Actively Shaping the New Mobility Reality
*Presented by: Chris Armstrong, Director of Smart Mobility*

*Speaker Series: The Future of Mobility in Our Urban Environment*

April 19, 2018
Pena Station NEXT TOD

Living lab for PSN Stakeholders to test smart city solutions and inform full scale deployment.

- 400 acres TOD on RTD’s University of Colorado A Line Commuter Rail, one stop from Denver Airport.
- Panasonic is an anchor tenant (Opened on Sep. 12th, 2016)
- Panasonic invested $2.5M in Pena Station NEXT Phase 1 (154 acres) with LC Fulenwider (Jul. 2016)
- Exclusive agreement for smart and sustainable products and services (5 year + extensions)
Peña Station NEXT
Denver, CO
Automotive Business is in Disruption

The automotive industry is poised for more disruption in the next decade than the last 5 decades combined.
Panasonic Automotive Customers
It’s A New Game

New transportation models
Swapping from hardware to software
Changing development strategies
New auto entrants & combining forces

NON-auto entrants:
- Google, Apple, Facebook,
- Capital intensive companies with deep investment threats
Factors Driving Disruption

Connected cars will lead to smart vehicles and then autonomous. Autonomous will further drive electric car demand...

...these 2 factors will change everything in the next 10 years.
"We won’t experience 100 years of progress in the 21st century — it will be more like 20,000 years of progress (at today’s rate)"

Ray Kurzweil
Inventor, author, Futurist
Acceleration of Technology

- **New Mobility Starts In Cities**
  - New mobility services will bring disruption, primarily in urban transportation
  - Early adopters will be urban dwellers with higher income / education levels

- **Mobility Already Changing Fast**
  - Millennials and Baby Boomers are dictating mobility preferences
  - 59% of Millennials interested in Unmanned Mobility vs. 20% of Boomers

- **New Mobility Is Driving the Adoption of Autonomy**
  - By 2025 shared autonomous vehicles will account for 10% of US miles driven
  - By 2040 increases to 80%

- **Mobility Is Profitable**
  - Creative P3 models will increase adoption of connected mobility
  - By 2020, Worldwide mobility revenues forecasted to reach $1.7 Trillion
National League Of Cities Say..

1. Economic Development – 75%
2. Infrastructure – 57%
3. Public Safety – 55%

Source: 2015 State of the Cities Report. (Top issues that matter to cities as surveyed with City Mayors nationally.)
How to Oversimplify Transportation

Transportation Planning

Capital Improvement Projects

Day-to-Day Operations

Traffic Operations

Roadway Safety

Maintenance
Colorado Transportation Trends

Population Growing & Traffic Worsening
• State population grew 10% (2010–2016), reaching 5.5M
• State population to reach 7.7M by 2035, a 40% increase
• By 2040, Colorado expects 122% increase in time delay and 147% increase in economic cost due to traffic congestion

Crashes & Fatalities Are Increasing
• Fatal crashes in Colorado grew 37% during 2011–2016, including a 15-year high in 2016 for fatalities involving pedestrians and cyclists
• Nationally, in 2013, there were 5.6 million crashes and 32,719 deaths

State Trends Demand Immediate Action to Tackle
• Estimated $9B funding gap for transportation infrastructure over next decade
• Statewide annual VMTs to reach 69.7B by 2040, a 45% increase
• Annual VMTs have been climbing steadily since 2011, reaching 48.1B in 2014
• Total statewide lane miles expected to remain flat (need to use existing lane miles much more efficiently)
Transportation Innovations

Transportation Planning

Capital Improvement Projects

Day-to-Day Operations

GA: I-285 and Ashford Dunwoody Diverging Diamond Int.
It’s Time to Lean Forward

Service Design Thinking for Technology & Innovation

Transportation Planning

Capital Improvement Projects

Day-to-Day Operations

Trial, Scale, Institutionalize

Traffic Operations

Roadway Safety

Maintenance
Connected Vehicle Technology
Vehicles have a lot to say...

Untapped vehicle data enabled by V2X

All built on national and federal standards.
Connected Vehicle Technology

CDOT-Panasonic V2X Data Ecosystem

Existing Traffic Management Platform

Input Sources
- Camera
- Sensors
- Weather

Output Sources
- Signage
- Traffic Lights
- Emergency Alert
- Community Alert

V2I DATA
RSU
I2V DATA
RSU
I2V DATA
V2I DATA
V2V

V2I Data
V2V Data

V2X Deployment Program
Projected 2035 numbers with 100% of cars instrumented and full BSM coverage

I-70 Mountain Corridor (90 miles)
- 0.082 billion messages/hr
- 22.9 GB/hr

All of I-70 in Colorado
- 0.27 billion messages/hr
- 76.3 GB/hr
- 0.64 PB/yr

Entire State of Colorado
- 2.12 billion messages/hr
- 592.3 GB/hr
- 4.95 PB/yr
Intelligent Transportation Systems

Atmospherics Detection 10+ Miles

- Variable Message Sign
- CCTV
- Toll Tags
- Side-Fired Radar
- Weather Station
- Ramp-Metering
- ITS
- Toll Tags
- Variable Message Sign
- CCTV
- Side-Fired Radar
- Weather Station
- Ramp-Metering
- ITS
Panasonic V2X Mission: Tackle these problems.

The three biggest problems facing our nation’s roadways...

5.6 million crashes
40,200 deaths
6.9 billion hours in traffic
3.1 billion gallons wasted

“The safety benefit of V2X is undeniable. It will save lives, and everybody knows that. A delay in rolling out V2X will cost lives, and that’s a tragedy.”

- Harry Lightsey, General Motors