THE CONNECTED/AUTOMATED VEHICLE WAVE:

What does it mean for the infrastructure industry?

Ohio Transportation Engineering Conference
October 26, 2016
THE RACE TO DRIVERLESS

Source: Google
THE RACE TO DRIVERLESS

Phase 1 (now to 2016): 'Passive' autonomous driving

Phase 2 (2015 to 2019): Limited driver substitution

Phase 3 (2018 to 2022): Complete autonomous capability

Phase 4 (two decades): 100% autonomous penetration, utopian society

Source: Morgan Stanley
IS THIS A CONNECTED CAR?

Source: Google
$AV \neq CV + 1$
WHAT IS CONNECTED?

→ Cooperative communications systems
→ Linking vehicles together, to the roadside, and to the “cloud”
→ Interoperable systems that work across all equipment and manufacturers
→ More complex to bring to market than AV due to regulatory requirements and business model considerations
WHAT IS THE ROLE OF CV IN THE AV SPACE?

→ AV “sees” with sensors and must interpret environment
→ Sensors detect green indication, computer knows green means GO
→ No context beyond what human driver can see
WHAT IS THE ROLE OF CV IN THE AV SPACE?

In a CV environment, the other vehicles and the traffic signal are “talking” to the AV:

- Phase state
- Time to phase change
- Real-time optimal progression speed
- Real-time route guidance based on signal delay
- Identification of hazards out of the view of sensor systems
WHAT COULD A C/AV WORLD LOOK LIKE?
TRAFFIC SAFETY

What if cars (and trucks, and buses...) no longer crashed?
Under low-volume conditions, vehicles travel at high speeds with sufficient spacing.

As volume increases, speed decreases as vehicle headways decrease.

If AVs could operate at high speed with low headways, huge potential capacity increases.
IS THIS OUR FUTURE?
CHANGES IN CAR OWNERSHIP MODEL

What if this…

…increasingly became this
POTENTIAL TO CHANGE THE CAR OWNERSHIP PARADIGM
“The technology may be ready before society is.”

Bill Ford, Jr., Chairman, Ford Motor Company

December, 2015
HOW DO WE PLAN FOR THIS UNCERTAIN FUTURE?
For decades, travel forecasting based largely on extrapolating historic trends
Today: disruption in the trend line within our planning horizon.
UNKNOWN PLANNING IMPLICATIONS OF C/AV

- Changes to network capacity and efficiency?
- Changes in Vehicle-Miles Traveled (VMT)?
- Changes in car ownership?
- Changes in trip sharing?
- Changes in transit efficacy?
WHAT DO WE KNOW TODAY

VMT Growth Rate: 1.6%

Population Growth Rate: 0.8%
When driving time is “regained”, how far might you ride in your car to work?
CHANGES IN DEMAND & OPPORTUNITY

Will new segments of the population become “drivers?”
ONLY PROFOUND DISRUPTION WILL BREAK THE TREND

- Attitude shifts regarding driving, car ownership
- Attitude shifts regarding ride sharing/carpooling
- Changes to cost structure
- Changes in land use policy
- Strengthening of transit services using new technology
WHERE ARE THE ANSWERS?

OR

Scenario Planning

- Roadway capacity
- Travel behavior
- Vehicle occupancy
- Timeframe of introduction
- Rate of fleet penetration
MnDOT is asking “how will changes with C/AV impact our long-term plans for the corridor?”

Scenario planning and modeling framework under development
WHY DEPLOY CV TECHNOLOGIES TODAY?

➔ Further economic competitiveness
➔ Identify pathways to early user benefits
➔ Gain deployment experience before mandate
➔ Prepare your digital infrastructure
MDOT LOOKING TO MOBILE FOR NEAR-TERM BENEFITS

Data Entry Portal for Construction Personnel

Data Elements Including:
- Speed Limit
- Lane and Ramp Closures
- Workers Present
- Truck Restrictions

Data Collection and Processing

Message Development

DSRC

DVI

Internet

Cellular

Mobile Device

WSP PARSONS BRINCKERHOFF
YOU DO NOT HAVE TO PILOT TO PREPARE

➔ Follow industry activity/research
➔ Anticipate greater communications needs and plan it into projects where sensible
➔ Conduct readiness self-assessment using a Capability Maturity Model
This era will represent the biggest change in transportation since the advent of the automobile itself.

Embrace  Plan  Prepare
Thank You

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