Autonomous Vehicles and the Future of Transportation

Credit: digidreamgrafix] /FreeDigitalPhotos.Net

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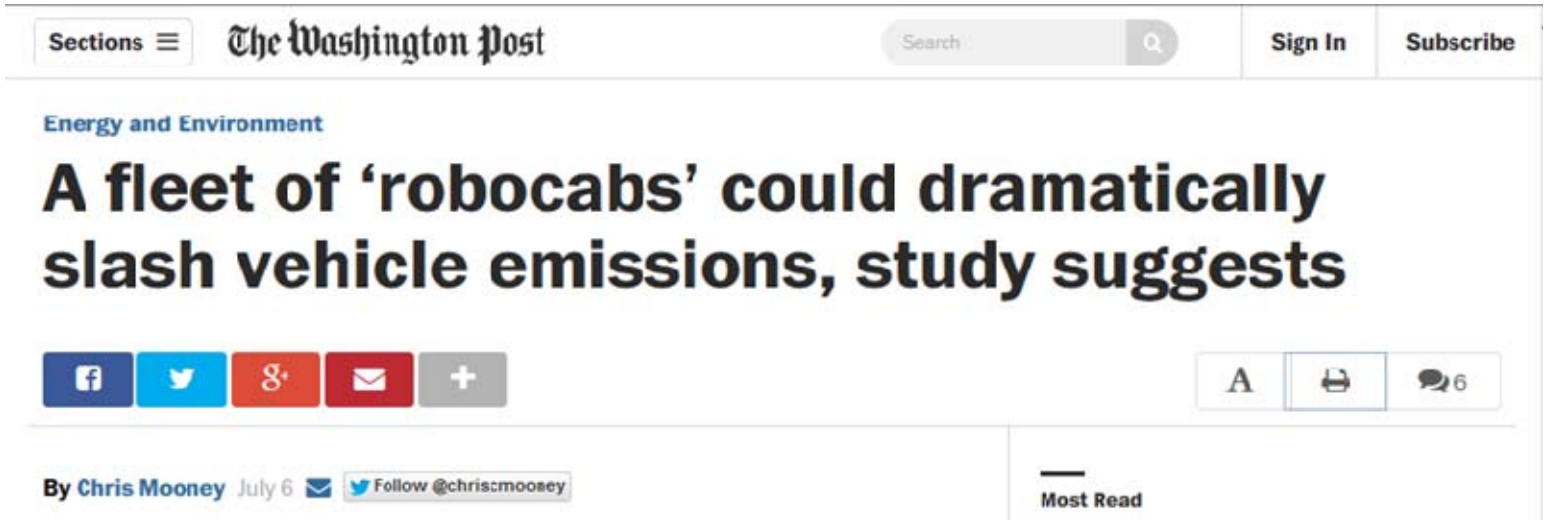
The Future: Vehicle Emissions Cut by 90%



The Future: Vehicle Emissions Cut by 90%

- 87 – 94 % reduction over current vehicles
  - Greenblatt, Jeffery, Saxena, Samveg, "Autonomous taxis could greatly reduce greenhouse-gas emissions" http://www.nature.com/nclimate/journal/vaop/ncurrent/abs/nclimate2685.html
- Up to 90% of current vehicles removed if AV "taxis" and high capacity transit implemented
  - OECD International Transport Forum, "Urban Mobility System Upgrade" http://www.internationaltransportforum.org/Pub/pdf/15CPB_Self-drivingcars.pdf
- IF Policies set strategy correctly
  - Eric Bruun & Moshe Givoni, "Sustainable mobility: Six research routes to steer transport policy" http://www.nature.com/news/sustainable-mobility-six-research-routes-to-steer-transport-policy-1.17860

How


WIRED
YIELD | FEB 2012
NO TRAFFIC JAMS
NO CRASHES
UNLIMITED TEXTING
R 1 3 5
2 4
YOUR NEXT CAR WILL DRIVE ITSELF
The unstoppable future of robotic vehicles, from Google to Mercedes.
by Tom Vanderbilt

?

Who Is Involved?

- Google:
  - Self-driving technology available to consumers within 5 years
- General Motors:
  - Driverless cars on the road by 2018
- Nissan:
  - Self-driving technologies by 2020
- William Clay Ford:
  - “Platooning” cars that drive themselves by 2025
- Aftermarket technology already being tested in California

Who Is Involved?

Manufacturers

Tech

Researchers

Mercedes-Benz

State and Local Policy Program

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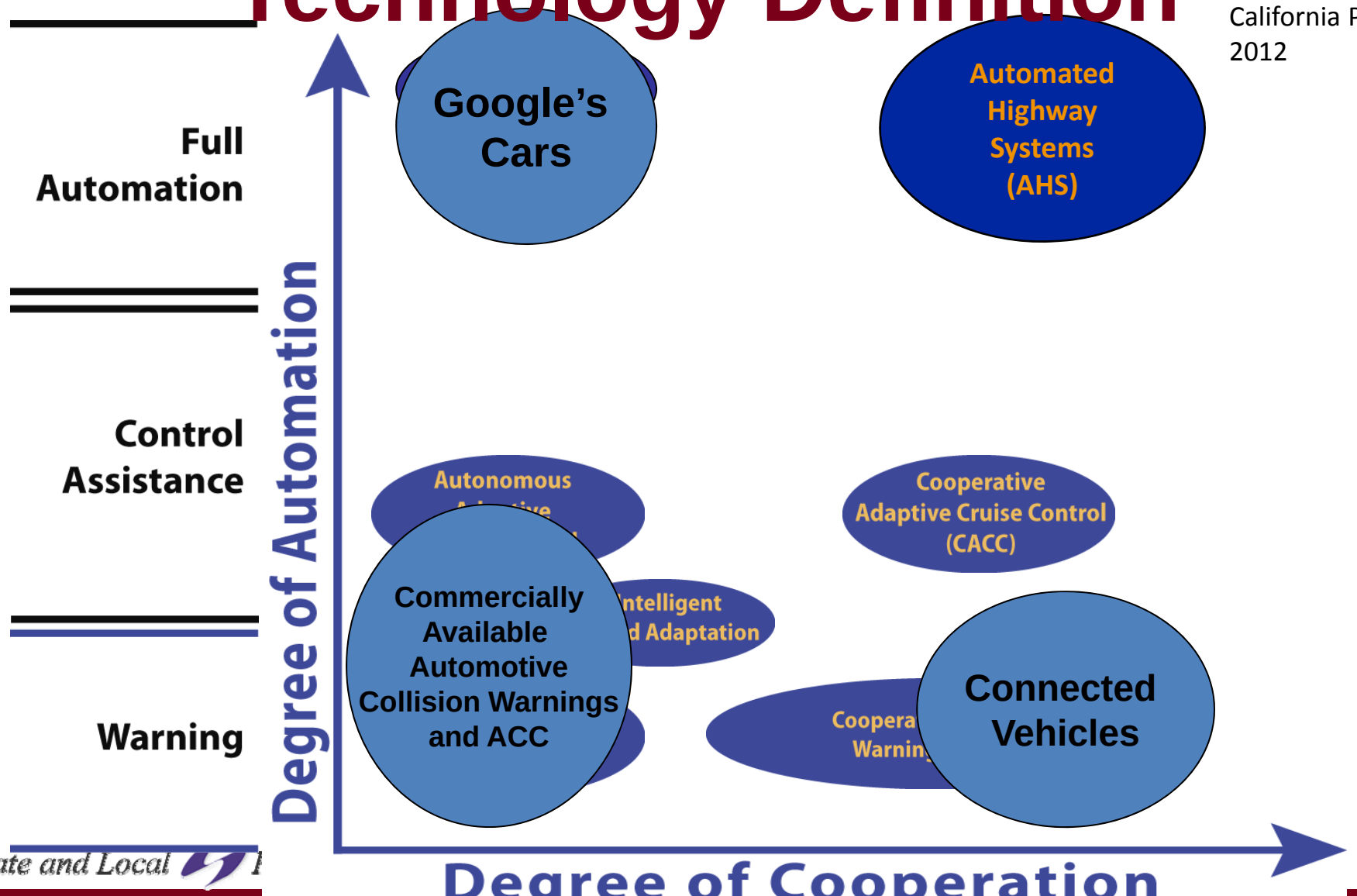
Role for Gov't?

- States with laws allowing testing:
  - Nevada, California, Florida and Michigan (also District of Columbia)
- States where testing is occurring without legislation
  - Texas, New Jersey
- NHTSA monitoring . . .
- More later . . .

Technology Definition

From Steven Shaldover, California PATH 2012



This is NOT a New Idea (1939 Futurama)

Why? Safety

Minnesota 2013

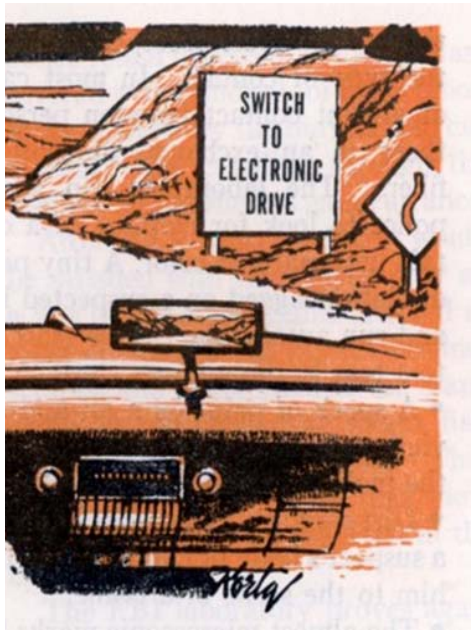
- 387 Fatalities
- 30,653 Injured
- 77,707 Traffic Crashes

Economic Cost more than $1.58 Billion

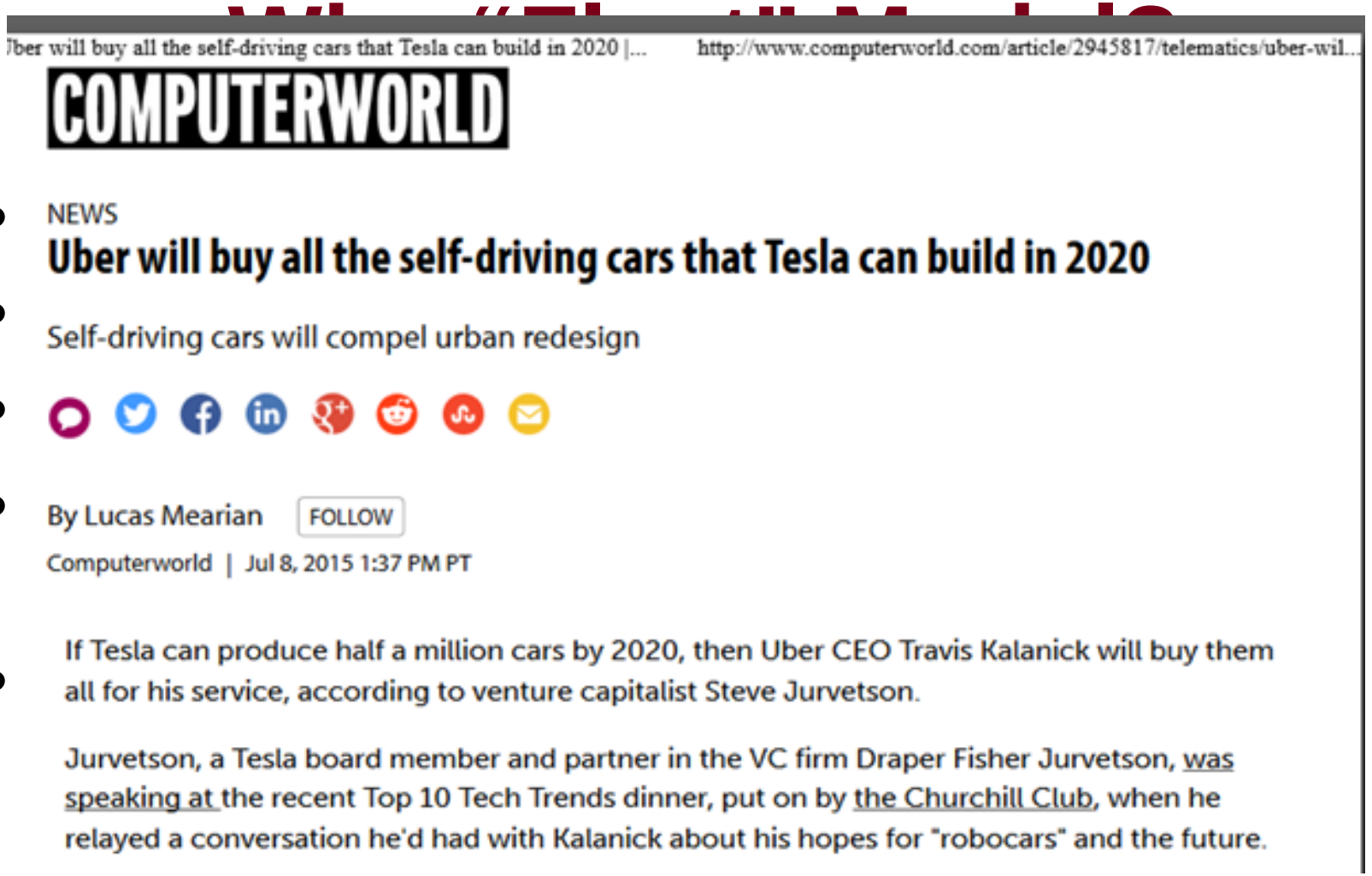
Up to 95% partly attributable to human error

Distracted driving in MN

- a factor in one in four crashes,
- at least 70 deaths
- 350 serious injuries



Credit: Science Digest Apr. 1958



Uber will buy all the self-driving cars that Tesla can build in 2020 |... http://www.computerworld.com/article/2945817/telematics/uber-wil...

COMPUTERWORLD

NEWS

Uber will buy all the self-driving cars that Tesla can build in 2020

Self-driving cars will compel urban redesign

By Lucas Mearian FOLLOW

Computerworld | Jul 8, 2015 1:37 PM PT

If Tesla can produce half a million cars by 2020, then Uber CEO Travis Kalanick will buy them all for his service, according to venture capitalist Steve Jurvetson.

Jurvetson, a Tesla board member and partner in the VC firm Draper Fisher Jurvetson, was speaking at the recent Top 10 Tech Trends dinner, put on by the Churchill Club, when he relayed a conversation he'd had with Kalanick about his hopes for "robocars" and the future.

Other Impacts: Land Use/Planning

- Parking
- Urbanization and Urban Sprawl

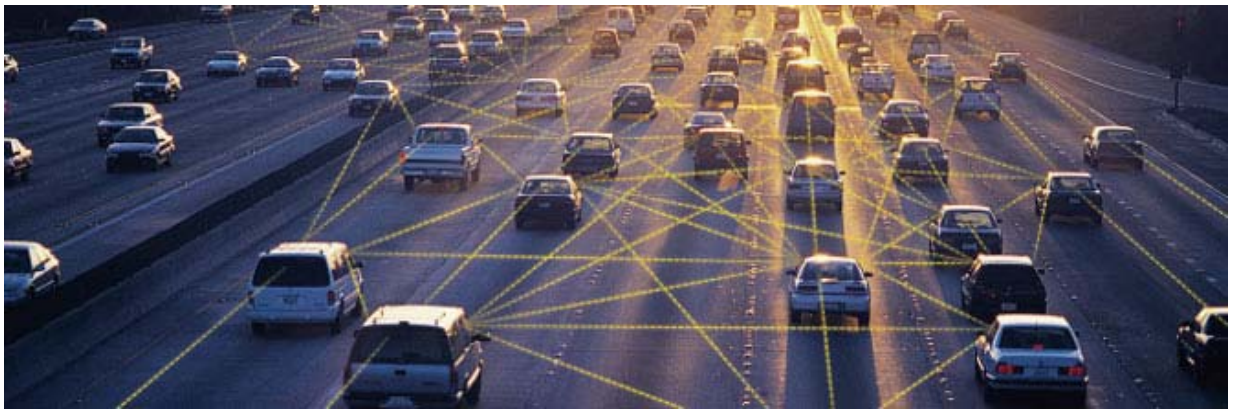
Other Impacts; Travel Behavior

- Changes in Cost of Travel
  - Less effort
  - More Time
  - More Efficient Gasoline Use
- Change in Behavior
  - Commute Length
  - Travel Frequency
  - Rule Adherence

Other Impacts: Highway Capacity

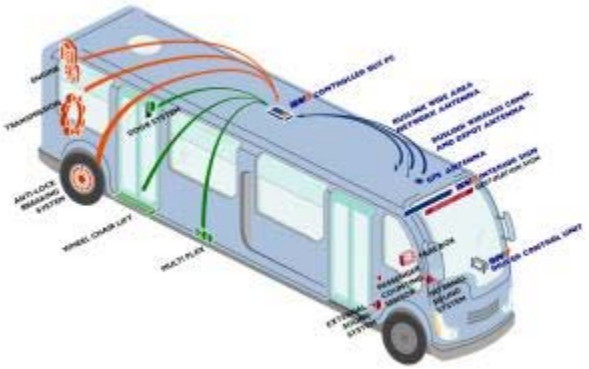
- Better Infrastructure Utilization
- Congestion Reduction
  - Increased Capacity
  - Gap reduction- low elasticity
    - Reduced Lane width
    - Smooth merging
- Intersection and Bottleneck Management

Credit: kapsch.net



Other Impacts: Other Modes

- Transit
  - Self-Driving Transit Vehicle more efficient than Self-Driving Car
  - Higher capacity still best in higher densities
- Bicycles
  - Cheaper, cleaner and more flexible than motorized vehicles



Other Impacts: Mobility and Access

- Expanded user base
  - Elderly
  - Disabled
  - Children?
- Increased Independence
- Decreased Cost of Travel

How Do We Get There?

- Review Current Laws for Restrictive Language (e.g. “Driver” defined as “person in physical control”)
- Engage Local Governments About Similar Restrictions (e.g. Land Use, transit contracts)
- Work with Unions, Taxi Operations to Smooth Transition
- Consider Subsidies for Those Less Able to Pay

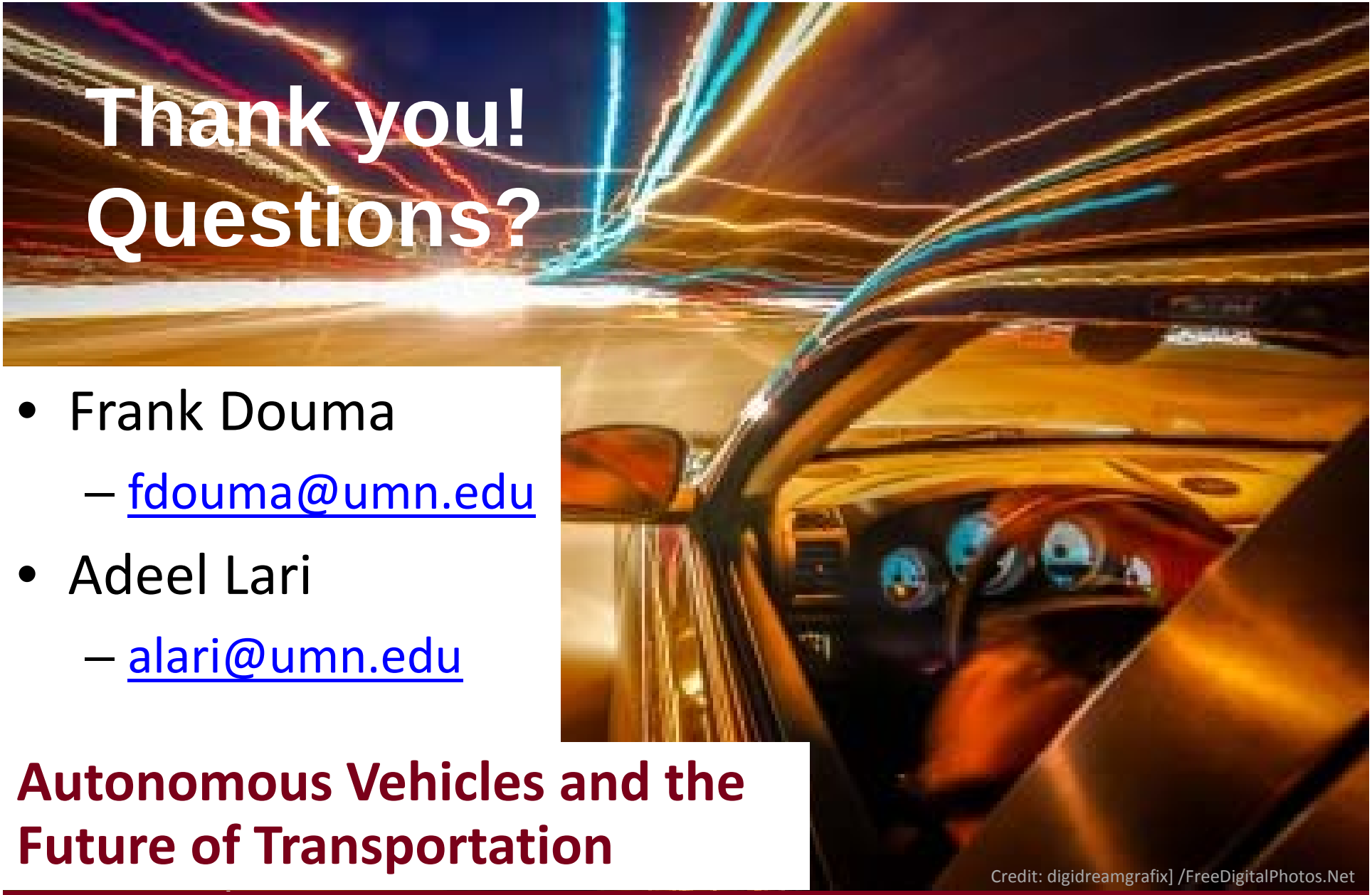
Want to Learn More?

- Soon to be Released *Minnesota Journal of Law, Science and Technology*
- 7 Papers on various aspects of Self-Driving Vehicles resulting from October 2014 Symposium
- Now available on-line: http://conservancy.umn.edu/handle/11299/172485/recent-submissions?offset=5

Want to Learn More?

- V2V
- Google
- Mercedes
- Audi

Thank you!
Questions?



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