Emerging Transportation Technology Strategic Plan for the St. Louis Region

AMPO Conference
Savannah, GA
October 18, 2017
Overview

• Background
• Project Elements
  • Survey
  • Interviews
  • SWOT Analysis
  • Policy Implications
• Recommendations
East-West Gateway Region

- 8 Counties
- 203 Municipalities
- 2.6 million people
- $141 billion dollar economy
- 10,612 miles of roads
- 758 miles of the federal interstate system
- 3,304 bridges
- 50 million annual transit trips
Connected2045: East-West Gateway

Ten Guiding Principles

1. **Preserve and Maintain the Existing System**: Ensure the transportation system remains in a state of good repair.
2. **Support Public Transportation**: Invest in public transportation to spur economic development, protect the environment, and improve quality of life.
3. **Support Neighborhoods & Communities**: Connect communities to opportunities and resources across the region.
4. **Foster a Vibrant Downtown & Central Core**: Improve access to and mobility within the central core by all modes to increase the attractiveness of St. Louis and strengthen the regional economy.
5. **Provide More Transportation Choice**: Create viable alternatives to automobile travel by providing bicycle and pedestrian facilities.
6. **Promote Safety and Security**: Provide a safe and secure transportation system for all users.
7. **Support a Diverse Economy with a Reliable System**: Reduce congestion and improve travel time reliability to support the diverse economic sectors of the region.
8. **Support Quality Job Development**: Support the growth of wealth-producing jobs that allow residents to save and return money to the economy.
9. **Strengthen Intermodal Connections**: Support freight movement and connections that are critical to the efficient flow of both people and goods.
10. **Protect Air Quality and Environmental Assets**: Encourage investments that recognize the linkages between the social, economic, and natural fabric of the region.
Background

- New technologies may fundamentally alter the way people travel in the future, with potentially dramatic impacts on safety, mobility, and system performance over the next 20-30 years.
- The pace of technology adoption is quickening.
- The St. Louis Region needs to better prepare for the future in its regional transportation planning and investment decision-making.

Emerging Transportation Technology Trends

Technology trends span several major areas, and overlap and synergize in powerful ways.

Synergies across technology trends
Project Elements

- Research & Analysis
- Survey
- Interviews
- Recommendations
- Final Plan
Survey

Organized to gather information on:

- Current level of understanding of emerging transportation technologies;
- Current activities related to, and investments being made in, emerging transportation technologies;
- Perspectives on the impacts of these technologies; and
- Desired regional coordination or policies related to transportation technology.

![Organization Type of Survey Respondents](image_url)

- Local government: 58.7%
- Private sector - freight and logistics industry: 6.0%
- Private sector - other: 4.0%
- Non-profit organization: 5.3%
- Educational institution: 26.0%
TRANSPORTATION TECHNOLOGIES LEVEL OF UNDERSTANDING RELATED TO EMERGING
LEVEL OF ACTIVITIES RELATED TO EMERGING TRANSPORTATION TECHNOLOGIES

- Evs and Infrastructure
- Green Infrastructure
- 3-D Printing
- Big Data
- Tech-Enabled Shared Mobility Options
- Autonomous Vehicles
- Tech-Enabled Freight Options
- Unmanned Aerial Drones
- Real-time travel info
- ICM / active traffic demand mgmt
- Active parking management
- Electronic Payment
- E-commerce
- Smart Infrastructure
- Social Media, incentives, gamification
- Telecommuting, telemedicine, others
- Connected Vehicles

1 - No Activities
2 - Some Activities
3 - Significant Activities
Valuable for Region to Improve Understanding of Emerging Transportation Technologies

<table>
<thead>
<tr>
<th>Answer Options</th>
<th>Response Percent</th>
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<tbody>
<tr>
<td>Yes</td>
<td>86.5%</td>
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<tr>
<td>No</td>
<td>13.5%</td>
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If the deployment of emerging technologies in the St. Louis Region could be accelerated or steered in a certain direction, would you like that to happen?
Interviews - Themes

- Overall uncertainty –
  - adoption, comfort, acceptance, timeline
- Demographics
- Equity
- Funding
- Safety
- Congestion impacts
- Infrastructure investments
- Freight
- Impacts on transit
- Hyperloop
## Strengths-Weaknesses-Opportunities-Threats (SWOT) Analysis

<table>
<thead>
<tr>
<th></th>
<th>To Leverage</th>
<th>To Overcome</th>
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<tr>
<td><strong>Internal</strong></td>
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<tr>
<td><strong>Strengths</strong></td>
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<tr>
<td>• Multi-modal transportation system</td>
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<td>• Major freight hub</td>
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<td>• Mid-size region, potentially well geared toward pilot testing</td>
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<tr>
<td>• Intelligent transportation systems (ITS) infrastructure</td>
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<td>• Interest from stakeholders</td>
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<td><strong>Weaknesses</strong></td>
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<tr>
<td>• Fragmented and complex government structure, across two states and multiple local governments</td>
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<td>• Population decline in urban core</td>
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<td>• Social barriers, including perceptions of inner-city crime</td>
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<td>• Sprawling region with low density and heavily car-centric travel patterns</td>
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<td>• Funding constraints</td>
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<tr>
<td><strong>Opportunities</strong></td>
<td></td>
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<tr>
<td>• Potential positive technology impacts:</td>
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<tr>
<td>- Significant safety improvements from new vehicle technologies and automation</td>
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<td>- Reduced travel costs</td>
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<td>- Increased travel choices</td>
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<td>- Improved access, particularly for those currently with limited mobility and those without access to private vehicles</td>
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<td>- Improved system reliability</td>
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<td>- Possible transit service improvements and reduction in cost</td>
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<td>- Optimized supply chain, yielding economic benefits</td>
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<td>- Quality job development in emerging technology fields</td>
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<td>- Air pollutant and greenhouse gas reductions from green/low carbon technologies</td>
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<td>- Potential for clean energy generation</td>
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<tr>
<td>• Federal grant programs</td>
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<td>• Private sector funding</td>
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<td><strong>External</strong></td>
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<tr>
<td><strong>Opportunities</strong></td>
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<tr>
<td>• Potential positive technology impacts:</td>
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<tr>
<td>- Reduced funds from traditional transportation funding sources</td>
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<td>- Increases in vehicle travel and congestion</td>
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<td>- Increases in sprawl / decentralized development patterns</td>
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<td>- New options draw people off of public transit</td>
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<td>- Gaps in access by those who cannot afford</td>
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<td>- Cyber-security threats associated with new technology</td>
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<td>- Reduction in employment, as jobs related to driving could be displaced</td>
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<tr>
<td><strong>Threats</strong></td>
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The expected impacts of emerging technologies on the Ten Guiding Principles are mixed. Many are positive, but several have high levels of uncertainty. Policy decisions may influence many of these impacts.
### Implications of Emerging Transportation Technologies on EWG Guiding Principles

<table>
<thead>
<tr>
<th>Guiding Principle</th>
<th>Potential Positive Impacts</th>
<th>Potential Negative Impacts</th>
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</thead>
<tbody>
<tr>
<td>Preserve and Maintain the Existing System</td>
<td>• Use of drones for bridge inspections</td>
<td>• Decline in traditional transportation funding sources through fuel taxes and vehicle registration fees</td>
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<td>• Instrumentation of highways to monitor conditions</td>
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<td>• Pavements that can repair themselves, melt snow, and provide lighted lane striping</td>
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<td>Support Public Transportation</td>
<td>• Improved transit signal priority, fare collection, and service enhancements</td>
<td>• Potential for autonomous vehicles, transportation network companies, and other service providers to reduce transit market share</td>
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<td></td>
<td>• Potential for greater integration with on-demand services that provide first-mile last-mile connections</td>
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<tr>
<td>Support Neighborhoods and Communities Throughout the Region</td>
<td>• May provide more access to opportunities for people without access to a private vehicle, as well as disabled and elderly populations</td>
<td>• Technology such as AVs might be primarily for those who can afford it</td>
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<td></td>
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<td>• Potential negative implications of e-commerce on community businesses</td>
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<tr>
<td>Foster a Vibrant Downtown</td>
<td>• Increased shared mobility options could enhance the demand for urban living and working environments</td>
<td>• Reduced time burden of driving due to AVs could encourage more suburban sprawl</td>
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<td></td>
<td>• Reduced vehicle and parking demands could provide more space to lower housing cost, add bike lanes, parks, or other amenities</td>
<td>• Electronic access to health care, education, etc. could reduce benefits of being in the urban core</td>
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<tr>
<td>Provide More Transportation Choices</td>
<td>• Technology enhances alternatives to personal auto use, including bicycle sharing, microtransit, carsharing, and ridesourcing</td>
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<tr>
<td>Guiding Principle</td>
<td>Potential Positive Impacts</td>
<td>Potential Negative Impacts</td>
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<tr>
<td>Promote Safety and Security</td>
<td>• CV and AV technology reduces driver error; technologies are designed to reduce crashes, injuries, and fatalities</td>
<td>• Potential concerns about cyber-security in relation to CV and AV technology</td>
</tr>
<tr>
<td>Support a Diverse Economy with a Reliable System</td>
<td>• Improvements in monitoring roadway conditions, as well as safety improvements, should directly result in fewer vehicle incidents, which would improve reliability</td>
<td>• Increased VMT could offset some of these benefits.</td>
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<td></td>
<td>• Better traveler information in vehicles enables travelers to re-route to minimize time stuck in congestion</td>
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<td>• More vehicle throughput within the existing transportation system that should help to reduce traffic congestion</td>
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<tr>
<td>Support Quality Job Development</td>
<td>• Connectivity has the potential to reduce barriers to travel and facilitate market interaction and overall economic growth.</td>
<td>• Vehicle automation could reduce direct employment in the transportation sector, as jobs related to driving (everything from truck drivers to taxi and transit service drivers) could be displaced</td>
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<td>• Opportunities for quality job development in emerging fields, including advanced logistics and data analytics, as well as in the development of innovative technologies and services</td>
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<td>Strengthen Intermodal Connections</td>
<td>• Opportunities to optimize the supply chain through improved logistics and data sharing are anticipated, resulting in travel time savings</td>
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<td></td>
<td>• Improvements in passenger connections between modes and services are expected</td>
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<tr>
<td>Protect Air Quality and Environmental Assets</td>
<td>• Potential for significant air pollutant and greenhouse gas emissions reductions from shifts to EVs</td>
<td>• Increased VMT could offset some gains</td>
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<tr>
<td></td>
<td>• Potential for clean energy generation throughout roadways, including solar and kinetic energy</td>
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</tbody>
</table>
Policy Areas of Focus in Regional Planning and Investment Decision Making

- Safety – Advancing deployment of safety innovations
- Security – Ensuring data privacy and cybersecurity
- Urban Form and Public Transit – Fostering policies that address the threats of increased decentralization due to technology and harness the advantages to support a vibrant central core and the success of public transportation
- Reliability – Using technology to improve access to real-time traveler information and optimize system reliability
- Equity – Using technology to enhance connections for underserved communities and ensuring that technology-based services don’t bypass disadvantaged communities
Policy Areas of Focus in Regional Planning and Investment Decision Making

- **Freight and Logistics (Goods Movement)** – Using technology to enhance efficient goods movement and spur economic development

- **Infrastructure Preservation and Maintenance** – Applying technology to improve the monitoring of infrastructure conditions and strengthen transportation asset management

- **Transportation Funding** – Addressing the challenge of technology exacerbating the problem of limited revenues for transportation investment and maintenance

- **Environmental Quality** – Advancing the adoption of eco-friendly infrastructure and vehicles
Examples of Implementation Strategies

- **Safety**
  - Invest in V2I communications infrastructure to support safety applications for drivers and pedestrians

- **Urban Form and Public Transit**
  - Advance automation in public transportation and quality improvements (e.g., free Wi-Fi) through pilot programs

- **Equity**
  - Offer incentives for private services to provide services in marginalized areas, such as those with predominantly low-income populations

- **Infrastructure Preservation and Maintenance**
  - Evaluate use of advanced technologies to support monitoring conditions, including use of drones and vehicle-generated data

**Responsibilities**

- Illinois and Missouri DOTs, local governments

- Metro

- Metro and local governments

- Illinois and Missouri DOTs, Metro, and local governments
Examples of Impacts to Investment Needs and Priorities

- Reduced needs for new highway infrastructure - More efficient use of existing infrastructure, boosting effective capacity
- Impacts on public transportation services - Opportunity to restructure public transportation services with automation, smaller vehicles running at higher frequencies
- Impacts on ITS infrastructure - Shifts from radio advisories and dynamic message signs to direct dissemination of information to vehicles
- Changing needs associated with law enforcement - Less need for enforcement of issues such as red light running, speeding, impaired or distracted driving
- Reduced parking needs - Reduced needs for on-street and off-street parking
- Workforce development needs – Potential reduction in jobs associated with driving; needs for more tech-savvy workforce or redeployment to customer service
- Transportation funding – Reduced revenues through traditional transportation fuel taxes
Recommendations: Moving Forward from Strategy to Implementation

Data, Modeling, and Analytics
- Bolster staff data analytics capabilities
- Develop a robust data collection plan, leveraging new forms of data to support performance measures
- Enhance modeling to address emerging transportation technologies

Long-Range Planning
- Establish a Technology Advisory Committee
- Develop a shared vision for technology to recommend regional strategies
- Conduct scenario planning to better understand alternative futures and to support more informed analyses of investment priorities
- Include considerations related to emerging transportation technology as a factor when prioritizing projects for the regional transportation plan (RTP)
- Update the regional ITS Architecture and Deployment Plan
- Update the Congestion Management Process and ensure that other regional planning products integrate emerging transportation technology

Programming and Funding
Update the current Transportation Improvement Process (TIP) project selection process to encourage innovative technology applications

Pilot Program Development
- Build federal grant readiness by creating a compelling grant narrative
- Establish a grant tracking system
- Develop and fund a regional technology deployment pilot program

Education, Convening, and Supporting Partner Efforts
- Work with local universities to identify opportunities to collaborate
- Coordinate peer-to-peer workshops and facilitate regional discussions on topics including public-private partnerships, changes to procurement policies, and data collection and analytics
- Conduct assessments of local governments’ awareness and readiness regarding technology on a periodic basis
Questions?

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