systems thinking approach to innovation

Why innovate – link to mission/goals & definition of success

What to innovate – type, scale, scope & resources (portfolio)

How to innovate – process & metrics

Who innovates – fostering an innovative culture & building partnerships

Where to innovate – collaborative physical and virtual space

An actionable roadmap to create a structured innovation program tailored to MnDOT.

Organizational Structure

Innovation Community of Practice (ICoP)

All employees can join. The Innovation Community of Practice (ICoP) works to advance, support, and model organizational innovation and improvement. Members will share knowledge, make connections and advance the department's innovation strategies. Ongoing bi-monthly meetings. Focus: All employees.

Senior Leadership Team (SLT)

Leaders who set the strategy for innovative programs, services, projects, initiatives and culture for the department.
Ongoing quarterly updates. Focus: Leadership.

Technical Advisory Panel (TAP)

A diverse group from across the agency to provide guidance to the Innovation consultant, promote/spread innovation, & support culture change. Initially formed as an ad hoc short-term group, but may transition into an ongoing group. Monthly meetings or more frequently if needed. Focus: Subject Matter Experts (SMEs).

Innovation Project Management Team (PMT)

Research & Innovation staff and Innovation consultant responsible for development & deployment of the Innovation Strategy. Weekly meetings.

Technical Advisory Panel

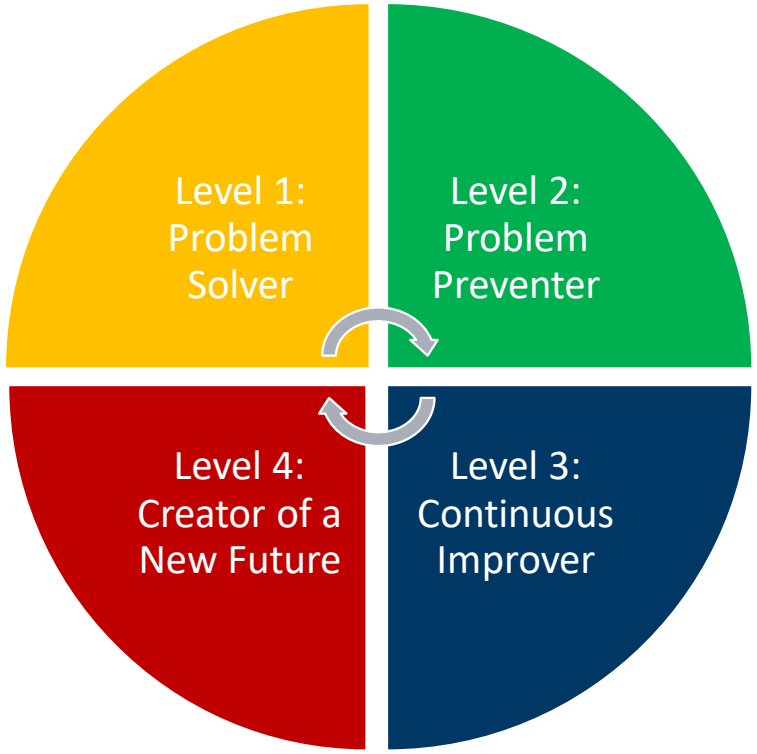
Technical Advisory Panel (TAP)

- Diverse group of staff from across the agency
- Provide guidance to the Innovation consultant, promote/spread innovation, & support culture change
- Making recommendations to the Senior Leadership Team (SLT)
- Initially formed as an ad hoc short-term (six to nine month) group focused on development of the Innovation Strategy Plan
- May transition into an ongoing innovation staff advisory group, if warranted
- Meets monthly for 1.5 to 2 hours

TAP Membership

Area of Connection
Strategic Operating Plan (SOP)
Long-range Plan (SMTP)
Equity & Diversity
MnIT (Technology)
Human Resources
Facility Services
Finance
Communications
Commissioners Office
Sustainability & Public Health
Continuous Improvement/Business Services
Office of Civil Rights
Chief Counsel
Tribal Affairs

Innovation Practitioners
Metro District
District 1
District 2
District 3
District 4
District 6
District 7
District 8
CAV-X
Maintenance
Materials & Road Research
Bridge
Office of Traffic Engineering
TSMO
State Aid
Statewide Radio Project
Environmental Stewardship



Source: Larry Myler, Innovation is Problem Solving…And a Whole Lot More.

Innovation Framework – "Innovating transportation for the public good"

As an organization, to shape change we must understand our challenges and their implications then innovate to be proactive, adaptable, and effective. Fostering an innovative culture that adopts a creative problem-solving approach based in design-thinking principles requires an **E^3 mindset of Empathy, Experimentation, and Empowerment.**

Empathy

Focus on understanding the needs and desires of those we serve internally and externally.

Experimentation

Ability to generate new ideas. Recognize success requires collaboration, rapid iteration and patience.

Empowerment

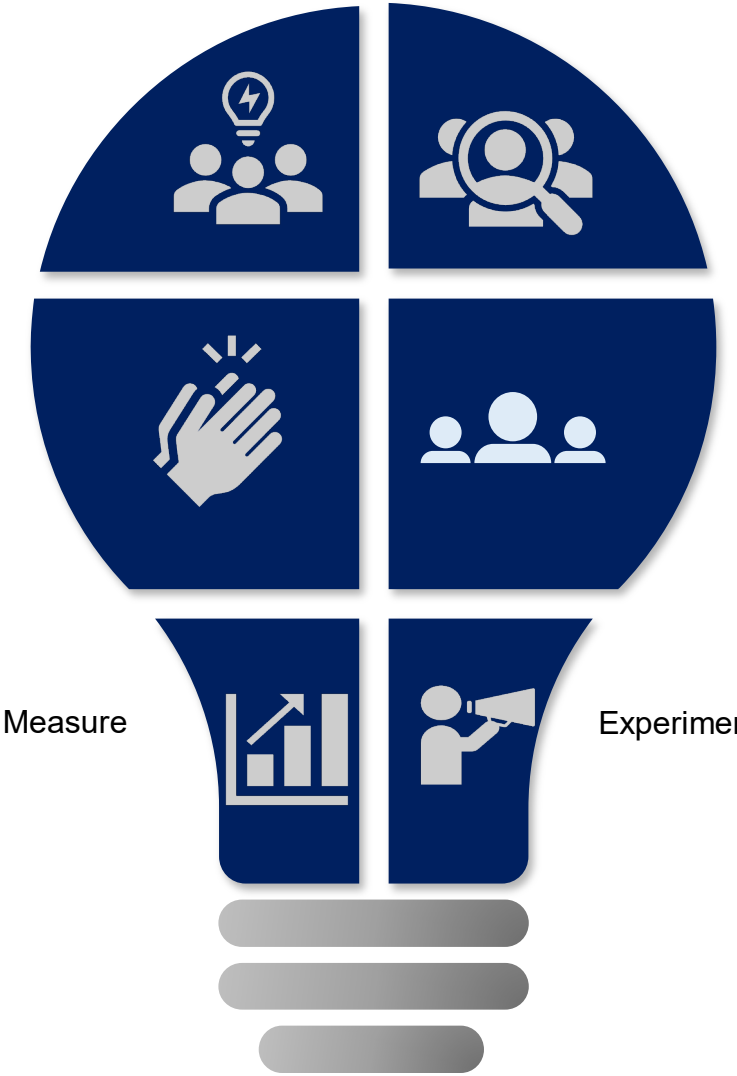
Providing support & tools to get things done. Empower people to take calculated risks, voice dissenting opinions, and secure resources.

Innovation is using critical & creative thinking to implement ideas that create value for the public we serve.

Innovation Goals

- Systemically integrate innovation into MnDOT's culture by adopting a "Yes And" rather than a "No But" mentality
- Accelerate, pilot & scale innovations to improve efficiency, effectiveness, & customer service
- Innovate to position MnDOT as a national leader
- Grow & leverage strategic partnerships to maximize/broaden the impact of innovations
- Implement innovations to support a safe, equitable, & sustainable transportation system for all

Strategies



Fostering a Culture of Innovation

Nurturing a climate that supports risk-taking, is change-oriented, and has a bias toward action.

Implementation (Strategies, Objectives & Actions)

Strategies	Objective	Actions
Support from Leadership	Empower employees to innovate	• Identify innovation as an organizational goal & norm • Dedicate resources (time, funding, space) to "seed" innovations • Provide dedicated time for innovation (e.g. 3M model) • Create spaces (physical & virtual) to inspire imagination & creativity • Establish a Center for Innovation within the Research & Innovation Office (RIO) supported by an Innovation Team
Customer Focused	Focus on understanding the needs of those we serve	• Focus on stakeholders through human-centered design thinking • Co-create by involving stakeholders throughout the innovation process
Experiment, learn & share	Champion innovative ideas, develop innovative talent and transform services to better serve the public	• Develop an idea pipeline • Compile a portfolio of innovations • Launch structures to rapidly identify, pilot & implement innovations (e.g., innovation day(s), innovation summit, crowdsourcing) • Build a learning community through training, coaching & mentoring (e.g., Community of Practice, Innovation Academy) • Develop networks & platforms (internal & external) for sharing knowledge and experience
Evaluate & Measure	Track alignment with department strategic objectives	• Record, evaluate and track innovation opportunities • Establish easily digestible metrics (e.g., dashboard)
Reward & Recognize	Recognize & celebrate innovations & innovators	• Innovation newsletter, website, blog, social media, webinars, podcasts • Innovation awards, incentives, and events
Collaborate	Build relationships & connect innovators across sectors to build a more equitable and inclusive innovation ecosystem	• Convene an Innovation Leadership Council (public/private partnership) to guide, support & promote innovation to fill role of the State Transportation Innovation Council (STIC) • Build relationships with public, private & philanthropic communities • Create and train a network of Innovation Ambassadors to break down organizational "silos" • Bring in outside experts & use professional networks to foster innovation

APPENDIX I. CALTRANS INNOVATION

INNOVATION

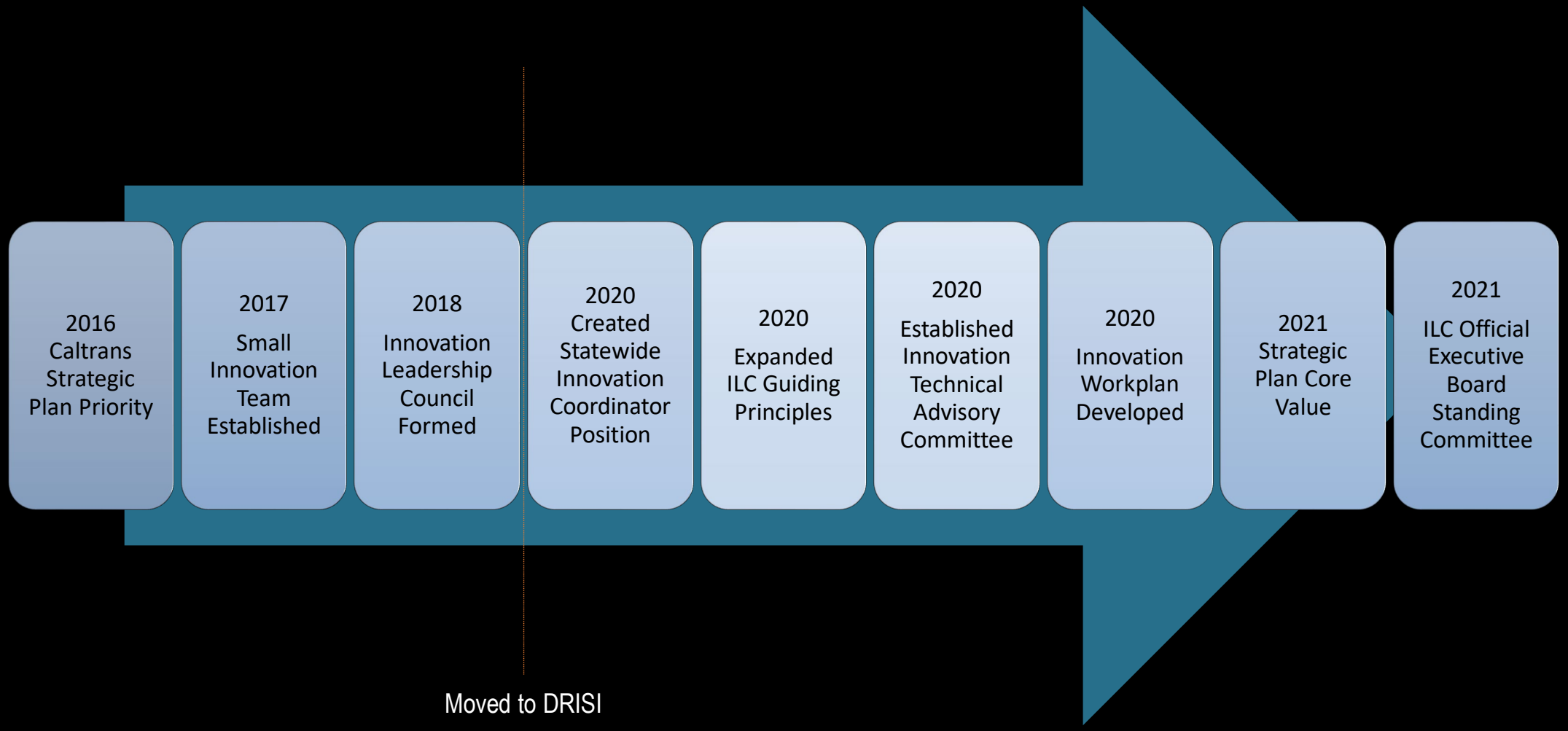
MINESSOTA DOT RESEARCH PEER EXCHANGE

OCTOBER 27, 2021

Pauline Valenzuela
Caltrans Statewide Innovation Coordinator

April Nitsos
iTeam Leader
Office Chief in the Division of Research, Innovation & System Information

INNOVATION EVOLUTION



CALTRANS ITEAM

Dara Wheeler
Division Chief of Caltrans Division of Research Innovation & System Information
Innovation Sponsor

April Nitsos, Supervising Transportation Engineer
- Chief, Office of Data Services and Technology
- Oversees iTeam

Pauline Valenzuela, Senior Transportation Planner
- Statewide Innovation Coordinator
- Executive Liaison to Innovation Leadership Council

Tiffany McCallister, Staff Services Manager 1
- Innovation Station Program Manager
- Innovation Fairs

Juan Araya, Senior Transportation Engineer
- Federal Innovation Funding Programs (EDC, STIC, AID, AMR)

Tawney Brennfleck, Senior Transportation Engineer
- Research Implementation
- Lean 6 Sigma

INNOVATION

Innovation Across Caltrans
Work Plan

2020-2021

Work plan to foster a culture of innovation across Caltrans

4 main goals

1. Caltrans Innovation Hub
2. Implement Online Tool
3. Caltrans Innovation Community
4. Collaboration

KEY ACCOMPLISHMENTS 2020-21

- Hosted First-Ever Innovation EXPO (www.caltransinnovationexpo.com), November 14-20, 2021
  - Showcased 40 Innovations Live, 20 in Virtual Exhibit Hall,
  - Collected External Innovation Contacts
- Implemented Communication Plan - Quarterly Newsletter and Monthly Messages to All Staff
  - External beginning October Newsletter
- Updated Innovation Leadership Council Guiding Principles
  - New Executive Chair and Vice Chair
  - Official Standing Committee under the Caltrans Executive Board
- Established Innovation Technical Advisory Committee
  - Supports ILC
  - Innovation Minded Individuals Representing various Districts and Divisions
  - Expert Advice, Recommendations and Feedback
- Established Innovation Liaisons in all Districts and Programs/Division at Caltrans
- Contract with CSU Sacramento for Support Services

CALTRANS INNOVATION ADVISORS

INNOVATION LEADERSHIP COUNCIL (ILC)
Subcommittee of the Executive Board, Governs Innovation at Caltrans

Meets Quarterly

INNOVATION TECHNICAL ADVISORY COMMITTEE (ITAC) *Senior Level and Above, Supports ILC*

Meets Every Other Month

INNOVATION TEAM (iTeam)
DRISI Staff, Manages Innovation Enterprise-wide

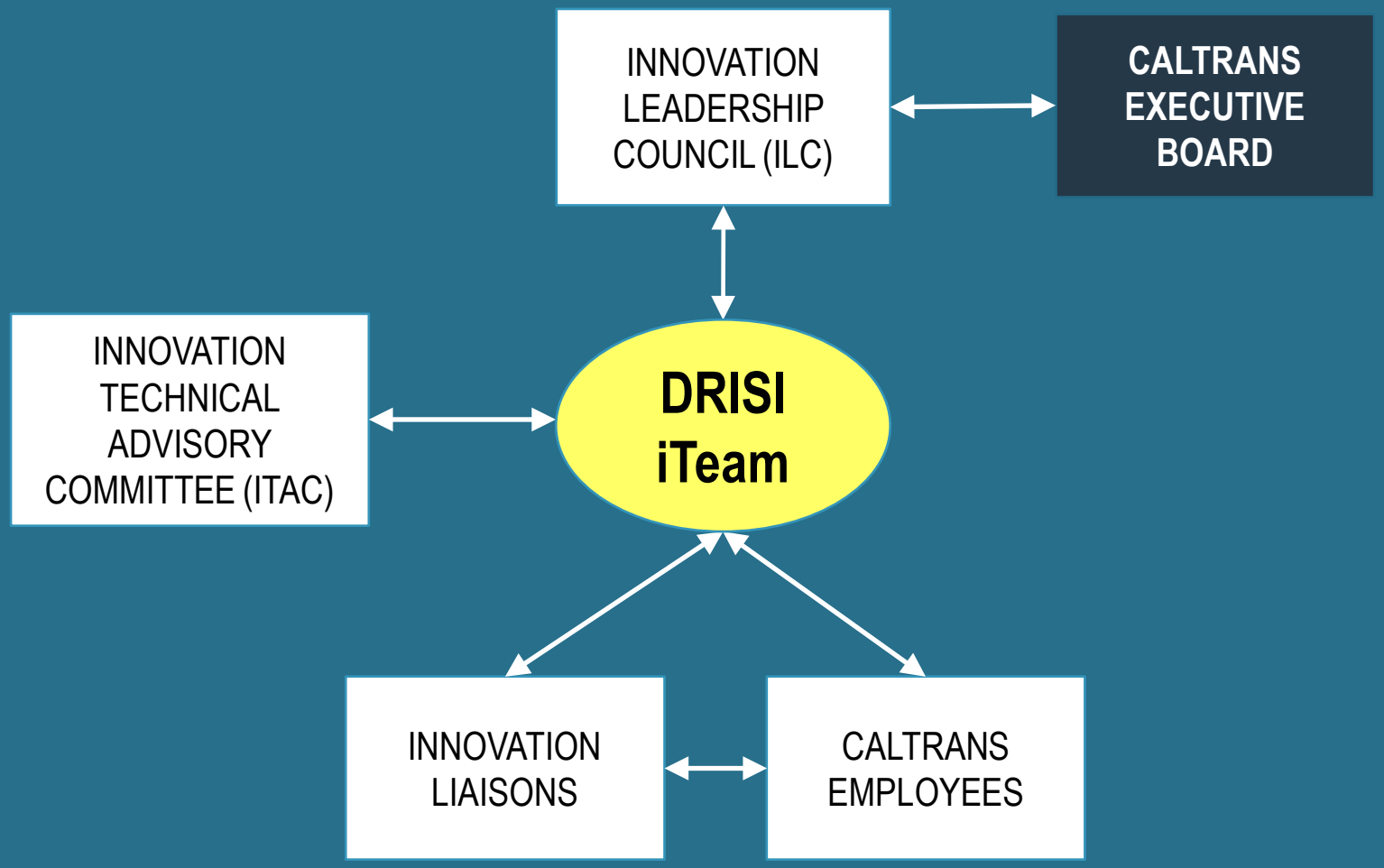
Meets Weekly

INNOVATION LIAISONS
Representatives in Each District and Division

Meets Quarterly

CALTRANS EMPLOYEES

INNOVATION COMMUNICATION



HQ INNOVATION TEAM (iTeam)

CURRENT EFFORTS

INNOVATION REPOSITORY

- Collection and storage of vetted innovations in a centralized location
- Accessible by all Caltrans employees

QUARTERLY NEWSLETTER

- External Starting Oct. 2021
- Showcases innovative staff and projects
- Provides resources and news

WASHTO AWARDS

- Annual award program
- 32 submissions received
- Currently selecting projects to receive awards totaling $3,000

INNOVATION STATION / LEAN-6 SIGMA CAMPAIGNS

- Process, Bureaucracy & Jams (PB&J) campaigns with HQ Admin and D4
- 2021 Black Belt L6S on Professional License Review
- District 11 innovation submittals

CALTRANS REFRESHING IDEA SUBMISSION PLATFORM (CRISP)

- Online platform for employee submission of innovative ideas
- Follows a formal review and vetting process, including ITAC & ILC review

CALTRANS INNOVATION ANNUAL REPORT

- New report from DRISI highlighting HQ innovation activities and campaigns
- First report expected January 2022

RESEARCH IMPLEMENTATION PROGRAM

- Min. $250k designated for implementation annually
- New research guidance and process
- MOU with AHMCT to identify implementable research

PROPOSED PERFORMANCE MEASURES

- Performance measures being developed to track outputs
- Return on Investment
- Inputs (Capital, Talent, Time)

INNOVATION RESOURCE CENTER @ CSUS

- Innovation support to Caltrans HQ iTeam
- Innovation readiness survey
- Training for middle managers
- Innovation resources website

INNOVATION EXCHANGE

A Newsletter Highlighting Innovation Across Caltrans

FALL | OCTOBER | 2021

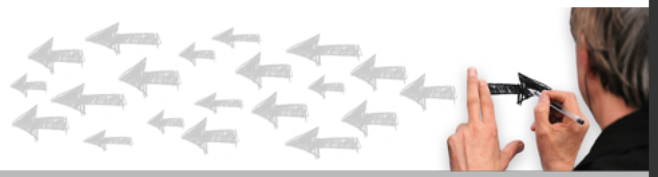
Welcome to the Fall 2021 installment of the Innovation Exchange Newsletter!

Starting this month, our Innovation Exchange Newsletter is now available to all Caltrans Employees AND our external partners across the country.

We are so excited to kick off this newsletter with the introduction of Caltrans' newly appointed Innovation Leadership Council Chair and Vice-Chair, both of whom bring an amazing energy to innovation in Caltrans.

As usual, this newsletter highlights our innovative staff and cutting-edge projects, as well as innovation resources, news, awards and training.

Caltrans Partners – sign up for this newsletter and other Caltrans innovation news here!

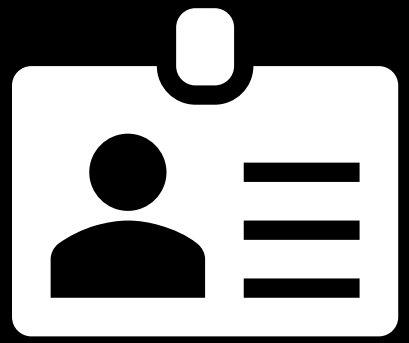


Caltrans Innovation is governed by the Caltrans Innovation Leadership Council (ILC) and is administered by the Caltrans Innovation Team (iTeam)in the Caltrans Division of Research, Innovation and System Information (DRISI).

In This Issue:

CALTRANS INNOVATION CONTACT

Pauline Valenzuela
Caltrans Statewide Innovation Coordinator
☎ 916.584.2177
pauline.valenzuela@dot.ca.gov



APPENDIX J. NORTH DAKOTA - TRANSPORTATION INNOVATION

PEER EXCHANGE

Amy Beise P.E., Research Manager

NORTH Dakota | Transportation

Be Legendary.

OVERVIEW

I. North Dakota Overview

II. Innovation

III. Programs and Processes

IV. Challenges and Tips

North Dakota Department of Transportation

Mission

Safely move people and goods.

Vision

North Dakota's Transportation Leader Promoting:

Safe Ways
Superior Service
Economic Growth

Values

Professionalism
Respect
Integrity
Dedication
Excellence

NORTH Dakota | Transportation
Be Legendary.™

COM0320

Strategic Focus Areas and Goals

Safety

Provide a safe and secure transportation system and workplace.

Innovation

Promote a culture of innovation to enhance external and internal services, products, and programs.

Assets

Preserve and enhance assets managed by NDDOT.

Mobility

NDDOT works to improve access to our transportation system through multi-modal solutions to enhance the movement of people and goods, having a positive impact on the quality of life and the economic well-being of North Dakotans.

Leadership

We strive to position the NDDOT as a local, state, and nationally trusted leader. We value service, excellence and diversity, instilling a culture of leadership, which expands the problem-solving capacity of our organization.

NORTH DAKOTA

BY THE NUMBERS

779,000 Population (47th/50)

$275,000,000 Federal Budget (44th/51)

7,415 Miles of Roadway

+80,752 Local Networks

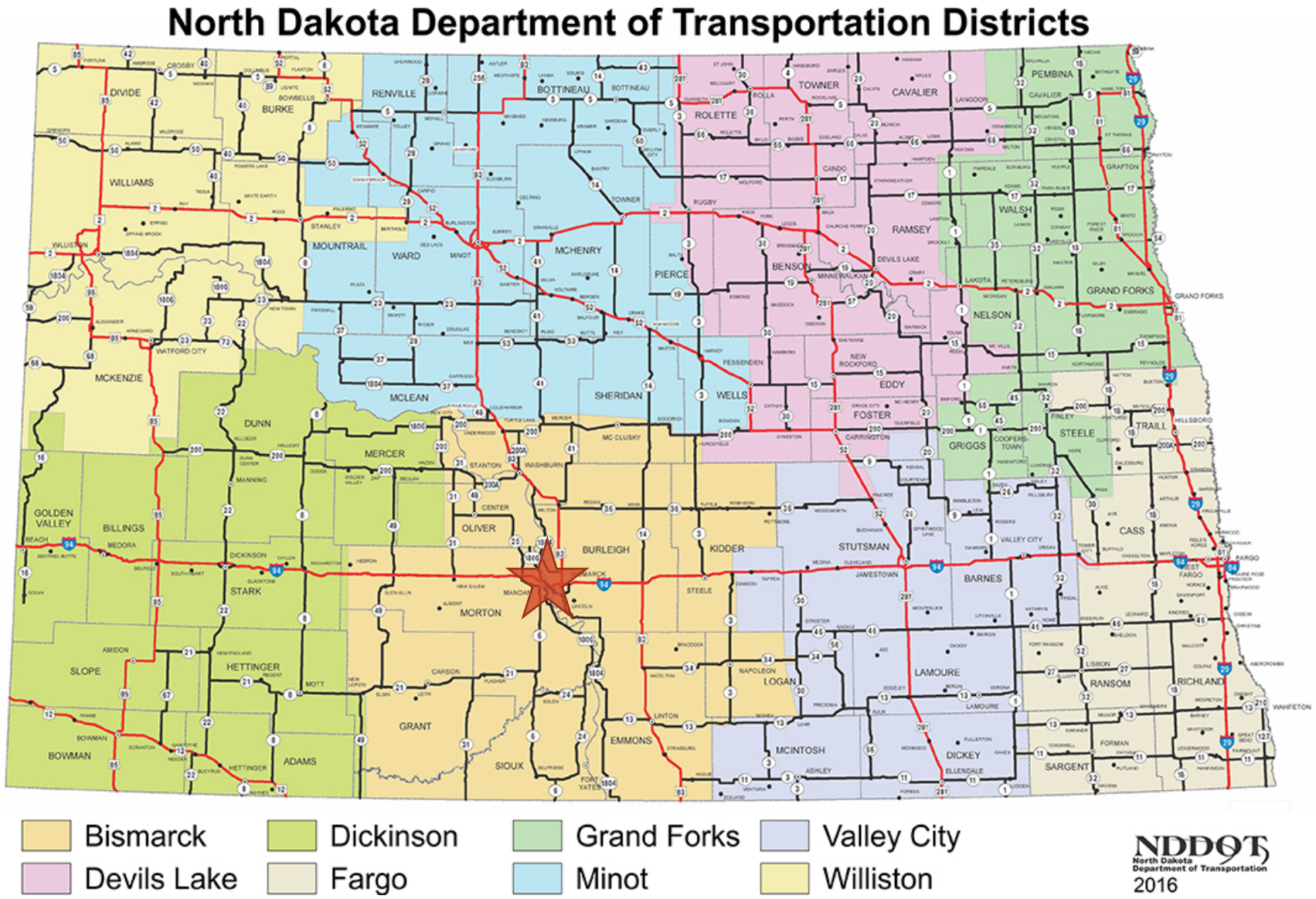
1,724 Bridges

+3,139 Local Networks

1,159,000+ Registered Vehicles

350 Snowplows

Average **39** events/year requiring snow/ice treatment



NDDOT
ORGANIZATION

- 982 Full Time Employees
- 8 Districts & Central Office

INNOVATION

RESEARCH AND INNOVATION

RESEARCH

VS

INNOVATION

All research is innovation but not all innovation is research

Research

Knowledge

Innovation

Better Business
out of Knowledge

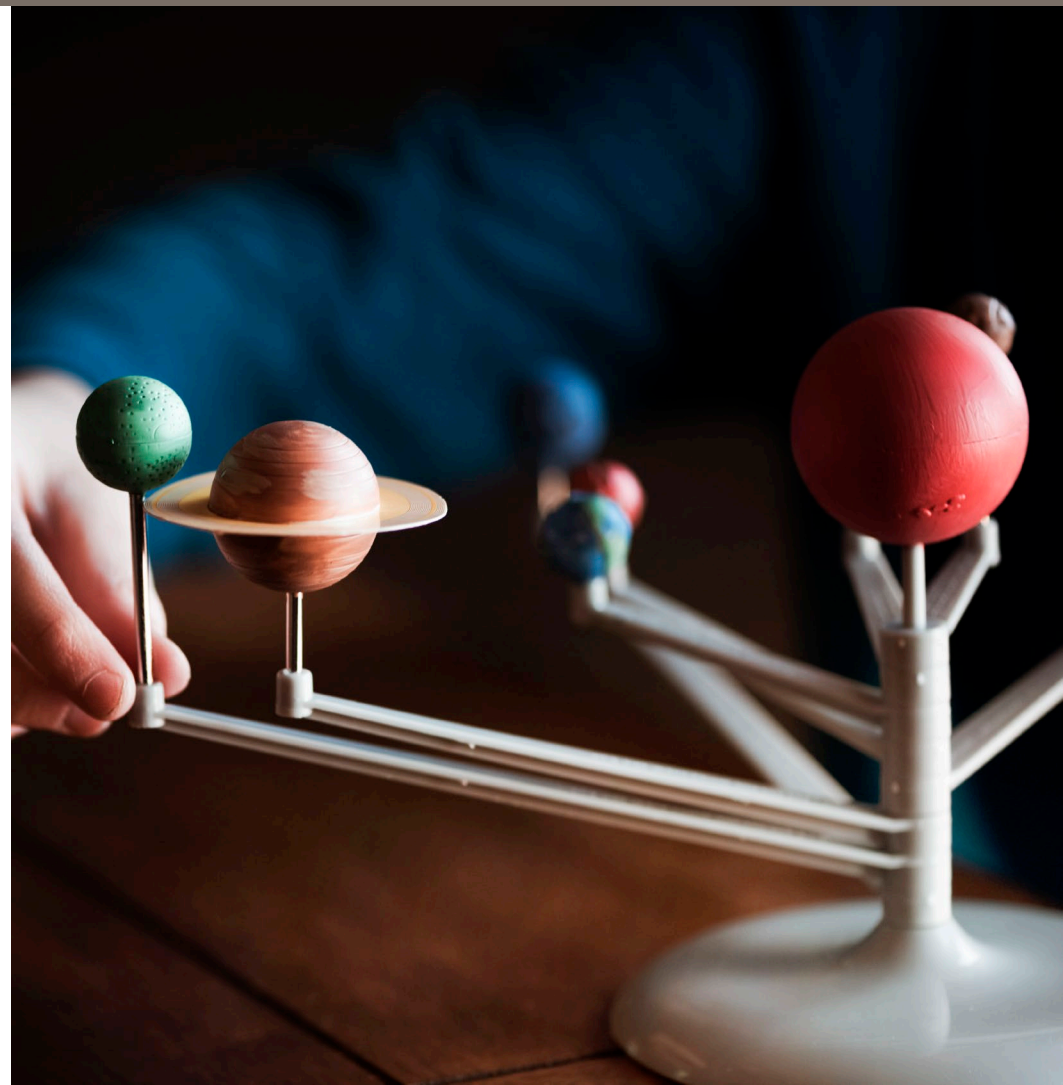
Do more with less **Effort**

Don’t Reinvent the Wheel… Make it more Efficient

RESEARCH AND INNOVATION

NDDOT

- Innovation is not a full-time position
- Neither is research
- The are separate but integrated



PROGRAMS AND PROCESSES

PROGRAMS AND PROCESSES

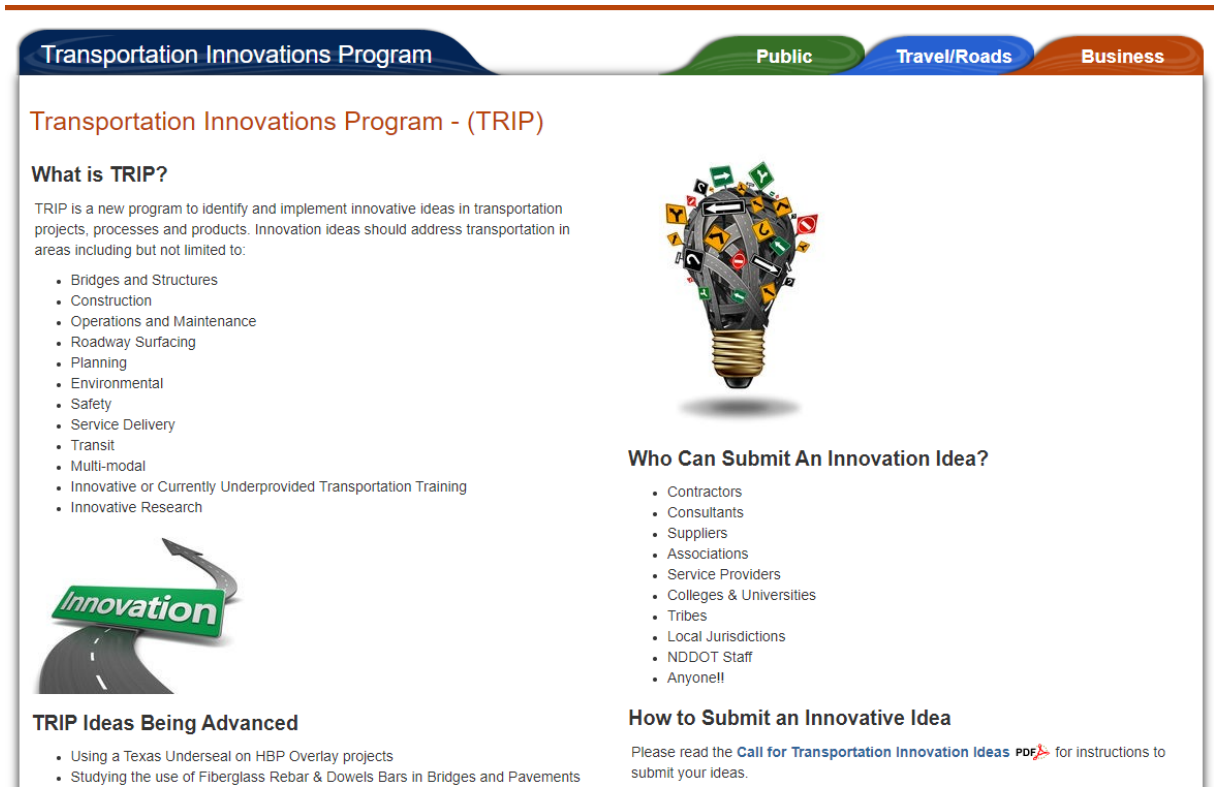
State Planning & Research – Part B

- Solicit Research Ideas Once/Year
- Committee Oversight and Approval
- Conduct Research
    1. Internal Research
    2. University Research
    3. Multi-State Pooled Funds

PROGRAMS AND PROCESSES

Transportation Innovation Program (TRIP)

- Formal Submission & Selection
- Anyone can submit
- Solicit ideas twice per year
- Management Selected/Approved



Transportation Innovations Program

Public | Travel/Roads | Business

Transportation Innovations Program - (TRIP)

What is TRIP?

TRIP is a new program to identify and implement innovative ideas in transportation projects, processes and products. Innovation ideas should address transportation in areas including but not limited to:

- Bridges and Structures
- Construction
- Operations and Maintenance
- Roadway Surfacing
- Planning
- Environmental
- Safety
- Service Delivery
- Transit
- Multi-modal
- Innovative or Currently Underprovided Transportation Training
- Innovative Research

TRIP Ideas Being Advanced

- Using a Texas Underseal on HBP Overlay projects
- Studying the use of Fiberglass Rebar & Dowels Bars in Bridges and Pavements

Who Can Submit An Innovation Idea?

- Contractors
- Consultants
- Suppliers
- Associations
- Service Providers
- Colleges & Universities
- Tribes
- Local Jurisdictions
- NDDOT Staff
- Anyone!!

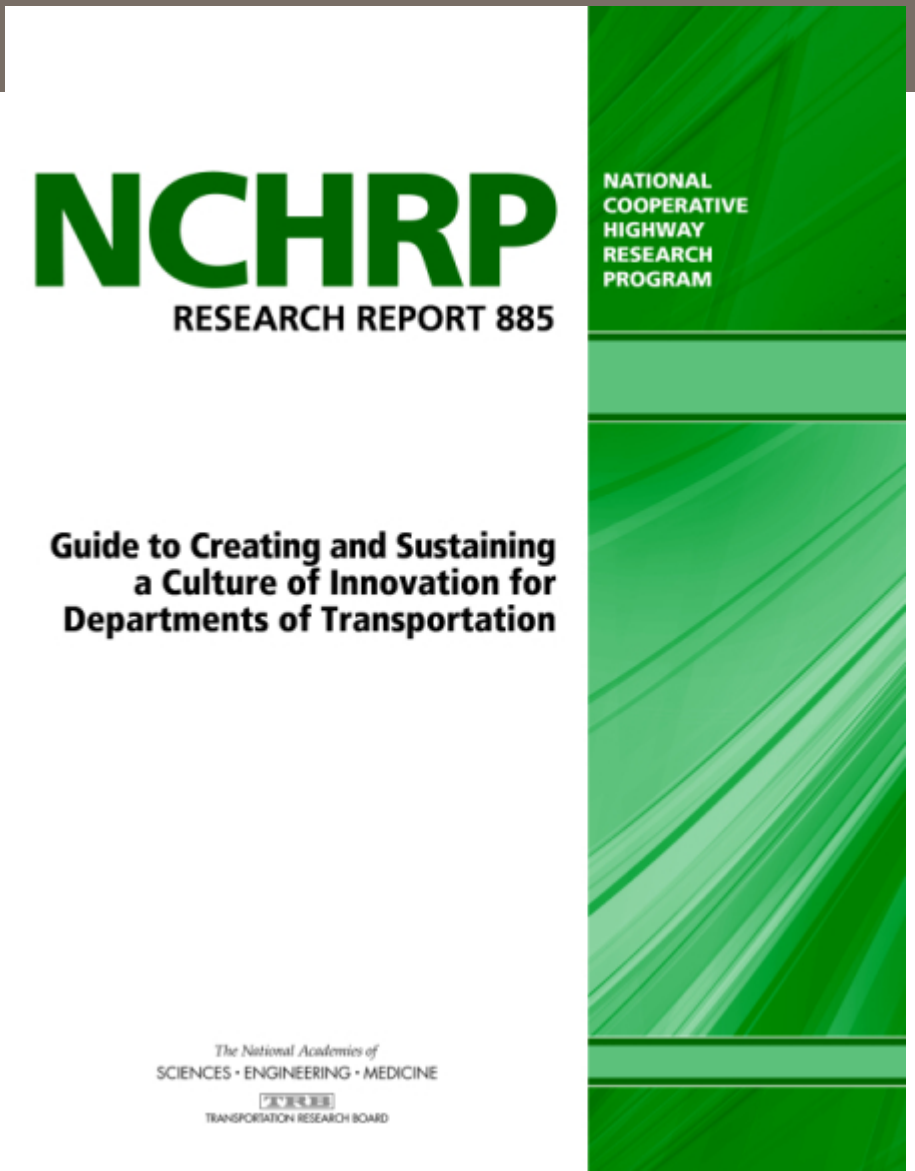
How to Submit an Innovative Idea

Please read the Call for Transportation Innovation Ideas PDF for instructions to submit your ideas.

PROGRAMS AND PROCESSES

Report Highlights

- Bottom-up Innovation
- It's Your Baby
- Incremental vs Breakthrough Innovation
- Tolerate Failure



CHALLENGES AND TIPS

CHALLENGES TO INNOVATION

#1 Culture Shift

Tips for Success

- ✓Start where you are
- ✓Engaged Workforce
- ✓Create Ownership
- ✓Recognize Effort

CHALLENGES TO INNOVATION

#2 Time

Tips for Success

✓Innovation is a job duty

✓Small Innovation Add Up

✓Talk is Cheap…Try Something!

✓What can we stop doing…..

CHALLENGES TO INNOVATION

#3 Standardization

Tips for Success

✓Form Peer Networks

✓Diversify

✓But Why???

✓Design Thinking

CHALLENGES TO INNOVATION

#4 Risk

Tips for Success

✓Empower Employees with Acceptable Amount of Risk

✓Encourage Intelligent Failure

Think **BIG**

Start **SMALL**

Move **FAST**

QUESTIONS?

Amy Beise, P.E.
abeise@nd.gov

NORTH Dakota | Transportation
Be Legendary.

APPENDIX K. UTAH - TRANSPORTATION INNOVATION

Research and Innovation Division

Keeping Utah Moving

Transportation Innovation
MnDOT Research Peer Exchange

October 27, 2021

Presented by:
Cameron Kergaye

www.udot.utah.gov/go/innovation

ORGANIZATIONAL STRUCTURE

UDOT Executive Director

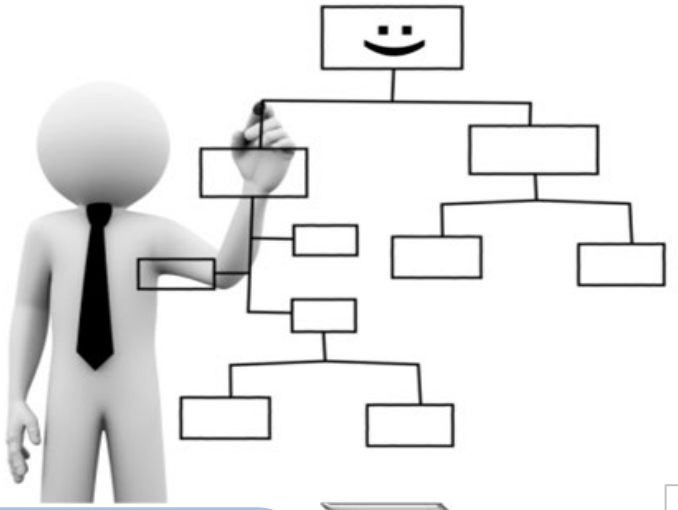
UDOT Deputy Director

Technology & Innovation Group

Research & Innovation Division

Innovation Program

- Rod McDaniels
- Winston Inoway

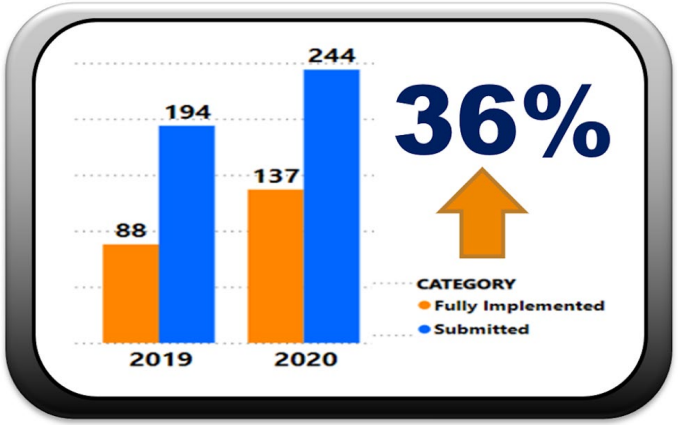


- UDOT Innovation Council
- FHWA Liaison
- Utah STIC

Innovation Program Snapshot

Innovation Spotlight Video Series
Increases employee engagement and helps to cover gaps between annual report publications.

20-Person Innovation Council
Supports accelerated innovation practices across the state at the ground level.

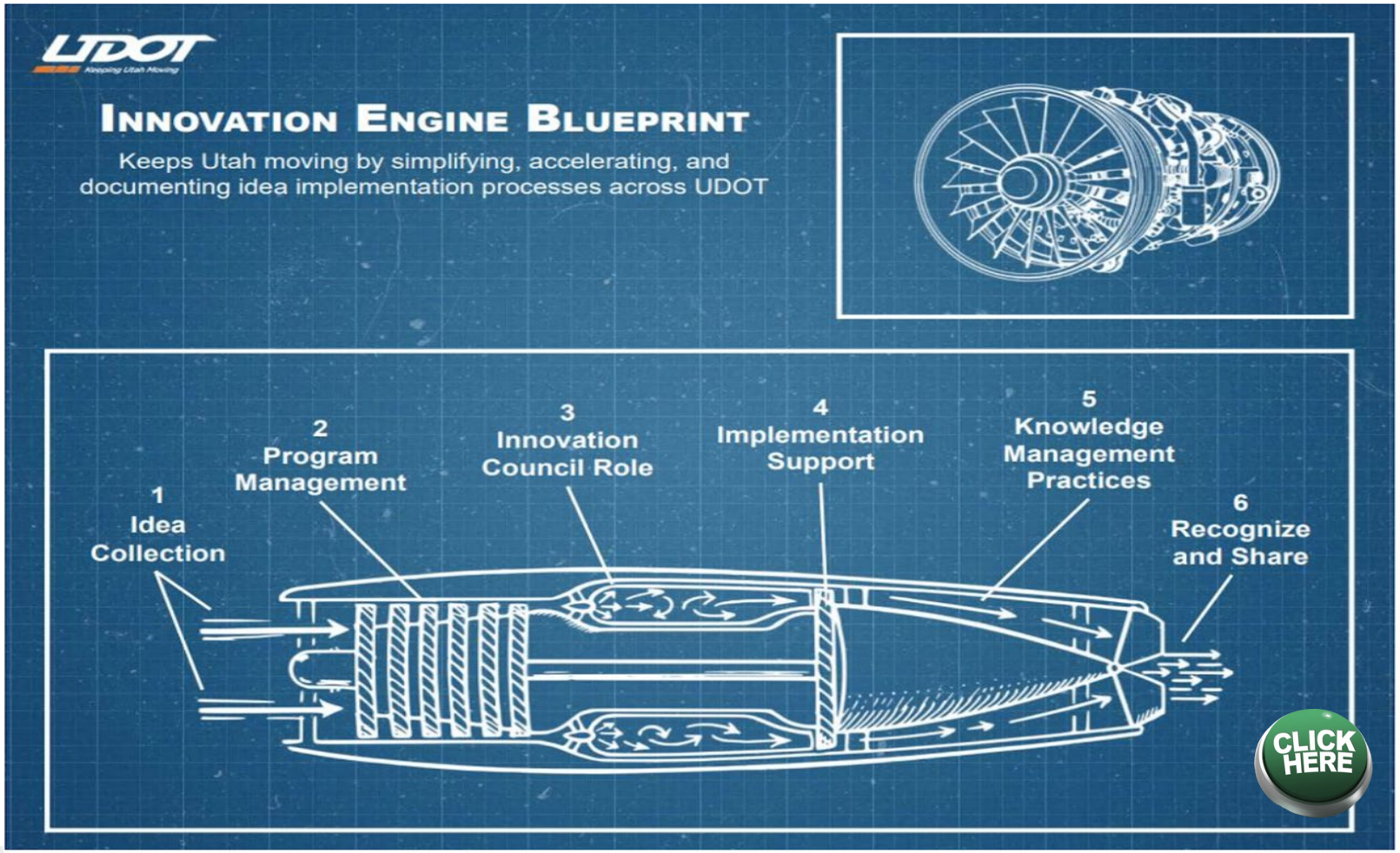


Increased Success Story Capturing
UDOT's Innovation Council played essential role in increasing performance during the pandemic!

You can now check developing *next issue* I&E Report content anytime in real time! Click the icon to the left to learn how checking is as simple as 1, 2, 3!

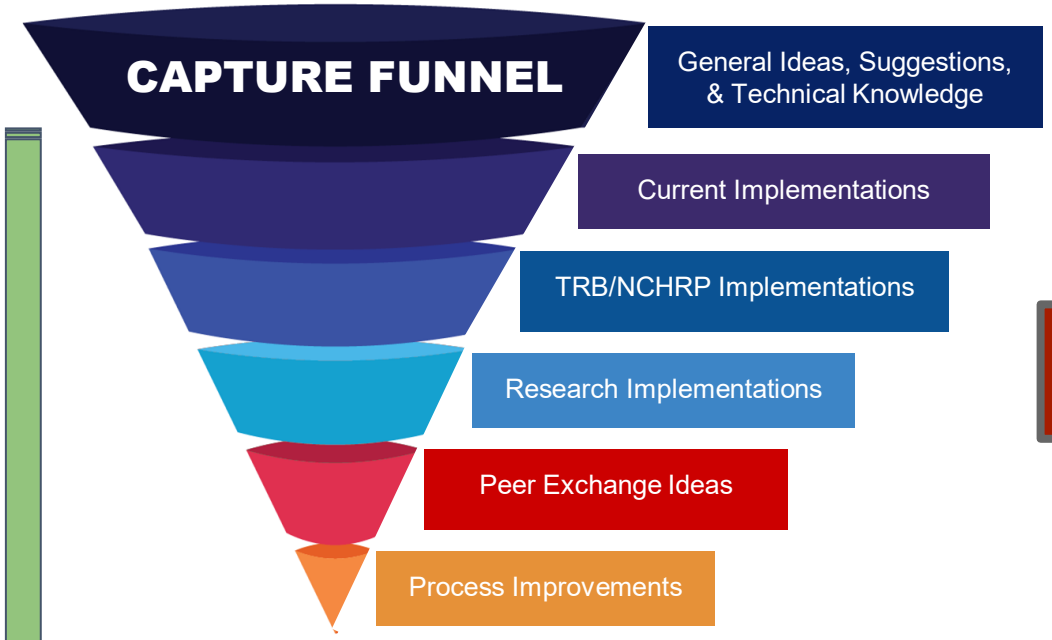
www.udot.utah.gov/go/innovations

PROGRAM PROCESS & APPROACH

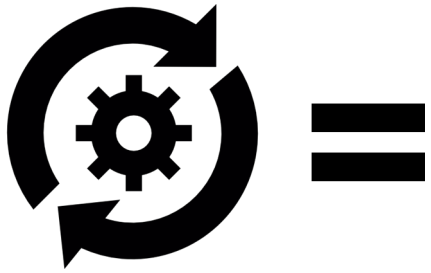


www.udot.utah.gov/go/innovation

UNIVERSAL CAPTURE CONCEPT

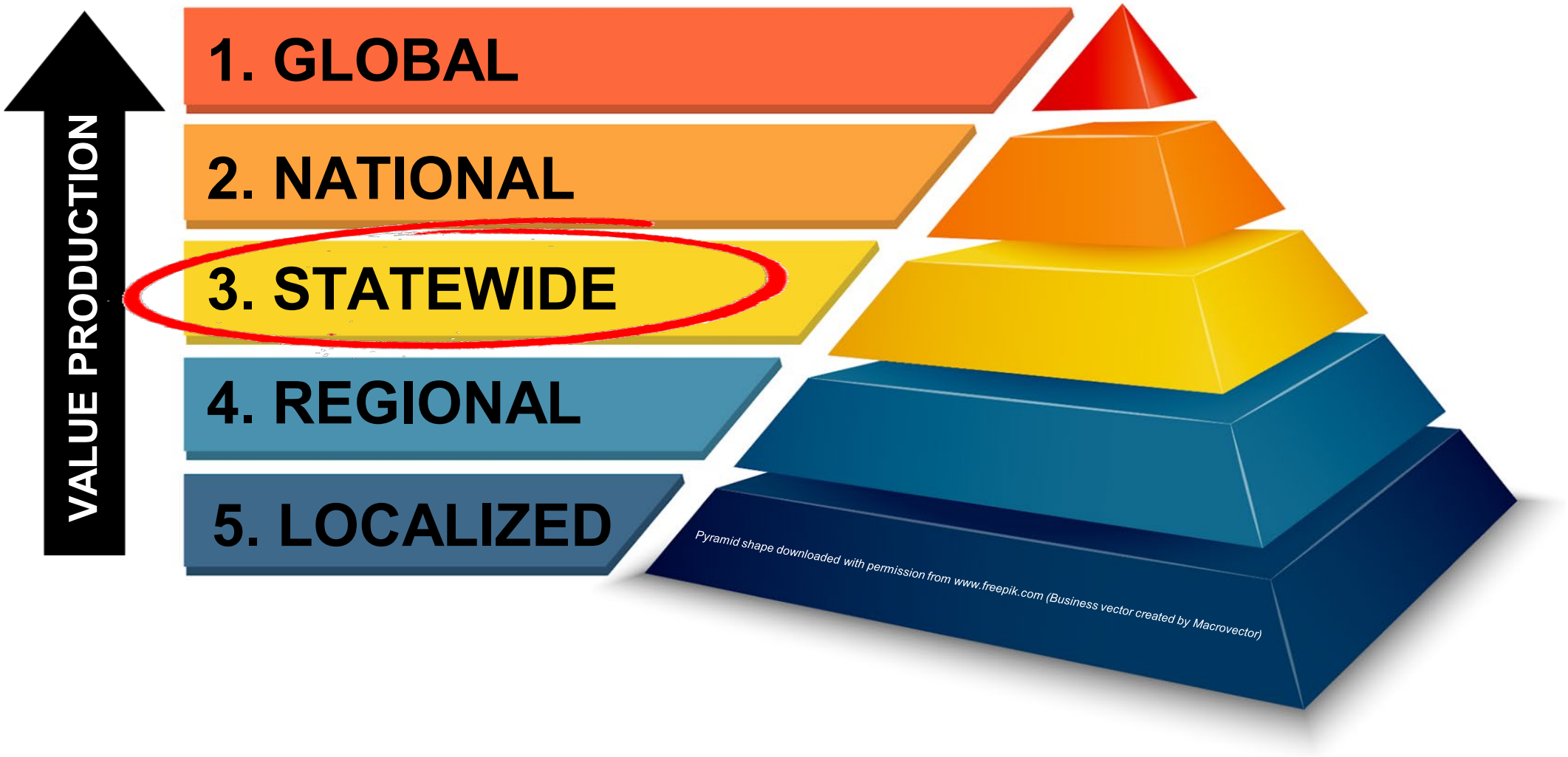


TRANSFORMING DISPARATE INPUTS INTO UNIFORM OUTPUTS



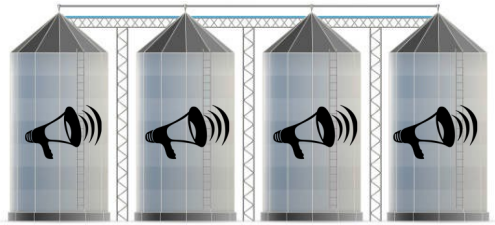
- Track
- Share
- ROI Analysis
- Live Dashboard
- Implementation Inventory
- Annual Report + KM

IMPLEMENTATION LEVELS

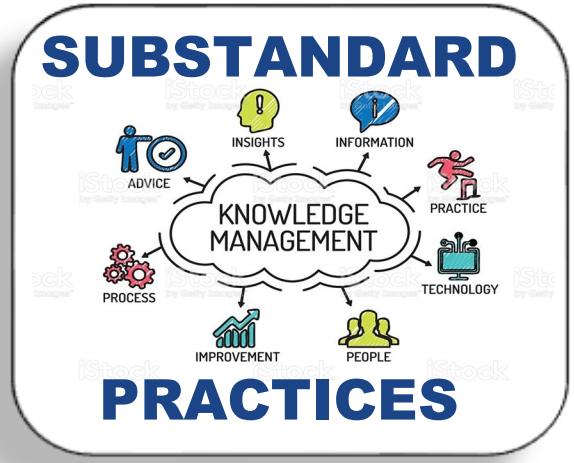


EMAIL SUBSTITUTION STRATEGY

=



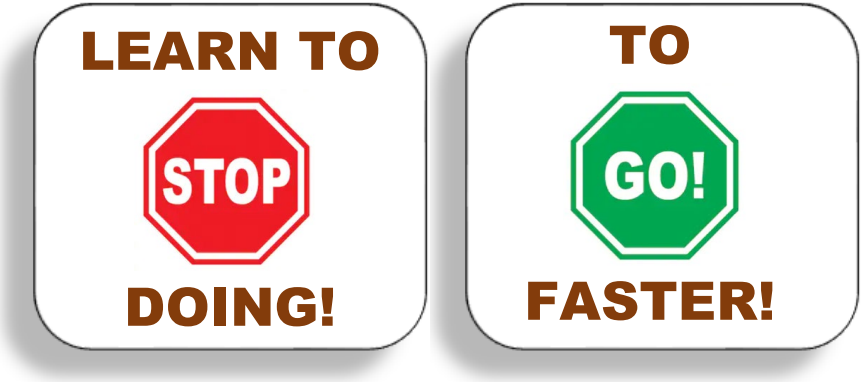
=



RETRAIN TO RELY ON IDEAS PORTAL FOR IDEA COMMS

- Requires additional discipline, **BUT**
- Radically Improves findability
- Increases communications transparency
- Accelerates sharing & statewide situational awareness
- Supports sound knowledge management practices
- Allows for opt-in participation

COUNTERINTUITIVE ACCELERATION



The smartest State DOT's of the future will learn how to get rid of low-performing activities, and replace them with high-performing activities faster than their counterparts.

Point #1: Innovation is *all about* speed, capacity, and resource alignment - the best idea on the planet is worthless if teams are too buried to rapidly realign themselves and make happen.

Point #2: Being able to do more with less (in perpetuity) is a MYTH! Something has to stop!

Point #3: Recognize that government is NOT good at stop doing! Private sector has a large advantage in this area due to market forces.

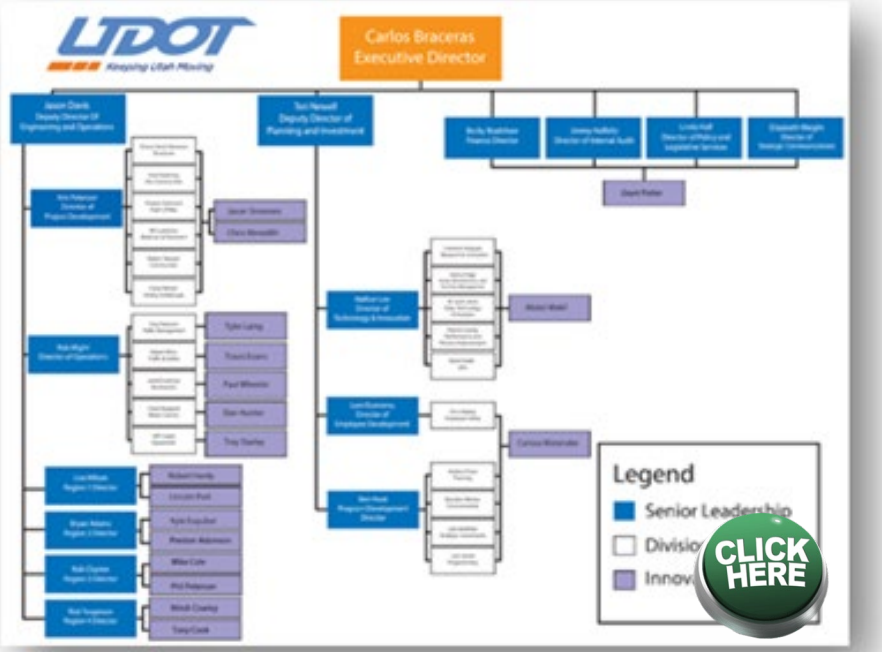
Private Sector Example: Google conducts Spring Cleaning exercises, on a continuous basis, to sunset non-performing activities.

UNIVERSAL IMPLEMENTATION BARRIERS

INNOVATION EXPLAINER VIDEO

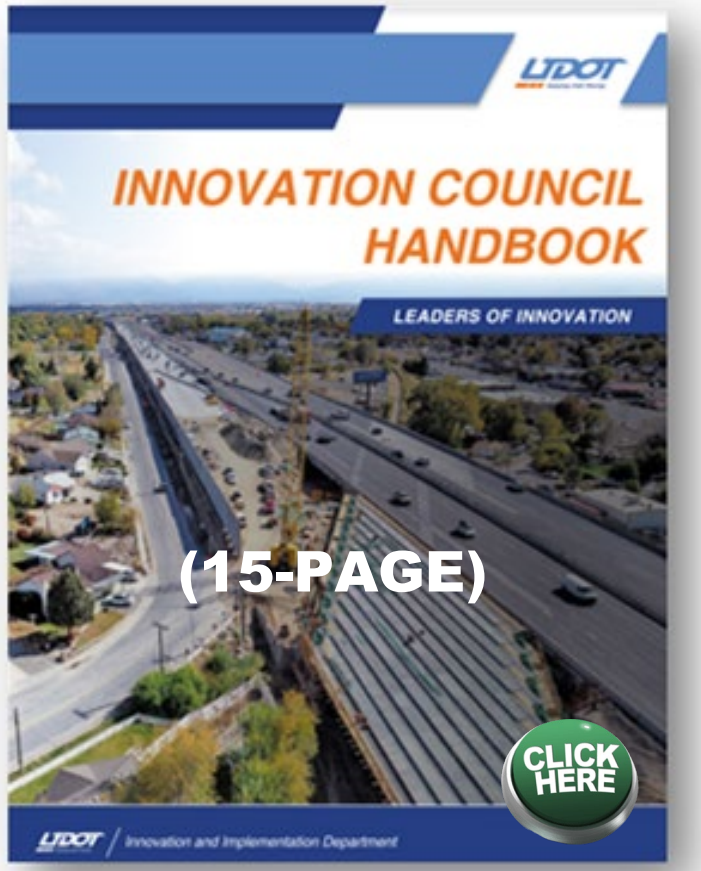
VIDEO LINK

INTERNAL INNOVATION COUNCIL

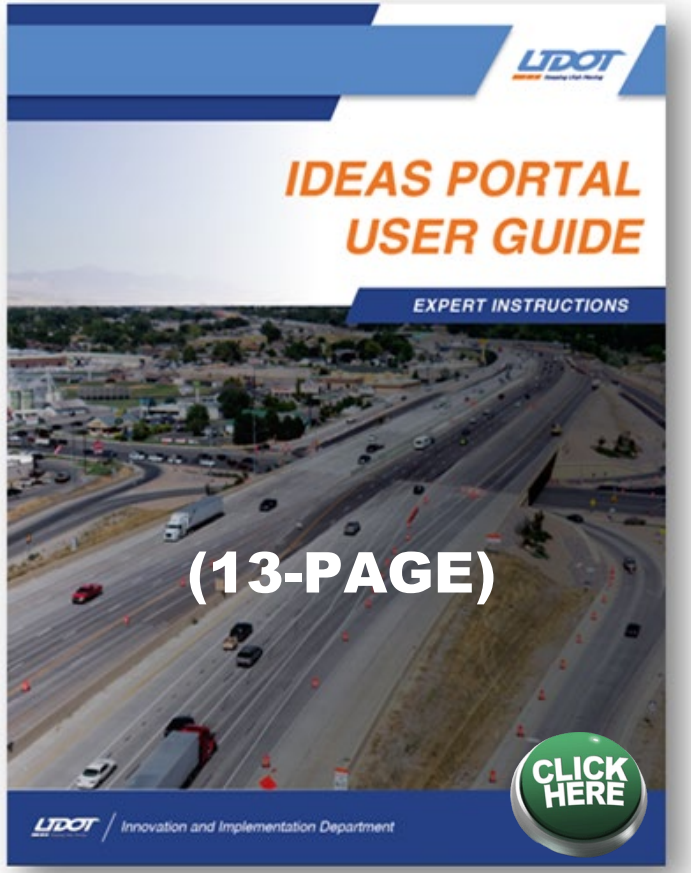


RECRUITMENT FLYER **18-PERSON TEAM**

INTERNAL INNOVATION COUNCIL



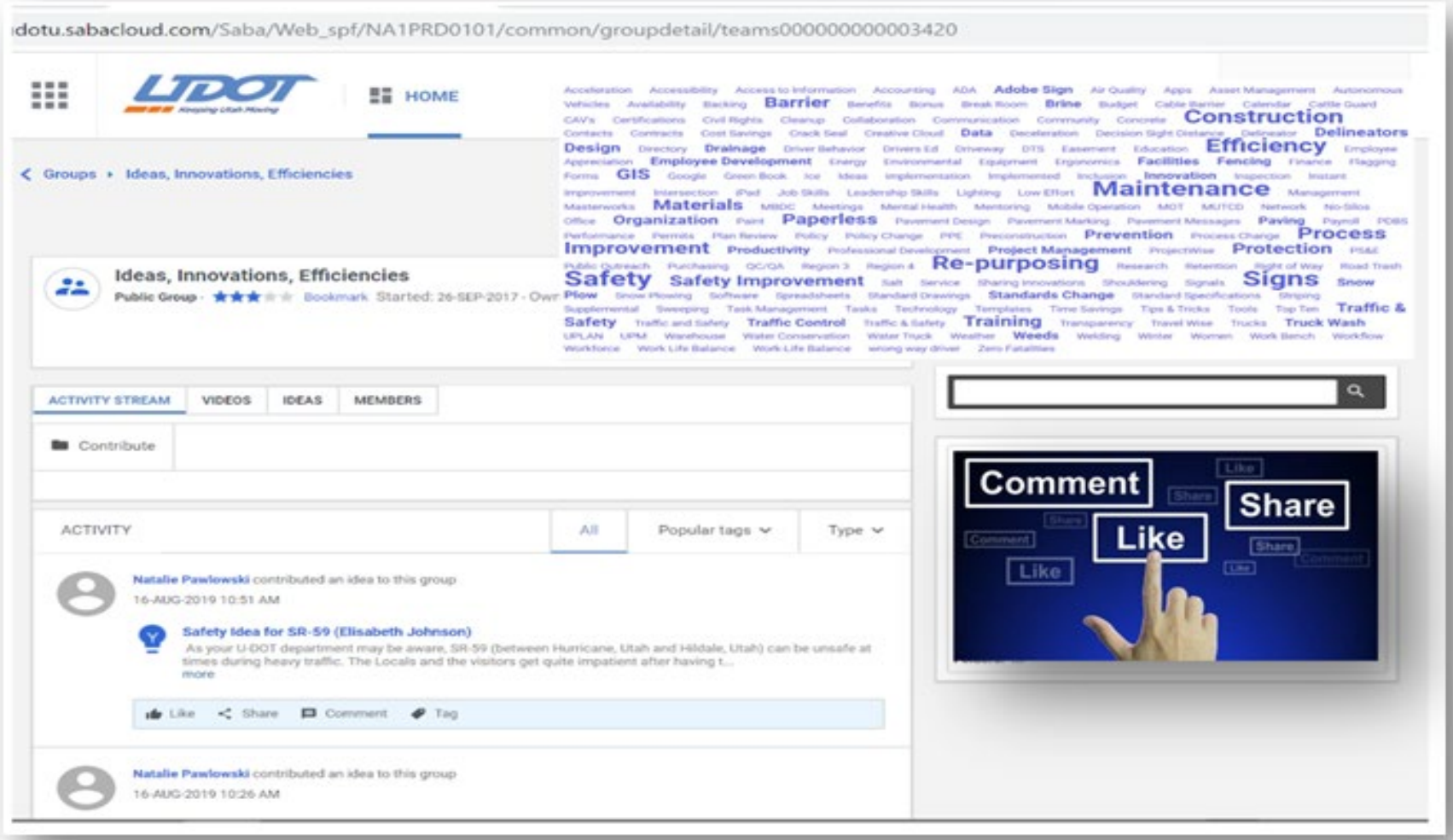
TRAINING GUIDE



PORTAL GUIDE

www.udot.utah.gov/go/innovation

IDEAS PORTAL



UDOT IDEAS PORTAL

www.udot.utah.gov/go/innovation

INNOVATION DASHBOARD

INNOVATION PROGRAM DASHBOARD

Date Updated
2021-10-04 11:46:05

Cumulative Savings

$18,062,061

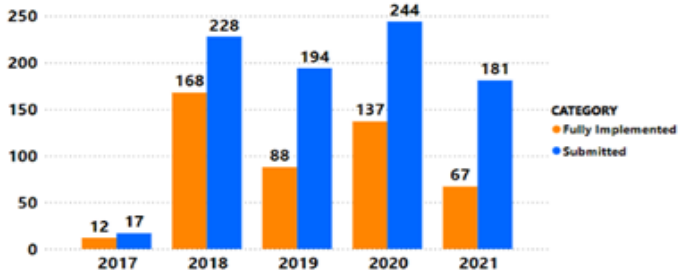
62,330 HOURS

UDOT % Idea Implementation Rate

864
Total Ideas Submitted

472
Total Ideas Implemented

Total Ideas by Year



Top 10 Ideas by ROI

RANK	DATE CREATED	DOLLARS SAVED *	TITLE	LINK
1	2020-02-03	$7,600,000	2020 IMPLEMENTATION INVENTORY: US-89/WDC Dirt Recycling ($9.5MM in projected cost savings)	
2	2020-03-04	$1,475,624	2019 IMPLEMENTATION INVENTORY: Lidar Usage with Drones	
3	2020-05-19	$237,728	2017 IMPLEMENTATION INVENTORY: Revenue-Neutral Permit Fees (UDOT OAC Program)	
4	2019-09-13	$82,084	Outdoor Advertising Control Program - Interactive GIS Map & Tutorial	
5	2018-08-16	$35,000	Nuclear gage shed	
6	2018-02-23	$30,000	Mower Wing Spring	
6	2019-08-12	$30,000	ROADS Safety Report App	
7	2019-08-12	$27,500	Automate PM Contract Review	
8	2020-06-02	$22,750	2020 IMPLEMENTATION INVENTORY: New (DTS-Developed) Research Project Management System	
9	2020-07-29	$16,500	U-START (UDOT's Streamlined Technical Access Review Tool)	
10	2018-10-01	$14,400	Large Sign Holder	

* The DOLLARS SAVED column in this table may show higher amounts than the total cumulative savings at the top left of the dashboard. *This is not an error*, rather it is a deliberate dashboard design function. The dashboard feeds the total cumulative savings number through a purposeful proration formula. For example, if innovation X results in $10K in annual savings 1/365 of that savings is added into the dashboard each day from the date of implementation. To learn more about why this specific calculation strategy and approach was adopted, please contact the Program Management Team available at this link: udot.utah.gov/go/innovation.

www.udot.utah.gov/go/innovation

INNOVATION & EFFICIENCIES REPORT

ANNUAL INNOVATION AND EFFICIENCIES REPORT ARCHIVE

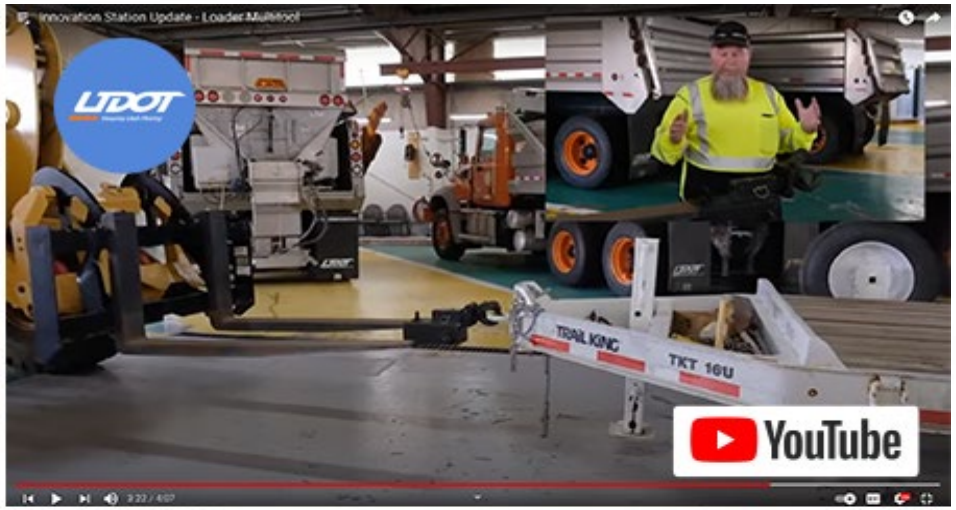
CLICK YEAR TO REVIEW REPORT		
2021*	2015	2010
2019	2014	2009
2018	2013	2008
2017	2012	2007
2016	2011	2006

*Reports are now published towards the end of the calendar year and do not receive broad circulation until the next calendar year. As a result, there was a request to label future reports in the year where they receive broad circulation. The 2020 report was not skipped, rather the 2021 report will cover the preceding year which is 2020.

UDOT Annual Innovation and Efficiencies Report Archive

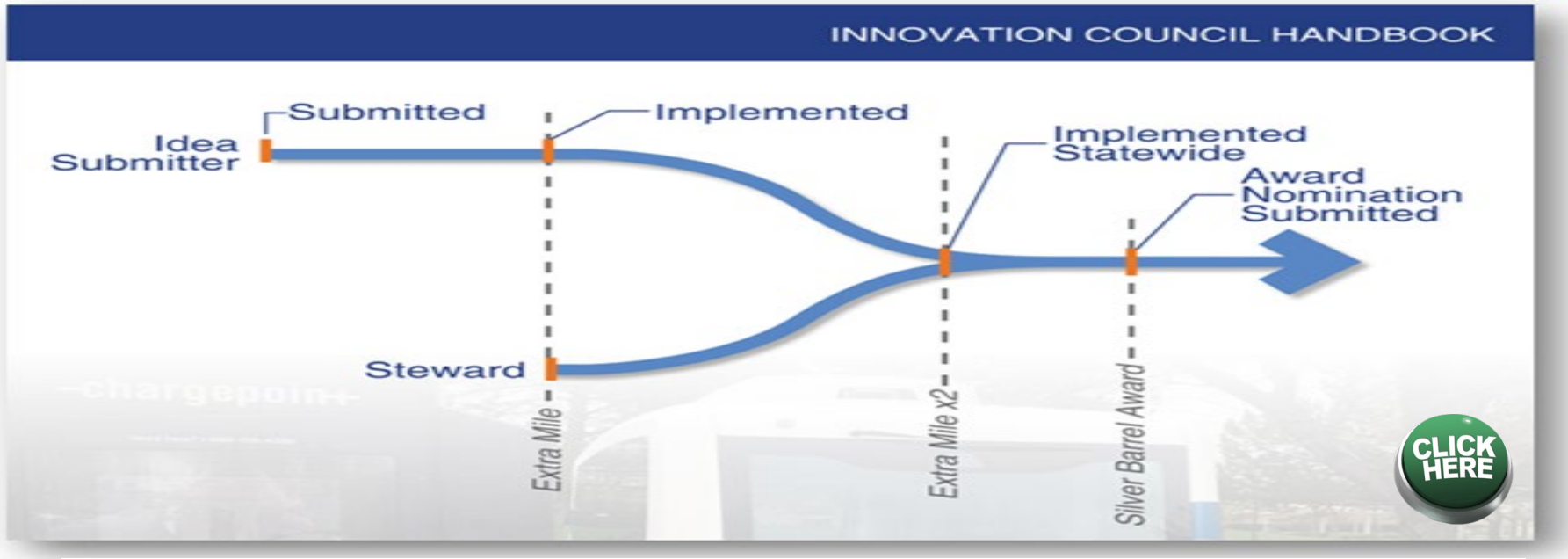
www.udot.utah.gov/go/innovation

IMPLEMENTATION SUCCESS VIDEOS



www.udot.utah.gov/go/innovation

INCENTIVIZED REWARDS APPROACH



www.udot.utah.gov/go/innovation

CENTER FOR ACCELERATING INNOVATION

INNOVATION DIFFUSION REQUIRES EFFECTIVE EXTERNAL PARTNERSHIPS

U.S. Department of Transportation Federal Highway Administration ⟷ PARTNERING ⟷ UDOT Keeping Utah Moving

The Federal Highway Administration (FHWA) Division Offices work with the State to develop, track and analyze activities and recommend innovative techniques and strategies to improve the performance of the transportation system. FHWA and its Division Offices are responsible for working with State Departments of Transportation to ensure that the nation's strategic investments preserve and modernize the U.S. highway system - and ultimately to save lives.

UDOT and the FHWA have been effectively partnering in this capacity for decades. FHWA has established multiple national programs aimed at accelerating innovation across the transportation sector.

EDC | AID Demo Accelerated Innovation Deployment | AMR Accelerating Market Readiness | STIC State Transportation Innovation Councils

These groups provide funding that contribute to the advancement of smart governance and highway safety

LEVERAGE $100K STIC FUNDING

STIC FUNDING APPLICATION

This is Utah's State Transportation Innovation Council (STIC) funding application. Please review this application in its entirety before completing. Total annual STIC program funding is currently set at $100,000 per state with a 20% match (of total) requirement. These funds may be awarded to a single project, or divided among multiple projects. Additional guidance is available at: www.fhwa.dot.gov/innovation/stic/guidance.cfm.

1 APPLICANT CONTACT INFO		2 HIGH LEVEL DETAILS	
Full Name:		Application Date:	
Agency Name:		Funding Amount Requested:	
Mailing Address:		Required Match Amount (20%):	
City, State, Zip:		Required Match Source Name:	
Email:		Projected Start Date:	
Phone:		Projected End Date:	

3 INNOVATION PROJECT NAME

4 PROJECT DESCRIPTION, OBJECTIVES, & SUMMARY OF DELIVERABLES

Important Note: Attaching additional supporting application information is allowed, however responding with only "see attached" is an insufficient response (except for Question #9). Please complete all fields on this application, or explain why a field is being left blank.

5 WORKLOAD IMPACTS & SUSTAINABILITY

Please describe whether the end result or work product **1)** adds new workload, **2)** replaces current workload, or **3)** ultimately removes existing workload relative to current environment where deployment is expected to occur. Please also describe the post-project sustainability approach (e.g., describe how this effort will be supported after the STIC project window closes).

2020 Utah STIC Funding Application — Page 1 of 3

Fiscal Year	Innovations	Project
2020	Emergency Relief	Develop and implement an emergency bridge inspection application ($100,000)
2019	Knowledge Management	DImplement an Integrated Knowledge Management Framework for the organization to create models for defining a desired future state. ($100,000)
2018	Automated Traffic Signal Performance Measures (ATSPMs)	Develop and implement Performance Based Traffic Control to increase mobility through work zones. ($50,000)
2018	e-Construction	Launch a state-wide pilot program to implement the use of e-Ticketing for Concrete Deliveries ($50,000)
2017	GIS	Develop a geospatially enabled indexing program in order to provide an easy point access to data from across the department without copying or duplication ($100,000)
2016	Design-Build	Advance the Design-Build program to include the use of Progressive Design-Build as an alternative contracting method ($100,000)
2015	3D Engineered Models	Development of a guidance document for advertising 3D Engineered Models for Construction as the legal document ($100,000)
2014	3D Engineered Models	Development of a 3D Utility Database ($100,000)

EDC-6 COORDINATION

2020 EDC-6 ENGAGEMENT PLANNING

Every Day Counts
Innovation for a Nation on the Move

PEOPLE:

- Workforce Development
- Crowdsourcing for Advancing Operations
- Virtual Public Involvement (VPI)

PRODUCTS:

- UHPC for Bridge Preservation and Repair
- Target Pavement Overlay Solutions

PROCESS:

- e-Ticketing and Digital As-Builts
- Next-Generation Traffic Information Management (TIM)

09/14/2020 - UDOT 2020 EDC-6 Engagement Planning Doc Page 1 of 1

Nathan Lee
Rod McDaniels
John Haynes
Lorri Economy
Lisa Miller
Eileen Barron
Cheryl Hersh Simmons
Jason Simmons
Ken Talbot
George Lukes
Becky Hjelm
Adrian Sellars
John Leonard

TRB ANNUAL MEETING COORDINATION

1		Name	Phone number	Email	Position Title	Region or Department	Supervisor Approval?	My TRB Profile Confirmed or Created?	TRBAM Registration Complete
2	9/18/2020	Abdul Wakil	3852679060	awakil@utah.gov	Asset Engineer for Maintenance	Technology and Innovation- Comp	Yes	☑	☑
3	9/14/2020	Adam Lough	801-718-4326	alough@utah.gov	Traffic Studies & Design Engineer	Operations- Complex	Yes	☑	☑
4	9/15/2020	Alana Spendlove	801-910-2095	aspendlove@utah.gov	Organizational Management Program Manager	Technology and Innovation- Comp	Yes	☑	☑
5	9/15/2020	Andrea Guevara	8019186617	aguevara@utah.gov	Region 2 Traffic Signal Engineer	Traffic Management Division - TOC	Yes	☑	☑
6	9/18/2020	Andrea Olson	385-235-0315	andreaolson@utah.gov	Planning Director	Program Development- Complex	Yes	☑	☑
7	9/17/2020	Andrew Gwynn	801-450-3670	agwynn@utah.gov	Construction Mgr., I-15 Technology Corridor	Region 3	Yes	☑	☑
8	9/17/2020	Angelo Papastamos	8016337712	apapastamos@utah.gov	Transportation Planning Manager	Program Development- Complex	Yes	☑	☑
9	9/18/2020	Anne Ogden	435-201-0151	anneogden@utah.gov	Traffic Engineer	Region 4	Yes	☑	☑
10	9/16/2020	Ari Menitove	8016315973	amenitove@utah.gov	Geological Engineer	Project Development- Complex	Yes	☑	☑
11	9/18/2020	Audrey R. D'Ambruoso	401-374-9254	adambruoso@utah.gov	Auditor IV, Financial Screening Analyst	Project Development- Complex	Yes	☑	☑
12	9/17/2020	Becky Hjelm	801-386-4162	bhjelm@utah.gov	Digital Delivery Project Manager	Project Development- Complex	Yes	☑	☑
13	9/21/2020	Ben Huot	801-910-2781	bhuot@utah.gov	Program Development Director	Program Development- Complex	Yes	☑	☑
14	9/21/2020	Ben Maughan	(801) 800-5087	bbmaughan@utah.gov	Design Squad Leader	Region 3	Yes	☑	☑
15	9/15/2020	Bill Lawrence	801-879-1993	BillLawrence@utah.gov	Materials and Pavements Director	Project Development- Complex	Yes	☑	☑
16	9/18/2020	Bill Townsend	(801) 830-9508	btownsend@utah.gov	Region District Engineer	Region 3	Yes	☑	☑
17	9/17/2020	Blaine Leonard	8018873723	bleonard@utah.gov	Transportation Technology Engineer	Traffic Management Division - TOC	Yes	☑	☑
18	9/17/2020	Boyd Humpherys	(435) 452-2057	bhumpherys@utah.gov	Project Director, I-15 Technology Corridor	Region 3	Yes	☑	☑
19	9/18/2020	Bren Edwards	8013095206	brenedwards@utah.gov	Stormwater Coordinator	Technology and Innovation- Comp	Yes	☑	☐
20	9/23/2020	Brent Hadfield	(435) 820-4774	Bhadfield@utah.gov	Resident Engineer	Region 4	Yes	☑	☑
21	9/17/2020	Brett Slater	8001-643-8864	brettslater@utah.gov	Preconstruction Engineer	Region 1	Yes	☑	☑
22	9/17/2020	Brian Allen	3854141092	brianja@utah.gov	Project Manager	Region 2	Yes	☑	☑
23	9/15/2020	Cameron Kergaye	801-633-0359	ckergaye@utah.gov	Director of Research & Innovation	Technology and Innovation- Comp	Yes	☑	☑
24	9/16/2020	Carmen Swanwick	801-232-7802	cswanwick@utah.gov	Region 2 Deputy Director	Region 2	Yes	☑	☐
25	9/17/2020	Caroline King	801-965-4203	carolineking@utah.gov	ROW Lead Agent III	Project Development- Complex	Yes	☑	☑
26	9/18/2020	Carolyn Macek	3853151554	cmacek@utah.gov	Stormwater Specialist	Technology and Innovation- Comp	Yes	☑	☑
27	9/17/2020	Carrie Jacobson	801-514-0018	cjacobson@utah.gov	Signal Engineer	Region 1	Yes	☑	☑
28	9/17/2020	Catherine Higgins	13854660347	chiggins@utah.gov	Communication spec	Program Development- Complex	Yes	☐	☐
29	9/16/2020	Charles A. Stormont	385.226.8948	castormont@utah.gov	Director of Right of Way and Property Management	Project Development- Complex	Yes	☑	☑
30	9/17/2020	Charles Felice	8018873691	cfelice@utah.gov	Transportation Technology Specialist	Traffic Management Division - TOC	Yes	☑	☑
31	9/16/2020	Charles Mason Hill	8019102091	cmason-hill@utah.gov	Region Two Preconstruction Engineer	Region 2	Yes	☑	☑

- 190 UDOT participants
- Developed invite strategy
- Profile setup instructions
- Registration instructions
- Idea capture & report process
- Direct mentoring

Other Innovation Program Activities

Annual Report Production
Research Prioritization Process
Research Projects
Ad-Hoc Innovation Teams & Projects
Innovation Council Engagement
ROI Calculations
Ideas Portal Responses
Rewards & Incentives Administration
TRB Facilitation & Tracking
UDOT & Other Conferences
Peer Exchanges
Survey Responses
Program Development Activities
Website Development
Multiple Presentations
FHWA Coordination

STIC Coordination (application process)
EDC Coordination
AID Demonstration Coordination
National Panel Participation
New Employee Orientation (NEO) Training
Real-Time Implementation Inventory Capture
AASHTO-RAC Participation
AASHTO Innovation Initiative Participation
NCHRP Participation
Annual Training Commitments
Other State DOT Engagement
Network Office of Continuous Improvement
Video Development Efforts
Executive Assignments
Research Database Development Team
Activity Tracking
Annual Shed Visits (all 92)

Universe image downloaded with permission from www.pixabay.com

Questions for UDOT?

Please contact:

Cameron Kergaye
ckergaye@utah.gov
801-633-0359

David Stevens
davidstevens@utah.gov
801-589-8340

APPENDIX L. 2021-23 WSDOT INNOVATIVE RESEARCH PROGRAM

MnDOT Peer Exchange

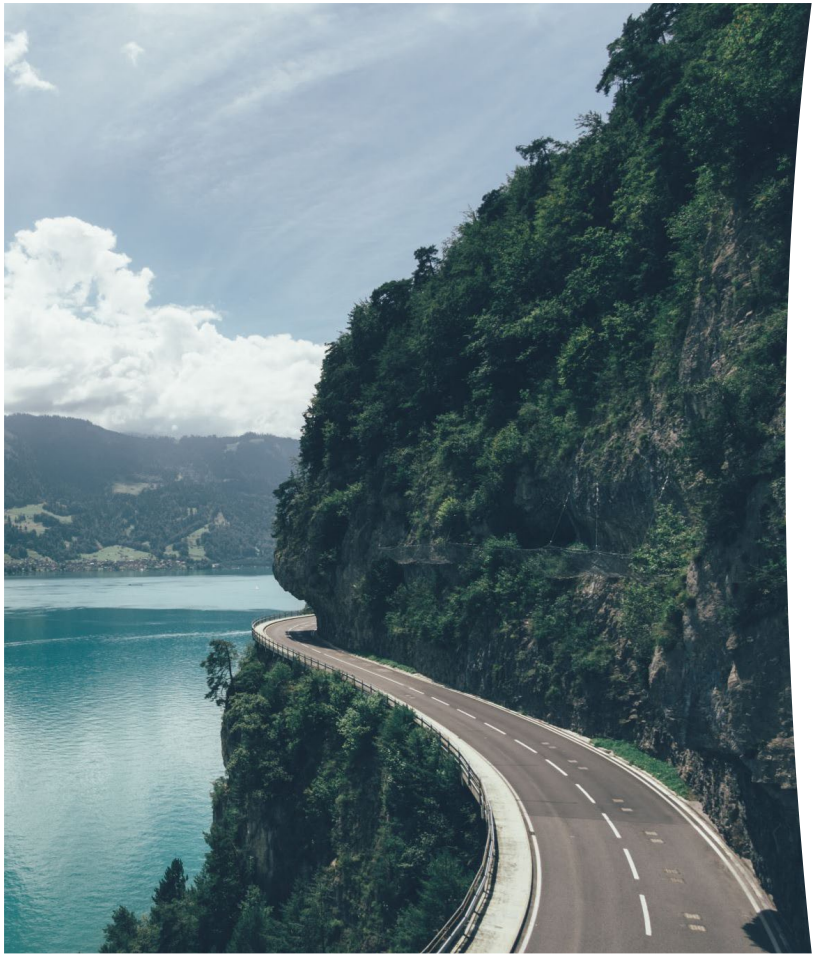
2021-23 WSDOT Innovative Research Program

Anne Freeman,
Research & Library Services Program Administrator
October 27, 2021

Roger Millar, Secretary of Transportation

Amy Scarton, Deputy Secretary of Transportation

WSDOT RESEARCH



How do we get there from here…

Background history of Research & Library Services

Recognized statewide, regionally, and nationally as an excellent research program

Strong collaborative relationships with our internal and external partners

Receiving continual awards through AASHTO's "High Value of Research Program"

Providing continued coordination and collaboration to the nationally recognized research/implementation programs, i.e., NCHRP, IDEA, FHWA STIC, EDC-6, and AID programs.

Background history of Research & Library Services (RLS)

Every DOT receives transportation research funds (80% fed, 20% state) from the federal gas tax that can be used for research, development & technology transfer. The funds also support the Transportation Research Board (TRB), the National Cooperative Highway Research Program (NCHRP), Pooled Fund research projects with other states, and some other smaller programs.

Research

Develops ideas, fund, and manage research projects that provide innovative & practical solutions to help advance WSDOT's practices & policies
Identifies & connect with experts to perform research that yields a return on investment of implementable ideas, products, and best practices
Represents WSDOT in partnerships with Federal Highways, the American Association of State Highway & Transportation Officials, the TRB, University Transportation Centers, universities & colleges, & others to fund & conduct transportation research in areas of common interest

Library

Provides accurate, credible information about transportation and related topics for agency employees, researchers and the public from the Library's print and digital collections.
Belongs to a global network of partner libraries, which extends access to other specialized and technical sources requested by agency
Disseminates final research reports and topical and timely news alerts to hundreds of subscribers within and beyond our agency

What possibly needs to change…a *continuous improvement process* with our guiding principles to align with Secretary's guidance

- Align and identify research topics critical to agency needs
- Influencer engagement to foster the environment to stay nimble, resilient and agile
- Formation of a Technical Advisory Group to provide project selection oversight
- New governance structure to provide the first 3 items are addressed

WSDOTs
State of Transportation (critical elements)

- Practical Solutions
- State of Good Repair
- Safety
- Transportation Systems Management & Operations
- Travel Demand Management
- Capacity
- Racial Justice
- Equity
- Diversity
- Inclusion

Our suggestions to do things differently…..

Unpack the research program to not only provide continued applied research, but foster innovative problem-solving ideas, and continue to provide project delivery to address agency needs as they arise….

Research Types - Biennium 2021-2023 (Budget of $2.5 Million)

- Traditional research
- Innovation focused research
- Quick Response research

Traditional Research

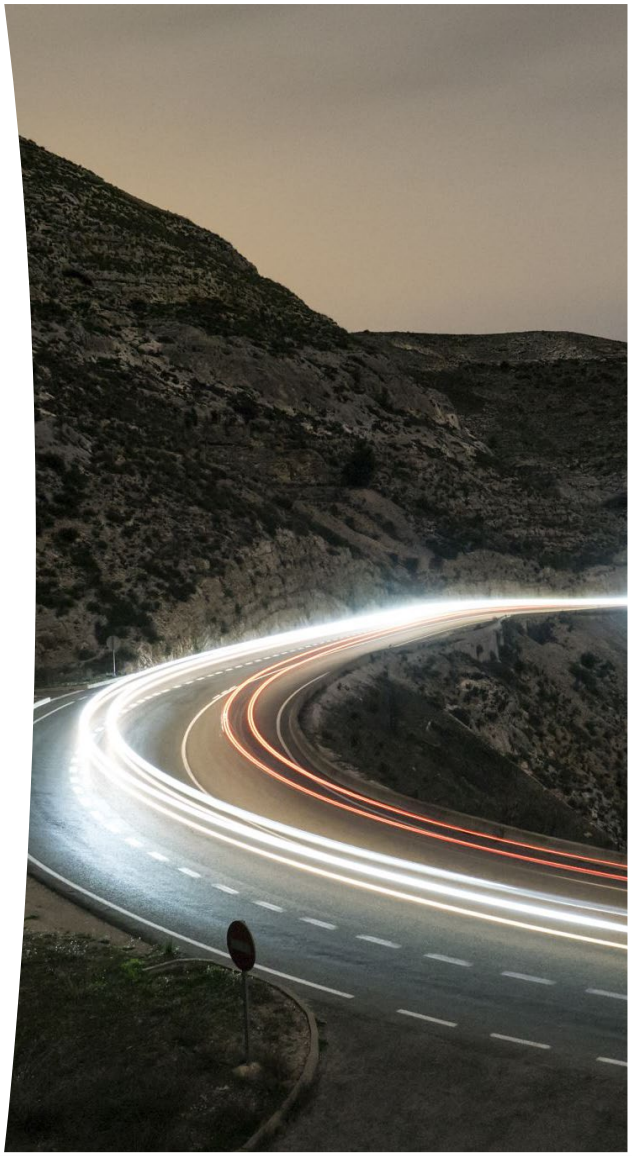
This category is our traditional research that typically uses a consultant or university to perform research in conjunction with a WSDOT subject matter expert.

- $1,200k over the 2021-2023 Biennium
- Maximum project amount $200k
- At a minimum 6 projects

Innovation Focused Research

This category will support or offset the costs to evaluate, improve and/or standardize practices such as developing guidance, new methods, standards & specifications and/or deploying new technology

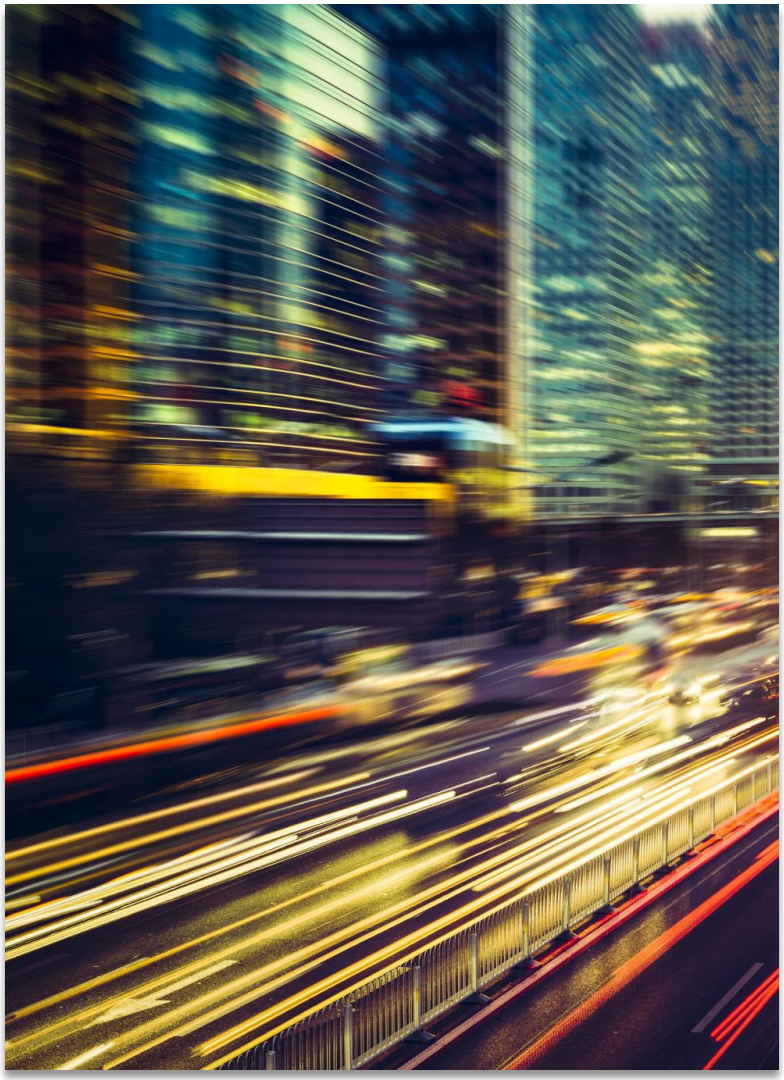
- Research Program Budget FY22 - $300k
- Research Program Budget FY23 - $300k
- Total Biennium Research Program Budget - $600k
- Maximum project amount $100k
- A minimum of 6 research projects for the 2021-2023 Biennium



Quick Response Research

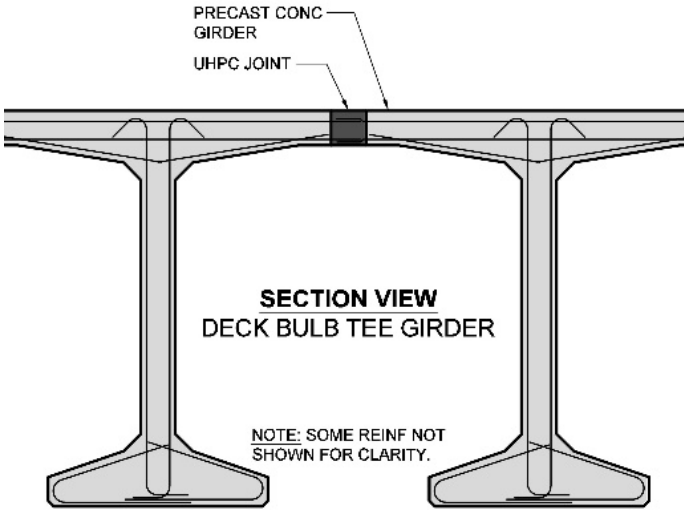
This category addresses high priority, opportunistic or emergent research needs as they arise outside of the normal research selection schedule.

- Quick Response Budget FY22 - $350K
- Quick Response Budget FY23 - $350K
- Total Biennium Quick Program Budget - $700k
- Maximum project amount $50K
- Will fund at least 14 projects for the 2021-2023 Biennium



Proposed Program Roll Out

- Announcement in February 2021 to Senior Managers for the FY 2021-23 SPR Research Program
- Two virtual sessions in February 2021 to explain the program roll out
- Each WSDOT section, branch, program, office & region can submit one research problem statement per biennium for Traditional Research, one Quick Response proposal & one Innovation proposal per year.

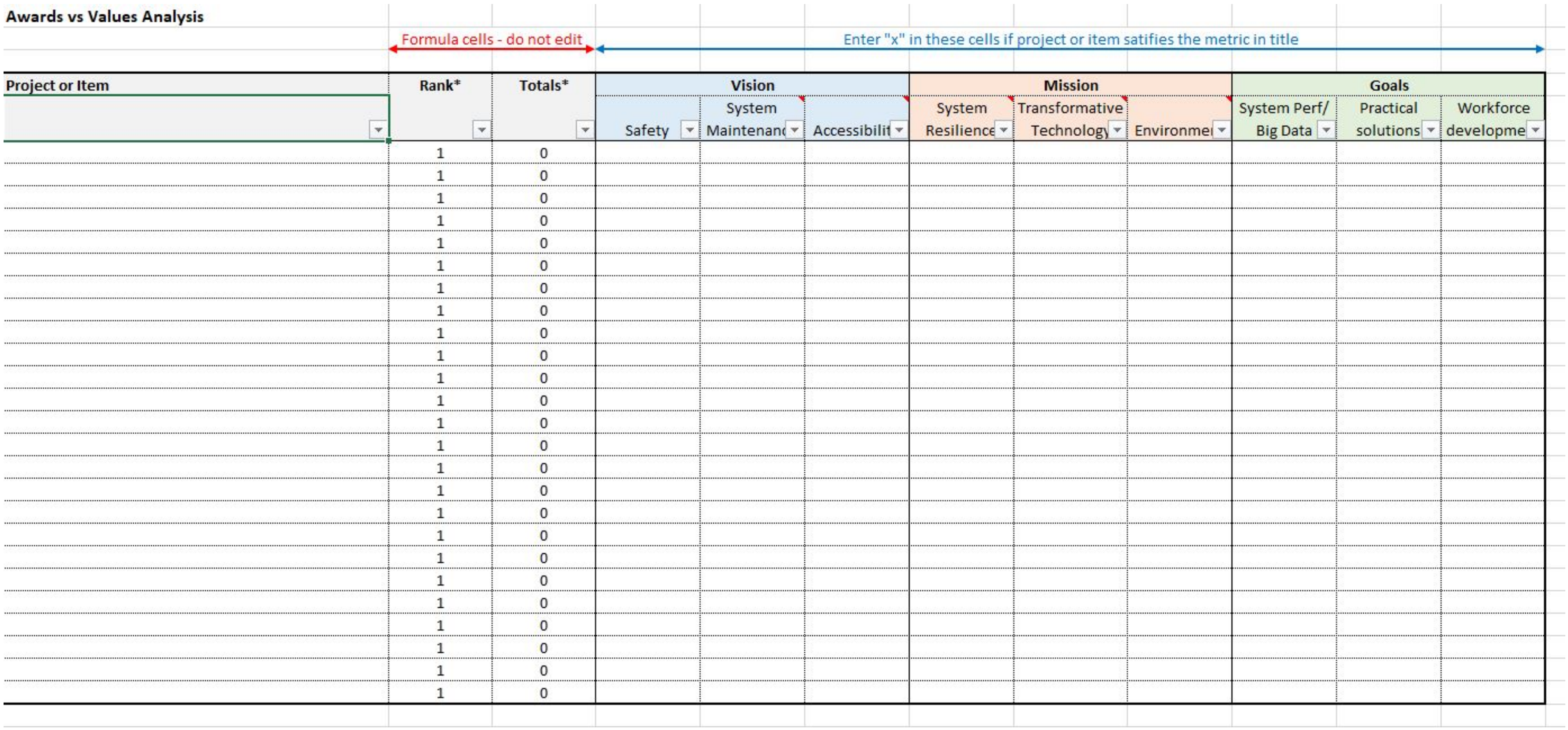


Program Guidance

- All research projects can utilize WSDOT staff time as part of the research effort
- All research project submittals will address how the proposed project delivers Inclusion, Workforce Development & Practical Solutions. What is the likelihood & plan of Implementation and what is the potential Return on Investment of the research
- Recommended research projects will be put forward by Research & Library Services to the Advisory Group (TAG) & the WSDOT Bi-Weekly Team for review & approval

Project Selection

Applying research program prioritization “decision-making” tool for making deliberate decisions (Technical Advisory Group to assist in refining the decision-making criteria for project selection).



Awards vs Values Analysis

Formula cells - do not edit

Enter "x" in these cells if project or item satifies the metric in title

Project or Item	Rank*	Totals*	Vision			Mission			Goals		
			Safety	System Maintenanc	Accessibilit	System Resilience	Transformative Technology	Environme	System Perf/ Big Data	Practical solutions	Workforce developme
	1	0									
	1	0									
	1	0									
	1	0									
	1	0									
	1	0									
	1	0									
	1	0									
	1	0									
	1	0									
	1	0									
	1	0									
	1	0									
	1	0									
	1	0									
	1	0									
	1	0									
	1	0									
	1	0									
	1	0									
	1	0									
	1	0									
	1	0									
	1	0									
	1	0									

Example: Making more deliberate decisions

EDC-STIC Projects 2019-2020 Objectives vs WSDOT Vision/Mission/Goals Weighted Analysis

Protected Worksheet (No Password)

Enter weight in **unshaded** title cells (green font)

Final Output

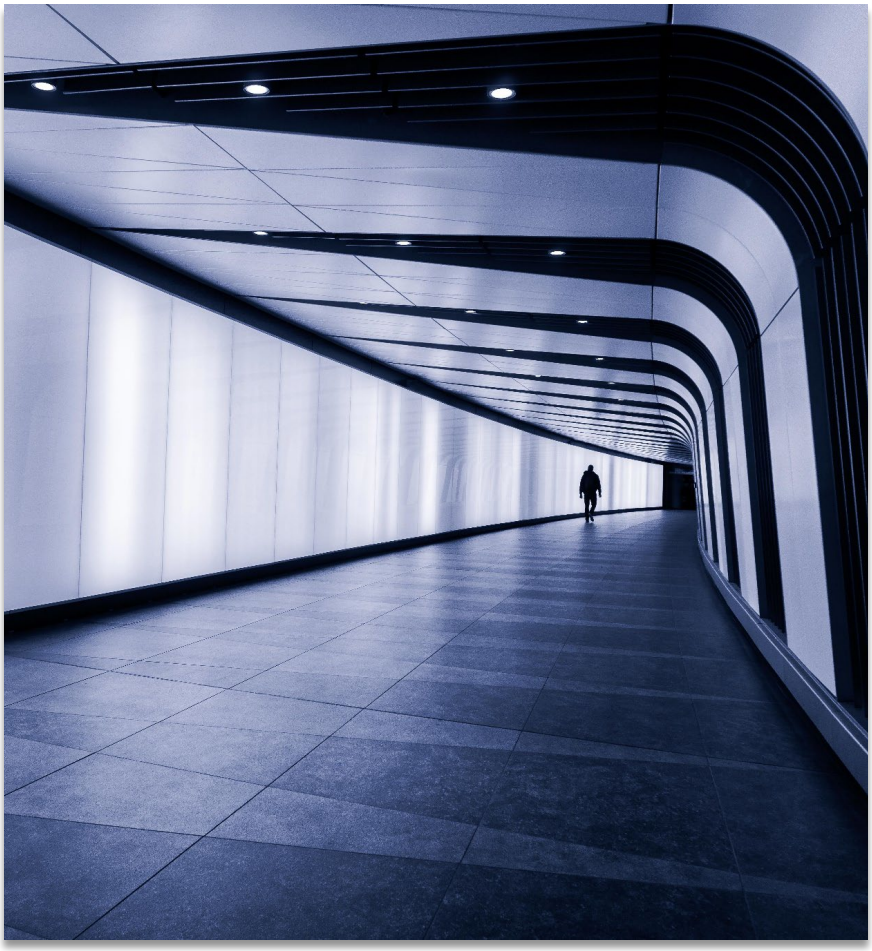
Enter score in **unshaded** cells

Item #	Project or Item	Rank	Total Score	Vision						Mission						Goals					
				Safety (1)		Multimodal/ Accessibility (2)		Sustainability/ Env. (3)		System Resilience (4)		Innovative Technology (5)		Economic Vitality (6)		Inclusion (7)		Practical Solutions (8)		Workforce Dev. (9)	
				Wt.	3	Wt.	3	Wt.	2	Wt.	2	Wt.	1	Wt.	3	Wt.	3	Wt.	3	Wt.	1
1	Multi-modal integration - Active Transp	2	48	3	9	3	9	2	4	1	2	1	1	2	6	3	9	2	6	2	2
2	Buried Bridges - Bridge & Structures	3	40	1	3	1	3	3	6	3	6	2	2	1	3	2	6	3	9	2	2
3	Dynamic Cone Pentrometer - WSU/Pavement	1	49	3	9	2	6	3	6	3	6	2	2	2	6	1	3	3	9	2	2

What do we need from the Executive Work Session Group?

- Guidance as we align our program to agency needs as they arise.
- An active influencer to the research program.
- Approval on the selected Traditional & Innovation research projects.

Thank you!



APPENDIX M. INCUBATE TO IMPLEMENT - A REVIEW OF WISDOT INNOVATION

Incubate to Implement: A review of WisDOT innovation

David Esse
DTSD Innovation & Technology Program Chief

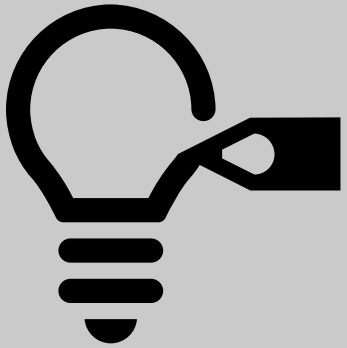
2021 MnDOT Research Peer Exchange

October 27, 2021

Today's Topics

- Developing a Culture of Innovation
- WisDOT Innovation Development Process
- Innovation Examples & Case Studies
- Looking into the future

Developing a Culture of Innovation



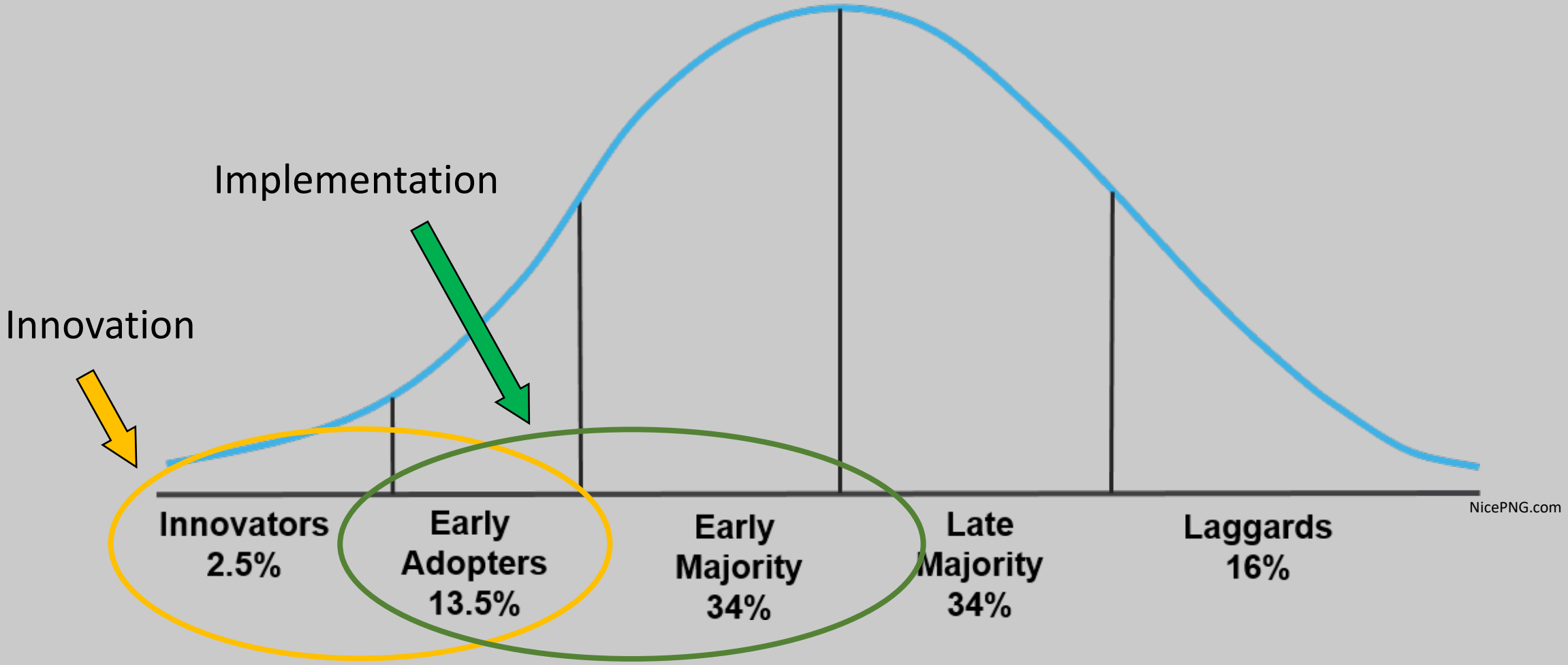
Goal: Create an environment that focuses on continuous improvement

Innovation begins with a definition

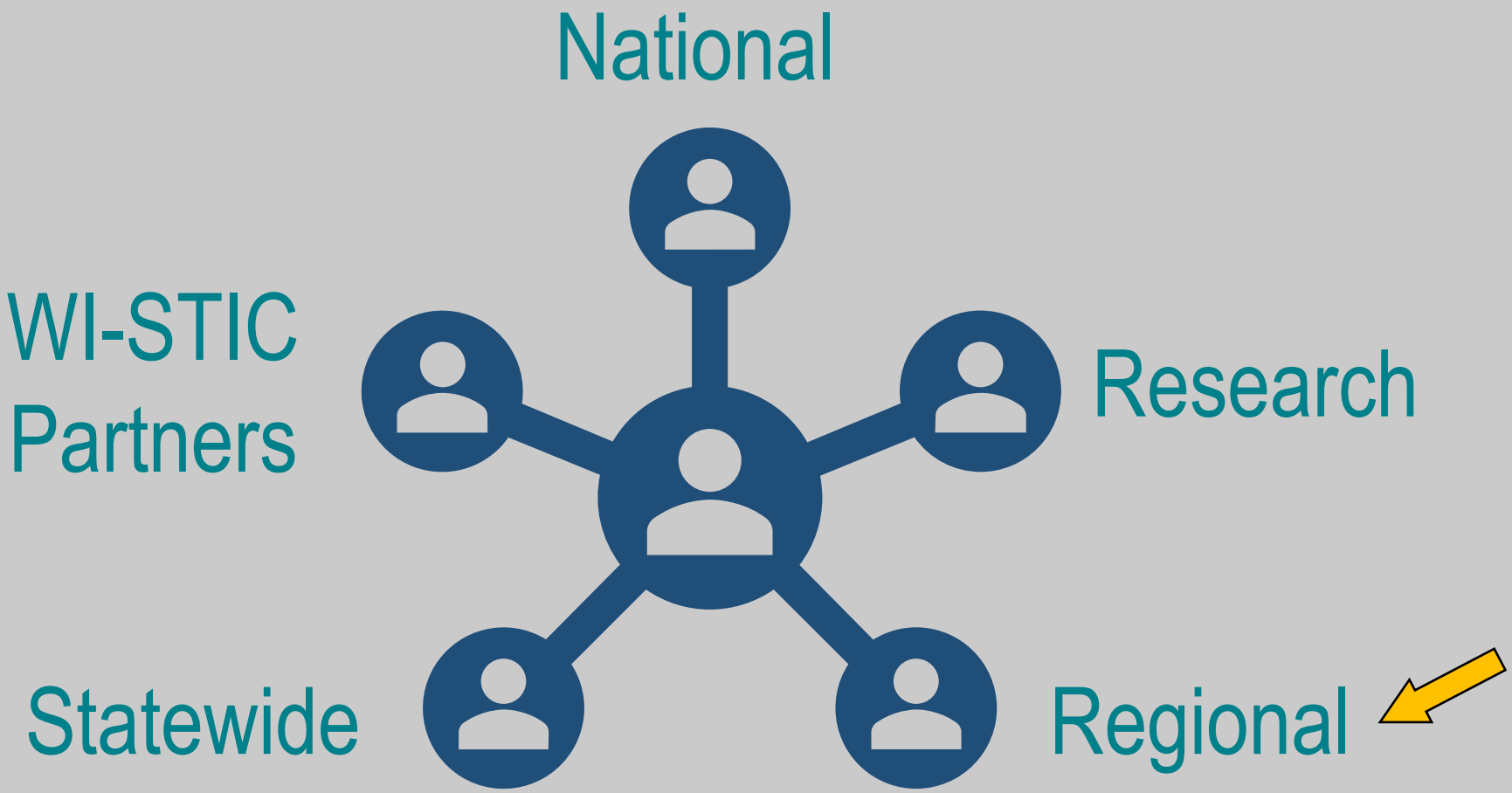
"Innovation is change that unlocks new value."

~Jaime Notter, Author

Who are your Innovators?



WisDOT Innovation Program

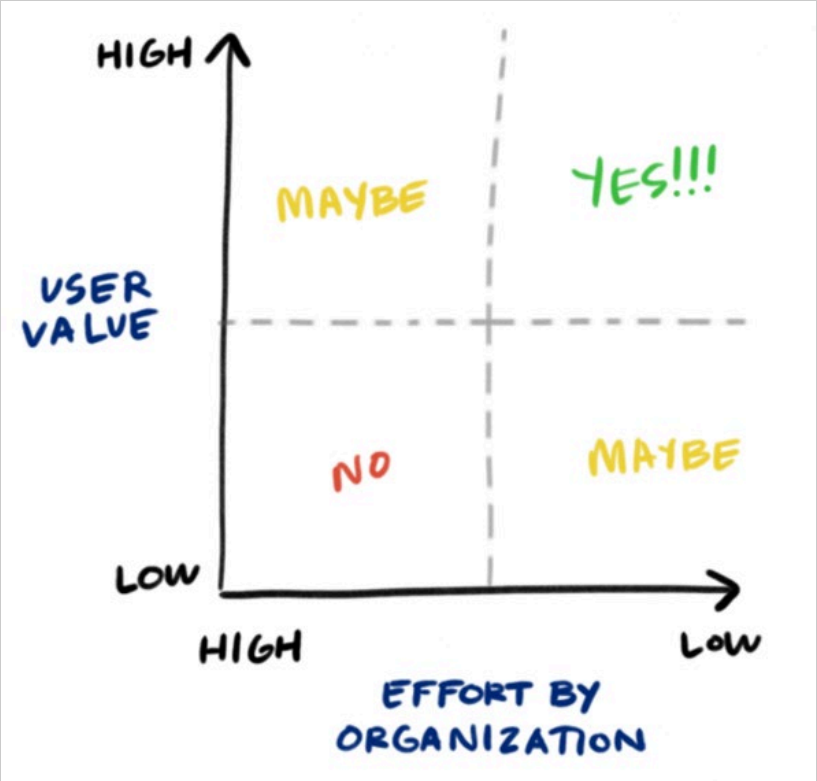


Organizational Elements of Innovation

- ✓ ***Leadership*** that supports calculated risk taking
- ✓ Devoted ***resources*** (People, $$, space)
- ✓ Clear ***business initiatives*** and drivers
- ✓ A ***culture*** that prioritizes innovation
- ✓ Champions, ***champions***, champions!

WisDOT Lessons Learned

- **Treat small ideas with respect!!**
- Engage and support your practitioners
- Keep your process simple and nimble
- Fail fast and acknowledge ‘wins’
- Communicate incremental progress
- **Use a “Value vs Effort Curve’**



nngroup.com

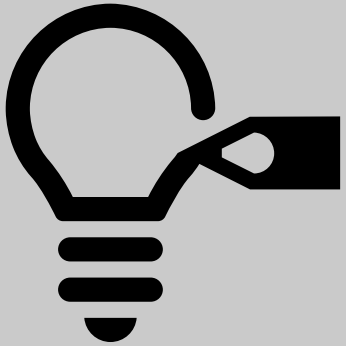
Additional Opportunities

- Employee development
  - Leadership & Mentorship
  - Employee Growth
  - Exposure to new areas of your business
- Provides focus on continuous improvement
- Opportunity to define business initiatives
  - eConstruction, BIM, Asset Management

Defining a Business Initiative

	Paper	Paperless	Electronic	Digital
Information	**Handwritten, Printed**	**Image**	**Data**	**Object**
	Physical Cabinets	*.pdf, .jpg*	*.dxf, .csv*	*model, services*
Workflow	**Organic**	**Implied**	**Explicit**	**Seamless**
	Learned	*email inbox*	*documented, semi-automated, Semi-measured*	*Automated, Notifications, Performance mgmt*
Integration	**None**	**Shared**	**Interoperable**	**Integrated**
	Printed & filled-out forms, snail or inter-d mail	*email a roadway design pdf*	*documents emailed from consultant to DOT and back again*	*Same model accessed, reviewed, marked up by all parties, auto-push of model data to traffic/maint. operations sys.*

Innovation Development



Goal: Rapid identification, testing and adoption of ideas

WisDOT 5 Steps to Innovation

Incubate
- *Discuss feasibility and document idea/process*
- *Conduct initial financial assessment*

Go/No-Go

Demonstrate
- *Collect and review existing research*
- *Demos from vendors, lead states or others*

Go/No-Go

Pilot
- *Practitioners validate expected benefits and ROI*
- *Identify needs for implementation*

Go/No-Go

Communicate
- *Share results and best practices with stakeholders*
- *Determine width and depth of implementation*

Go/No-Go

Implement
- *Creation of an implementation plan, budget, resources*
- *Selection of implementation champions*

Go/No-Go

Innovation Case Studies

Each of these examples required support, partnership & leadership!

“What if?”

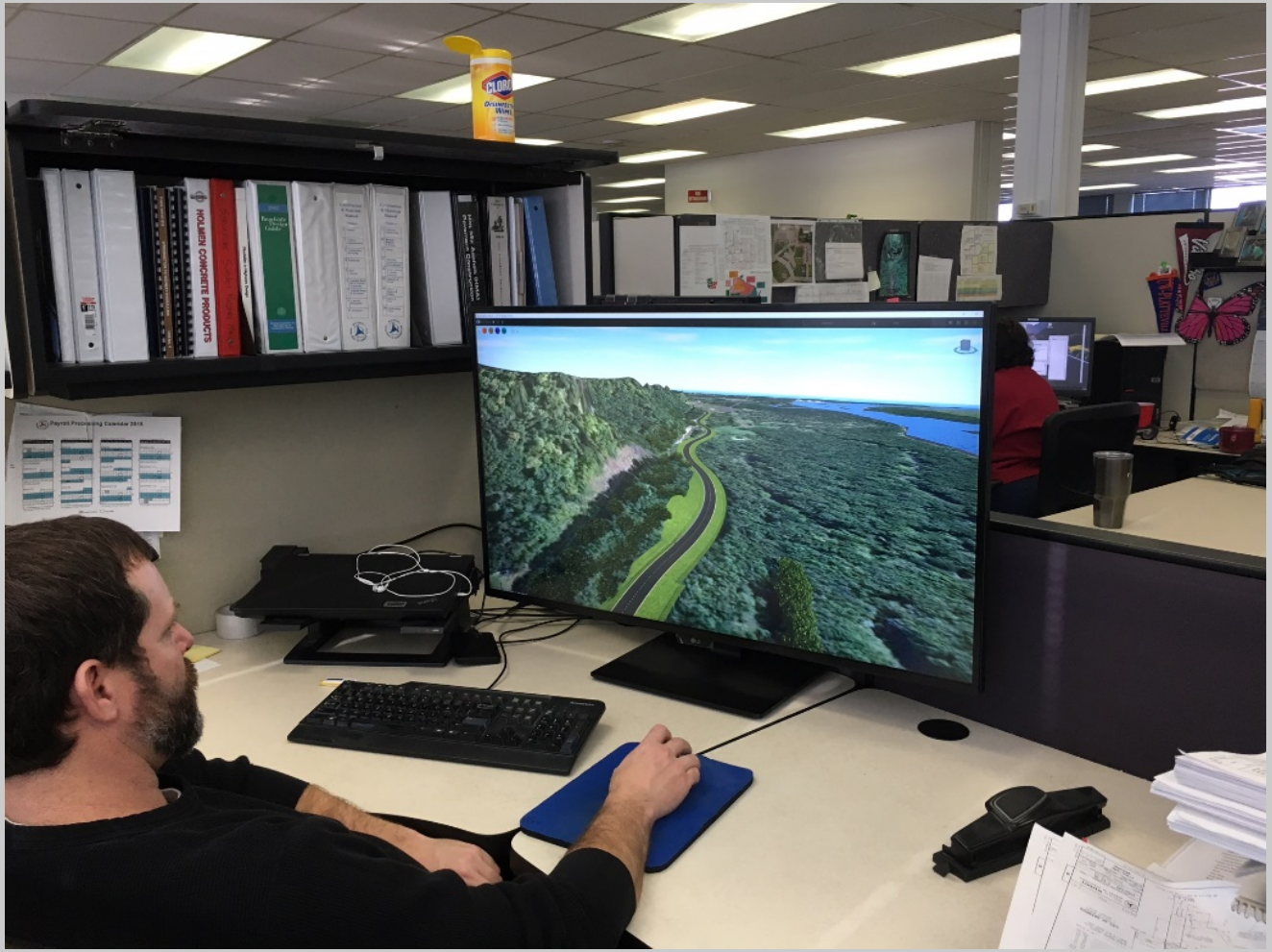
43” 4k Monitors

Problem:

- User desire to get rid of break between screens
- Need for higher resolution
- More workspace (pixels)

Solution:

- 43” commercial grade 4k TV
- Time & Material savings
- End user satisfaction



~~Stolen~~ "Borrowed" Culvert Inspections

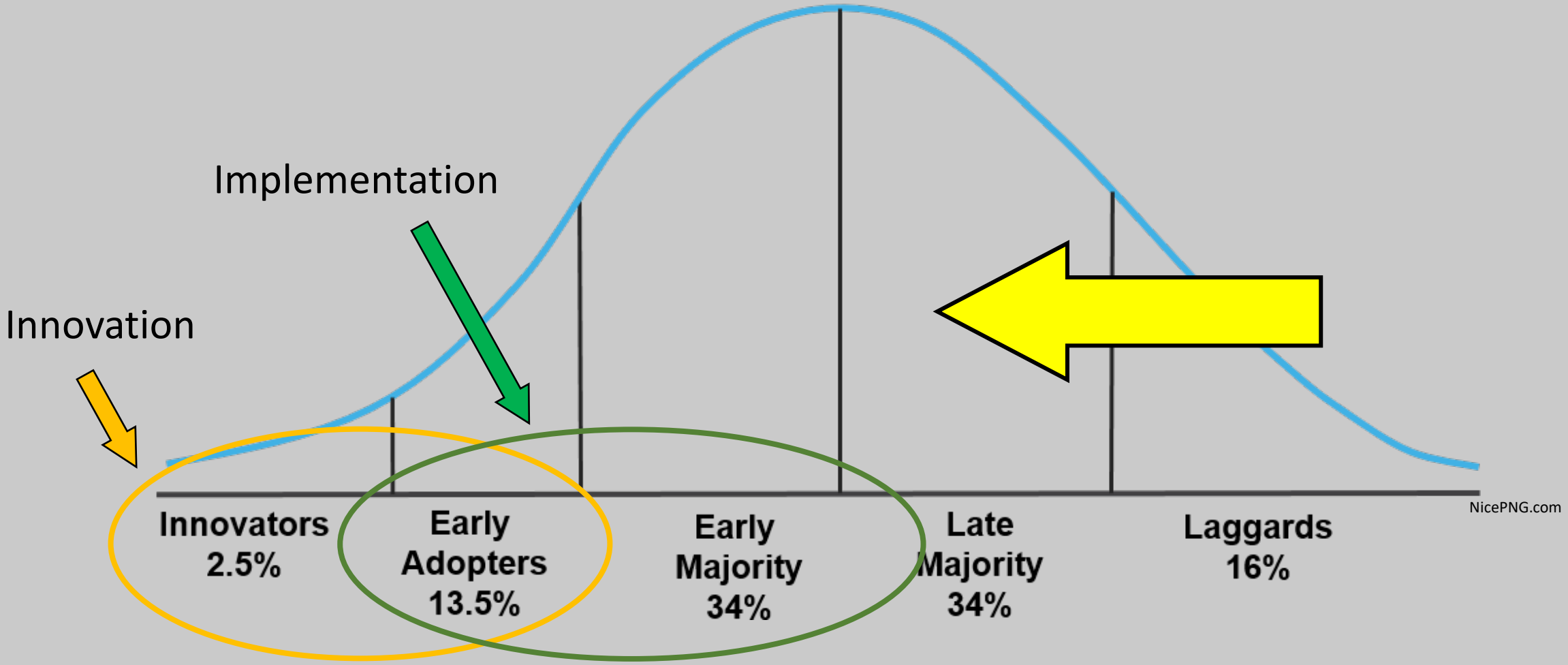
<u>Problem</u>:

- Cannot get a complete inspection
- Visual inspection from ends
- Dangerous environment (risk)

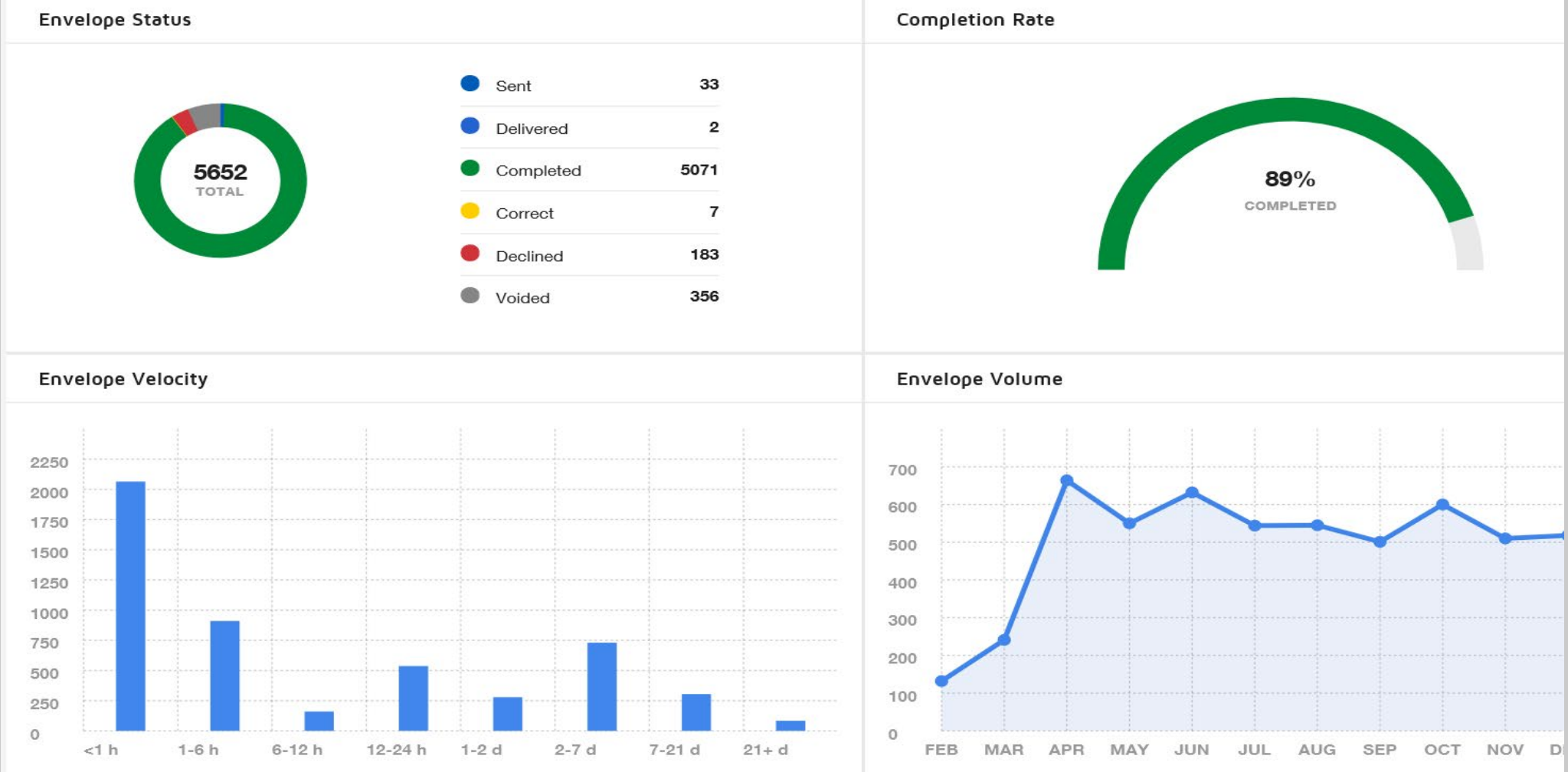
<u>Solution</u>:

- R/C Truck with Go-Pro Camera
- Live video feed to inspector
- Time savings + Higher quality

“The COVID Shift”



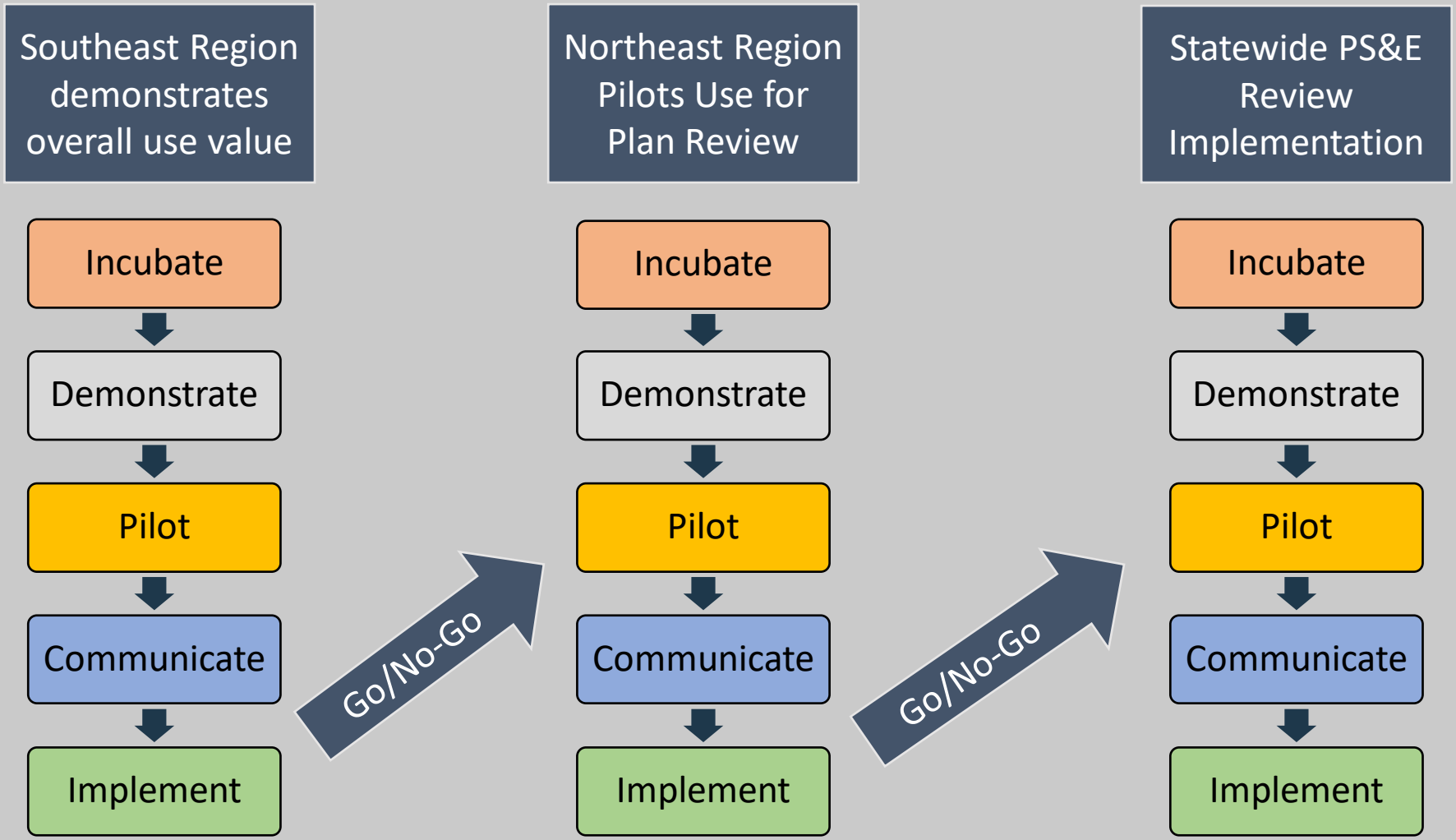
“The COVID Shift” eSignatures



“The COVID Shift” File Sharing & Access

- Box Statistics
  - <100 TB of data pre-COVID….Now ~268 TB and growing
  - 19 Million image uploads
    - Construction, real estate, ETO, aerial, maintenance
  - 1,790,000 PDFs
  - 799,000 Documents
  - 139,000 Spreadsheets
  - 25,000 Videos

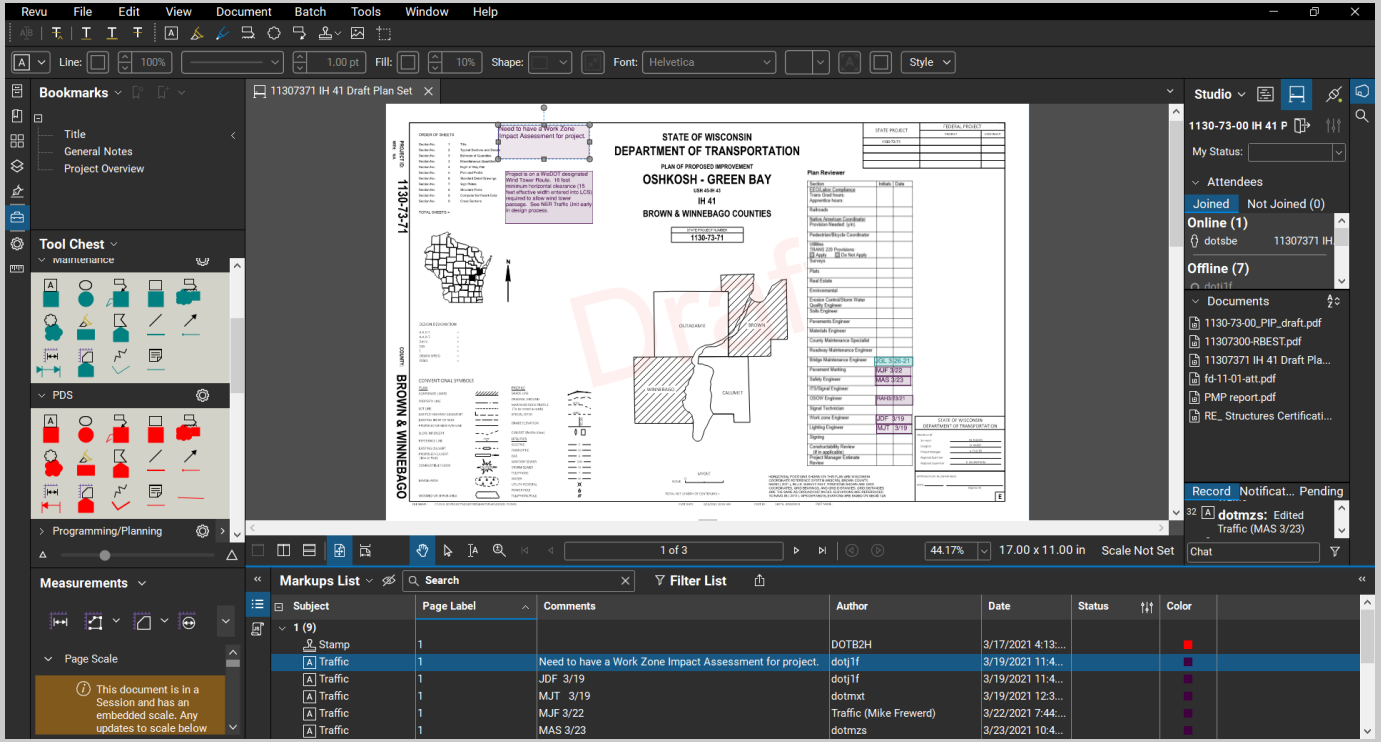
“Innovation that Evolves” Collaborative Review



Collaborative PS&E Design Review

Goal:

- Collaborative simultaneous PDF review
- Need for engineering tools
- Push for paperless
- Address comment tracking and resolution



Solution:

- Bluebeam Studio (Cloud Collab.)
- Time & Material savings
- Stronger collaboration

bluebeam®
NO LIMITS®

Value Capture: Collaborative PS&E Review

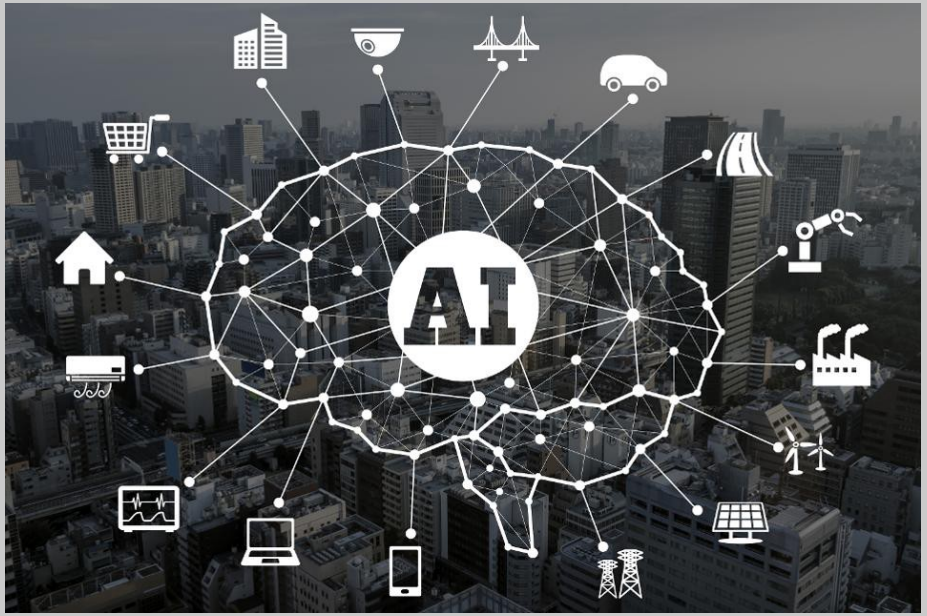
- Benefit scenarios include collaboration during plan development, design alternatives, plats, traffic plans and ad-hoc use

	Hourly Rate	# Per Year	Est. Time Saved (hrs.)	Est. Benefit
Statewide ROW Plats Review	$55	350	1	$19,250
Statewide PS&E review	$55	700	7.5	$288,750
Utilities Coordination and Review	$55	100	1	$5,500
Ad-hoc Use	$55	10000	0.5	$275,000
TOTAL BENEFIT				**$588,500**

- Average 369 LET projects/year
- ~700 plans reviewed each year because PS&E review process spans between years
- Total time saved for entire project team during PS&E process (e.g. one person on the team saves 10 minutes, another saves 30, another saves 1 hour, etc...)

Where are we headed with innovation?

- Artificial Intelligence & Machine Learning
  - Opening new doors for our industry
  - Bringing data and storage needs the world has never seen before
  - Requires a new realm of knowledge, experience and thinking



Technology will continue to evolve.

Projects will come and go.

Your culture is what matters!

Thank you!!

David Esse
DTSD Innovation & Technology Program Chief
david.esse@dot.wi.gov
608.261.6068

APPENDIX N. FOSTERING INNOVATION AT MNDOT

Fostering Innovation at MnDOT

Shannon Fiecke| Marketing & Communications Manager

MnDOT Office of Research & Innovation

October 27, 2021

DEPARTMENT OF TRANSPORTATION

mndot.gov/research/innovation

Overview

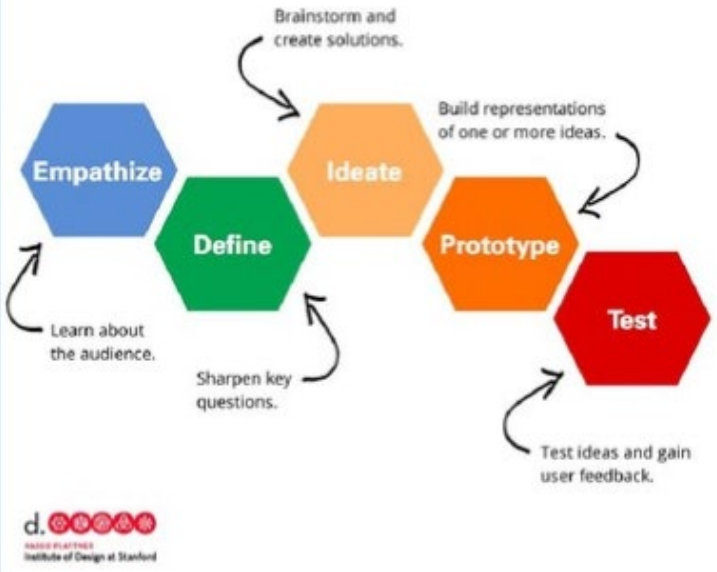
- Innovation Program Initiatives
- Recognition
- COVID-19 Research Solicitation
- Specialty Programs

Innovation Newsletter

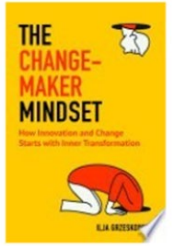
- Quarterly email
- Innovation resources
- Innovation stories
- Team updates
- Available at mndot.gov/research/innovation.html

Innovation Training

Speaker Shares How to Apply Human-Centered Design to Employee Work



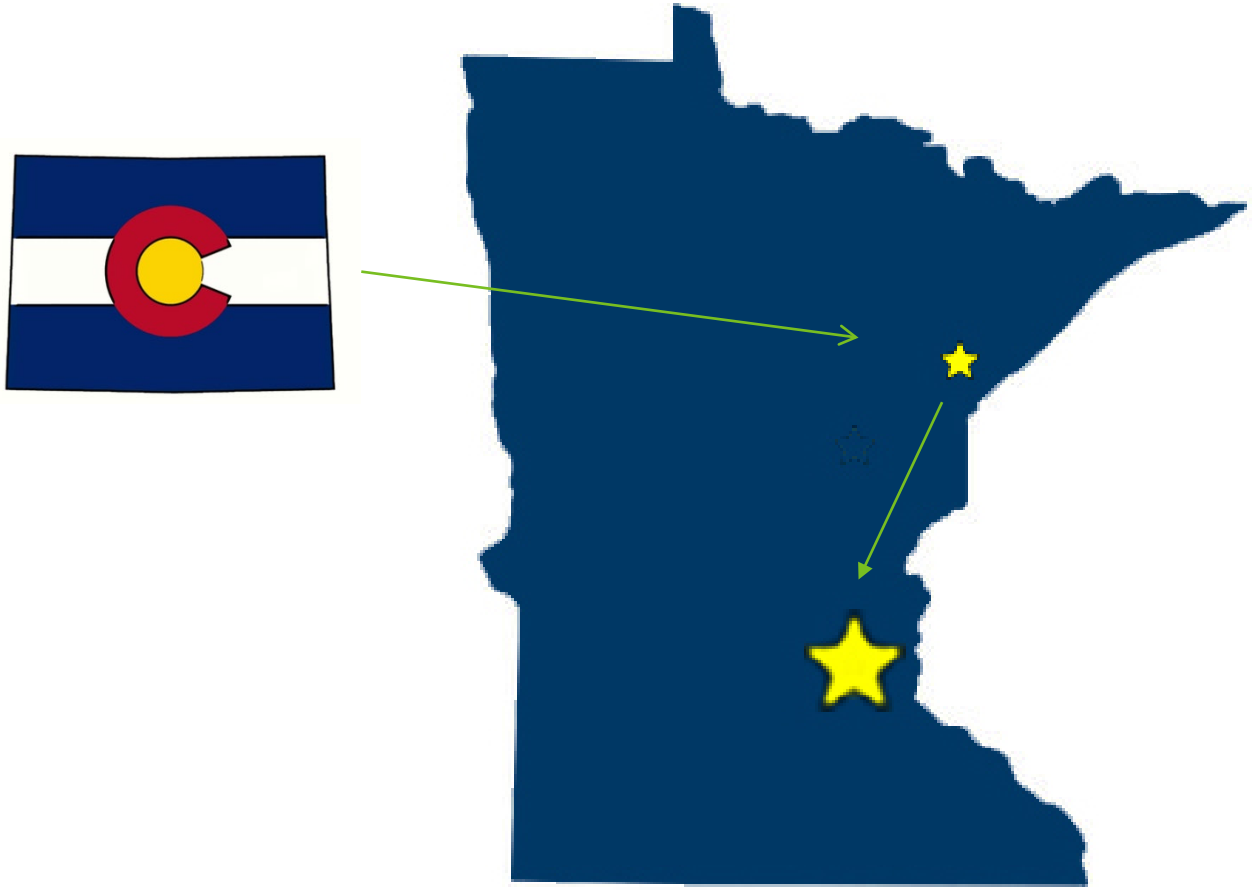
Reading More in the New Year? Innovation eBooks Now Available



Trying to make a change in the workplace? The MnDOT Library has launched a professional development e-books collection that has several tiles focused on innovation and creativity in the workplace. To suggest a title for the collection or learn more about this new service, visit library's iHub page.

- *The Changemaker Mindset: How Innovation and Change Start with Inner Transformation*
- *Innovating Innovation: Leadership Tools to Make Revolutionary Change Happen for You and Your Business*
- *Leadership for Innovation: Three Essential Skill Sets for Leading Employee-Driven Innovation*
- *The Road to Reinvention: How to Drive Disruption and Accelerate Transformation*
- *Thinking, Fast and Slow*

Innovation Highlights

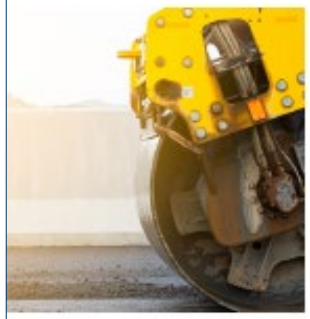


- **1/2 cost** of one contracted cleaning
- **1/20th** of new machine

Homegrown Tunnel Washers Are Budget-Savers

Metro District's tunnel washer is mounted on a John Deere tractor. The washing equipment can be removed, freeing the tractor up for other duties. This photo was taken during a cleaning of the Lowry Hill Tunnel on Oct. 21. Photo by John Bieniek

COVID-19 Innovations Report



Asphalt Delivery E-Tickets

Due to COVID-19, we are speeding up the adoption of electronic tickets (E-Tickets) for reporting the delivery of hot mix asphalt to construction sites, which not only reduces physical contact, but also increases the accuracy of records and speed of payments.

Virtual Public Engagement

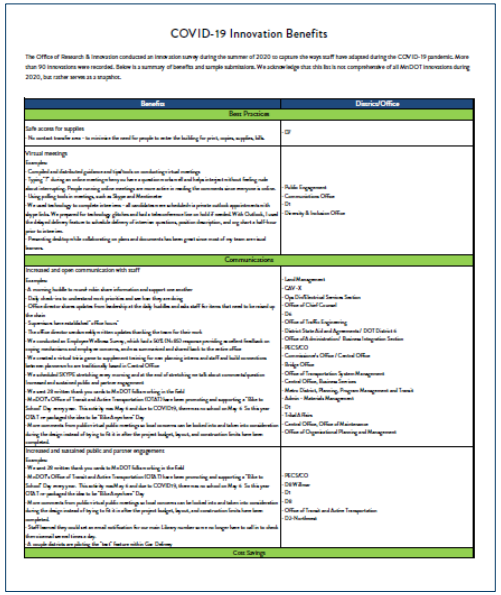
As COVID-19 restrictions limited our ability to host in-person meetings, MnDOT's public engagement staff found new, creative ways to connect with Minnesotans. The 35W@94 Crosstown to Downtown project offered a virtual self-guided tour, including the history of I-35W, project benefits and construction features. The Highway 67 Granite Falls to Echo project hosted a virtual open house sharing information about the current road closure and potential solutions. It has had close to 1,000 visitors.

Virtual Inspection of Motor Carriers

Early on in the pandemic, we turned to virtual inspections to conduct safety audits that couldn't be delayed. Inspection procedures used a streaming chat application to inspect wheelchair restraints on Special Transportation Service vehicles for the elderly and disabled. A short video was created to explain the process to customers.

80% of innovations were permanently adopted

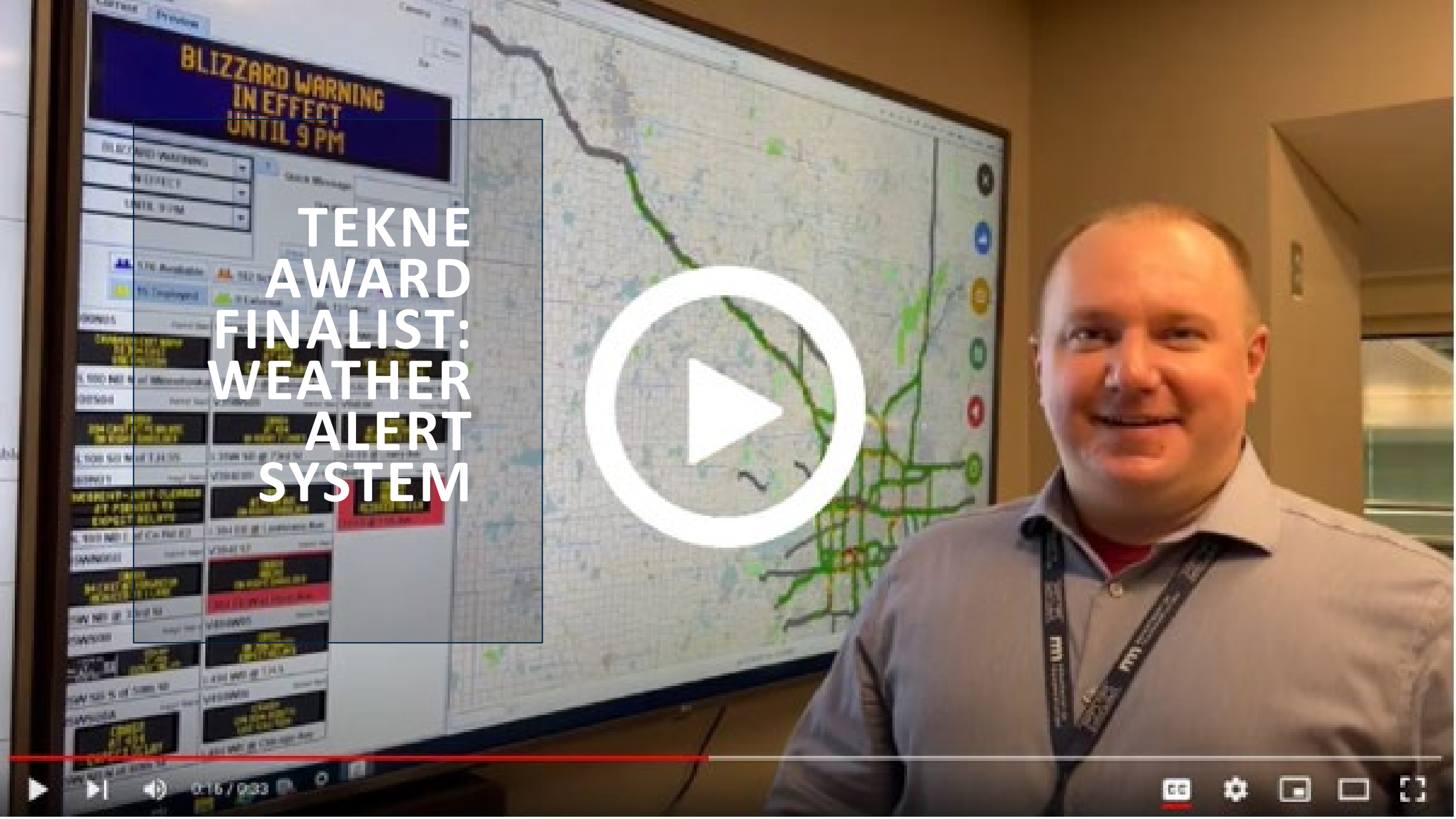
90+ COVID-19 innovations



COVID-19 Innovation Benefits

The Office of Research & Innovation conducted an innovation survey during the summer of 2020 to capture the ways staff have adapted during the COVID-19 pandemic. More than 90 innovations were recorded. Below is a summary of benefits and sample submissions. We acknowledge that this list is not comprehensive of all MnDOT innovations during 2020, but rather serves as a snapshot.

Benefits	District/Office
Best Practices	
Safe access for supplies We contact transfer area - to minimize the need for people to enter the building for print, copies, supplies, bills.	- OF
Virtual meetings Examples: - Compiled and distributed guidance and tips/tools on conducting virtual meetings - Typing "/" during an online meeting or hang up hand to have a question to allow off and helps interject without feeling rude about interrupting. People running online meetings are more active in reading the comments since everyone is online. - Using polling tools in meetings, such as Skype and Mentimeter We used technology to complete interviews - all candidates were scheduled in private outlook appointments with skype links. We prepared for technology glitches and had a teleconference line on hold if needed. With Outlook, I used the delayed delivery feature to schedule delivery of interview questions, position description, and org chart a half-hour prior to interview. - Presenting, desktop while collaborating on plans and documents has been great since most of my team are in-out towers.	- Public Engagement - Communications Office - D1 - Diversity & Inclusion Office
Communications	
Increased and open communication with staff Examples: - A morning huddle to re-orient value alone information and support one another - Daily check ins to understand work priorities and see how they are doing - Office director shares updates from leadership at the daily huddles and asks staff for items that need to be raised up the chain - Supervisors have established "office hours" - The office director sends weekly e-mites updates thanking the team for their work We conducted an Employee Wellness Survey, which had a 60% (96/80) response providing excellent feedback on coping, conductance and employee concerns, and we summarized and shared back to the entire office We created a virtual tool to grant to supplement training for new planning interns and staff and build connections between planners who are traditionally based in Central Office We scheduled SKYPE stretching every morning and at the end of stretching we talk about communication, increased and sustained public and partner engagement We sent 20 written thank you cards to MnDOT fellow working in the field MnDOT's Office of Transit and Active Transportation (OTAT) have been promoting and supporting a "Bike to School" Day every year. This activity was May 6 and due to COVID19, there was no school on May 6. So this year OTAT re-packaged the idea to be "Bike Inspection" Day We are comments from public virtual public meetings so local concerns can be looked into and taken into consideration during the design instead of trying to fit it in after the project budget, layout, and construction limits have been completed. Increased and sustained public and partner engagement Examples: We sent 20 written thank you cards to MnDOT fellow working in the field MnDOT's Office of Transit and Active Transportation (OTAT) have been promoting and supporting a "Bike to School" Day every year. This activity was May 6 and due to COVID19, there was no school on May 6. So this year OTAT re-packaged the idea to be "Bike Inspection" Day We are comments from public virtual public meetings so local concerns can be looked into and taken into consideration during the design instead of trying to fit it in after the project budget, layout, and construction limits have been completed. - Staff learned they could set an email notification for our main Library number so we no longer have to call in to check if we received new items a day. A couple districts are piloting the 'me' feature within Get Delivery	- Land Management - CAV-X - Gas Oil/Electrical Services Section - Office of Chief Counsel - D6 - Office of Traffic Engineering - District State Aid and Agreements/ DOT District 6 - Office of Administration/ Business Integration Section - PECSICO - Commissioner's Office / Central Office - Bridge Office - Office of Transportation System Management - Central Office, Business Services - Metro District, Planning, Program Management and Transit - Admin - Materials Management - D1 - Tribal Affairs - Central Office, Office of Maintenance - Office of Organizational Planning and Management - PECSICO - DEW River - D1 - D6 - Office of Transit and Active Transportation - D2-Northeast
Cost Savings	

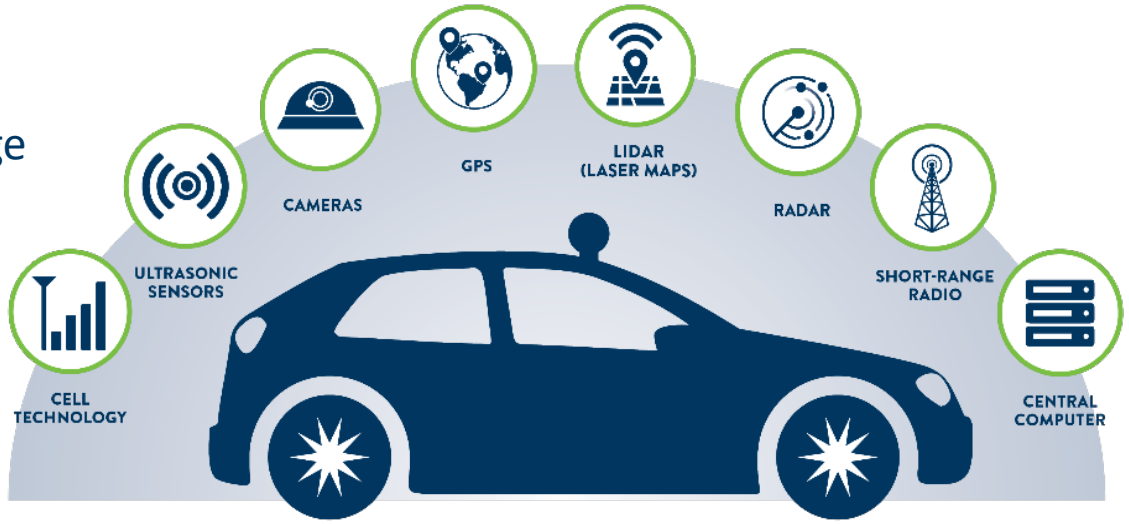

BLIZZARD WARNING
IN EFFECT
UNTIL 9 PM
TEKNE AWARD FINALIST: WEATHER ALERT SYSTEM

COVID-19 Research Solicitation

- Open research solicitation
- Quick turnaround (1-year) projects
- University, private sector participation
- 25 proposals; 5 funded (public engagement, equitable contracting, speed impacts, future of teleworking; post-COVID transit)

Specialty Programs: CAV-X, MnROAD

CAV-X
Challenge



Flexible, Rigid, Geotechnical,
Intelligent Construction,
Preventative Maintenance teams

Specialty Programs: Maintenance Operations

- State, local programs
- Pilot commercial or home-grown equipment, methods
- Fact-sheet/video, monthly bulletin

(Photo: Sibley County, Evaluation of Grader Front-Mounted Retriever Hitch)

APPENDIX O. MINNESOTA'S CONNECTED AND AUTOMATED VEHICLES PROGRAM

OCTOBER 27, 2021

MINNESOTA'S CONNECTED AND AUTOMATED VEHICLES PROGRAM

TRANSPORTATION INNOVATION

DESTINATIONCAV

DEPARTMENT OF TRANSPORTATION

CHALLENGES WE ARE TRYING TO SOLVE

CAV DESTINATIONCAV

DEPARTMENT OF TRANSPORTATION

STATEWIDE CAV

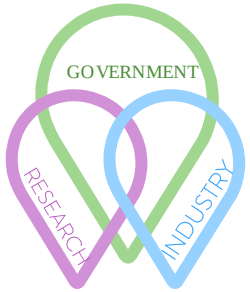
Destination CAV – Innovation and exploration that harnesses technology to improve quality of life

The future of mobility comes to Minnesota

DESTINATION CAV

THE FUTURE OF MOBILITY COMES TO MINNESOTA

Governor's Advisory Council



Innovation Alliance

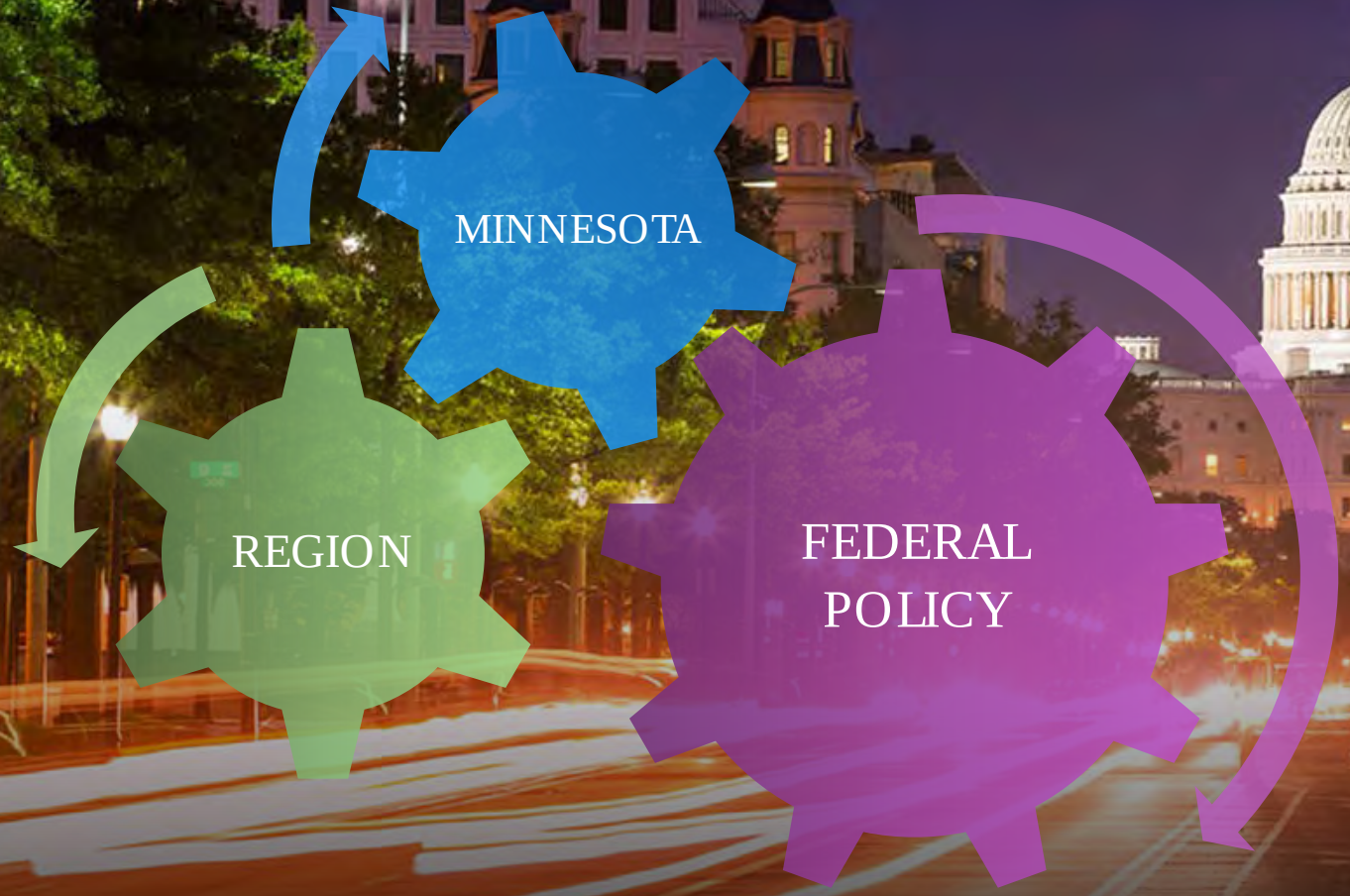
Interagency CAV Team ("I-CAV")

CAV-X Team & Internal MnDOT Working Group

DESTINATION CAV

DEPARTMENT OF TRANSPORTATION

NATIONAL CAV



MAASTO
MID AMERICA ASSOCIATION OF STATE TRANSPORTATION OFFICIALS

AUVSI
ALL THINGS UNMANNED

U.S. Department of Transportation
Federal Highway Administration

TRB
Transportation Research Board

ITS AMERICA

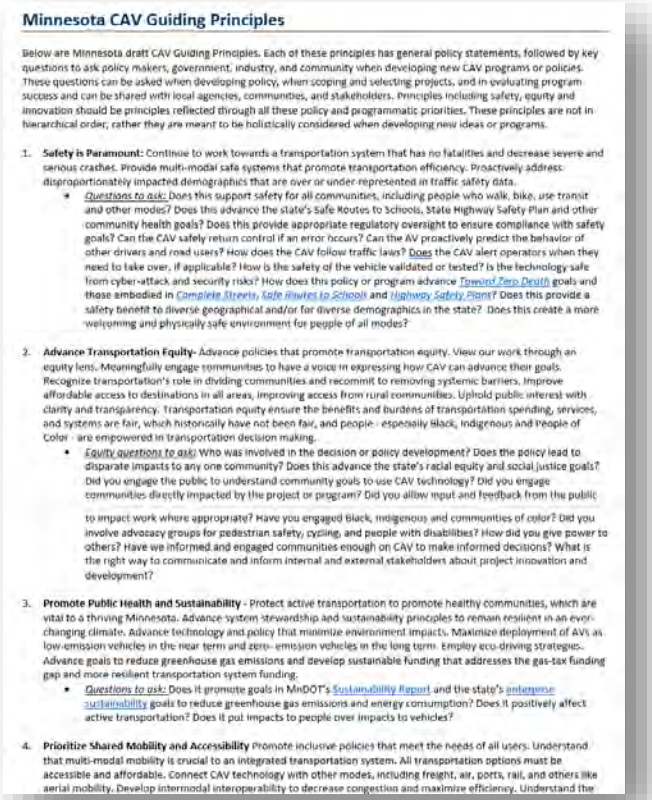
CAV DESTINATION CAV

mn DEPARTMENT OF TRANSPORTATION

MN CAV GUIDING PRINCIPLES

Goal: Guide stakeholders and leaders to ask the right questions when developing policy, programs and directing investment.

1. Safety is paramount
2. Advance transportation equity
3. Promote public health and sustainability
4. Prioritize shared mobility and accessibility
5. Innovation
6. Agile infrastructure investment
7. People- focused policy
8. Economic prosperity and quality of life
9. System resiliency thru data access and security



Minnesota CAV Guiding Principles

Below are Minnesota draft CAV Guiding Principles. Each of these principles has general policy statements, followed by key questions to ask policy makers, government, industry, and community when developing new CAV programs or policies. These questions can be asked when developing policy, when scoping and selecting projects, and in evaluating program success and can be shared with local agencies, communities, and stakeholders. Principles including safety, equity and innovation should be principles reflected through all these policy and programmatic priorities. These principles are not in hierarchical order, rather they are meant to be holistically considered when developing new ideas or programs.

1. **Safety is Paramount:** Continue to work towards a transportation system that has no fatalities and decrease severe and serious crashes. Provide multi-modal safe systems that promote transportation efficiency. Proactively address disproportionately impacted demographics that are over or under-represented in traffic safety data.
   - *Questions to ask:* Does this support safety for all communities, including people who walk, bike, use transit and other modes? Does this advance the state's Safe Routes to Schools, State Highway Safety Plan and other community health goals? Does this provide appropriate regulatory oversight to ensure compliance with safety goals? Can the CAV safely return control if an error occurs? Can the AV proactively predict the behavior of other drivers and road users? How does the CAV follow traffic laws? Does the CAV alert operators when they need to take over, if applicable? How is the safety of the vehicle validated or tested? Is the technology safe from cyber-attack and security risks? How does this policy or program advance *Toward Zero Death* goals and those embodied in *Complete Streets*, *Safe Routes to Schools* and *Highway Safety Plans*? Does this provide a safety benefit to diverse geographical and/or for diverse demographics in the state? Does this create a more welcoming and physically safe environment for people of all modes?

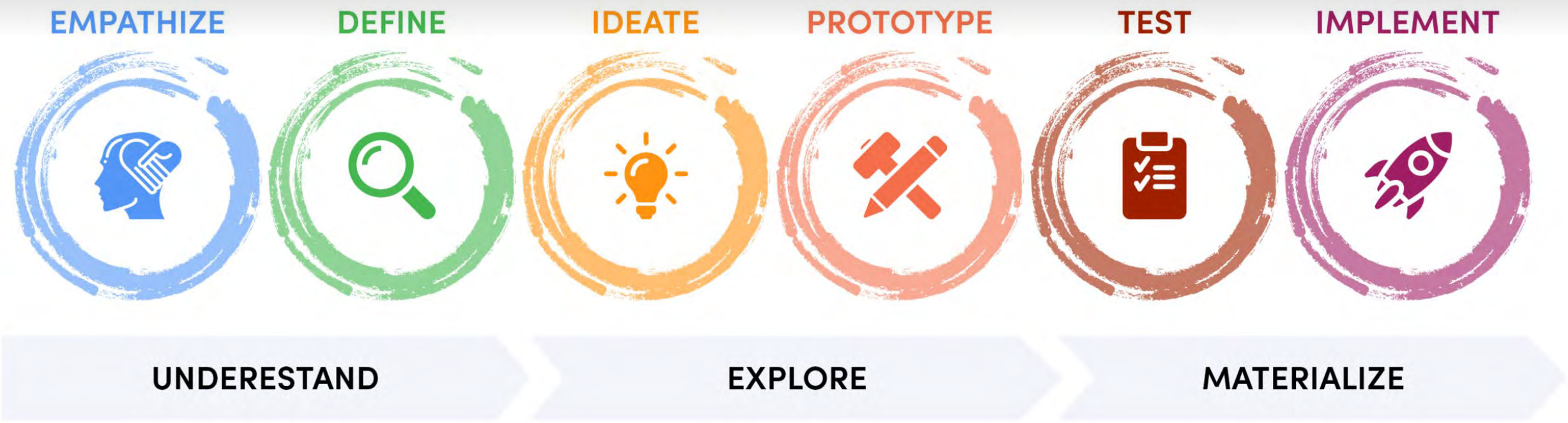
2. **Advance Transportation Equity-** Advance policies that promote transportation equity. View our work through an equity lens. Meaningfully engage communities to have a voice in expressing how CAV can advance their goals. Recognize transportation's role in dividing communities and recommit to removing systemic barriers. Improve affordable access to destinations in all areas, improving access from rural communities. Uphold public interest with clarity and transparency. Transportation equity ensure the benefits and burdens of transportation spending, services, and systems are fair, which historically have not been fair, and people - especially Black, Indigenous and People of Color - are empowered in transportation decision making.
   - *Equity questions to ask:* Who was involved in the decision or policy development? Does the policy lead to disparate impacts to any one community? Does this advance the state's racial equity and social justice goals? Did you engage the public to understand community goals to use CAV technology? Did you engage communities directly impacted by the project or program? Did you allow input and feedback from the public to impact work where appropriate? Have you engaged Black, Indigenous and communities of color? Did you involve advocacy groups for pedestrian safety, cycling, and people with disabilities? How did you give power to others? Have we informed and engaged communities enough on CAV to make informed decisions? What is the right way to communicate and inform internal and external stakeholders about project innovation and development?

3. **Promote Public Health and Sustainability** - Protect active transportation to promote healthy communities, which are vital to a thriving Minnesota. Advance system stewardship and sustainability principles to remain resilient in an ever-changing climate. Advance technology and policy that minimize environment impacts. Maximize deployment of AVs as low-emission vehicles in the near term and zero- emission vehicles in the long term. Employ eco-driving strategies. Advance goals to reduce greenhouse gas emissions and develop sustainable funding that addresses the gas-tax funding gap and more resilient transportation system funding.
   - *Questions to ask:* Does it promote goals in MnDOT's Sustainability Report and the state's enterprise sustainability goals to reduce greenhouse gas emissions and energy consumption? Does it positively affect active transportation? Does it put impacts to people over impacts to vehicles?

4. **Prioritize Shared Mobility and Accessibility** Promote inclusive policies that meet the needs of all users. Understand that multi-modal mobility is crucial to an integrated transportation system. All transportation options must be accessible and affordable. Connect CAV technology with other modes, including freight, air, ports, rail, and others like aerial mobility. Develop intermodal interoperability to decrease congestion and maximize efficiency. Understand the

CAV Policy Guiding Principles, July 2021

DESIGN THINKING & HCD



MINNESOTA CAV CHALLENGE

HAVE AN IDEA? REQUEST A MEETING TO ADVANCE A COMMUNITY PARTNERSH IP

WTS
Advancing Women in Transportation
Minnesota Chapter

GEORGE CRONIN ★ awards for ★ Procurement Excellence ™

AMERICA'S transportation awards

DESTINATIONCAV
THE FUTURE OF MOBILITY IS IN MINNESOTA

POLARIS INDUSTRIES INC
wsb
AECOM
iteris
VISION SYSTEMS INTELLIGENCE
EY
TRAFFIC CONTROL CORPORATION
plus.ai
id8 INNOVATE DESIGN CREATE
HDR
creative enterprise zone
HNTB
applied INFORMATION
KRATOS DEFENSE & SECURITY SOLUTIONS
First Transit
here
Athey Creek CONSULTANTS
wsp
THE EHRLICHMAN GROUP
easy MILE
Center for Transportation Studies
ALLIANT
MobilityMania Accessibility for All
3M

10 3
VENDOR MEETINGS

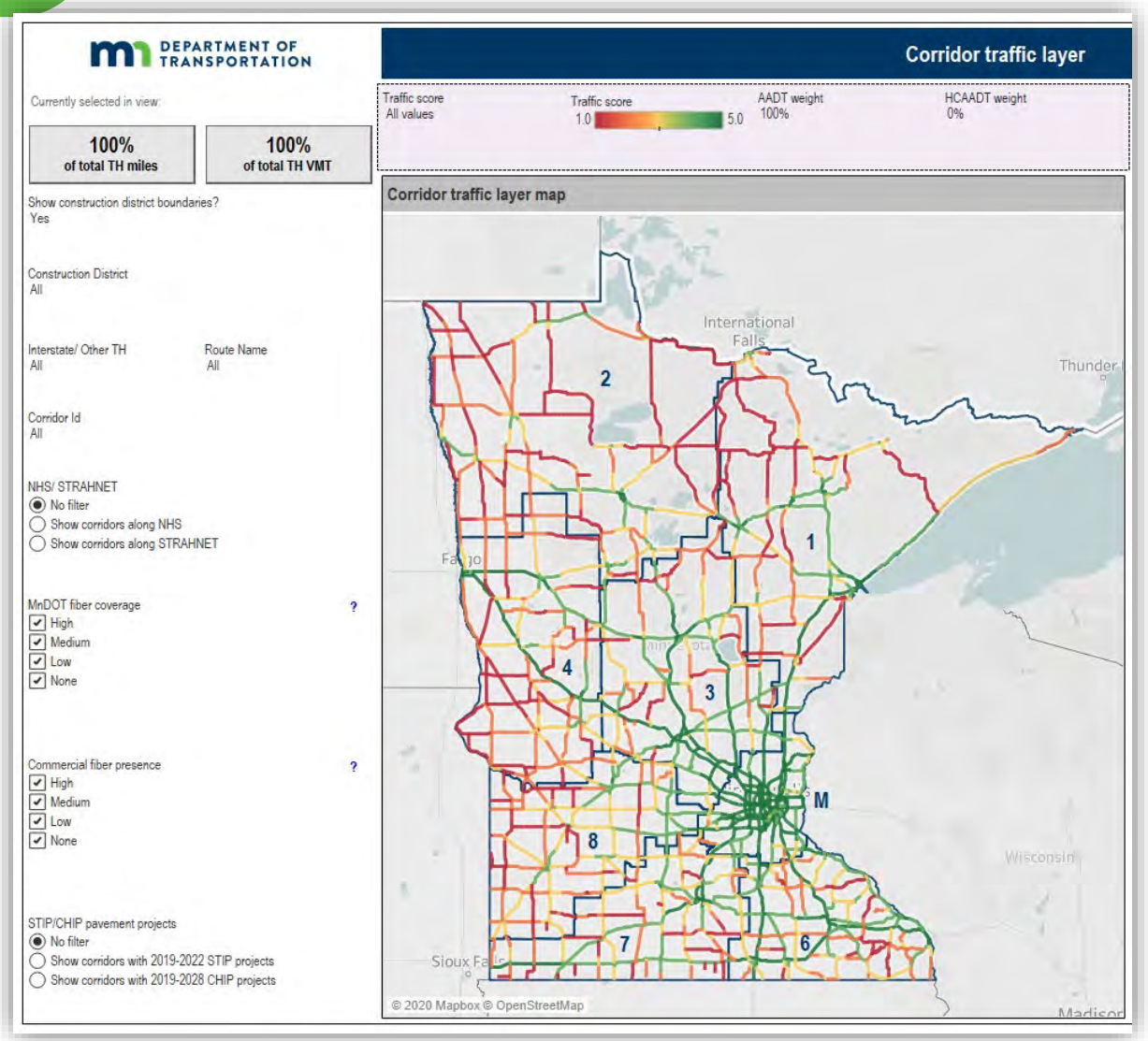
69
PROPOSALS SUBMITTED

16
AWARDED PROJECTS

DESTINATIONCAV

DEPARTMENT OF TRANSPORTATION

FIBER OPTIC STUDY & PARTNERSHIP



GIS overview of Minnesota traffic volumes

Traffic layer - Daily traffic volumes to prioritize investment where most traffic is

Opportunity layer – Connect state assets (cameras, buildings, signals, traffic data collectors) to prioritize corridors that connect cameras, sensors and buildings.

Commercial layer – Shows private sector plans to build to prioritize investment based on private interest.

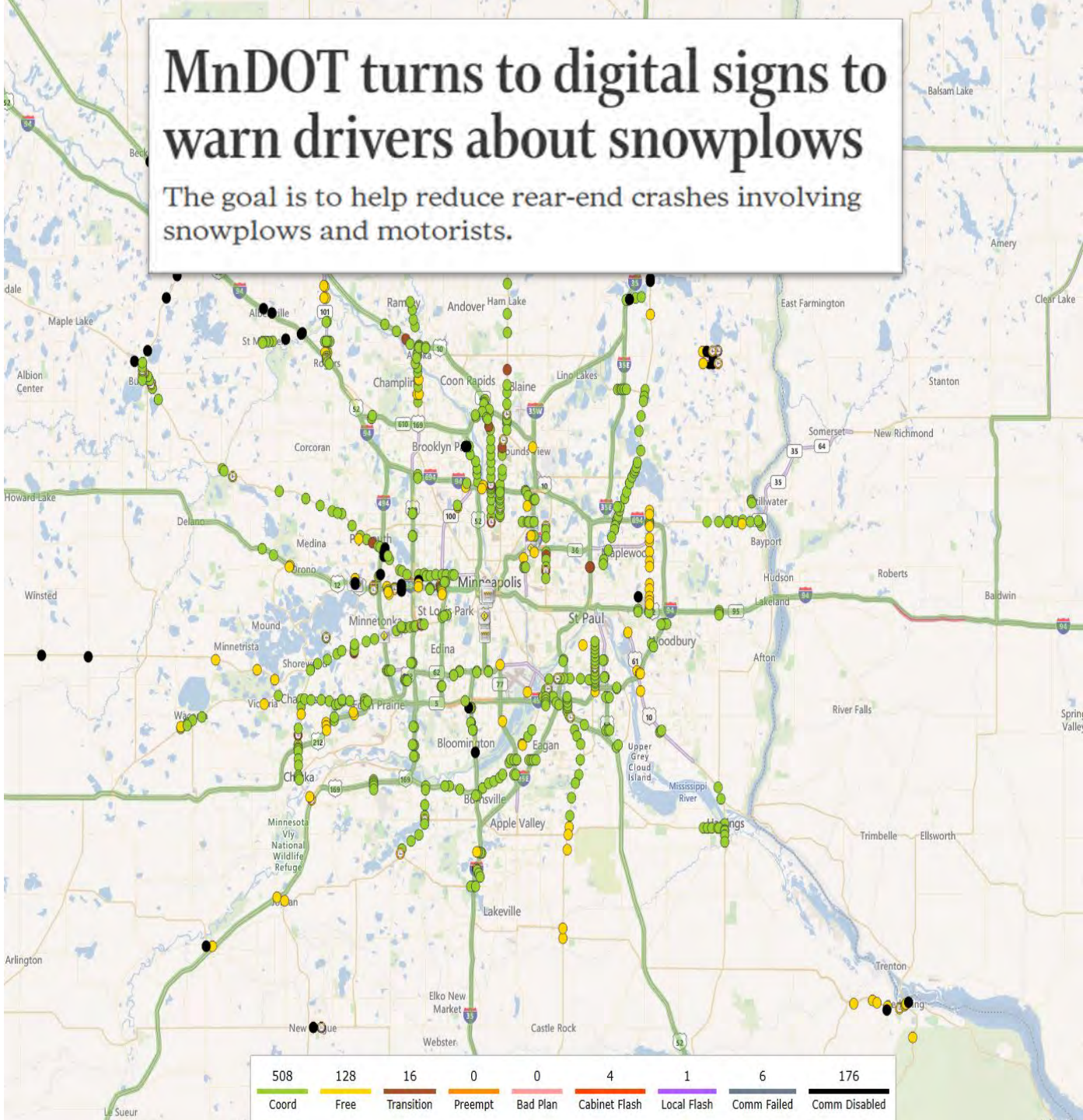
Combined – Shows all the layers to prioritize different corridors.

DESTINATION CAV

DEPARTMENT OF TRANSPORTATION

TRAVELER INFO

- Snowplows warning
- Signal priority
- Signal timing
- Pedestrian and cyclistdetection



DESTINATIONCAV

AUTONOMOUS MAINTENANCE

SELF-DRIVING TRUCKS WITH 'CRASH CUSHIONS' TO PROTECT WORKERS

DESTINATION CAV

DEPARTMENT OF TRANSPORTATION
DESTINATION CAV

MED CITY MOVER

- Two Level 4 automated shuttles
  - Onboard ambassador
  - Urban route
  - Open to the public
  - 12 months of operation
- Goals
  - Engage
  - Improve
  - Identify
  - Enhance

MED CITY MOVER

CAV DESTINATIONCAV

DEPARTMENT OF TRANSPORTATION

WHAT WE NEED

- Innovative Team
- Innovation Time
- Sharing of innovative ideas
- Human-centered design approach
- Flexible funding, procurement, and internal processes

WHAT WE'VE LEARNED

1. Take Risks
2. Collaborate
3. Prioritize

THANK YOU

MINNESOTA CONNECTED AND AUTOMATED VEHICLES PROGRAM

TARA OLDS
Executive Director
Connected and Automated Vehicles
tara.olds@state.mn.us

DESTINATIONCAV

DEPARTMENT OF TRANSPORTATION

APPENDIX P. MINNESOTA - INFORMING, IMPROVING AND INNOVATING TRANSPORTATION

DEPARTMENT OF TRANSPORTATION

Informing, Improving and Innovating Transportation

Research Strategic Plan (2017-2022)

Response to emerging transportation trends, opportunities & challenges.

Identifies strategic research priorities to guide our research investments & implementation decisions.

Serves as a framework for decision-makers, project managers & technical experts to identify critical needs, screen project ideas, & select high quality proposals.

Strategic Research Priorities

ADVANCING EQUITY

ASSET MANAGEMENT

CLIMATE CHANGE & ENVIRONMENT

INNOVATION & FUTURE NEEDS

SAFETY

We conduct need-inspired applied transportation research to maximize the health of people, the environment, and the economy.

Transportation Equity

To ensure equitable access to safe & efficient transportation systems.

Transportation Equity

Involving People With Visual Impairment in Facility Decision-Making

Emerging Focus Area

- COVID-19 impact on equitable contracting, public engagement, & transit use/perceptions
- Public engagement
- Workforce development
- Human-centered design

Transportation Equity

Emerging Focus Areas

- Equity impacts of emerging technologies (CAV, electric vehicles) and services (share mobility)
- Gender equity in accessibility & travel experiences
- Quantitative & qualitative equity analyses (accessibility, traffic emissions, & safety)

Transportation equity ensures the benefits and burdens of transportation spending, services, and systems are fair and just, which historically has not been the case. Transportation equity also requires sharing power in decision-making with people, especially Black, Indigenous, and People of Color. (MnDOT Draft Definition, 2021)

APPENDIX Q. MASSACHUSETTS - EQUITY AND RESEARCH

MnDOT Peer Exchange: Equity and Research

October 28, 2021

Lily Oliver, PhD ***Manager of Research***

Liz Williams, PhD ***Director of Data and Policy***

Massachusetts Department of Transportation, Office of Transportation Planning

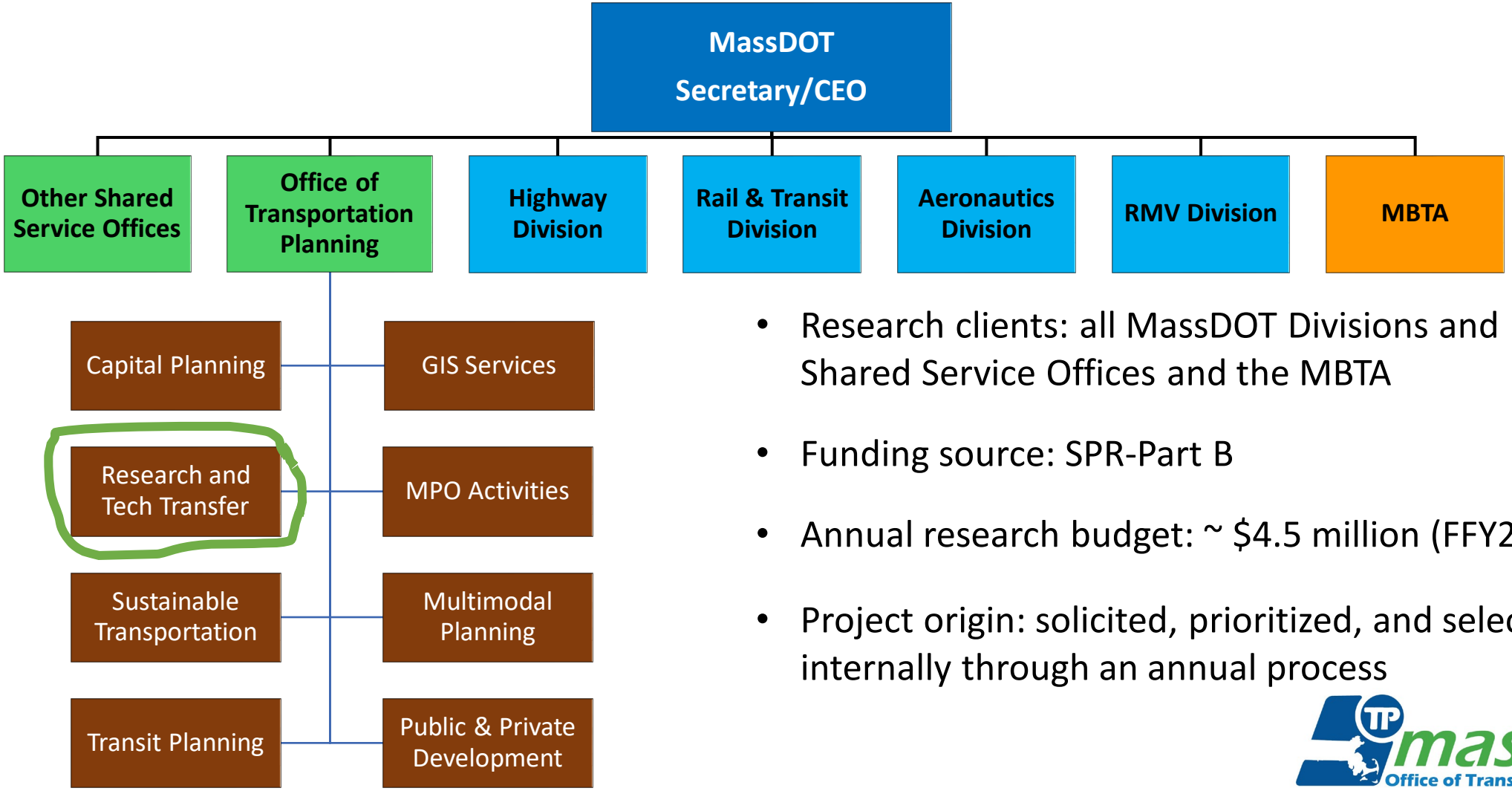
massDOT Office of Transportation Planning

Transportation Equity at MassDOT

- ‘Defining’ equity
- Approach
  a. Modal and corridor planning
  b. Access to destinations
  c. Qualitative data collection
  d. Research and peer exchange

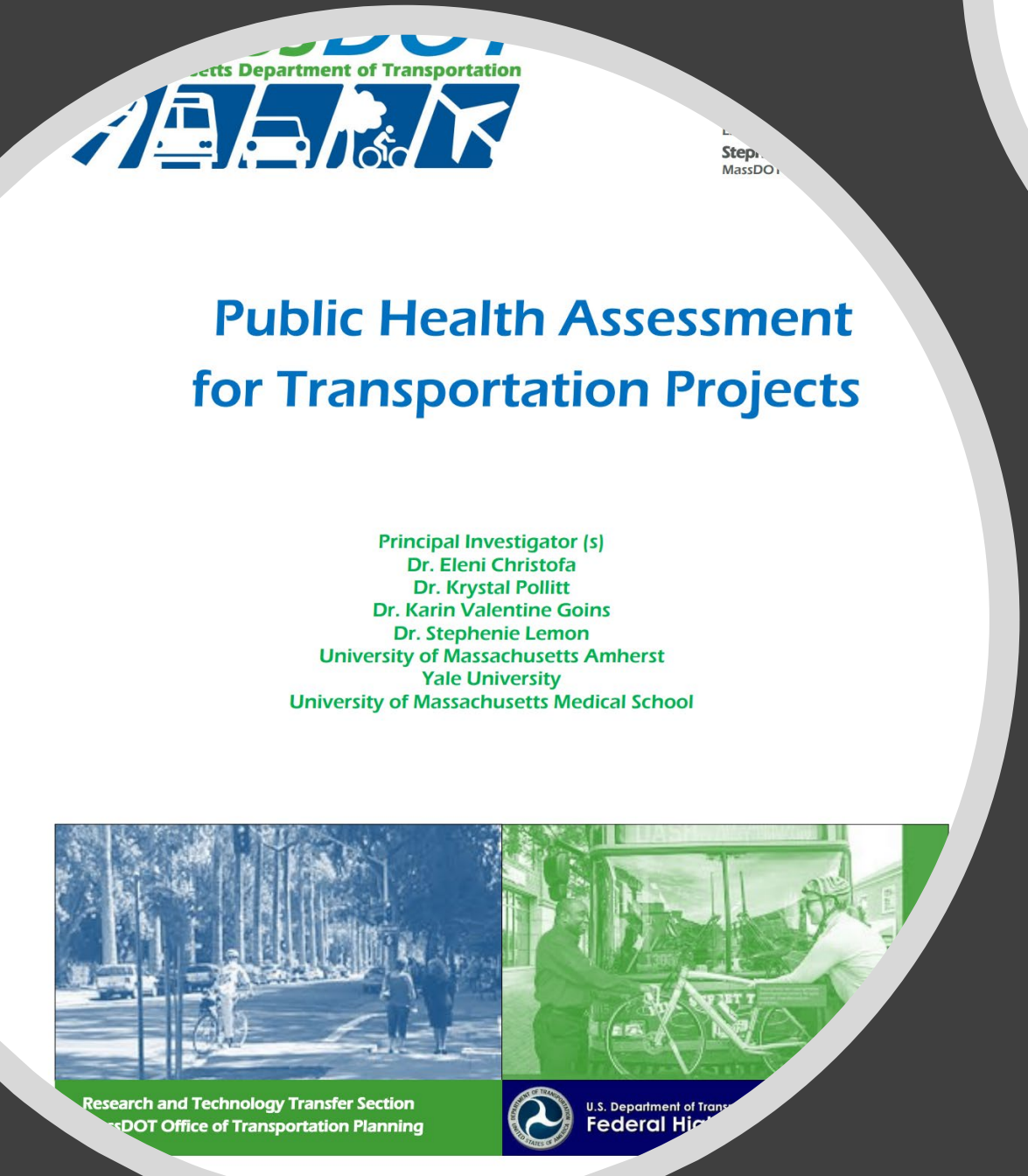
massDOT Office of Transportation Planning

MassDOT Research & Tech Transfer Section Overview



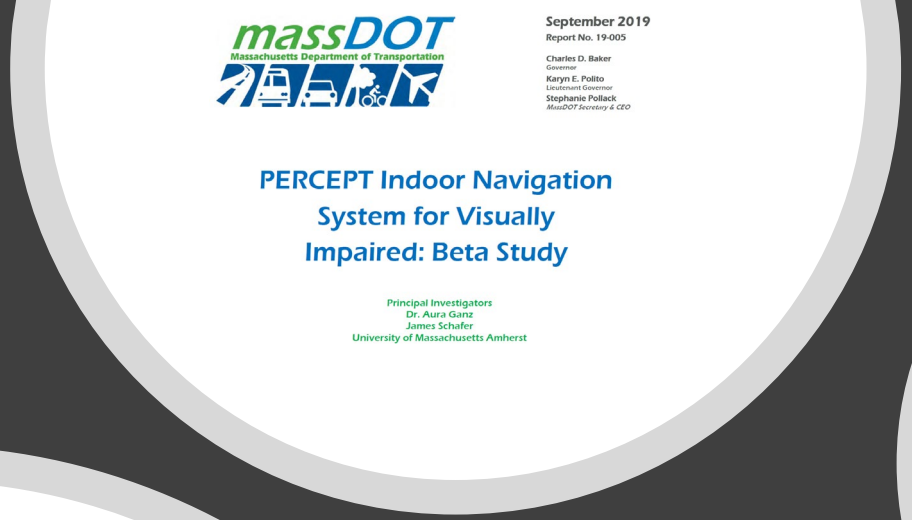
- Research clients: all MassDOT Divisions and Shared Service Offices and the MBTA
- Funding source: SPR-Part B
- Annual research budget: ~ $4.5 million (FFY22)
- Project origin: solicited, prioritized, and selected internally through an annual process

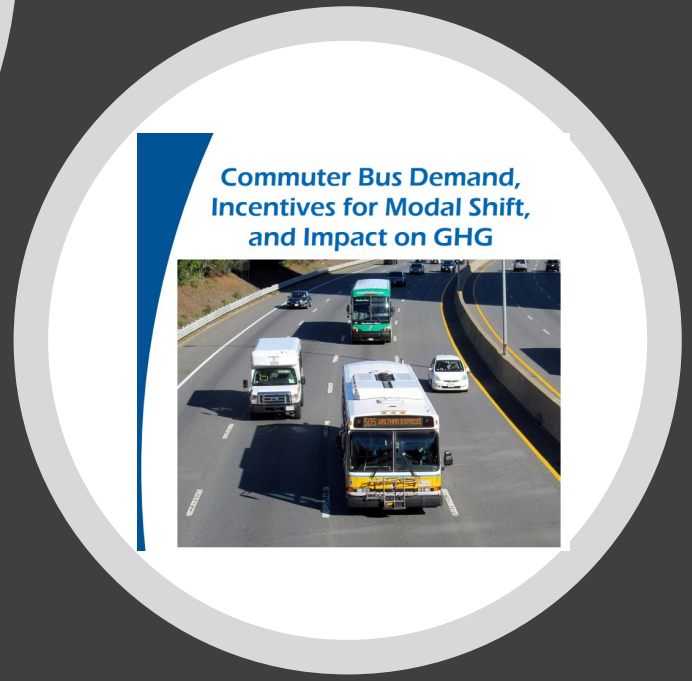
massDOT Office of Transportation Planning

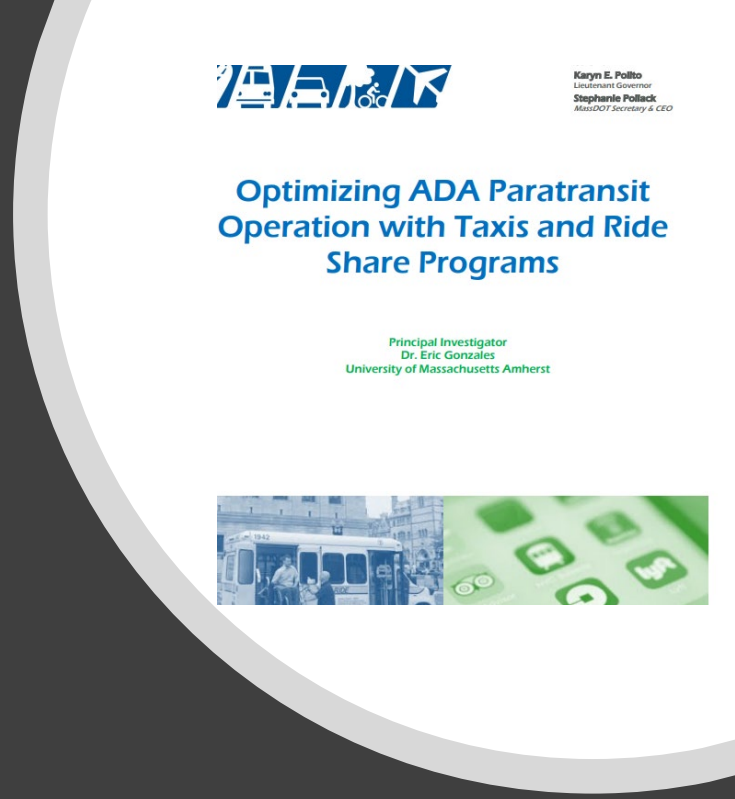


Research to Incorporate Equity & Public Health into Transportation Planning

massDOT
Office of Transportation Planning

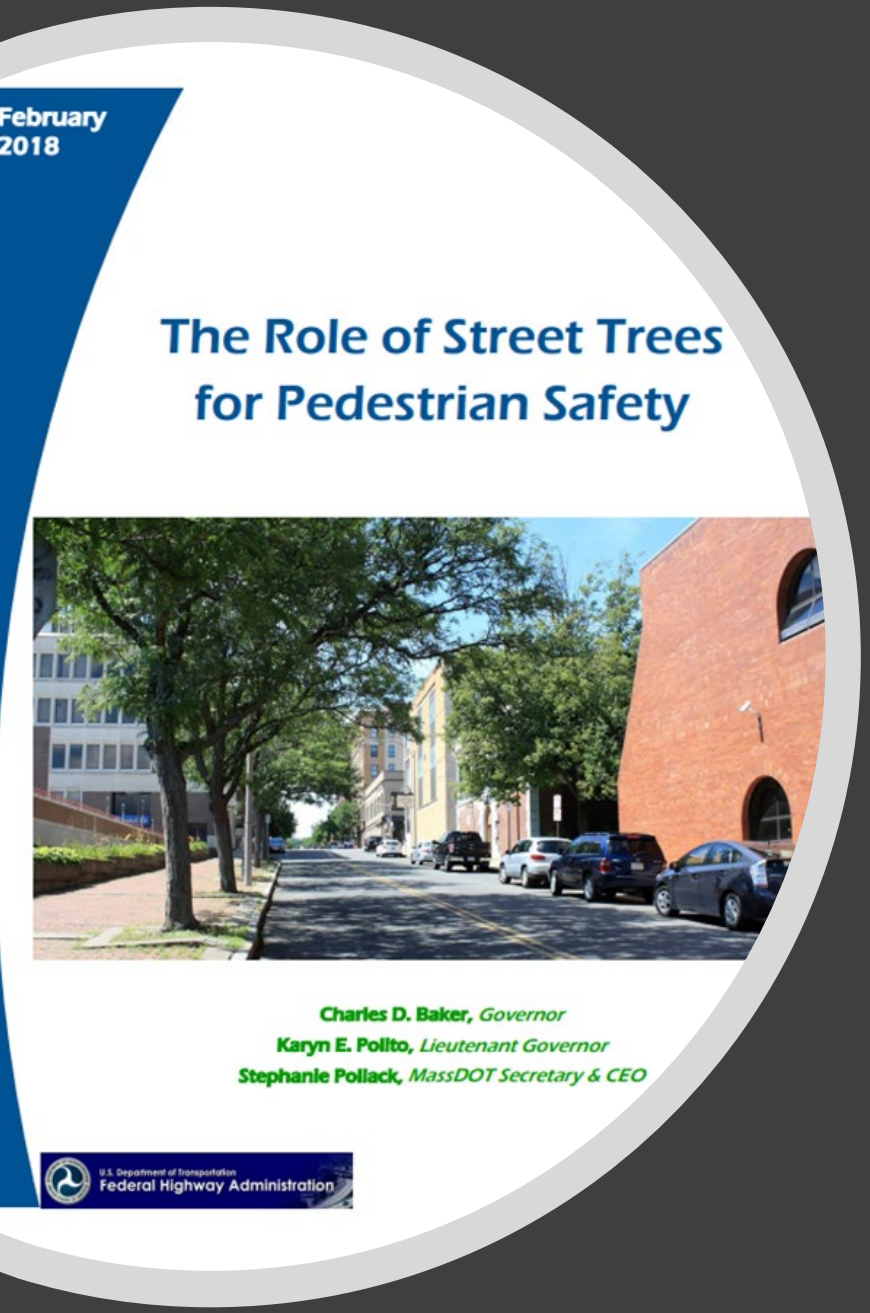


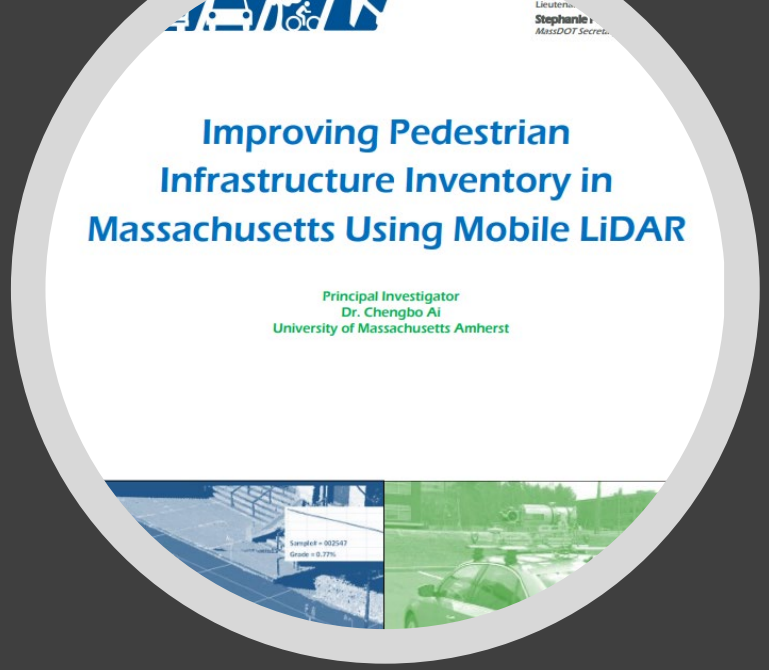


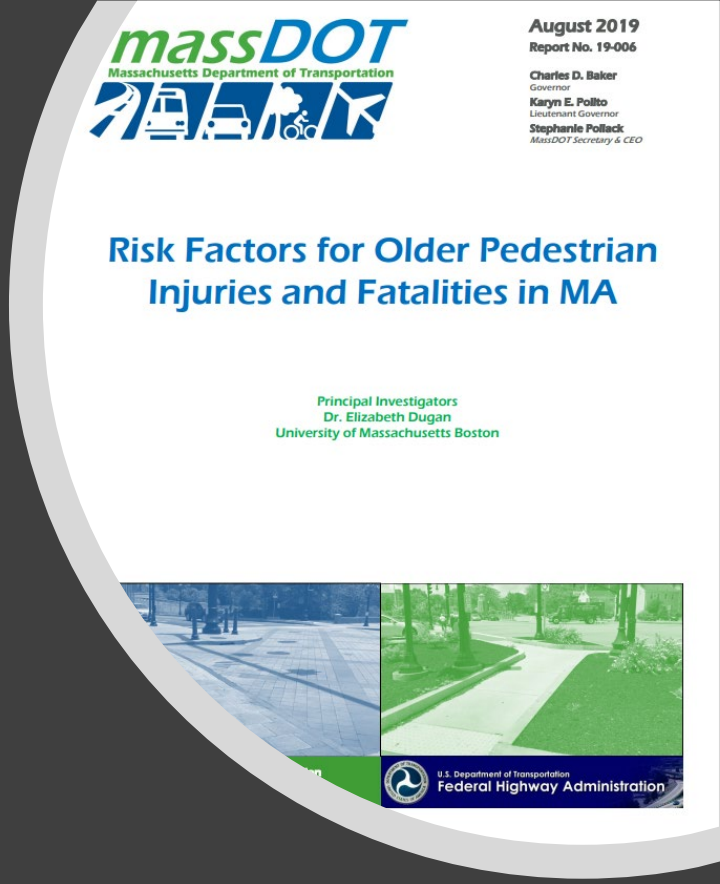


Research to Improve Transit Services for Underserved and Underrepresented Population

massDOT
Office of Transportation Planning

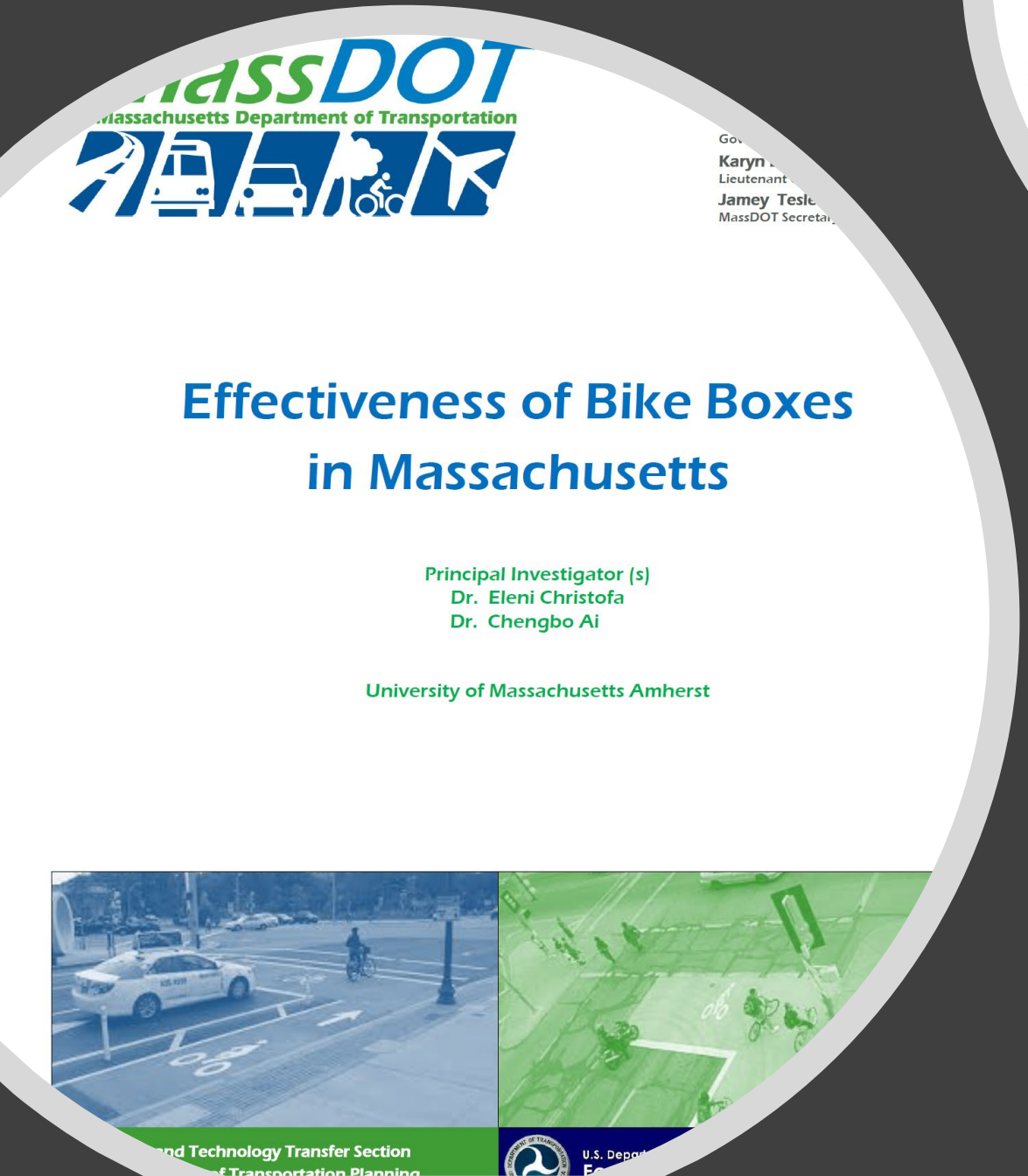


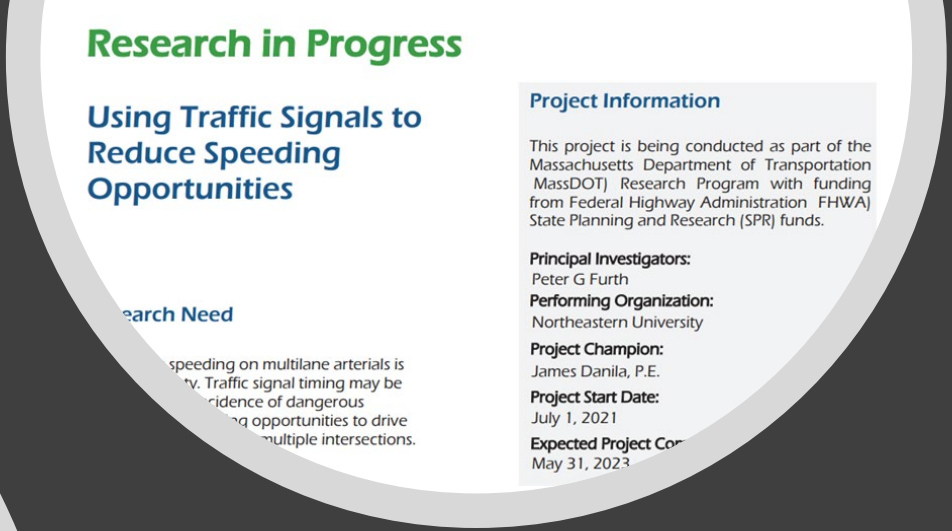




Research to Improve Safety of and Services to Pedestrians -- Infrastructure Design, Engineering and Maintenance

massDOT
Office of Transportation Planning





Research to Improve Safety of Disadvantaged Road Users -- Intersection Treatment and Signaling

massDOT Office of Transportation Planning

New Projects with an Equity Component in the Pipeline for FFY22

- Two-stage Bike Boxes
- Accessibility-focused Customer Technology User Study (MBTA)
- Data-driven Transit Capital Investment (RTA)

Please visit Research and Technology Transfer | Mass.gov for research summaries and final reports.

APPENDIX R. CALIFORNIA - EQUITY AND RESEARCH

Caltrans
CALIFORNIA DEPARTMENT OF TRANSPORTATION

DRISI
Caltrans Division of Research, Innovation and System Information

La Keda Huckabay, Chief Office of Planning, Policy and Program Development

Research and Equity

MnDOT Research Peer Exchange
October 27, 2021

“Research is messy because humans are. We must be open and vulnerable about this.”
Sonaksha

DRISI

Caltrans Office of Race and Equity (CORE)

Definitions

***Transportation Equity**: The fair distribution of transportation benefits and burdens, outcomes, modes, and resources for the entire population, regardless of race, ability age, gender, social standing, or any other factor.*

***Mobility Equity**: A transportation system that increases access to high quality options, reduces air pollution, and enhances economic, opportunity in low-income communities of color.*

Source: Caltrans Race and Equity Glossary of Terms

Steps Toward Achieving Equity

- Equity Statement
- Caltrans Strategic Plan – Equity Goal
- California Transportation Plan 2050 – Equity Goal
- Executive Conversations
- Race and Equity Action Plan
- Equity Tool Kit
- Equity Index
- Listening Sessions

Barriers to Achieving Equity

- Institutional
- Varying Perception
- Distrust
- Workforce Development
- Recruitment
- Lack of Data
- Lack of Resources

DRISI’s Role in Achieving Equity

- Knowledge and Innovation
- Secure Speakers
- Host Workshops
- Facilitate Research
- Research Roadmaps

Contact Information:
Lakeda.Huckabay@dot.ca.gov

“Ever onward to equity.”
Abhijit Naskar

Questions

APPENDIX S. CALTRANS TRANSPORTATION EQUITY IN RESEARCH - PROJECT LIST

Caltrans Transportation Equity in Research – October 2021

Research Tasks

3994 – Community Engagement Metric for Pilot Equity Index

The goal of this research is to have a durable, versatile equity indicator metric that will accurately measure the level of community engagement in a given geographic region and be inserted into a larger Pilot Equity Index, which will contain a number of other equity indicators as well.

3913 – Digital Mobility Assistant for Disabled Transit Users

The goal is to build a working prototype system that would help generate a travel plan for a disabled person using available mobility options that include transit and paratransit but is not limited to those. Our target community consists of the customers of Independent Living Resources of Solano and Contra Costa Counties. In addition to the prototype, we will produce a concept design for the product that will describe how travelers and mobility services are added to the system and a path to deployment.

3325 -- Improving our understanding of transport electrification benefits for disadvantage communities

The proposed research will improve long-term sustainability by identifying how and why (or why not) TE projects align with regional and local transportation goals. The research will result in a deep dive case study that can serve as a template for evaluating future TE expenditures with respect to identifying and quantifying disadvantaged community (DAC) benefits. The research will improve the implementation and evaluation of the Senate Bill 350 program as directed by the California Public Utilities Commission and intended by the California State Legislature. The specific interest is in ensuring that disadvantaged communities equitably benefit from the implementation of programs.

3429 -- How People Move: Analyzing the Travel of Vulnerable Populations in Los Angeles

This project will extend a rich body of scholarship on travel patterns and needs of vulnerable populations by using data from the 2017 National Household Travel Survey (NHTS) California add-on and the University of California, Berkeley Transportation Injury Mapping System (TIMS). The NHTS California add-on confidential dataset will provide a sample of 23,000 households across California. These data will be paired with the five most recent years of collision data available in non-provisional format from TIMS.

3418 -- Increasing Access, Mobility, and Shelter Opportunities for Disadvantaged Populations: Affordable Housing in Transit-Oriented Developments

The research design comprises multiple-case studies to investigate regulatory and non-regulatory barriers to housing in transit-oriented developments in low-income and disadvantaged communities with high transit dependency that still have not been able to leverage the transit infrastructure to pursue infill developments.

3421 -- Assessing the Impact of Equity Work in Active and Sustainable Transportation

This project proposes to assess the impact of equity, diversity, and inclusion efforts in active and sustainable transportation. Researchers will engage in a qualitative analysis of current and emerging equity work in sustainable and active transportation by using a combination of semi-structured interviews and ethnographic methods.

3431 -- Mobility, Accessibility and Disadvantaged Neighborhoods

To understand the nature, pattern, and magnitude of commonalities and differences among neighborhoods in mobility and access to opportunities, the project will construct and analyze tract-level and transportation-mode-specific accessibility indicators to employment, quality elementary schools, and primary health care.

Caltrans Transportation Equity in Research – October 2021

Research Tasks--Continued

3439 -- The Implications of Freeway Siting in California: An Equity, Geospatial, and Case Study Approach

This multidisciplinary project will examine four consequences of freeway construction on minority neighborhoods: 1) direct disruption, including disinvestment and loss of housing, local businesses, and local institutions, 2) increasing segregation, such as facilitating suburban white flight and hardening of racial boundaries, 3) diminished access to job or education opportunities because of spatial mismatch, and 4) health impacts because of increasing mobile sources of pollution.

3508 -- California Tribal Planning Needs Assessment

The goal of this project is to identify the competencies, networks, and resources present in the Study Group, and in doing so identify their planning capacity, document any gaps in knowledge, and provide recommendations for additional aid as relevant.

Preliminary Investigations

- PI-0290 - Exploring Transportation Related Equity Indicators and Decision-Making Tools to Improve Mobility and Transportation System Access for Disadvantaged Communities

  The goal of this project is to seek information about the practices that other state departments of transportation and California agencies have instituted and implemented (or plan to implement) to measure the proposed transportation policies, programs and projects, and ensure transportation equity for disadvantaged communities (including low-income communities, communities of color and tribal nations.

- PI-0301 – Best Practices of State DOTs that Document the Impacts of Freeway Siting on Communities of Color

  The goal of this research is to seek information about other state departments of transportation have inventoried freeways for the purpose of documenting the freeway's development and the resultant impact to communities who have been displaced, and potentially harmed.

Special Events

- NCST Policy Workshop on Equity, November 16, 2020
- NCST Policy Workshop on Equity in Adapting Transportation Infrastructure to Climate Change, November 2021

Presentations to Caltrans Executive Board

- Charles T. Brown, "Providing Safe and Healthy Transportation Options to Disadvantaged Communities" Senior Researcher and Adjust Professor at Voorhess Transportation Center, Rutgers University

- Dr. Eric Avila, "Disparate Impact on Communities of Color from Freeway Siting"
  Professor of Chicana/o Studies, History and Urban Planning, University of California, Los Angeles, Luskin School of Public Affairs, author of "Forklore of the Freeway, Race and Revolt in the Modernist City, 2014"

- Angie Schmitt, "Pedestrian Safety in Community of Color"
  Principal of 3MPH Planning and Consulting, Cleveland, Ohio, author of "Right of Way, Race, Class and the Silent Epidemic of Pedestrian Deaths in America, 2020"

APPENDIX T. WASHINGTON STATE - EQUITY AND RESEARCH

MnDOT Peer Exchange
WSDOT – Equity & Research

Anne Freeman
WSDOT Research & Library Services Program Administrator
October 28, 2021

Roger Millar, Secretary of Transportation

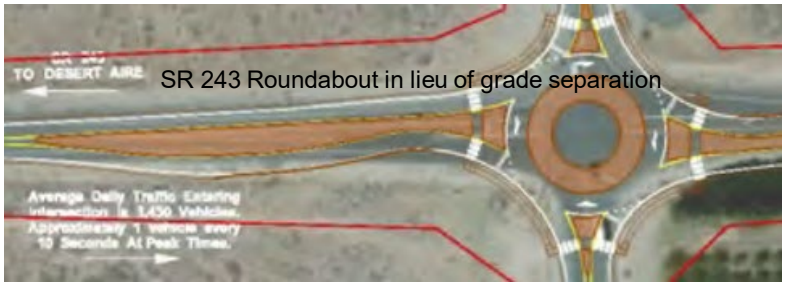
Amy Scarton, Deputy Secretary of Transportation

WSDOT Goals


Safety
Engagement
Sustainability
Leadership
Integrity
Innovation
INCLUSION
WORKFORCE DEVELOPMENT
PRACTICAL SOLUTIONS

WSDOT's Strategic Plan

I-5 Shoulder used as auxiliary lane



SR 243 Roundabout in lieu of grade separation

Strategic Goals

Inclusion

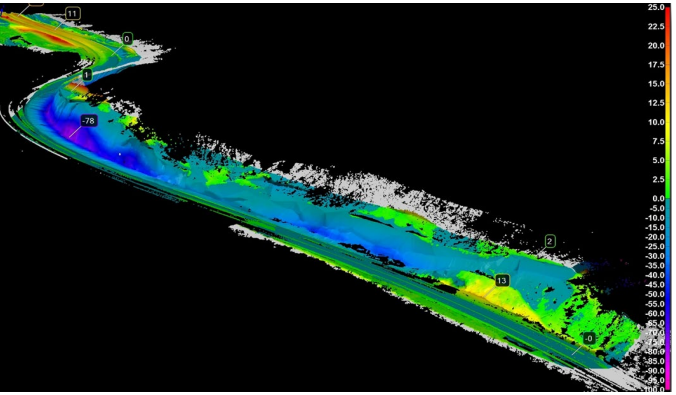
- Strengthening our commitment to diversity and engagement to ensure every voice is heard.

Practical Solutions

- Collaborate with our partners to make the right investments, in the right places, at the right time, using the right approach to achieve an integrated, sustainable transportation system and organization.

Workforce Development

- Find the best possible talent for the agency, while taking steps to retain our quality workforce



WSDOT Research Office

Research Program – average 150 active projects valued at over **$20m**.

New Research Topics: **Work Force Training, Equity in Tolling, EV Charging, Fish Passage, etc**.

Other Research Programs – STIC, EDC, AID, SHRP2, Transportation Pooled Fund Studies, and our UTC's (PacTrans and TriDurLE)

Technology transfer activities include Webinar Wednesdays series and **TRAC e-News (future work on Technology Readiness Level and Innovation Symposium**

WSDOT: Innovative Program 2021-2023

WSDOT SPR Research: Weighted Evaluation Metrics

Innovative Program 2021-2023

Protected Worksheet - do not enter data in shaded cells

Max allowable score: 5

Scores entered by: Division:

18 Total projects

BN 21/23 Funding for *Innovative* $ 600,000 Tot cost of props $ 1,647,261

Final Output

Enter score in unshaded cells below to the maximum value highlighted above

Item #	Proposed Project or Study (*Innovative* Category)	Continuing Project	Division	Division Priority	Office	SME	PI	Institution	RM	Cost	Rank	Total Score	Strategic						Valuable		Implementable	
													Workforce Development		Practical Solutions/		Inclusion/Equity		ROI/Risk Mitigation		Influence Change	
												100.0%	Score	20%	Score	20%	Score	20%	Score	25%	Score	15%
1	Fish Passage Step Pool	N	Development	5	Hydraulics	Heilman	TBD	TBD	JP	50,000	1											
2	Nanofiber Concrete Pavement	N	Construction	2	Pavement	Schofield	Nassiri	WSU	MM	100,000	1											
3	Digital Interactive Publications	N	TSSA	1	Performance Mgt	Irvin	Lasley	TTI	JP	60,000	1											
4	Greenhouse Gas Emmissions	N	Construction	1	Mats Lab	Loc	Simonen	UW	MM	100,000	1											
5	Methane Energy Generation at Rest areas	N	M&O	1	Capital Facilities	Rodgers	Duan	SMU	DB	97,290	1											
6	Origin & Destination Study	N	Ferries	1	Community Services & Planning	Cirkovich	TBD	TBD	JP	45,000	1											
7	Schedule Mgt in DB Projects	N	NWR	1	Construction	Kayanda	AbdelAziz	UW	MM	99,971	1											
8	Stormwater First Flush	N	Development	1	Hydraulics	Heilman	TBD	TBD	MM	95,000	1											
9	Closed Crossing Tactile Indicators (ADA)	N	Development	2	ASDE Zeller	Wells	Caspi	UW	JP	100,000	1											
10	Transit Oriented Development Screening Tool	N	Innovative Partnerships	1	Innovative Partnerships	Buckley	Shen	UW	DB	100,000	1											
11	Archiving, Analyzing, and Visualizing Open Transit Data Tool	N	Management of Mobility	1	Urban Mobility	Johnson	MacKenzie	UW	DB	100,000	1											
12	Fish Passages eDNA	N	Development	3	Hydraulics	Kanzler	Kelley	UW	JP	100,000	1											
13	Equity in Planning	N	Planning	1	PAC	Warner	Berney	UW	JP	100,000	1											
14	Active Transportation Research Enrichment & Exploration	N	Active Transportation	1	Active Transportation	Wood	TBD	PSU	JP	100,000	1											
15	Innovative Solution for Truck Parking Facility Monitoring, Availability Prediction, and Management Using Edge Computing and AI	Y	Traffic	1	Traffic	Neeley	Wang	UW	DB	100,000	1											
16	Computer Vision for Automated Traffic Sign Detection & Data Inventory	N	Traffic	2	Traffic	Mowlds	Wang	UW	DB	100,000	1											
17	Seismic Recentering Bridge System	N	Development	4	Bridge	Khaleghi	Stanton	UW	MM	100,000	1											
18	Electric Aviation Infrastructure	N	Aviation	4	Aviation	Hodgman	TBD	TBD	JP	100,000	1											

Equity Analysis of Tolling

- **Research Program** will provide the University of Washington $200,000 in transportation research funds in 2022 for this new project just selected for the 2021-23 Biennium.
- The research will first develop a formal process by which the equity of WSDOT's multi-faceted toll program can be evaluated and reported. The UW team expects that slightly different performance metrics will be needed for different WSDOT toll facilities because they use different approaches to tolling.
- The project will then develop a software process for routinely extracting transaction data from the toll division's financial system, statistically determine the socio-economic characteristics of toll paying customers, and compute those equity measures using those statistics.

WSDOT Equity Study

- Research Program provided $78,500 in the spring of 2021 to Office of Equal Opportunity for this study with Western Washington University that will concluded in August of 2021.
- The researchers will examine WSDOT's overall equitability of its projects using four evaluative lenses to look at recent Right of Way & Condemnation actions, WSDOT's Maintenance & Preservation Investments, WSDOT's Workforce, and Income Inequality.

Community Engagement Support for the Highway System Plan Update

- **Community Engagement Support for the Highway System Plan Update** is a $150,000 project that started the spring of 2021 and will finish in the fall. The University of Washington is using funding from the WSDOT Planning Office utilizing a Task Order via the RLS Office. The WSDOT Team consists of representatives from RLS and the Multimodal Planning and Data Division.
- The objective of this project is to develop easily deployed tools that allow WSDOT to increase its communication with external groups and individuals around the state on important transportation policy issues, despite the ongoing pandemic.
- The project will deliver a web-based tool that helps WSDOT both disseminate information about the Highway System Plan and gather community input regarding investment priorities.
- The resulting data will be analyzed and summarized to support decision making on the update to the Highway System Plan.
- The project will also develop strategies for improving engagement with individuals and groups that represent the needs and interests of disadvantaged and traditionally under-represented communities.

Thank you!

APPENDIX U. MINNESOTA - TRANSPORTATION EQUITY RESEARCH & PLANNING

Transportation Equity Research & Planning

Philip Schaffner (he/him)

Director of Statewide Planning

DEPARTMENT OF TRANSPORTATION

Minnesota’s multimodal transportation system maximizes the health of people, the environment and our economy

Also…

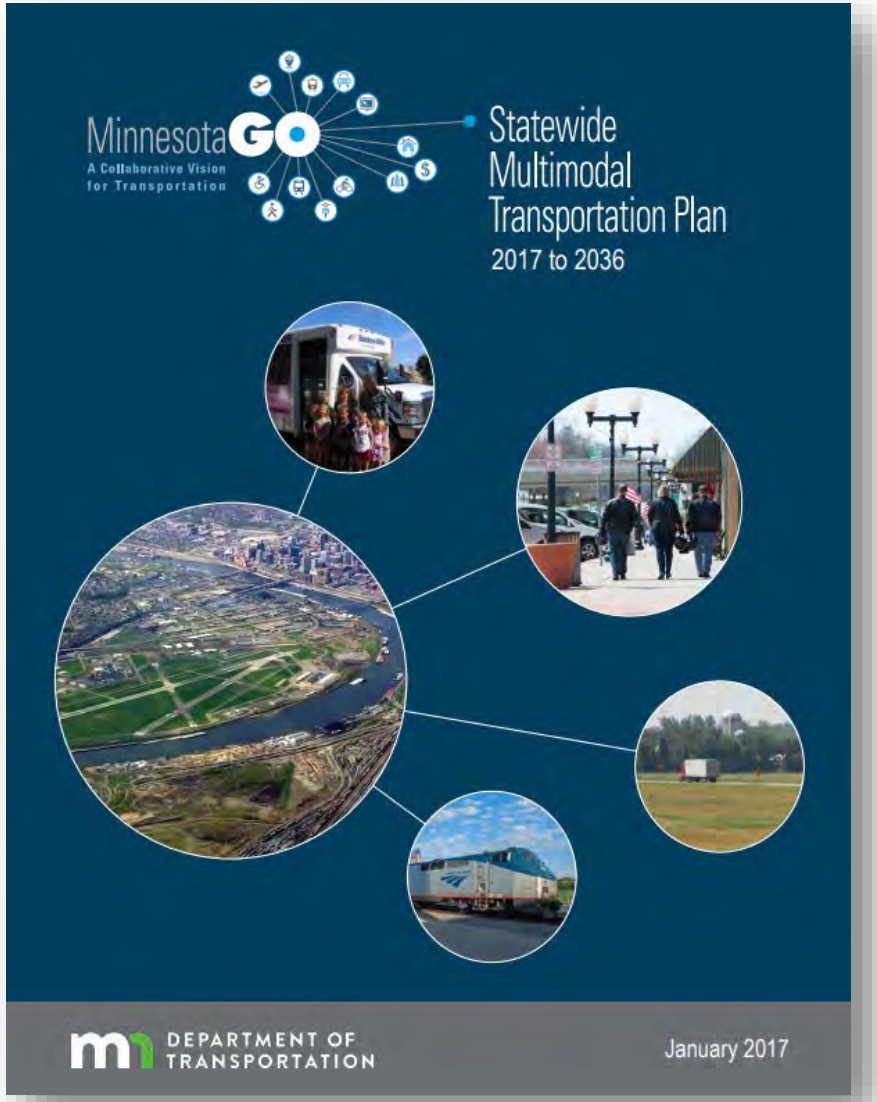
Transportation Asset Management Plan

Strategic Highway Safety Plan

ADA Transition Plan

CAV Strategic Plan, etc.

MnDOT's 2017 Commitment to Equity



Work plan item:

Study how transportation affects equity and identifying transportation strategies and approaches that will meaningfully reduce disparities

Advancing Transportation Equity Initiative

Research Projects

Community Conversations

Equitable contracting and engagement

Programs and Process Review

Performance Measures

Updated Plans

Research Roadmap

Research Roadmap (2019)

CENTER FOR TRANSPORTATION STUDIES
UNIVERSITY OF MINNESOTA

DEPARTMENT OF TRANSPORTATION

Advancing Transportation Equity

Strategies for reducing transportation disparities

Project Highlights

- Efforts to advance transportation equity need to focus on both the structural inequities built into society–such as racial segregation and auto dependency–and the transportation barriers that affect specific communities and population groups.
- Equity initiatives are likely to require actions beyond a transportation agency's traditional responsibilities.
- Top opportunities for advancing transportation equity include inclusive public engagement and interagency collaboration across all levels and sectors.
- Detailed recommendations targeting specific populations and focusing on multimodal solutions offer promise for improving transportation equity in Minnesota.

Project Background

Transportation contributes to many broad societal outcomes, such as employment, wealth, and health. However, there are disparities and inequities in Minnesotans' ability to reach destinations. Underserved and underrepresented communities in Minnesota include low-income communities, communities of color, indigenous communities, older adults, people with disabilities, women and youth, rural residents, and people with limited car access.

The Minnesota Department of Transportation (MnDOT) launched its Advancing Transportation Equity initiative in 2017 to better understand how transportation systems, services, and decision-making processes help or hinder the lives of underserved and underrepresented communities in Minnesota. As part of this effort, MnDOT enlisted the help of University of Minnesota transportation researchers to examine current research and practice in the field, recommend action steps for MnDOT and its partners to consider in advancing transportation equity, and identify directions for future research and practice that can advance transportation equity in Minnesota.

Current Research and Practice

Researchers began by examining current research in the field of transportation equity. A review of the literature found that transportation equity has been defined in a variety of ways. Based on the community input received during this study, the team created a working definition of equitable transportation (see sidebar).

Redefining Transportation Equity

After gathering community input from a diverse group of transportation users and stakeholders, researchers developed a working definition of equitable transportation:

- *Transportation systems* that support multimodal options that are affordable, sustainable, reliable, efficient, safe, and easy to use;
- *Quality transportation services* that are accessible to all populations for reaching destinations independently if needed; and
- *Transportation decision-making processes* that incorporate inclusive public engagement to reduce the long-standing socioeconomic disparities experienced by underserved and underrepresented communities.

- Outcome Evaluation Metrics Related to Equity that Include both Quantitative and Qualitative Measures
- Advancing Equity in Accessibility and Travel Experiences: The Role of Gender and Identity
- Improving Transportation Equity for all by Centering the Needs of Marginalized and Underserved Communities
- Enhancing Managed Lane Equity Analysis

DEPARTMENT OF TRANSPORTATION

Community Conversations

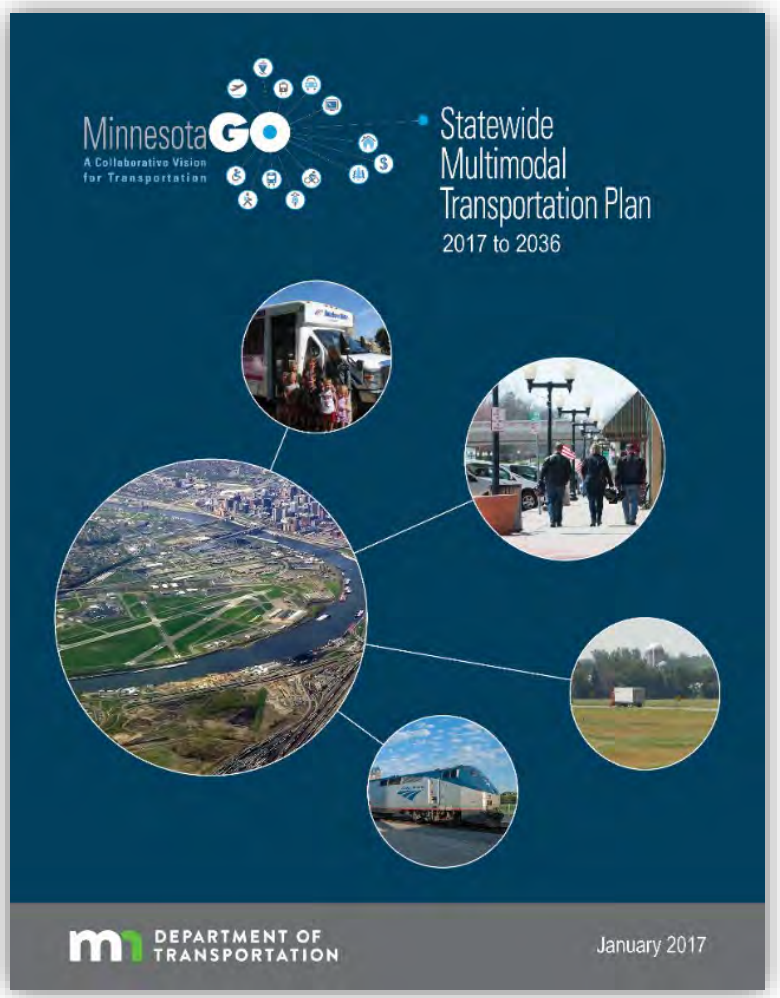
Why Conversations?

- **Collect a wide variety** of feedback
- **Ask follow-up questions** to better understand the feedback
  - What, Where, When, Why?
  - Why is that important?
  - Can you tell me more about that?
  - What impact does that have?
- **Listen to and document stories** that illustrate the importance of transportation to specific communities
- Face-to-face conversations help **build relationships** for future two-way interactions between MnDOT and communities

Transportation as Opportunity

“If someone has transportation, you can get away from an abusive spouse, get a job, life gets simpler, it’s critical to changing someone’s life. Think of the stress it relieves to drop kids off at daycare and go to work without worrying about how you’re going to get there.” – Southwest MN

Statewide Multimodal Transportation Plan (SMTP)



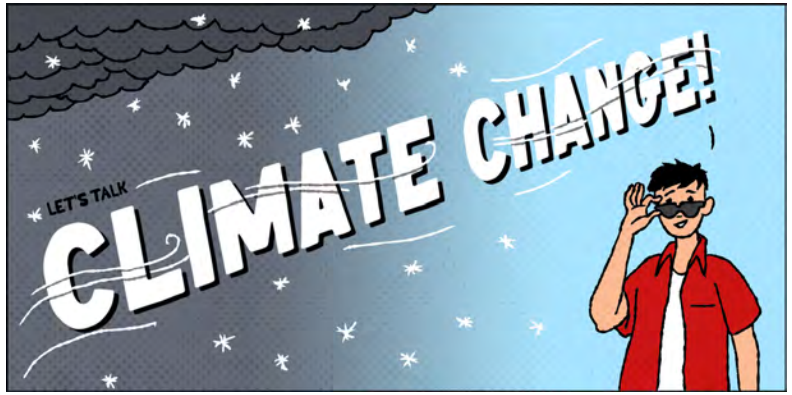
- Developed by MnDOT, but covers all transportation
- Overarching objectives, strategies and performance measures for <u>all modes</u>
- Next update due early 2022

Statewide Plan Process Elements

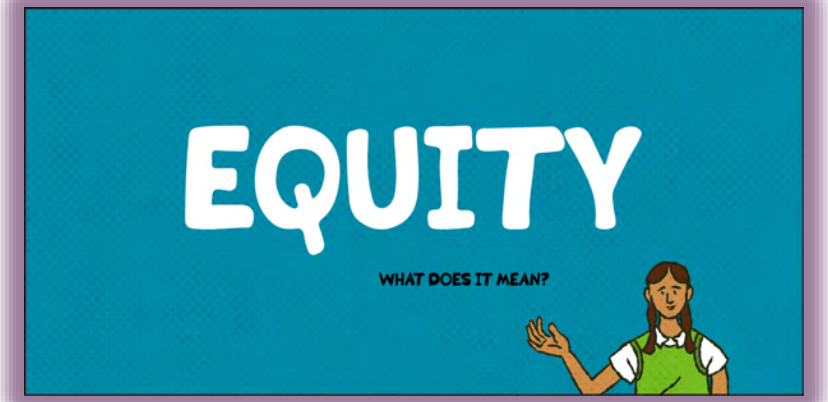
- Equity work group (mixed MnDOT staff, transportation partners and community based groups) – also supports state highway investment plan
- Equity focus area – specific engagement
- Partnership with CBOs for engagement
- Defining Transportation Equity
- Equity review for all work groups + combined work group equity workshop
- Equity integrated into all objectives

Focus Areas

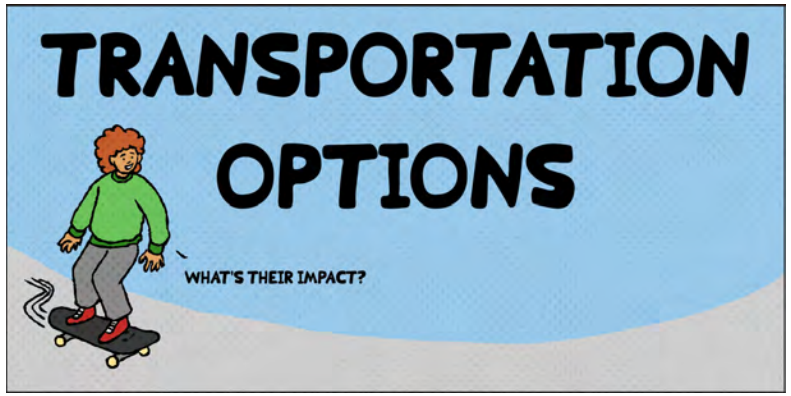

AGING
INFRASTRUCTURE
LET'S HASH IT OUT!


LET'S TALK
CLIMATE CHANGE!


ECONOMY AND
EMPLOYMENT
WHAT'S IT ALL ABOUT?


EQUITY
WHAT DOES IT MEAN?


LET'S TALK
SAFETY


TRANSPORTATION
OPTIONS
WHAT'S THEIR IMPACT?

EQUITY

WHAT DOES IT MEAN?

LANGUAGE BARRIERS, LACK OF INFO AND LIMITED OPPORTUNITIES MAKE IT DIFFICULT FOR EVERYONE TO PARTICIPATE, OR TO UNDERSTAND ITS IMPACTS.

MEANING THERE IS LITTLE REPRESENTATION IN PLANNING AND DECISION MAKING.

NOT TO MENTIONTHE SEVERE HEALTH RISKS OF LIVING NEAR BUSY ROADS, BUS TERMINALS AND NOISY AIRPORTS.

91% OF COMMUNITIES OF COLOR AND INDIGENOUS COMMUNITIES SUFFER FROM AIR POLLUTION ABOVE RISK GUIDELINES.

POLICY, DESIGN AND OPERATIONS IN THINGS LIKE HOUSING AND TRANSPORTATION HAVE LED TO INEQUITIES FOR INDIGENOUS PEOPLE AND PEOPLE OF COLOR

FOR EXAMPLE, CONSTRUCTION OF INTERSTATES IN THE 1950'S DISPLACED HOMES, BUSINESSES AND CHURCHES

AND REDUCED HOUSING IN THESE AREAS.

AND TRANSPORTATION CAN ALSO SUPPORT THE HEALTH OF PEOPLE, THE ENVIRONMENT, AND THE ECONOMY.

TRANSPORTATION EQUITY ENSURES THE BENEFITS AND BURDENS OF TRANSPORTATION SPENDING, SERVICES, AND SYSTEMS ARE FAIR, WHICH HISTORICALLY HAVE NOT BEEN FAIR, AND PEOPLE—ESPECIALLY BLACK, INDIGENOUS AND PEOPLE OF COLOR—ARE EMPOWERED IN TRANSPORTATION DECISION MAKING.

THIS MOSTLY TOOK PLACE IN COMMUNITIES WHERE LOANS WERE DENIED OR HOUSING WAS RESTRICTED BY DEED, LEADING TO MUCH LOWER PROPERTY VALUES.

THIS DISPROPORTIONATELY EFFECTED POC.

FAVORING HIGHWAY DEVELOPMENT OVER PUBLIC TRANSPORT LASTED FOR YEARS.

THIS ENCOURAGED HOUSING DEVELOPMENT FURTHER FROM KEY DESTINATIONS, FOSTERING SEGREGATION AND INCOME INEQUALITY.

HOW DO YOU ENVISION A MORE EQUITABLE FUTURE?

EQUITY

WHAT DOES IT MEAN?

Shared Definition of Transportation Equity

Feedback from over 1,000 people

- Community based organizations
- Metropolitan planning organizations
- Local and federal transportation agencies
- MnDOT employee resource groups, diversity & inclusion committees
- Disadvantage Business Enterprise & Workforce Collaborative

Draft Revised Definition (Fall 2021)

Transportation equity ensures the benefits and burdens of transportation spending, services, and systems are fair and just, which historically has not been the case. Transportation equity also requires sharing power in decision-making with people, especially Black, Indigenous, and People of Color.

Key Terms to be Defined

- Transportation benefits and burdens
- Fairness in transportation
- Justice in transportation
- Black, Indigenous and People of Color (BIPOC)
- Power in transportation decision-making
- Transportation spending

Next Steps

- MnDOT leadership review and approval (Nov – Dec)
- Include definition in the 2022 publication of Statewide Multimodal Transportation Plan
- Continue conversations about how the definition should inform funding and decision-making
- Develop transportation equity training project for MnDOT staff
- Develop transportation equity metrics to measure progress

DEPARTMENT OF TRANSPORTATION

Additional Contacts

Abdullahi Abdulle (he/him) | Equity Planning Coordinator | Abdullahi.Abdulle@state.mn.us

Hally Turner (she/her) | Policy Planning Director | hally.turner@state.mn.us

DEPARTMENT OF TRANSPORTATION

Thank you!

https://www.dot.state.mn.us/planning/program/advancing-transportation-equity/

www.minnesotago.org

APPENDIX V. RESEARCH AND INNOVATION OFFICE - MNDOT STRENGTHS AND CHALLENGES, OPPORTUNITIES FOR MNDOT, AND KEY TAKEAWAYS

DEPARTMENT OF TRANSPORTATION

Minnesota DOT Virtual Research Peer Exchange

October 2021

Messaging the Value of Research

MnDOT Strengths and Challenges

- Periodic implementation surveys
- Benefits methodology as foundation
- Project communication planning that targets multiple audiences
- IdeaScale/local agency meetings for research ideas
- Invite participation on TAPs
- Announce projects/share results via multiple platforms: targeted email, social media, blog, newsletters, project alerts, media stories.

Opportunities for MnDOT

- Improve benefits monitoring process
- Transparent idea tracking/reporting
- Enhance current communication efforts:
  - End-of-project presentations/webinars
  - More short videos
  - Topic or category-based newsletters
  - Website: Wikipedia-like topic pages.
- Improve research and innovation liaison/ambassador network, especially in the greater Minnesota districts.

Messaging the Value of Research

Key Takeaways

Iowa	Messaging the value of activities (tooting horn) versus messaging value of research
	Ideas website as a model for more transparent idea tracking
	Research symposium with other states; chance for interface
	Recognition of opportunities for ROI on some projects; soft projects often impossible to calculate ROI
Kansas	30-minute meetings with champions to focus on benefits reporting
	Implementing the thesis vs implementing the results
Arizona	Periodic study of implementation (every 5 years)
	Shorter, simpler, cleaner publications
Utah	ROI study every 5 years
	Dashboard development
	Video
	Final presentations recorded

Innovation

MnDOT Strengths and Challenges

- Being intentional & linking strategy to mission & goals
- Leadership support & dedicated resources
- CAV-X, MnROAD, maintenance worker innovation program
- Launch of agency-wide innovation program w/ webinars, innovation highlights, employee recognition
- Willingness to experiment - open research/idea solicitations, like CAV-X Challenge and COVID-19 solicitation
- Message that all staff are innovators – 4 levels of innovators is a sound message

Opportunities for MnDOT

- Continued implementation of MnDOT vision, mission, goals, and research strategic priorities in funding and decision-making.
- Innovation beyond products to processes and services – i.e., Innovate within our structured research cycle. More efficient and easily understood processes.
- Creating a culture of innovation within the agency. Providing an innovation space.
- Broader participation at national level to be a leader in innovation & a unique approach.

Innovation

Washington	Three-pronged funding: traditional research, innovation-focused projects, and rapid response (4-6 week rollout). Project selection criteria; rating for how proposal meets each of organization's major goals/priorities (this also improved engagement of governance board). Proposals previously narrowed down to 1 per office/district per 1 funding category.
North Dakota	TRIP invitation for innovation idea (twice-year, can be submitted by anyone). All innovation is a form of research, but not all research is innovation. Research = new knowledge, innovation = better business practices as an application of new knowledge. "Do more with less effort; not do more with less," ask "What can we stop doing?" "Don't reinvent the wheel, make it more efficient." "NCHRP 885: Guide to Creating and Sustainable Culture of Innovation" (bottom-up innovation, incremental vs. break-through; tolerate failure); NDDOT employment engagement survey vs. satisfaction survey. Engagement measures "psychological" connection to work. Goal is to create ownership; Middle management tends to be biggest roadblock to innovation; Form peer networks so not blinded by your own processes

Innovation

California	Innovation idea call now subject-based, versus universal; Innovation Expo; InnovationHub website; Innovation Resource Center at CSU; Innovation liaisons; innovation repository; Innovation report; collaboration with all partners (LTAP, STIC, EDA); leadership structure (council-top leader, plus TAC-mid-level, district/specialty leadership;
Utah	Idea portal, dashboard that allows feedback/comments; annual innovation/efficiencies report; videos; avoid email substitution strategy; what can you stop doing- annual Google spring cleaning idea; staff awards (rewards?) for implementation; leverage STIC $; now considering outside ideas. Innovation levels from local (office) to global.
Wisconsin	Establish clear business drivers/ “buoys” to aim for; weigh ideas against user value vs. effort chart; treat all ideas with respect (example larger computer screen); WISDOT Value Capture; is innovation a topic on your agenda. Research and Innovation programs separate, but work together.

Equity

MnDOT Strengths and Challenges

- We have a well-rounded plan for transportation equity research
- Our transportation equity research plan is the result of a robust practitioner and community engagement effort and partnerships
- We are looking at gender-based travel patterns/needs.
- Our DOT is committed to incorporating equity into statewide transportation plans.

Opportunities for MnDOT

- Continue funding, engagement, and partnerships.
- Occasionally refresh/revisit equity research roadmap for new emerging needs or topics that no longer need research.
- Monitor and share work going in other states, countries.
- Share findings Minnesota's equity research work with transportation policy-makers and practitioners for further discussion and develop buy-in/awareness. Report back to senior leadership for any necessary policy changes or implementation.

Equity

California	Work with tribal governments to identify needs
California, Washington, Mass.	Many, many project examples to share with Minnesota practitioners.
Mass.	Equity incorporated into project design and selection
Washington	Inspired by recent discussions and focus on equity at national level (TRB/ASHTO)

Key Reflections

Executive support is critical to success

All research is innovation, but not all innovation is research

Think about what you can stop doing – don’t just add to the plate

Focus on early adopters & how that has changed with COVID

Link activities back to agency mission, vision and goals – why are we doing this?

It is about testing a thesis and sometimes the answer is to NOT proceed & that is OK