



**I-LinCP**  
Institute for Leadership in Capital Projects

9th Annual I-LinCP Forum  
April 7, 2017 | Austin, TX

# WHO'S DRIVING? What's Coming in Autonomous and Connected Vehicles



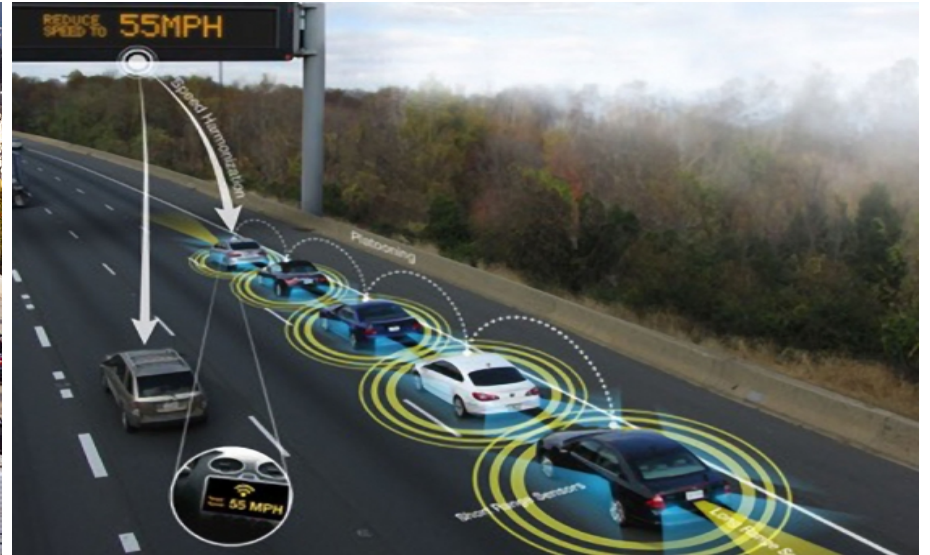
Presented by

**James M. Twomey, P.E.**

EVP – Surface Transportation Market



# Back to the Future

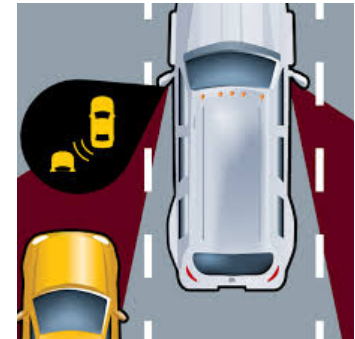


# How do we plan for transformation?

- Engage Stakeholders
- Scenario Planning
- Expert Interviews, including Cyber Security
- Ask Questions:
  - What is it and how quickly is it happening?
  - How will travelling change?
  - How will our cities and communities change?
  - What are the Economic consequences?
  - What are the Environmental consequences?
  - What are the Social consequences?

# What is AV/CV and how quickly is it happening?

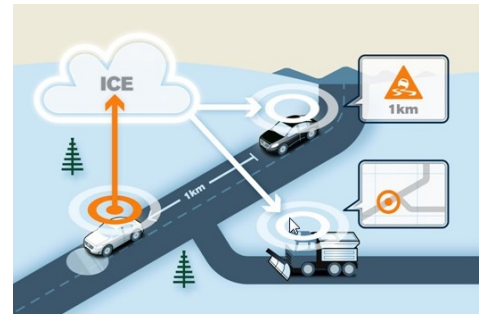
- 6 levels of vehicle automation:
  - Level 0 – fully human operated
  - Level 5 – fully automated (AV)
- In between:
  - Adaptive cruise control and braking
  - Sensors for blind spots, park assist, etc.
- Vehicle to Vehicle – cars talking to each other
- Peds and Bikers will participate in sensing
- Data, infrastructure, telecommunications will emerge in the form of Smart Cities
- No car maker has achieved Level 5, yet!
- New Players – Google accelerating the change





# How will traveling change?

- More travel:
  - Elderly/disabled/non-car owners access to AV
  - Urban areas – may increase, but with offsets
- Intra/Inter-regional – may increase  
- longer trips
- Greater efficiency and use of transportation infrastructure:
  - Smaller cars/trucks traveling closer together
  - V2V and V2I communications
- Transportation Planners – beginning to test theories and models, highly dependent on assumptions



# How will our cities and communities change?

- New mobility options will change transportation system performance
- Cities – Drive Sweden, a visionary look at transforming travel
- Outside of Cities
  - future of transportation land use is less clear
- Roads will undergo a transformation
- Need a series of implementation stages as we transition through to the future of transportation



# What are the economic consequences?

- Any disruptive technology will have economic consequences, and AV/CV is no different
- New industries will emerge to support new modes of transportation
- Old industries will become obsolete (i.e. bus/truck drivers)
- Timing of progress – dependent on politics and policy
- Transportation funding – like gas taxes will phase out
- Alternative funding – based on Big Data and Mobility Purchasing will become more prevalent
- Greatest challenge ahead – ensuring funding streams keep pace with needs, especially through transition period ahead



# What are the environmental consequences?

- Utopian and dystopian views of the future environment are being formed as we speak
- Increased travel could be a threat to Environment if AV/CV do not greatly reduce physical and carbon footprints
- Smaller electric cars – could dominate someday and offset effects to environment caused by increased travel
- Materials and design of our infrastructure will change leading to more sustainability





# What are the social consequences?

- Unprecedented safety in our travel
- Non-drivers will have mobility equal to today's drivers
- Indirect effects from:
  - Disappearance of ambulance chasers
  - Social benefits of elderly/disabled to work and/or volunteer



# Summary

- Start now and engage planners and stakeholders to understand the transformational transportation opportunities ahead
- Begin to implement regulatory changes to make the most of the AV/CV future.

