



What is TPEC?

→Transportation Policy and Economic Competitiveness Program (TPEC) is a research program within...

- The Humphrey School of Public Affairs
- The State and Local Policy Program
- The Center for Transportation Studies

→TPEC Research focuses on...

- ◆ Finance
- ◆ Industry Clusters and Freight
- ◆ Technology



TPEC: What Does Our Work Look Like?

- TPEC aims to conduct research, create tools for policymakers, and engage in outreach to increase understanding of the relationships between transportation and economic development.

- Resources for policy makers include:

- Minnesota Transportation Finance database

- National Freight Economy Atlas

- SDV Task Force & Usability Matrix



Why Automated Vehicles?

SAFETY

United States

40,100 in USA in 2016

Worldwide

1.25 Million Deaths in 2013

50+ million Injuries

65+ Million Deaths in 20th Century

Approximately WW II casualties

Economic Cost > \$500 Billion/year

90% percent of accidents caused by driver's error



The SDV Task Force & The Usability Matrix

- Convened to examine potential impacts of SDV technology on “transportation disadvantaged” populations in MN
 - Strategic group of elected officials, policy experts, social advocates, MnDOT and more
 - Identified disparities in SDV technology and helped facilitate outreach in Greater Minnesota
- A tool developed by the SDV Task Force
 - A table to analyze current and needed SDV deployment models
 - SDV Task Force identified
 - A need for outreach with Greater Minnesota
 - What SDV models can serve rural and suburban transit needs?

The screenshot shows the website for the Transportation Policy and Economic Competitiveness (TPEC) center at the University of Minnesota. The browser address bar shows the URL <http://tpec.umn.edu/research/technology/>. The website header includes the University of Minnesota logo and the slogan "Driven to Discover". Below the header is a navigation menu with links for Home, Research, Researchers, Publications, Events, and About. The main content area features a paragraph about the task force's mission to identify strategies for transportation disadvantaged populations. Below this is a section titled "Completed research" with a list of reports and studies. Two blue arrows with yellow outlines point to the "Research" menu item and the "Completed research" section.

UNIVERSITY OF MINNESOTA
Driven to Discover

HUMPHREY SCHOOL OF PUBLIC AFFAIRS | CENTER FOR TRANSPORTATION STUDIES

TPEC TRANSPORTATION POLICY AND ECONOMIC COMPETITIVENESS

Home Research Researchers Publications Events About

TPEC researchers have convened a task force to examine the potential impacts of self-driving vehicles on a wide variety of people who are “transportation disadvantaged.” The task force will seek to identify strategies that ensure seniors, the disabled, and other disadvantaged communities fully enjoy the mobility offered by SDVs. It is made up of representatives from the Minnesota Department of Transportation, Metro Mobility, metro-area counties, non-profits, and organizations from Greater Minnesota.

Completed research

- Self-Driving Vehicles Task Force Report and Matrix of Users (PDF), 2017
- Self-Driving Vehicles: Current Status of Autonomous Vehicle Development and Minnesota Policy Implications, Minnesota Journal of Law, Science & Technology, 2015
- Self-driving cars: As revolutionary in the 21st century for public health as vaccines were in the 20th, University of Minnesota School of Public Health Ignite Symposium video, Feb. 2016
- Options for Automated Speed Enforcement Pilot Projects in Minnesota Work and School Zones, May 2014, Report no. CT13-14-06
- Understanding the Economic Effects of Flexibility Through Three Employer Case Studies, February 2013, Report no. MNDOT 2013-07
- Investigating Deployment Potential for Automated Speed Enforcement in Minnesota (2012)
- Minnesota Field Test of Coasting (2012)
- Identifying Issues Related to Deployment of Automated Speed Enforcement - FY12 TechPlan (2011)
- ITS Data Needs: How Much Do We Really Need to Know? - FY11 TechPlan (2011)
- ITS and Location Privacy: Suggestions for Peaceful Coexistence - FY10 TechPlan (2009)

User Groups	Geography							
	Central City		Suburban (No Centralized Core)		Isolated Small City (One/Two streets)		Rural (Scattered)	
	Application	Who Organizes?	Application	Who Organizes?	Application	Who Organizes?	Application	Who Organizes?
Physical Barriers (C) - Affordability of transportation	High/Low speed transit, mixed vehicle	Federal, State, region, municipality, for profit	Low speed transit, mixed vehicle	For profit, submitted by stakeholder	Low speed transit, mixed vehicle	County, regional with subsidy, non-profit	County, regional with subsidy, non-profit	County, regional with subsidy, non-profit
Communication Barriers (C) - Written street pavement messages with barriers that prevent people with vision impairments from reading the message. Auditory health messages may be inaccessible to people with hearing impairments.	High/Low speed transit, mixed vehicle	Federal, State, region, municipality, for profit	Low speed transit, mixed vehicle	For profit, submitted by stakeholder	Low speed transit, with features that accommodate visual and auditory impairments	County, regional with subsidy, non-profit	Archaic Rural Transit - Ownership, with features that accommodate visual and auditory impairments	Submitted by stakeholder, non-profit
Physical Barriers (C) - Steps and curbs that block a person with mobility impairment from entering a building or using sidewalks	High/Low speed transit, mixed vehicle	Federal, State, region, municipality, for profit	Low speed transit, mixed vehicle	For profit, submitted by stakeholder	Low speed transit, with ramp and step-up/down features that are aware of surrounding infrastructure accessibility	County, regional with subsidy, non-profit	Archaic Rural Transit - Ownership, Community Land-Use/Development with long and steep driveways	Submitted by stakeholder, non-profit
Policy Barriers (C) - General reasonable accommodations to qualified individuals with disabilities so they can perform the essential functions of the job for which they have applied to have been hired to perform	High/Low speed transit, mixed vehicle	Federal, State, region, municipality, for profit	Low speed transit, mixed vehicle	For profit, submitted by stakeholder	Low speed transit, ADA compliance the ability to travel anonymously	County, regional with subsidy, non-profit	Archaic Rural Transit - Ownership, Community Land-Use/Development, ADA compliance, the ability to travel anonymously	Submitted by stakeholder, non-profit
Programmatic Barriers (C) - Incomplete scheduling, Provider's efficiency, knowledge, and understanding of people with disabilities	High/Low speed transit, mixed vehicle	Federal, State, region, municipality, for profit	Low speed transit, mixed vehicle	For profit, submitted by stakeholder	Low speed transit, vehicle requirements that mandate ADA accessibility ensuring on demand services are equitable	County, regional with subsidy, non-profit	Archaic Rural Transit - Ownership, Community Land-Use/Development, vehicle requirements that mandate ADA accessibility ensuring on demand services are equitable	Submitted by stakeholder, non-profit
Social Barriers (C) - People with disabilities are the least likely to be employed	High/Low speed transit, mixed vehicle	Federal, State, region, municipality, for profit	Low speed transit, mixed vehicle	For profit, submitted by stakeholder	Low speed transit	County, regional with subsidy, non-profit	Archaic Rural Transit - Ownership, Community Land-Use/Development	Submitted by stakeholder, non-profit
Transportation Barriers (C) - Lack of access to accessible or convenient transportation for people who are not able to drive because of vision or cognitive impairment	High/Low speed transit, mixed vehicle	Federal, State, region, municipality, for profit	Low speed transit, mixed vehicle	For profit, submitted by stakeholder	Low speed transit, vehicle requirements that mandate ADA accessibility ensuring on demand services are equitable	County, regional with subsidy, non-profit	Archaic Rural Transit - Ownership, Community Land-Use/Development, vehicle requirements that mandate ADA accessibility ensuring on demand services are equitable	Submitted by stakeholder, non-profit
Attitudinal Barriers (C) - People sometimes describe those with disabilities, assuming that quality of life is poor and that they are inevitably because of their impairment	High/Low speed transit, mixed vehicle	Federal, State, region, municipality, for profit	Low speed transit, mixed vehicle	For profit, submitted by stakeholder	Low speed transit	County, regional with subsidy, non-profit	Archaic Rural Transit - Ownership, Community Land-Use/Development	Submitted by stakeholder, non-profit

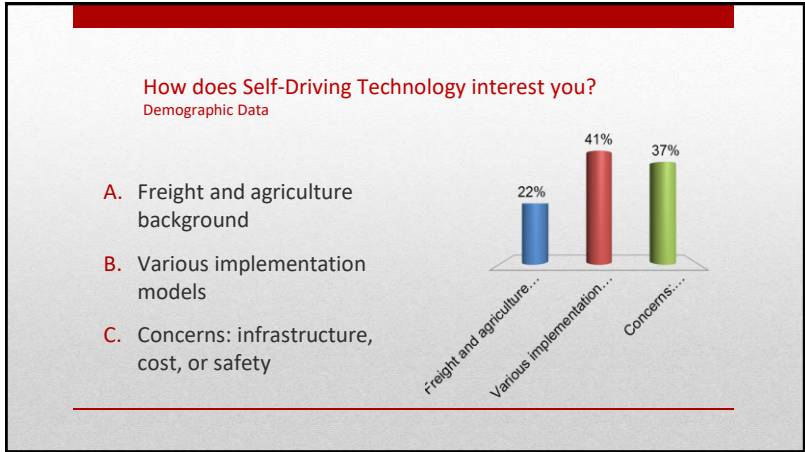
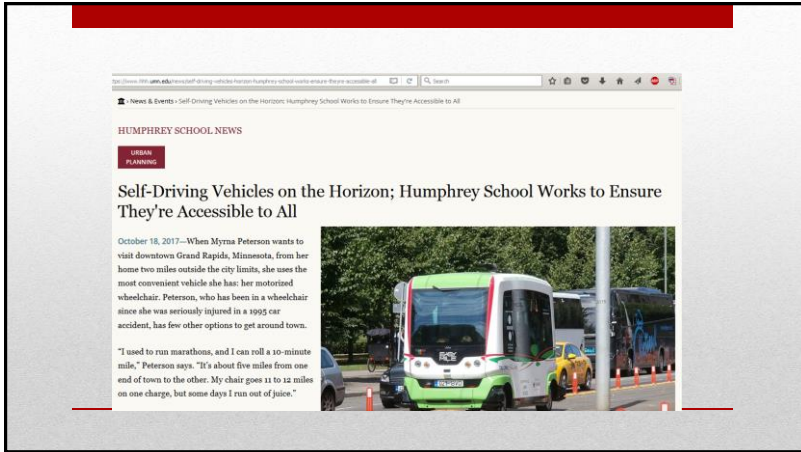
TPEC Outreach in Greater Minnesota

- SDV Task Force identified a need for SDV outreach in Greater Minnesota
- TPEC is conducting listening and learning sessions in communities around the state.



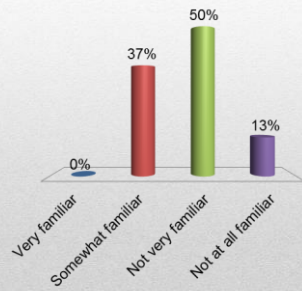
Objectives:

- Share TPEC & SDV Task Force work and findings.
- Hear stakeholder's thoughts and opinions on SDV technology, SDV equity issues, and SDV implementation in rural settings
- Better understand current and forecasted transportation needs of the community



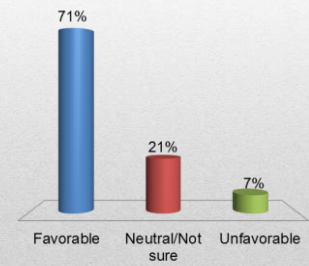
What is your familiarity with the Autonomous Vehicles?

- A. Very familiar
- B. Somewhat familiar
- C. Not very familiar
- D. Not at all familiar



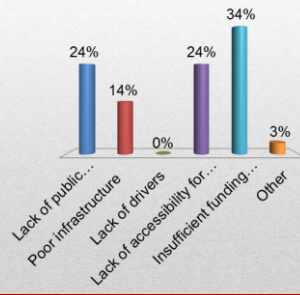
What is your opinion about Autonomous Vehicles?

- A. Favorable
- B. Neutral/Not sure
- C. Unfavorable



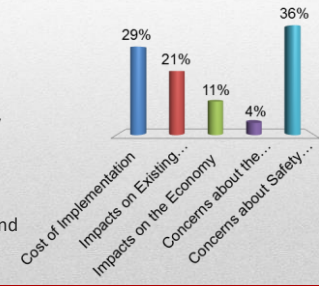
What is your most pressing transportation problem in the region?

- A. Lack of public transportation
- B. Poor infrastructure
- C. Lack of drivers
- D. Lack of accessibility for seniors and transit disadvantaged?
- E. Insufficient funding (transit and/or infrastructure)
- F. Other



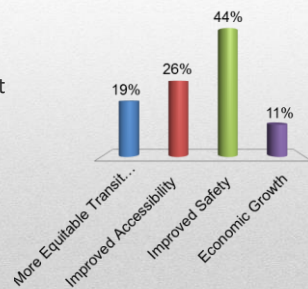
What is your first concern about Autonomous Vehicles?

- A. Cost of Implementation
- B. Impacts on Existing Infrastructure
- C. Impacts on the Economy
- D. Concerns about the Emerging Technology
- E. Concerns about Safety and Security Implications



What do you see as the greatest benefit that Autonomous Vehicles can offer to your community?

- A. More Equitable Transit Opportunities
- B. Improved Accessibility
- C. Improved Safety
- D. Economic Growth



How Can Communities Effectively Prepare for SDV Technologies?

Rural / Small Towns?

- Greater efficiency in low density?
- Last mile complement to existing service?
- Age in place?
- Exactly who?



- No more parking ramps with sloped floors
 - May need to repurpose those buildings
- 5G
- Figure out how we are going to help all of the drivers (bus, truck, train, cab) that will lose their jobs
- Planning/Land Use regulations
- Answer the VMT question
 - Roadways and bridges

What Should We Be Doing Right Now?

Thank you

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