Automated Vehicles: Status, Deployment and Impacts

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2016 Real Estate Conference
The Ohio State University
AV Update

From the Editors
One way to measure the ever-increasing momentum of AVs is the number of media pieces that feature AVs. CAVCOE is increasingly being invited to contribute comments to all media -- and there has been a substantial increase in the number of conferences we receive to speak at. Recently, CAVCOE members appeared on TV news items, an hour-long phone-in radio show, and we have been featured in several media. In April, we are speaking at a record six conferences in one week...
Agenda

• Autonomous Vehicles (AVs): status and deployment
  • Trends and general impacts of AVs
  • Impact
  • Conclusions
First Generation of AVs are here

• Semi-autonomous cars: Infiniti Q50, Mercedes S-Class
  – Intelligent cruise control (acceleration and braking)
  – Lane-keeping
  – Automatic parking
  – Pedestrian avoidance / automatic braking
Navya
EasyMile EZ10
Trial of RDM’s fully-automated taxis in Milton Keynes, UK
Suncor: Automated Heavy Hauler
AV Rollout

• Rollout will be incremental; two versions

• Technology companies: Google, RDM, Navya
  – Low-speed, electric, fully-automated, controlled environment
  – Then add speed, capability to drive on public roads

• Most major car manufacturers
  – Add Advanced Driver Assistance Systems (ADAS) to familiar models
  – Intelligent cruise control (acceleration and braking), lane-keeping, pedestrian avoidance, auto parking
  – Then evolve to full automation
## Timeline and Predictions

<table>
<thead>
<tr>
<th>Year</th>
<th>Event</th>
</tr>
</thead>
<tbody>
<tr>
<td>Now</td>
<td>First commercial, semi-autonomous, highway-capable cars</td>
</tr>
<tr>
<td></td>
<td>First commercial, 2nd generation, fully-automated shuttle bus services</td>
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<tr>
<td>2020</td>
<td>Automakers launch fully autonomous cars</td>
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<tr>
<td>2025</td>
<td>AV usage significant part of total VKTs</td>
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Fewer Collisions

- AVs have the potential to be much safer than human drivers
- 93% of collisions involve driver error
- Hopefully, we can reduce collisions by 80%
“Crash Proof Cars”

• There is no such thing !!!
• All hardware, software fails occasionally
• 7% of collisions have nothing to do with the driver
  – Will happen whether a human or computer is driving
• There will be collisions – but far fewer
Development Challenges

- Cyber-security
- Reversing
- Extreme weather
- Work zones
- Traffic signals AND police officer
- Road repairs
- Pedestrian prediction
- Facial reading
- Rare events
Regulatory and other Challenges

• Federal regulations re vehicle standards, etc.
• State regulatory frameworks
• Municipal planning for AVs
• Insurance
• Legal
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Automated Vehicles
Connected Vehicles
Electric Vehicles

ACE Vehicles
Transportation-as-a-Service (TaaS)

• “Mobility-as-a-service”
• “Personalized mass transit”
• Trend away from personal car ownership
  – To use of fully-automated taxis
  – Merging of regular taxis, car rental and transit business models
• Significant mode of transportation in future
• Call one via smartphone
• Slightly more expensive than premium transit ticket
Impacts on Private Sector

• Corporate business plans
  – Auto industry: OEMs, Tier 1 and 2s,
  – Auto insurance
  – Electricity generation, distribution
  – Forest products
  – Oil industry
  – Parking
  – Resource industry
  – Taxis, rental cars
  – Technology industry
  – Trucking: long-haul and local
Direct Employment Displacement

- Auto-body repair
- Auto-insurance
- Bus drivers
- Courier service drivers
- Driving instructors / trainers
- Health staff involved with organ and tissue donation
- Lawyers involved with car collision litigation
- Medical staff involved in car crash victim rehabilitation
- Road safety professionals
- Taxi drivers / chauffeurs
- Tow-truck drivers
- Traffic police
- Transport truck drivers
- Trauma surgeons
Impacts on Government

• All levels / most departments
  – Finance, economy and GDP
  – Health-care
  – Electricity generation, distribution
  – National security
  – Policies on technology, industry, R&D
  – Policing
  – Transit including transit infrastructure
  – Transportation policies and regulations
  – Urban planning, housing
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Impact of AVs: US

- US Transportation Secretary Anthony Foxx in *Thinking Highways*:
  - Widespread adoption of AVs:
    - Five-fold increase in highway capacity
    - Traffic incidents would practically disappear
    - Elderly and people with disabilities will have improved mobility
  - “It is up to the public sector, including agencies like USDOT, to begin sorting out [the regulatory and performance standards] issues now. There is no excuse for waiting.”
Helsinki’s Vision

• Helsinki aims to transcend conventional public transport by allowing people to purchase mobility in real time, straight from their smartphones

• The hope is to furnish riders with an array of options so cheap, flexible and well-coordinated that it becomes competitive with private car ownership not merely on cost, but on convenience and ease of use

Source: The Guardian
Eric Garcetti, LA Mayor on AVs

• “While we're building out this rail network, we simultaneously should be looking at, I think, bus rapid transit (BRT’s) lanes, not because BRTs are good—of course they've been proven successful—but because autonomous vehicles are going to be here,” he said. "How do you spend billions of dollars on fixed rail, when we might not own cars in this city in a decade or a decade and a half?”

• Such bus lanes could come in handy when the age of autonomy arrives, he added. "A bus lane today, may be a bus and an autonomous vehicle lane tomorrow.”

Source: CityWatch LA http://www.citywatchla.com/lead-stories-hidden/7923-la-s-mayor-promises-driverless-cars-within-the-decade
Municipalities

• Mobility services will have a significant impact on local transportation, transit

• Recommend that municipalities and transit companies develop a 21st Century vision for transportation
  – Visions that incorporates the impact of AVs
Infrastructure Planning

• AVs may not need special infrastructure
• AVs may trigger changes in infrastructure
Urban Governance, Planning

• Changes in where people live and work
  – More intensification or more sprawl?

• Change in design of homes

• Reduced focus on Transit Oriented Development

• Less pollution + less parking spaces = greener cities

• AV-only zones

• Improvements to ranking on liveability index
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Conclusions

• AVs will lead to huge, disruptive changes to our lives, society and the economy

• Our cities and our world will look very different in 2030 compared to today

• Recommend that this change be actively managed by all levels of government to maximize the benefits to everybody in 21st century
Follow-up

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