The Future is Bright!  
So how do we get there?

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The Intersection of Technology & Transportation

Transportation options that were once a fantasy are now reality:

• Traffic information is available on-demand.
• Cars & bicycles are shared.
• Self driving cars are here.
• Smart phones enable an array of mobility options:
  – call a personal driver at the click of a button.
  – crowd-source the best possible route to a given destination.

And just around the corner:

• Same-hour delivery service via drones.
• Electric vehicles charging over the air via charging infrastructure integrated into the road – “Integrated Dynamic Wireless Charging”.

• As of July 2017, 22 states have passed legislation related to autonomous vehicles.
• Four states have issued Executive Orders – Washington, Arizona, Wisconsin, and Massachusetts.
• No state prohibits Autonomous Vehicle (AV) testing or operations.
NHTSA Statement (2016):

“Automated vehicle safety technologies signal the next revolution in roadway safety. We see great potential in these technologies to save lives—more than 30,000 people die on our roads every year and we can tie 94 percent of crashes to human choice—transform personal mobility and open doors to communities that today have limited mobility options.

The DOT Federal Automated Vehicles Policy sets the voluntary framework for the safe and rapid deployment of these advanced technologies.”

• In the Fall of 2016 the National Highway Traffic Safety Administration (NHTSA) issued guidance to states on AV’s & January, 2017 NHTSA issued a proposed rule mandating all new light vehicles be equipped with standardized vehicle-to-vehicle (V2V) communications.

• Meanwhile, the American Society of Civil Engineers awarded the U.S. a D+ grade in its 2017 Infrastructure Report Card – the same grade given since 1998. Estimates it will require a minimum of $4.6 Trillion to bring the system to a level of “adequate”.

The National Landscape
Washington State’s Challenges

• The U.S. Census Bureau recently released data indicating King County had the fourth-highest population increase in the country from 2015 – 2016. Bringing King County’s population to 2.2 million people.

• According to the 2016 INRIX Traffic Scorecard, Seattle ranks 20th worldwide in congestion, and 10th nationally, with driver delay averaging 55 hours a year in peak times.

• According to a combined report from the Associations of Washington Business, Ports, Counties and Cities, there is a statewide need of approximately $134 Billion for highways and local roads, and an additional $4.2 Billion for bridges.

• This doesn’t include all the infrastructure needs to enable AV’s.
Cars of the Future Need Roads of the Future

Autonomous cars need good roads and technology infrastructure:
- Smooth surfaces with clear stripping
- Embedded pavement sensors
- Interactive signage and information
- Real time communications systems
- Continuous communications & connectivity

Cars today already have many attributes of autonomous vehicles:
- Self-parking
- Reads electronic traffic signals
- Maintains a safe distance in steady traffic
- Brakes automatically
- Lane departure warnings
- Keeps us connected to the internet, makes calls and texts
Road Reality Check

Autonomous Cars
The Fuel Efficiency Bar Continues to Rise

- Current Federal CAFE Standards: **54.5 MPG by 2025**
- Washington State’s Current Average MPG: **20.5 MPG**
- The Federal Energy Information Administration conservatively predicts:
  - All **NEW** cars by 2040 = **48 MPG**
  - All cars (**new and old**) by 2040 = **37 MPG**
- Auto manufacturers are setting the transition pace:
  - Volvo has plans to produce only hybrid and electric cars starting in 2019.
  - Toyota 2017 Mirai - powered by hydrogen fuel cell with an EPA rated 312-mile range and plans to shift to hydrogen fuel cell fleet in the next 15+ years.
  - Ford is investing $4.5 billion to transition to hydrogen fuel cell and other alternative fuels over the next 15+ years.
  - Tesla has released its all electric Model 3 - nearly 400,000 people placed a $1,000 deposit to own one.
The Gas tax is working ok today, but is not sustainable long-term due to growing vehicle fuel efficiency.

Road Usage Charge Possible
Future Funding Source

• A road usage charge (RUC) is a per mile charge drivers would pay for the use of the roads, rather than paying by the gallon of gas.

• Identified in Washington State as a viable, long-term, sustainable funding source in need of further exploration.

• Could replace the gas tax as the foundational statewide source of revenue for roads.
Impact of RUC By Car Type

Cost of gas tax or RUC at 1,000 miles/month

- **2007 Ford F-150**: $9 less/month
- **2010 Ford Fusion**: $2 less/month
- **2010 Ford Focus**: $6 more/month
- **2016 Toyota Prius c**: $14 more/month
- **Tesla Model S**: $24 more/month

- 15 MPG: $9 less/month
- 20 MPG: $2 less/month
- 30 MPG: $6 more/month
- 45 MPG: $14 more/month
- ∞ MPG: $24 more/month

49.4 cent fuel tax vs. RUC @ 2.4 cents/mile
RUC & Autonomous Vehicles

Three Primary Models emerge when envisioning a future deployment of AV’s and road usage charging:

**MODEL 1 – Near-Term:** Personal car ownership continues as it is today
RUC would be administered via personal accounts directly with drivers, making consumer acceptance and privacy issues prominent.

**MODEL 2 – Mid-Term:** There is a mix of Mobility-as-a-Service (MaaS) and personal car ownership
Consumer acceptance and privacy issues are prominent for personal car owners. But RUC is more easily applied with service providers, creating an indirect consumer experience with RUC.

**MODEL 3 – Long-Term:** MaaS replaces personally owned vehicles, making mobility something we consume as a service
Under this model, auto-makers and/or service providers own the AV fleet and thus charges for use of the roadway are assessed upon service providers as part of their operations, rather than individual drivers. Thus, public acceptance & individual privacy issues become less prominent.
Near-Term Policy Considerations

Guidance from the National Highway Traffic Safety Administration (NHTSA) on recommended next steps for states:

• Evaluate current laws and regulations to address impediments and gaps.

• Determine how to allocate liability among AV owners, operators, passengers, manufacturers, and others when an accident occurs and who must carry insurance.

• Define who or what is the “driver” of an AV.

• Convene an AV task force/committee made up of various interests including decision makers, state transportation officials and operating agencies, law enforcement, state IT leaders, state insurance regulators, state agencies representing aging, disabled and low-income populations, tolling authorities, and transit authorities.
Mid & Long-Term Policy Considerations

• Set forth a testing regime that establishes processes and policies aimed at facilitating the safe testing of AV’s in selected jurisdictions across the state.

• Assess potential impacts of AV’s and MaaS operations on statewide revenue collections, safety, congestion levels, transit usage, and park and ride utilization.

• Determine impacts AV’s and MaaS may have on the mobility of low-income, disadvantaged, and disabled populations.

• Assess long-term AV / tech. related infrastructure investments needs and determine how to balance those needs with other ongoing statewide funding needs such as maintenance and preservation.

• Identify long-term, sustainable funding approaches that employ the use of compatible technology to allow for streamlining of tax, fee, and toll collections.
The Key to the Future is Collaboration

While AV’s bring great promise to solving many of our transportation challenges, the complexity and impact of policies and regulations will be far reaching.

Collaboration & partnerships will be key to a successful transition into the future.
Thank You!

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