mobility**next**

HPTE Board Meeting, October 2019

What's Changed?

mobility*next* "1.0"

- Public led
- "Big Tent" – everyone included

Issues

- Public Agencies not accustomed to private engagement struggled
- Lots of inaction; Slow
- Too much inertia to overcome

mobility*next* "2.0"

- Examine ALL options; no biases or inertia
- Coalition of the willing
- Focus on Metro Denver
- Metro Mayors act as "true north"
- Chamber support

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mobilitynext is a nonprofit, member funded organization focused on developing the best possible solutions for Metro Denver

Mission: *To leverage the best and brightest minds, regionally and globally, to accelerate pragmatic solutions to Metro Denver's growing mobility challenges.*

What's different: *No biases, inertia or agendas...just the best ideas from the brightest people & companies*
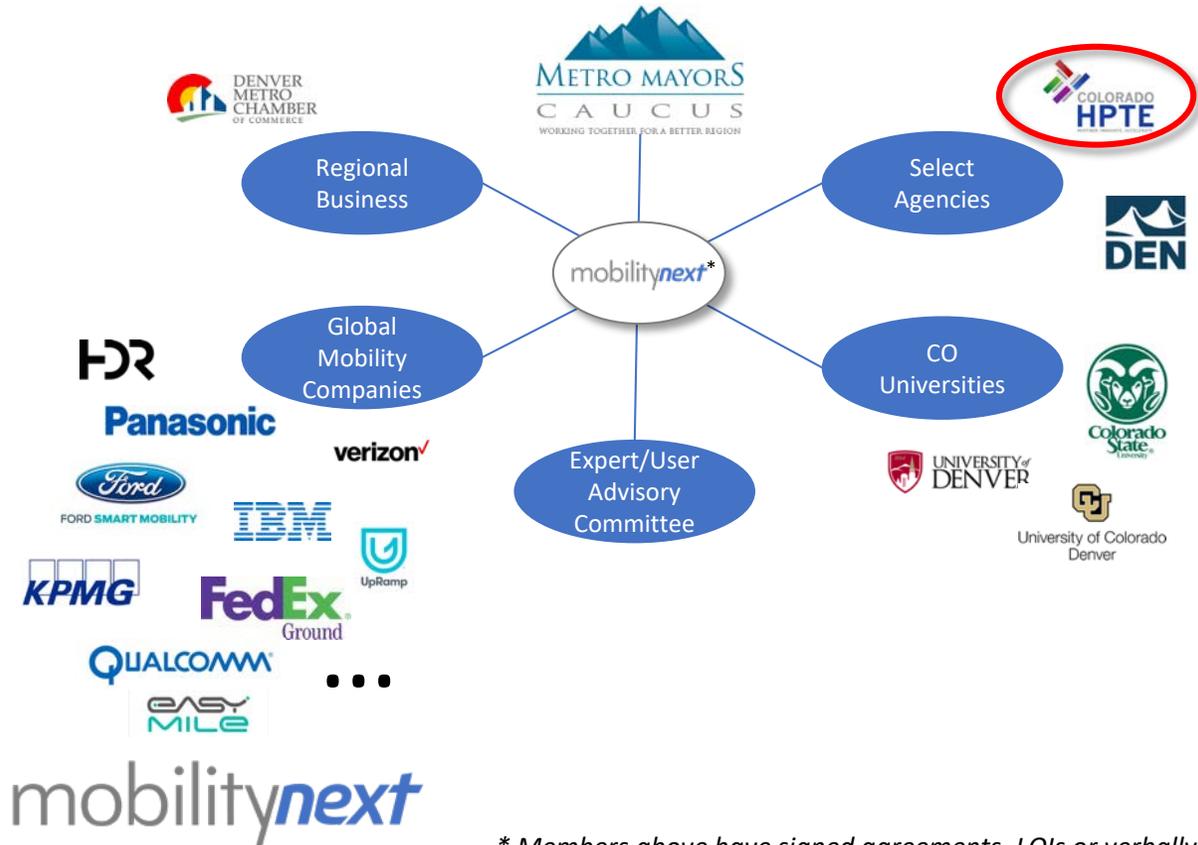
HPTE Benefits:

- ❖ *Finance & Funding Lead/Guide for Region*
- ❖ *Driver broader financing discussion*
- ❖ *Connect directly with 40 Mayors, other CO Agencies, Universities, local companies, and Global Mobility leaders*
- ❖ *Use content & data to support HPTE mission*
- ❖ *Streamlined support from universities and companies*
- ❖ *Grant participation*
- ❖ *Support Denver Metro Region (contribution to 501c3)*

* Members above have signed agreements, LOIs or verbally agreed to participate

Our approach looks at Mobility pragmatically & broadly

Strategy
- Focus on pragmatic solutions
- Leverage broad base of experts

Pilots
- Detailed assumptions to test
- Test with only 3 outcomes: Yes, Yes but or No

Deployment (Not in scope)
- Deploy after fully informed
- Measure and assess with data from above

Mobility Focus Areas*

- Transformational Technology & Services
- Serving a Growing & Shifting Population
- Research & Innovation: Preparing for the Future
- Energy & Sustainability: Protecting the Planet
- Institutional & Workforce Capacity: Providing a Capable & Diverse Workforce
- Resilience & Security: Preparing for Threats
- Goods Movement: Moving Freight
- Safety & Public Health: Safeguarding the Public
- Funding & Finance: Paying the Tab
- Equity: Serving the Disadvantaged
- System Performance & Management: Improving the Performance of the Transportation Networks
- Governance: Managing our Systems

Proposal: HPTE leads the Funding & Finance Topic Area

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* Transportation Research Board, 2019

We leverage an experienced & motivated team

Jim Doyle
Managing Director

Expertise:
- Large-scale projects
- Advanced mobility technology

Experience:
- Panasonic
- IBM
- Nortel
- BS, Syracuse University
- MBA, Indiana University

Personal:
- Wife & two kids
- Lives in DTC

David Levy
Program Director

Expertise:
- Behavioral Economics (User Adoption)
- Environmental Policy

Experience:
- Rocky Mountain Institute
- ALM Media
- Informa
- BA, Emory University
- MA, University of Colorado

Personal:
- Avid runner and backpacker
- Lives in Boulder

Example Focus Area Leads:

Jack Buffington

Goods Movement
- Supply Chain Leader MillerCoors
- Professor at DU
- Leader of Transportation Institute (DTI)
- Ph.D. in Industry Marketing/Supply Chain Mgt.

COLORADO HPTE
PARTNER. INNOVATE. ACCELERATE.

Nick Farber
(*proposed)

Funding & Finance
- P3 Finance lead for State of CO
- National innovative transportation finance expert
- J.D. DU

Board:

Don Hunt (Chair)

Kelly Brough

Jim Doyle

Partners/Support:

Brownstein Hyatt Farber Schreck

SEWALD HANFLING
PUBLIC AFFAIRS

COLORADO SMART CITIES ALLIANCE

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HPTE Membership Fees & Contribution

Fee:

- $25K/Year for four (4) years with "out" each year

Contribution (*Defined by HPTE in terms of degree and frequency**):

- Personnel time to support Topic Area (Finance & Funding), Strategy and Pilots
- Participation in events (e.g. Mobility Summit)
- Knowledge & experience contribution for Metro Mayors

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* Prior model required co-location

mobility*next*: *accelerating* mobility innovation

Examples that Metro Mayors are Interested In (e.g. Pilots)

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Problem Statement

Many of the Denver region's arterial roadways see heavy traffic, congested intersections, and unreliable travel times during peak travel periods. Traffic signal synchronization is thus essential to optimizing traffic flow across time and space, ensuring safe passage for bikes and pedestrians, and reducing infrastructure strain. Intelligent synchronization is equally vital to implementing public transit services, and managing special situations such as emergencies and special events.

But multi-jurisdictional corridors present unique challenges for transportation planners when the needs and resources of individual jurisdictions vary, and in some cases, are at odds. Smart synchronization and prioritization is even more consequential for special situations, such as emergencies, special events, and unplanned public transit needs.

Furthermore, synchronization in four directions – east, west, north and south - is nearly impossible to achieve when macro-traffic patterns differ greatly across jurisdictions, and when incumbent technologies cannot adapt quickly enough to new modes and travel behaviors which dramatically shift more common and historically predictable traffic patterns.
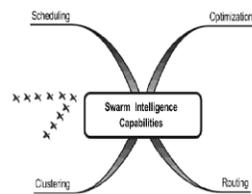
Hypothesis

Traffic management systems powered by swarm intelligence – defined as the collective behavior of decentralized, self-organized systems, and which incorporates principles drawn from evolutionary game theory - will unlock new arterial efficiencies and offer multi-jurisdictional arterials the most flexible and adaptive control solutions. Swarm intelligence will also increase public transit performance, improve emergency response, and dynamically manage special event inflections.

Arterial intersections informed by swarm intelligence are modeled as individually-motivated agents taking part in a dynamic process in which both the local goals and region-wide goals can be simultaneously taken into account. Jurisdictions will benefit from this form of intelligence because 1) it is not necessary to have a central system operator determine the direction of the coordination 2) system operators can build subgroups of synchronization which meet discrete local needs in terms of allowing vehicles to pass in one given direction, and 3) it avoids explicit 'negotiation' between jurisdictions when they have to decide which direction to give priority.

Key Questions to Answer

1. Can decentralized, artificial intelligence-powered systems deliver better results than coordinated human decision making?
2. What are the legal and ethical risks of deployment?
3. How can such a system be A/B tested against proven, existing systems and methods?
4. How long will it take for such a system to 'learn' and optimize itself

Key Topic Areas (Highlighted)

1. Transformational Technology & Services	2. Serving a Growing & Shifting Population.	3. Energy & Sustainability: Protecting the Planet	4. Resilience & Security: Preparing for Threats
5. Safety & Public Health: Safeguarding the Public	6. Equity: Serving the Disadvantaged	7. Governance: Managing our Systems	8. System Performance & Mgt: Improving Performance of Transportation Networks
9. Funding & Finance: Paying the Tab	10. Goods Movement: Moving Freight	11. Institutional & Workforce Capacity: Providing a Capable & Diverse Workforce	12. Research & Innovation: Preparing for the Future

Key Stakeholders to Participate

- Affected jurisdictions
- Surface transportation users (Public, First Responders, Commercial Freight, School Districts, etc.)
- CDOT
- RTD

Problem Statement

FasTracks was approved by voters in 2004 to expand transit across the Denver metro region. The original program budget was $4.7B, with a target completion of 2017. Rising costs, right of way constraints, and the 2008 recession have put many projects decades behind schedule, and billions of dollars over budget. Flat / declining public transit demand across the Denver metro region is compounding funding challenges for unfinished corridors.

The projected cost to finish the Northwest Rail (Westminster – Longmont) is $1.5-1.7B, with full service not expected until after 2050.

RTD is currently exploring an interim service plan, called the Peak Service Plan, to provide limited rush hour rail service along the unfinished portion of the Northwest Corridor from Westminster to Longmont. RTD staff estimates that the reduced service plan would cost $117M to launch, and initially carry 1,400 passengers every weekday.
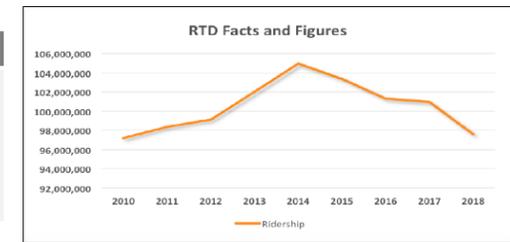
Hypothesis

New mobility technologies and services that are less expensive, faster to implement, and which are likely to see higher adoption rates will be available before the Peak Service Plan can be implemented – if even approved. These new, alternative technologies and services will obviate an interim service plan, and potentially the remaining unfinished 35 miles of rail.

These services could provide the region with viable alternatives for future expansion in ways that could be more customizable by community, more cost effective and far more flexible.

Key Questions to Answer

1. What new technologies and service types are best suited for this corridor?
2. Which of these can perform better than RTD's proposed alternatives?
3. What are the costs of implementation?
4. What are the available funding mechanisms?
5. What are the marginal savings, functional advantages, and environmental benefits of the alternatives?

RTD Facts and Figures — Ridership

Key Topic Areas (Highlighted)

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Key Stakeholders to Participate

- Taxpayers
- Communities and commuters along the Northwest Corridor
- US 36 Mayors & Commissioners Coalition
- RTD
- CDOT
- Commuting Solutions

Focus Area Idea | The Intersection of Mobility and Outdoor Recreation — mobilitynext

Problem Statement

Outdoor Recreation demand in Colorado exceeds the capacity of the land, and the roads which are used to access it. As a result, we are rapidly degrading natural resources, and experiencing untenable levels of traffic and infrastructure strain along roads that access recreation destinations. Population growth and tourism growth add proportionate pain, and traditional work schedules leave little room to spread recreation demand more evenly across the work week.

Hypothesis

An Intelligent Recreation System (IRiS) can capture data generated during the recreation decision-making process to 'see' recreation demand as it develops, and before it hits the roads and trails. IRiS will provide land and transportation managers with new tools for measuring and analyzing recreation demand, and travel demand associated with these pursuits.
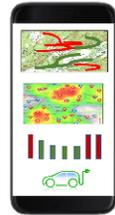
Data collected by the IRiS platform can be used to nudge users away from over-burdened destinations, and toward more sustainable recreation and transportation alternatives in real time, at the most influential touchpoints, and *before* action is taken.

Insights from IRiS can also be integrated with TDM platforms to improve understanding of origin-destination and trip purpose demand inputs for outdoor recreation goals, which are less predictable and more fluid than work commute goals. A fully developed platform will:

- Redirect people from congested areas to lightly used areas
- Promote shared and sustainable transportation alternatives for recreation pursuits.
- Encourage and incentivize off-peak recreation travel.

Key Questions to Answer

1. What are the legal and ethical issues associated with collecting data from government digital assets on user preferences and intent?
2. Will the system inadvertently shift critical economic activity away from dependent communities?
3. How long will it take for such a system to 'learn' and optimize itself?
4. Will it be effective?

Key Topic Areas (Highlighted)

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Key Stakeholders to Participate

- Land Management Agencies (USFS, NPS, Open Space)
- CDOT
- Jurisdictions through which access roads pass
- Communities that are economically dependent on outdoor recreation
- Colorado residents
- OEDIT
- The Environment

Focus Area Idea | DEN Access | POV and TNC reduction — mobilitynext

Problem Statement

Denver International Airport is the third largest domestic hub in the U.S., with 35 million annual domestic O&D passengers. DEN's location on the eastern edge of the Denver metro region is far from most population centers, many of which do not have convenient public transit options for reaching the airport. As a result, many passengers prefer to - or must - drive their own cars (POVs) or use Transportation Network Companies (TNCs) like Uber or Lyft to reach the airport. POVs and TNCs create congestion, impose infrastructure strain, and drive increased capital expenditures to support.

Although the University of Colorado A Line, which opened in April 2016, has proven to be a viable and desirable alternative for reaching/departing the airport, it is inconvenient for a majority of DEN passengers whose origin-destination is not along the line's path. Connections are available, but reaching these connection points often requires driving, and once people get in their cars, they tend to remain in their cars and not use mass transit. To reduce POV and TNC use for DEN access, the Denver metro region must provide additional, more convenient, and more flexible alternatives for transporting passengers to and from the airport through public and shared services.

Hypothesis

An expanded portfolio of transportation alternatives will reduce POV and TNC use for reaching DEN. Crucially, this portfolio must be robust and diverse enough to accommodate a wide range of consumer preferences, travel time constraints, convenience thresholds, price points, and geographic Originations-Destinations. To create such a portfolio, public and private mobility assets must be coordinated and choreographed to serve a wide range of traveler use cases, with the primary goal of feeding the A Line and SkyRide/BRT stops.

Key Questions to Answer

1. Can public-private partnerships between RTD and TNCs be created to make the A-line more accessible to more people?
2. Can TNC fees be leveraged to support alternatives and improvements?
3. What incentives can be offered to employers to increase employee use of public transit to DEN for business travel.
4. Can options to driving be done in a way that they are relatively as convenient, less costly, and overall a great experience?

Key Topic Areas (Highlighted)

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Key Stakeholders to Participate

- DEN
- RTD
- CDOT | HPTE
- DEN passengers
- Transportation Network Companies
- Ground Transportation Services
- DEN employees

Problem Statement

Micromobility is defined as a form of personal mobility enabled by light vehicles such as electric scooters, electric skateboards, and electric pedal assisted bicycles. The primary condition for inclusion in this category is a vehicle weight less than 1100 lbs; a secondary condition is that these vehicles are made available as a shared service. The global explosion of shared bikes and scooters has been deemed by some mobility experts as the "the fastest technological adoption in history".

As shared bikes and scooters suddenly appeared in great numbers on streets and sidewalks around the Denver metro region, policymakers have been scrambling to understand how, when, and where these vehicles are being deployed and used. Many communities, notably downtown Denver, now face significant safety and right-of-way issues in the absence of proactively crafted, well-informed policy and regulation.

Hypothesis

Cities across the Denver metro region should create a framework of common standards and implementation road maps to better understand and integrate new modes of transportation. This framework should include, but not be limited to, the following core principles*:

- Adaptive regulation that can be quickly updated as technology and consumer preferences evolve.
- Risk-weighted regulation that acknowledges the realities of a community's infrastructure and user needs.
- Outcome-based regulation, such as performance-based criteria (rather than fixed, arbitrary caps on fleet sizes) for service providers.
- Regulatory sandboxes where the effects of micromobility solutions can be tested.

MPOs, TMAs, and micromobility companies can work together to standardize evaluation criteria for potential solutions such as adaptive speed controls, centralized park locations by block to reduce clutter, integrated charging infrastructure with local utilities, and common/centralized tax/fee structures for augmenting limited municipal budgets.

(Principles informed by (2019, April 22). Small is beautiful Making micromobility work for citizens, cities, and service providers. The Deloitte Center for Integrated Research)

Key Questions to Answer

1. Are common guidelines feasible, in practice, when community interests, infrastructure, and user needs vary widely?
2. How can micromobility service providers be involved 'from the ground-up' in this dialogue, without biasing the results?
3. How do we determine acceptable risks before risks are even known, and how do we factor social and environmental benefits into policymaking when the technology is developed and deployed faster than it can be evaluated?

Key Topic Areas (Highlighted)

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Key Stakeholders to Participate

- DRCOG
- TMAs
- RTD
- Municipalities
- Citizens / pedestrians / cyclists